

Drainage Service Department

Monthly Environmental Monitoring & Auditing report for

Contract No.DC/2009/22

Drainage Improvement in Shuen Wan, Tai Po – Contract 1

September 2013

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EXECUTIVE SUMMARY

This is the thirty first monthly Environmental Monitoring and Audit (EM&A) Report for the drainage improvement works in Shuen Wan, Tai Po under Drainage Services Department Contract No. DC/2009/22 entitled “Drainage Improvement Works in Shuen Wan, Tai Po – Contract 1”. This report concludes the impact monitoring for the activities undertaken during the period from 1st September 2013 to 30th September 2013. The major site activities in this reporting period were mainly installation of minor E&M equipment, E&M testing, construction of green roof, construction of road & drain in pumping station, construction of boundary wall and installation of cladding, backfilling and reinstatement and remove sheetpiles.

The Environmental Team (ET) is responsible for the EM&A works required in the EM&A manual (revision 3). Site inspections were carried out on weekly basis to investigate and audit the equipment and work methodologies with respect to pollution control and environmental mitigation. The weekly inspections records and photos taken were kept.

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

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 6 abnormal incidents of water quality criteria were recorded in this reporting month. During the reporting period, construction of intake structure was conducted near the Wai Ha River. Proper mitigation measures were implemented by contractor to avoid site water releasing to the Wai Ha river and no particular observation of defective site activities were found causing water contamination. The exceedances of Turbidity and SS were believed to be mainly attributed by adverse weather and natural fluctuation. And, since the recorded levels of Turbidity and SS at control station had also exceeded its baseline action or limit level, the exceedances recorded at W2 were unlikely to be related to the Project.

No exceedance of A/L level was reported for the monitoring of hydrological characteristics in the reporting period.

The ECA was handed over to AFCD on 16th October 2012. And, the monitoring for *Pavetta hongkongensis* was completed.

Visual and landscape monitoring has been conducted for the project. Details of the observations are referred to sections 7.

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

Site works proposed to be carried out in the upcoming month at Area A & B are refer to section 2.2.

It is expected that noise, air and water quality impacts will be resulted from the works. ET has reminded the contractor to provide environmental pollution control measures wherever necessary and to keep a good environmental management at site practice. The recommended mitigation measures proposed for the project as well as implementation status are refer to section 12.3.

The ET will continue to implement the environmental monitoring & audit programme in accordance with the EM&A Manual (revision 3) and Environmental Permit requirement.

1 Introduction

This is the thirty first monthly Environmental Monitoring and Audit (EM&A) Report for the drainage improvement works in Shuen Wan, Tai Po under Drainage Services Department Contract No. DC/2009/22 entitled “Drainage Improvement Works in Shuen Wan, Tai Po – Contract 1”. The site layout plan is shown in **Appendix A**. The Environmental Team, Environmental Pioneers & Solutions Limited was appointed by Kwan Lee – Kuly Joint Venture to prepare the report. The report is to be submitted to the Contractor, the Engineer and the IEC.

This report presents the results of the environmental monitoring of the project activities conducted within the reporting period from 1st September 2013 to 30th September 2013. This report included the noise monitoring, water quality monitoring, hydrological characteristics monitoring, visual and landscape monitoring, and regular site inspections once per week for verification of implementation of the mitigation measures as recommended in the Environmental Permit (EP-303/2008) (EP), EM&A Manual (revision 3) and the Contractor’s Environmental Management Plan (EMP).

2 Construction Stage

2.1 Construction activities in the reporting period

Major activities in the reporting period included the followings:

Area A.:

- Installation of E&M equipment
- E&M Testing
- Construction of Green Roof
- Construction of Road & Drain in Pumping Station
- Construction of Boundary Wall
- Installation of Cladding

Area B.:

- Backfilling and reinstatement
- Remove sheetpiles

2.2 Construction activities for the coming month

Proposed key construction works in the coming months will include:

Area A (Pumping Station)

1. Green Roof of Pumping Station
2. Construction of Boundary Wall & Fencing
3. Road in Pumping Station
4. Installation of minor E&M equipment
5. Planting and landscape soft work
6. Installation of Cladding
7. Rectification works at Ting Kok Road
8. Remaining works at intake structure

Area B (Tung Tsz Nursery)

1. Reinstatement

2.3 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 3.3, 4.3, and 5.3 for noise, water quality, and hydrological characteristics respectively.

3 Noise Monitoring

3.1 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 D**) 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 3.5.2, 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.

3.2 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 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 3.2.1 summarizes the equipment list for noise monitoring

Table 3.2.1 Equipment List for Noise Monitoring

| Equipment | Manufacturer & Model No. | Precision Grade | Qty |
|---|---------------------------|-------------------------------------|-----|
| Integrated sound level meter | Svantek 955 | IEC 61672 Type 1 IEC 1260 Type 1 | 1 |
| Windscreen | Microtech gefell model W2 | N/A | 1 |
| Acoustical calibrator | Svantek SV30A | IEC 942 Type 1 | 1 |
| Wind speed indicator | Kestrel K1000 | N/A | 1 |
| Remarks: Calibration details of the sound level meter is given in Appendix C for reference | | | |

3.3 Monitoring Locations

According to the Environmental Monitoring and Audit manual, impact noise monitoring for contract 1 was undertaken at two locations during the construction phase of the project. The proposed monitoring locations are summarized in Table 3.3.1. Figure 3.3.1 shows the Noise Monitoring Locations.

Noise measurement at each monitoring location was taken at a point 1m from the exterior of the selected premises and at a height of 1.2m above ground with no disturbance to the dweller and least obstructed view.

Table 3.3.1 Noise Monitoring Locations during Construction Phase

| Noise Monitoring Station | Location |
|--------------------------|--|
| M1 | 14, Shuen Wan Chim Uk |
| AL1 | Joint Village Office for Villages in Shuen Wan, Tai Po |

In accordance with the requirements in the EM&A manual (revision 3), 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 (i.e. 1900-2300, 2300-0700 of next day and Sundays / general holiday), impact monitoring that comprises 3 consecutive $L_{eq(5minutes)}$ would be carried out.

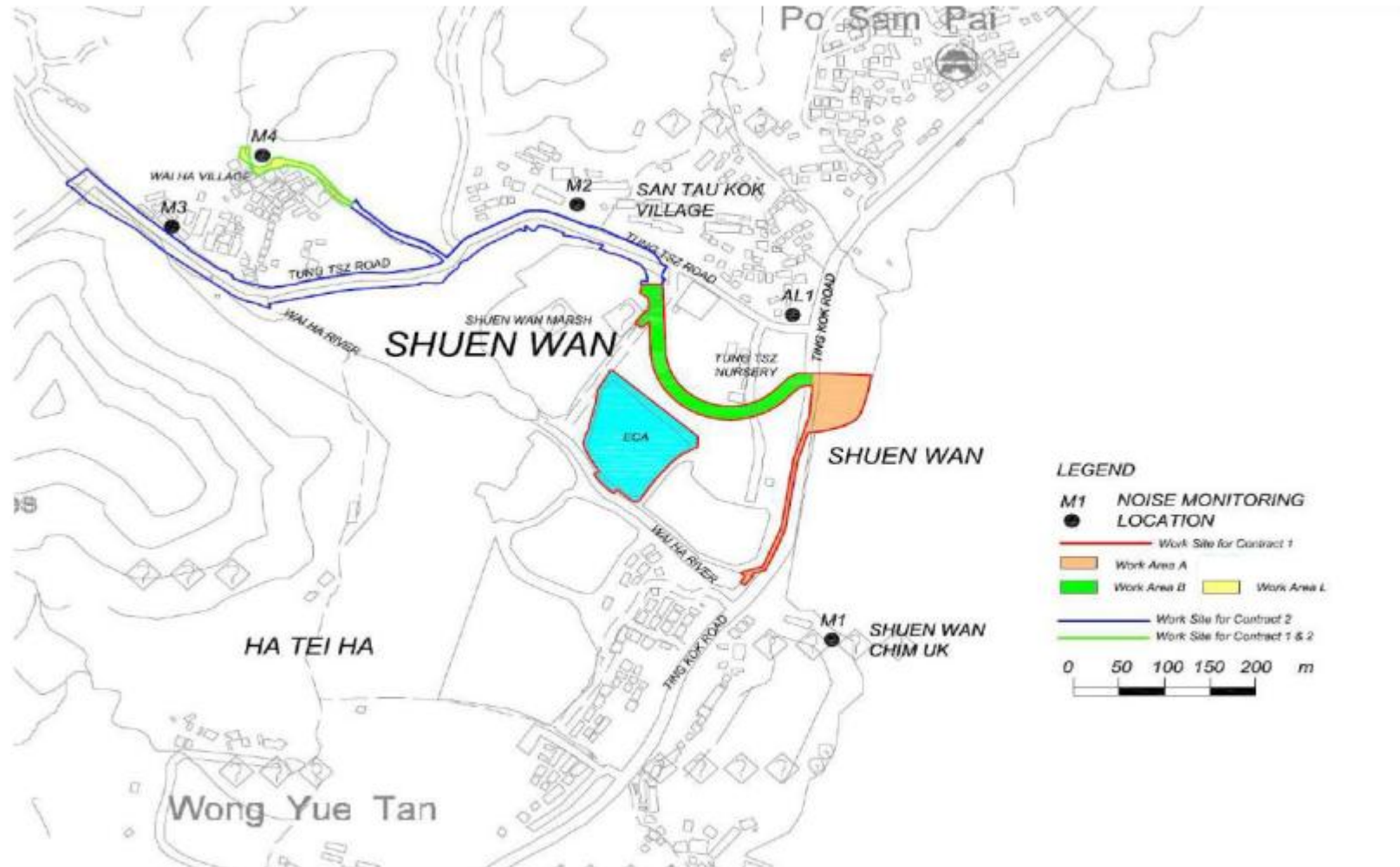


Figure 3.3.1 Impact noise monitoring locations

3.4 Monitoring Results and Interpretation

Relevant details of the noise monitoring results are presented in Table 3.4.1. The results of M1 ranged between 64.3dB (A) and 66.8dB (A), and AL1 ranged between 66.1dB (A) and 69.1dB (A), were within the limit levels and therefore, no exceedance was found.

| Table 3.4.1 Noise Monitoring Results for the reporting period | | | | | | | |
|---|------------------------|-----------|-------|---------------------------|----------------|------------|---------|
| Location | Parameter | Date* | Time | L _{Aeq} dB(A) | Limit dB(A) | Exceedance | Weather |
| M1 | L _{eq} 30mins | 4-Sep-13 | 13:15 | 66.5 | 75 | N | Sunny |
| M1 | L _{eq} 30mins | 11-Sep-13 | 11:00 | 63.5 | 75 | N | Cloudy |
| M1 | L _{eq} 30mins | 18-Sep-13 | 12:40 | 61.5 | 75 | N | Cloudy |
| M1 | L _{eq} 30mins | 25-Sep-13 | 11:25 | 60.9 | 75 | N | Sunny |
| AL1 | L _{eq} 30mins | 4-Sep-13 | 13:55 | 64.5 | 75 | N | Sunny |
| AL1 | L _{eq} 30mins | 11-Sep-13 | 11:45 | 70.1 | 75 | N | Cloudy |
| AL1 | L _{eq} 30mins | 18-Sep-13 | 13:20 | 69.9 | 75 | N | Cloudy |
| AL1 | L _{eq} 30mins | 25-Sep-13 | 12:10 | 68.9 | 75 | N | Sunny |

Remarks: Raw datasheet for noise monitoring are attached in **Appendix D** for reference.

3.5 Action and Limit level for Construction Noise

The Action and Limit (A/L) levels for construction noise are defined in Table 3.5.1. Should non-compliance of the criteria occur, action in accordance with the Action Plan in Table 3.5.2 should be carried out.

There was no exceedance recorded in the reporting period.

Table 3.5.1 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. | | |

3.6 Monitoring Schedule for the next reporting period

Noise monitoring schedule is proposed to be carried out on 2nd, 9th, 16th, 23rd, and 30th of October 2013.

Table 3.5.2 Event / Action Plan for Construction Noise

| EVENT | | | | |
|--------------|---|---|--|--|
| | ET Leader | IEC | ER | CONTRACTOR |
| Action Level | 1. Notify IEC and Contractor. 2. Carry out investigation. 3. Report the results of investigation to the IEC, ER and Contractor. 4. Discuss with the Contractor and formulate remedial measures. 5. Increase monitoring frequency to check | 1. Review the analysed results submitted by the ET. 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly. 3. Supervise the implementation of remedial measures. | 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. Check remedial measures | 1. Submit noise mitigation proposals to IEC. 2. Implement noise mitigation proposals. |

| | | | | |
|--------------------|---|--|--|---|
| <p>Limit Level</p> | <ol style="list-style-type: none"> 1. Notify IEC, ER, EPD and Contractor. 2. Identify source. 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 IEC, ER and EPD the causes and actions taken for the exceedances. 7. Assess effectiveness of Contractor's remedial actions and keep IEC, ER and EPD | <ol style="list-style-type: none"> 1. Discuss amongst ER, ET, and Contractor on the potential remedial actions. 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the 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. Check remedial measures properly implemented. 5. If exceedance | <ol style="list-style-type: none"> 1. Take immediate action to avoid 2. Submit proposals for remedial actions to IEC 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 Water Monitoring

4.1 Water Quality Monitoring Parameters and Methodology

Turbidity in Nephelometric Turbidity Unit (NTU), and Dissolved Oxygen (DO) in mg/L, temperature, and pH measurements were in-situ measurements and suspended solids measurements were performed by a HOKLAS accredited laboratory using recommended reference method APHA 2540D.

4.2 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.

The measurements were performed by a portable and weatherproof multi-meter, model TOA-DKK WQC-24. The equipment was calibrated and verified by certified laboratory every 3 months to ensure they perform to the same level of accuracy as stated in the manufacturer's specification. Detailed calibration records of the multi-meter were shown in **Appendix C** for reference

Suspended solids were 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.

4.3 Monitoring Locations

In accordance with the EM&A Manual (revision 3), monitoring stations for contract 1 were established at two locations, which are summarized in Table 4.3.1.

Table 4.3.1 – Water Quality Monitoring Stations

| Monitoring Station | Location | Coordinates |
|---------------------------|--|----------------------|
| W1 | Between the Shuen Wan Marsh and ECA | E:839301 N:836386 |
| W2 | Between Tolo Harbour and Proposed Penstock | E:839542 N:836184 |

As illustrated in Figure 4.3.1, W1 served as the control station while W2 was the monitoring location of water quality.

According to the approved proposal of revision for Action/Limit Level Criteria of Water Quality Monitoring, two reference points (C1 & C2) were added.

Should the water quality parameters monitoring results at the monitoring station W2 exceed the water quality criteria, the water quality monitoring data of two reference points (C1 and C2) will be used as the supplementary information. The monitoring data of C1 should be used for comparison with the monitoring data of W2 that taken at flood tide; and the monitoring data of C2 should be used for comparison with the monitoring data of W2 that taken at ebb tide. The comparison of water quality between W2 and C1 at flood tide and between W2 and C2 at ebb tide is to prove whether influence of water quality is caused by the construction activities. The details of C1 and C2 are referred to the previous submission.

In accordance with the EM&A Manual (revision 3), measurements shall be taken at 3 water depths, namely, 1m below water surface, mid-depth and 1m above river bed, except where the water depth less than 6m, the mid-depth station may be omitted. Should the water depth be less than 3m, only the mid-depth station will be monitored.

As the depth of water was less than 3m, water samples were collected at mid-depth of each proposed monitoring stations for measurements and sample collection.

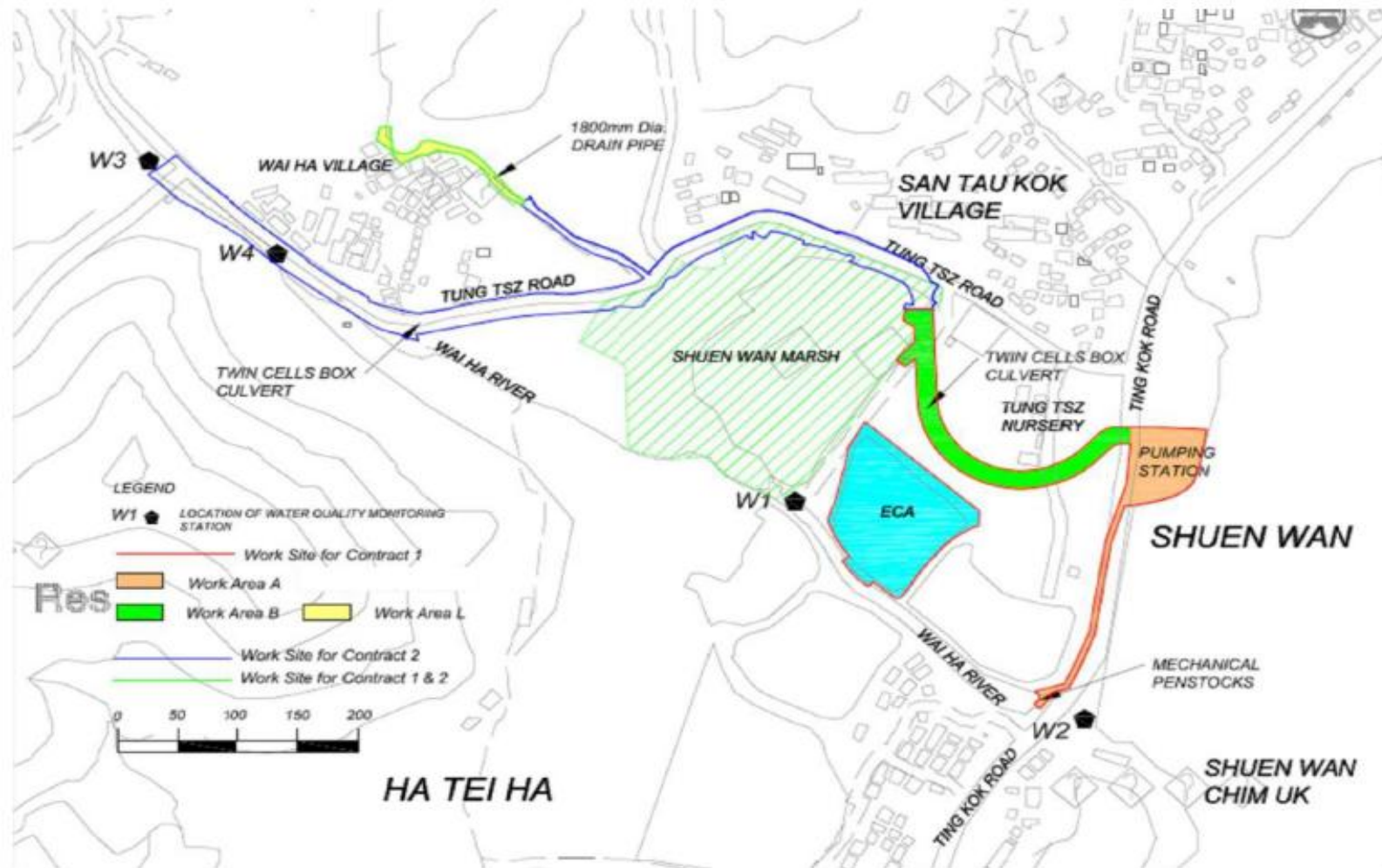


Figure 4.3.1 Water Quality Monitoring Locations

4.4 Monitoring Frequency

Impact water quality monitoring for each monitoring station were performed at mid-flood or mid-ebb tides for 3 days per week during the course of the construction river works.

Monitoring were carried out on 2nd, 4th, 6th, 9th, 11th, 13th, 16th, 18th, 23rd, 25th, 27th and 30th of September 2013.

4.5 Monitoring Results and Interpretation

Water quality monitoring was carried out twelve times in this reporting month. Detailed on-site measurements are shown in **Appendix E**. Table 4.5.1 presents consolidated results throughout the reporting month.

There were 6 abnormal incidents of water quality limits (Turbidity) were recorded in this reporting month according to the established action and limit levels. ET has arranged site investigations for the abnormal incidents. No construction activities were carried out at the river bed. During the reporting period, construction of intake structure was conducted near Wai Ha River. Proper mitigation measures were implemented by contractor to avoid site water releasing to the Wai Ha river and no particular observation of defective site activities were found causing water contamination. The exceedances of Turbidity and SS were believed to be mainly attributed by adverse weather and natural fluctuation, since the recorded levels of Turbidity and SS at control station had also exceeded its baseline action or limit level, the exceedances recorded at W2 were unlikely to be related to the Project.

The water condition of Wai Ha River is presented in photo attached in **Appendix M**.

Table 4.5.1 Summary of Water Quality Monitoring Results of this reporting month

| | Average of Monitoring Results | | | | | |
|----|--------------------------------------|---------------------------|-----------|-----------------------------------|--------------------------------|-----------------------------------|
| | <i>Temperature</i> (°C) | <i>Turbidity</i> (NTU) | <i>pH</i> | <i>Dissolved Oxygen</i> (mg/L) | <i>Dissolved Oxygen</i> (%) | <i>Suspended Solids</i> (mg/L) |
| W1 | 24.8 | 15.5 | 7.88 | 7.58 | 93.2 | 18.3 |
| W2 | 28.2 | 3.0 | 7.9 | 7.42 | 77.5 | 7.5 |
| C1 | 29.9 | 9.0 | 8.15 | 8.1 | 88.0 | 12.0 |
| C2 | 26.2 | 23.2 | 8.22 | 7.14 | 86.5 | 31.0 |

Table 4.5.2 Interpretations of abnormal incidents recorded in the reporting month

| Date | Tide | Parameter | Interpretations |
|-------------|-------------|------------------|--|
| 4/9/2013 | Ebb | Turbidity | Exceedance was caused by natural fluctuation |
| 11/9/2013 | Ebb | Turbidity | Exceedance was caused by natural fluctuation |
| 16/9/2013 | Ebb | Turbidity | Exceedance was caused by adverse weather |
| | | SS | |
| 18/9/2013 | Ebb | Turbidity | Exceedance was caused by natural fluctuation |
| | | SS | |
| 23/9/2013 | Ebb | Turbidity | Exceedance was caused by adverse weather |
| | | SS | |
| 25/9/2013 | Ebb | Turbidity | Exceedance was caused by natural fluctuation |

4.6 Action and limit level for Water Quality

Based on the criteria stipulated in EM&A manual (revision 3) and baseline water quality monitoring data obtained, the A/L levels are shown in Table 4.6.1, Table 4.6.2. The A/L levels for W1 were ignored since W1 functions as the control station for contract 1. 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 4.6.3 should be taken.

Table 4.6.1 Action and Limit Levels for Water Quality at All Monitoring Stations

| Parameters | Action | Limit |
|------------------|--|--|
| DO in mg/L | 5 percentile of baseline data | 4 mg/L |
| pH | N/A | 6.0 – 9.0 |
| SS in mg/L | 95 percentile of baseline data or 120% of upstream control station's SS | 99 percentile of baseline data or 130% of upstream control station's SS |
| Turbidity in NTU | 95 percentile of baseline data or 120% of upstream control station's Turbidity | 99 percentile of baseline data or 130% of upstream control station's Turbidity |

Table 4.6.2 Action and Limit Levels for Water Quality at All Monitoring Stations

| Parameters | Monitoring Stations (Flood Tide) | | | | Monitoring Stations (Ebb Tide) | | | |
|-----------------|----------------------------------|-------------|--------------|-------------|--------------------------------|-------------|--------------|-------------|
| | W1 | | W2 | | W1 | | W2 | |
| | Action Level | Limit Level | Action Level | Limit Level | Action Level | Limit Level | Action Level | Limit Level |
| DO (mg/L) | 8.07 | 8.07 | 7.81 | 7.69 | 7.12 | 7.02 | 6.77 | 6.31 |
| pH | N/A | 6.0-9.0 | N/A | 6.0-9.0 | N/A | 6.0-9.0 | N/A | 6.0-9.0 |
| SS (mg/L) | 7.7 | 8.1 | 7.7 | 8.6 | 10.5 | 10.9 | 9.4 | 9.9 |
| Turbidity (NTU) | 4.9 | 5.3 | 1.7 | 1.8 | 4.2 | 4.7 | 3.0 | 3.5 |

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 4.6.3 Event and action Plan for Water Quality

| Event | ET Leader | IEC | ER | Contractor |
|---|---|--|--|---|
| ACTION LEVEL | | | | |
| Action level being exceeded by one sampling day | <ol style="list-style-type: none"> 1. Repeat in-situ measurements to confirm findings; 2. Identify reasons for non-compliance and source(s) of impact; 3. Inform IEC, Contractor and Engineer; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, Engineer and Contractor; 6. Ensure mitigation measures are implemented. <p>Repeat measurement on next day of</p> | <ol style="list-style-type: none"> 1. Discuss mitigation measures with ET, Engineer and Contractor; 2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly; 3. Assess effectiveness of implemented mitigation measures. | <ol style="list-style-type: none"> 1. Discuss proposed mitigation measures with IEC, ET and Contractor; 2. Make agreement on mitigation measures to be implemented; 3. Assess effectiveness of implemented mitigation measures. | <ol style="list-style-type: none"> 1. Inform Engineer and confirm in writing notification of the non-compliance; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes in working methods; 5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days; 6. Implement agreed mitigation measures. |

| | | | | |
|--|---|--|--|---|
| | exceedance. | | | |
| Action level being exceeded by more than two consecutive sampling days | <ol style="list-style-type: none"> 1. Repeat in-situ measurements to confirm findings; 2. Identify reasons for non-compliance and source(s) of impact; 3. Inform IEC, Contractor and Engineer; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, Engineer and Contractor; 6. Ensure mitigation measures are implemented. 7. Prepare to increase the monitoring frequency to daily; | <ol style="list-style-type: none"> 1. Discuss mitigation measures with ET, Engineer and Contractor; 2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly; 3. Assess effectiveness of implemented mitigation measures. | <ol style="list-style-type: none"> 1. Discuss proposed mitigation measures with IEC, ET and Contractor; 2. Make agreement on mitigation measures to be implemented; 3. Assess effectiveness of implemented mitigation measures. | <ol style="list-style-type: none"> 1. Inform Engineer and confirm in writing notification of the non-compliance; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes in working methods; 5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days; 6. Implement agreed mitigation measures. |

| | | | | |
|--|---|--|---|---|
| | 8. Repeat measurement on next day of exceedance. | | | |
| LIMIT LEVEL | | | | |
| Limit level being exceeded by one sampling day | 1. Repeat in-situ measurements to confirm findings; 2. Identify reasons for non-compliance and source(s) of impact; 3. Inform EPD, IEC, Contractor and Engineer; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, Engineer and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring | 1. Discuss mitigation measures with ET, Engineer and Contractor; 2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly; 3. Assess effectiveness of implemented mitigation measures. | 1. Discuss proposed mitigation measures with IEC, ET and Contractor; 2. Request Contractor to critically review the working methods; 3. Make agreement on mitigation measures to be implemented; 4. Assess effectiveness of implemented mitigation measures. | 1. Inform Engineer and confirm in writing notification of the non-compliance; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes in working methods; 5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days; 6. Implement agreed mitigation |

| | | | | |
|---|---|--|--|---|
| | frequency to daily until no exceedance of Limit level. | | | measures. |
| Limit level being exceeded by more than two consecutive sampling days | <ol style="list-style-type: none"> 1. Repeat in-situ measurements to confirm findings; 2. Identify reasons for non-compliance and source(s) of impact; 3. Inform EPD, IEC, Contractor and Engineer; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, Engineer and Contractor; 6. Ensure mitigation measures are implemented. 7. Increase the monitoring frequency to daily until no exceedance of | <ol style="list-style-type: none"> 1. Discuss mitigation measures with ET, Engineer and Contractor; 2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly; 3. Assess effectiveness of implemented mitigation measures. | <ol style="list-style-type: none"> 1. Discuss proposed mitigation measures with IEC, ET and Contractor ; 2. Request Contractor to critically review the working methods; 3. Make agreement on mitigation measures to be implemented; 4. Assess effectiveness of implemented mitigation measures; 5. Consider and if necessary | <ol style="list-style-type: none"> 1. Inform Engineer and confirm in writing notification of the non-compliance; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes in working methods; 5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days; 6. Implement agreed mitigation measures; |

| | | | | |
|--|---------------------------------------|--|--|--|
| | Limit level for two consecutive days. | | instruct Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit Level. | 7. As directed by the Engineer, slow down or stop all or part of the construction activities until no exceedance of Limit level. |
|--|---------------------------------------|--|--|--|

4.7 Monitoring Schedule for the next reporting period

Water quality monitoring schedule is proposed to be carried out on 2nd, 4th, 7th, 9th, 11th, 16th, 18th, 21st, 23rd, 25th, 28th and 30th of October 2013.

5 Hydrological Characteristics Monitoring

5.1 Hydrological Characteristics Monitoring Parameters and Methodology

Impact monitoring of hydrological characteristics was undertaken to establish hydrological characteristics of sections of Wai Ha River adjacent to Drainage Improvement Works in Shuen Wan, Tai Po.

The hydrological characteristics of sections of Wai Ha River were measured by water flow rate and depth.

5.2 Monitoring Equipment

Monitoring performed by a portable echo-sounder, model Greyline Stingray. The equipment was calibrated and verified by certified laboratory or manufacturer every year to ensure they perform to the same level of accuracy as stated in the manufacturer's specification.

Calibration Certificate of the multi-meter is given in **Appendix C**.

5.3 Monitoring Locations

In accordance with the EM&A Manual (revision 3), monitoring stations for contract 1 were established at two locations and summarized in Table 5.3.1.

Table 5.3.1 – Water Quality Monitoring Stations

| Monitoring Station | Location | Coordinates |
|---------------------------|-------------------------------------|----------------------|
| H1 | Between the Shuen Wan Marsh and ECA | E:839301 N:836386 |
| H2 | Route to Sam Kung Temple | E:839163 N:836433 |

As illustrated in Figure 5.3.1, H2 served as the control station while H1 was the monitoring location of hydrological characteristics.

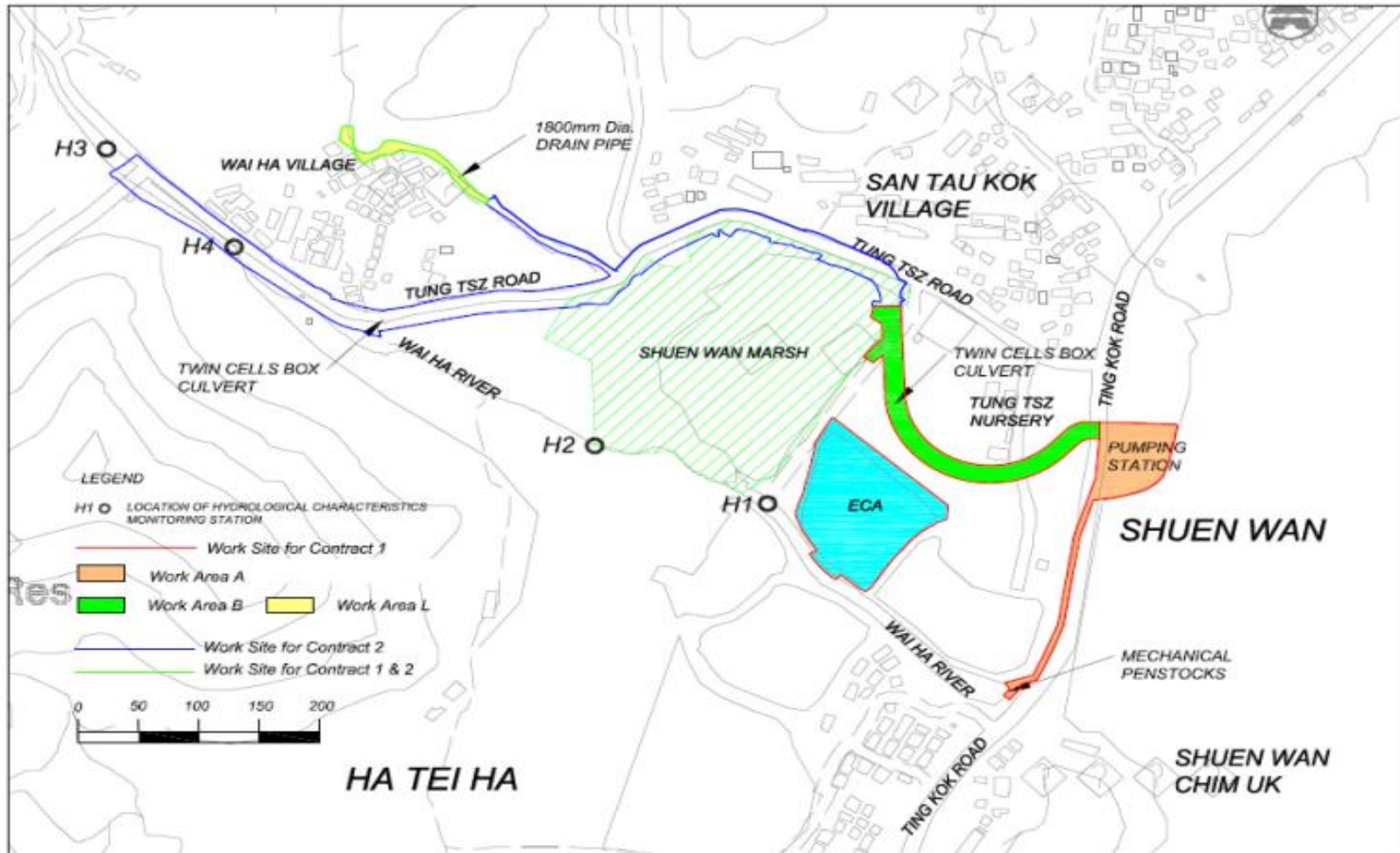


Figure 5.3.1 Hydrological Characteristics Monitoring Locations

5.4 Monitoring Frequency

Hydrological characteristics monitoring for each monitoring station were performed at mid-flood and mid-ebb tides for once per week during the course of the construction river works.

Monitoring was carried out on 6th, 13th, 18th and 27th of September 2013.

5.5 Monitoring Results and Interpretation

Hydrological characteristics monitoring was carried out four times in this reporting period. The monitoring results are summarized in Table 5.5. All results were within the action and limit levels, therefore, no exceedance was found.

Table 5.5 Summary of Water Quality Monitoring Results

| | Average of Monitoring Results | |
|-----------|-------------------------------|-------------------------------------|
| | Water Depth (m) | Water Flow Rate (m ³ /s) |
| H1(Flood) | ~0.42 | ~0.094 |
| H1(Ebb) | ~0.20 | ~0.188 |
| H2(Flood) | ~0.39 | ~0.659 |
| H2(Ebb) | ~0.26 | ~0.754 |

Details of the monitoring data were presented in **Appendix F**.

5.6 Action and limit level for Hydrological Characteristics

The Action and Limit levels for all monitoring stations are summarized in Table 5.6.1, which would be applied for compliance assessment of hydrological characteristics for this project. If the hydrological characteristics monitoring results at any impact stations exceeded the criteria, the actions in accordance with the Event and Action Plan in Table 5.6.2 should be taken.

Table 5.6.1 Action and Limit Levels for Hydrological Characteristics at All Monitoring Stations

| Parameters | Action | Limit |
|-------------------------------------|--|--|
| Water Depth at Mid-flood (m) | 0.08 | 0.06 |
| Water Depth at Mid-ebb (m) | 0.08 | 0.06 |
| Water Flow Rate (m ³ /s) | 120% of control station's water flow rate on the same day of measurement | 140% of control station's water flow rate on the same day of measurement |

Table 5.6.2 Event and action Plan for Hydrological Characteristics

| Event | ET Leader | IEC | ER | Contractor |
|--|---|---|---|--|
| ACTION LEVEL | | | | |
| Action level being exceeded by one sampling day | <ol style="list-style-type: none"> Repeat in-situ measurements to confirm findings; Identify reasons for non-compliance and source(s) of impact; Inform IEC, Contractor and Engineer; Check monitoring data, Contractor's working methods and any excavation works or dewatering processes; Discuss mitigation measures with IEC, Engineer and Contractor; Ensure mitigation measures are implemented. Repeat measurement on next day of exceedance. | <ol style="list-style-type: none"> Discuss mitigation measures with ET, Engineer and Contractor; Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly; Assess effectiveness of implemented mitigation measures. | <ol style="list-style-type: none"> Discuss proposed mitigation measures with IEC, ET and Contractor; Make agreement on mitigation measures to be implemented; Assess effectiveness of implemented mitigation measures. | <ol style="list-style-type: none"> Inform Engineer and confirm in writing notification of the non-compliance; Rectify unacceptable practice; Check working methods and any excavation works or dewatering processes; Consider changes in working methods and plans; Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days; Implement agreed mitigation measures. |
| Action level being exceeded by more than two consecutive sampling days | <ol style="list-style-type: none"> Repeat in-situ measurements to confirm findings; Identify reasons for non-compliance and source(s) of impact; Inform IEC, | <ol style="list-style-type: none"> Discuss mitigation measures with ET, Engineer and Contractor; Review proposals on mitigation | <ol style="list-style-type: none"> Discuss proposed mitigation measures with IEC, ET and Contractor; Make agreement | <ol style="list-style-type: none"> Inform Engineer and confirm in writing notification of the non-compliance; Rectify |

| | | | | |
|---|---|---|--|---|
| | <p>Contractor and Engineer;</p> <p>4. Check monitoring data, Contractor's working methods and any excavation works or dewatering processes;</p> <p>5. Discuss mitigation measures with IEC, Engineer and Contractor;</p> <p>6. Ensure mitigation measures are implemented.</p> <p>7. Prepare to increase the monitoring frequency to daily;</p> <p>8. Repeat measurement on next day of exceedance.</p> | <p>measures submitted by Contractor and advise the Engineer accordingly;</p> <p>3. Assess effectiveness of implemented mitigation measures.</p> | <p>on mitigation measures to be implemented;</p> <p>3. Assess effectiveness of implemented mitigation measures.</p> | <p>unacceptable practice;</p> <p>3. Check working methods and any excavation works or dewatering processes;</p> <p>4. Consider changes in working methods and plans;</p> <p>5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days;</p> <p>6. Implement agreed mitigation measures.</p> |
| LIMIT LEVEL | | | | |
| <p>Limit level being exceeded by one sampling day</p> | <p>1. Repeat in-situ measurements to confirm findings;</p> <p>2. Identify reasons for non-compliance and source(s) of impact;</p> <p>3. Inform AFCD, IEC, Contractor and Engineer;</p> <p>4. Check monitoring data, and Contractor's working methods and any excavation works or dewatering processes;</p> <p>5. Discuss</p> | <p>1. Discuss mitigation measures with ET, Engineer and Contractor;</p> <p>2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly;</p> <p>3. Assess effectiveness of implemented mitigation</p> | <p>1. Discuss proposed mitigation measures with IEC, ET and Contractor;</p> <p>2. Request Contractor to critically review the working methods;</p> <p>3. Make agreement on mitigation measures to be implemented</p> | <p>1. Inform Engineer and confirm in writing notification of the non-compliance ;</p> <p>2. Rectify unacceptable practice;</p> <p>3. Check working methods and any excavation works or dewatering processes;</p> <p>4. Consider changes in working</p> |

| | | | | |
|--|---|---|---|--|
| | <p>mitigation measures with IEC, Engineer and Contractor;</p> <p>6. Ensure mitigation measures are implemented;</p> <p>7. Increase the monitoring frequency to daily until no exceedance of Limit level.</p> | <p>measures.</p> | <p>d;</p> <p>4. Assess effectiveness of implemented mitigation measures.</p> | <p>methods and plans;</p> <p>5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days;</p> <p>6. Implement agreed mitigation measures.</p> |
| <p>Limit level being exceeded by more than two consecutive sampling days</p> | <p>1. Repeat in-situ measurements to confirm findings;</p> <p>2. Identify reasons for non-compliance and source(s) of impact;</p> <p>3. Inform AFCD, IEC, Contractor and Engineer;</p> <p>4. Check monitoring data, and Contractor's working methods and any excavation works or dewatering processes;</p> <p>5. Discuss mitigation measures with IEC, Engineer and Contractor;</p> <p>6. Ensure mitigation measures are implemented.</p> <p>7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days.</p> | <p>1. Discuss mitigation measures with ET, Engineer and Contractor;</p> <p>2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly;</p> <p>3. Assess effectiveness of implemented mitigation measures.</p> | <p>1. Discuss proposed mitigation measures with IEC, ET and Contractor;</p> <p>2. Request Contractor to critically review the working methods;</p> <p>3. Make agreement on mitigation measures to be implemented;</p> <p>4. Assess effectiveness of implemented mitigation measures;</p> <p>5. Consider and if necessary instruct Contractor to slow down or to</p> | <p>1. Inform Engineer and confirm in writing notification of the non-compliance ;</p> <p>2. Rectify unacceptable practice;</p> <p>3. Check working methods and any excavation works or dewatering processes;</p> <p>4. Consider changes in working methods and plans;</p> <p>5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days;</p> <p>6. Implement agreed mitigation</p> |

| | | | | |
|--|--|--|---|--|
| | | | stop all or part of the construction activities until no exceedance of Limit Level. | 7. As directed by the Engineer, slow down or stop all or part of the construction activities until no exceedance of Limit level. |
|--|--|--|---|--|

5.7 Monitoring Schedule for the next reporting period

Hydrological characteristics monitoring schedule is proposed to be carried out on 4th, 11th, 18th and 25th of October 2013.

6 Ecological Monitoring of ECA

6.1 Ecological Monitoring of ECA

6.1.1 Scope of Monitoring

The ECA was formally handed over to AFCD on 16th October 2012. The wire mesh fences and gate at the northwestern part of the ECA were fixed and reinstated by the Main Contractor. No site visit and ecological monitoring by the Wetland Specialist from the Main Contractor and the Ecologist from the IEC respectively were carried out in November 2012. The post-establishment phase monitoring and management of the ECA have commenced and to be undertaken by the AFCD in accordance with the monitoring and management items stipulated in the latest approved EM&A Manual of the Project

6.2 Monitoring Results

According to Table 6.17 of the EM&A Manual, ecological monitoring of the ECA will be carried out by qualified ecologists during the 1-year wetland establishment period of the ECA before handing over to AFCD for their post establishment monitoring. Establishment phase of the ECA began in September 2011, ecological monitoring programme was conducted and monitoring data was presented in respective monthly EM&A reports. Ecological monitoring programme ended in September 2012 and hence there will be no ECA report attached in EM&A reports.

6.2.1 Description of monitoring of transplanted *Pavetta hongkongensis* in Ecological Compensatory Area

According to the latest Transplantation Proposal, monitoring of the transplanted individual of *Pavetta hongkongensis* will cover a period of 12 months after the transplanting exercise. The monitoring will be conducted once a week in the first 3 months and once in each subsequent month in the remaining monitoring period. Health condition and growth of each transplanted individuals will be assessed and photographic records will be undertaken for each inspection.

6.2.2 Description of transplanted *Pavetta hongkongensis* and remarks

The monitoring of the transplanted individual of *Pavetta hongkongensis* has been covered a period of 12 months. Therefore, the monitoring for *Pavetta hongkongensis* was not carried out in this reporting period.

7 Landscape and Visual

7.1 Introduction

The Landscape and Visual Monitoring of the Project is conducted to fulfill Clauses 5.2 and 5.4 of EP-303/2008 and the monitoring requirements in accordance with Section 7 of the approved updated EM&A Manual (approved by EPD on 31st May 2012) of the Project. A Baseline Review on updating the landscape and visual condition, and the mitigation measures of the Project (including Contracts 1 and 2 of the Project) was undertaken before the commencement of the Project. The review findings were updated in the Baseline Environmental Monitoring Report submitted to the EPD on 14th February 2011.

This monthly monitoring report will detail the scope of landscape and visual monitoring work, monitoring findings and observations, and any recommendations and advice on proper implementation of the landscape mitigation measures in the works areas under Contract 1 of the Project.

7.2 Scope of Monitoring

7.2.1 Monitoring Objectives

Landscape and Visual Monitoring of the Project should be conducted in a bi-weekly basis for checking the design, implementation and maintenance of the landscape and visual mitigation measures throughout the construction phase and in a quarterly basis during operational phase of the Project. Observations of any potential conflicts between the proposed mitigation measures and the project works carried out by the Contractors should be recorded. Recommendation and advice on proper implementation of the landscape mitigation measures should be provided to the Contractor for minimizing any potential impacts on the landscape and visual elements.

7.2.2 Monitoring during Construction Phase

The following landscape and visual mitigation measure should be implemented during

the construction phase of the project to minimize the potential impacts:

- Visual Screen – Use of hoardings as visual screens for the construction in the works areas;
- Contaminant/ Sediment Control – Use of temporary barriers, covers and drainage provision around the construction works as contaminant/ sediment control to prevent the contaminants and sediments from entering the sensitive water-based habitats;
- Pollution Control – Implementation of pollution control measures to minimize any adverse environmental impacts to the surrounding habitats;
- Liaison with Nursery – Liaison with the nursery operator as necessary to minimize any adverse impact to the daily operation and plant holding capacity of the nursery;
- Existing Trees within Works Area – Maintenance and protection of the existing trees, especially their crowns, trunks and roots, within work sites; and
- Construction Light – Provision of construction light should be controlled at night to avoid excessive glare to the surrounding villages and to Plover Cove.

7.2.3 Monitoring during Operational Phase

The following landscape and visual mitigation measure should be implemented during the operational phase of the project to minimize the potential impacts:

- Viewing area formation by planting with shrubs, grasses and benches along the area;
- Architectural design of the pump house will help it fit into the existing suburban, natural to semi-natural surroundings;
- Landscape design of pump house by providing sufficient planting around its boundary fence;
- Enhancement planting along Tung Tsz Road with shrubs/ trees of suitable species to help protect the stream and marshes;
- Construction of box culvert should be with at least 1.0m soil depth for enhancement planting;
- Transplanting of existing affected trees to adjacent locations should be carried out;
- Preparation for transplanting is needed to allow sufficient time for root pruning and rootball preparation prior to transplanting; and
- Reinstatement of affected area should be carried out to check that the works areas are properly reinstated.

7.3 Landscape and Visual Monitoring Results

7.3.1 Monitoring Date(s)

This monthly Landscape and Visual Monitoring (September 2013) was conducted to cover only Areas A, B and C of Contract 1 of the Project. The bi-weekly monitoring was conducted on 5th and 19th September 2013.

Area C (i.e. Ecological Compensatory Area (ECA)) was formally handed over to AFCD on 16th October 2012 for management and maintenance. No access into the ECA is allowed after the handover.

All photos stated in this section are recorded in **Appendix G**.

The bi-weekly monitoring for Contract 2 was also undertaken on 5th and 19th September 2013. The monitoring findings and recommendation will be submitted in a separate Monthly EM&A Report under Contract DC/2010/02.

7.3.2 Visual Screen

No follow-up action by the Contractor is required as from the *Monthly EM&A Report for August 2013*.

Observation

Construction hoardings have been erected in Area A along the entire site boundary. Temporary construction hoardings have been erected around Wai Ha River estuary since the building of an automatic mechanical penstock at the area (**Photo 1**). As observed in September 2013, the permanent boundary wall was establishing along the western side of Area A (**Photo 2**), while those along the northern side was also removed. The main entrance of Area A has also been shifted from the southern corner to the northern corner along the western side of the area (**Photo 3**). Since January 2013, the site hoardings along the eastern boundary of Area A have been removed due to the active construction works for the installation of drainage pipe and the associated structure.

A section of temporary hoarding has been erected from northwest to southwest parts (i.e. Phase 1 construction works) of Tung Tsz Nursery in Area B (approximately along the works boundary from Trees U42 to U62). Another section of temporary hoarding has been erected from southwest to eastern parts (i.e. Phase 2 construction works) of the Nursery since May 2012 and connected with Phase I construction works area. An open section with no construction work has been maintained as a major road access inside Tung Tsz Nursery for their daily operations. As observed in September 2013, temporary construction hoardings had been established along the eastern end of Phase 1 with an entrance, while the western end of Phase 2 works area were still aligned with temporary construction barriers (**Photo 4**).

The gate of the adjacent housing area near the previous main entrance of Area C has been reinstated at its original location by the Contractor since November 2012.

Recommendation

No specific recommendation is required.

7.3.3 Contaminant/ Sediment Control

No follow-up action by the Contractor is required as from the *Monthly EM&A Report for August 2013*.

Observation

Area A

Provision of dust control measure (such as wheel washing facilities) has been maintained at the exit point of Area A.

According to the Main Contractor, groundwater or used water from the excavated sites or box culvert were pumped into the silt/sand removal facilities connected with the pollution control system stored in Area B. The filtered water was then drained to the sedimentation tank placed adjacent to the fenced Area C and subsequently discharged into the manhole

adjacent to Area C.

Area B

Dust control measure (such as wheel washing facilities) has been resumed since October 2012. The construction vehicles were washed at the entrance of the access road leading towards the works area at northwestern part of Tung Tsz Nursery. Used water and groundwater from the built box culvert and the construction site within the Nursery were collected and mostly drained directly to the sedimentation tanks placed adjacent to the fenced Area C. The water was further filtered through the silt/sand removal facilities in the tank before discharging into the manhole adjacent to Area C. Since the major excavation and construction works in Area B were almost finished in September 2013, no significant discharge of groundwater or used water from Area B was noted during the inspections in September 2013.

Area C

Area C was formally handed over to AFCD on 16th October 2012 for management and maintenance. The pond of the ECA has connected with the Wai Ha River directly. No water resulting from normal wetland maintenance practice was pumped out from the ECA.

Recommendation

The Contractor should regularly check the condition and locations of the drainage pipes and ensure that all used water should be appropriately filtered and discharged to the manholes/other discharge points agreed by the Engineer and EPD.

7.3.4 Pollution Control

All used water for washing vehicular wheel and construction works was filtered and drained to the manholes and drainage points, as following the recommendation stated in *Monthly EM&A Report for August 2013*

Observation

Area A

Provision of vehicular wheel washing facilities (such as provision of hose for washing the vehicles) was observed at the exit point of Area A to reduce the contamination to the surrounding habitats in Plover Cove. According to the Main Contractor, groundwater or used water from the excavated sites or box culvert were pumped into the silt/sand removal facilities connected with the pollution control system stored in Area B. The filtered water was then drained to the sedimentation tank placed adjacent to the fenced Area C and subsequently discharged into the manhole adjacent to Area C.

No direct discharge of water into the adjacent Wai Ha River was observed from the works area for building the automatic mechanical penstock at Wai Ha River estuary as only minor civil works were carried out.

Area B

All used water was collected and drained directly to the sedimentation tank placed adjacent to the fenced Area C. This water was further filtered through the silt/sand removal facilities in the tank before discharging into the manhole adjacent to Area C. Since the major excavation and construction works in Area B were almost finished in September 2013, no significant discharge of groundwater or used water from Area B was noted during the inspections in September 2013.

Area C

Area C was formally handed over to AFCD on 16th October 2012 for management and maintenance. The pond of the ECA has been connected to Wai Ha River directly as following the scheme design of Habitat Compensatory Plan. No direct discharge of turbid water into the adjacent Wai Ha River was observed through the fence of Tung Tsz Nursery **(Photo 5)**.

Recommendation

The Contractor should regularly check the condition and locations of the drainage pipes and ensure that all used water should be appropriately filtered and discharged to the manholes/other discharge points agreed by the Engineer and EPD. This is to avoid any potential contamination to the vegetation in Shuen Wan marsh and other vegetated/marinated areas adjacent to the active works area.

7.3.5 Liaison with Nursery

Active construction works within Tung Tsz Nursery has been extended to the east of the nursery in connection with Ting Kok Road since May 2012. All of these active construction works area were demarcated with construction hoardings.

The transplanted tree *Grevillea robusta* (U58) was considered to be a dead specimen which has been closely monitored on a bi-weekly basis before.

The works practice and maintenance of trees within the nursery generally follow the recommendation as stated in Monthly EM&A Report for August 2013. Any observed issues related to the liaison with the nursery are highlighted in this section.

Observation

The temporary hoardings have been erected from northwest to southwest parts of Tung Tsz Nursery in Area B since April 2011. Phase 2 construction works have continued and temporary hoardings have been erected since May 2012. The major road access within the Nursery has been maintained to minimize the impact on the nursery's daily operation resulting from the construction works. As mentioned before in Section 3.2.3, temporary construction hoardings had been established along the eastern end of Phase 1 with an entrance, while the western end of Phase 2 works area were still aligned with temporary construction barriers (Photo 4).

Regular monitoring for all transplanted and retained trees within the nursery was conducted on a bi-weekly basis. The transplanted tree *Grevillea robusta* (U58) was

considered to be a dead specimen as no sign of regenerated leaves was observed along the trunk and the remaining branches (Photo 6). There was still no replacement of the broken bamboo stake, which has been reported in Monthly EM&A Report for July 2013, in September 2013. Given the broken bamboo stake provides no support to the dead tree with a significant wound on the middle tree trunk, there is a potential risk of whole tree failure, with its falling zone covering the assess path used by any visitors/ nursery workers in the Nursery.

As reported in the previous Monthly EM&A Reports, the retained tree U68 (*Gmelina arborea*) was found fallen after the severe typhoon in July 2012, with its leaning trunk being pruned and removed in August 2012 (as reported in Monthly EM&A Report for August 2012). Regular removal of generated watersprouts has been noted throughout the monitoring period and newly generated watersprouts were still observed in September 2013.

No muddy water was found leaking out through the temporary hoarding into the nursery.

Recommendation

The works area and the construction works should be properly managed and implemented without influencing the daily operation of the nursery (i.e. provide enough access road and works area for the nursery operation).

All transplanted trees should be watered regularly (e.g. at least every two days during the dry season) by the appointed landscape contractor. Meanwhile, the Contractor should prevent forming waterlogged areas or leakage of used water from the active construction works area into the Nursery. This is to prevent causing any nuisance to the nursery's daily operation.

For *Grevillea robusta* (U58), the dead specimen should be removed from the site as soon as possible. Prior to the tree removal, any access underneath its tree fall zone should be restricted for the safety concern of the nursery operation.

The appointed landscape contractor and the Contractor should closely monitor the health

conditions of all transplanted/relocated and retained trees throughout the construction period of the Project.

7.3.6 Existing Trees within Works Areas

Maintenance of the existing trees within the works areas generally follows the recommendations as stated in *Monthly EM&A Report for August 2013*, except the observations as highlighted in the following sections.

Observation

Area A

E38 (*Melaleuca cajuputi* subsp. *cumingiana*) was found to be relocated by the contractor from the northern corner to the northern part next to the temporary site office in Area A in late August 2013 (Photo 7). As inspected in September 2013, the tree was in very poor health condition with only dry and wilt leaves in its canopy. Due to the poor transplantation skill applied on this tree, the tree bark and cambium layer along the trunk were damaged and the tree bark along the damaged tree trunk appeared very dry and shrunken (Photo 8).

The tree to be transplanted E16 (*Bombax ceiba*) has been relocated to the southern side of Area A next to the site hoarding since July 2012. The tree was in fair condition in September 2013 (Photo 9).

Two trees (*Melaleuca cajuputi* subsp. *cumingiana*) have been found in the northeastern part of Area A since February 2013. New foliage was found regenerated in the canopy of one of them (tree tag named as “T27”) as inspected in June 2013. No tree tag was found on another tree and its health condition was fair.

The leaning trunk of E61 (*Macaranga tanarius* var. *tomentosa*) has been burlapped and supported by two steel poles since May 2013. Though new leaves have regenerated along the leaning trunk, this tree is still in poor health condition and under physiological stress (Photo 10). Its structural condition is poor.

Damaged tree trunk on E55 (*Macaranga tanarius* var. *tomentosa*) was reported in Monthly EM&A Report for April 2013. The wound on the trunk of E55 has been burlapped since May 2013. The upper section of the tree trunk has broken since June 2013. The tree was still in poor condition with most of its foliage as watersprouts only (Photo 11). The tree was located just next to some on-going construction works.

Extensive excavation and site formation works were noted at the eastern part of Area A. The works were carried out next to the retained trees along the eastern side, which the trees were only protected by a few temporary construction barriers established as tree protection zone. Mechanical damage on the tree canopies is possible.

No other significant damages on the crowns, trunks and roots of the remaining trees resulting from the construction machinery were observed during the monitoring in September 2013 in Area A.

Area B

As highlighted in the Section “Liaison with Nursery”, the transplanted tree *Grevillea robusta* (U58) was considered to be a dead specimen as no sign of regenerated leaves was observed along the trunk and the remaining branches (Photo 6). There was still no replacement of the broken bamboo stake.

No recovery signs have been observed on the relocated trees U34, U35 and U37 and they are regarded as dead specimens (Photos 12-14); the dead tree trunks of U34 and U35 have collapsed since August 2013. Temporary storage of construction materials was still observed close to the tree group of U34, U35, U37 and other living trees (e.g. U44) in Area B (Photo 15).

Half of the planter of U47 (*Terminalia catappa*) was found broken in August 2013, and its roots and planter soil were exposed in the air. As inspected in September 2013, the planter was not yet repaired (Photo 16).

U67 (*Cassia fistula*) has been retained at its original planter. A sign of suspected termite infestation was observed close to its trunk flare (Photo 17). The tree was still in fair health

and structural condition as observed in September 2013.

U64 (*Bauhinia purpurea*) has been transplanted to its final receptor site in 2011. The tree appears in generally fair condition, but decayed wood and cracked tree bark have been observed at the western side of the tree trunk in the recent few months (Photos 18-19).

U55 (*Pterocarpus indicus*) has also been transplanted to its final receptor site in 2011 and pest control was applied on this tree in early 2013 due to the sign of termite infestation. Its health condition has been improved (Photo 20), however, a few long dead branches and twigs were observed. Close monitoring on this tree is still required.

The relocated tree U77 (*Terminalia catappa*) in Phase 2 of Area B was suspected to be dead as no leaves have been observed in the canopy since its relocation, and loose bark was found along the trunk (Photo 21). U76 and U78 (*Terminalia catappa*) remained in marginally fair condition with regenerated leaves concentrated and development of watersprouts in the upper canopy. Dieback twigs were still observed in September 2013 and minor tree bark tearing was observed at the trunk flares of these trees (Photos 22-23).

Most of the construction materials piled close to the trunk flare of A43 was removed in July 2013, but surplus soil was still found around the trunk flare (Photo 24).

A temporary shelter was still observed next to the relocated tree U74 (*Delonix regia*), in which the shelter has been established since April 2013 (Photo 25). No significant damage on the tree trunk and canopy caused by the shelter was observed. No more construction materials were stored close to the trunk flare hole (Photo 26).

For the retained tree A40 (*Terminalia catappa*) at the entrance of Phase 2 construction areas, the excavated area close to its planter has not yet refilled with soil and some of the tree roots growing underneath the tree planter are still under a risk of being damaged by any future minor civil works (Photo 27). The tree may have a risk of leaning if its underground roots are further damaged.

Many relocated trees in Phases 1 and 2 works area within the Nursery were in fairly poor to fair condition due to the poor transplantation skills and poor site condition (e.g. tree

root zones have been disturbed by used, turbid liquid or grease). Proper tree protection (e.g. guying and temporary TPZ) and removal of surplus soils and construction materials should be implemented to maintain the existing trees.

The remaining trees, including retained and transplanted specimens, within the nursery were maintained generally in fair condition, with no significant damage on tree crowns, trunks and roots observed during the monitoring in September 2013.

Area C

Area C was formally handed over to AFCD on 16th October 2012 for management and maintenance. The area was fenced off and no access was allowed.

Recommendations

Area A

Maintenance of proper TPZs with no temporarily stored construction materials, excessive stockpiled soil and waterlogged condition around the tree trunk flares have been the major tree management issues in Areas A and B. The Contractor should continue notifying the on-site workers not to stockpile soil/construction materials or place construction equipment within and close to the TPZs or lower trunk/trunk flare. Any temporarily stored construction materials/ equipment and excessive water around the trunk flares should be removed or drained immediately. The Contractor should remind the operators of the construction machines and on-site workers to be aware of the presence of these relocated and retained trees nearby their works, and prevent the accidental damage on these trees as far as practical. In particular, the Contractor should establish proper tree protection zone around the retained trees at the southern side of Area A in order to minimize the potential mechanical damage from the on-going excavation and site formation works. Meanwhile, the Contractor and sub-contractor should carefully design the civil works. Common civil works, such as excavation and sheet piling works, should be programmed and designed carefully by taking tree buffer zone into consideration. The works should avoid affecting the tree canopy, trunk and underground root zone with regard to tree dripline as far as possible.

The Contractor is advised to check the condition of the orange construction nets in both

Areas A and B, which have been used to demarcate the tree protection zone, and repair the damaged nets as soon as possible.

The Contractor should continue the maintenance of proper tagging system for all trees within and outside the hoarded site in order to facilitate the monitoring of their existing condition. In addition, the Contractor should maintain regular monitoring of the tree protection system and condition of the retained and transplanted trees.

All retained trees or trees to be transplanted should be watered regularly (e.g. at least every two days) by the landscape contractor or on-site workers. The Contractor should conduct regular inspection on the health condition and protection measures of each existing trees within the Area A. In particular, regular watering should be applied on those relocated trees with regard to their poor health condition. If these trees or other transplanted/ relocated trees are found to be dead specimens in the wet season, the Contractor should replace these specimens.

The recently relocated tree E38 appeared in fairly poor condition after the relocation. Given the tree bark at the middle trunk was heavily damaged during the transplantation, the long-term acceptable physiological condition may not be promised. Close monitoring is regarded as a major maintenance practice for this tree.

Area B

All transplanted trees should be watered regularly (e.g. at least every two days during the dry season) by the landscape contractor. This is a necessary maintenance practice to improve the survival rates and growth for trees showing poor health condition as a result of the transplantation shock. Regular check of the tree health should be conducted. Proper protective measures such as guying and TPZs are recommended especially for the newly transplanted/ relocated trees. Waterlogged areas (e.g. previously around trunk bases of U76, U77 and U78, and currently around U74) should be avoided and all used water/ temporary storage of construction materials or surplus soil around the tree trunk flares and close to the tree root zones should be drained out or removed immediately. To prevent accidental drainage of used water into the tree root zones of the relocated trees, the Contractor is recommended to establish a proper separation (e.g. sandbags barriers or

wooden plates) between the trees (especially U76, U77 and U78) and the ground of the active construction works. If in such circumstance that there is direct conflict between certain tree parts of the retained, transplanted or relocated tree(s) and the construction works/ machinery, the pruning works should be carried out in accordance with any local, national or international standards related to tree remedial works.

Regular inspection of the tree health of a number of trees (i.e. U55, U64, U67, U74 and A40) should be undertaken to update their health condition and any deterioration of tree defects. The Contractor is advised to check the condition of all bamboo stakes used for staking transplanted trees, and replace any damaged stakes as soon as possible. In particular, the Contractor has to inform the Nursery Operator for the dead transplanted tree U58 and to restrict any access within the tree-falling zone of U58 before any follow-up action to the tree. The landscape contractor appointed by the Contractor should assess the tree stability and consider whether the tree has to be removed immediately. If these trees or other transplanted/ relocated trees are found to be dead specimens in the wet season after the assessment by the arborist of the appointed landscape contractor, the Contractor should replace these specimens.

The Contractor is advised to repair the broken planter of the tree U47 (located in Phase 1 of the works area) as soon as possible.

All tree tags on the trees should be managed properly by the Contractor throughout the construction and establishment phases.

Area C

As Area C was handed over to AFCD for management and maintenance, no further recommendation is given.

7.3.7 Construction Lights

No follow-up action on maintenance of construction light is required as from the *Monthly EM&A Report for August 2013*.

Observation

No construction light impact to the surrounding villages and to Plover Cove as all construction activities and construction sites are halted at 1800. No construction light at night is provided by the Contractor.

Recommendation

No specific recommendation is required.

7.4 Audit Schedule

The next bi-weekly Landscape & Visual Monitoring in October 2013 is scheduled to be conducted in the weeks of 1st, 14th and 28th October 2013.

8 Action taken in Event of Exceedance

If the measurements (Noise, Water, Hydrological Characteristics, and 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 month there was no exceedance for noise, hydrological characteristics, and ecological measurements recorded; therefore, no actions were taken.

There were 6 abnormal incidents of water quality limits (Turbidity) were recorded in this reporting month according to the established action and limit levels. ET has arranged site investigations for the abnormal incidents. No construction activities were carried out at the river bed. During the reporting period, construction of intake structure was conducted near Wai Ha River. Proper mitigation measures were implemented by contractor to avoid site water release to the Wai Ha river and no particular observation of defective site activities were found causing water contamination. The exceedances of Turbidity and SS were believed to be mainly attributed by adverse weather and natural fluctuation, since the recorded levels of Turbidity and SS at control station had also exceeded its baseline action or limit level, the exceedances recorded at W2 were unlikely to be related to the Project.

The water condition of Wai Ha River is presented in photo attached in **Appendix M**.

9 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.

Table 9.1 is a summary of figures of the construction wastes disposal provided by Contractor.

Table 9.1 Summary of Construction Waste Disposal

| Month | Actual Quantities of Inert C & D Materials Generated Monthly | | | | | | Actual Quantities of C & D Wastes Generated Monthly | | | | |
|---|--|-------------------------------------|------------------------|--------------------------|-------------------------|---------------|---|---------------------------|----------------------|----------------|-----------------------------|
| | Total Quantity Generated | Hard Rock and Large Broken Concrete | Reused in the Contract | Reused in other Projects | Disposed as Public Fill | Imported Fill | Metals | Paper/cardboard packaging | Plastics | Chemical Waste | Others, e.g. general refuse |
| | (in'000m3) | (in'000m3) | (in'000m3) | (in'000m3) | (in'000m3) | (in'000m3) | (in'000kg) | (in'000kg) | (in'000kg) | (in'000kg) | (in'000kg) |
| Year2011 | 11.758 | 0.00 | 9.703 | 0.665 | 0.750 | 0.556 | 0.00 | 0.00 | 0.00 | 0.00 | 0.165 |
| Year 2012 | 10.737 | 0.00 | 9.884 | 1.185 | 0.05 | 0.00 | 2.37 | 0.00 | 0.00 | 0.00 | 0.192 |
| Jan 13 | 0.290 | 0.00 | 0.24 | 0.00 | 0.05 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Feb 13 | 0.190 | 0.00 | 0.16 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.035 |
| Mar 13 | 1.14 | 0.00 | 1.13 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Apr 13 | 1.540 | 0.00 | 1.52 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| May 13 | 0.85 | 0.00 | 0.82 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Jun 13 | 0.33 | 0.00 | 0.33 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Jul 13 | 0.255 | 0.00 | 0.24 | 0.00 | 0.015 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Aug 13 | 0.08 | 0.00 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Sep 13 | 0.04 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 |
| Total | 27.21 | 0.00 | 24.107 | 1.85 | 0.895 | 0.566 | 2.37 | 0.00 | 0.00 | 0.00 | 0.43 |
| Forecast of Total Quantities of C & D Materials to be Generated from the Contract | | | | | | | | | | | |
| | Total Quantity Generated | Hard Rock and Large Broken Concrete | Reused in the Contract | Reused in other Projects | Disposed as Public Fill | Imported Fill | Metals | Paper/cardboard packaging | Plastics (see note3) | Chemical Waste | Others, e.g. general refuse |
| | (in'000m3) | (in'000m3) | (in'000m3) | (in'000m3) | (in'000m3) | (in'000m3) | (in'000kg) | (in'000kg) | (in'000kg) | (in'000kg) | (in'000kg) |
| | 0.04 | 0 | 0.04 | 0.0 | 0.00 | 0.00 | 0 | 0.01 | 0.00 | 0.1 | 0.02 |

Notes (1) The Performance targets are given in PS Clause 26.23 (14)

(2) The waste flow table shall also include C & D materials that are specified in the Contract to be imported for used at the sites

(3) Plastics refer to plastics bottles/containers, plastic sheets/foam from packaging materials.

(4) The summary table shall be submitted to the Engineer's Representative monthly together with the Waste Flow Table for review and monitoring in accordance with the PS Clause 25.20A(4)

10 Status of Permits and Licenses obtained

Table 10.1 is the updated status of environmental related permits/ license obtained for the construction activities.

Table 10.1 Status of Permits and Licenses Obtained

| Description | License / Permit No.# | Date of Issue | Site | Date of expiry | Status |
|---|-----------------------|---------------|---------------|----------------|--------|
| Environmental Permit | EP-303/2008 | 2008/2/25 | Area A, B & C | not applicable | Valid |
| Discharge License | WT00006448-2010 | 2010/6/15 | Area A, B & C | 30/6/2015 | Valid |
| Registration as a Chemical Waste Producer | 316597 | 2010/4/26 | Area A, B & C | not applicable | Valid |
| Waste Disposal | 7010348 | 2010/3/2 | Area A, B & C | not applicable | Valid |

11 Compliant Log

There was no formal complaint received during the reporting period. Therefore, follow up actions for the environmental complaint is not required.

Table 11.1 Summary of Formal Complaints received

| | Noise | Water | Ecology | Others |
|----------------|-------|-------|---------|--------|
| Year 2011 | 0 | 0 | 0 | 0 |
| Year 2012 | 0 | 0 | 0 | 0 |
| January 2013 | 0 | 0 | 0 | 0 |
| February 2013 | 0 | 0 | 0 | 0 |
| March 2013 | 0 | 0 | 0 | 0 |
| April 2013 | 0 | 0 | 0 | 0 |
| May 2013 | 0 | 0 | 0 | 0 |
| June 2013 | 0 | 0 | 0 | 0 |
| July 2013 | 0 | 0 | 0 | 0 |
| August 2013 | 0 | 0 | 0 | 0 |
| September 2013 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 |

12 Site Environmental Audits

12.1 Site Inspection

Site inspections were undertaken weekly to inspect the construction activities in active site areas to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented.

Within this reporting period, site inspections were conducted on 5th, 12th, 19th and 26th of September 2013. A detailed checklist of each site inspection together with comments and relevant photos have been filed and kept. The findings from inspection were summarized in Table 12.1.

Table 12.1 Summary results of site inspections findings

| Date | Findings | Identification | Advice from ET | Action taken | Closing date |
|--|---|----------------|---|---|--------------|
| 26 Jun 13 4, 11, 18, 25 & 30 Jul 13 8,15, 22 & 30 Aug 13 5 & 12 Sep 13 | Damaged hoarding was observed at Area B. | Observation | Contractor was reminded to replace or repair the hoarding for prevention of muddy water leakage. | Damaged hoarding was repaired by contractor. | 19 Sep 13 |
| 18, 25 & 30 Jul 13 8, 15, 22 & 30 Aug 13 5 & 12 Sep 13 | Construction waste was observed at Area B. | Observation | Contractor was reminded that the construction waste should be stored properly and routine disposal should be implemented. | Construction waste was removed by contractor. | 19 Sep 13 |
| 25 & 30 Jul 13 8, 15, 22 & 30 Aug 13 | Damaged tree protective fencing was observed at Area B. | Observation | Contractor was reminded that the damaged tree protective fencing should be replaced | Damaged tree protective fencing was replaced by contractor. | 19 Sep 13 |

| Date | Findings | Identification | Advice from ET | Action taken | Closing date |
|--|---|----------------|--|--|--------------|
| 5 & 12 Sep 13 | | | and provided enough space for all the trees. | | |
| 30 Jul 13 8, 15, 22 & 30 Aug 13 | Construction materials were placed inside the tree protection zone at Area A. | Observation | Contractor was reminded that the construction materials should be removed and stored properly. | Construction materials were removed by contractor. | 5 Sep 13 |
| 12, 19 & 26 Sep 13 | Haul road was dry and dusty at Area A. | Observation | Contractor was advised that routine water spraying should be implemented for dust suppression. | N/A | N/A |
| 26 Sep 13 | Accumulative construction waste was observed at Area A. | Observation | Contractor was reminded to remove the construction waste as soon as possible. | N/A | N/A |

12.2 Compliance with legal and Contractual requirement

There was no non-compliance recorded for the month of September 2013.

12.3 Implementation status and effectiveness of the mitigation measures

Contractor has implemented mitigation measures to address those problems as advised by ER and ET. Some of the measures taken by the contractor were considered as effective to minimize negative impact to the environment. Ongoing investigation will be carried out to observe performance and effectiveness of those measures. Outstanding environmental items will be inspected in next month.

As there were some ongoing follow up practices, contractor was reminded to regularly review and rectify the discrepancy once found and maintain good site

condition. The contractor implemented various environmental mitigation measures as recommended in the Environmental Permit and Final Mitigation Measures Report.

The recommend mitigation measures of EM&A manual (revision 3) are presented in **Appendix H (A)**.

The implemented statuses of mitigation measures are presented in **Appendix H (B)**

13 Future Key issues and recommendations

According to the forecasted site activities, key environmental issued to be considered should at least include:

- Site water control and relevant protective measures.
- Quality of effluent discharge from Area A.
- Control and disposal for construction wastes generated from works.

Tree protective measure for tree planting and transplanting, should be implemented, such as tree protection zone and regular watering.

14 Conclusions

installation of minor E&M equipment, E&M testing, construction of green roof, construction of road & drain in pumping station, construction of boundary wall and installation of cladding, backfilling and reinstatement and remove sheetpiles were major site activities being carried out within this reporting period.

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 on 26th of September 2013.

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

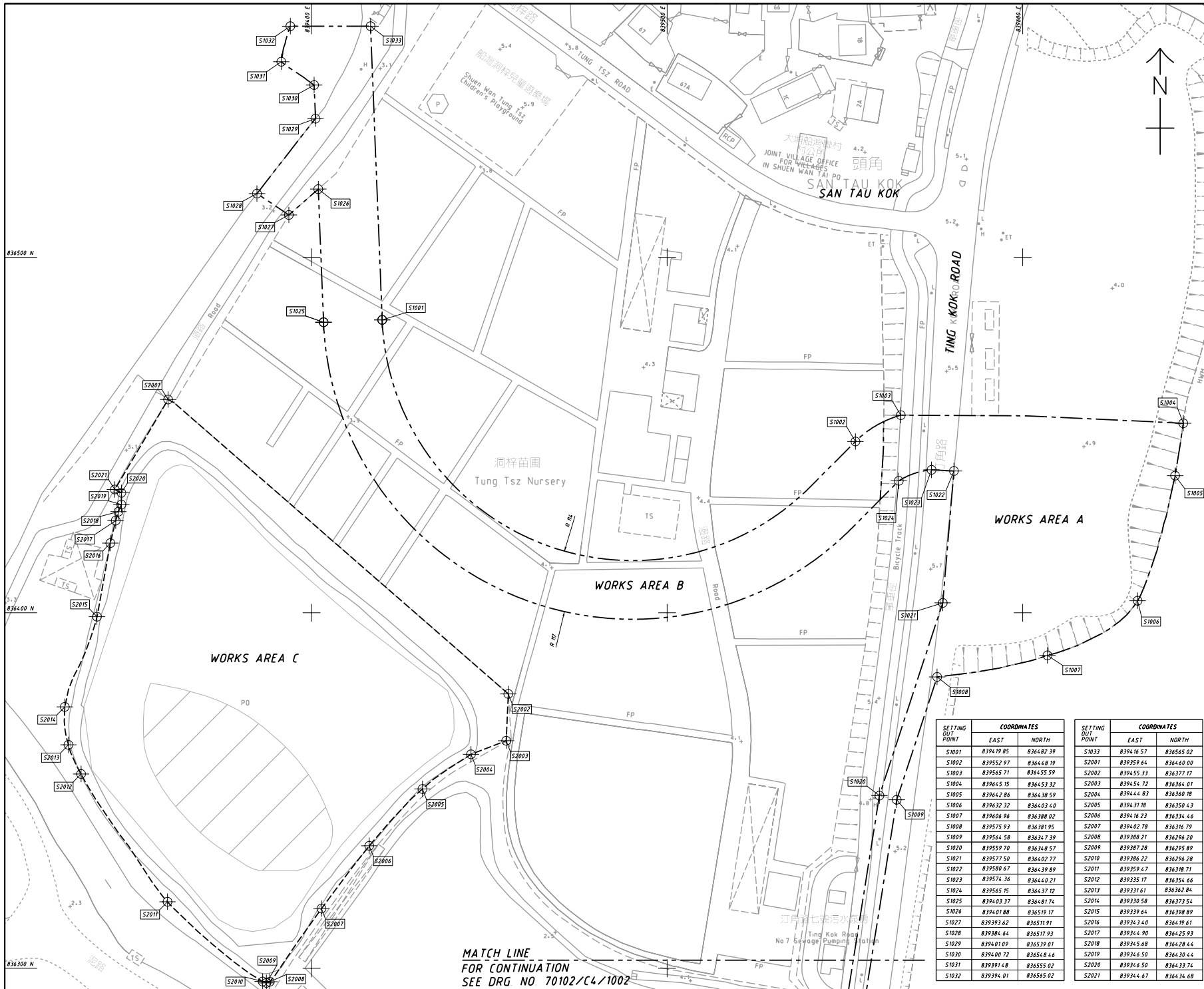
For water quality monitoring, total 6 abnormal incidents of water quality criteria were recorded in this reporting month. During the reporting period, construction of intake structure was conducted near Wai Ha River. Proper mitigation measures were implemented by contractor to avoid site water release to the Wai Ha river and no particular observation of defective site activities were found causing water contamination. The exceedances of Turbidity and SS were believed to be mainly attributed by natural fluctuation. And, since the recorded levels of Turbidity and SS at control station had also exceeded its baseline action or limit level, the exceedances recorded at W2 were unlikely to be related to the Project.

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

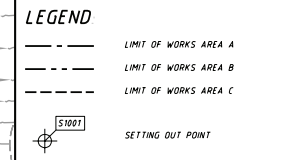
ET has reminded the contractor to provide environmental pollution control measures wherever necessary, and to keep a good environmental management at site practice.

The ET will continue to implement the environmental monitoring & audit programme in accordance with the EM&A Manual (revision 3) and Environmental Permit requirement.

Appendix A: Site Location Plan



- NOTES**
- 1 ALL LEVELS ARE IN METRE ABOVE PRINCIPAL DATUM
 - 2 ALL CO-ORDINATES GIVEN ARE IN METRE AND ARE IN ACCORDANCE WITH HK1980 COORDINATES SYSTEM
 - 3 ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED
 - 4 THE PUBLIC CLEANING AREA SHALL BE THE AREAS WITHIN 2.50 BEYOND THE LIMIT OF WORKS AREAS EXCLUDING PRIVATE AREAS



| | | | |
|---|----------------------|----------|-------|
| A | TENDER ADDENDUM NO 2 | ECYPREYM | 10-09 |
| - | TENDER DRAWING | ECYPREYM | 09-09 |

D DRAINAGE SERVICES DEPARTMENT,
THE GOVERNMENT OF THE HONG KONG
SPECIAL ADMINISTRATIVE REGION

DRAINAGE IMPROVEMENT
WORKS IN SHUEN WAN TAI PO - CONTRACT 1

SETTING OUT PLAN FOR
WORKS AREA A, B AND C

SHEET 1 OF 2

AECOM

DRGNQ. 70102/C4/1001A
圖紙編號

| | | |
|---------------------|----------------------------|---------------------|
| DESIGNED BY CPWU | CONTRACT NO. DC/2009/22 | DR. APPROVED DML |
| DRAWN BY LWL | STATUS 1/1 | |
| SCALE A1 : 1 500 | DIMENSIONS ARE IN METRES | |

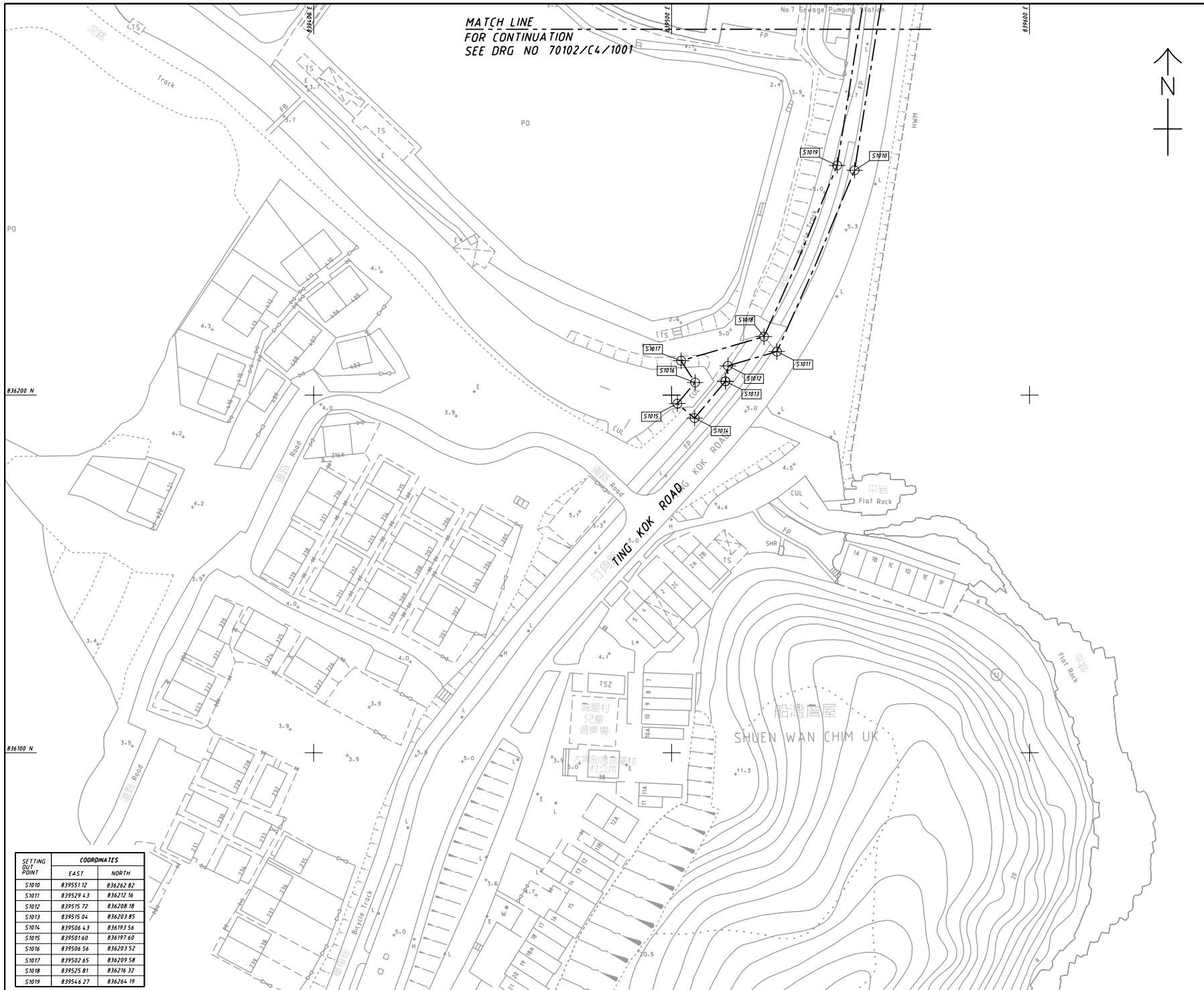
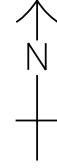
| SETTING OUT POINT | COORDINATES | | SETTING OUT POINT | COORDINATES | |
|-------------------|-------------|------------|-------------------|-------------|-----------|
| | EAST | NORTH | | EAST | NORTH |
| S1001 | 8394.19 85 | 8364.87 39 | S1033 | 8394.16 57 | 836565 02 |
| S1002 | 839552 87 | 836448 19 | S2001 | 839359 64 | 836440 00 |
| S1003 | 839565 71 | 836455 59 | S2002 | 839455 33 | 836377 17 |
| S1004 | 839645 15 | 836453 32 | S2003 | 839454 72 | 836364 01 |
| S1005 | 839642 86 | 836438 59 | S2004 | 839444 83 | 836360 18 |
| S1006 | 839632 32 | 836403 40 | S2005 | 839431 18 | 836350 43 |
| S1007 | 839606 96 | 836388 02 | S2006 | 839416 23 | 836334 46 |
| S1008 | 839575 93 | 836381 95 | S2007 | 839402 78 | 836316 79 |
| S1009 | 839564 58 | 836347 39 | S2008 | 839388 21 | 836294 20 |
| S1020 | 839559 70 | 836348 57 | S2009 | 839387 28 | 836295 89 |
| S1021 | 839577 50 | 836402 77 | S2010 | 839386 22 | 836296 28 |
| S1022 | 839580 67 | 836439 89 | S2011 | 839359 47 | 836318 71 |
| S1023 | 839574 36 | 836440 21 | S2012 | 839335 17 | 836354 66 |
| S1024 | 839565 15 | 836437 12 | S2013 | 839331 61 | 836362 84 |
| S1025 | 839403 37 | 836481 74 | S2014 | 839330 58 | 836373 54 |
| S1026 | 839401 88 | 836519 17 | S2015 | 839339 64 | 836398 89 |
| S1027 | 839393 62 | 836517 93 | S2016 | 839344 90 | 836419 61 |
| S1028 | 839384 64 | 836517 93 | S2017 | 839344 90 | 836425 93 |
| S1029 | 839401 09 | 836539 01 | S2018 | 839345 68 | 836428 44 |
| S1030 | 839400 72 | 836540 44 | S2019 | 839346 50 | 836430 44 |
| S1031 | 839391 48 | 836555 02 | S2020 | 839346 50 | 836433 74 |
| S1032 | 839394 01 | 836565 02 | S2021 | 839347 67 | 836434 68 |

MATCH LINE
FOR CONTINUATION
SEE DRG NO 70102/C4/1002

836500 N
836400 N
836300 N
2010-2-5 11:54:09
p:\projects\70102\1000\TENDER ADDENDUM NO 2\1001A.dgn

MATCH LINE
FOR CONTINUATION
SEE DRG. NO 70102/C4/1001

NOTE
1. FOR NOTES AND LEGEND SEE DRAWING
NO. 70102/C4/1001



836200 N

836100 N

2010-2-5 13:32:23

| SETTING OUT POINT | COORDINATES | |
|-------------------|-------------|-----------|
| | EAST | NORTH |
| S1010 | 839551.12 | 836262.82 |
| S1011 | 839529.43 | 836212.16 |
| S1012 | 839515.72 | 836208.18 |
| S1013 | 839515.04 | 836203.85 |
| S1014 | 839506.43 | 836193.56 |
| S1015 | 839501.60 | 836197.60 |
| S1016 | 839506.56 | 836203.52 |
| S1017 | 839502.65 | 836209.58 |
| S1018 | 839525.81 | 836216.32 |
| S1019 | 839546.27 | 836264.19 |

| | | |
|----------------|----------|-------|
| TENDER DRAWING | ECYPRC14 | 09-09 |
| NO. | DATE | SCALE |

D DRAINAGE SERVICES DEPARTMENT,
THE GOVERNMENT OF THE HONG KONG
SPECIAL ADMINISTRATIVE REGION

DRAINAGE IMPROVEMENT
WORKS IN SHUEN WAN, TAI PO - CONTRACT 1

SETTING OUT PLAN FOR
WORKS AREA A, B AND C

SHEET 2 OF 2

AECOM

DRG. NO. 70102/C4/1002
圖紙編號

| | | | | | |
|---------------------------|----------|----------------------|------------|--------------------|-----|
| DESIGNED BY 設計 | CP/WU | CONTRACT NO. 合約編號 | DC/2009/22 | APPROVED BY 核准人 | DML |
| DRAWN BY 繪圖 | LWL | STATUS 狀態 | | | |
| SCALE 比例 | A1:1 500 | | | | |
| DIMENSIONS ARE IN 尺寸單位 | METRES | | | | |

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Appendix B: Key Personal Contact information chart

| Post | Name | Contact No. | Contact Fax | e-mail |
|--|------------------|--------------------|--------------------|-------------------------------|
| Project Manager | Mr. W. K. Chan | 6821 1136 | 2674 6688 | dc200922jv_pmcwk@yahoo.com.hk |
| Site Agent | Mr. K. M. Ma | 9552 1734 | 2674 6688 | dc200922jv_suba@yahoo.com.hk |
| Environmental Officer | Mr. W. K. Chan | N/A | 2674 6688 | dc200922jv_pmcwk@yahoo.com.hk |
| Environmental Supervisor | Mr. Anthony Chan | 9179 2092 | 2674 6688 | anthony277@hotmail.com |
| Asia Ecological Consultants Ltd. (Wetland Specialist) | Dr. Mike Leven | 2486 2885 | 2471 8389 | mrleven@asiaecol.com.hk |
| Environmental Pioneers & Solutions Limited (Environmental Team) | Mr. Johnny Lee | 2889 0569 | 2856 2010 | johnnylee@epsl.com.hk |

Appendix C: Calibration Certificates for Measuring Instruments



Calibration Certificate

Certificate No. **28553**

Page 1 of 5 Pages

Customer : Environmental Pioneers and Solutions Limited

Address : Flat A, 19/F., Chai Wan Industrial Centre Building, 21 Lee Chung Street, Chai Wan, HK.

Order No. : Q23300

Date of receipt : 11-Dec-12

Item Tested

Description : Sound Level Meter

Manufacturer : SVAN

Model : 955

Serial No. : 27302

Test Conditions

Date of Test : 8-Jan-13

Supply Voltage : --

Ambient Temperature : (23 ± 3)°C

Relative Humidity : (50 ± 25) %

Test Specifications

Calibration check.

Ref. Document/Procedure: Z01.

Test Results


All results were within the IEC 61672 Type1, IEC 1260 Class1 and manufacturer's specification.
The results are shown in the attached page(s).

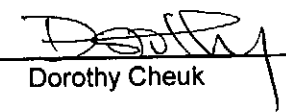
Main Test equipment used:

| <u>Equipment No.</u> | <u>Description</u> | <u>Cert. No.</u> | <u>Traceable to</u> |
|----------------------|--------------------------|------------------|---------------------|
| S017 | Multi-Function Generator | C127181 | SCL-HKSAR |
| S024 | Sound Level Calibrator | 28588 | NIM-PRC & SCL-HKSAR |

The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to International System of Units (SI).
The test results apply to the above Unit-Under-Test only

Calibrated by : 
P. F. Wong

Approved by : 
Dorothy Cheuk

Date: 8-Jan-13

This Certificate is issued by:
Hong Kong Calibration Ltd.
Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.
Tel: 2425 8801 Fax: 2425 8646



Calibration Certificate

Certificate No. 28553

Page 2 of 5 Pages

Results :

1. Self-generated noise: 2.0 dBA (Mfr's Spec (Electrical) ≤ 14 dBA)

2. Acoustical signal test

| UUT Setting | | | | Applied Value (dB) | UUT Reading (dB) | |
|-------------|---------------------|----------------|-------------------|--------------------|------------------|--------------|
| Range (dB) | Frequency Weighting | Time Weighting | 1/1 Octave Filter | | Before adjust | After adjust |
| 25-120 | A | F | OFF | 94.0 | -- | 93.5 |
| | | S | OFF | | -- | 93.5 |
| | C | F | OFF | -- | 93.5 | |
| | A | F | OFF | 114.0 | -- | 113.9 |
| | | S | OFF | | -- | 113.9 |
| | C | F | OFF | -- | 113.9 | |
| | A | F | ON | 94.0 | -- | 93.5 |
| | A | F | ON | 114.0 | -- | 113.9 |
| 45-139 | A | F | OFF | 94.0 | *91.6 | 93.5 |
| | | S | OFF | | -- | 93.5 |
| | C | F | OFF | -- | 93.5 | |
| | A | F | OFF | 114.0 | -- | 113.9 |
| | | S | OFF | | -- | 113.9 |
| | C | F | OFF | -- | 113.9 | |
| | A | F | ON | 94.0 | -- | 93.5 |
| | A | F | ON | 114.0 | -- | 113.9 |

Mfr's Spec. : ± 0.7 dB

Uncertainty : ± 0.1 dB

3 Electrical signal tests of frequency weightings (A weighting)

| Frequency | Attenuation (dB) | IEC 61672 Type 1 Spec. |
|-----------|------------------|--------------------------------|
| 31.5 Hz | -39.5 | - 39.4 dB, ± 2 dB |
| 63 Hz | -26.5 | - 26.2 dB, ± 1.5 dB |
| 125 Hz | -16.2 | - 16.1 dB, ± 1.5 dB |
| 250 Hz | -8.7 | - 8.6 dB, ± 1 dB |
| 500 Hz | -3.3 | - 3.2 dB, ± 1.4 dB |
| 1 kHz | 0.0 (Ref) | 0 dB, ± 1.1 dB |
| 2 kHz | +1.2 | + 1.2 dB, ± 1.6 dB |
| 4 kHz | +1.0 | + 1.0 dB, ± 1.6 dB |
| 8 kHz | -1.1 | - 1.1 dB, + 2.1 dB ~ -3.1 dB |
| 16 kHz | -6.9 | - 6.6 dB, + 3.5 dB ~ - 17.0 dB |

Uncertainty : ± 0.1 dB



Calibration Certificate

Certificate No. 28553

Page 3 of 5 Pages

4. Frequency & Time weightings at 1 kHz

4.1 Frequency Weighting (Fast)

| UUT Setting | Applied Value (dB) | UUT Reading (dB) | Difference (dB) | IEC 61672 Type 1 Spec. |
|-------------|--------------------|------------------|-----------------|------------------------|
| A | 94.0 | 93.5 (Ref.) | -- | ± 0.4 dB |
| C | 94.0 | 93.5 | 0.0 | |

4.2 Time Weighting (A-weighted)

| UUT Setting | Applied Value (dB) | UUT Reading (dB) | Difference (dB) | IEC 61672 Type 1 Spec. |
|----------------|--------------------|------------------|-----------------|------------------------|
| Fast | 94.0 | 93.5 (Ref.) | -- | ± 0.3 dB |
| Slow | 94.0 | 93.5 | 0.0 | |
| Time-averaging | 94.0 | 93.5 | 0.0 | |

Uncertainty : ± 0.1 dB

5. Level linearity on the reference level range

| UUT Range | Applied Value (dB) | UUT Reading (dB) | Difference (dB) | IEC 61672 Type 1 Spec. |
|-----------------------|--------------------|------------------|-----------------|------------------------|
| 140 dB (Ref Level) | 137.0 | 136.5 | 0.0 | ± 1.1 dB |
| | 136.0 | 135.5 | 0.0 | |
| | 135.0 | 134.5 | 0.0 | |
| | 134.0 | 133.5 | 0.0 | |
| | 129.0 | 128.5 | 0.0 | |
| | 124.0 | 123.5 | 0.0 | |
| | 119.0 | 118.5 | 0.0 | |
| | 114.0 | 113.5 | 0.0 | |
| | 109.0 | 108.5 | 0.0 | |
| | 104.0 | 103.5 | 0.0 | |
| | 99.0 | 98.5 | 0.0 | |
| | 94.0 | 93.5 (Ref) | -- | |
| | 89.0 | 88.5 | 0.0 | |
| | 84.0 | 83.5 | 0.0 | |
| | 79.0 | 78.5 | 0.0 | |
| | 74.0 | 73.5 | 0.0 | |
| | 69.0 | 68.5 | 0.0 | |
| | 64.0 | 63.5 | 0.0 | |
| | 59.0 | 58.5 | 0.0 | |
| | 54.0 | 53.5 | 0.0 | |
| 49.0 | 48.4 | 0.1 | | |
| 48.0 | 47.4 | 0.1 | | |

Uncertainty : ± 0.1 dB



Calibration Certificate

Certificate No. **28553**

Page 4 of 5 Pages

6. Toneburst response (4kHz)

| UUT Setting | Tone Burst Duration(ms) | UUT Reading(dB) | Difference (dB) | IEC 61672 Type 1 Spec. |
|----------------|-------------------------|-----------------|-----------------|--------------------------|
| Fast | Steady | 137.0(Ref) | -- | -- |
| | 200 | 136.0 | -1.0 | -1.0 ± 0.8dB |
| | 2 | 118.9 | -18.1 | -18.0, +1.3 dB ~ -1.8 dB |
| | 0.25 | 109.9 | -27.1 | -27.0, +1.3 dB ~ -3.3 dB |
| Slow | Steady | 137.0(Ref) | -- | -- |
| | 200 | 129.5 | -7.5 | -7.4 ± 0.8dB |
| | 2 | 109.9 | -27.1 | -27.0, +1.3 dB ~ -3.3 dB |
| Time averaging | Steady | 137.0(Ref) | -- | -- |
| | 200 | 130.0 | -7.0 | -7.0±0.8dB |
| | 2 | 110.8 | -26.2 | -27.0, +1.3 dB ~ -1.8 dB |
| | 0.25 | 102.0 | -35.0 | -36.0, +1.3 dB ~ -3.3 dB |

Uncertainty : ± 0.1 dB

7. Peak C sound level (140 dB Range, C-weighted, Fast)

| Freq(Hz) | Signal Type | Indication of overload | UUT reading (dB) | Difference (dB) | IEC 61672 Type 1 Spec. |
|----------|----------------|------------------------|------------------|-----------------|------------------------|
| 8000 | Steady | -- | 132.0 | -- | 3.2 ± 2.4 dB |
| | Complete-cycle | No | 135.3 | 3.3 dB | |
| 500 | Steady | -- | 132.0 | -- | 2.4 ± 1.4 dB |
| | +ve half-cycle | No | 129.3 | 2.7 dB | |
| | -ve half-cycle | No | 129.1 | 2.9 dB | |

Uncertainty : ± 0.1 dB



Calibration Certificate

Certificate No. 28553

Page 5 of 5 Pages

8. Overload indication (140 dB range, A-weighted, Time-average, 4kHz)

| UUT Reading at overload (dB) | | Difference (dB) | IEC 61672 Type 1 Spec. |
|------------------------------|---------------------|-----------------|------------------------|
| + ve one half cycle | - ve one half cycle | | |
| 137.0 | 138.5 | 1.5 | < 1.8 dB |

The overload indicator latched on until reset

Uncertainty : ± 0.1 dB

9. Filter Characteristics

9.1 1/1 – Octave Filter

| Frequency | Attenuation (dB) | IEC 1260 Class 1 (dB) |
|-------------|------------------|-----------------------|
| 125 Hz | -76.4 | < - 61 |
| 250 Hz | -70.5 | < - 42 |
| 500 Hz | -36.3 | < - 17.5 |
| 707 Hz | -4.3 | - 2 ~ - 5 |
| 1 kHz (Ref) | -- | -- |
| 1.414 kHz | -2.1 | - 2 ~ - 5 |
| 2 kHz | -50.6 | < - 17.5 |
| 4 kHz | -82.3 | < - 42 |
| 8 kHz | -82.5 | < - 61 |

Uncertainty : ± 0.25 dB

Remarks : 1. UUT : Unit-Under-Test

2. The uncertainty claimed is for a confidence probability of not less than 95%.
3. Atmospheric Pressure : 1010 hPa.
4. Preamplifier model : SV 12L , S/N : 25732
5. Firmware Version: 6.12.4
6. Power Supply Check: OK
7. The UUT was adjusted with the supplied sound calibrator at the reference sound pressure level before the calibration.
8. *Out of specification.

----- END -----



Calibration Certificate

Certificate No. **28554**

Page 1 of 2 Pages

Customer : Environmental Pioneers and Solutions Limited

Address : Flat A, 19/F., Chai Wan Industrial Centre Building, 21 Lee Chung Street, Chai Wan, HK.

Order No. : Q23300

Date of receipt : 11-Dec-12

Item Tested

Description : Sound Level Calibrator

Manufacturer : Svantek

Model : SV30A

Serial No. : 29085

Test Conditions

Date of Test : 3-Jan-13

Supply Voltage : --

Ambient Temperature : (23 ± 3)°C

Relative Humidity : (50 ± 25) %

Test Specifications

Calibration check.

Ref. Document/Procedure : F21, Z02.

Test Results

All results were within the IEC 942 Class1 specification.

The results are shown in the attached page(s).


Main Test equipment used:

| <u>Equipment No.</u> | <u>Description</u> | <u>Cert. No.</u> | <u>Traceable to</u> |
|----------------------|------------------------|------------------|---------------------|
| S014 | Spectrum Analyzer | 13535 | NIM-PRC & SCL-HKSAR |
| S024 | Sound Level Calibrator | 28588 | NIM-PRC & SCL-HKSAR |
| S041 | Universal Counter | 28347 | SCL-HKSAR |
| S206 | Sound Level Meter | 16338 | SCL-HKSAR |

The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to International System of Units (SI).
The test results apply to the above Unit-Under-Test only

Calibrated by : 
P. F. Wong

Approved by : 
Dorothy Cheuk

Date: 3-Jan-13



Calibration Certificate

Certificate No. 28554

Page 2 of 2 Pages

Results :

1. Level Accuracy

| UUT Nominal Value (dB) | Measured Value (dB) | IEC 942 Class 1 Spec. |
|------------------------|---------------------|-----------------------|
| 94 | 94.03 | ± 0.3 dB |
| 114 | 114.02 | |

Uncertainty : ± 0.2 dB

2. Frequency

| UUT Nominal Value | Measured Value | IEC 942 Class 1 Spec. |
|-------------------|----------------|-----------------------|
| 1 kHz | 1.000 kHz | ± 2 % |

Uncertainty : ± 3.6 x 10⁻⁶

3. Level Stability : 0.0 dB

IEC 942 Class 1 Spec. : ± 0.1 dB

Uncertainty : ± 0.01 dB

4. Total Harmonic Distortion : < 0.1 %

IEC 942 Class 1 Spec. : < 3 %

Uncertainty : ± 2.3 % of reading

Remark : 1. UUT : Unit-Under-Test

2. The above measured values are the mean of 3 measurements.

3. The uncertainty claimed is for a confidence probability of not less than 95%.

4. Atmospheric Pressure : 1010 hPa.

----- END -----



ALS Technichem (HK) Pty Ltd

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

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

WORK ORDER: HK1319308
LABORATORY: HONG KONG
DATE RECEIVED: 17/07/2013
DATE OF ISSUE: 24/07/2013

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
Equipment Type: MULTIMETER
Brand Name: TOA DKK
Model No.: WMS-24
Serial No.: 682337
Equipment No.: --
Date of Calibration: 24 July, 2013

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. Fung Lim Chee, Richard
General Manager
Greater China & Hong Kong

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Page 1 of 2

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION



Work Order: HK1319308
Date of Issue: 24/07/2013
Client: ENVIRONMENTAL PIONEERS & SOLUTIONS LIMITED

Description: MULTIMETER
Brand Name: TOA DKK
Model No.: WMS-24
Serial No.: 682337
Equipment No.: --
Date of Calibration: 24 July, 2013

Date of next Calibration: 24 October, 2013

Parameters:

Conductivity

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

| Expected Reading (uS/cm) | Displayed Reading (uS/cm) | Tolerance (%) |
|--------------------------|----------------------------|---------------|
| 146.9 | 140 | -4.7 |
| 6667 | 7100 | 6.5 |
| 12890 | 13800 | 7.1 |
| 58670 | 61300 | 4.5 |
| Tolerance Limit (±%) | | 10.0 |

Dissolved Oxygen

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

| Expected Reading (mg/L) | Displayed Reading (mg/L) | Tolerance (mg/L) |
|-------------------------|--------------------------|------------------|
| 4.92 | 4.76 | -0.16 |
| 6.09 | 5.93 | -0.16 |
| 7.59 | 7.60 | 0.01 |
| Tolerance Limit (±mg/L) | | 0.20 |

pH Value

Method Ref: APHA 21st Ed. 4500H:B

| Expected Reading (pH Unit) | Displayed Reading (pH Unit) | Tolerance (pH unit) |
|----------------------------|-----------------------------|---------------------|
| 4.0 | 4.09 | 0.09 |
| 7.0 | 7.13 | 0.13 |
| 10.0 | 10.15 | 0.15 |
| Tolerance Limit (±pH 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 (°C) | Displayed Reading (°C) | Tolerance (°C) |
|------------------------|-------------------------|-----------------|
| 10.5 | 10.8 | 0.3 |
| 22.0 | 22.0 | 0.0 |
| 39.5 | 39.8 | 0.3 |
| Tolerance Limit (±°C) | | 2.0 |

Turbidity

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

| Expected Reading (NTU) | Displayed Reading (NTU) | Tolerance (%) |
|------------------------|-------------------------|---------------|
| 0 | 0.0 | -- |
| 4 | 4.3 | 7.5 |
| 40 | 43.2 | 8.0 |
| 80 | 85.9 | 7.4 |
| 400 | 422.0 | 5.5 |
| 800 | 868.1 | 8.5 |
| Tolerance Limit (±%) | | 10.0 |

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Mr. Fung Lim Chee, Richard
 General Manager
 Greater China & Hong Kong



Calibration Certificate

Certificate No. **27765**

Page 1 of 2 Pages

Customer : Environmental Pioneers and Solutions Limited

Address : Flat A, 19/F., Chai Wan Industrial Centre Building, 20 Lee Chung Street, Chai Wan, HK.

Order No. : Q22905

Date of receipt : 9-Nov-12

Item Tested

Description : Portable Level-Velocity Logger

Manufacturer : Greyline

Model : Stingray

Serial No. : 45525

Test Conditions

Date of Test : 10-Dec-12

Supply Voltage : --

Ambient Temperature : (23 ± 3)°C

Relative Humidity : (50 ± 25) %

Test Specifications

Calibration check.

Ref. Document/Procedure: V12, T03, M07.

Test Results

All results were within the tolerance(s).

The results are shown in the attached page(s).

Main Test equipment used:

| <u>Equipment No.</u> | <u>Description</u> | <u>Cert. No.</u> | <u>Traceable to</u> |
|----------------------|------------------------|------------------|---------------------|
| S179 | Std. Tape | 20976 | NIM-PRC |
| S136A | Stop Watch | 26076 | SCL-HKSAR |
| S214A | Std. Thermo-Hygrometer | 21518 | SCS-SWISS, NIM-PRC |

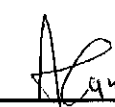
The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to international System of Units (SI).
The test results apply to the above Unit-Under-Test only

Calibrated by :


S. K. Tang

Approved by :


Alan Chu

Date: 10-Dec-12



Calibration Certificate

Certificate No. 27765

Page 2 of 2 Pages

Results :

1. Flow Rate

| Applied Value (Ft/s) | UUT Reading (Ft/s) | Tolerance | Uncertainty |
|----------------------|--------------------|---------------|-------------|
| 1.34 | 1.4 | $\pm 5\%$ f.s | $\pm 1\%$ |

2. Level

| Applied Value (Ft) | UUT Reading (Ft) | Tolerance | Uncertainty |
|---------------------|-------------------|----------------|-------------|
| 1.00 | 1.0 | $\pm 5\%$ f.s. | $\pm 0.1\%$ |
| 2.00 | 2.0 | | |
| 3.00 | 3.0 | | |
| 4.00 | 4.0 | | |

3. Temperature

| Applied Value (°C) | UUT Reading (°C) | Tolerance | Uncertainty |
|--------------------|------------------|---------------------------------|-----------------------------------|
| 23.0 | 22 | $\pm 2\text{ }^{\circ}\text{C}$ | $\pm 0.2\text{ }^{\circ}\text{C}$ |

Remarks : 1. UUT : Unit-Under-Test

2. The uncertainty claimed is for a confidence probability of not less than 95%.

3. Sensor Used : Model : QZ02L-UT-01-PS

S/N : 10D18289

----- END -----

Appendix D: Construction Noise Monitoring Data

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

Noise Monitoring Data Sheet

| | | | |
|--|-------------------------|--|--|
| Monitoring Location | | M1 | AL1 |
| Monitoring Method | | Façade | Façade |
| Date of Monitoring | | 4/9/2013 | 4/9/2013 |
| Weather Condition | | Cloudy | Cloudy |
| Measurement Start Time (hh:mm) | | 13:15 | 13:55 |
| Measurement Time Length (mins) | | 30 mins | |
| SLM Model & S/N | | SVAN 955 | |
| Wind Speed (m/s) | | 0.2 | 0.2 |
| Measurement Results | L _{eq} (dB(A)) | 66.5 | 64.5 |
| | L ₁₀ (dB(A)) | 68.1 | 65.8 |
| | L ₉₀ (dB(A)) | 48.5 | 51.5 |
| Major Construction Noise Source(s) During Monitoring | | The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities | The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities |
| Other Noise Source(s) During Monitoring | | – Background Noise – Traffic Noise | – Background Noise – Traffic Noise |

Name

Signature

Date

Prepared by: Lau Kai Chung

Lau Kai Chung

4/9/2013

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

Noise Monitoring Data Sheet

| | | | |
|--|-------------------------|--|--|
| Monitoring Location | | M1 | AL1 |
| Monitoring Method | | Façade | Façade |
| Date of Monitoring | | 11/9/2013 | 11/9/2013 |
| Weather Condition | | Sunny | Sunny |
| Measurement Start Time (hh:mm) | | 11:00 | 11:45 |
| Measurement Time Length (mins) | | 30 mins | |
| SLM Model & S/N | | SVAN 955 | |
| Wind Speed (m/s) | | 0.2 | 0.2 |
| Measurement Results | L _{eq} (dB(A)) | 63.5 | 70.1 |
| | L ₁₀ (dB(A)) | 65.1 | 72.3 |
| | L ₉₀ (dB(A)) | 50.3 | 59.8 |
| Major Construction Noise Source(s) During Monitoring | | The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities | The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities |
| Other Noise Source(s) During Monitoring | | – Background Noise – Traffic Noise | – Background Noise – Traffic Noise |

Name

Signature

Date

Prepared by: Lau Kai Chung

Lau Kai Chung

11/9/2013

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

Noise Monitoring Data Sheet

| | | | |
|--|-------------------------|--|--|
| Monitoring Location | | M1 | AL1 |
| Monitoring Method | | Façade | Façade |
| Date of Monitoring | | 18/9/2013 | 18/9/2013 |
| Weather Condition | | Sunny | Sunny |
| Measurement Start Time (hh:mm) | | 12:40 | 13:20 |
| Measurement Time Length (mins) | | 30 mins | |
| SLM Model & S/N | | SVAN 955 | |
| Wind Speed (m/s) | | 0.2 | 0.2 |
| Measurement Results | L _{eq} (dB(A)) | 61.5 | 69.9 |
| | L ₁₀ (dB(A)) | 63.8 | 70.5 |
| | L ₉₀ (dB(A)) | 48.5 | 56.7 |
| Major Construction Noise Source(s) During Monitoring | | The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities | The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities |
| Other Noise Source(s) During Monitoring | | – Background Noise – Traffic Noise | – Background Noise – Traffic Noise |

Name

Signature

Date

Prepared by: Lau Kai Chung

Lau Kai Chung

18/9/2013

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

Noise Monitoring Data Sheet

| | | | |
|--|-------------------------|--|--|
| Monitoring Location | | M1 | AL1 |
| Monitoring Method | | Façade | Façade |
| Date of Monitoring | | 25/9/2013 | 25/9/2013 |
| Weather Condition | | Sunny | Sunny |
| Measurement Start Time (hh:mm) | | 11:25 | 12:10 |
| Measurement Time Length (mins) | | 30 mins | |
| SLM Model & S/N | | SVAN 955 | |
| Wind Speed (m/s) | | 0.4 | 0.4 |
| Measurement Results | L _{eq} (dB(A)) | 60.9 | 68.9 |
| | L ₁₀ (dB(A)) | 62.8 | 69.8 |
| | L ₉₀ (dB(A)) | 47.7 | 58.7 |
| Major Construction Noise Source(s) During Monitoring | | The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities | The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities |
| Other Noise Source(s) During Monitoring | | – Background Noise – Traffic Noise | – Background Noise – Traffic Noise |

Name

Signature

Date

Prepared by: Lau Kai Chung

Lau Kai Chung

25/9/2013

Appendix E: Water Quality Monitoring Data

Remark:

Red highlighting: The value is exceeding limit level

Yellow highlighting: The value is exceeding action levele

Environmental Pioneers & Solutions Limited
Water Quality Monitoring - Summary of On-Site Measurement Results

Date of Sampling : 2/9/2013

Weather : Cloudy

| Monitoring Location | W1 | W2 | C2 |
|-------------------------|---------|-------|-------|
| Time (hhmm) | 10:30 | 12:05 | 10:40 |
| Tide Mode | Mid-ebb | | N/A |
| Water Depth (m) | <1 | <1 | <1 |
| pH value | 8.20 | 8.03 | 8.80 |
| Temperature (°C) | 24.1 | 28.9 | 23.8 |
| Turbidity (NTU) | 3.3 | 2.0 | 2.1 |
| DO (mg/L) | 7.40 | 7.89 | 6.10 |
| DO Saturation (%) | 88% | 85% | 73% |
| Suspended Solids (mg/L) | 2.0 | 6.0 | 2.0 |

Remark or Observation : _____

Name

Signature

Date

Prepared By : Lau kai chung

Lau kai chung

2/9/2013

Environmental Pioneers & Solutions Limited
Water Quality Monitoring - Summary of On-Site Measurement Results

Date of Sampling : 4/9/2013

Weather : Cloudy

| Monitoring Location | W1 | W2 | C2 |
|-------------------------|---------|-------|-------|
| Time (hhmm) | 10:41 | 13:15 | 10:57 |
| Tide Mode | Mid-ebb | | N/A |
| Water Depth (m) | <1 | <1 | <1 |
| pH value | 8.40 | 7.69 | 8.40 |
| Temperature (°C) | 23 | 26.8 | 23.2 |
| Turbidity (NTU) | 67.2 | 3.1 | 69.4 |
| DO (mg/L) | 8.80 | 6.81 | 8.80 |
| DO Saturation (%) | 96% | 70% | 103% |
| Suspended Solids (mg/L) | 56.0 | 6.0 | 58.0 |

Remark or Observation : _____

Name

Signature

Date

Prepared By : Lau kai chung

Lau kai chung

4/9/2013

Environmental Pioneers & Solutions Limited
Water Quality Monitoring - Summary of On-Site Measurement Results

Date of Sampling : 6/9/2013

Weather : Sunny

| Monitoring Location | W1 | W2 | C2 |
|-------------------------|---------|-------|-------|
| Time (hhmm) | 14:15 | 14:20 | 14:15 |
| Tide Mode | Mid-ebb | | N/A |
| Water Depth (m) | <1 | <1 | <1 |
| pH value | 8.90 | 7.86 | 8.70 |
| Temperature (°C) | 27.6 | 27.5 | 27.9 |
| Turbidity (NTU) | 4.30 | 2.9 | 13.00 |
| DO (mg/L) | 7.50 | 6.86 | 7.60 |
| DO Saturation (%) | 94% | 75% | 95% |
| Suspended Solids (mg/L) | 3.0 | 5.8 | 39.0 |

Remark or Observation : _____

Name

Signature

Date

Prepared By : Lau kai chung

Lau kai chung

6/9/2013

Environmental Pioneers & Solutions Limited
Water Quality Monitoring - Summary of On-Site Measurement Results

Date of Sampling : 9/9/2013

Weather : Sunny

| Monitoring Location | W1 | W2 | C2 |
|-------------------------|---------|-------|-------|
| Time (hhmm) | 15:30 | 16:00 | 15:00 |
| Tide Mode | Mid-ebb | | N/A |
| Water Depth (m) | <1 | <1 | <1 |
| pH value | 8.40 | 7.89 | 8.50 |
| Temperature (°C) | 29.5 | 29.6 | 29.4 |
| Turbidity (NTU) | 50.6 | 2.10 | 136.5 |
| DO (mg/L) | 8.10 | 7.23 | 6.10 |
| DO Saturation (%) | 109% | 78% | 81% |
| Suspended Solids (mg/L) | 70.0 | 6.4 | 180.0 |

Remark or Observation : _____

Name

Signature

Date

Prepared By : Lau kai chung

Lau kai chung

9/9/2013

Environmental Pioneers & Solutions Limited
Water Quality Monitoring - Summary of On-Site Measurement Results

Date of Sampling : 11/9/2013

Weather : Sunny

| Monitoring Location | W1 | W2 | C2 |
|-------------------------|---------|-------|-------|
| Time (hhmm) | 16:20 | 16:00 | 10:50 |
| Tide Mode | Mid-ebb | | N/A |
| Water Depth (m) | <1 | <1 | <1 |
| pH value | 8.20 | 7.86 | 8.70 |
| Temperature (°C) | 25.1 | 28.5 | 23.9 |
| Turbidity (NTU) | 4.2 | 3.2 | 3.5 |
| DO (mg/L) | 5.60 | 6.90 | 6.00 |
| DO Saturation (%) | 68% | 70% | 71% |
| Suspended Solids (mg/L) | 8.0 | 8.4 | 6.0 |

Remark or Observation : _____

Name

Signature

Date

Prepared By : Lau kai chung

Lau kai chung

11/9/2013

Environmental Pioneers & Solutions Limited
Water Quality Monitoring - Summary of On-Site Measurement Results

Date of Sampling : 13/9/2013

Weather : Sunny

| Monitoring Location | W1 | W2 | C1 |
|-------------------------|-----------|-------|-------|
| Time (hhmm) | 9:00 | 14:00 | 14:05 |
| Tide Mode | Mid-flood | | |
| Water Depth (m) | <1 | <1 | <1 |
| pH value | 7.20 | 8.25 | 8.15 |
| Temperature (°C) | 31.2 | 30.1 | 29.9 |
| Turbidity (NTU) | 41.1 | 2.9 | 9.0 |
| DO (mg/L) | 9.40 | 8.01 | 8.10 |
| DO Saturation (%) | 127% | 85% | 88% |
| Suspended Solids (mg/L) | 47.0 | 5.8 | 12.0 |

Remark or Observation : _____

Name

Signature

Date

Prepared By : Lau kai chung

Lau kai chung

13/9/2013

Environmental Pioneers & Solutions Limited
Water Quality Monitoring - Summary of On-Site Measurement Results

Date of Sampling : 16/9/2013

Weather : Sunny

| Monitoring Location | W1 | W2 | C2 |
|-------------------------|---------|-------|-------|
| Time (hhmm) | 10:21 | 10:50 | 16:45 |
| Tide Mode | Mid-ebb | | N/A |
| Water Depth (m) | <1 | <1 | <1 |
| pH value | 8.00 | 7.83 | 7.40 |
| Temperature (°C) | 28.9 | 28.5 | 28.1 |
| Turbidity (NTU) | 2.2 | 3.0 | 9.7 |
| DO (mg/L) | 8.50 | 7.68 | 7.70 |
| DO Saturation (%) | 111% | 75% | 99% |
| Suspended Solids (mg/L) | 2.0 | 14.0 | 21.0 |

Remark or Observation : _____

Name

Signature

Date

Prepared By : Lau kai chung

Lau kai chung

16/9/2013

Environmental Pioneers & Solutions Limited
Water Quality Monitoring - Summary of On-Site Measurement Results

Date of Sampling : 18/9/2013

Weather : Sunny

| Monitoring Location | W1 | W2 | C2 |
|-------------------------|---------|-------|-------|
| Time (hhmm) | 11:00 | 12:40 | 11:20 |
| Tide Mode | Mid-ebb | | N/A |
| Water Depth (m) | <1 | <1 | <1 |
| pH value | 7.50 | 7.82 | 8.50 |
| Temperature (°C) | 28.3 | 28.4 | 28 |
| Turbidity (NTU) | 7.4 | 3.1 | 6.5 |
| DO (mg/L) | 6.50 | 7.70 | 7.50 |
| DO Saturation (%) | 83% | 78% | 95% |
| Suspended Solids (mg/L) | 12.0 | 16.0 | 11.0 |

Remark or Observation : _____

Name

Signature

Date

Prepared By : Lau kai chung

Lau kai chung

18/9/2013

Environmental Pioneers & Solutions Limited
Water Quality Monitoring - Summary of On-Site Measurement Results

Date of Sampling : 23/9/2013

Weather : Rainy

| Monitoring Location | W1 | W2 | C2 |
|-------------------------|---------|-------|------|
| Time (hhmm) | 14:41 | 16:00 | 8:59 |
| Tide Mode | Mid-ebb | | N/A |
| Water Depth (m) | <1 | <1 | <1 |
| pH value | 7.30 | 7.88 | 7.10 |
| Temperature (°C) | 7.2 | 28.1 | 28.9 |
| Turbidity (NTU) | 2.9 | 4.3 | 3.6 |
| DO (mg/L) | 7.20 | 7.56 | 6.90 |
| DO Saturation (%) | 82% | 78% | 74% |
| Suspended Solids (mg/L) | 5.0 | 11.0 | 6.0 |

Remark or Observation : _____

Name

Signature

Date

Prepared By : Lau kai chung

Lau kai chung

23/9/2013

Environmental Pioneers & Solutions Limited
Water Quality Monitoring - Summary of On-Site Measurement Results

Date of Sampling : 25/9/2013

Weather : Sunny

| Monitoring Location | W1 | W2 | C2 |
|-------------------------|---------|-------|-------|
| Time (hhmm) | 16:00 | 16:00 | 10:40 |
| Tide Mode | Mid-ebb | | N/A |
| Water Depth (m) | <1 | <1 | <1 |
| pH value | 8.60 | 7.80 | 8.30 |
| Temperature (°C) | 23.8 | 29.1 | 23.7 |
| Turbidity (NTU) | 3.3 | 3.4 | 1.7 |
| DO (mg/L) | 7.10 | 7.35 | 7.40 |
| DO Saturation (%) | 84% | 80% | 87% |
| Suspended Solids (mg/L) | 2.0 | 3.8 | 2.0 |

Remark or Observation : _____

Name

Signature

Date

Prepared By : Lau kai chung

Lau kai chung

25/9/2013

Environmental Pioneers & Solutions Limited
Water Quality Monitoring - Summary of On-Site Measurement Results

Date of Sampling : 27/9/2013

Weather : Sunny

| Monitoring Location | W1 | W2 | C2 |
|-------------------------|---------|------|-------|
| Time (hhmm) | 8:45 | 9:00 | 09:19 |
| Tide Mode | Mid-ebb | | N/A |
| Water Depth (m) | <1 | <1 | <1 |
| pH value | 7.30 | 8.11 | 7.70 |
| Temperature (°C) | 24.3 | 27.5 | 25.5 |
| Turbidity (NTU) | 1.0 | 2.90 | 5.9 |
| DO (mg/L) | 6.60 | 7.60 | 6.90 |
| DO Saturation (%) | 78% | 78% | 81% |
| Suspended Solids (mg/L) | 2.0 | 4.8 | 12.0 |

Remark or Observation : _____

Name

Signature

Date

Prepared By : Lau kai chung

Lau kai chung

27/9/2013

Environmental Pioneers & Solutions Limited
Water Quality Monitoring - Summary of On-Site Measurement Results

Date of Sampling : 30/9/2013

Weather : Cloudy

| Monitoring Location | W1 | W2 | C2 |
|-------------------------|---------|-------|-------|
| Time (hhmm) | 16:00 | 10:20 | 10:10 |
| Tide Mode | Mid-ebb | | N/A |
| Water Depth (m) | <1 | <1 | <1 |
| pH value | 6.60 | 7.75 | 8.30 |
| Temperature (°C) | 25 | 25.1 | 25.8 |
| Turbidity (NTU) | 6.2 | 3.3 | 3.3 |
| DO (mg/L) | 8.30 | 7.48 | 7.50 |
| DO Saturation (%) | 101% | 78% | 92% |
| Suspended Solids (mg/L) | 10.0 | 1.8 | 4.0 |

Remark or Observation : _____

Name

Signature

Date

Prepared By : Lau kai chung

Lau kai chung

30/9/2013

Appendix F: Hydrological Characteristics Monitoring Data

| Location | Position | Tide | Date | Time | Weather | Water Depth (m) | Water Flow (m/s) | Water Flow (m ³ /s) |
|----------|----------|-------|-------------|-------|---------|--------------------|---------------------|-----------------------------------|
| H1 | Mid | Flood | 6-Sep-2013 | | | | | |
| H1 | Mid | Flood | 13-Sep-2013 | 13:00 | Sunny | 0.48 | 0.12 | 0.150 |
| H1 | Mid | Flood | 18-Sep-2013 | 13:00 | Sunny | 0.36 | 0.18 | 0.225 |
| H1 | Mid | Flood | 27-Sep-2013 | | | | | |
| H2 | Mid | Flood | 6-Sep-2013 | | | | | |
| H2 | Mid | Flood | 13-Sep-2013 | 13:40 | Sunny | 0.42 | 0.24 | 1.507 |
| H2 | Mid | Flood | 18-Sep-2013 | 13:40 | Sunny | 0.36 | 0.18 | 1.130 |
| H2 | Mid | Flood | 27-Sep-2013 | | | | | |
| H1 | Mid | Ebb | 6-Sep-2013 | 13:20 | Sunny | 0.12 | 0.24 | 0.300 |
| H1 | Mid | Ebb | 13-Sep-2013 | | | | | |
| H1 | Mid | Ebb | 18-Sep-2013 | 11:40 | Sunny | 0.24 | 0.12 | 0.150 |
| H1 | Mid | Ebb | 27-Sep-2013 | 8:00 | Sunny | 0.24 | 0.24 | 0.300 |
| H2 | Mid | Ebb | 6-Sep-2013 | 14:00 | Sunny | 0.24 | 0.18 | 1.130 |
| H2 | Mid | Ebb | 13-Sep-2013 | | | | | |
| H2 | Mid | Ebb | 18-Sep-2013 | 12:15 | Sunny | 0.18 | 0.06 | 0.377 |
| H2 | Mid | Ebb | 27-Sep-2013 | 8:40 | Sunny | 0.36 | 0.24 | 1.507 |

Appendix G: Landscape and Visual Monitoring Photos



Photo 1 – Temporary hoardings have been established to surround the works area at Wai Ha River estuary.



Photo 2 – The permanent boundary wall has started to be established along the western side of Area A.



Photo 3 – The main entrance of Area A has been shifted from the south to the north along the western side of the area.



Photo 4 – Temporary hoardings has been established at the eastern end of Phase 1 with an entrance, while the western end of Phase 2 works area were still aligned with temporary construction barriers (as shown in the photo).



Photo 5 – No discharge of muddy water was observed in Area C.



Photo 6 – Overall view of the transplanted tree U58, which is considered to be dead.



Photo 7 – Relocated tree E38 was in very poor health condition with only dry and wilt leaves in its canopy.



Photo 8 – The tree bark along the damaged tree trunk of E38 appeared to be very dry and shrunken.



Photo 9 – The relocated tree E16 remained in fair condition in August 2013.



Photo 10 – The wound at the trunk flare of E61 was burlapped and the leaning tree trunk was supported by two steel poles.



Photo 11 – E55 with burlapped broken trunk was still in poor condition.



Photo 12 – The dead trunk of U34 was found collapsed within the Tree Protection Zone.



Photo 13 – The dead trunk of U35 was found collapsed within the Tree Protection Zone.



Photo 14 – No recovery sign of the relocated tree U37 in Area B was observed.



Photo 15 – Temporary storage of construction material was still observed next to the tree groups in Area B.



Photo 16 – Half of the planter of U47 was broken and not yet repaired.



Photo 17 – A sign of suspected termite infestation was observed close to the trunk flare of U67.



Photo 18 – U64 appears in generally fair condition in September 2013.



Photo 19 – Decayed wood and cracked tree bark have been observed at the western side of the tree trunk of U64 in the recent months.



Photo 20 – Improved health condition of the transplanted tree U55.



Photo 21 – The relocated tree U77 in Area B was suspected to be a dead specimen.



Photo 22 – U76 remained in marginally fair condition with watersprouts in the canopy.



Photo 23 – U78 remained in marginally fair condition with watersprouts in the canopy.



Photo 24 – Surplus soil was still found around the trunk flare of A43.



Photo 25 – A temporary shelter was still observed next to the relocated tree U74 in Area B.



Photo 26 – No more construction material was stored next to the trunk flare.



Photo 27 – The excavated area close to the retained tree A40 has not yet refilled as inspected in September 2013.

Appendix H:

A)

The recommended mitigation measures of EM&A manual (revision 3)

B)

Implementation status of environmental protection and mitigation measures

A) The recommended mitigation measures of EM&A manual (revision 3)

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|------------------------------|-----------|--|---|-------------------------------|-------------------------|--------------------------------|--|
| A <i>Noise Impact</i> | | | | | | | |
| S 3.30 | 2.18 | Good Site Practice: <ul style="list-style-type: none"> ▪ Only well-maintained plant shall be operated on-site and plant shall be serviced regularly during the construction program ▪ Silencers or mufflers on construction equipment shall be utilized and shall be properly maintained during the construction program ▪ Mobile plant, if any, shall be sited as far from NSRs as possible ▪ Machines and plant (such as | To minimize construction noise impacts | Contractor | Works areas | Construction phase | EIAO-TM NCO |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|---------------|-----------|--|---|-------------------------------|--------------------------------|--------------------------------|--|
| | | <p>trucks) that may be in intermittent use shall be shut down between work periods or shall be throttled down to a minimum</p> <ul style="list-style-type: none"> ▪ Plant known to emit noise strongly in one direction shall, wherever possible, be orientated so that the noise is directed away from the nearby NSRs ▪ Material stockpiles and other structures shall be effectively utilized, wherever practicable, in screening noise from on-site construction activities. | | | | | |
| S 3.31 - 3.32 | 2.19 | Use of quieter PME | To minimize construction noise impacts | Contractor | Works areas | Construction phase | EIAO-TM NCO |
| S 3.33 – 3.34 | 2.20-2.21 | Use of temporary noise barrier | To minimize construction noise impacts | Contractor | Works areas as shown in Figure | Construction phase | EIAO-TM NCO |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|-----------------------------|-----------|--|---|-------------------------------|--|--------------------------------|--|
| 3.36-3.38 | 2.23-2.24 | | | | 3.5 | | |
| S 3.35 and Table 3.6 | 2.22 | Use of alternative quieter construction method (the Low Impact Method) | To minimize construction noise impacts | Contractor | Part of the works area for pipe laying in Wai Ha (refer to Figure 3.5) | Construction phase | EIAO-TM NCO |
| 3.36-3.38 | 2.23-2.24 | Use of noise enclosure | To minimize construction noise impacts | Contractor | Part of the works area for pipe laying in Wai Ha (refer to Figure 3.5) | Construction phase | EIAO-TM NCO |
| B Air Quality Impact | | | | | | | |
| S4.16 | 3.5 | Implementation of mitigation measures stipulated in the Air Pollution Control (Construction Dust) Regulation and good site practices including but not limited to the following: | To minimize construction dust impacts | Contractor | Construction Sites | Construction Phase | EIAO-TM |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|----------|-----------|--|---|-------------------------------|-------------------------|--------------------------------|--|
| | | <ul style="list-style-type: none"> ▪ Use of regular watering to reduce dust emissions from exposed site surfaces and unpaved road, with complete coverage, particularly during dry weather; ▪ Use of frequent watering for particularly dusty static construction areas and areas close to ASRs; ▪ Tarpaulin covering of all dusty vehicle loads transported to, from and between site location; ▪ Establishment and use of vehicle wheel and body washing facilities at the exit points of the site; ▪ Routing of vehicles and | | | | | |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|--------------------------------------|-----------|---|---|-------------------------------|-------------------------|--------------------------------|--|
| | | positioning of construction plant should be at the maximum possible distance from ASRs. <ul style="list-style-type: none"> ▪ Stockpiled excavated materials should be covered with tarpaulin, and should be removed off-site within 24 hours to avoid any odour nuisance arising. | | | | | |
| C <i>Water Quality Impact</i> | | | | | | | |
| S5.29 | 4.5 | Construction Site Run-off and Drainage: <ul style="list-style-type: none"> ▪ Before commencing any site formation work, all sewer and drainage connections shall be sealed to prevent debris, soil, sand etc. from entering public | To minimize water quality impacts | Contractor | Works sites | Construction phase | ProPECC PN 1/94 Construction Site Drainage |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|----------|-----------|--|---|-------------------------------|-------------------------|--------------------------------|--|
| | | <p>sewers/drains.</p> <ul style="list-style-type: none"> ▪ Temporary ditches shall be provided to facilitate run-off discharge into appropriate watercourses, via a silt retention pond. No site run-off shall enter the fishponds at Shuen Wan. ▪ Sand/silt removal facilities such as sand traps, silt traps and sediment basins shall be provided to remove sand/silt particles from runoff to meet the requirements of the Technical Memorandum standard under the Water Pollution Control Ordinance. The design of silt removal facilities shall be based on the guidelines provided in ProPECC PN 1/94. All drainage | | | | | |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|----------|-----------|---|---|-------------------------------|-------------------------|--------------------------------|--|
| | | <p>facilities and erosion and sediment control structures shall be inspected monthly and maintained to ensure proper and efficient operation at all times and particularly during rainstorms.</p> <ul style="list-style-type: none"> ▪ Water pumped out from excavated pits shall be discharged into silt removal facilities. ▪ During rainstorms, exposed slope/soil surfaces shall be covered by a tarpaulin or other means. <p>Other measures that need to be implemented before, during, and after rainstorms as summarized in ProPECC PN 1/94 shall be followed.</p> | | | | | |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|----------|-----------|---|---|-------------------------------|--|-----------------------------------|--|
| | | <ul style="list-style-type: none"> ▪ Exposed soil areas shall be minimized to reduce potential for increased siltation and contamination of runoff. ▪ Earthwork final surfaces shall be well compacted and subsequent permanent work or surface protection shall be immediately performed to reduce the potential of soil erosion. ▪ Open stockpiles of construction materials or construction wastes on-site shall be covered with tarpaulin or similar fabric during rainstorms. | | | | | |
| S5.30 | 4.7 | Further precautionary measures during rainy season: | To minimize water quality impacts to the designated Conservation Area | Contractor | Works areas near the Conservation Area | Rainy seasons during construction | EIAO-TM Water Pollution Control Ordinance |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|----------|-----------|---|---|-------------------------------|-------------------------|--------------------------------|--|
| | | <ul style="list-style-type: none"> ▪ For the construction of the box culvert next to the existing channel of the Wai Ha River, sand bags should be deployed around the boundary of the works trench to prevent muddy water ingress into the adjacent CA or Wai Ha River. Sand bags should also be used to surround the excavated trench. Generally, the sand bags will be placed up to a height of 300mm to provide adequate allowance for the built-up water level during rainstorm event. With sand bags in place, surface runoff will be intercepted and flow to Wai Ha River or collected by the existing drainage system as usual. ▪ For the construction of the box | | | | phase | (WPCO) |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|----------|-----------|--|---|-------------------------------|-------------------------|--------------------------------|--|
| | | <p>culvert in the extreme northeast corner of Shuen Wan Marsh</p> <p>Conservation Area sand bags should be deployed along the limit of the works area to prevent muddy water ingress into the CA. Sand bags should be placed to a height of at least 300mm from ground level and +2.5 mPD (whichever is greater) to provide adequate allowance for the built-up water level during rainstorm events.</p> <p>Unpolluted surface runoff within the works area should then be collected and directed into the existing drainage system.</p> <ul style="list-style-type: none"> ▪ Sheet-piles, which would be installed around the works trench near the Conservation Area, would | | | | | |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|----------|-----------|--|---|-------------------------------|-------------------------|--------------------------------|--|
| | | <p>be extended above ground level for about 2m to serve as hoardings to isolate the works site.</p> <ul style="list-style-type: none"> ▪ Tarpulin sheets would be used to cover the excavation areas during heavy rainstorms. This would prevent the ingress of rainwater into the trench minimising the risk of muddy water getting into Wai Ha River and the adjacent Conservation Area. ▪ Any concrete washing water would be contained inside the works site surrounded by the extended sheet piles. A pump sump at the bottom of the trench would be provided to pump any excess water during concrete washing. | | | | | |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|-------------|-----------|---|---|-------------------------------|-------------------------|--------------------------------|--|
| | | <ul style="list-style-type: none"> ▪ Stockpiling the excavated materials adjacent to the Conservation Area would not be allowed. The excavated materials would be either removed off site immediately after excavation, or stockpile at location(s) away from the Conservation Area. The stockpile locations shall be approved by the site engineer. | | | | | |
| S5.31-S5.32 | 4.8-4.9 | <p>General Construction Activities:</p> <ul style="list-style-type: none"> ▪ Debris and refuse generated on-site should be collected, handled and disposed of properly to avoid entering the Wa Ha River and fish ponds at Shuen Wan. Stockpiles of cement and other construction materials should be kept covered | To minimize water quality impacts | Contractor | Works sites | Construction phase | EIAO-TM WPCO |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|----------|-----------|--|---|-------------------------------|-------------------------|--------------------------------|--|
| | | <p>when not being used.</p> <ul style="list-style-type: none"> ▪ Oils and fuels should only be used and stored in designated areas which have pollution prevention facilities. To prevent spillage of fuels and solvents to nearby water bodies, all fuel tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. The bund should be drained of rainwater after a rain event. | | | | | |
| S5.33 | 4.10 | <p>Sewage from Construction workforce:</p> <ul style="list-style-type: none"> ▪ Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site. A | To minimize water quality impacts | Contractor | Works sites | Construction phase | EIAO-TM WPCO |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|----------|-----------|---|---|-------------------------------|-------------------------|--------------------------------|--|
| | | licensed contractor would be responsible for appropriate disposal and maintenance of these facilities. | | | | | |
| S5.34 | 4.11 | <p>River Channel Excavation Works:</p> <ul style="list-style-type: none"> ▪ The excavation works within the upstream end of the existing river channel of the Wai Ha River for the construction of the proposed box culvert shall be carried out in dry condition. Containment measures such as bunds and barriers shall be used within the affected length of the river channel and the excavation works restricted to within an enclosed dry section of the channel. The excavation works within Wai Ha River shall be restricted to the period from October | To minimize water quality impacts | Contractor | Works sites | Construction phase | EIAO-TM WPCO |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|--|-----------|---|---|-------------------------------|-------------------------|--------------------------------|--|
| | | to April. | | | | | |
| D Waste Management Implications | | | | | | | |
| S6.20 – 6.22 | 5.5 | <p>Good site practices:</p> <ul style="list-style-type: none"> ▪ Nomination of approved personnel, such as a site manager, to be responsible for good site practices and making arrangements for collection of all wastes generated at the site and effective disposal to an appropriate facility. ▪ Training of site personnel in proper waste management and chemical waste handling procedures. ▪ Provision of sufficient waste disposal points and regular | To reduce waste management impacts | Contractor | Works sites | Construction phase | ETWB TCW No.19/2005 ETWB TCW No.31/2004 |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|----------|-----------|---|---|-------------------------------|-------------------------|--------------------------------|--|
| | | <p>collection for disposal.</p> <ul style="list-style-type: none"> ▪ Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers. ▪ Separation of chemical waste for special handling and appropriate treatment at the Chemical Waste Treatment Facility. ▪ Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors. ▪ A Waste Management Plan | | | | | |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|------------|-----------|---|---|-------------------------------|-------------------------|--------------------------------|--|
| | | <p>should be prepared and submitted to the Engineer for approval. One may make reference to ETWB TCW No. 15/2003 for details.</p> <ul style="list-style-type: none"> ▪ A recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) should be proposed. | | | | | |
| S6.23-6.24 | 5.7 | <p>Waste reduction measures:</p> <ul style="list-style-type: none"> ▪ Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal. ▪ To encourage collection of aluminium cans by individual collectors, separate labelled bins | To achieve waste reduction | Contractor | Works sites | Construction phase | EIAO-TM |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|----------|-----------|---|---|-------------------------------|-------------------------|--------------------------------|--|
| | | <p>shall be provided to segregate this waste from other general refuse generated by the work force.</p> <ul style="list-style-type: none"> ▪ Any unused chemicals or those with remaining functional capacity shall be recycled. ▪ Maximising the use of reusable steel formwork to reduce the amount of C&D material. ▪ Proper storage and site practices to minimise the potential for damage or contamination of construction materials. ▪ Plan and stock construction materials carefully to minimise amount of waste generated and | | | | | |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|------------|-----------|---|---|-------------------------------|-------------------------|--------------------------------|--|
| | | avoid unnecessary generation of waste. | | | | | |
| S6.25-6.26 | | <p>Construction & Demolition (C&D) Material:</p> <ul style="list-style-type: none"> ▪ Excavated material with suitable characteristics/size should be reused on-site as fill material as far as practicable, such as for backfilling of the box culvert and drainage pipe works. ▪ Suitable areas should be designated within the works site boundaries for temporary stockpiling of C&D material. ▪ Within stockpile areas, the following measures should be taken to control potential environmental | <p>To minimize off-site disposal of C&D material</p> <p>To minimize environmental impacts during the handling of C&D material</p> | Contractor | Works sites | Construction phase | EIAO-TM |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|----------|-----------|---|---|-------------------------------|-------------------------|--------------------------------|--|
| | | <p>impacts or nuisance:</p> <ul style="list-style-type: none"> - covering material during heavy rainfall; - locating stockpiles to minimize potential visual impacts; and - minimizing land intake of stockpile areas as far as possible. <ul style="list-style-type: none"> ▪ When disposing C&D material at a public filling area, the material shall only consist of soil, rock, concrete, brick, cement plaster/mortar, inert building debris, aggregates and asphalt. The material shall be free from marine mud, household refuse, plastic, metals, industrial and chemical waste, animal and vegetable matter, and other material considered to be | | | | | |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|----------|-----------|--|--|-------------------------------|-------------------------|--------------------------------|---|
| | | unsuitable by the Filling Supervisor. | | | | | |
| S6.27 | | <p>Chemical waste:</p> <ul style="list-style-type: none"> ▪ Contractor should register with the EPD as a Chemical Waste Producer and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. ▪ Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. ▪ Appropriate labels should be securely attached on each chemical waste container indicating the | To minimize environmental impacts during the handling, transportation and disposal of chemical waste | Contractor | Works sites | Construction phase | EIAO-TM Waste Disposal (Chemical Waste) (General) Regulation |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|----------|-----------|--|--|-------------------------------|-------------------------|--------------------------------|--|
| | | <p>corresponding chemical characteristics of the chemical waste, such as explosives, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc.</p> <ul style="list-style-type: none"> ▪ The Contractor should use a licensed collector to transport and dispose of the chemical wastes generated at the Chemical Waste Treatment Centre at Tsing Yi, or other licenced facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation. | | | | | |
| S6.28 | | <p>General refuse:</p> <ul style="list-style-type: none"> ▪ It should be stored in enclosed bins or compaction units separate from C&D material. ▪ A reputable waste collector | To minimize environmental impacts during the handling and transportation of general refuse | Contractor | Works sites | Construction phase | EIAO-TM |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|----------------------------|-----------|--|---|-------------------------------|-------------------------|--------------------------------|--|
| | | <p>should be employed by the contractor to remove general refuse from the site, separately from C&D material.</p> <ul style="list-style-type: none"> ▪ An enclosed and covered area is preferred to reduce the occurrence of 'wind blown' light material. | | | | | |
| E Ecological Impact | | | | | | | |
| S. 7.95 | 6.6 | <ul style="list-style-type: none"> ▪ Sheet-pilings, which will be installed around the trench of excavation, should be extended above ground level for ~2m to act as hoarding to isolate the works site. ▪ The trenching works for the construction of the proposed box culvert should be carried out in phases, with a trench length of not | To minimize the impacts on the stream and natural river bank | Contractor | Whole site | Construction Phase | EIAO-TM |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|----------|-----------|---|---|-------------------------------|-------------------------|--------------------------------|--|
| | | <p>more than 120m in each phase. The trench should be backfilled and compacted with suitable materials upon completion of each phase of the construction works.</p> | | | | | |
| S7.117 | 6.6 | <ul style="list-style-type: none"> ▪ The construction of intercept point of twin cell box culvert at the upstream of Wai Ha River should be confined to only one side of the river bank. ▪ To restore and enhance the ecological value of the stream, the affected river bank should be reinstated to its original condition or lined with rock-filled gabion. ▪ Planting pits should be provided in the gabion bank to allow the re-establishment of riparian vegetation. | To minimize the impacts on the stream and natural river bank | Contractor | Whole site | Construction Phase | EIAO-TM |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|----------|-----------|---|---|-------------------------------|-------------------------|--------------------------------|--|
| | | <ul style="list-style-type: none"> ▪ The existing natural riverbed and substrates should be retained and the natural pool-riffle sequence should be re-created in the new channel bed. | | | | | |
| S 7.118 | 6.7 | <ul style="list-style-type: none"> ▪ All works carried out within the the river channel of Wai Ha River should be carried out from October to April, with construction carried out by land-based plant. ▪ Works within river/stream channels should be restricted to an enclosed dry section of the river, with containment measures such as bunds and barriers used within the river to minimize the impacts upon the downstream water body. | To minimise sedimentation/ water quality impacts | Contractor | Whole Site | Construction Phase | EIAO-TM |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|----------|-----------|--|---|--|-------------------------|--------------------------------|--|
| | | <ul style="list-style-type: none"> ▪ Site runoff should be directed towards regularly cleaned and maintained silt traps and oil/grease separators to minimize the risk of sedimentation and pollution of river water. ▪ The silt and oil/grease separators should be appropriately designed for the local drainage and ground conditions. ▪ To minimize leakage and loss of sediments during excavation in narrow channels, tightly sealed closed grab excavators should be deployed where material to be handled is wet. | | | | | |
| S 7.119 | 6.8 | <ul style="list-style-type: none"> ▪ The construction of the proposed box-culvert would have the potential to directly impact a few | To protect plant species of conservation interest | Contractor/ qualified botanist/horticu | Whole site | Construction Phase | EIAO-TM |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|----------|-----------|--|---|-------------------------------|-------------------------|--------------------------------|--|
| | | <p>individual of a plant species of conservation interest (Hong Kong Pavetta, <i>Pavetta hongkongensis</i>). The affected individuals should be transplanted to a suitable nearby habitats prior to the construction phase.</p> <ul style="list-style-type: none"> ▪ A detailed vegetation survey of the affected species of conservation interest should be conducted by a suitably qualified botanist/ecologist to identify the affected individuals in order to provide details for transplantation scheme. ▪ Transplantation should be supervised by a suitably qualified botanist/horticulturalist. A detailed transplantation methodology should be formulated during the detailed design stage of this Project. | | Horticulturalist | | | |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|----------|-----------|---|---|-------------------------------|-------------------------|--------------------------------|--|
| S 7.120 | 6.9 | <ul style="list-style-type: none"> ▪ Noise mitigation measures such as the use of quieter construction plant and temporary noise barriers should be implemented to minimize disturbance to habitats adjacent to the works areas. ▪ Temporary noise barriers should be used during the construction of the box-culvert along Tung Tsz Road, the floodwater pumping station, the mechanical gate, and drainage pipe to minimize potential construction phase disturbance to ardeids and avifauna foraging in marsh habitat. ▪ Noise generating construction works near the Shuen Wan Egrettry SSSI should be avoided as far as practicable during the breeding season (March to June) of the | To minimise disturbance impacts. | Contractor | Whole site | Construction Phase | EIAO-TM |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|----------|-----------|---|---|-------------------------------|-------------------------|--------------------------------|--|
| | | <p>ardeids.</p> <ul style="list-style-type: none"> ▪ Works near the SSSI (i.e. installation of mechanical gate) should be restricted to be executed outside the breeding season by provision of special conditions in the contract document. ▪ Hoardings with minimum height of 2m should be set up along the south side of the proposed box culvert works area adjacent to the marsh, extending at least 20m at both ends, throughout the construction period. | | | | | |
| S 7.121 | 6.10 | <ul style="list-style-type: none"> ▪ Placement of equipment or stockpile in designated works areas and access routes selected on existing disturbed land to minimise disturbance to natural or | To minimise disturbance to habitats. | Contractor | Whole site | Construction Phase | EIAO-TM |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|----------|-----------|---|---|-------------------------------|-------------------------|--------------------------------|--|
| | | moderate-high ecological value habitats. | | | | | |
| S 7.121 | 6.10 | <ul style="list-style-type: none"> ▪ Construction activities should be restricted to work areas that would be clearly demarcated. The work areas should be reinstated after completion of the works. | To minimise disturbance to natural habitats outside works area. | Contractor | Whole site | Construction Phase | EIAO-TM |
| S 7.121 | 6.10 | <ul style="list-style-type: none"> ▪ Waste skips should be provided to collect general refuse and construction wastes. The wastes would be disposed of timely and properly off-site. | To minimise disturbance to habitats. | Contractor | Whole site | Construction Phase | EIAO-TM |
| S 7.121 | 6.10 | <ul style="list-style-type: none"> ▪ General drainage arrangements should include sediment and oil traps to collect and control construction site run-off. | To minimise sedimentation/ water quality impacts | Contractor | Whole site | Construction Phase | EIAO-TM |
| S 7.121 | 6.10 | <ul style="list-style-type: none"> ▪ Open burning on works sites is illegal, and should be strictly prohibited. | To prevent accidental hill-fires. | Contractor | Whole site | Construction Phase | EIAO-TM |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|----------|-----------|--|---|------------------------------------|-------------------------|--------------------------------|--|
| S 7.122 | 6.11 | <ul style="list-style-type: none"> ▪ De-silting should be limited to the dry season. | To minimise sedimentation/ water quality impacts | Maintenance parties of the channel | Whole site | Operation Phase | EIAO-TM |
| S 7.122 | 6.11 | <ul style="list-style-type: none"> ▪ Waste material produced during de-silting should be disposed of in a timely and appropriate manner. | To minimise sedimentation/ water quality impacts | Maintenance parties of the channel | Whole site | Operation Phase | EIAO-TM |
| S 7.123 | 6.12 | <ul style="list-style-type: none"> ▪ Planting of trees should be provided within the project area to compensate for the unavoidable loss of approximately 0.08ha secondary woodland habitat due to the Project. ▪ Planting of trees and other vegetation within project area along the banks of Wai Ha River and Tung Tsz Road should be carried out to provide compensation for unavoidable tree-felling and loss of riparian vegetation resulting from the | To compensate the loss of vegetation | Contractor | Whole site | Construction Phase | EIAO-TM |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|----------|-----------|---|--|----------------------------------|--|--------------------------------|--|
| | | <p>Project.</p> <ul style="list-style-type: none"> ▪ The compensatory planting should make use of native plant species with flowers/fruits attractive to wildlife. | | | | | |
| S 7.124 | 6.13 | <ul style="list-style-type: none"> ▪ Compensation would be required for the loss of a small area of marsh habitat (about 0.30ha) within the CA resulting from the construction of the box-culvert. ▪ An existing low ecological value recreational fishpond on government land adjacent to the marsh would be used as a proposed area (about 0.8ha) for the compensation for the marsh as well as secondary woodland habitats loss (0.08ha). ▪ The pond should be enhanced by removing boardwalks around the | To compensate the loss of marsh habitat and enhance the quality compensatory habitat | Contractor / qualified ecologist | The recreational fish pond located to the southwest of the existing Tung Tsz Nursery | Construction Phase | EIAO-TM |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|----------|-----------|--|---|-------------------------------|-------------------------|--------------------------------|--|
| | | <p>existing pond, and restoring vegetation along the pond bunds, and it would be re-profiled to provide areas of shallow water (approximately 15-50cm deep), creating a suitable foraging habitat for avifauna, particularly ardeids and other waders.</p> <ul style="list-style-type: none"> ▪ Screen planting of shrubs and trees along the south-eastern bund of the pond should be implemented to minimise disturbance to avifauna and other wildlife from the adjacent recreational fishpond. The enhanced pond is expected to provide a moderate-high ecological value wetland habitat. | | | | | |

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & Main Concern to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? |
|-----------|-----------|--|--|-------------------------------|-------------------------|-----------------------------------|--|
| F | | <i>Landscape and Visual</i> | | | | | |
| Table 8.4 | 7.6 | Visual screen, contaminant/ liaison with nursery, protection of existing trees with works area and construction light are used or practiced to mitigate the impacts during construction phase. | To mitigate the landscape | Contractor | Whole site | Construction | EIAO-TM |
| Table 8.4 | 7.7 | Viewing area formation, architectural design for pump house, landscape design for pump house, enhancement planting along Tung Tsz Road, sufficient soil depth for enhancement planting, transplanting of trees to adjacent locations, preparation for transplanting and reinstatement of affected area are practiced to mitigate the impacts during operational phase. | To mitigate the landscape and visual impacts during the operational phase. | Contractor | Whole site | Detail Design / Operational Phase | EIAO-TM |

Appendix H:

A)

The recommend mitigation measures of EM&A manual (revision 3)

B)

Implementation status of environmental protection and mitigation measures

B) Implementation status of environmental protection and mitigation

| EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & main concern to Address | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? | Implementation status |
|-------------|--|---|---|--------------------------------|--|-----------------------|
| 2.18 | Use well maintained construction plant | To minimize construction noise impact | Works areas | Construction phase | EIAO-TM NCO | Implemented |
| | Shut down plants between work periods | | | | | Implemented |
| | Install silencers on construction equipment | | | | | Implemented |
| | Locate mobile plant far away from NSRs | | | | | Implemented |
| | Quiet plants should be used | | | | | Implemented |
| 2.19 | Use of quieter PME | | | | | Not applicable |
| 2.20 - 2.21 | Use of temporary noise barrier | | Pipe laying in Wai Ha | | | Not applicable |
| 2.22 | Use of alternative quieter construction method | | Part of the Works Pipe laying in Wai Ha | | | Not applicable |
| 2.23 – 2.24 | Use of noise enclosure | | Pipe laying in Wai Ha | | | Not applicable |

| EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & main concern to Address | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? | Implementation status |
|----------------------|--|--|--------------------------------|---------------------------------------|---|------------------------------|
| 3.5 | Implement regular watering and vehicle washing facilities | To minimize construction dust impact | Construction Site | Construction phase | EIAO-TM | Implemented |
| | Cover excavated or stockpile of dusty material by impervious sheeting or sprayed with water | | | | | Implemented |
| | Use tarpaulin to cover dusty materials on vehicles | | | | | Implemented |
| 4.5 | Provide silt trap and oil interceptor to remove the oil, lubricants, grease, silt, grit and debris from the wastewater before pumped to the public storm water drainage system | To minimize water quality impact | Construction Site | Construction phase | EIAO-TM WPCO | Implemented |
| 4.5 | During rainstorms, exposed slope/soil surfaces shall be covered by a tarpaulin or other means. Others measures that need to be implemented before, during, and after rainstorms as summarized in ProPECC PN 1/94 shall be followed | | | | | Not applicable |

| EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & main concern to Address | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? | Implementation status |
|-----------|---|--|--|-----------------------------------|--|-----------------------|
| 4.10 | Provide site toilet facilities | To minimize water quality impact | Construction Site | Construction phase | EIAO-TM WPCO | Implemented |
| 4.7 | <p>Further precautionary measures during rainy season:</p> <p>For the construction of the box culvert next to the existing channel of the Wai Ha River, sand bags should be deployed around the boundary of the works trench to prevent muddy water ingress into the adjacent CA or Wai Ha River. Sand bags should also be used to surround the excavated trench. Generally, the sand bags will be placed up to a height of 300mm to provide adequate allowance for the built-up water level during rainstorm event. With sand bags in place, surface runoff will be intercepted and flow to Wai Ha River or collected by the existing drainage system as usual.</p> <p>For the construction of the box culvert in the extreme northeast corner of Shuen Wan Marsh Conservation Area sand bags should be deployed along the limit of the works area to prevent muddy water ingress into the CA. Sand bags should be placed to a height of at least 300mm from round level and +2.5 mPD (whichever is greater) to provide adequate allowance</p> | To minimize water quality impact to the designated Conservation Area | Works areas near the Conservation Area | Rainy seasons during construction | EIAO-TM WPCO | Not applicable |

| EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & main concern to Address | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? | Implementation status |
|-----------|--|---|-------------------------|--------------------------------|--|--|
| | <p>for the built-up water level during rainstorm events. Unpolluted surface runoff within the works area should then be collected and directed into the existing drainage system.</p> <p>Sheet-piles, which would be installed around the works trench near the Conservation Area, would be extended above ground level for about 2m to serve as hoardings to isolate the works site.</p> <p>Tarpulin sheets would be used to cover the excavation areas during heavy rainstorms. This would prevent the ingress of rainwater into the trench minimising the risk of muddy water getting into Wai Ha River and the adjacent Conservation Area.</p> <p>Any concrete washing water would be contained inside the works site surrounded by the extended sheet piles. A pump sump at the bottom of the trench would be provided to pump any excess water during concrete</p> | | | | | |
| 5.9 | Reuse excavated material as much as possible | | | | | Implemented |
| 5.7 | <p>Any unused chemicals or those with remaining functional capacity shall be recycled.</p> <p>Recycle scrap metals or abandoned equipment</p> | To achieve waste reduction | Works areas | Construction phase | EIAO-TM | <p>Not applicable</p> <p>Implemented</p> |

| EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & main concern to Address | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? | Implementation status |
|----------------------|--|--|--------------------------------|---------------------------------------|---|------------------------------|
| 5.5 | A recording system for the amount of wastes generated, recycled and disposed should be proposed | To reduce waste management impacts | Works areas | Construction phase | ETWB TCW | Implemented |
| 5.9 | Adopt a trip ticket system for the disposal of C&D materials | | | | No. 19/2005 | Implemented |
| 5.11 | All general refuse should be segregated and stored in enclosed bins or compaction units | | | | ETWB TCW NO. 31/2004 | Implemented |
| 5.10 | Contractor should be a required to register with the EPD as a Chemical Waste Producer and to follow the guidelines states in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. | To minimize the environmental impacts associated with the handling, transportation and disposal of chemical waste. | Work site | Construction phase | EIAO-TM Waste Disposal (Chemical Waste)(General) Regulation | Implemented |
| | <p>Good quality containers compatible with the chemical wastes should be used, and Incompatible chemicals should be stored separately.</p> <p>Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosives, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc.</p> | | | | | Not applicable |

| EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & main concern to Address | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? | Implementation status |
|----------------------|---|--|--------------------------------|---------------------------------------|---|------------------------------|
| 5.5 | A recording system for the amount of wastes generated, recycled and disposed should be proposed | To reduce waste management impacts | Works areas | Construction phase | ETWB TCW No. 19/2005 ETWB TCW NO. 31/2004 | Implemented |
| 6.6 | Sheet-pilings, which will be installed around the trench of excavation, should be extended above ground level for ~2m to act as hoarding to isolate the works site. The trenching works for the construction of the proposed box culvert should be carried out in phases, with a trench length of not more than 120m in each phase. The trench should be backfilled and compacted with suitable materials upon completion of each phase of the construction works. | To minimize the impacts on the stream and natural river bank. | Whole site | Construction phase | EIAO-TM | Implemented |
| 6.6 | The construction of intercept oint of twin cell box culvert at the upstream of Wai Ha River should be confined to only one side of the river bank. To restore and enhance the ecological value of the stream, the affected river bank should be reinstated to its original condition or lined with rock-filled gabion. Planting pits should be provided in the gabion bank to allow the re-establishment of riparian vegetation. | To minimize the impacts on the stream and natural river bank. | Whole site | Construction phase | EIAO-TM | No applicable |

| EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & main concern to Address | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? | Implementation status |
|----------------------|--|--|--------------------------------|---------------------------------------|---|------------------------------|
| | <p>The existing natural riverbed and substrates should be retained and the natural pool-riffle sequence should be re-created in the new channel bed.</p> | | | | | |
| 6.7 | <p>All works carried out within the river channel of Wai Ha River should be carried out from October to April, with construction carried out by land-based plant.</p> <p>Works within river/stream channels should be restricted to an enclosed dry section of the river, with containment measures such as bunds and barriers used within the river to minimize the impacts upon the downstream water body.</p> <p>Site runoff should be directed towards regularly cleaned and maintained silt traps and oil/grease separators to minimize the risk of sedimentation and pollution of river water.</p> <p>The silt and oil/grease separators should be appropriately designed for the local drainage and ground conditions.</p> <p>To minimize leakage and loss of sediments during excavation in narrow channels, tightly sealed closed grab excavators should be deployed where material to be handled is wet.</p> | <p>To minimize sedimentation/ water quality impacts</p> | <p>Whole site</p> | <p>Construction phase</p> | <p>EIAO-TM</p> | <p>No applicable</p> |

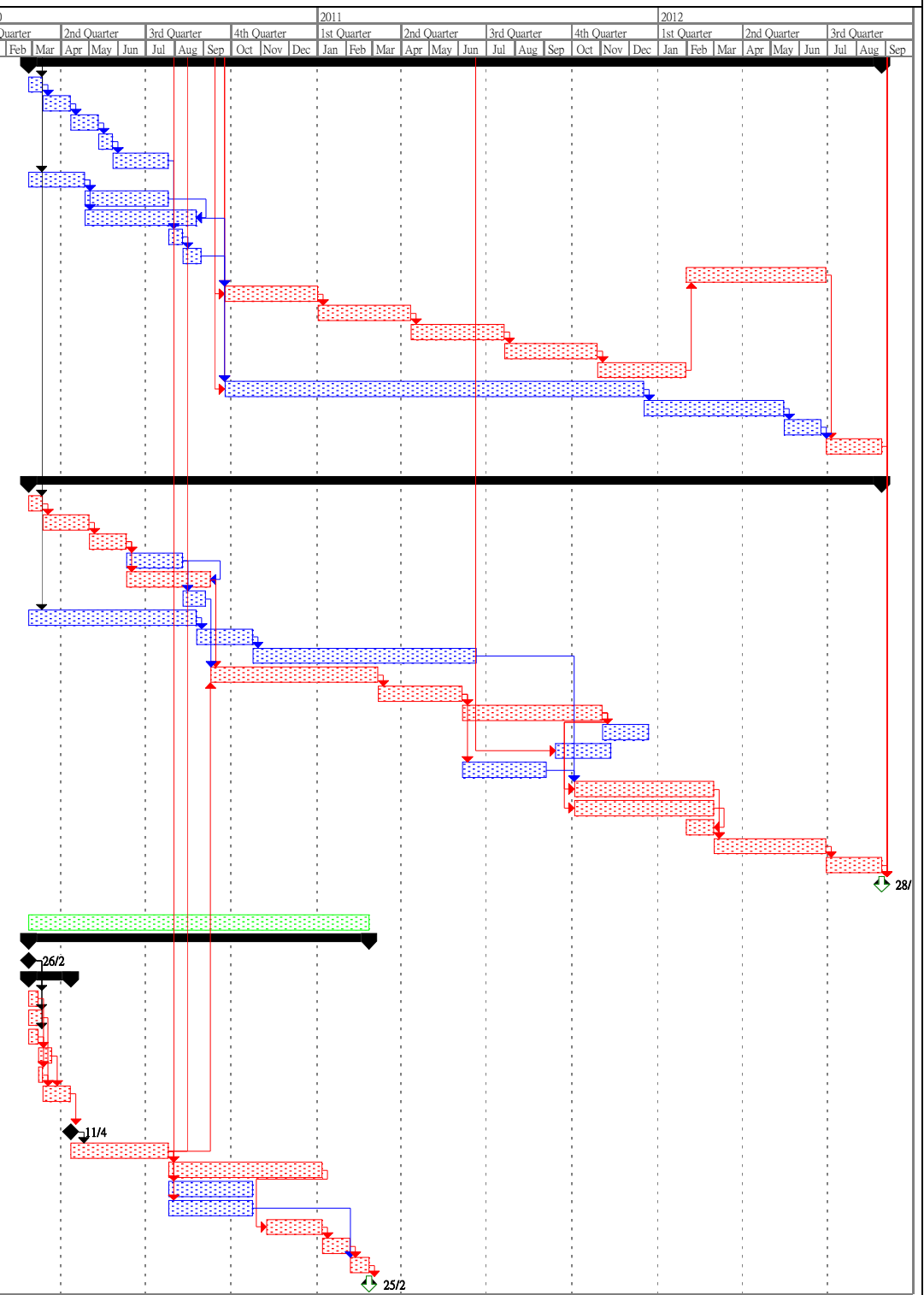
| EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & main concern to Address | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? | Implementation status |
|-----------|---|---|-------------------------|--------------------------------|--|-----------------------|
| 6.8 | <p>The construction of the proposed box-culvert would have the potential to directly impact a few individual of a plant species of conservation interest (Hong Kong Pavetta, Pavetta hongkongensis). The affected individuals should be transplanted to a suitable nearby habitats prior to the construction phase.</p> <p>A detailed vegetation survey of the affected species of conservation interest should be conducted by a suitably qualified botanist/ecologist to identify the affected individuals in order to provide details for transplantation scheme.</p> <p>Transplantation should be supervised by a suitably qualified botanist/horticulturalist. A detailed transplantation methodology should be formulated during the detailed design stage of this Project.</p> | To protect plant species of conservation interest | Whole site | Construction phase | EIAO-TM | No applicable |
| 6.9 | Placement of equipment or stockpile in designated works areas and access routes selected on existing disturbed land to minimize disturbance to natural or moderate-high ecological value habitats. | To minimise disturbance to habitats. | Whole site | Construction phase | EIAO-TM | No applicable |
| 6.13 | General drainage arrangements should include sediment and oil traps to collect and control construction site run-off. | To minimise sedimentation/ water quality impacts | Whole site | Construction phase | EIAO-TM | Implemented |

| EM&A Ref. | Recommended Mitigation Measures | Objectives of the Recommended Measure & main concern to Address | Location of the measure | When to implement the measure? | What requirements or standards for the measure to achieve? | Implementation status |
|----------------------|---|--|--------------------------------|---------------------------------------|---|------------------------------|
| 6.13 | Construction activities should be restricted to work areas that would be clearly demarcated. The work areas should be reinstated after completion of the works. | To minimise disturbance to natural habitats outside works area. | Whole site | Construction phase | EIAO-TM | Implemented |
| 6.13 | Placement of equipment or stockpile in designated works areas and access routes selected on existing disturbed land to minimize disturbance to natural or moderate-high ecological value habitats. | To minimise disturbance to natural habitats | Whole site | Construction phase | EIAO-TM | Implemented |
| 7.6 | Visual screen, contaminant/ liaison with nursery, protection of existing trees with works area and construction light are used or practiced to mitigate the impacts during construction phase | To mitigate the landscape and visual impacts during the Construction phase | Whole site | Construction phase | EIAO-TM | Implemented |
| 7.7 | Viewing area formation , architectural design for pump house, landscape design for pump hose, enhancement planting along Tung Tsz Road, sufficient soil depth for enhancement planting, transplanting of trees to adjacent locations preparation for transplanting and reinstatement of affected area are practiced to mitigate the impacts during operational phase. | To mitigate the landscape and visual impacts during the operational phase | Whole site | Detail Design / Operational Phase | EIAO-TM | Not Applicable |

Appendix I: Construction Programme

Master Programme (Rev. 6)

| ID | ID no. in Rev. 5 | ID no. in Rev. 4 | ID no. in Rev. 3 | ID no. in Rev. 2 | Task Name | Duration | Start | Finish | Predecessors | Successors | 2010 | | | | | | | | | | | | 2011 | | | | | | | | | | | | 2012 | | | | | | | | | | | |
|-----|------------------|------------------|------------------|------------------|--|-----------------|--------------------|--------------------|----------------------------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | | | 1st Quarter | 2nd Quarter | 3rd Quarter | 4th Quarter | 1st Quarter | 2nd Quarter | 3rd Quarter | 4th Quarter | 1st Quarter | 2nd Quarter | 3rd Quarter | 4th Quarter | 1st Quarter | 2nd Quarter | 3rd Quarter | 4th Quarter | | | | | | | | | | | | | | | | | | | | |
| 82 | 82 | 82 | 80 | 79 | Twin Cell Box Culvert | 915 days | Fri 26/2/10 | Tue 28/8/12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 83 | 83 | 83 | 81 | 80 | Liaison with LCSD | 15 days | Fri 26/2/10 | Fri 12/3/10 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 84 | 84 | 84 | 82 | 81 | Determination of Box Culvert Alignment | 30 days | Sat 13/3/10 | Sun 11/4/10 | 83 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 85 | 85 | 85 | 83 | 82 | Record Survey | 30 days | Mon 12/4/10 | Tue 11/5/10 | 84 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 86 | 86 | 86 | 84 | 83 | Condition Survey of Existing Structure | 15 days | Wed 26/5/10 | Wed 26/5/10 | 85 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 87 | 87 | 87 | 85 | 84 | Submission of Method Statement to LCSD | 60 days | Thu 27/5/10 | Sun 25/7/10 | 86 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88 | 88 | 88 | 86 | 85 | Design of Temporary Traffic Arrangement | 60 days | Fri 26/2/10 | Mon 26/4/10 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 89 | 89 | 89 | 87 | 86 | Submission of TTA to TMLG for Approval | 90 days | Tue 27/4/10 | Sun 25/7/10 | 88 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90 | 90 | 90 | 88 | 87 | Excavation Permit | 120 days | Tue 27/4/10 | Tue 24/8/10 | 88,89FF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 91 | 91 | 91 | 89 | 88 | Temporary Removal of Structure and Facilities / Re provision | 15 days | Mon 26/7/10 | Mon 9/8/10 | 87 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 92 | 92 | 92 | | | Provision of Temporary Irrigation Pipes | 20 days | Tue 10/8/10 | Sun 29/8/10 | 91 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 93 | 93 | 93 | 91 | 89 | Box Culvert at Chainage 0 - 25 | 150 days | Wed 1/2/12 | Fri 29/6/12 | 98 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 94 | 94 | 94 | 92 | 90 | Box Culvert at Chainage 25 - 75 | 100 days | Fri 24/9/10 | Sat 1/1/11 | 31FS-30 days,30,92 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 95 | 95 | 95 | 93 | 91 | Box Culvert at Chainage 75 - 125 | 100 days | Sun 2/1/11 | Mon 11/4/11 | 94 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 96 | 96 | 96 | 94 | 92 | Box Culvert at Chainage 125 - 175 | 100 days | Tue 12/4/11 | Wed 20/7/11 | 95 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 97 | 97 | 97 | 95 | 93 | Box Culvert at Chainage 175 - 225 | 100 days | Thu 21/7/11 | Fri 28/10/11 | 96 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 98 | 98 | 98 | 96 | 94 | Box Culvert at Chainage 225 - 275 | 95 days | Sat 29/10/11 | Tue 31/1/12 | 97 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 99 | 99 | 99 | 97 | 95 | Box Culvert at Chainage 275 - 300 | 450 days | Fri 24/9/10 | Sat 17/12/11 | 90,31FS-30 days,30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100 | 100 | 100 | 98 | 96 | Box Culvert at Chainage 300 - 350 (Including Outfall & Desilting Chamber) | 150 days | Sun 18/12/11 | Tue 15/5/12 | 99 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 101 | 101 | 101 | 99 | | 1200mm dia. Drainage Pipe | 40 days | Wed 16/5/12 | Sun 24/6/12 | 100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102 | 102 | 102 | 100 | 97 | Reinstallation and Reinstatement of Existing Structure, Facilities and Trees | 60 days | Sat 30/6/12 | Tue 28/8/12 | 93,101 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 103 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 104 | 104 | 104 | 102 | 99 | Dia. 2100mm Drainage Pipe | 915 days | Fri 26/2/10 | Tue 28/8/12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 105 | 105 | 105 | 103 | 100 | Record Survey | 15 days | Fri 26/2/10 | Fri 12/3/10 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 106 | 106 | 106 | 104 | 101 | Site Investigation (Trial Pit) | 50 days | Sat 13/3/10 | Sat 1/5/10 | 105 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 107 | 107 | 107 | 105 | 102 | Design of Temporary Traffic Arrangement | 40 days | Sun 2/5/10 | Thu 10/6/10 | 106 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 108 | 108 | 108 | 106 | 103 | Submission of TTA to TMLG for Approval | 60 days | Fri 11/6/10 | Mon 9/8/10 | 107 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 109 | 109 | 109 | 107 | 104 | Excavation Permit | 90 days | Fri 11/6/10 | Wed 8/9/10 | 107,108FF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 110 | 110 | 110 | 108 | | Liaison with HyD / LCSD for Planter Removal | 25 days | Tue 10/8/10 | Fri 3/9/10 | 108 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 111 | 111 | 111 | 109 | 105 | E&M Design of Penstocks | 180 days | Fri 26/2/10 | Tue 24/8/10 | 17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 112 | 112 | 112 | 110 | 106 | Submission for Approval | 60 days | Wed 25/8/10 | Sat 23/10/10 | 111 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 113 | 113 | 113 | 111 | 107 | Fabrication & Delivery of Penstocks | 240 days | Sun 24/10/10 | Mon 20/6/11 | 112 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 114 | 114 | 114 | 112 | 108 | MH 04 to MH 05 | 180 days | Thu 9/9/10 | Mon 7/3/11 | 109,139,110 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 115 | 115 | 115 | 113 | 109 | MH 03 to MH 04 | 90 days | Tue 8/3/11 | Sun 5/6/11 | 114 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 116 | 116 | 116 | 114 | 110 | Intake to MH 03 | 150 days | Mon 6/6/11 | Wed 21/1/11 | 115 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 117 | 117 | 117 | 115 | 115 | Reinstatement of Existing Planter | 50 days | Thu 3/11/11 | Thu 22/12/11 | 116 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 118 | 118 | 118 | 116 | 111 | MH 05 to MH 06 | 60 days | Sat 12/11/11 | Wed 14/9/11 | 47SS+80 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 119 | 119 | 119 | | | Temporary Drainage Management Plan | 90 days | Mon 6/6/11 | Sat 3/9/11 | 115 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 120 | 120 | 120 | 118 | 112 | Intake (As required in Dry Season) | 150 days | Tue 4/10/11 | Thu 1/3/12 | 116FS-30 days,113,119 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 121 | 121 | 121 | 119 | 113 | Modification of Existing Outlet Structure of Wai Ha River | 150 days | Tue 4/10/11 | Thu 1/3/12 | 116FS-30 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 122 | 122 | 122 | 120 | 114 | Installation of 4 nos of Mechanical Penstocks | 30 days | Wed 1/2/12 | Thu 1/3/12 | 121FF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 123 | 123 | 123 | 121 | | E & M Works | 120 days | Fri 2/3/12 | Fri 29/6/12 | 122,120 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 124 | 124 | 124 | 122 | | Misc. Works & Reinstatement | 60 days | Sat 30/6/12 | Tue 28/8/12 | 123 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 125 | 125 | 125 | 123 | 116 | Completion of Section I | 0 days | Tue 28/8/12 | Tue 28/8/12 | 78,124,102,51,58,65,71,80 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 126 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 127 | 127 | 127 | 125 | 118 | Time for Completion of Section II | 365 days | Fri 26/2/10 | Fri 25/2/11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 128 | 128 | 128 | 126 | 119 | Section II (Area C - Ecological Compensation Area at Shuen Wan) | 365 days | Fri 26/2/10 | Fri 25/2/11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 129 | 129 | 129 | 127 | 120 | Commencement of Works | 0 days | Fri 26/2/10 | Fri 26/2/10 | 131,132,133 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 130 | 130 | 130 | 128 | 121 | Preliminary Works | 45 days | Fri 26/2/10 | Sun 11/4/10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 131 | 131 | 131 | 129 | 122 | Site Clearance | 10 days | Fri 26/2/10 | Sun 7/3/10 | 129 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 132 | 132 | 132 | 130 | 123 | Hoarding Erection | 15 days | Fri 26/2/10 | Fri 12/3/10 | 129 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 133 | 133 | 133 | 131 | 124 | Pumping Water out of Pond | 10 days | Fri 26/2/10 | Sun 7/3/10 | 129 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 134 | 134 | 134 | 132 | 125 | Check actual Tidal against Predicted Tidal Level | 15 days | Mon 8/3/10 | Mon 22/3/10 | 131 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 135 | 135 | 135 | 133 | 126 | Survey Existing Pond Bed | 5 days | Mon 8/3/10 | Fri 12/3/10 | 133 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 136 | 136 | 136 | 134 | 127 | Design of Ecological Compensation Area | 30 days | Sat 13/3/10 | Sun 11/4/10 | 135,134FS-10 days,132 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 137 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 138 | 138 | 138 | 136 | 129 | Submission of Design of Ecological Compensation Area to EPD for Approval | 0 days | Sun 11/4/10 | Sun 11/4/10 | 136 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 139 | 139 | 139 | 137 | 130 | Refer to Permit Requirement plus 15 weeks for Approval and Commencement of Works | 105 days | Mon 12/4/10 | Sun 25/7/10 | 138 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 140 | 140 | 140 | 138 | 131 | Fill of Pond to Designed Level | 165 days | Mon 26/7/10 | Thu 6/1/11 | 139 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 141 | 141 | 141 | 139 | 132 | Transplanting | 90 days | Mon 26/7/10 | Sat 23/10/10 | 139 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 142 | 142 | 142 | | | Temporary Drainage Management Plan | 90 days | Mon 26/7/10 | Sat 23/10/10 | 139 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 143 | 143 | 143 | 141 | 133 | Planting Works at Upper Level | 60 days | Mon 8/11/10 | Thu 6/1/11 | 140FS-60 days | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 144 | 144 | 144 | 142 | 134 | Planting Works at Lower Level | 30 days | Fri 7/1/11 | Sat 5/2/11 | 143 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 145 | 145 | 145 | 143 | 135 | Setting up Water Circulation System | 20 days | Sun 6/2/11 | Fri 25/2/11 | 144,142 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 146 | 146 | 146 | 144 | 136 | Completion of Section II | 0 days | Fri 25/2/11 | Fri 25/2/11 | 145 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



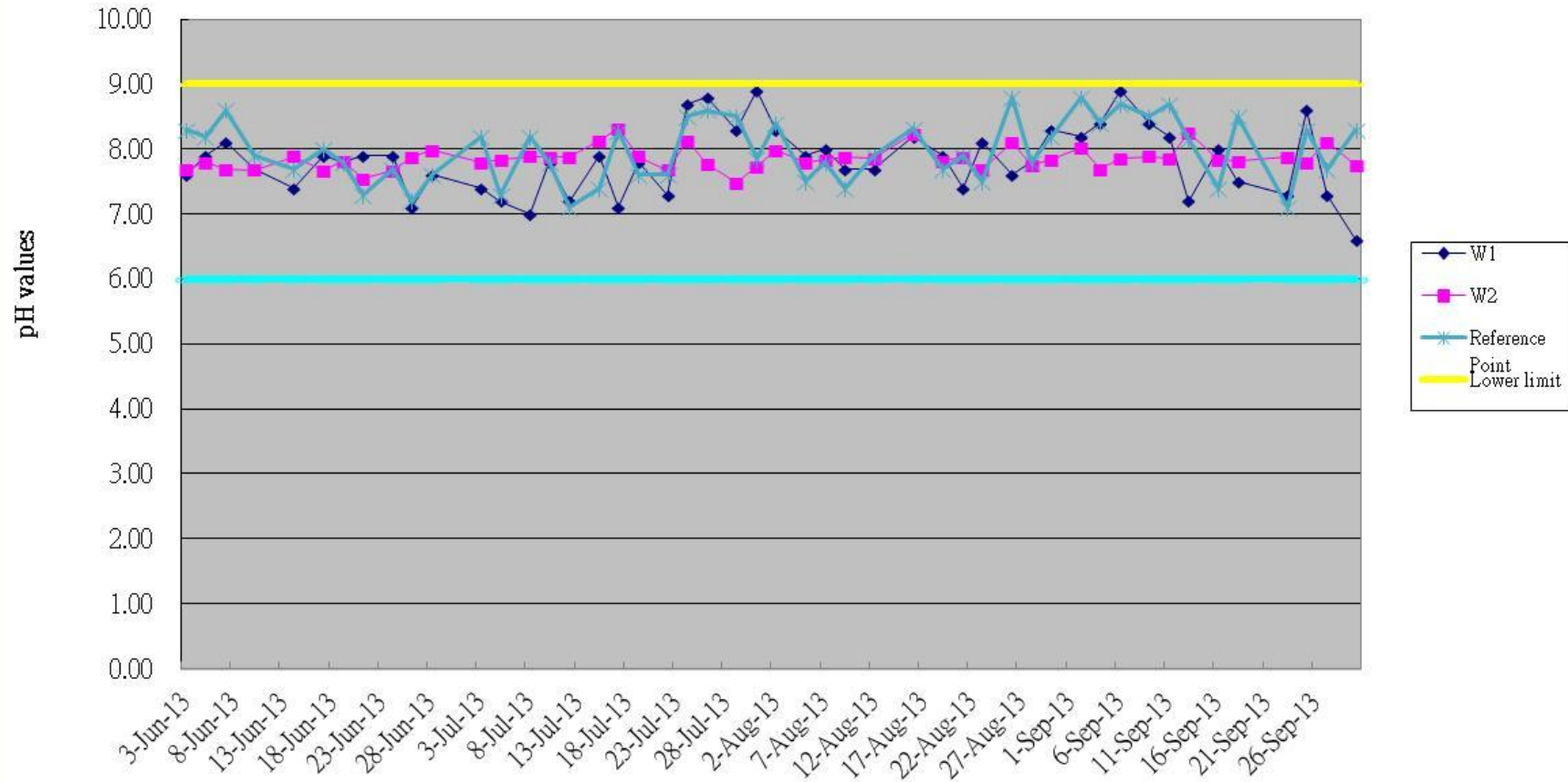
Appendix J: Three month rolling programme

3 Months Rolling Programme (September 2013 - November 2013)

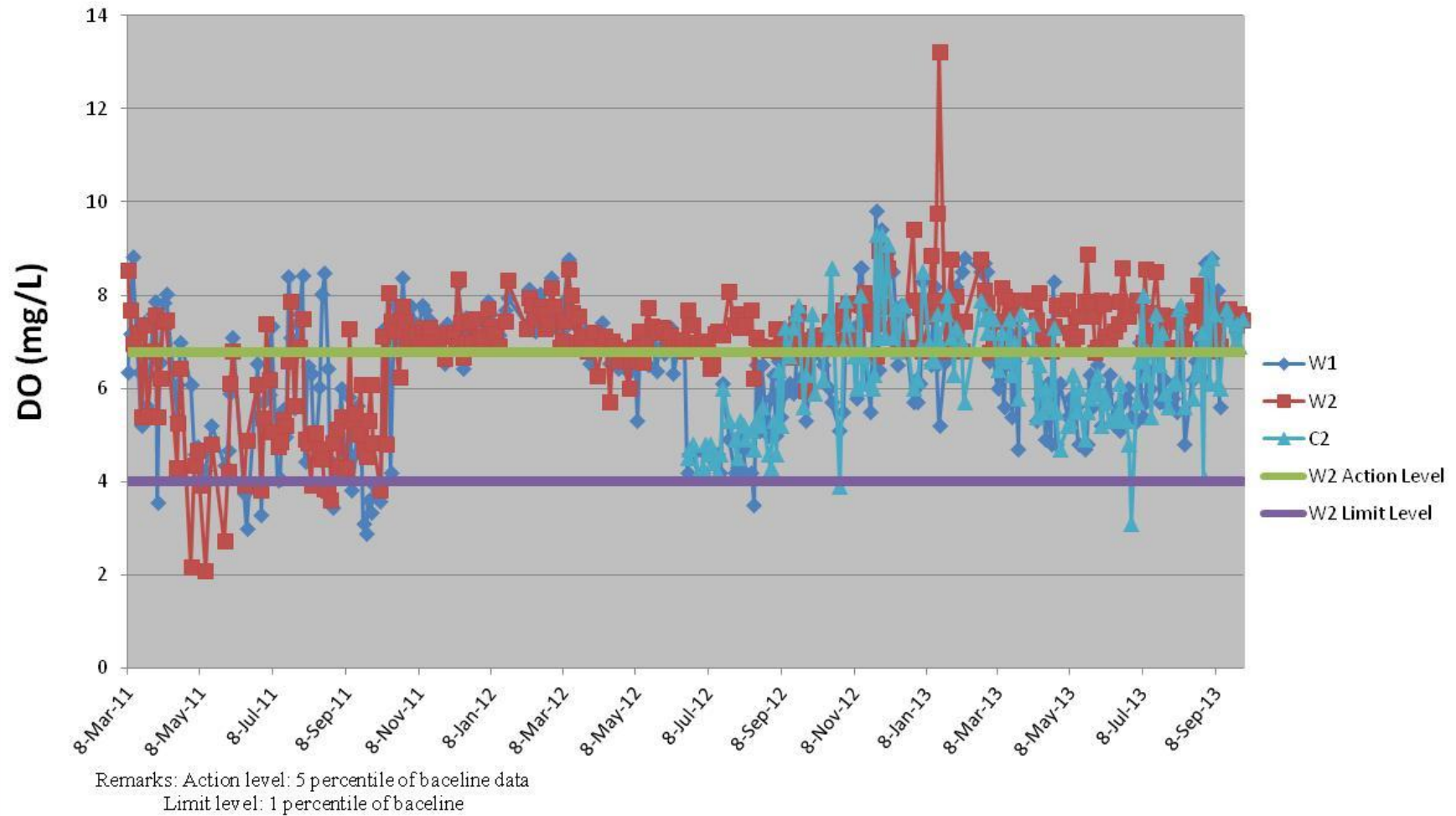
| ID | Task Name | Duration | Start | Finish | August 2013 | | | | | | | September 2013 | | | | | | | October 2013 | | | | | | | November 2013 | | | | | | | December 2013 | | | | | | | January 2014 | | | | | | | February 2014 | | | | | | | March 2014 | | | | | | | April 2014 | | | | | | |
|----|---|----------|-------------|--------------|-----------------|------|-----|------|------|------|-----|----------------|------|------|------|------|-------|-------|--------------|------|-------|-------|-------|------|------|---------------|-------|-------|-----|------|------|------|---------------|-----|------|------|-----|-----|------|--------------|------|--|--|--|--|--|---------------|--|--|--|--|--|--|------------|--|--|--|--|--|--|------------|--|--|--|--|--|--|
| | | | | | 21/7 | 28/7 | 4/8 | 11/8 | 18/8 | 25/8 | 1/9 | 8/9 | 15/9 | 22/9 | 29/9 | 6/10 | 13/10 | 20/10 | 27/10 | 3/11 | 10/11 | 17/11 | 24/11 | 1/12 | 8/12 | 15/12 | 22/12 | 29/12 | 5/1 | 12/1 | 19/1 | 26/1 | 2/2 | 9/2 | 16/2 | 23/2 | 2/3 | 9/3 | 16/3 | 23/3 | 30/3 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Area A | 150 days | Thu 1/8/13 | Sat 28/12/13 | [Milestone bar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Pumping Station | 80 days | Thu 1/8/13 | Sat 19/10/13 | [Milestone bar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Complete the remaining man-made slope | 30 days | Thu 1/8/13 | Fri 30/8/13 | [Task bar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Road and Kerb | 40 days | Thu 1/8/13 | Mon 9/9/13 | [Task bar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Fencing and Boundary Wall | 80 days | Thu 1/8/13 | Sat 19/10/13 | [Task bar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | Cladding | 40 days | Thu 1/8/13 | Mon 9/9/13 | [Task bar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | Green Roof | 10 days | Tue 10/9/13 | Thu 19/9/13 | [Task bar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | Landscape Works | 20 days | Tue 10/9/13 | Sun 29/9/13 | [Task bar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | Installation of Minor E&M Works eg. Lighting, Lightning System ... | 50 days | Thu 1/8/13 | Thu 19/9/13 | [Task bar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | Ting Kok Road | 150 days | Thu 1/8/13 | Sat 28/12/13 | [Milestone bar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | Resurfacing Existing Bicycle Track | 150 days | Thu 1/8/13 | Sat 28/12/13 | [Task bar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | Reinstatement of Planter | 50 days | Thu 1/8/13 | Thu 19/9/13 | [Task bar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | Planting | 10 days | Fri 20/9/13 | Sun 29/9/13 | [Task bar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | Reinstatement of Manhole | 40 days | Thu 1/8/13 | Mon 9/9/13 | [Task bar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | Complete the remaining section of Intake Structure | 60 days | Thu 1/8/13 | Sun 29/9/13 | [Task bar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | Installation of Bar Screen | 20 days | Mon 30/9/13 | Sat 19/10/13 | [Task bar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | Area B (Tung Tsz Nursery) | 240 days | Thu 1/8/13 | Fri 28/3/14 | [Milestone bar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | Backfilling and reinstatement of Trench | 30 days | Thu 1/8/13 | Fri 30/8/13 | [Task bar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | Reinstatement of Footpath, Irrigation System, Removal of Temporary Hoarding | 150 days | Sat 31/8/13 | Mon 27/1/14 | [Task bar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 | Reinstatement of Existing StormWater Drain | 50 days | Thu 1/8/13 | Thu 19/9/13 | [Task bar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | Desilting Works in Constructed Box Culvert | 50 days | Sat 31/8/13 | Sat 19/10/13 | [Task bar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Appendix K: Graphical plots of trends of monitored parameter

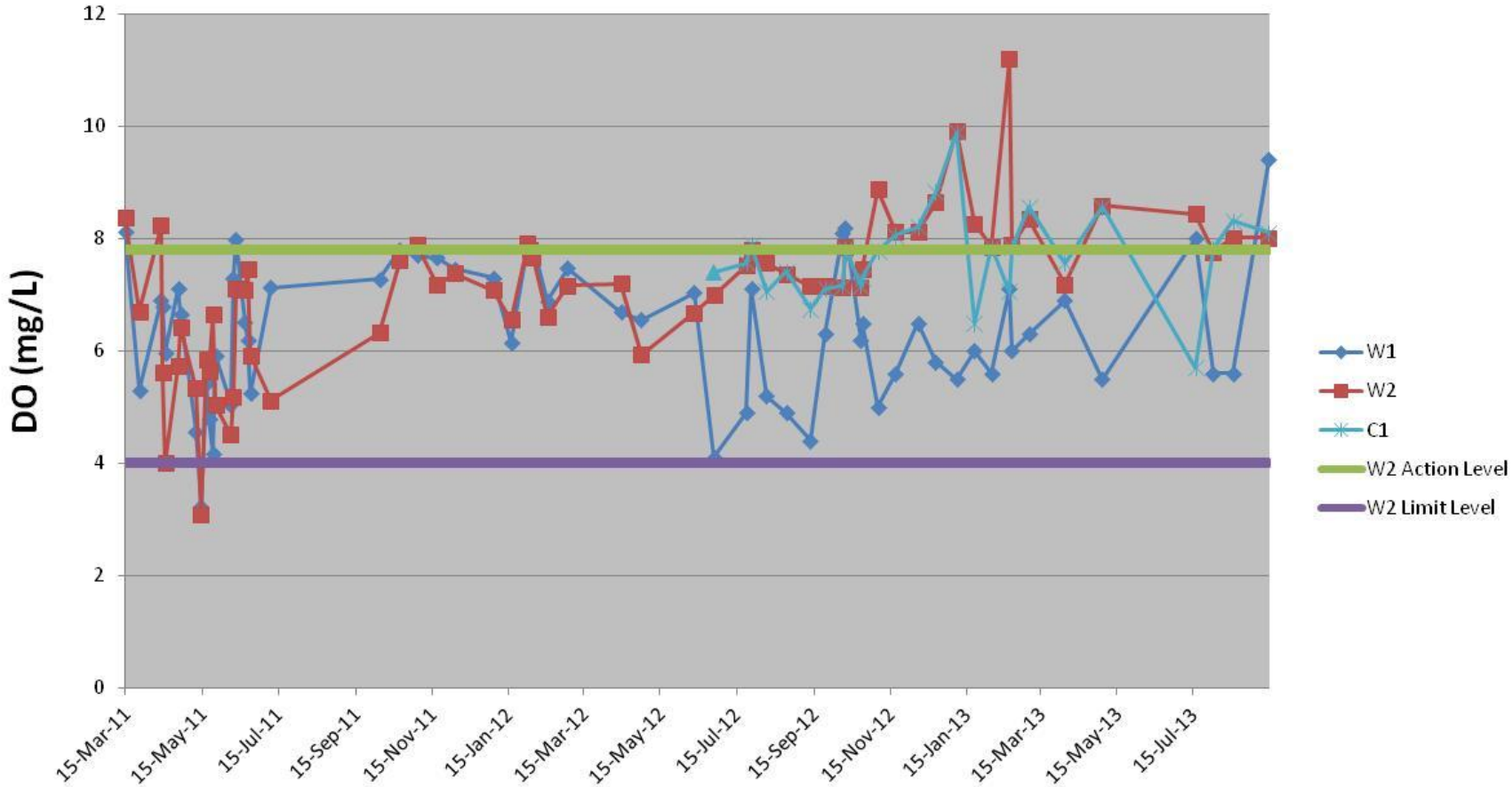
Graphical plots of pH values W1&W2



Graphical plots of DO (ebb tide) for W1&W2

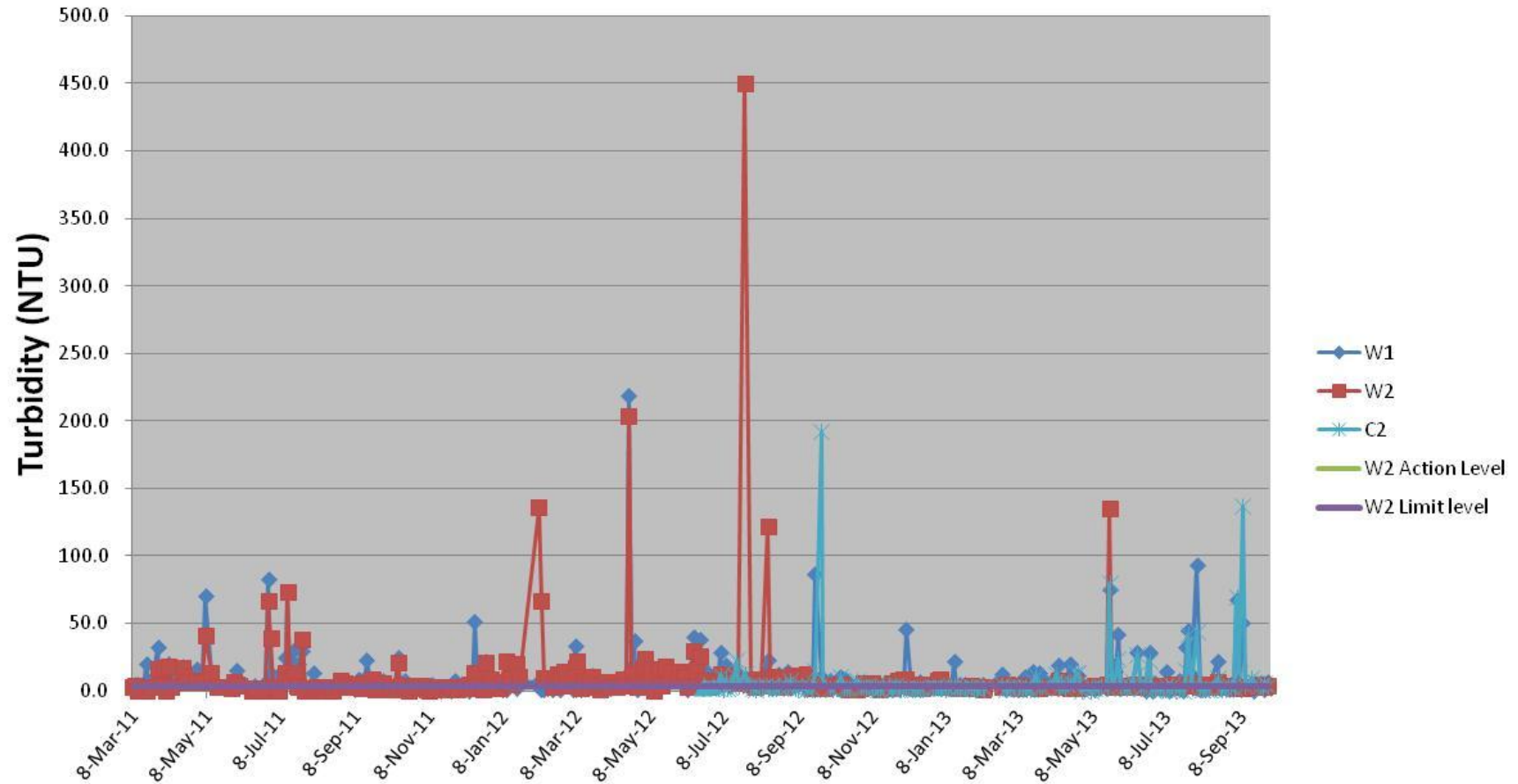


Graphical plot of DO (flood tide) of W1&W2



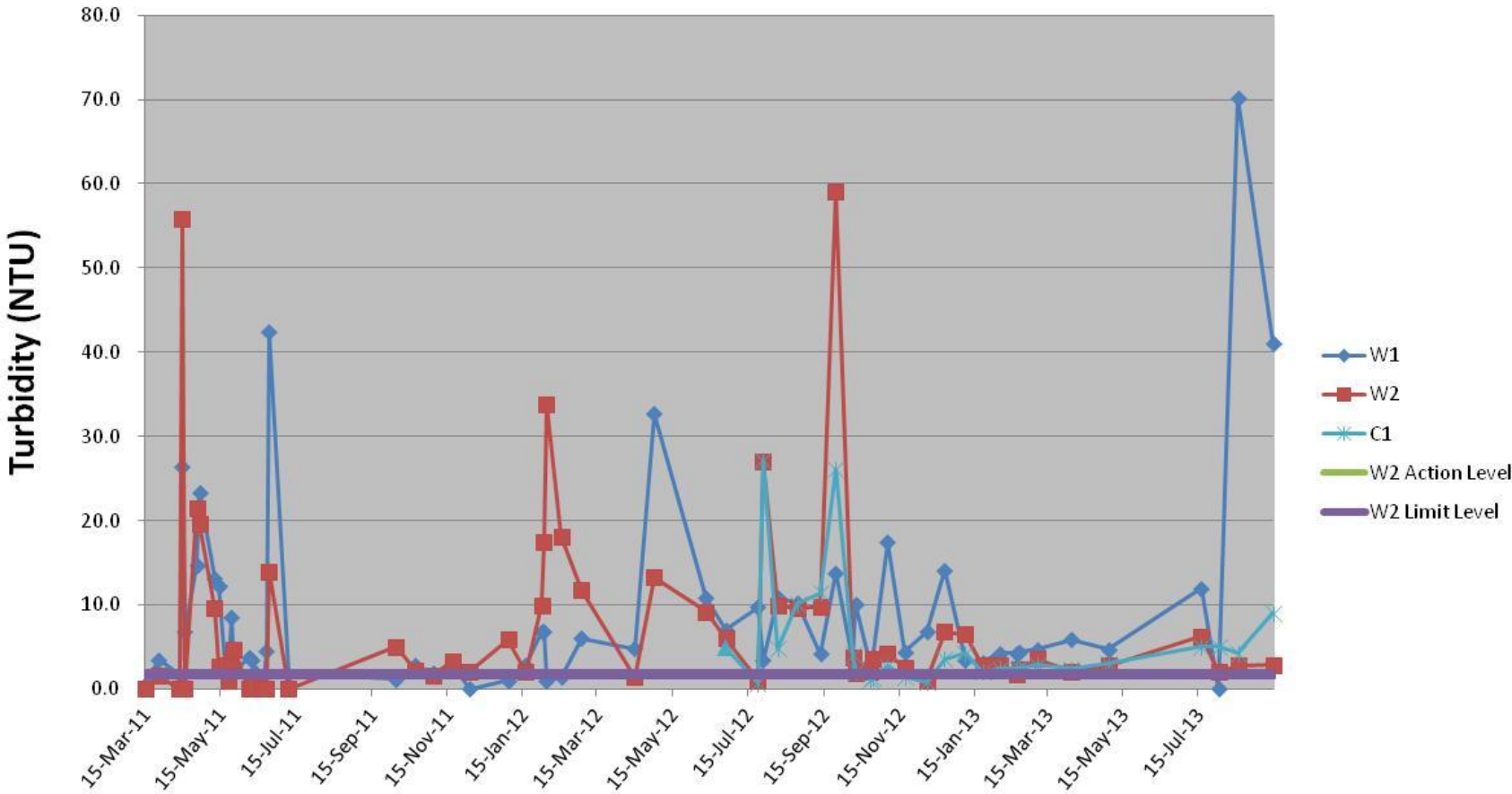
Remarks: Action level: 5 percentile of baseline data
 Limit level: 1 percentile of baseline

Graphical plots of Turbidity (ebb tide) for W1&W2



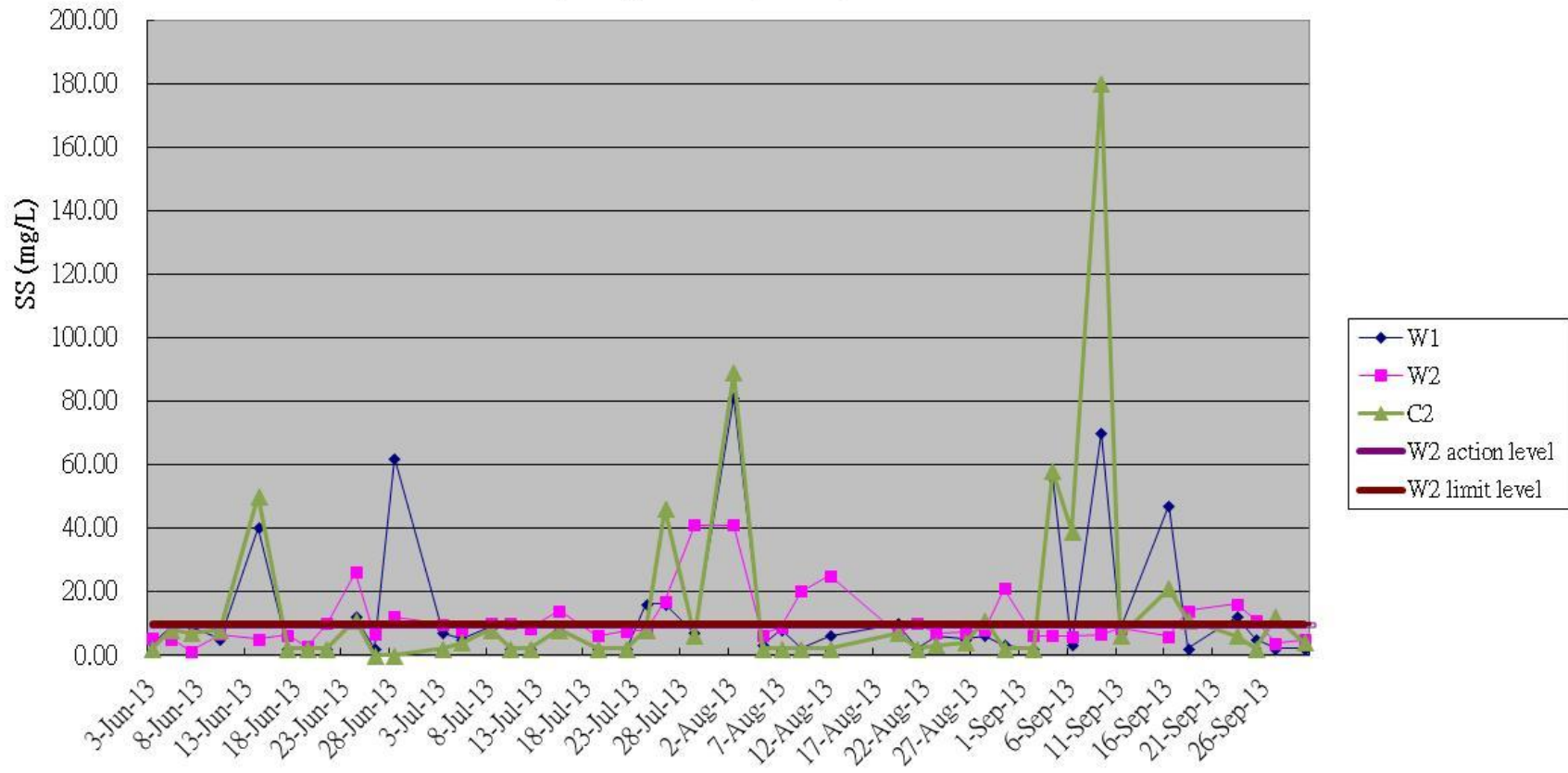
Remarks: Action limit is 95% of baseline data or 120% of upstream control station's Turbidity
Limit level is 99% of baseline data or 130% of upstream control station's Turb

Graphical plots of Turbidity (flood tide) for W1&W2



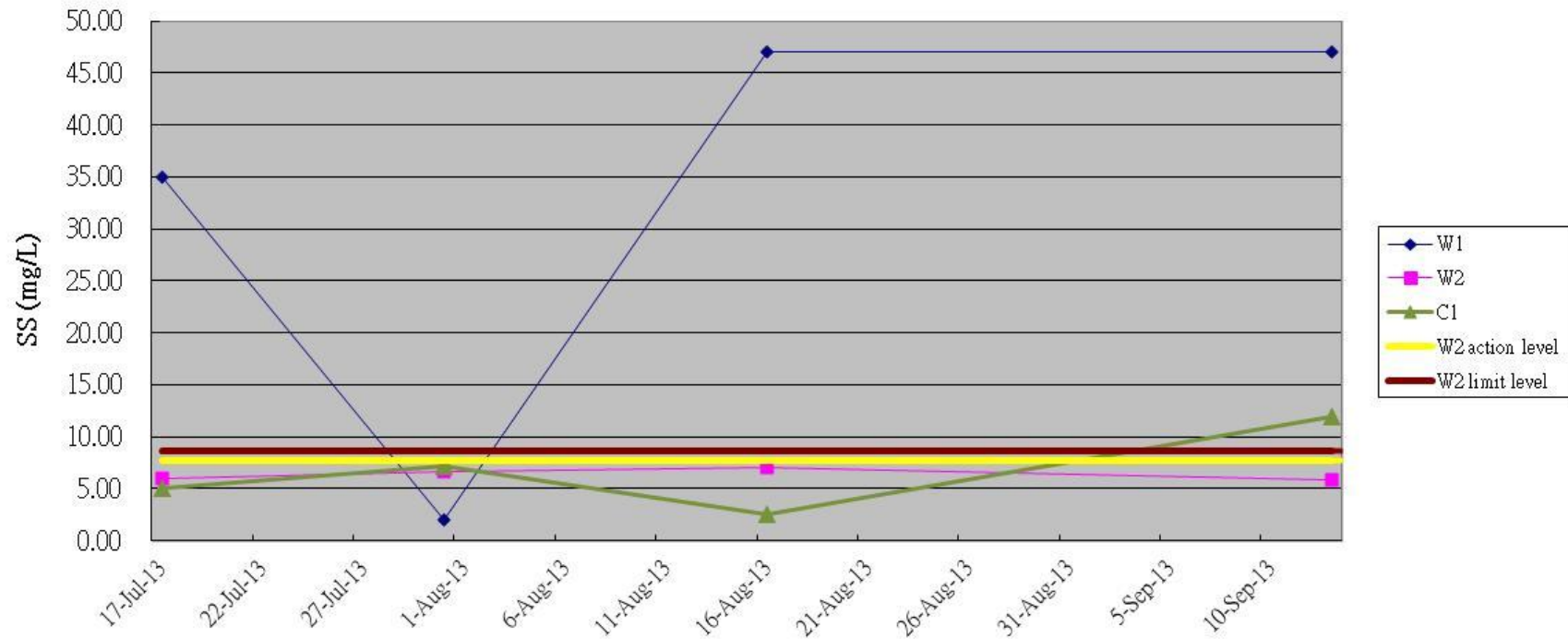
Remarks: Action limit is 95% of baseline data or 120% of upstream control station's Turbidity
 Limit level is 99% of baseline data or 130% of upstream control station's Turb

Graphical plots of SS (ebb tide) for W1&W2



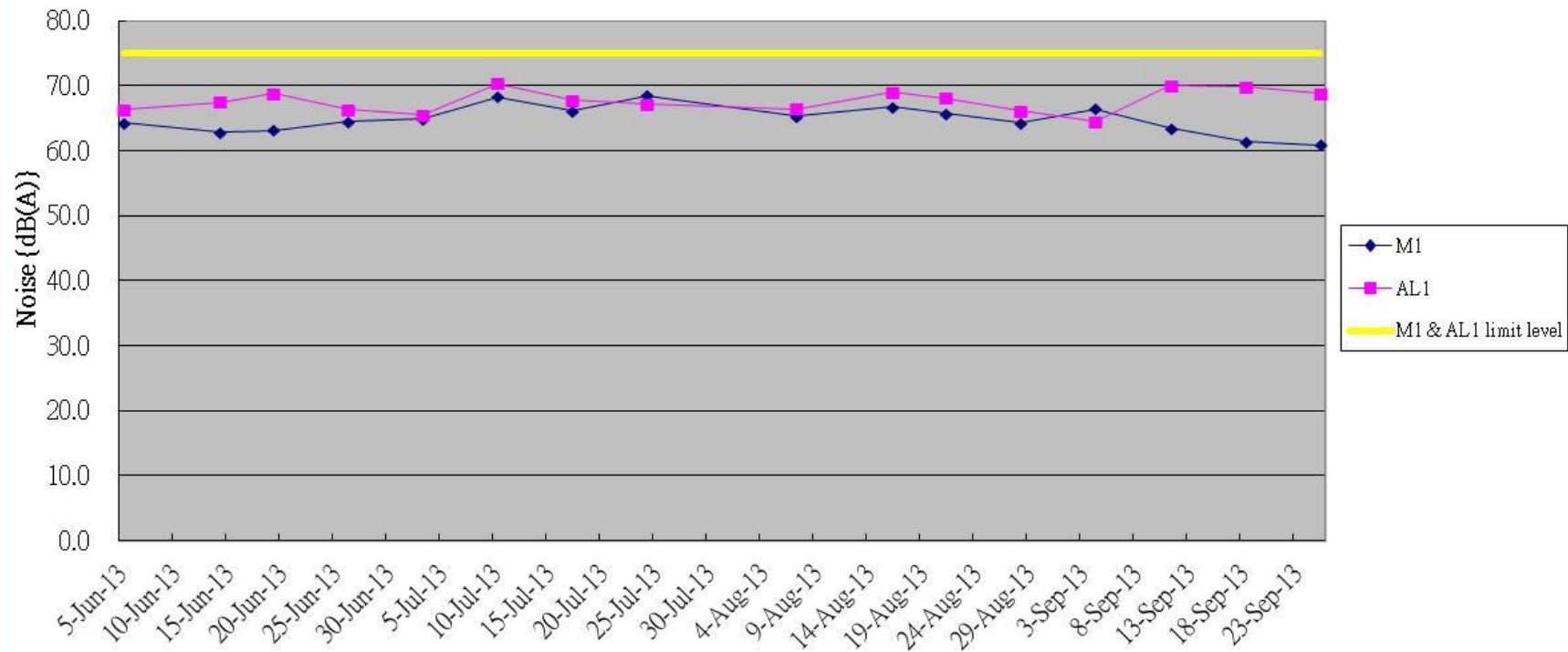
Remarks: Action limit is 95% of baseline data or 120% of upstream control station's SS
 Limit level is 99% of baseline data or 130% of upstream control station's SS

Graphical plots of SS (flood tide) for W1&W2



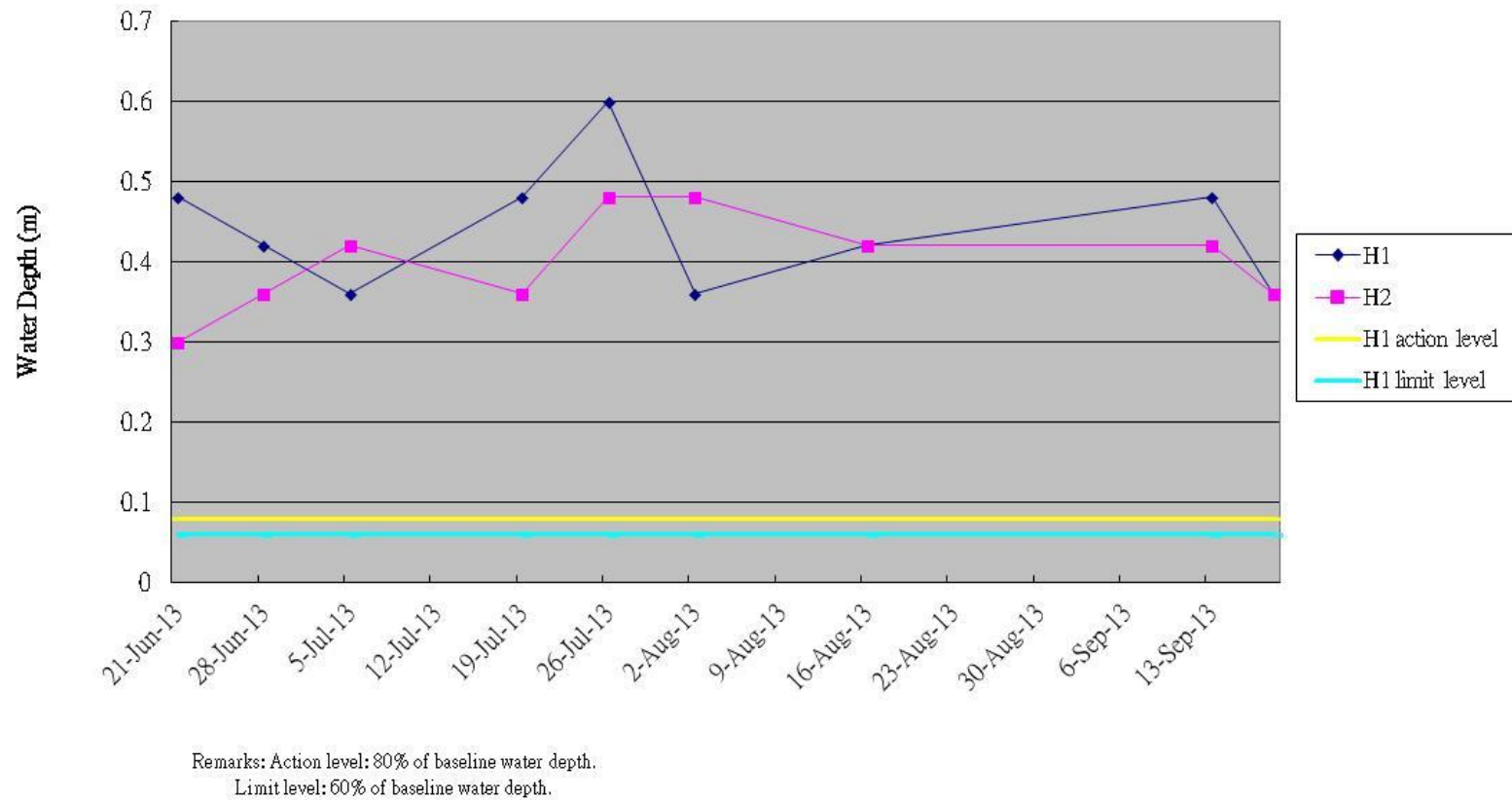
Remarks: Action limit is 95% of baseline data or 120% of upstream control station's SS
Limit level is 99% of baseline data or 130% of upstream control station's SS

Graphical plots of Noise for M1 & AL1

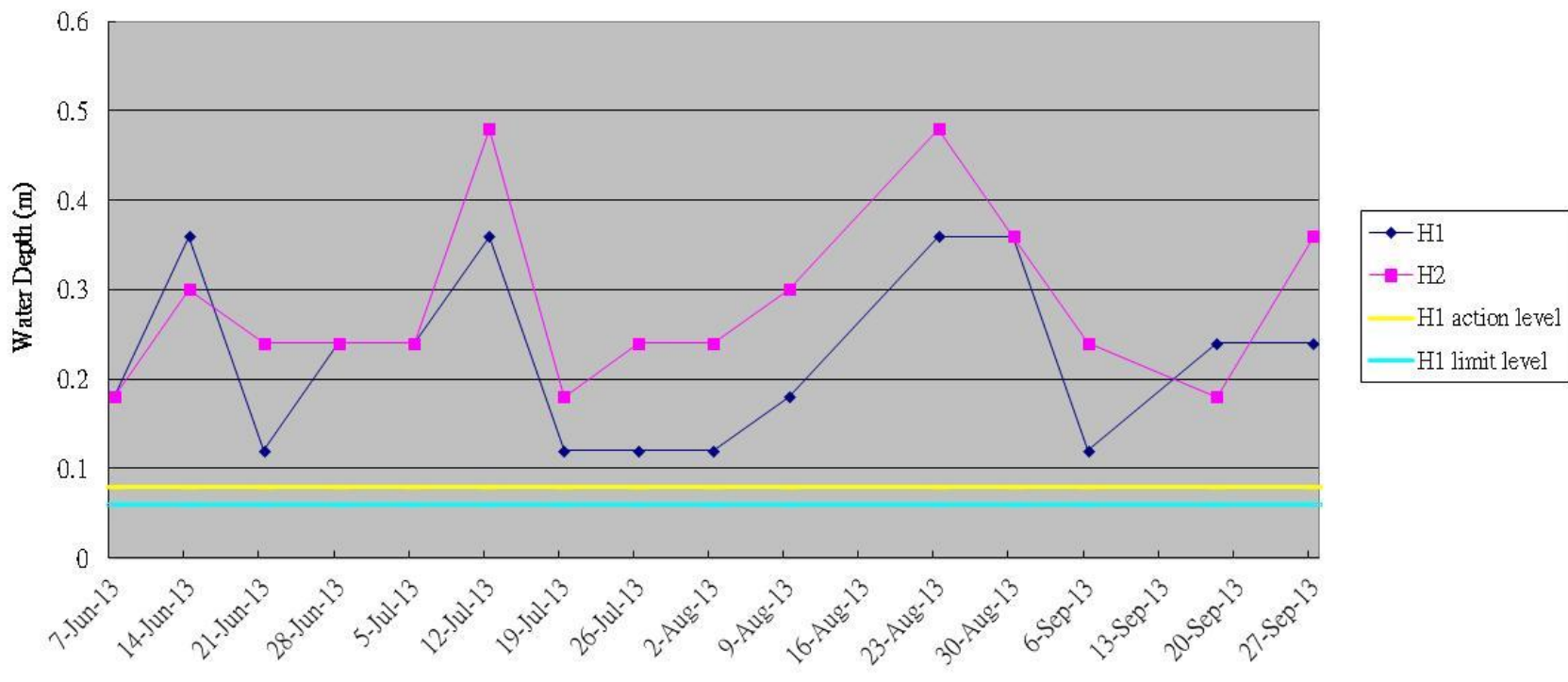


Remarks: Action limit is when one documented complaint is received

Graphical plots of Hydrological Monitoring(water depth at flood tide) for H1 & H2

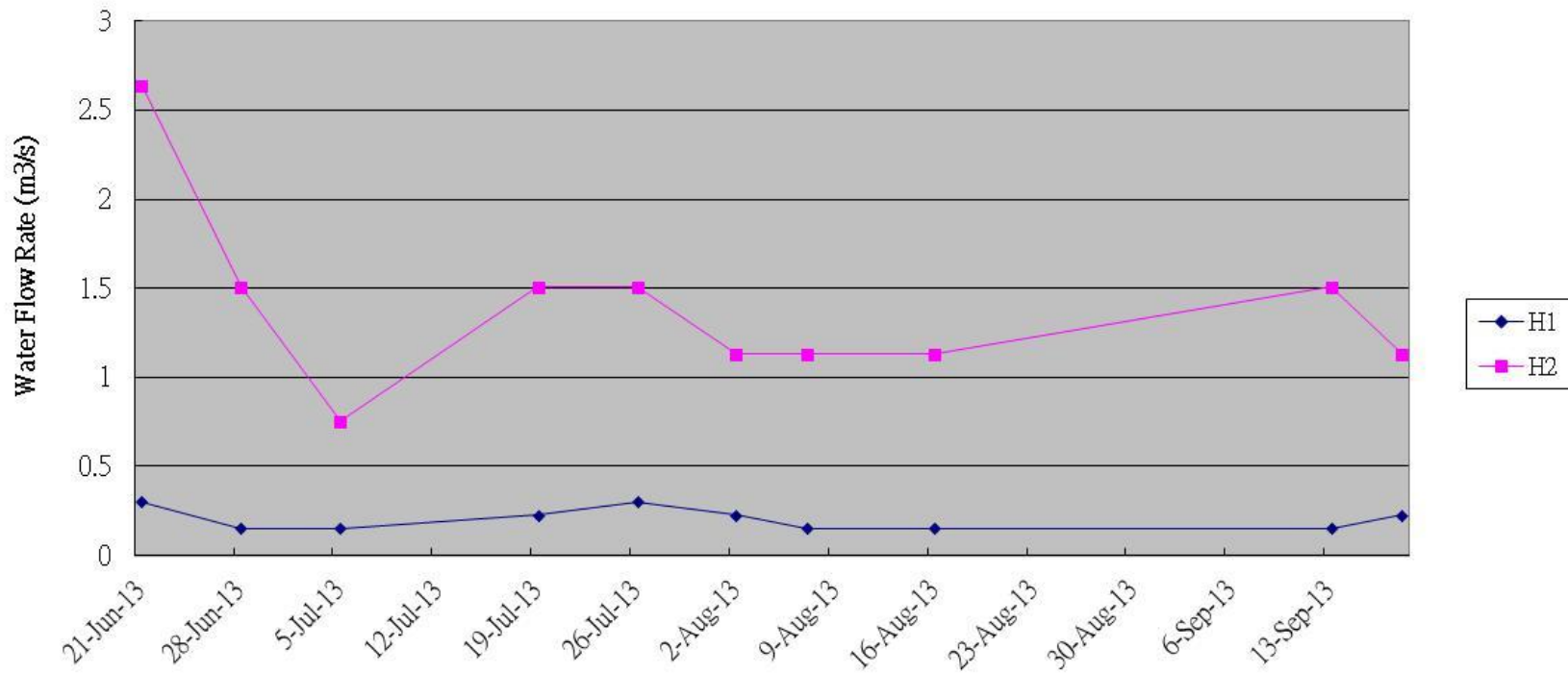


Graphical plots of Hydrological Monitoring(water depth at ebb tide) for H1 & H2



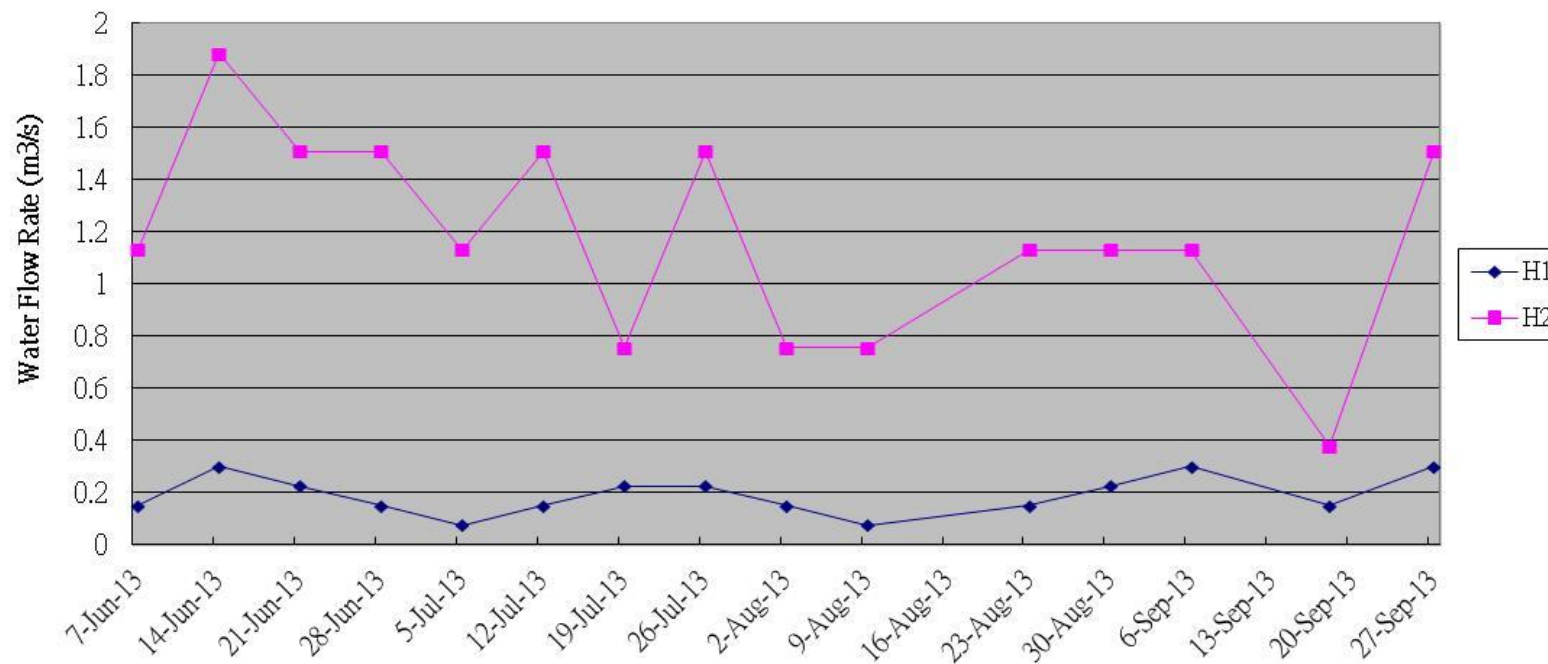
Remarks: Action level: 80% of baseline water depth.
 Limit level: 60% of baseline water depth.

Graphical plots of Hydrological Monitoring(water flow rate at flood tide) for H1 & H2



Remarks: Action level: 120% of control station's water flow rate on the same day of measurement.
Limit level: 140% of control station's water flow rate on the same day of measurement.

Graphical plots of Hydrological Monitoring(water flow rate at ebb tide) for H1 & H2



Remarks: Action level: 120% of control station's water flow rate on the same day of measurement.
Limit level: 140% of control station's water flow rate on the same day of measurement.

Appendix L: Ecological monitoring report

Agreement No. DP/01/2010
Drainage Improvement Works in Shatin and Tai Po:
Ecological Monitoring in area under Contract 1
(Report 16a for September 2013)

Prepared for:
Drainage Services Department

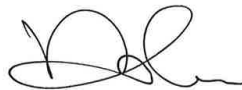
Prepared by:
ENVIRON Hong Kong Limited

Date:
Oct 2013

Reference Number:
R3348_V1.0

Agreement No. DP/01/2010
Drainage Improvement Works in Shatin and Tai Po:
Ecological Monitoring in area under Contract 1
(Report 16a for September 2013)

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Report\201309\16a*

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1. Introduction

1.1 Project description

The Drainage Improvement Works in Shuen Wan was undertaken to minimize the potential flooding impacts in Sha Tin and Tai Po area. Although the Ecological Impact Assessment in the EIA Report identified that ecological impacts resulting from the proposed drainage improvement works at Shuen Wan were anticipated to be very minor in scale, ecological mitigation and ecological monitoring were recommended in the EM&A Manual (http://env-shuenwan.com/pdf/review_note_em&a_rev.3.pdf) as stipulated under Environment Permit No. EP-303/2008.

1.2 Scope of ecological impact monitoring was described in the Particular Specifications and EM & A Manual of the projects. In brief, the monitoring tasks include regular check on the retained and transplanted trees and shrubs, monitoring on fauna groups and aquatic fauna within the works area and any ecologically sensitive area within 100 m of the works boundary.

1.3 China-Hong Kong Ecology Consultants Co. was commissioned by ENVIRON Hong Kong Limited to perform the ecological impact monitoring survey for areas under Contract 1 starting from March 2011.

1.4 The outline of this ecological monitoring report was as follow:

- Highlights of this report
- Summary of construction activities for the month
- Monitoring methodology
- Monitoring data
- Remedial measures adopted to the adverse condition
- Record of complains and remedial measures
- Review of monitoring results
- Forecast of works programme and monitoring requirements
- Comments and brief summary

1.5 This is the report No. 16a ecological monitoring conducted on 26th September 2013 within the works boundary under Contract 1 and area within 100 m from the works boundary.

2. Highlights of this report

- Field survey was conducted on 26th Sep 2013
- Construction activities of Contract 1 was continued since March 2011
- Lower number of species was observed within the works area under Contract 1, in particular stream ecological monitoring point 2 (SEMP 2) due to recent river diversion for Ecological Compensatory Area (ECA) construction.
- Habitats in the 100 m buffer area retain its natural condition.

3. Summary of construction activities for the month

Major construction activities carried out in Contract 1 by the contractor during the present monitoring period (Sep 2013) includes:

Area A (Pumping Station)

- Installation of E&M equipment
- E&M Testing
- Construction of Green Roof
- Construction of Road & Drain in Pumping Station
- Construction of Boundary Wall
- Installation of Cladding

Area B (Tung Tsz Nursery)

- Reinstatement in Tung Tsz Nursery

Area C (ECA)

- Handovered to AFCD.

4. Monitoring Methodology

Ecological monitoring methods were generally followed those described in the baseline ecological surveys (DC/2009/22). However, sampling area maybe reduced because of habitat change, for instance, deforestation and channel modification due to drainage works, where sampling was not applicable. Moreover, as the Ecological Monitoring for Ecological Compensatory Area (ECA) was completed and the ECA was handover to AFCD on January 2013 already, thus the monitoring survey and photo taking on SEMP 2 was not applicable also. Survey data and evaluation are detailed in the following sections.

4.1 Vegetation survey

Vegetation survey was performed along the designated transects (**Figure 1**) for ecological monitoring as described in the project specifications to monitor the vegetation health which could be adversely influenced by any bad site practice. Qualitative data of plants within the works boundary and wetland vegetation in the 100 m buffer area of Contract 1 adjacent to construction site and wetland was recorded. Riparian vegetation including aquatic and emergent at 4 stream ecological monitoring points (hereinafter referred to as "SEMP") under Contract 1 (i.e. SEPM 1; **Figure 2**) along the affected stream channel and riparian habitat was recorded in terms of species, relative abundance and average heights. Any signs of damages and adverse health problems directly caused the works were recorded and reported.

Nomenclature and protection status of the species followed those documented in the AFCD website (www.hkbiodiversity.net) and Hong Kong Herbarium (2004).

4.2 Avifauna

Bird survey was conducted by following the proposed transects which cover the major ecologically sensitive areas of the Project (**Figure 1**). All bird species were recorded with special attention paid on the species of conservation importance and wetland-dependent species. List of bird species recorded and the relative abundance was provided.

4.3 Herpetofauna

Hepetofauna survey was conducted via direct observation and active searching along the survey transects with a focus in the work areas (**Figure 1**). All reptiles and amphibians encountered or heard were recorded. Nomenclature and conservation status of herpetofauna species follows AFCD website (www.hkbiodiversity.net).

4.4 Butterflies and Odonata

Odonates and butterfly survey of different habitats within the Study Area was conducted along the proposed transect (**Figure 1**). All butterflies and odonata were identified and relative abundance was recorded. Nomenclature and status of conservation of butterflies follows Lo & Hui (2005) while that of odonata follows AFCD websites (www.hkbiodiversity.net).

4.5 Mammals

As the monitoring site was situated near traffics, plant nursery and residential buildings, mammals were unlikely inhabited at the site except rodents, domestic dogs and cats. Detailed mammal monitoring was not conducted. However, any sighting, tracks and signs of mammals encountered during survey of other faunal groups was recorded. Bat was surveyed by search for potential colony habitat, such as palm trees, which are often used by fruit bats as nesting sites.

4.6 Aquatic fauna

Monitoring of aquatic fauna was carried out mainly by bank-side observation, sometimes with the aid of binoculars, at two stream ecological monitoring points under Contract 1 (i.e. SEMP 1). These points are selected for covering representative sections of Wai Ha River and are shown in **Figure 1**. Netting and fish traps were also deployed at these points to collect supplementary data. Aquatic fauna seen/collected was identified *in situ* to the lowest possible taxon and relative abundance was presented.

5. Monitoring data

5.1 Vegetation survey

The habitats identified in area under Contract 1 are marine, recreational fish pond, river course, wooded area, mangrove, marsh and developed area (including village). Vegetation were found in wooded area, mangrove, marsh, develop area and river bank. During the current monitoring period, some riparian climbers (*Cocculus orbiculatus*) at SEMP 2 was removed due to direct conflict with the construction of ECA. The riparian vegetations were dominated by *Leucaena leucocephala* and *Plantago major* with average coverage ranged from 15% to 40% (**Table 1**). A list of plant species recorded from different habitats within the assessment area under Contract 1 is presented on **Table 2**. A total of 130 species were recorded within the assessment boundary of Contract 1 in which 121 species were recorded within the buffer area, while 52 species recorded within the work areas under Contract 1. No protected species were recorded.

5.2 Avifauna

A total of 15 bird species were recorded in the current survey under Contract 1 (**Table 3**). In the work area under Contract 1, 4 bird species were recorded in which none are considered to be of conservation concern. A total of 14 bird species were recorded in the 100m buffer area in which one wetland dependent species *Ardeola bacchus* is recognized as being regional conservation concern, though it is common in suitable habitats in Hong Kong. (Viney et al., 2005).

5.3 Herpetofauna

No reptile was recorded within the assessment area. Mating call of Gunter's Frog, was heard from the water of pools, ditches and river bank within the 100m buffer zone. Common Toad was found on both work area and buffer zone of the site. The species recorded belongs to common species in Hong Kong. (**Table 4**).

5.4 Butterflies

A total of 15 butterfly species were recorded during surveys (**Table 5**). Only 3 butterfly species were recorded within the work boundary of Contract 1, while most of the butterfly species were inhabiting outside the proposed construction area in which none of the species are of the conservation concern.

5.5 Odonata

A total of 5 odonata species were recorded during the surveys (**Table 6**). The species Wandering glider (*Pantala flavescens*) was found within the work boundaries under Contract 1, while most of the observed odonata species were largely inhabiting along the river bank in the 100m buffer area.

5.6 Mammal

A few Short-nosed Fruit Bats *Cynopterus sphinx* were observed nesting in a few palm trees at the playground near Ting Kok Nursery Community Garden within Contract 1 boundary. No other mammals or trace of mammals was observed within the assessment area.

5.7 Aquatic fauna

Under Contract 1 (i.e. SEMP 1), a total of 7 fish species, 1 bivalve and 1 snail were recorded and most of them were residing in brackish environments (**Table 7**). Some river works were carried out in SEMP 1 as showed in **Figure 2**. Overall, no protected or rare species were recorded.

6. Remedial measures adopted to the adverse condition

There was no non-compliance event recorded within this reporting month.

7. Record of complains and remedial measures

There was no complaint in relation to environmental issue recorded in this reporting month.

8. Review of the monitoring results

During the present survey period, construction activities were carried out at works area under Contract 1, while 100 m buffer area remains natural. Much of the construction activities are carried out at Tung Tsz Nursery and pumping station under Contract 1. In general, lower numbers of species were recorded within the works area under Contract 1 than that of 100 m buffer area because of the associated constructions and urbanized in nature, and most of the construction activities are restricted in the developed area with low ecological significance. As mitigation measures recommended in the EM&A Manual were properly implemented during the current survey, and hence the residual environmental impacts would be minimized.

9. Forecast of works programme and monitoring requirements

The tentative construction activities undertaken by the contractor in the coming months are as follows:

Area A (Pumping Station)

- Installation of E&M equipment
- E&M Testing
- Construction of Green Roof
- Construction of Road & Drain in Pumping Station
- Construction of Boundary Wall
- Installation of Cladding

Area B (Tung Tsz Nursery)

- Reinstatement in Tung Tsz Nursery

Area C (ECA)

- Handovered to AFCD

The monitoring programme described in EM&A will strictly follow to verify compliance of environmental requirements and the proper implementation of all necessary mitigation measures.

10. Comments and summary

The bi-monthly ecological impact monitoring under Contracts 1 (excluding the ECA) was conducted in Sep 2013 and relevant flora and fauna data were collected according to project specification and EM & A Manual. As indicated by the low diversity and abundance of species recorded within the work areas, habitats within the work boundary under Contracts 1 offer few ecological opportunities for inhabitation of fauna and flora. Given that the construction activities are restricted in the developed area with proper mitigation measures being implemented, disturbances associated with the current construction activities are largely affecting area with low ecological significance. On the other hand, the natural habitats in the 100 m buffer area are retained at acceptable condition, and hence the 100 m buffer area has not been significantly affected by the construction works.

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Figure

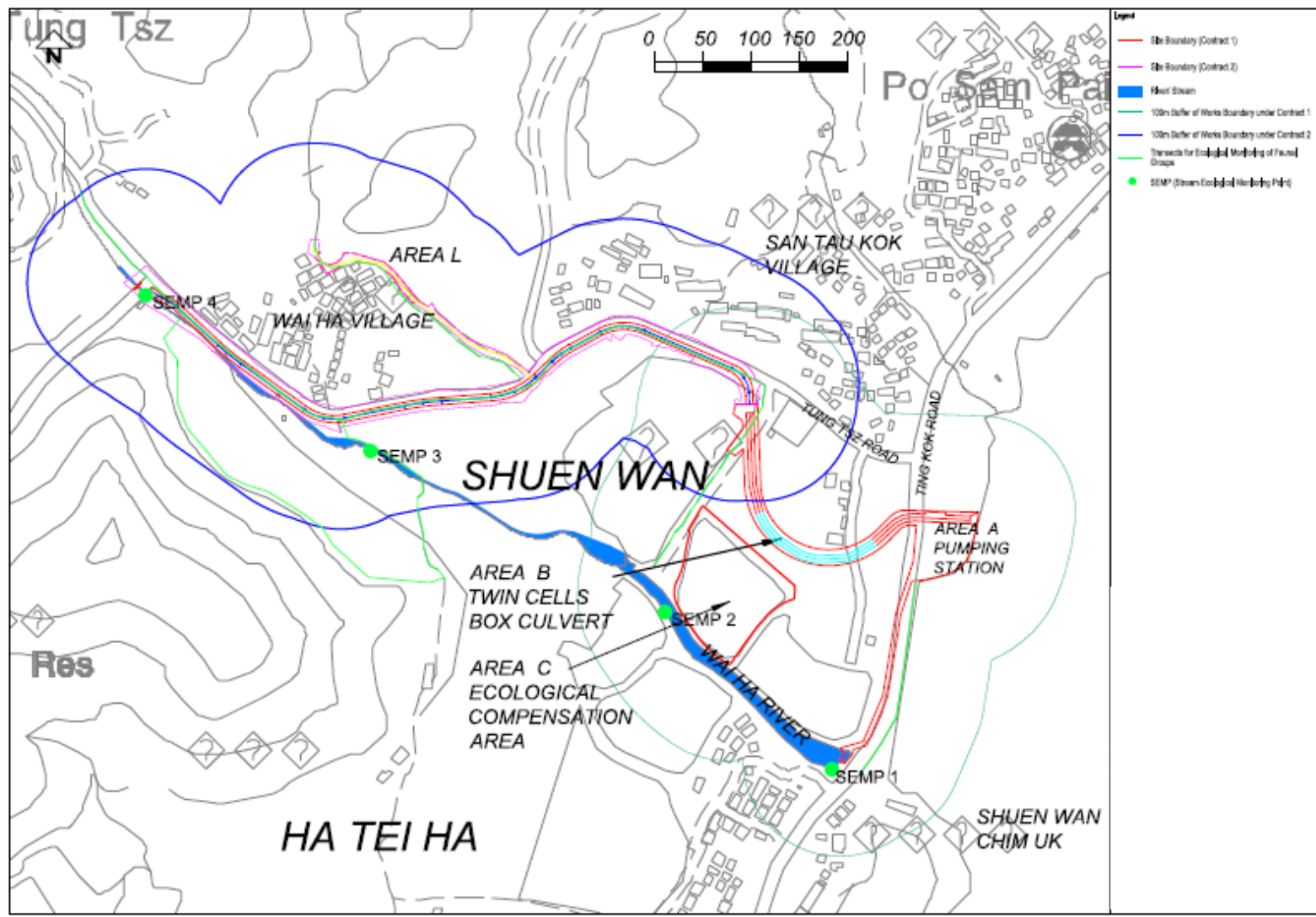


Figure: 1

Title: Map showing the ecological monitoring transect and the boundary of assessment area.

Project: Agreement No. DP/01/2010 Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 1 (September 2013, Report 16a)



Drawn by: ML

Checked by: TC

Rev.: 1.0

Date: Oct 2013



Figure: 2

Title: SEMP 1, the first sampling point of Wai Ha River under Contract 1.

Project: Agreement No. DP/01/2010 Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 1 (September 2013, Report 16a)



Drawn by: ML

Checked by: TC

Rev.: 1.0

Date: Oct 2013

Table

Table 1. List of riparian vegetation and coverage (%) recorded from two stream sampling points under Contract 1 (i.e. SEMP 1).

| Species | Family | Growth form | Sampling point | SEMP 1 | |
|---------------------------------|----------------|---------------------|---------------------|-------------|----|
| | | | Status in Hong Kong | Height (cm) | % |
| <i>Albizia lebbbeck</i> | MIMOSACEAE | Tree | E | | |
| <i>Arundinella nepalensis</i> | POACEAE | Perennial Herb | N | | |
| <i>Bidens alba</i> | ASTERACEAE | Herb | E | 30 | 10 |
| <i>Celtis sinensis</i> | ULMACEAE | Tree | N | | |
| <i>Eclipta prostrata</i> | ASTERACEAE | Perennial herb | N | 30 | 1 |
| <i>Ficus virens</i> | MORACEAE | Tree | N | 100 | 1 |
| <i>Kandelia obovata</i> | RHIZOPHORACEAE | Shrub or Small Tree | N | | |
| <i>Leucaena leucocephala</i> | MIMOSACEAE | Small Tree | E | | |
| <i>Macaranga tanarius</i> | EUPHORBIACEAE | Tree | N | | |
| <i>Mikania micrantha</i> | ASTERACEAE | Climbing Herb | E | 10 | 1 |
| <i>Pennisetum alopecuroides</i> | POACEAE | Perennial Herb | N | 250 | 10 |
| <i>Plantago major</i> | PLANTAGINACEAE | Perennial herb | N | 30 | 15 |
| Bare | n/a | n/a | n/a | n/a | 62 |

*Key:

E = Exotic

N = Native

n/a = not available

Table 2. List of vegetation recorded from works area under Contracts 1 and 100 m buffer area in the impact monitoring survey conducted in Sep 2013. Vegetation species presents in the identified location was indicated by “V”.

| Habitat | Species name | Family | Growth form | *Status in Hong Kong | Work Area under Contract 1 | 100 m buffer area under Contract 1 |
|---------|-----------------------------------|--------------------------|---------------------------|----------------------|----------------------------|------------------------------------|
| Stream | <i>Chrysalidocarpus lutescens</i> | ARECACEAE | Shrub Palm | E | | V |
| | <i>Melia azedarach</i> | MELIACEAE | Tree | E | | V |
| | <i>Murraya paniculata</i> | RUTACEAE | Small Tree | E | | V |
| | <i>Lantana camara</i> | VERBENACEAE | Shrub | E | | V |
| | <i>Ficus hispida</i> | MORACEAE | Tree | N | | V |
| | <i>Ficus virens</i> | MORACEAE | Tree | N | | V |
| | <i>Chrysopogon aciculatus</i> | POACEAE | Perennial Herb | N | | V |
| | <i>Microstegium ciliatum</i> | POACEAE | Perennial Procumbent Herb | N | | V |
| | <i>Mucuna birdwoodiana</i> | FABACEAE (PAPILIONACEAE) | Climber: Vine | N | | V |
| | <i>Pistia stratiotes</i> | ARACEAE | Floating Aquatic Herb | N | | V |
| | <i>Cyperus flabelliformis</i> | CYPERACEAE | Herb | E | | V |
| | <i>Acanthopanax gracilistylus</i> | ARALIACEAE | Shrub | E | | V |
| | <i>Ficus triangularis</i> | MORACEAE | Tree | E | | V |
| | <i>Spirodela polyrrhiza</i> | LEMNACEAE | Floating Small Herb | N | | V |
| | <i>Glochidion zeylanicum</i> | EUPHORBIACEAE | Shrub or Small Tree | N | | V |
| | <i>Sterculia lanceolata</i> | STERCULIACEAE | Semi-deciduous Tree | N | | V |
| | <i>Albizia lebeck</i> | MIMOSACEAE | Tree | E | | V |

| Habitat | Species name | Family | Growth form | *Status in Hong Kong | Work Area under Contract 1 | 100 m buffer area under Contract 1 |
|-----------------------|--|--------------------------|----------------|----------------------|----------------------------|------------------------------------|
| | <i>Arundinella nepalensis</i> | POACEAE | Perennial Herb | N | | V |
| | <i>Bidens alba</i> | ASTERACEAE | Herb | E | | V |
| | <i>Clerodendrum inerme</i> | VERBENACEAE | Shrub | N | | V |
| | <i>Coculus orbiculatus</i> | MENISPERMACEAE | Climber: Vine | N | | V |
| | <i>Hibiscus tiliaceus</i> | MALVACEAE | Tree or Shrub | N | | V |
| | <i>Leucaena leucocephala</i> | MIMOSACEAE | Small Tree | E | | V |
| | <i>Manilkara zapota</i> | SAPOTACEAE | Tree | E | | V |
| | <i>Sapium discolor</i> | EUPHORBIACEAE | Tree | N | | V |
| Developed area | <i>Pericampylus glaucus</i> | MENISPERMACEAE | Woody Vine | N | | V |
| | <i>Ficus variegata</i> var. <i>chlorocarpa</i> | MORACEAE | Tree or Shrub | N | V | V |
| | <i>Citrus reticulata</i> Blanco | RUTACEAE | Small Tree | E | | V |
| | <i>Salvia japonica</i> | LAMIACEAE (LABIATAE) | Herb | N | | V |
| | <i>Morus alba</i> | MORACEAE | Tree or Shrub | N | | V |
| | <i>Emilia sonchifolia</i> | ASTERACEAE | Herb | N | | V |
| | <i>Clausena lansium</i> | RUTACEAE | Small Tree | E | | V |
| | <i>Pyrostegia venusta</i> | BIGNONIACEAE | Climber: Vine | E | | V |
| | <i>Psidium guajava</i> | MYRTACEAE | Tree | E | | V |
| | <i>Catharanthus roseus</i> | APOCYNACEAE | Subshrub | N | | V |
| | <i>Archontophoenix alexandrae</i> | ARECACEAE | Tree Palm | E | | V |
| | <i>Desmodium heterocarpon</i> | FABACEAE (PAPILIONACEAE) | Shrub | N | | V |
| | <i>Rhinacanthus nasutus</i> | ACANTHACEAE | Herb | E | | V |
| | <i>Acacia confusa</i> | MIMOSACEAE | Tree | E | V | V |
| | <i>Artocarpus macrocarpon</i> | MORACEAE | Tree | E | V | V |
| | <i>Averrhoa carambola</i> | OXALIDACEAE | Small Tree | E | V | V |

| Habitat | Species name | Family | Growth form | *Status in Hong Kong | Work Area under Contract 1 | 100 m buffer area under Contract 1 |
|---------|----------------------------------|-----------------|---------------------|----------------------|----------------------------|------------------------------------|
| | <i>Bauhinia blakeana</i> | CAESALPINIACEAE | Tree or Shrub | N | V | V |
| | <i>Bauhinia variegata</i> | CAESALPINIACEAE | Tree | E | V | V |
| | <i>Bridelia tomentosa</i> | EUPHORBIACEAE | Shrub or Small Tree | N | V | V |
| | <i>Calliandra haematocephala</i> | MIMOSACEAE | Shrub | E | V | V |
| | <i>Caryota ochlandra</i> | ARECACEAE | Tree palm | E | V | V |
| | <i>Cassia spectabilis</i> | CAESALPINIACEAE | Small Tree | E | V | V |
| | <i>Casuarina equisetifolia</i> | CASUARINACEAE | Tree | E | V | V |
| | <i>Citrus grandis</i> | CASUARINACEAE | Tree | E | V | V |
| | <i>Cordyline fruticosa</i> | AGAVACEAE | Shrub | E | V | V |
| | <i>Cynodon dactylon</i> | POACEAE | Perennial Herb | N | V | V |
| | <i>Dracaena draco</i> | AGAVACEAE | Tree | E | V | V |
| | <i>Elaeocarpus haminanensis</i> | ELAEOCARPACEAE | Small Tree | E | V | V |
| | <i>Eleusine indica</i> | POACEAE | Herb | N | V | V |
| | <i>Eriobotrya japonica</i> | ROSACEAE | Small Tree | E | V | V |
| | <i>Ficus benjamina</i> | MORACEAE | Tree | E | V | V |
| | <i>Ficus elastica</i> | MORACEAE | Tree | E | V | V |
| | <i>Ficus simplicissima</i> | MORACEAE | Shrub | N | V | V |
| | <i>Hibiscus rosa-sinensis</i> | MALVACEAE | Shrub | E | V | V |
| | <i>Lantana camara</i> | VERBENACEAE | Shrub | E | V | V |
| | <i>Litchi chinensis</i> | SAPINDACEAE | Tree | E | V | V |
| | <i>Lumnitzera racemosa</i> | COMBRETACEAE | Shrub or Small Tree | N | V | V |
| | <i>Lygodium japonicum</i> | LYGODIACEAE | Climbing Herb | N | V | V |
| | <i>Melaleuca quinquenervia</i> | MYRTACEAE | Tree | E | V | V |
| | <i>Oxalis corniculata</i> | OXALIDACEAE | Perennial Herb | N | V | V |
| | <i>Phoenix roebelenii</i> | ARECACEAE | Small Tree Palm | E | V | V |

| Habitat | Species name | Family | Growth form | *Status in Hong Kong | Work Area under Contract 1 | 100 m buffer area under Contract 1 |
|---------|---------------------------------|----------------|----------------|----------------------|----------------------------|------------------------------------|
| | <i>Polygonum hydropiper</i> | POLYGONACEAE | Herb | N | V | V |
| | <i>Psychotria serpens</i> | RUBIACEAE | Climber: Vine | N | V | |
| | <i>Pterocypsela indica</i> | ASTERACEAE | Herb | N | V | V |
| | <i>Rhapis excelsa</i> | ARECACEAE | Shrub Palm | N | V | V |
| | <i>Sansevieria trifasciata</i> | AGAVACEAE | Perennial Herb | E | V | V |
| | <i>Schefflera actinophylla</i> | ARALIACEAE | Climbing Shrub | E | V | V |
| | <i>Schefflera heptaphylla</i> | ARALIACEAE | Tree | N | V | V |
| | <i>Sesbania cannabina</i> | FABACEAE | Herb | E | V | V |
| | <i>Terminalia catappa</i> | COMBRETACEAE | Large Tree | E | V | V |
| | <i>Thuja orientalis</i> | CUPRESSACEAE | Tree | E | V | V |
| | <i>Tradescantia spathacea</i> | COMMELINACEAE | Herb | E | V | V |
| | <i>Youngia japonica</i> | ASTERACEAE | Herb | N | V | V |
| | <i>Acanthus ilicifolius</i> | ACANTHACEAE | Shrub | N | | V |
| | <i>Acrostichum aureum</i> | ACROSTICHACEAE | Herb | N | | V |
| | <i>Aegiceras corniculatum</i> | MYRSINACEAE | Shrub | N | | V |
| | <i>Alocasia odora</i> | ARACEAE | Perennial Herb | N | | V |
| | <i>Avicennia marina</i> | VERBENACEAE | Shrub | N | | V |
| | <i>Digitaria ciliaris</i> | POACEAE | Herb | N | | V |
| | <i>Panicum repens L.</i> | POACEAE | Perennial Herb | N | | V |
| | <i>Pennisetum alopecuroides</i> | POACEAE | Perennial Herb | N | | V |
| | <i>Phragmites anstralis</i> | POACEAE | Perennial Herb | N | | V |
| | <i>Plantago major</i> | PLANTAGINACEAE | Perennial herb | N | | V |
| | <i>Solanum nigrum</i> | SOLANACEAE | Herb | N | | V |
| | <i>Bombax ceiba</i> | BOMBACACEAE | Tree | E | V | |
| | <i>Bidens alba</i> | ASTERACEAE | Herb | E | V | |
| | <i>Panicum maximum</i> | GRAMINEAE | Herb | E | V | |
| | <i>Microstegium ciliatum</i> | POACEAE | Perennial | N | V | |

| Habitat | Species name | Family | Growth form | *Status in Hong Kong | Work Area under Contract 1 | 100 m buffer area under Contract 1 |
|-------------------|--------------------------------------|---------------------------|---------------------|----------------------|----------------------------|------------------------------------|
| | | | Procumbent Herb | | | |
| | <i>Leucaena leucocephala</i> | MIMOSACEAE | Small Tree | E | V | |
| Plantation | <i>Bischofia javanica</i> | EUPHORBIACEAE | Tree | N | | V |
| | <i>Scolopia chinensis</i> | FLACOURTIACEAE | Tree or Large Shrub | N | | V |
| | <i>Piper hancei</i> | PIPERACEAE | Climber: Vine | N | | V |
| | <i>Dimocarpus longan</i> | SAPINDACEAE | Tree | E | | V |
| | <i>Paederia scandens</i> | RUBIACEAE | Climber: Vine | N | | V |
| | <i>Cleistocalyx operculatus</i> | MYRTACEAE | Tree | N | | V |
| | <i>Antidesma bunius</i> | EUPHORBIACEAE | Tree | N | | V |
| | <i>Litsea monopetala</i> | LAURACEAE | Small Tree | N | | V |
| | <i>Microcos paniculata</i> | TILIACEAE | Shrub or Small Tree | N | | V |
| | <i>Maesa perlaris</i> | MYRSINACEAE | Shrub | N | | V |
| | <i>Boehmeria nivea (L.) Gaudich.</i> | URTICACEAE | Subshrub or shrub | E | | V |
| | <i>Mallotus apelta</i> | EUPHORBIACEAE | Shrub or Small Tree | N | | V |
| | <i>Sapindus saponaria</i> | SAPINDACEAE | Tree | N | | V |
| | <i>Aporosa dioica</i> | EUPHORBIACEAE | Tree | N | | V |
| | <i>Wedelia chinensis</i> | ASTERACEAE | Perennial Herb | N | | V |
| | <i>Carica papaya</i> | CARICACEAE | Tree | E | | V |
| | <i>Rubus reflexus</i> | ROSACEAE | Climbing Shrub | N | | V |
| | <i>Brassica rapa</i> | BRASSICACEAE (CRUCIFERAE) | Biennial Herb | E | | V |
| | <i>Mucuna championii Benth.</i> | FABACEAE | Climbing Vine | N | | V |

| Habitat | Species name | Family | Growth form | *Status in Hong Kong | Work Area under Contract 1 | 100 m buffer area under Contract 1 |
|--|-------------------------------|-----------------|---------------------|----------------------|----------------------------|------------------------------------|
| | <i>Pinus massoniana</i> | PINACEAE | Tree | N | | V |
| Ting Kok Nursery Community Garden | <i>Bauhinia purpurea</i> | CAESALPINIACEAE | Tree | E | V | |
| | <i>Callistemon viminalis</i> | MYRTACEAE | Tree | E | V | |
| | <i>Dillenia indica</i> | DILLENACEAE | Tree | E | V | |
| | <i>Lonicera japonica</i> | CAPRIFOLIACEAE | Climber: Vine | N | V | |
| | <i>Tabebuia chrysantha</i> | BIGNONIACEAE | Small Tree | E | V | |
| | <i>Wisteria sinensis</i> | FABACEAE | Climber: Vine | E | V | |
| Wooded area | <i>Celtis sinensis</i> | ULMACEAE | Tree | N | | V |
| | <i>Ligustrum sinensis</i> | OLEACEAE | Tree or Shrub | N | | V |
| | <i>Macaranga tanarius</i> | EUPHORBIACEAE | Tree | N | | V |
| | <i>Pandanus tectorius</i> | PANDANACEAE | Shrub or Small Tree | N | | V |
| | <i>Excoecaria agallocha</i> | EUPHORBIACEAE | Tree | N | | V |
| | <i>Kandelia obovata</i> | RHIZOPHORACEAE | Shrub or Small Tree | N | | V |
| | <i>Thespesia populnea</i> | MALVACEAE | Tree or Shrub | N | | V |
| | <i>Zoysia sinica</i> | POACEAE | Perennial Herb | N | | V |
| Marsh | <i>Acanthus ilicifolius</i> | ACANTHACEAE | Shrub | N | | V |
| | <i>Acrostichum aureum</i> | ACROSTICHACEAE | Herb | N | | V |
| | <i>Aegiceras corniculatum</i> | MYRSINACEAE | Shrub | N | | V |
| | <i>Alocasia odora</i> | ARACEAE | Perennial Herb | N | | V |
| | <i>Avicennia marina</i> | VERBENACEAE | Shrub | N | | V |
| | <i>Digitaria ciliaris</i> | POACEAE | Herb | N | | V |
| | <i>Ficus hispida</i> | MORACEAE | Tree | N | | V |
| | <i>Hibiscus tiliaceus</i> | MALVACEAE | Tree or Shrub | N | | V |
| | <i>Ipomea cairica</i> | CONVOLVULACEAE | Climber: Twining | E | | V |

| Habitat | Species name | Family | Growth form | *Status in Hong Kong | Work Area under Contract 1 | 100 m buffer area under Contract 1 |
|---------|---------------------------------|----------------|---------------------|----------------------|----------------------------|------------------------------------|
| | | | Herb | | | |
| | <i>Kandelia obovata</i> | RHIZOPHORACEAE | Shrub or Small Tree | N | | V |
| | <i>Macaranga tanarius</i> | EUPHORBIACEAE | Tree | N | | V |
| | <i>Mikania micrantha</i> | ASTERACEAE | Climbing Herb | E | | V |
| | <i>Panicum repens L.</i> | POACEAE | Perennial Herb | N | | V |
| | <i>Pennisetum alopecuroides</i> | POACEAE | Perennial Herb | N | | V |
| | <i>Phragmites australis</i> | POACEAE | Perennial Herb | N | | V |
| | <i>Plantago major</i> | PLANTAGINACEAE | Perennial herb | N | | V |
| | <i>Polygonum lapathifolium</i> | POLYGONACEAE | Herb | N | | V |
| | <i>Pueraria lobata</i> | FABACEAE | Climber: Vine | N | | V |
| | <i>Schefflera heptaphylla</i> | ARALIACEAE | Tree | N | | V |
| | <i>Solanum nigrum</i> | SOLANACEAE | Herb | N | | V |
| | <i>Solanum torvum</i> | SOLANACEAE | Shrub | E | | V |

***Key:**

E = Exotic

N = Native

Table 3. List of avifauna species and maximum counts recorded from the impact monitoring survey in Sep 2013 at work area under Contracts 1 and 100 m buffer area.

| Species | Common name | Habitat | Conservation status in Hong Kong | Work area: Contract 1 | 100m buffer area |
|----------------------------------|-------------------------|---------|----------------------------------|-----------------------|------------------|
| <i>Acridotheres cristatellus</i> | Crested Myna | | | 1 | 2 |
| <i>Ardeola bacchus</i> | Chinese Pond Heron | W | RC | | 2 |
| <i>Amaurornis phoenicurus</i> | White-breasted Waterhen | W | | | 1 |
| <i>Copsychus saularis</i> | Oriental Magpie Robin | | | 1 | 1 |
| <i>Dicrurus macrocercus</i> | Black Drongo | | | | 2 |
| <i>Egretta garzetta</i> | Little Egret | W | | | 2 |
| <i>Garrulax perspicillatus</i> | Masked Laughing thrush | | | | 2 |
| <i>Orthotomus sutorius</i> | Common Tailorbird | | | | 2 |
| <i>sser montanus</i> | Eurasian Tree Sparrow | | | | 4 |
| <i>Pycnonotus jocosus</i> | Red-whiskered Bulbul | | | | 2 |
| <i>Pycnonotus sinensis</i> | Chinese Bulbul | | | | 2 |
| <i>Prinia flaviventris</i> | Yellow-bellied Prinia | | | 1 | |
| <i>Streptopelia chinensis</i> | Spotted Dove | | | | 3 |
| <i>Sturnus nigricolis</i> | Black-necked Starling | | | | 2 |
| <i>Zosterops japonicus</i> | Japanese White-eye | | | 2 | 3 |
| Total number of species : | | | | 4 | 14 |

* Key:

W = Wetland dependent species ; RC = Regional Concern

Table 4. List of herpetofauna and maximum counts recorded from the impact monitoring survey in Sep 2013 at work area under Contracts 2 and 100 m buffer area..

| Species | Common name | Conservation status in Hong Kong | Work area: Contract 1 | 100m Buffer area of Contract 1 |
|---------------------------|--------------------|---|------------------------------|---------------------------------------|
| <i>Rana guentheri</i> | Gunther's Frog | Common | | 2@ |
| <i>Bufo melanostictus</i> | Common Toad | Common | 1 | 1 |

Key:

@-Calling heard

Table 5. Relative abundance of butterfly species recorded under Contracts 1 in impact monitoring survey during Sep 2013.

| Species | Common name | Conservation status in Hong Kong | Work area: Contract 1 | 100m Buffer area of Contract 1 |
|---------------------------------|------------------------|----------------------------------|-----------------------|--------------------------------|
| <i>Abisara echerius</i> | Plum judy | Very Common | | + |
| <i>Catopsilia pomona</i> | Lemon Emigrant | Common | | + |
| <i>Catopsilia pyranthe</i> | Mottled Emigrant | Common | | + |
| <i>Eurema hecabe</i> | Common Grass Yellow | Very Common | + | ++ |
| <i>Lethe confuse</i> | Banded Tree Brown | Common | | + |
| <i>Hypolimnias bolina kezia</i> | Great Egg-fly | Common | | + |
| <i>Mycalesis mineus</i> | Dark-brand Bush Brown | Very Common | + | + |
| <i>Mycalesis zonata</i> | South China Bush Brown | Common | | + |
| <i>Neptis hylas</i> | Common Sailer | Common | | + |
| <i>Papilio bianor</i> | Chinese Peacock | Common | | + |
| <i>Papilio memnon agenor</i> | Great Mormon | Very Common | | + |
| <i>Papilio polytes polytes</i> | Common Mormon | Common | + | + |
| <i>Pieris canidia</i> | Indian Cabbage White | Very Common | | + |
| <i>Pseudaonzeeria maha</i> | Pale Grass Blue | Very Common | | + |
| <i>Ypthima baldus</i> | Common Five-ring | Very Common | | + |

Key:

+ : Species exists in the survey area

++ : Species common in the survey area

+++ : Species abundant in the survey area

Table 6. Relative abundance of odonata species recorded under Contracts 1 in impact monitoring survey during Sep 2013.

| Species | Common name | Conservation status in Hong Kong | Work area: Contract 1 | 100m Buffer area of Contract 1 |
|--------------------------------------|----------------------|----------------------------------|-----------------------|--------------------------------|
| <i>Copera marginipes</i> | Yellow Featherlegs | Abundant | | + |
| <i>Ictinogomphus pertinax</i> | Common Flangetail | Common | | + |
| <i>Orthetrum pruinosum neglectum</i> | Common Red Skimmer | Abundant | | + |
| <i>Pantala flavescens</i> | Wandering Glider | Abundant | + | + |
| <i>Rhyothemis variegata arria</i> | Variegated Flutterer | Common | | + |

Key:

+ : Species exists in the survey area

++ : Species common in the survey area

+++ : Species abundant in the survey area

Table 7. Relative abundance of aquatic species recorded in Wai Ha River within the 100 m buffer of works boundary under Contracts 1 in the impact monitoring survey during Sep 2013.

| Species | Common name | ¹ Life-cycle characteristics | ² Origin | SEMP 1 |
|---------------------------------|-----------------------|---|---------------------|----------|
| <i>Ambassis gymnocephalus</i> | Glassperch | M | N | + |
| <i>Gerres macracanthus</i> | Longspine Silverbidy | M | N | + |
| <i>Mugil cephalus</i> | Flatehead Grey Mullet | M | N | + |
| <i>Opsariichthys evolans</i> | Minnow | F | N | + |
| <i>Oreochromis mossambicus</i> | Mozambique Tilapa | F | I | ++ |
| <i>Oreochromis niloticus</i> | Nile Tilapa | F | I | ++ |
| <i>Tilapia zillii</i> | Redbelly Tilapa | F | I | + |
| <i>Saccostrea cucullata</i> | Rock Oyster | M | N | + |
| <i>Cerithidea cingulata</i> | Mud snail | M | N | + |
| Total number of species: | 9 | | | 9 |

Key:

Relative abundance:

- + : Species exists in the survey area
- ++ : Species common in the survey area
- +++ : Species abundant in the survey area

¹Life-cycle characteristics:

- M = Marine vagrant
- F = Freshwater species

²Origin:

- N = Native
- I = Introduced; / = not available

Appendix M. Photo of Wai Ha River in September 2013



Photo 1. Wai Ha River at W2



Photo 2. Wai Ha River at C1



Photo 3. Wai Ha River at W2



Photo 4. Wai Ha River at C1



Photo5. Wai Ha River at W2



Photo6. Wai Ha River at C1



Photo7. Wai Ha River at W2



Photo8. Wai Ha River at C1