Drainage Service Department

Monthly Environmental Monitoring & Auditing report for

Contract No.DC/2009/22
Drainage Improvement in Shuen Wan, Tai Po – Contract 1

Decmeber 2013

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EXECUTIVE SUMMARY

This is the thirty fourth 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 December 2013 to 31st December 2013. The major site activities in this reporting period were mainly installation of minor E&M equipment, E&M testing, planting on man-made slope, construction of road & drain in pumping station, installation of cladding, installation of fencing and reinstatement in Tung Tsz Nursery (Footpath).

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 11 abnormal incidents of water quality criteria were recorded in this reporting month. During the reporting period, no construction activities were 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 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 fourth 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 December 2013 to 31st December 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 minor E&M equipment
- E&M Testing
- Planting on man-made slope
- Construction of Road & Drain in Pumping Station
- Installation of Cladding
- Installation of Fencing

Area B.:

- Reinstatement in Tung Tsz Nursery (Footpath)

2.2 Construction activities for the coming month

Proposed key construction works in the coming months will include:

Area A (Pumping Station)

1. Construction of Boundary Fencing
2. Road in Pumping Station
3. Installation of Minor E&M equipment
4. Planting and landscape soft work
5. Installation of Cladding
6. Rectification works at Ting Kok Road
7. Remaining works at Intake Structure

Area B (Tung Tsz Nursery)

1. Reinstatement in Tung Tsz Nursery

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.

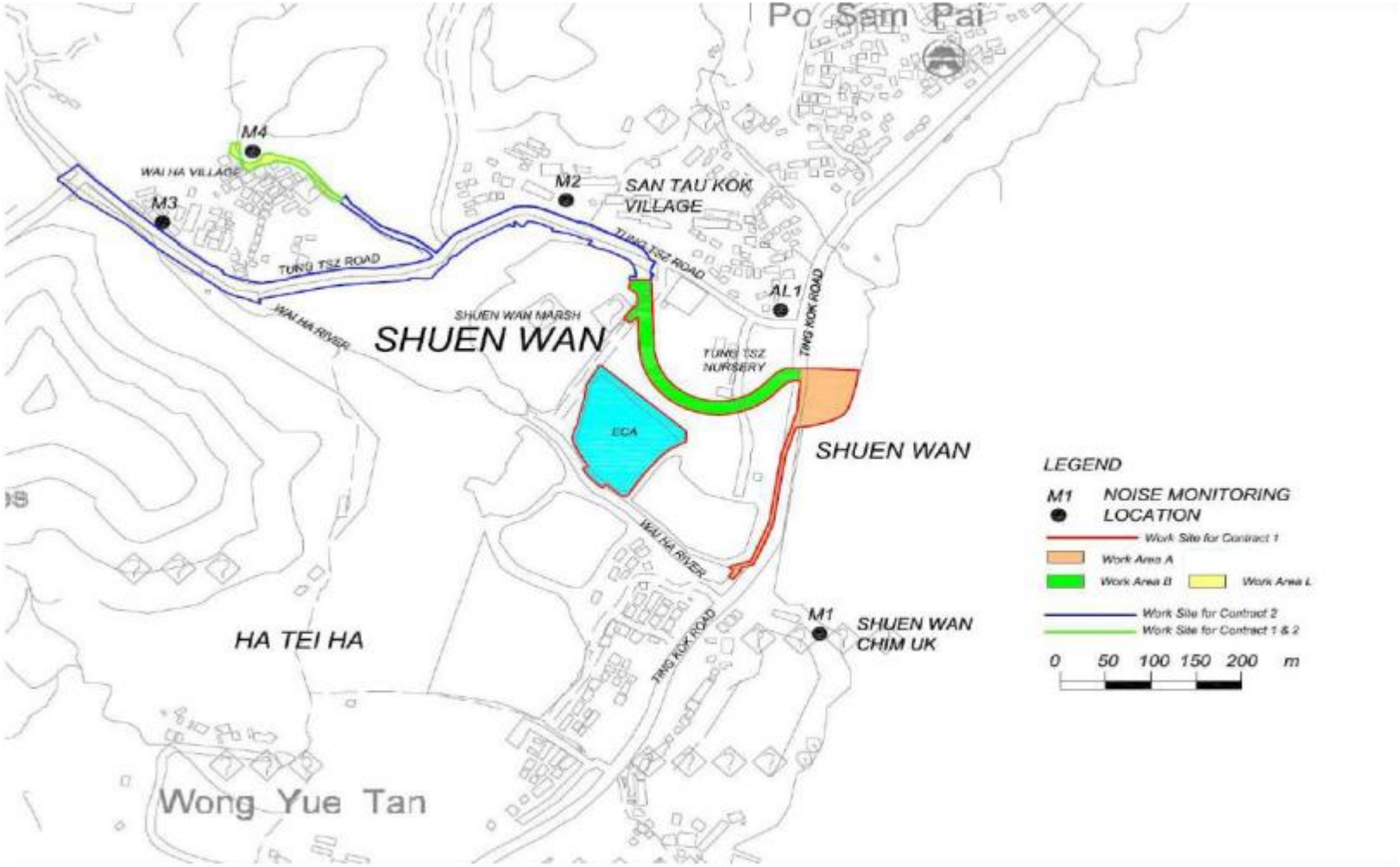


Figure 3.3.1 Impact noise monitoring locations

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 61.3dB (A) and 64.5dB (A), and AL1 ranged between 67.4dB (A) and 69.5dB (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-Dec-13	14:25	61.3	75	N	Sunny
M1	$L_{eq\ 30mins}$	11-Dec-13	15:00	63.5	75	N	Sunny
M1	$L_{eq\ 30mins}$	18-Dec-13	13:45	63.6	75	N	Sunny
M1	$L_{eq\ 30mins}$	27-Dec-13	14:55	64.5	75	N	Sunny
AL1	$L_{eq\ 30mins}$	4-Dec-13	15:05	68.8	75	N	Sunny
AL1	$L_{eq\ 30mins}$	11-Dec-13	15:40	69.5	75	N	Sunny
AL1	$L_{eq\ 30mins}$	18-Dec-13	14:20	68.5	75	N	Sunny
AL1	$L_{eq\ 30mins}$	27-Dec-13	15:30	67.4	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, 8th, 15th, 22nd and 29th of January 2014.

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.

Limit Level	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, EPD and ER	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.	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	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^{o}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^{o}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.

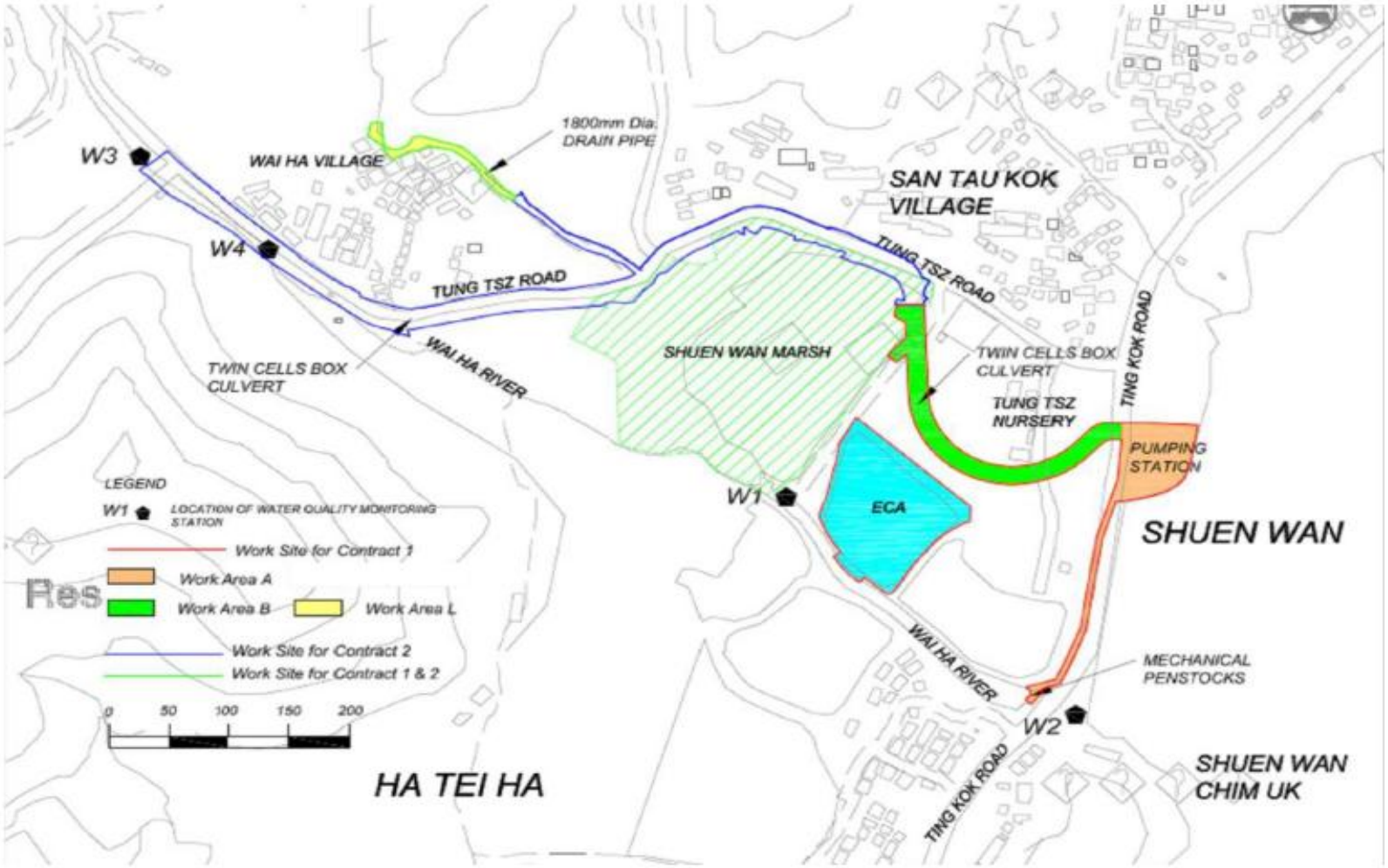


Figure 4.3.1 Water Quality Monitoring Locations

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, 20th, 23rd, 27th and 30th of December 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 11 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, no construction activities were 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 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					
	Temperature (°C)	*Turbidity (NTU)*	*pH*	*Dissolved Oxygen (mg/L)*	*Dissolved Oxygen (%)*	*Suspended Solids (mg/L)*
W1	18.6	6.7	7.82	7.53	80.3	6.9
W2	19.3	4.0	7.81	7.37	76.6	5.0
C1	19.3	4.7	8.32	7.54	81.4	5.0
C2	18.4	8.0	8.47	7.95	85.2	5.0

Table 4.5.2 Interpretations of abnormal incidents recorded in the reporting month

Date	**Tide**	**Parameter**	**Interpretations**
2/12/2013	Ebb	Turbidity	Exceedance was caused by natural fluctuation
6/12/2013	Ebb	Turbidity	
		SS	
9/12/2013	Ebb	Turbidity	
		SS	
11/12/2013	Flood	Turbidity	
		SS	
13/12/2013	Ebb	Turbidity	
16/12/2013	Ebb	Turbidity	
18/12/2013	Ebb	Turbidity	
20/12/2013	Ebb	Turbidity	
23/12/2013	Ebb	Turbidity	
27/12/2013	Flood	Turbidity	
30/12/2013	Ebb	Turbidity	

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	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. Repeat measurement on next day of	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. Make agreement on mitigation measures to be implemented; 3. 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 measures.

	exceedance.			
Action level being exceeded by more than two consecutive sampling days	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;	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. Make agreement on mitigation measures to be implemented; 3. 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 measures.

	8. Repeat measurement on next day of exeedance.			
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	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	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; 5. Consider and if necessary	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, 6th, 8th, 10th, 13th, 15th, 17th, 20th, 22nd, 24th, 27th and 29th of January 2014.

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.

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.

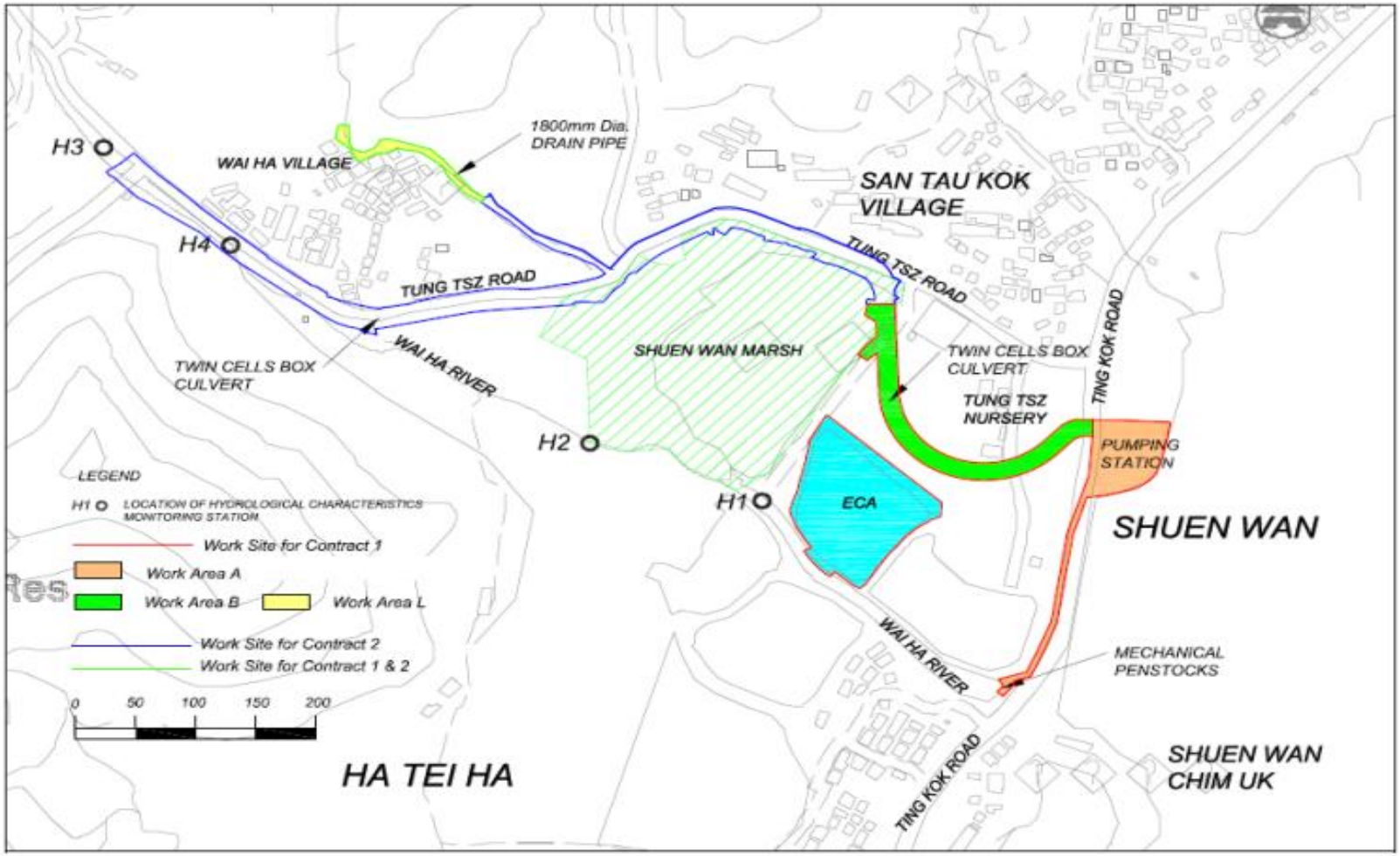


Figure 5.3.1 Hydrological Characteristics Monitoring Locations

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, 20th and 27th of December 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	~0.225
H1(Ebb)	~0.30	~0.169
H2(Flood)	~0.39	~1.413
H2(Ebb)	~0.30	~1.036

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	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, Contractor's working methods and any excavation works or dewatering processes; 5. Discuss mitigation measures with IEC, Engineer and Contractor; 6. Ensure mitigation measures are implemented. 7. Repeat measurement on next day of exceedance.	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. Make agreement on mitigation measures to be implemented; 3. Assess effectiveness of implemented mitigation measures.	1. Inform Engineer and confirm in writing notification of the non-compliance; 2. Rectify unacceptable practice; 3. Check working methods and any excavation works or dewatering processes; 4. Consider changes in working methods and plans; 5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days; 6. Implement agreed mitigation measures.
Action level being exceeded by more than two consecutive sampling days	1. Repeat in-situ measurements to confirm findings; 2. Identify reasons for non-compliance and source(s) of impact; 3. Inform IEC,	1. Discuss mitigation measures with ET, Engineer and Contractor; 2. Review proposals on mitigation	1. Discuss proposed mitigation measures with IEC, ET and Contractor; 2. Make agreement	1. Inform Engineer and confirm in writing notification of the non-compliance; 2. Rectify

	Contractor and Engineer; 4. Check monitoring data, Contractor's working methods and any excavation works or dewatering processes; 5. Discuss mitigation measures with IEC, Engineer and Contractor; 6. Ensure mitigation measures are implemented. 7. Prepare to increase the monitoring frequency to daily; 8. Repeat measurement on next day of exeedance.	measures submitted by Contractor and advise the Engineer accordingly; 3. Assess effectiveness of implemented mitigation measures.	on mitigation measures to be implemented; 3. Assess effectiveness of implemented mitigation measures.	unacceptable practice; 3. Check working methods and any excavation works or dewatering processes; 4. Consider changes in working methods and plans; 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				
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 AFCD, IEC, Contractor and Engineer; 4. Check monitoring data, and Contractor's working methods and any excavation works or dewatering processes; 5. Discuss	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	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 implemente	1. Inform Engineer and confirm in writing notification of the non-compliance; 2. Rectify unacceptable practice; 3. Check working methods and any excavation works or dewatering processes; 4. Consider changes in working

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

			stop all or part of the construction activities until no exceedance of Limit Level.	measures; 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, 10th, 17th, 24nd and 29th of January 2014.

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 on 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 (December 2013) was conducted to cover only Areas A, B and C of Contract 1 of the Project. The bi-weekly monitoring was conducted on 11th and 27th December 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**.

7.3.2 Visual Screen

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

Observation

Construction hoardings were once erected along the entire site boundary of Area A. Temporary construction hoardings have been erected around Wai Ha River estuary since the building of an automatic mechanical penstock at the area (**Photos 1-2**). As observed in December 2013, construction hoarding at the northern and southern sides of Area A (i.e. the proposed pump house station) was removed and construction of boundary walls along the western and part of the northern sides of Area A was in progress (**Photo 3**), while the proposed chain-link fence had not yet erected along the rest of the boundary sides of Area A as inspected on 27th December 2013. 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 pipes and the associated structures.

The temporary hoardings established for demarcating the construction site boundary of Phases 1 and 2 construction works area of Area B in Tung Tsz Nursery were removed in

progress in December 2013. As inspected on 27th December 2013, all these temporary hoardings were removed, and both construction works areas were partly demarcated with barrier tapes (**Photos 4-5**). The open section between Phases 1 and 2 works area was temporarily blocked for reinstatement works. As reported in the submitted *Monthly EM&A Report for November 2013*, the hoarding along the eastern boundary of Phase 2 in Area B (i.e. the section next to Ting Kok Road) was permanently reinstated with the original chain-link fence. Canvas sheets were put on the reinstated fence to screen off the existing construction site from the pedestrian path (**Photo 6**).

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 November 2013.*

Observation

Area A

The wheel washing facility at the entrance of Area A was removed as the major earthwork was completed and most of the ground surface in Area A has been turned into concrete road.

According to the Main Contractor, no groundwater or used water was pumped from the excavated sites or built box culvert in December 2013.

Area B

The major excavation and construction works in Area B were almost completed, leaving minor excavation and reinstatement work for irrigation pipes and nursery beds in both

Phases 1 and 2 within Tung Tsz Nursery. The wheel washing facility at the entrance of the access road leading towards the works area at northwestern part of Tung Tsz Nursery was removed. No significant discharge of groundwater or used water from Area B was noted during the inspection in December 2013, but occasional discharge of rain water from the built box culvert into the nearby Marsh was noted. The discharge was generally clear.

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 November 2013.*

Observation

Area A

The wheel washing facilities at the entrance of Area A was removed as the major earthwork was completed and most of the ground surface in Area A has been turned into concrete road. According to the Main Contractor, no groundwater or used water was pumped from the excavated sites or built box culvert during December 2013.

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

The major excavation and construction works in Area B were almost completed, leaving minor excavation and reinstatement work for irrigation pipes and nursery beds in both Phases 1 and 2 within Tung Tsz Nursery. The wheel washing facility at the entrance of the access road leading towards the works area at northwestern part of Tung Tsz Nursery was removed. No significant discharge of groundwater or used water from Area B was noted during the inspection in December 2013, but occasional discharge of rain water from the built box culvert into the nearby Marsh was noted. The discharge was generally clear.

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 7**).

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. As mentioned in Section 3.2 above, all temporary hoardings established for demarcating the construction site boundary in Tung Tsz Nursery were removed as inspected on 27th December 2013.

The works practice and maintenance of trees within the nursery generally follow the recommendation as stated in *Monthly EM&A Report for November 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, while those boundary hoardings around Phase 2 construction works have been erected since May 2012. As mentioned in Section 3.2, these temporary hoardings along Phases 1 and 2 of Area B works areas were removed by end of December 2013 (as inspected on 27th December 2013). The site boundary was demarcated with barrier tapes. In addition, the hoarding along the eastern boundary of Phase 2 in Area B was permanently reinstated with the original chain-link fence, which was further screened by canvas sheets (**Photo 6**).

The open section between Phases 1 and 2 works area was temporarily blocked for reinstatement works. It is expected that the reinstated access path close to the easternmost boundary of Phase 2 (i.e. the path next to the reinstated chain-link fence) could provide temporary access for the nursery workers.

According to the information provided by the Main Contractor and have been inspected since October 2013, minor excavation works (**Photos 8-9**) were undertaken in Phases 1 and 2 to reinstate the irrigation pipes for future horticultural practice in the Nursery. As inspected on 27th December 2013, the reinstatement works for the original access paths and ground of the nursery beds were in progress (**Photo 10**).

Regular monitoring for all transplanted and retained trees within the nursery was conducted on a bi-weekly basis. The dead, transplanted tree *Grevillea robusta* (U58) was removed by the Contractor in October 2013 and its stump was still left in the planter.

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 was sometimes noted throughout the monitoring period. As observed in December 2013, the regenerated watersprouts were removed as vegetation management practice in 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 paths 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. In addition, the Contractor is recommended to replace or remove the broken bamboo stakes for the transplanted trees prior to handing over the site back to the Nursery Operator.

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 November 2013*, except the observations as highlighted in the following sections.

Observation

Area A

Construction of the slanting component of the proposed green roof and pumping house (including excavation and site formation works) was almost completed by end of

December 2013. The proposed green roof on the pumping house was vegetated with herbaceous ground cover *Arachis duranensis* in accordance with the approved Landscape Plan (**Photos 11-12**).

Temporary construction barriers were used to demarcate the Tree Protection Zone (TPZ) for the existing retained and relocated trees in Area A. As observed on 27th December 2013, the construction work and site formation work close to the slanting component of the pumping house in the south was almost completed. However, only the tree E44 (*Celtis sinensis*) was protected within a TPZ, while no TPZ was established to protect a line of other retained trees nearby E44.

The tree to be transplanted E16 (*Bombax ceiba*) was relocated to the southern side of Area A next to the site hoarding in July 2012. The tree was in fair condition in December 2013 (**Photo 13**) and its TPZ was demarcated by temporary construction barrier and nets. However, given that its close proximity to the construction work which may be resumed close to the pumping house, the condition of the TPZ should be regularly monitored and maintained.

E38 (*Melaleuca cajuputi* subsp. *cumingiana*) was 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. As reported in the submitted *Monthly EM&A Report for November 2013*, this tree was removed by the Contractor and a planter was built at the same location in accordance with the approved Landscape Plan. Four new trees of *Cinnamomum burmannii* were planted in this planter (**Photo 14**). No further planting of shrubs and trees was noted in Area A.

Two trees (*Melaleuca cajuputi* subsp. *cumingiana*) have been found in the northeastern part of Area A since February 2013 and they have remained in fair condition.

The leaning trunk of E61 (*Macaranga tanarius* var. *tomentosa*) has been burlapped and supported by two steel poles since May 2013. The regenerated leaves along the leaning trunk were weak and this tree is still in poor health condition and under physiological stress (**Photo 15**). 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 16**). The tree was located just next to a temporary storage area of construction materials.

A retained tree T253 (*Bridelia tomentosa*) was in marginally fair condition. Dead scaffold limbs with dry, peeled bark were observed (**Photos 17-18**). This identified tree defect may be only related to the intrinsic physiological and structural condition of T253.

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 December 2013 in Area A.

Area B

As highlighted in the Section "Liaison with Nursery", the transplanted tree *Grevillea robusta* (U58) was removed in October 2013 as it was certified as dead specimen. Its stump was left in the tree planter (**Photo 19**).

The relocated trees U34, U35 and U37 were certified as dead specimens (**Photos 20-22**). The collapsed dead tree trunk of U34 was still remained on-site, while only part of the collapsed trunk of U35 could be found on 27th December 2013. Most of the excavated soil piled close to the relocated trees along both sides of Phase 1 works area was removed by end of December 2013.

Half of the planter of U47 (*Terminalia catappa*) has broken since August 2013, and some of its roots and planter soil were exposed in the air. As inspected in December 2013, the previously reported stockpiled soil was removed away. However, the planter was not yet repaired (**Photo 23**).

U55 (*Pterocarpus indicus*) has 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 24**), but long branches with wounds and

dieback twigs were still observed in the canopy. Close monitoring on this tree is still required.

Sign of suspected termite infestation has been observed at the lower trunk of the retained tree U67 (*Cassia fistula*) (**Photo 25**). The tree was still in fair health and structural condition as observed in December 2013, but close monitoring should be undertaken.

Apart from the removal of the dead tree U77 (*Terminalia catappa*) in Phase 2 of Area B in October 2013, other relocated trees U76, U78 and U79 (all are *Terminalia catappa*) had been removed by the time of inspection on 27th December 2013 (**Photo 26**). According to the information by the Contractor, the Nursery Operator requested the Contractor to remove these three trees.

A wooden plate discarded among the overgrown climbers and canopy of the relocated tree U74 (*Delonix regia*) was found removed (**Photo 27**).

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 28**). The tree may have a risk of leaning if its underground roots are further damaged.

The excavated holes have still existed next to the relocated trees (including A36, A43, U48, U53, U54, U69 and U70) in Phase 1 (**Photos 8-9**). According to the information provided by the Main Contractor, the ground was excavated to reinstate the irrigation pipes for future horticultural practice in the Nursery. Trees which were previously relocated or retained within the planters may not be affected significantly. However, given the close proximity of the trees to the excavated area and the potential influence on the soil ground underneath the planters resulting from the excavation works, the trees may pose a risk of leaning or show deterioration in health condition if their roots are damaged by the excavation works.

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. Proper tree

protection (e.g. guying and temporary TPZ) and removal of surplus soils (esp. those related to the reinstatement of irrigation system) 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 December 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 covering the tree driplines 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 (e.g. for the case of the retained trees in the eastern and southern parts of Area A), and prevent 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 checking 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 site workers should not remove the tree protection zone during the construction phase.

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. In addition, the appointed landscape construction should provide regular watering on the newly planted trees (*Cinnamomum burmannii* in the planter) and ground cover (*Arachis duranensis* on the green roof) throughout the maintenance period.

The relocated tree E38 appeared in 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 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 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, U67 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. 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 repairing the broken planter of the tree U47 (located in Phase 1 of the works area) and avoid stockpiling of soil close to the trunk flare.

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

The Contractor is advised to programme the excavation works appropriately in Phases I and 2 of Area B. The Contractor should establish a buffer zone and tree protection zone between the excavated ground and the relocated/ retained trees wherever practical

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 November 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 January 2014 is scheduled to be conducted in the weeks of 6th and 20th January 2014.

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 and hydrological characteristics. therefore, no actions were taken.

There were 11 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, no construction activities were 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, 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
Oct 13	0.04	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Nov-13	0.04	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dec-13	0.004	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Total	27.294	0.00	24.267	1.85	0.895	0.566	2.37	0.00	0.00	0.00	0.47

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
October 2013	0	0	0	0
November 2013	0	0	0	0
December 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 4th, 12th, 20th and 27th of December 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
25 Oct 13 1, 8, 16, 22 Nov 13 4 & 12 Dec 13	Open stockpiles was observed at Area A.	Observation	Contractor was reminded that dusty materials should be covered with tarpaulin sheets for dust suppression.	Open stockpile was covered with tarpaulin	20 Dec 2013
29 Nov 13	Inadequate tree protection was observed at Area A.	Observation	Contractor was reminded that the tree protection zone with enough space should be provided.	Tree protection zone was set up at Area A.	4 Dec 2013
12 & 27 Dec 13	Accumulative general refuse was observed at Area A.	Observation	Contractor was reminded that routine site clearance should be implemented to maintain good housekeeping.	To be follow during next inspection.	N/A

12.2 Compliance with legal and Contractual requirement

There was no non-compliance recorded for the month of December 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 statues 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:

- Dust control at Area A and Area B.
- Quality of effluent discharge from Area A.
- 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, planting on man-made slope, construction of road & drain in pumping station, installation of cladding, installation of fencing and reinstatement in Tung Tsz Nursery (Footpath) 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 4th of December 2013.

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

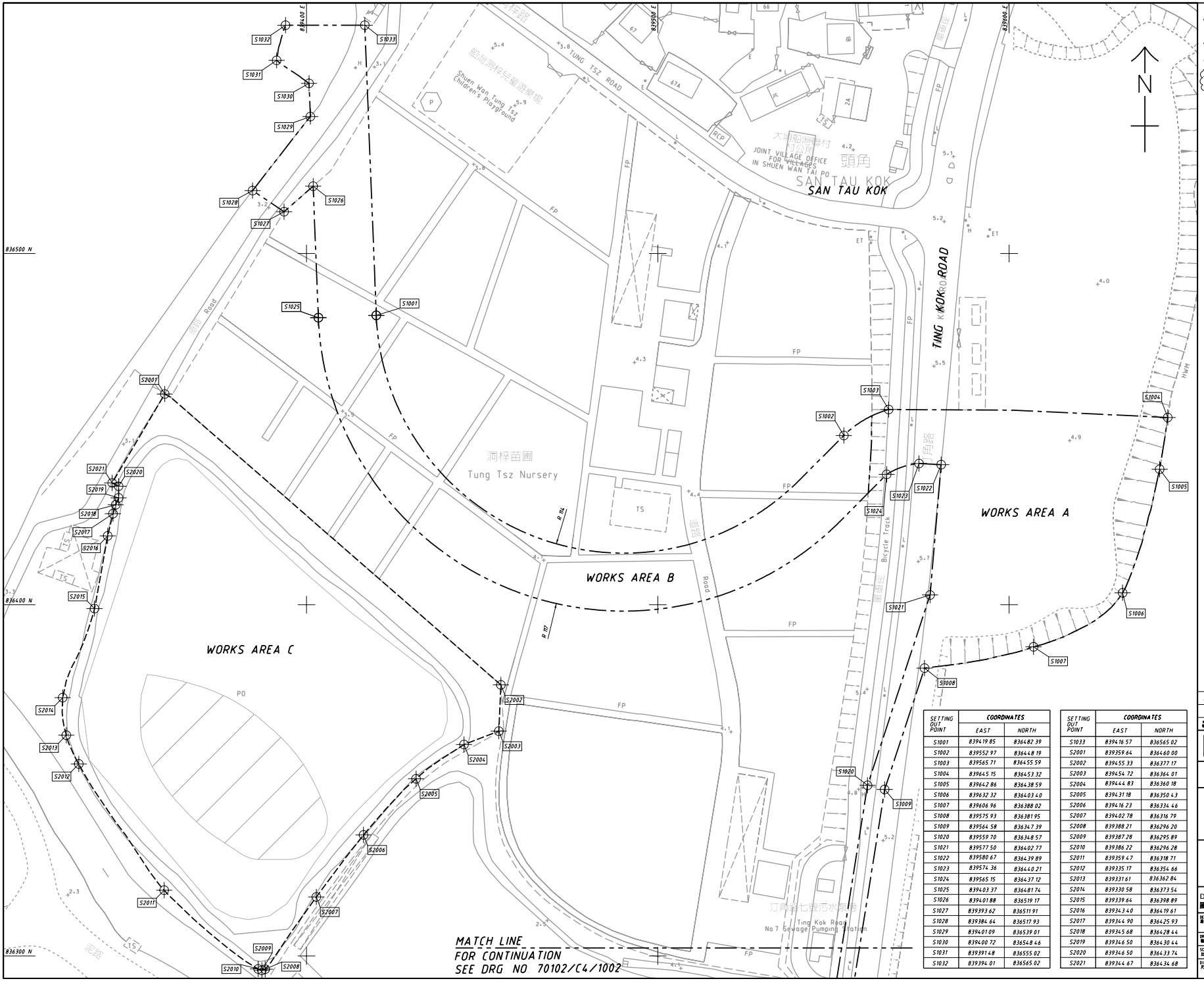
For water quality monitoring, total 11 abnormal incidents of water quality criteria were recorded in this reporting month. During the reporting period, no construction activities were conducted near Wai Ha River. Proper mitigation measures were implemented by contractor to avoid site water release to 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 HK(1980) COORDINATES SYSTEM
3. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED
4. THE PUBLIC CLEANING AREA SHALL BE THE AREAS WITHIN 2.5m BEYOND THE LIMIT OF WORKS AREAS EXCLUDING PRIVATE AREAS △A

LEGEND

- LIMIT OF WORKS AREA A
- LIMIT OF WORKS AREA B
- LIMIT OF WORKS AREA C
- S1001 SETTING OUT POINT

SETTING OUT POINT	COORDINATES EAST	NORTH
S1001	839419.85	836482.39
S1002	839552.97	836448.19
S1003	839565.71	836455.59
S1004	839645.15	836453.32
S1005	839642.86	836438.59
S1006	839632.32	836403.40
S1007	839606.96	836388.02
S1008	839575.93	836381.95
S1009	839564.58	836347.39
S1020	839559.70	836348.57
S1021	839577.50	836402.77
S1022	839580.67	836439.89
S1023	839574.36	836440.21
S1024	839565.15	836437.12
S1025	839403.37	836481.74
S1026	839401.88	836519.17
S1027	839393.62	836511.91
S1028	839386.64	836517.93
S1029	839401.09	836539.01
S1030	839400.72	836548.46
S1031	839391.48	836555.02
S1032	839394.01	836565.02

SETTING OUT POINT	COORDINATES EAST	NORTH
S1033	839416.57	836565.02
S2001	839359.64	836440.00
S2002	839455.33	836377.17
S2003	839454.72	836364.01
S2004	839444.83	836360.18
S2005	839431.18	836350.43
S2006	839416.23	836334.46
S2007	839402.78	836316.79
S2008	839388.21	836296.20
S2009	839387.28	836295.89
S2010	839386.22	836296.28
S2011	839359.47	836318.71
S2012	839335.17	836354.66
S2013	839331.61	836362.84
S2014	839330.58	836373.54
S2015	839339.64	836398.89
S2016	839343.40	836419.61
S2017	839344.90	836425.93
S2018	839345.68	836428.44
S2019	839346.50	836430.44
S2020	839346.50	836433.74
S2021	839344.67	836434.68

A	TENDER ADDENDUM NO.2	ECYP	RCYK	10-09
-	TENDER DRAWING	ECYP	RCYK	09-09
REV. 修訂	DESCRIPTION 內容摘要	BY 修訂者	CHECKED 核准	DATE 日期

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

DRG.NO. 圖紙編號 70102/C4/1001A

DESIGNED BY 設計	CPWU	CONTRACT NO. 合約編號	DC/2009/22
DRAWN BY 繪圖	LWL	P. DIV.- APPROVED 負責人	DML
SCALE 比例	A1 1 500	STATUS 類別	
DIMENSIONS ARE IN 尺寸單位	METRES	© COPYRIGHT RESERVED 版權所有	

2010-2-5 11:54:09

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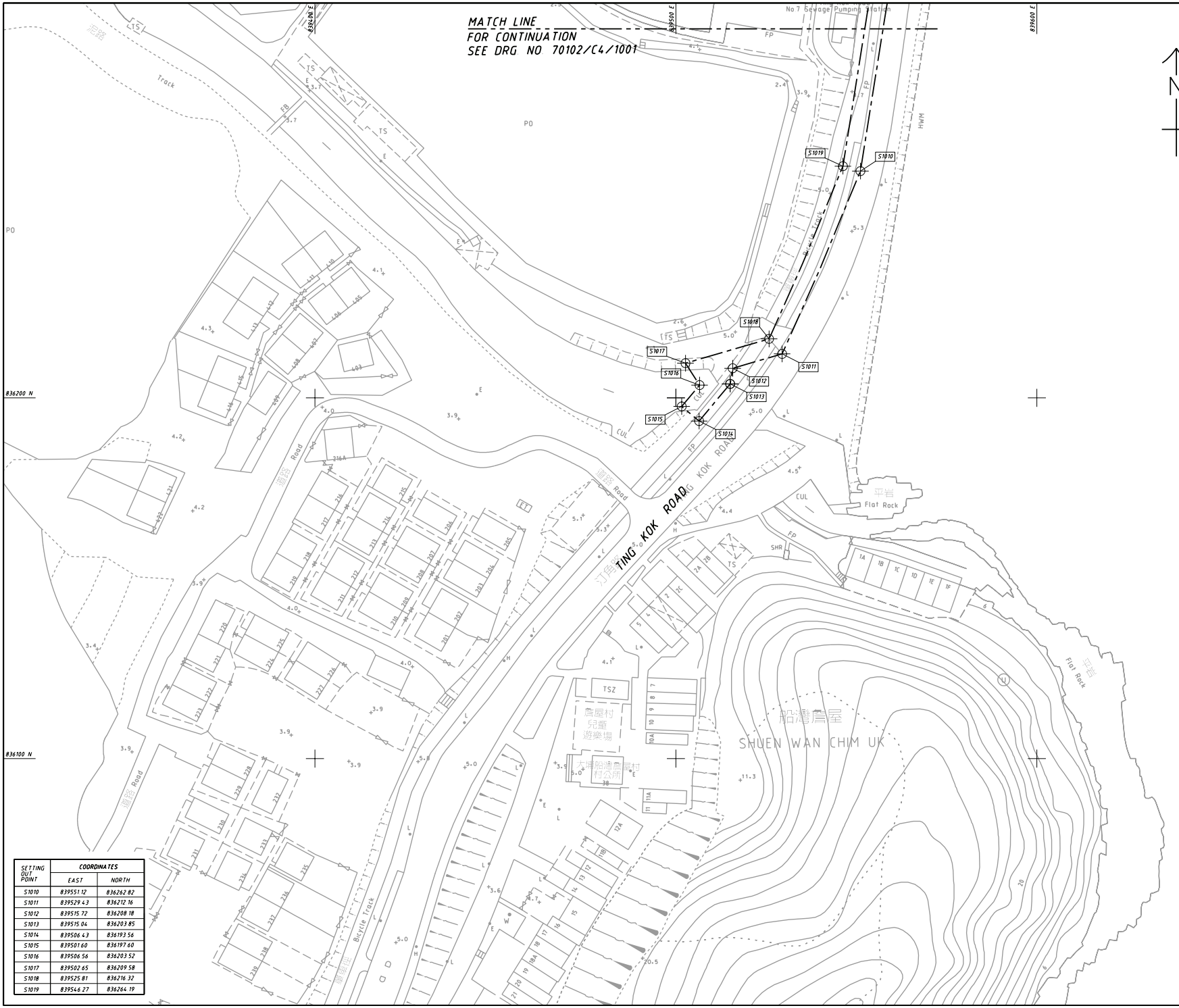

SETTING OUT POINT	COORDINATES	
	EAST	NORTH
S1010	839551.12	836262.82
S1011	839529.43	836212.16
S1012	839515.72	836208.18
S1013	839515.04	836203.85
S1014	839506.43	836193.56
S1015	839501.60	836197.60
S1016	839506.56	836203.52
S1017	839502.65	836209.58
S1018	839525.81	836216.32
S1019	839546.27	836264.19

NOTE

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

NO. 號碼	DESCRIPTION 內容說明	BY 繪製	CHECKED 檢查	DATE 日期
-	TENDER DRAWING	ECY	PRC	YK 09-09

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. 圖紙編號 70102/C4/1002

DESIGNED BY 設計	CPWU	CONTRACT NO. 合約編號	DC/2009/22
DRAWN BY 繪圖	LWL	P. DIV.- APPROVED 負責人	DML
SCALE 比例	A1 1 500	STATUS 類別	
DIMENSIONS ARE IN 尺寸單位	METRES	© COPYRIGHT RESERVED 版權所有	

2010-2-5 13 32 23

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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@ya hoo.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.co m.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

Hong Kong Calibration Ltd.
香 港 校 正 有限公司

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:

Equipment No.	Description	Cert. No.	Traceable to
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

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

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

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

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 ----------

Hong Kong Calibration Ltd.
香港校正有限公司

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:

Equipment No.	Description	Cert. No.	Traceable to
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

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

E

Calibration Certificate

Certificate No. 28554

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 : $\pm 3.6 \times 10^{-6}$

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	**WORK ORDER:**	HK1328496
CLIENT:	ENVIRONMENTAL PIONEERS & SOLUTIONS LIMITED	**LABORATORY:**	HONG KONG
ADDRESS:	FLAT A, 19/F, CHAI WAN INDUSTRIAL BUILDING, 20 LEE CHUNG STREET, CHAI WAN, HONG KONG	**DATE RECEIVED:**	16/10/2013
		DATE OF ISSUE:	24/10/2013

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 aceptance criteria of ALS will be followed.

Scope of Test:	Conductivity, Dissolved Oxygen, pH, Temperature and Turbidity
Equipment Type:	WATER QUALITY MULTI-METER
Brand Name:	TOA DKK
Model No.:	WMS-24
Serial No.:	685940
Equipment No.:	--
Date of Calibration:	23 October, 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

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1328496
Date of Issue: 24/10/2013
Client: ENVIRONMENTAL PIONEERS & SOLUTIONS LIMITED

Description: WATER QUALITY MULTI-METER
Brand Name: TOA DKK
Model No.: WMS-24
Serial No.: 685940
Equipment No.: --
Date of Calibration: 23 October, 2013 Date of next Calibration: 23 January, 2014

Parameters:

Conductivity

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

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
146.9	138.0	-6.1
6667	6530	-2.1
12890	12800	-0.7
58670	56900	-3.0
	Tolerance Limit (±%)	10.0

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.67	3.77	0.10
5.15	5.29	0.14
7.25	7.09	-0.16
	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	4.03	0.03
7.0	6.99	-0.01
10.0	9.92	-0.08
	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)
11.0	10.6	-0.4
25.0	24.0	-1.0
32.0	31.0	-1.0
	Tolerance Limit (±°C)	2.0

Turbidity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.0	--
4	3.9	-2.5
40	39.4	-1.5
80	79.4	-0.7
400	383.6	-4.1
800	799.8	0.0
	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

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		4/12/2013	4/12/2013
Weather Condition		Sunny	Sunny
Measurement Start Time (hh:mm)		14:25	15:05
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))	61.3	68.8
	L_{10} (dB(A))	63.4	69.7
	L_{90} (dB(A))	48.0	53.5
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
Perpared by:	Lau Kai Chung	**Lau Kai Chung**	4/12/2013

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		11/12/2013	11/12/2013
Weather Condition		Sunny	Sunny
Measurement Start Time (hh:mm)		15:00	15:40
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	69.5
	L_{10} (dB(A))	65.1	70.3
	L_{90} (dB(A))	49.3	55.8
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
Perpared by:	Lau Kai Chung	**Lau Kai Chung**	11/12/2013

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		18/12/2013	18/12/2013
Weather Condition		Sunny	Sunny
Measurement Start Time (hh:mm)		13:45	14:20
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))	63.6	68.5
	L_{10} (dB(A))	64.8	69.7
	L_{90} (dB(A))	47.5	58.1
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
Perpared by:	Lau Kai Chung	**Lau Kai Chung**	18/12/2013

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		27/12/2013	27/12/2013
Weather Condition		Sunny	Sunny
Measurement Start Time (hh:mm)		14:55	15:30
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))	64.5	67.4
	L_{10} (dB(A))	65.4	68.9
	L_{90} (dB(A))	46.1	57.7
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
Perpared by:	Lau Kai Chung	**Lau Kai Chung**	27/12/2013

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： 2/12/2013

Weather： Cloudy

Monitoring Location	W1	W2	C2
Time (hhmm)	11:36	13:00	17:30
Tide Mode	Mid-ebb		
Water Depth (m)	<1	<1	<1
pH value	8.10	7.75	8.90
Temperature (^{o}C)	19.1	18.1	17.8
Turbidity (NTU)	4.7	3.3	2.2
DO (mg/L)	7.80	7.38	8.10
DO Saturation (%)	84%	75%	82%
Suspended Solids (mg/L)	5.0	2.6	4.0

Remark or Observation：

	Name	Signature	Date
Prepared By：	Lau kai chung	**Lau kai chung**	2/12/2013

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

Date of Sampling : 4/12/2013

Weather : Cloudy

Monitoring Location	**W1**	**W2**	**C2**
Time (hhmm)	13:08	14:25	16:50
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	7.50	8.01	8.00
Temperature (^{o}C)	20.3	20.8	21.2
Turbidity (NTU)	3.8	2.8	2.7
DO (mg/L)	8.50	7.47	6.20
DO Saturation (%)	92%	75%	70%
Suspended Solids (mg/L)	4.0	1.4	3.0

Remark or Observation :

	Name	**Signature**	**Date**
Prepared By :	Lau kai chung	**Lau kai chung**	4/12/2013

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

Date of Sampling : 6/12/2013

Weather : Cloudy

Monitoring Location	W1	W2	C2
Time (hhmm)	14:46	15:20	13:49
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	7.70	7.65	9.10
Temperature (^{o}C)	21.5	18.5	23.5
Turbidity (NTU)	15.70	3.9	3.40
DO (mg/L)	7.70	7.21	7.90
DO Saturation (%)	84%	73%	91%
Suspended Solids (mg/L)	16.0	11.0	2.0

Remark or Observation :

	Name	Signature	Date
Prepared By :	Lau kai chung	**Lau kai chung**	6/12/2013

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

Date of Sampling : 9/12/2013

Weather : Sunny

Monitoring Location	W1	W2	C2
Time (hhmm)	17:47	16:00	10:52
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	7.80	7.80	8.60
Temperature (^{o}C)	22.3	21.5	21.8
Turbidity (NTU)	4.6	4.5	2.2
DO (mg/L)	7.10	6.98	8.70
DO Saturation (%)	78%	75%	96%
Suspended Solids (mg/L)	6.0	12.0	2.0

Remark or Observation :

	Name	Signature	Date
Prepared By :	Lau kai chung	**Lau kai chung**	9/12/2013

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

Date of Sampling : 11/12/2013

Weather : Sunny

Monitoring Location	W1	W2	C1
Time (hhmm)	12:58	15:00	15:05
Tide Mode	Mid-flood		
Water Depth (m)	<1	<1	<1
pH value	8.00	8.15	8.23
Temperature (^{o}C)	21.1	21.5	21.3
Turbidity (NTU)	4.5	3.5	3.8
DO (mg/L)	7.10	7.89	7.87
DO Saturation (%)	76%	85%	85%
Suspended Solids (mg/L)	4.0	9.4	

Remark or Observation :

	Name	Signature	Date
Prepared By :	Lau kai chung	**Lau kai chung**	11/12/2013

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

Date of Sampling : 13/12/2013

Weather : Sunny

Monitoring Location	W1	W2	C2
Time (hhmm)	10:02	10:25	17:03
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	7.60	7.48	8.30
Temperature (^{o}C)	21.3	22.9	19.2
Turbidity (NTU)	4.5	4.1	1.1
DO (mg/L)	6.20	7.16	9.30
DO Saturation (%)	66%	75%	104%
Suspended Solids (mg/L)	8.0	3.8	5.0

Remark or Observation :

	Name	Signature	Date
Prepared By :	Lau kai chung	**Lau kai chung**	13/12/2013

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

Date of Sampling : 16/12/2013

Weather : Sunny

Monitoring Location	**W1**	**W2**	**C2**
Time (hhmm)	12:23	13:00	16:47
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	7.30	7.71	8.40
Temperature (^{o}C)	15.4	20.3	15.7
Turbidity (NTU)	18.6	3.6	9.5
DO (mg/L)	7.1	7.21	9.30
DO Saturation (%)	79%	78%	104%
Suspended Solids (mg/L)	13.0	3.8	8.0

Remark or Observation :

	Name	**Signature**	**Date**
Prepared By :	Lau kai chung	**Lau kai chung**	16/12/2013

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

Date of Sampling : 18/12/2013

Weather : Cloudy

Monitoring Location	W1	W2	C2
Time (hhmm)	13:18	13:45	15:20
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	7.40	7.87	8.70
Temperature (^{o}C)	14.2	16.7	13.4
Turbidity (NTU)	3.6	3.1	2.8
DO (mg/L)	8.40	7.31	9.00
DO Saturation (%)	85%	78%	84%
Suspended Solids (mg/L)	3.0	2.2	2.0

Remark or Observation :

	Name	Signature	Date
Prepared By :	Lau kai chung	**Lau kai chung**	18/12/2013

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

Date of Sampling : 20/12/2013

Weather : Cloudy

Monitoring Location	W1	W2	C2
Time (hhmm)	13:48	15:00	13:00
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	7.00	7.89	8.10
Temperature (^{o}C)	17.3	17.6	17.9
Turbidity (NTU)	1.8	3.5	20.9
DO (mg/L)	6.10	7.21	6.20
DO Saturation (%)	66%	75%	67%
Suspended Solids (mg/L)	2.0	5.0	12.0

Remark or Observation :

	Name	Signature	Date
Prepared By :	Lau kai chung	**Lau kai chung**	20/12/2013

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

Date of Sampling : 23/12/2013

Weather : Cloudy

Monitoring Location	W1	W2	C1
Time (hhmm)	16:00	16:00	16:30
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	6.20	7.79	8.40
Temperature (^{o}C)	18.1	17.5	17.2
Turbidity (NTU)	4.0	3.5	5.6
DO (mg/L)	7.90	7.16	7.20
DO Saturation (%)	86%	70%	78%
Suspended Solids (mg/L)	8.0	3.8	10.0

Remark or Observation :

	Name	Signature	Date
Prepared By :	Lau kai chung	**Lau kai chung**	23/12/2013

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

Date of Sampling : 27/12/2013

Weather : Sunny

Monitoring Location	**W1**	**W2**	**C1**
Time (hhmm)	14:28	14:55	15:00
Tide Mode	Mid-flood		
Water Depth (m)	<1	<1	<1
pH value	12.00	7.88	8.16
Temperature (^{o}C)	16.9	17.3	17.5
Turbidity (NTU)	11.6	3.1	2.0
DO (mg/L)	8.80	8.11	7.91
DO Saturation (%)	88%	85%	85%
Suspended Solids (mg/L)	12.0	2.0	2.4

Remark or Observation :

	Name	**Signature**	**Date**
Prepared By :	Lau kai chung	**Lau kai chung**	27/12/2013

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

Date of Sampling : 30/12/2013

Weather : Cloudy

Monitoring Location	W1	W2	C2
Time (hhmm)	10:25	11:30	16:13
Tide Mode	Mid-ebb		N/A
Water Depth (m)	<1	<1	<1
pH value	7.20	7.68	8.20
Temperature (^{o}C)	15.3	19.1	16.6
Turbidity (NTU)	3.0	4.5	1.2
DO (mg/L)	7.60	7.34	7.60
DO Saturation (%)	80%	75%	76%
Suspended Solids (mg/L)	2.0	2.6	2.0

Remark or Observation :

	Name	Signature	Date
Prepared By :	Lau kai chung	**Lau kai chung**	30/12/2013

Appendix F: Hydrological Characteristics Monitoring Data

Position	Tide	Date	Time	Weather	Water Depth (m)	Water Flow (m/s)	Water Flow (m^3/s)
Mid	Flood	6-Dec-2013	9:35	Cloudy	0.36	0.24	0.300
Mid	Flood	13-Dec-2013	15:10	Sunny	0.48	0.18	0.225
Mid	Flood	20-Dec-2013	9:05	Cloudy	0.48	0.18	0.225
Mid	Flood	27-Dec-2013	14:10	Sunny	0.36	0.12	0.150
Mid	Flood	6-Dec-2013	10:05	Cloudy	0.24	0.24	1.507
Mid	Flood	13-Dec-2013	15:35	Sunny	0.48	0.24	1.507
Mid	Flood	20-Dec-2013	9:40	Cloudy	0.36	0.24	1.507
Mid	Flood	27-Dec-2013	14:35	Sunny	0.48	0.18	1.130
Mid	Ebb	6-Dec-2013	15:10	Cloudy	0.36	0.18	0.225
Mid	Ebb	13-Dec-2013	9:35	Sunny	0.24	0.24	0.300
Mid	Ebb	20-Dec-2013	14:10	Cloudy	0.3	0.12	0.150
Mid	Ebb	*27-Dec-2013					
Mid	Ebb	6-Dec-2013	15:35	Cloudy	0.24	0.24	1.507
Mid	Ebb	13-Dec-2013	10:05	Sunny	0.3	0.24	1.507
Mid	Ebb	20-Dec-2013	14:45	Cloudy	0.36	0.18	1.130
Mid	Ebb	*27-Dec-2013					

*Only one mid-tide is within working hours on 27 December 2013.

Appendix G: Landscape and Visual Monitoring Photos

	
Photo 1 – Temporary construction hoardings have been established around the works area at Wai Ha River estuary.	**Photo 2** – Temporary construction hoardings have been established around the works area at Wai Ha River estuary.
	
Photo 3 – Construction of the proposed boundary walls along part of the northern and western sides of Area A was in progress.	**Photo 4** – The temporary construction hoardings in Phase 1 were removed and replaced by barrier tape.
	
Photo 5 – The temporary construction hoardings in Phase 1 were removed and replaced by barrier tape.	**Photo 6** – Chain-link fence was reinstated at the eastern end of Phase 2 works area and covered by canvas sheets.

	
Photo 7 – No discharge of muddy water was observed in Area C.	**Photo 8** – Minor excavation works were undertaken in Phase 1 to reinstate the irrigation pipes.
	
Photo 9 – Minor excavation works were undertaken in Phase 1 to reinstate the irrigation pipes.	**Photo 10** – The reinstatement works for the original access paths and ground of the nursery beds were in progress
	
Photo 11 – The slanting component of the pumping house was vegetated with ground cover *Arachis duranensis*.	**Photo 12** – The rooftop of the pumping house was vegetated with ground cover *Arachis duranensis*.

	
Photo 13 – Tree Protection Zone of E16 was demarcated by construction barriers and nets.	**Photo 14** – Four new trees of *Cinnamomum burmannii* were planted in this planter.
	
Photo 15 – The leaning E61 was in poor structural and physiological condition.	**Photo 16** – The damaged tree trunk of E55 was burlapped and the tree was in poor condition.
	
Photo 17 – The retained tree T253 was in marginally fair condition.	**Photo 18** – Dead scaffold limbs with peeled bark were observed on T253.

	
Photo 19 – The transplanted tree U58 was dead and removed.	**Photo 20** – The collapsed trunk of a dead tree U34.
	
Photo 21 – The collapsed tree trunk of dead tree U35 was not found.	**Photo 22** – Dead tree U37.
	
Photo 23 – Half of the planter of U47 was broken, but was not yet repaired.	**Photo 24** – The health condition of U55 has been improved.

	
Photo 25 –Sign of suspected termite infestation was observed at the lower trunk of U67.	**Photo 26** – U76, U78 and U79 were removed and their original locations were indicated in photo.
	
Photo 27 – A wooden plate discarded among the overgrown climbers and canopy of the relocated tree U74 was found removed.	**Photo 28** – The excavated area close to the planter of A40 has not yet refilled with soil.

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		***Noise Impact***					
S 3.30	2.18	Good Site Practice: ▪ 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?
		trucks) that may be in intermittent use shall be shut down between work periods or shall be throttled down to a minimum ▪ 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?
		▪ 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. ▪ Stockpiled excavated materials should be covered with tarpaulin, and should be removed off-site within 24 hours to avoid any odour nuisance arising.					
C		***Water Quality Impact***					
S5.29	4.5	Construction Site Run-off and Drainage: ▪ 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?
		sewers/drains. ▪ 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?
		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. ▪ 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. Other measures that need to be implemented before, during, and after rainstorms as summarized in ProPECC PN 1/94 shall be followed.					

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?
		▪ 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?
		▪ 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?
		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 ground level and +2.5 mPD (whichever is greater) to provide adequate allowance 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. ▪ 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?
		be extended above ground level for about 2m to serve as hoardings to isolate the works site. ▪ 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?
		▪ 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-S 5.32	4.8-4.9	General Construction Activities: ▪ 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?
		when not being used. ▪ 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	Sewage from Construction workforce: ▪ 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	River Channel Excavation Works: ▪ 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	Good site practices: ▪ 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?
		collection for disposal. ▪ 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?
		should be prepared and submitted to the Engineer for approval. One may make reference to ETWB TCW No. 15/2003 for details. ▪ 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	Waste reduction measures: ▪ 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?
		shall be provided to segregate this waste from other general refuse generated by the work force. ▪ 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		Construction & Demolition (C&D) Material: ▪ 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	To minimize off-site disposal of C&D material To minimize environmental impacts during the handling of C&D material	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?
		impacts or nuisance: - covering material during heavy rainfall; - locating stockpiles to minimize potential visual impacts; and - minimizing land intake of stockpile areas as far as possible. ▪ 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		Chemical waste: ▪ 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?
		corresponding chemical characteristics of the chemical waste, such as explosives, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc. ▪ 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		General refuse: ▪ 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?
		should be employed by the contractor to remove general refuse from the site, separately from C&D material. ▪ An enclosed and covered area is preferred to reduce the occurrence of 'wind blown' light material.					
E		***Ecological Impact***					
S. 7.95	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	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?
		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.					
S7.117	6.6	▪ 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?
		▪ 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	▪ 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?
		▪ 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	▪ 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?
		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. ▪ 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.		lturalist			

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	▪ 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 Egretry 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?
		ardeids. ▪ 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	▪ 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	▪ 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	▪ 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	▪ 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	▪ 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	▪ 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	▪ 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	▪ 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?
		Project. ▪ The compensatory planting should make use of native plant species with flowers/fruits attractive to wildlife.					
S 7.124	6.13	▪ 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?
		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. ▪ 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		***Landscape and Visual***					
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	Further precautionary measures during rainy season: 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 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	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
	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. 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. 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					
5.9	Reuse excavated material as much as possible	To achieve waste reduction	Works areas	Construction phase	EIAO-TM	Implemented
5.7	Any unused chemicals or those with remaining functional capacity shall be recycled.					Not applicable
	Recycle scrap metals or abandoned equipment					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
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
5.9	Adopt a trip ticket system for the disposal of C&D materials					Implemented
5.11	All general refuse should be segregated and stored in enclosed bins or compaction units					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
	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 corresponding chemical characteristics of the chemical waste, such as explosives, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc.					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 steam 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 steam 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
	The existing natural riverbed and substrates should be retained and the natural pool-riffle sequence should be re-created in the new channel bed.					
6.7	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. 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. 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.	To minimize sedimentation/ water quality impacts	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
6.8	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. 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.	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

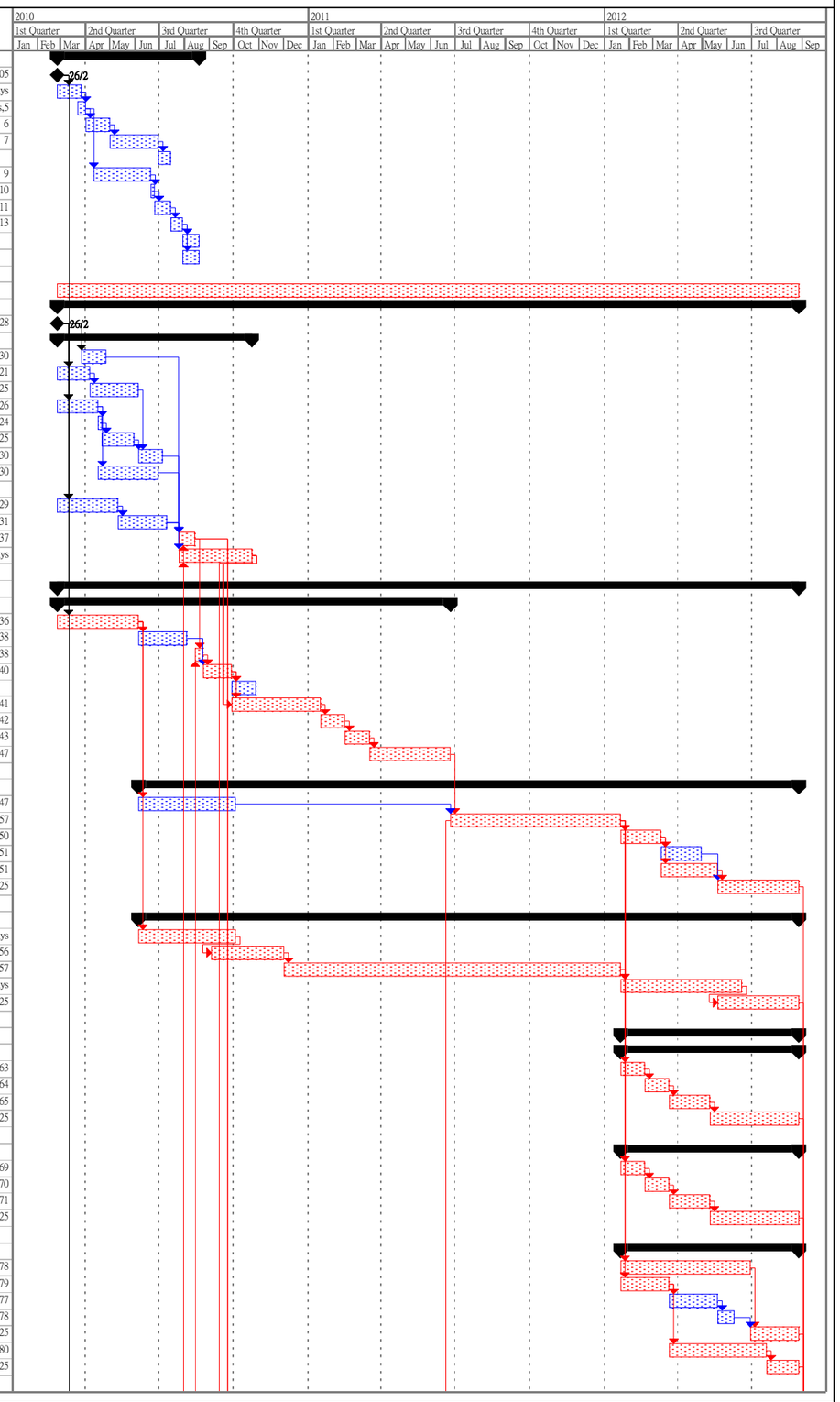
EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & main concern to Address	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?	Implementation status
6.13	Construction activities should be restricted to work areas 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 Pogramme

Contract No.: DC/2009/22
Contract Title: Drainage Improvement Works in Shuen Wan, Tai Po - Contract 1

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
1	**1**	**1**	**1**	1	**Preliminary Works (Area I - Pak Shek Kok)**	**175 days**	**Fri 26/2/10**	**Thu 19/8/10**		
2	2	2	2	2	Commencement of Works	0 days	Fri 26/2/10	Fri 26/2/10		3,83,88,105
3	3	3	3	3	Design & Construction of Site Hoarding	30 days	Fri 26/2/10	Sat 27/3/10	2	4FS-5 days
4	4	4	4	4	Site Clearance	10 days	Tue 23/3/10	Thu 1/4/10	3FS-5 days	8FS+10 days,5
5	5	5	5	5	Design of Engineer's Site Office	30 days	Fri 2/4/10	Sat 1/5/10	4	6
6	6	6	6	6	Construction of Engineer's Site Office	60 days	Sun 2/5/10	Wed 30/6/10	5	7
7	7	7	7	7	Engineer's Site Office - Setup the Internal Finishing / Furniture/ Equipment	15 days	Thu 1/7/10	Thu 15/7/10	6	
8	8	8	8	8	Construction of Contractor's Accommodation	70 days	Mon 12/4/10	Sun 20/6/10	4FS+10 days	9
9	9	9	9	9	Installation of Sewerage Storage Tank	5 days	Mon 21/6/10	Fri 25/6/10	8	10
10	10	10	10	10	Contractor Accommodation - Setup the Internal Finishing / Furniture / Equipment	20 days	Sat 26/6/10	Thu 15/7/10	9	11
11	11	11	11	11	Establishment of Vehicular Gate, Storage Area	15 days	Fri 16/7/10	Fri 30/7/10	10	12,13
12	12	12	12	12	Establishment of Welfare Facilities for Workers	20 days	Sat 31/7/10	Thu 19/8/10	11	
13	13	13	13		Temporary Drainage System	20 days	Sat 31/7/10	Thu 19/8/10	11	
14										
15	15	15	15	15	**Time for Completion of Section I**	915 days	Fri 26/2/10	Tue 28/8/12		
16	**16**	**16**	**16**	16	**Section I (Area A,B - Shuen Wan)**	**915 days**	**Fri 26/2/10**	**Tue 28/8/12**		
17	17	17	17	17	Commencement of Works	0 days	Fri 26/2/10	Fri 26/2/10		19FS+30 days,35,111,22,20,28
18	**18**	**18**	**18**	18	**Preliminary Works**	**240 days**	**Fri 26/2/10**	**Sat 23/10/10**		
19	19	19	19	19	Seek clarification regarding Environmental Permit	30 days	Sun 28/3/10	Mon 26/4/10	17FS+30 days	30
20	20	20	20	20	Design of TTA Scheme for Site Access	40 days	Fri 26/2/10	Tue 6/4/10	17	21
21	21	21	21	21	Submission of TTA to TMLG for Approval	60 days	Wed 7/4/10	Sat 5/6/10	20	25
22	22	22	22	22	Site Clearance	50 days	Fri 26/2/10	Fri 16/4/10	17	23,26
23	23	23	23	23	Project Signboard	5 days	Sat 17/4/10	Wed 21/4/10	22	24
24	24	24	24	24	Hoarding Erection	40 days	Thu 22/4/10	Mon 31/5/10	23	25
25	25	25	25	25	Establish Site Access	30 days	Sun 6/6/10	Mon 5/7/10	24,21	30
26	26	26	26	26	Ground Investigation	75 days	Sat 17/4/10	Wed 30/6/10	22	30
27										
28	28	28	28	28	Tree Survey	75 days	Fri 26/2/10	Tue 11/5/10	17	29
29	29	29	29	29	Submission of Tree Survey Record	60 days	Wed 12/5/10	Sat 10/7/10	28	30,31
30	30	30	30	30	Tree Felling	20 days	Mon 26/7/10	Sat 14/8/10	29,139,25,26,19	94,99,37
31	31	31	31	31	Tree Transplanting	90 days	Mon 26/7/10	Sat 23/10/10	29,139	94FS-30 days,99FS-30 days,40FS-30 days
32										
33	**33**	**33**	**33**	33	**Pumping Station**	**915 days**	**Fri 26/2/10**	**Tue 28/8/12**		
34	**34**	**34**	**34**	34	**Piling Works**	**485 days**	**Fri 26/2/10**	**Sat 25/6/11**		
35	35	35	35	35	Submission of Method Statement	100 days	Fri 26/2/10	Sat 5/6/10	17	46,54,36
36	36	36	36		Material Ordering & Delivery to Site	60 days	Sun 6/6/10	Wed 4/8/10	35	38
37	37	37	37	36	Ground Preparation for Piling	10 days	Sun 15/8/10	Tue 24/8/10	139,30	38
38	38	38	38	37	Preliminary Pile	35 days	Wed 25/8/10	Tue 28/9/10	37,36	39,40
39	39	39	39	39	Loading Test	30 days	Wed 29/9/10	Thu 28/10/10	38	
40	40	40	40	38	Working Piles	110 days	Wed 29/9/10	Sun 16/1/11	38,31FS-30 days	41
41	41	41			Loading Test for working piles	30 days	Mon 17/1/11	Tue 15/2/11	40	42
42	42	42	41	40	Sheetpiling	30 days	Wed 16/2/11	Thu 17/3/11	41	43
43	43	43	42	41	Excavation to Pile Cut Off Level / Shoring	100 days	Fri 18/3/11	Sat 25/6/11	42	47
44										
45	**45**	**45**	**44**	43	**Main Structure of Pumping Station**	**815 days**	**Sun 6/6/10**	**Tue 28/8/12**		
46	46	46	45	44	Temporary Works Submission	120 days	Sun 6/6/10	Sun 3/10/10	35	47
47	47	47	46	45	Reinforced Concrete Works	210 days	Sun 26/6/11	Sat 21/1/12	46,43	118SS+80 days,75,48,68,62,74,57
48	48	48	47	46	Roofing	50 days	Sun 22/1/12	Sun 11/3/12	47	49,50
49	49	49	48	47	Manmade Slope	50 days	Mon 12/3/12	Mon 30/4/12	48	51
50	50	50	49	48	Internal Finishing Works	70 days	Mon 12/3/12	Sun 20/5/12	48	51
51	51	51	50	49	External Finishing Works	100 days	Mon 21/5/12	Tue 28/8/12	50,49	125
52										
53	**53**	**53**	**52**	51	**E & M**	**815 days**	**Sun 6/6/10**	**Tue 28/8/12**		
54	54	54	53	52	Submission of E & M Design	120 days	Sun 6/6/10	Sun 3/10/10	35	55FS-30 days
55	55	55	54	53	Approval of E & M Design	90 days	Sat 4/9/10	Thu 2/12/10	54FS-30 days	56
56	56	56	55	54	Fabrication & Delivery of Plant & Material	415 days	Fri 3/12/10	Sat 21/1/12	55	57
57	57	57	56	55	Plumbing & E&M works	150 days	Sun 22/1/12	Tue 19/6/12	56,47	58FS-30 days
58	58	58	57	56	Final Testing Works	100 days	Mon 21/5/12	Tue 28/8/12	57FS-30 days	125
59										
60	**60**	**60**	**59**	58	**External Structure**	**220 days**	**Sun 22/1/12**	**Tue 28/8/12**		
61	**61**	**61**	**60**	59	**Pumping Station to Outfall Structure**	**220 days**	**Sun 22/1/12**	**Tue 28/8/12**		
62	62	62	61	60	Installation of Cofferdam & Site Hoarding Phase 2	30 days	Sun 22/1/12	Mon 20/2/12	47	63
63	63	63	62	61	Excavation	30 days	Tue 21/2/12	Wed 21/3/12	62	64
64	64	64	63	62	Constrcution of 2nos. of 1500mm dia. Drainage Pipes	50 days	Thu 22/3/12	Thu 10/5/12	63	65
65	65	65	64	63	2 nos. of Outfall Structures	110 days	Fri 11/5/12	Tue 28/8/12	64	125
66										
67	**67**	**67**	**66**	65	**Tide Level Monitoring Chamber**	**220 days**	**Sun 22/1/12**	**Tue 28/8/12**		
68	68	68	67	66	Installation of Cofferdam & Site Hoarding Phase 2	30 days	Sun 22/1/12	Mon 20/2/12	47	69
69	69	69	68	67	Excavation	30 days	Tue 21/2/12	Wed 21/3/12	68	70
70	70	70	69	68	Construction of Pipe & Tide Level Monitoring Chambers	50 days	Thu 22/3/12	Thu 10/5/12	69	71
71	71	71	70	69	Outfall Structure	110 days	Fri 11/5/12	Tue 28/8/12	70	125
72										
73	**73**	**73**	**72**	71	**External Misc. Works**	**220 days**	**Sun 22/1/12**	**Tue 28/8/12**		
74	74	74	73	72	Boundary Wall & Fencing	160 days	Sun 22/1/12	Fri 29/6/12	47	78
75	75	75	74	73	3nos. of Flow Measurement chambers and Pipes	60 days	Sun 22/1/12	Wed 21/3/12	47	76,79
76	76	76	75	74	Surface Drainage System & Catchpits	60 days	Thu 22/3/12	Sun 20/5/12	75	77
77	77	77	76	76	Concrete Pavement	20 days	Mon 21/5/12	Sat 9/6/12	76	78
78	78	78	77	77	Landscaping Works	60 days	Sat 30/6/12	Tue 28/8/12	77,74	125
79	79	79	78		225mm dia. Sewer Across Ting Kok Road and Connection to Existing Manholes	120 days	Thu 22/3/12	Thu 19/7/12	75	80
80	80	80			Sewer Manhole SM1	40 days	Fri 20/7/12	Tue 28/8/12	79	125
81										



Master Programme - Rev. 6
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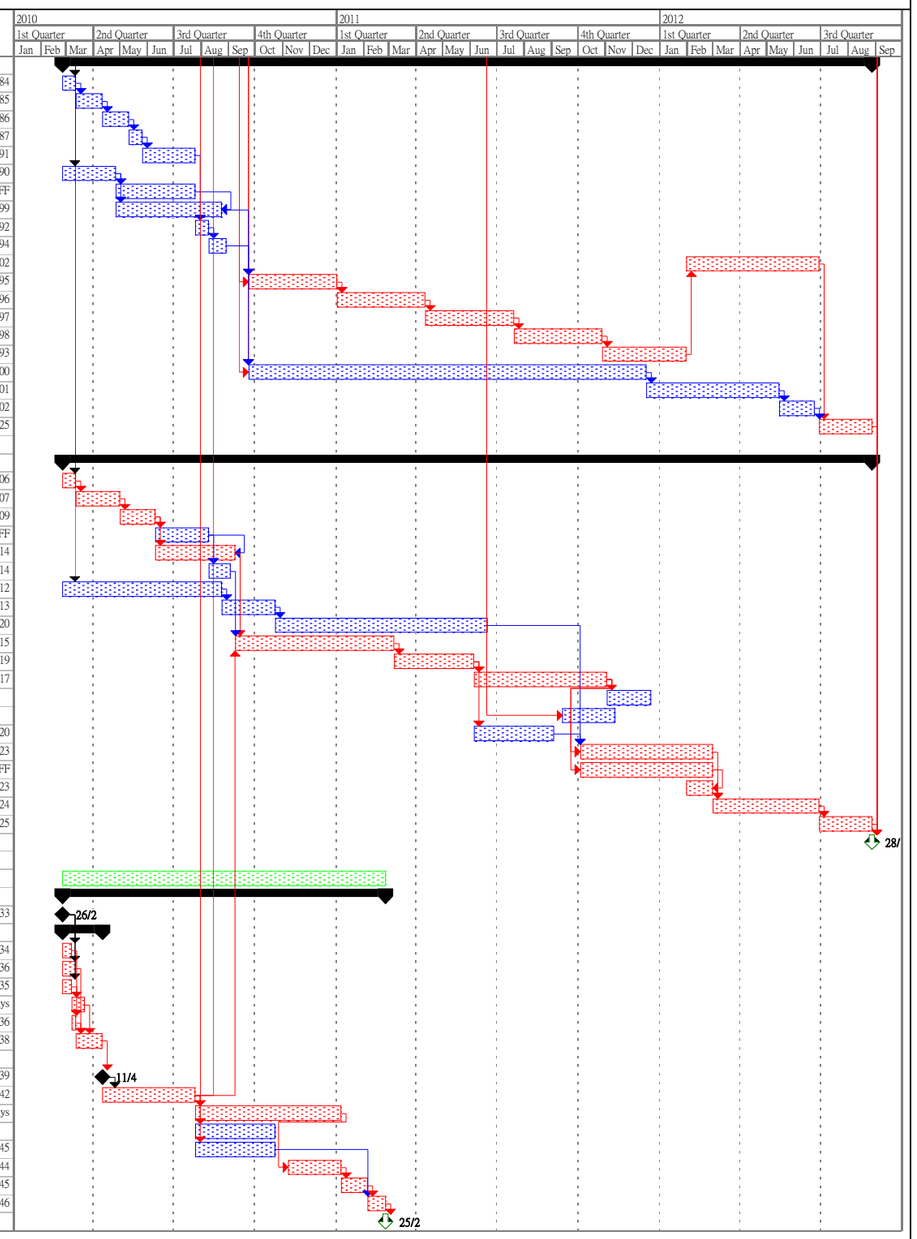
Task | Progress | Summary | Rolled Up Critical Task | Rolled Up Progress | External Tasks | Group By Summary
Critical Task | Milestone | Rolled Up Task | Rolled Up Milestone | Split | Project Summary | Deadline

Contract No.: DC/2009/22
Contract Title: Drainage Improvement Works in Shuen Wan, Tai Po - Contract 1

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
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	84	82	81	Determination of Box Culvert Alignment	30 days	Sat 13/3/10	Sun 11/4/10	83	85
85	85	85	83	82	Record Survey	30 days	Mon 12/4/10	Tue 11/5/10	84	86
86	86	86	84	83	Condition Survey of Existing Structure	15 days	Wed 12/5/10	Wed 26/5/10	85	87
87	87	87	85	84	Submission of Method Statement to LCSD	60 days	Thu 27/5/10	Sun 25/7/10	86	91
88	88	88	86	85	Design of Temporary Traffic Arrangement	60 days	Fri 26/2/10	Mon 26/4/10	2	89,90
89	89	89	87	86	Submission of TTA to TMLG for Approval	90 days	Tue 27/4/10	Sun 25/7/10	88	90FF
90	90	90	88	87	Excavation Permit	120 days	Tue 27/4/10	Tue 24/8/10	88,89FF	99
91	91	91	89	88	Temporary Removal of Structure and Facilities / Reprovision	15 days	Mon 26/7/10	Mon 9/8/10	87	92
92	92	92			Provision of Temporary Irrigation Pipes	20 days	Tue 10/8/10	Sun 29/8/10	91	94
93	93	93	91	89	Box Culvert at Chainage 0 - 25	150 days	Wed 1/2/12	Fri 29/6/12	98	102
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	95	93	91	Box Culvert at Chainage 75 - 125	100 days	Sun 2/1/11	Mon 11/4/11	94	96
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	97	95	93	Box Culvert at Chainage 175 - 225	100 days	Thu 21/7/11	Fri 28/10/11	96	98
98	98	98	96	94	Box Culvert at Chainage 225 - 275	95 days	Sat 29/10/11	Tue 31/1/12	97	93
99	99	99	97	95	Box Culvert at Chainae 275 - 300	450 days	Fri 24/9/10	Sat 17/12/11	90,31FS-30 days,30	100
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	101	99		1200mm dia. Drainage Pipe	40 days	Wed 16/5/12	Sun 24/6/12	100	102
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	125
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	106	104	101	Site Investigation (Trial Pit)	50 days	Sat 13/3/10	Sat 1/5/10	105	107
107	107	107	105	102	Design of Temporary Traffic Arrangement	40 days	Sun 2/5/10	Thu 10/6/10	106	108,109
108	108	108	106	103	Submission of TTA to TMLG for Approval	60 days	Fri 11/6/10	Mon 9/8/10	107	110,109FF
109	109	109	107	104	Excavation Permit	90 days	Fri 11/6/10	Wed 8/9/10	107,108FF	114
110	110	110	108		Liaison with HyD / LCSD for Planter Removal	25 days	Tue 10/8/10	Fri 3/9/10	108	114
111	111	111	109	105	E&M Design of Penstocks	180 days	Fri 26/2/10	Tue 24/8/10	17	112
112	112	112	110	106	Submission for Approval	60 days	Wed 25/8/10	Sat 23/10/10	111	113
113	113	113	111	107	Fabrication & Delivery of Penstocks	240 days	Sun 24/10/10	Mon 20/6/11	112	120
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	115	113	109	MH 03 to MH 04	90 days	Tue 8/3/11	Sun 5/6/11	114	116,119
116	116	116	114	110	Intake to MH 03	150 days	Mon 6/6/11	Wed 2/11/11	115	120FS-30 days,121FS-30 days,117
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	Wed 14/9/11	Sat 12/11/11	47SS+80 days	
119	119	119			Temporary Drainage Management Plan	90 days	Mon 6/6/11	Sat 3/9/11	115	120
120	120	120	118	112	Intake (As required in Dry Season)	150 days	Tue 4/10/11	Thu 1/3/12	116FS-30 days,113,119	123
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	122FF
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	123	121		E & M Works	120 days	Fri 2/3/12	Fri 29/6/12	122,120	124
124	124	124	122		Misc. Works & Reinstatement	60 days	Sat 30/6/12	Tue 28/8/12	123	125
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	134
132	132	132	130	123	Hoarding Erection	15 days	Fri 26/2/10	Fri 12/3/10	129	136
133	133	133	131	124	Pumping Water out of Pond	10 days	Fri 26/2/10	Sun 7/3/10	129	135
134	134	134	132	125	Check actual Tidal against Predicted Tidal Level	15 days	Mon 8/3/10	Mon 22/3/10	131	136FS-10 days
135	135	135	133	126	Survey Existing Pond Bed	5 days	Mon 8/3/10	Fri 12/3/10	133	136
136	136	136	134	127	Design of of Ecological Compensation Area	30 days	Sat 13/3/10	Sun 11/4/10	135,134FS-10 days,132	138
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	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	140,114,30,31,37,141,142
140	140	140	138	131	Fill of Pond to Designed Level	165 days	Mon 26/7/10	Thu 6/1/11	139	143FS-60 days
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	145
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	144	142	134	Planting Works at Lower Level	30 days	Fri 7/1/11	Sat 5/2/11	143	145
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	146	144	136	**Completion of Section II**	0 days	Fri 25/2/11	Fri 25/2/11	145	



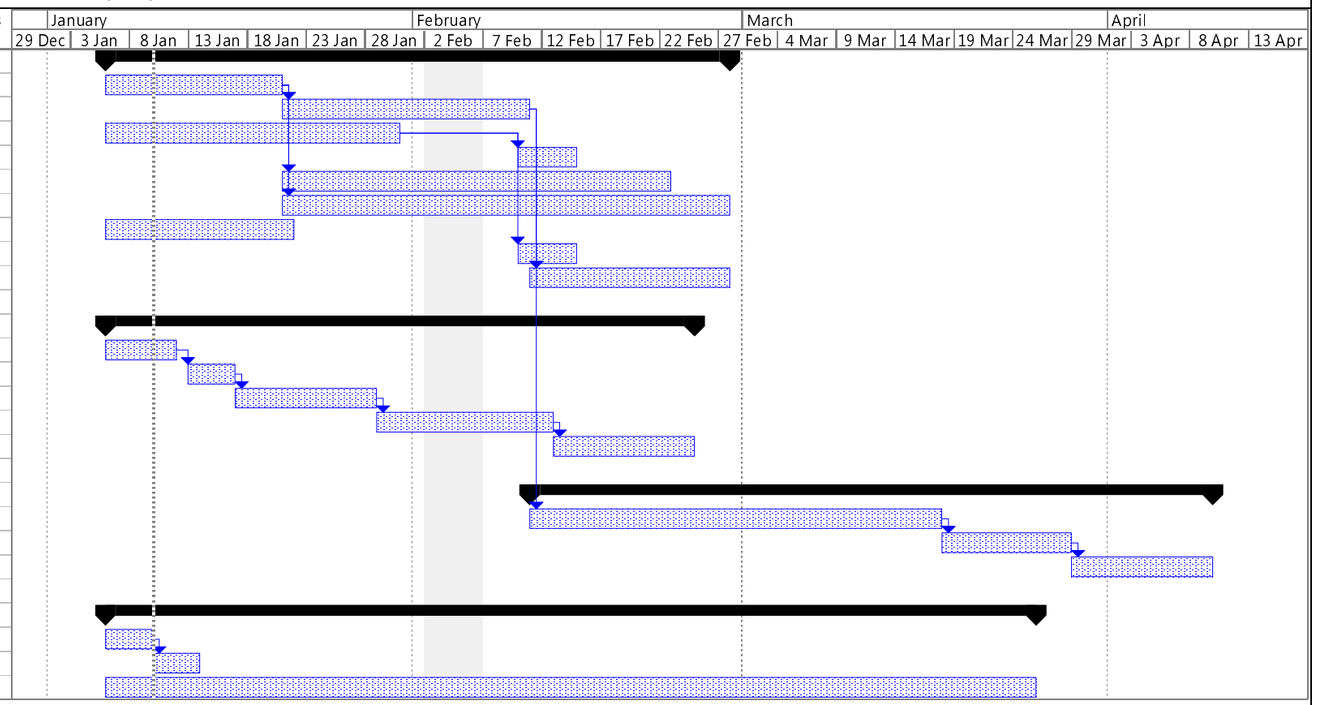
Master Programme - Rev. 6
Data Date: 2010-2-26

Task | Progress | Summary | Rolled Up Critical Task | Rolled Up Progress | External Tasks | Group By Summary
Critical Task | Milestone | Rolled Up Task | Rolled Up Milestone | Split | Project Summary | Deadline

Appendix J: Three month rolling programme

3 months Rolling Programme

ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names
1	**Pumping Station**	**38 days**	**Mon 6/1/14**	**Thu 27/2/14**		
2	Road & Kerb	13 days	Mon 6/1/14	Mon 20/1/14		
3	Footpath	10 days	Tue 21/1/14	Mon 10/2/14	2	
4	Boundary Fencing	22 days	Mon 6/1/14	Thu 30/1/14		
5	Handrails	5 days	Mon 10/2/14	Fri 14/2/14	4	
6	Defect in Wet Well	21 days	Tue 21/1/14	Sat 22/2/14	2	
7	Cladding	25 days	Tue 21/1/14	Thu 27/2/14	2	
8	Toilet	14 days	Mon 6/1/14	Tue 21/1/14		
9	Planting	5 days	Mon 10/2/14	Fri 14/2/14	4	
10	Other Defects	15 days	Tue 11/2/14	Thu 27/2/14	3	
11						
12	**Intake Structure**	**35 days**	**Mon 6/1/14**	**Mon 24/2/14**		
13	Installation of Bar Screen	6 days	Mon 6/1/14	Sat 11/1/14		
14	Remove Sheetpiles	4 days	Mon 13/1/14	Thu 16/1/14	13	
15	Gabion	10 days	Fri 17/1/14	Tue 28/1/14	14	
16	Access Road	5 days	Wed 29/1/14	Wed 12/2/14	15	
17	Fencing & Gate	10 days	Thu 13/2/14	Mon 24/2/14	16	
18						
19	**Reinstatement in Ting Kok Road**	**50 days**	**Tue 11/2/14**	**Wed 9/4/14**		
20	Footpath & Planter	30 days	Tue 11/2/14	Mon 17/3/14	3	
21	Defect in 2100 Drain / Cat ladder	10 days	Tue 18/3/14	Fri 28/3/14	20	
22	Carriageway	10 days	Sat 29/3/14	Wed 9/4/14	21	
23						
24	**Area B**	**60 days**	**Mon 6/1/14**	**Tue 25/3/14**		
25	Backfilling for 1650 Drain	4 days	Mon 6/1/14	Thu 9/1/14		
26	Concrete Road	3 days	Fri 10/1/14	Mon 13/1/14	25	
27	Reinstatement in Tung Tsz Nursery	60 days	Mon 6/1/14	Tue 25/3/14		

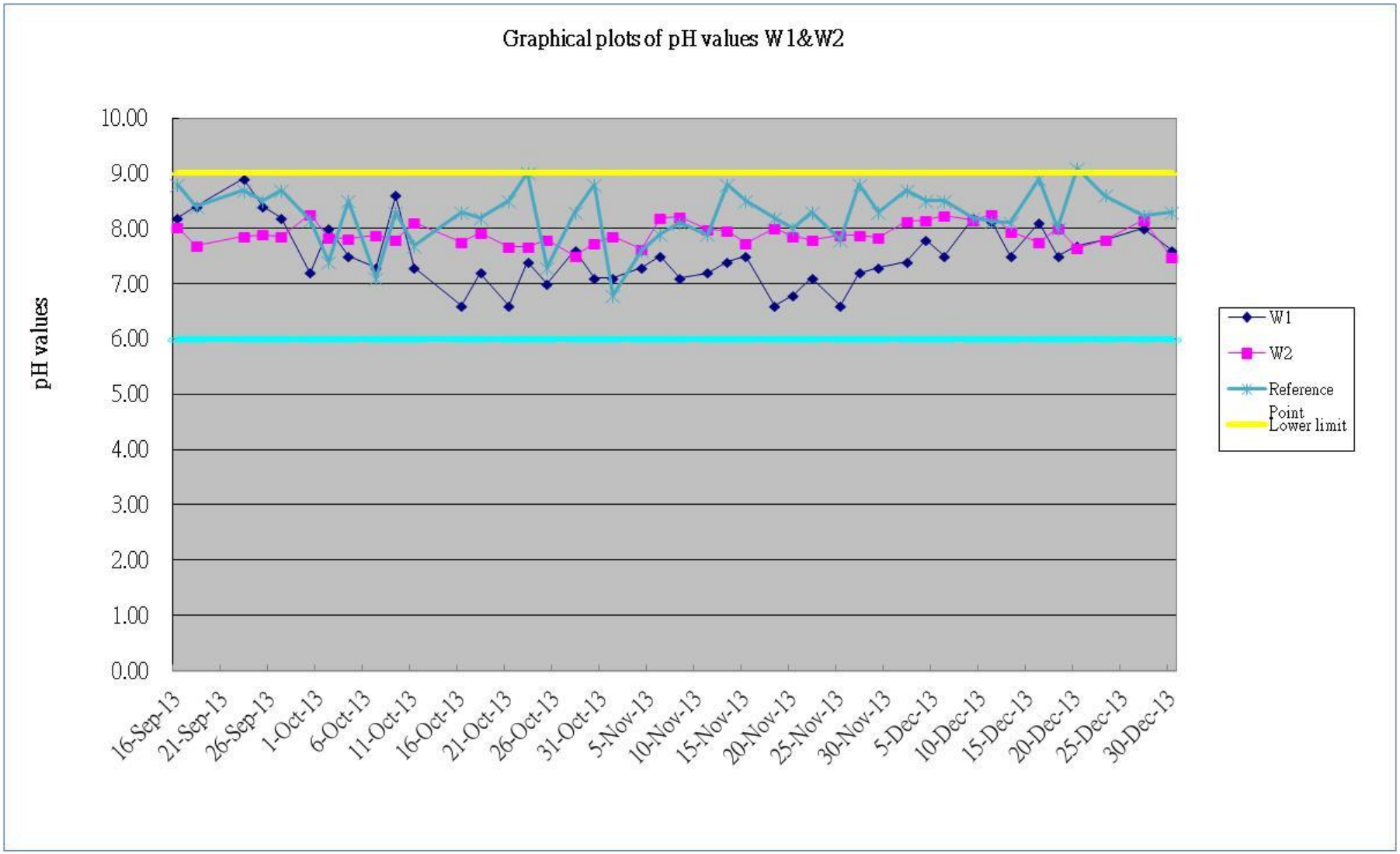


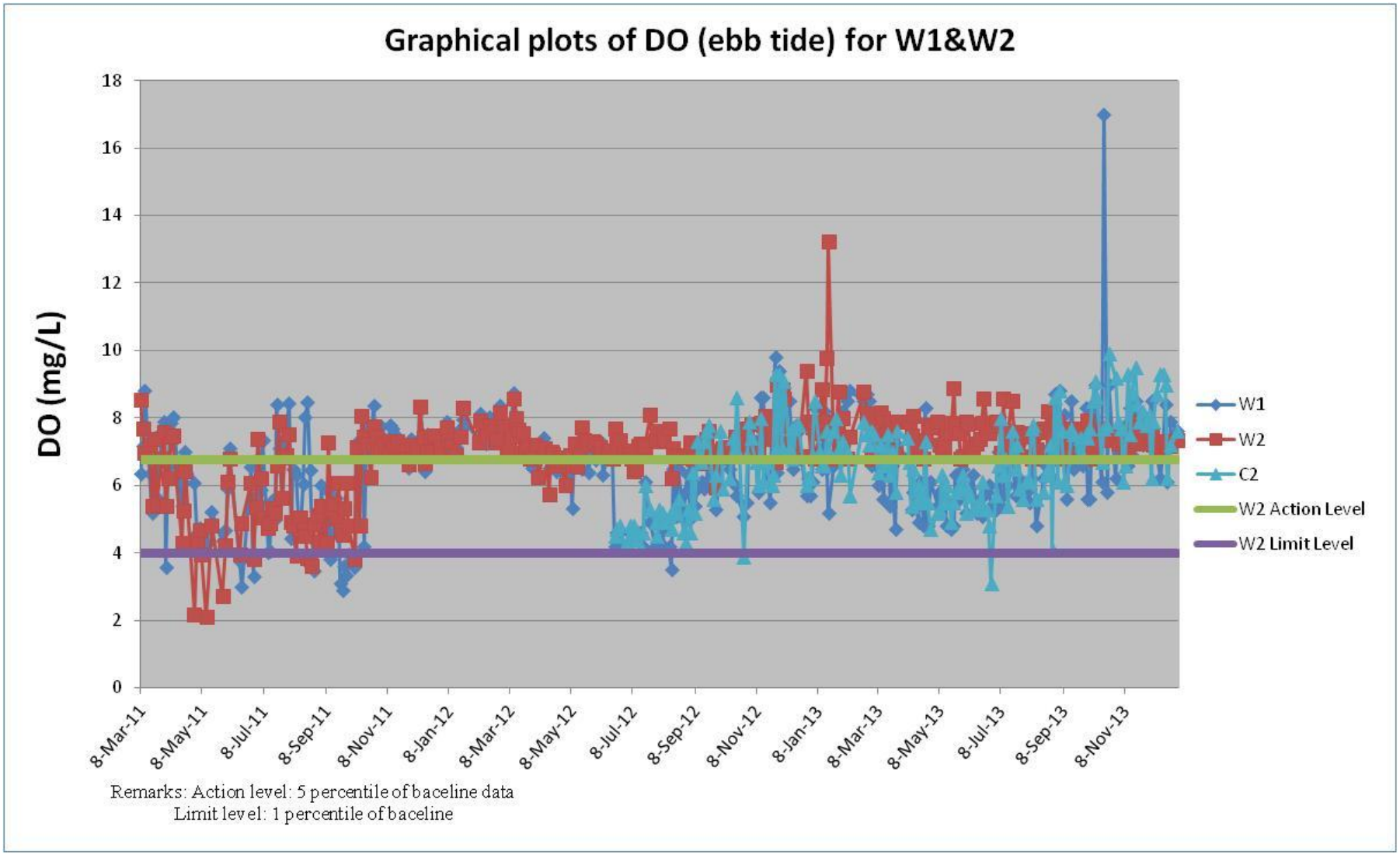
2014-1-6

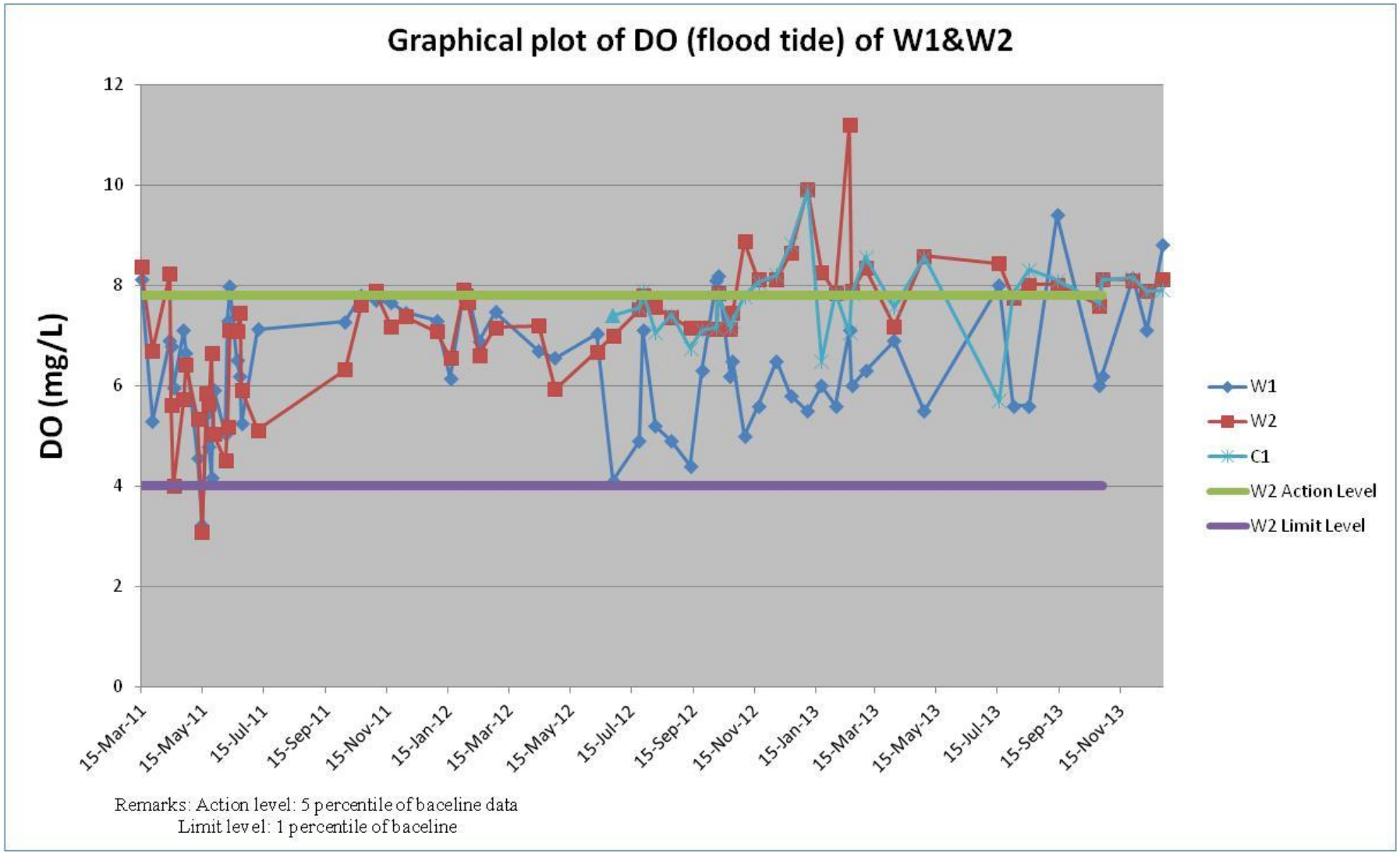
Task | Progress | Summary | External Tasks | Deadline

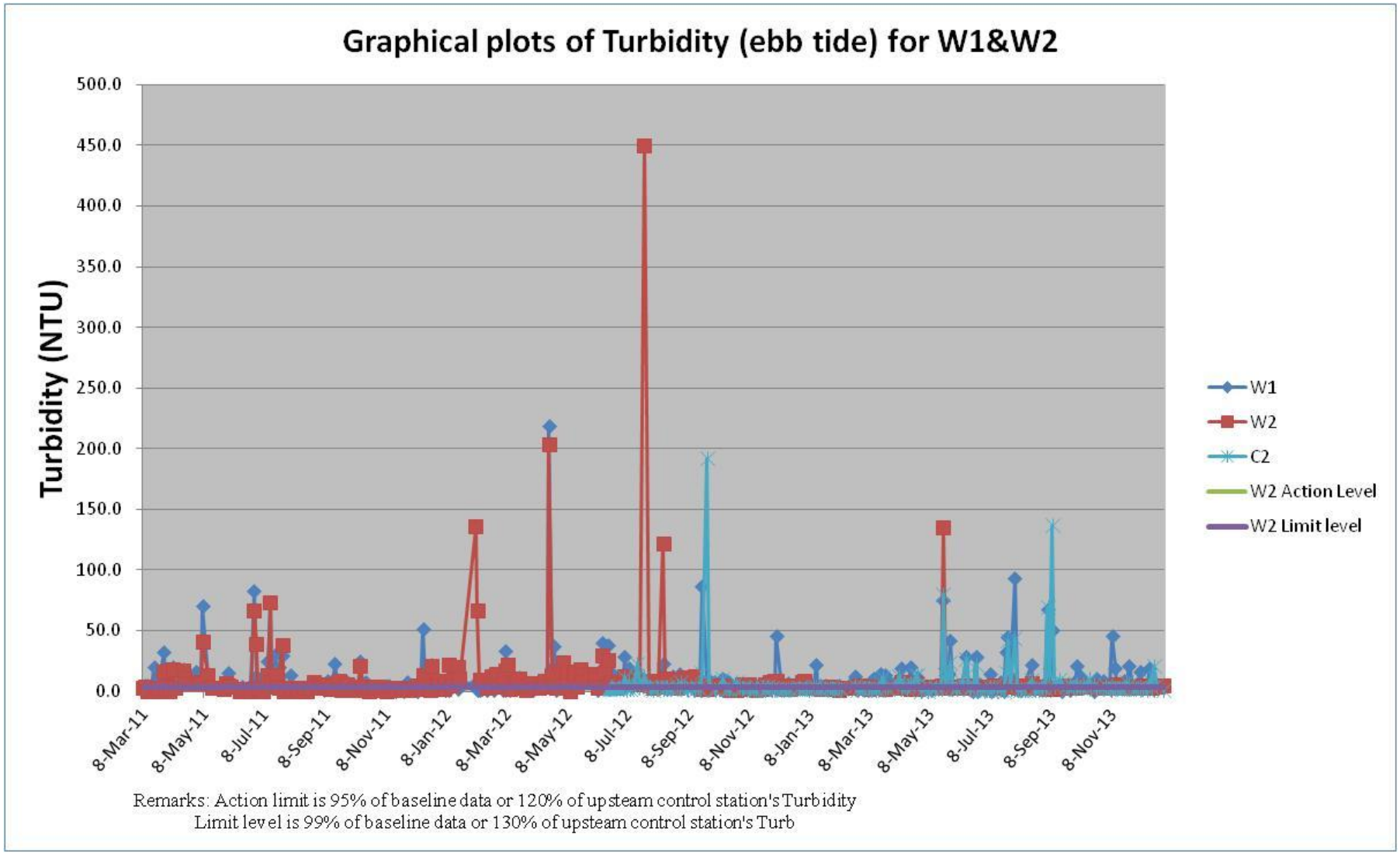
Split | Milestone | Project Summary | External Milestone

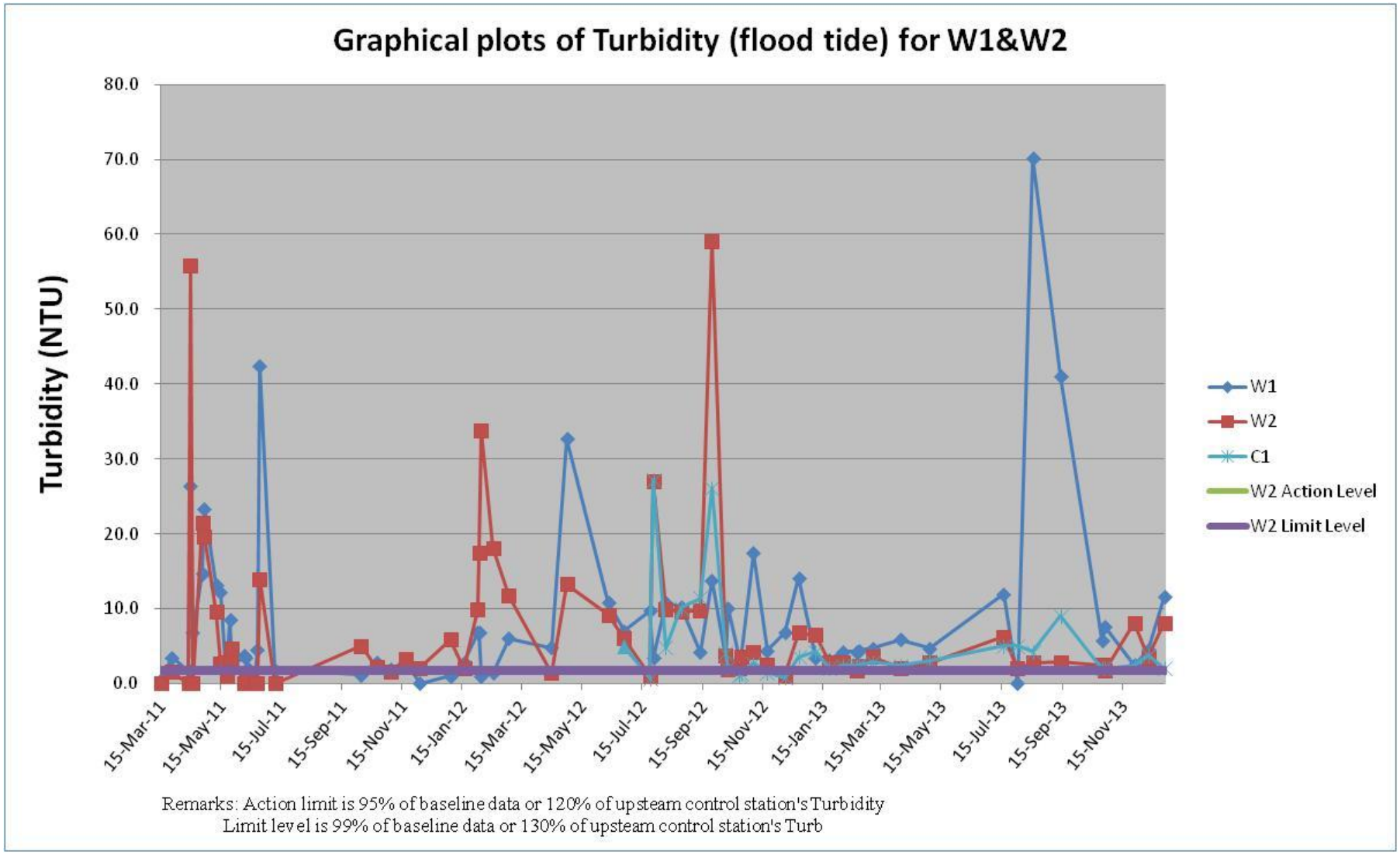
Appendix K: Graphical plots of trends of monitored parameter

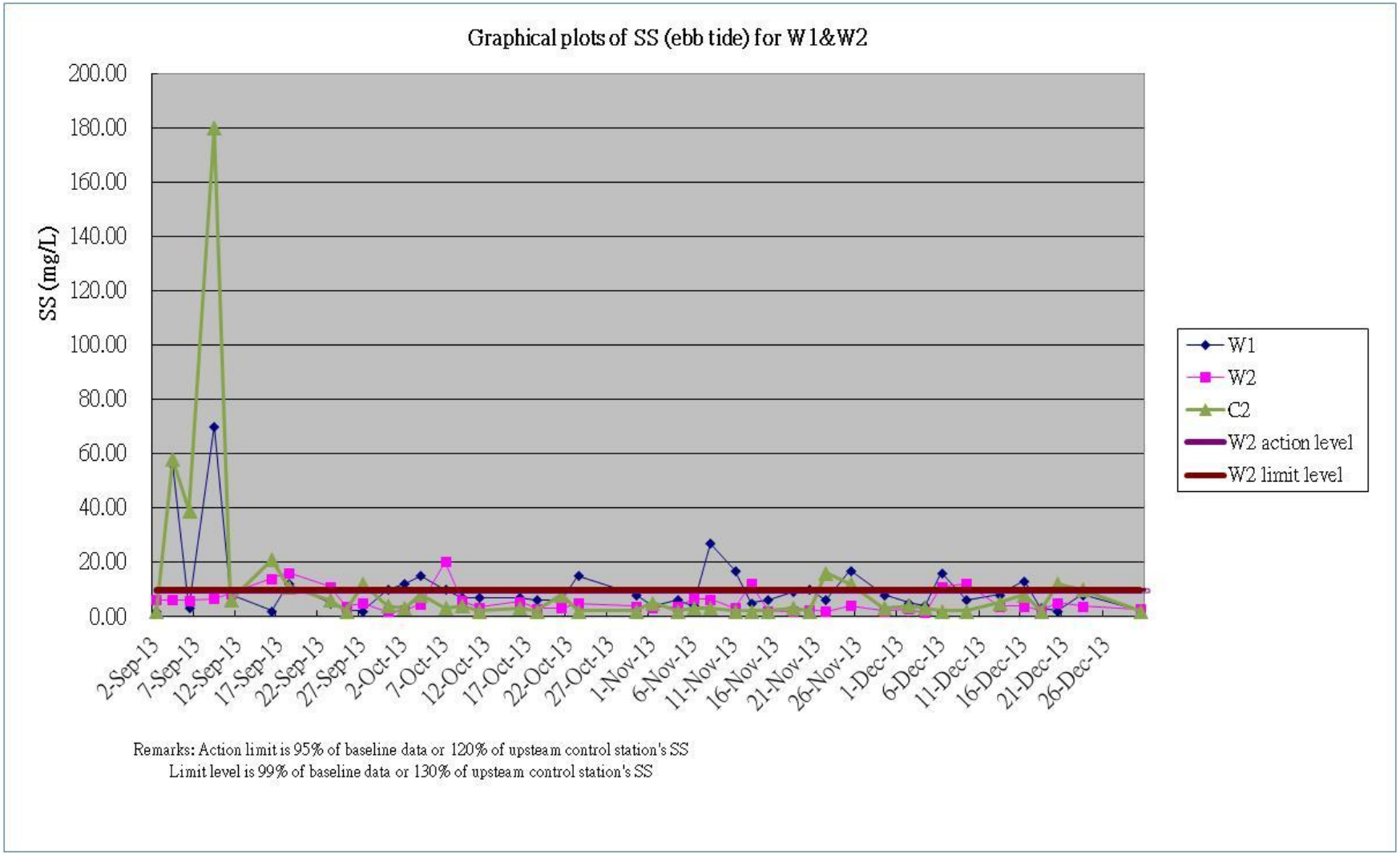

Graphical plots of pH values W1&W2
pH values
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
16-Sep-13
21-Sep-13
26-Sep-13
1-Oct-13
6-Oct-13
11-Oct-13
16-Oct-13
21-Oct-13
26-Oct-13
31-Oct-13
5-Nov-13
10-Nov-13
15-Nov-13
20-Nov-13
25-Nov-13
30-Nov-13
5-Dec-13
10-Dec-13
15-Dec-13
20-Dec-13
25-Dec-13
30-Dec-13
W1
W2
Reference
Point
Lower limit

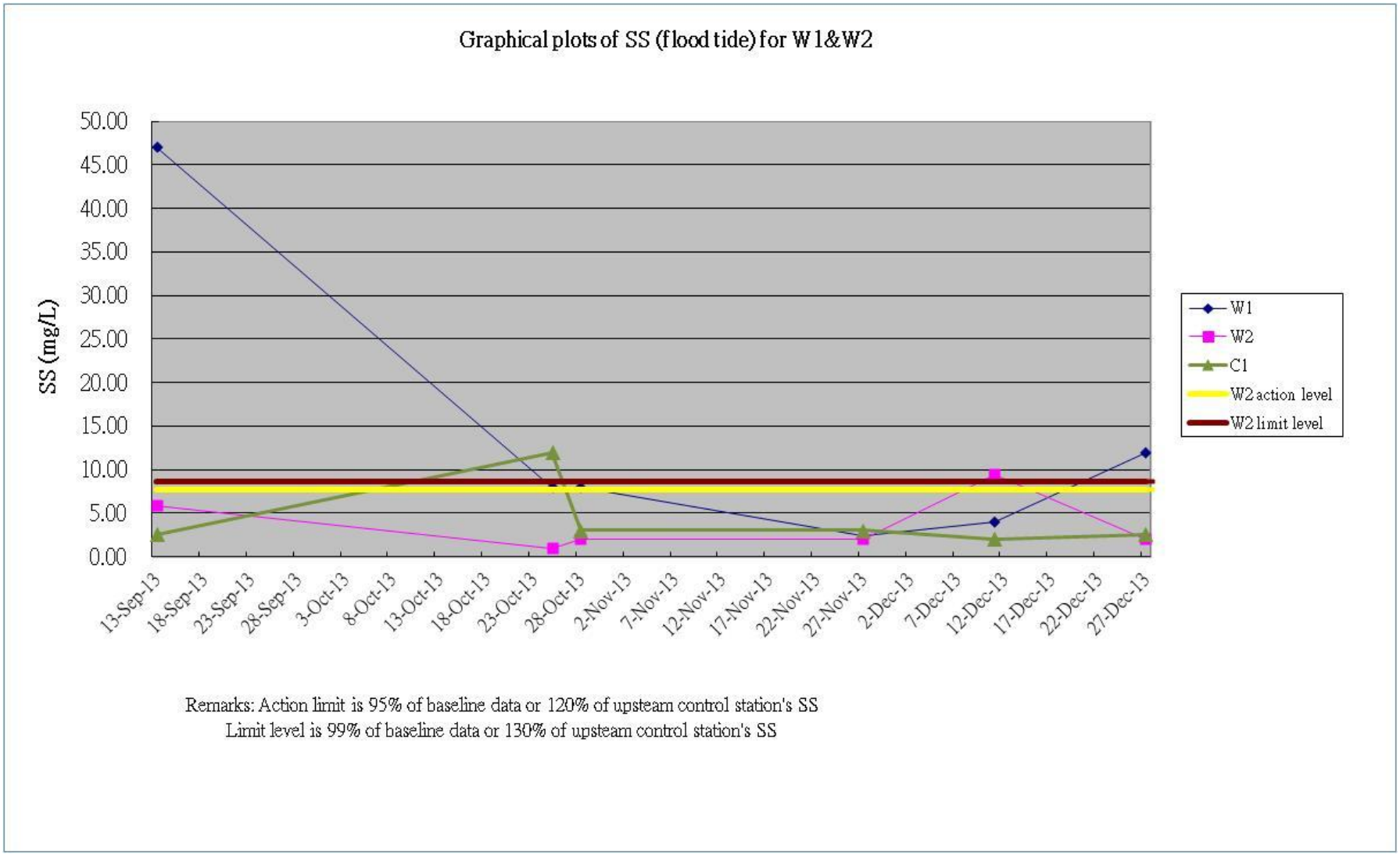

Graphical plots of DO (ebb tide) for W1&W2
DO (mg/L)
18
16
14
12
10
8
6
4
2
0
8-Mar-11
8-May-11
8-Jul-11
8-Sep-11
8-Nov-11
8-Jan-12
8-Mar-12
8-May-12
8-Jul-12
8-Sep-12
8-Nov-12
8-Jan-13
8-Mar-13
8-May-13
8-Jul-13
8-Sep-13
8-Nov-13
W1
W2
C2
W2 Action Level
W2 Limit Level
Remarks: Action level: 5 percentile of baceline data
Limit level: 1 percentile of baceline

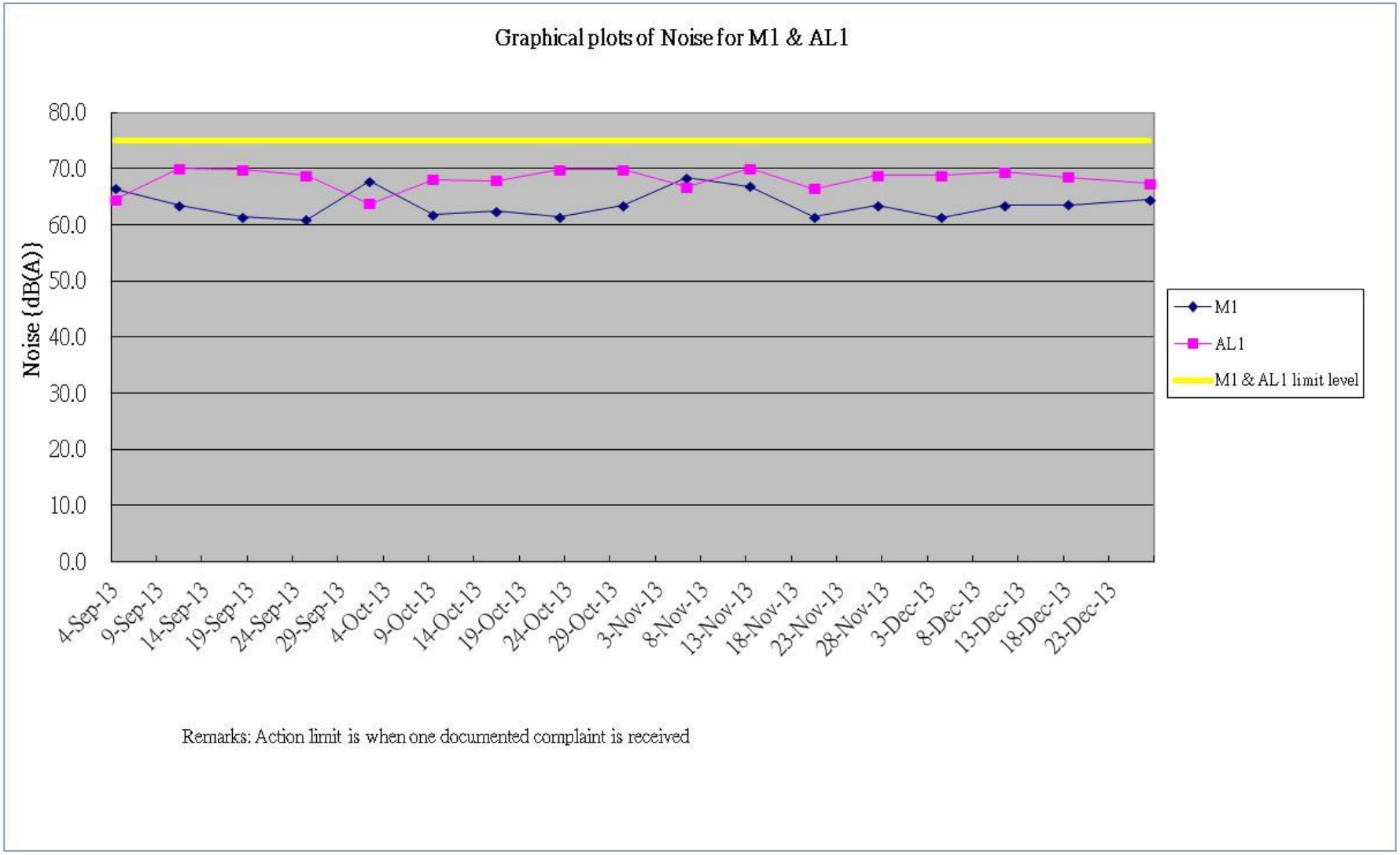

Graphical plot of DO (flood tide) of W1&W2
DO (mg/L)
12
10
8
6
4
2
0
15-Mar-11
15-May-11
15-Jul-11
15-Sep-11
15-Nov-11
15-Jan-12
15-Mar-12
15-May-12
15-Jul-12
15-Sep-12
15-Nov-12
15-Jan-13
15-Mar-13
15-May-13
15-Jul-13
15-Sep-13
15-Nov-13
W1
W2
C1
W2 Action Level
W2 Limit Level
Remarks: Action level: 5 percentile of baceline data
Limit level: 1 percentile of baceline

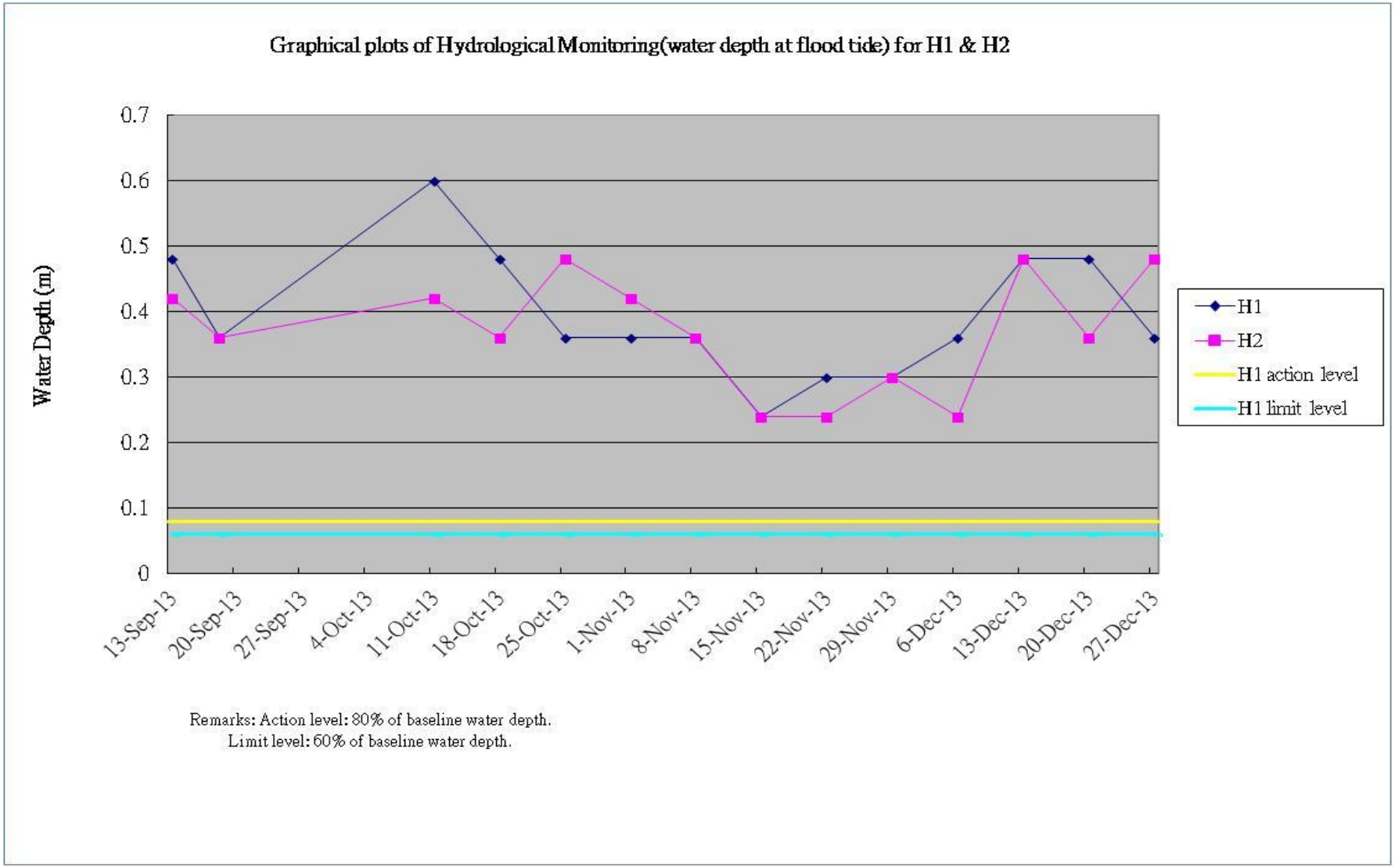

Graphical plots of Turbidity (ebb tide) for W1&W2
Turbidity (NTU)
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
8-Mar-11
8-May-11
8-Jul-11
8-Sep-11
8-Nov-11
8-Jan-12
8-Mar-12
8-May-12
8-Jul-12
8-Sep-12
8-Nov-12
8-Jan-13
8-Mar-13
8-May-13
8-Jul-13
8-Sep-13
8-Nov-13
W1
W2
C2
W2 Action Level
W2 Limit level
Remarks: Action limit is 95% of baseline data or 120% of upsteam control station's Turbidity
Limit level is 99% of baseline data or 130% of upsteam control station's Turb

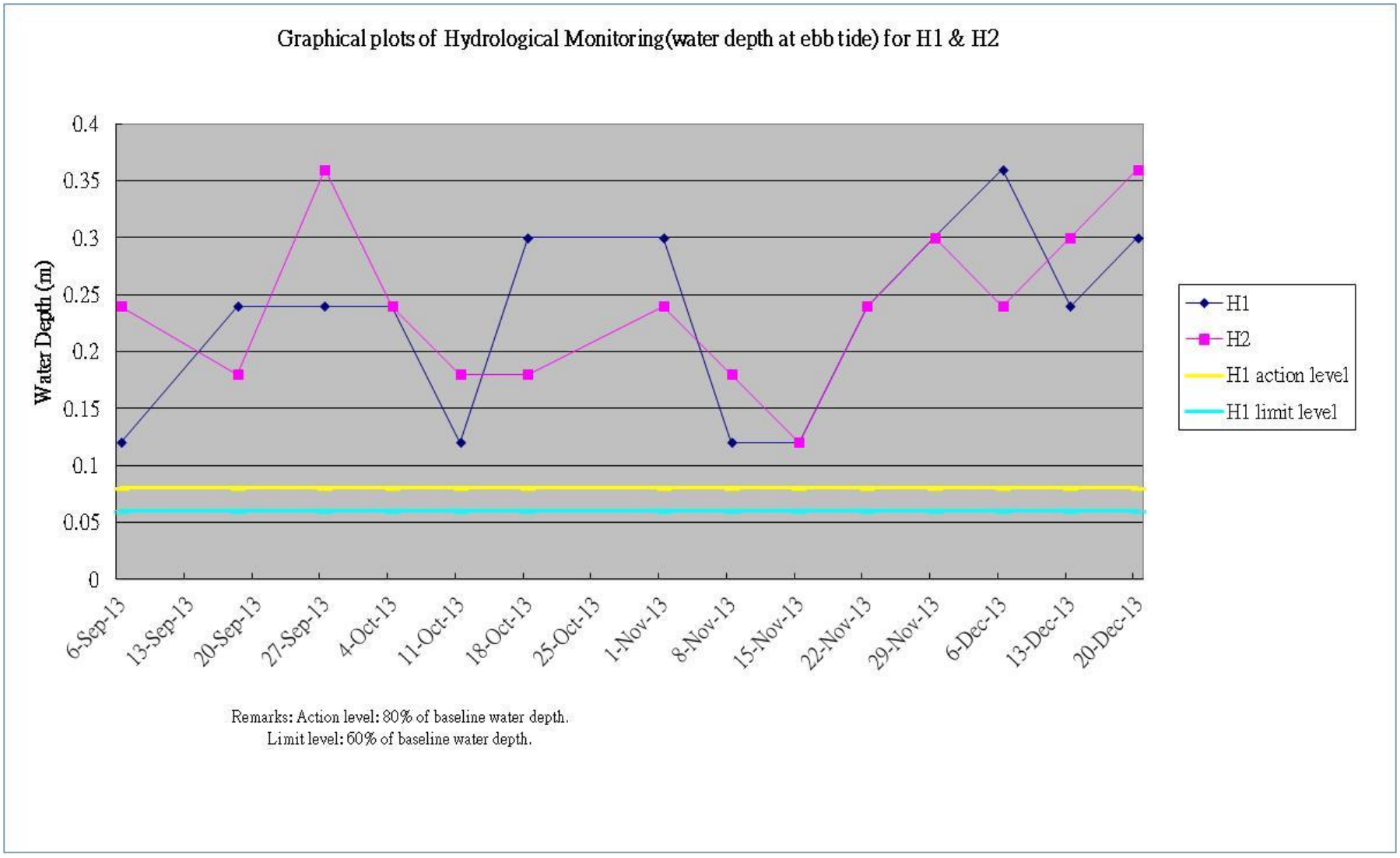

Graphical plots of Turbidity (flood tide) for W1&W2
Turbidity (NTU)
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
15-Mar-11
15-May-11
15-Jul-11
15-Sep-11
15-Nov-11
15-Jan-12
15-Mar-12
15-May-12
15-Jul-12
15-Sep-12
15-Nov-12
15-Jan-13
15-Mar-13
15-May-13
15-Jul-13
15-Sep-13
15-Nov-13
W1
W2
C1
W2 Action Level
W2 Limit Level
Remarks: Action limit is 95% of baseline data or 120% of upsteam control station's Turbidity
Limit level is 99% of baseline data or 130% of upsteam control station's Turb

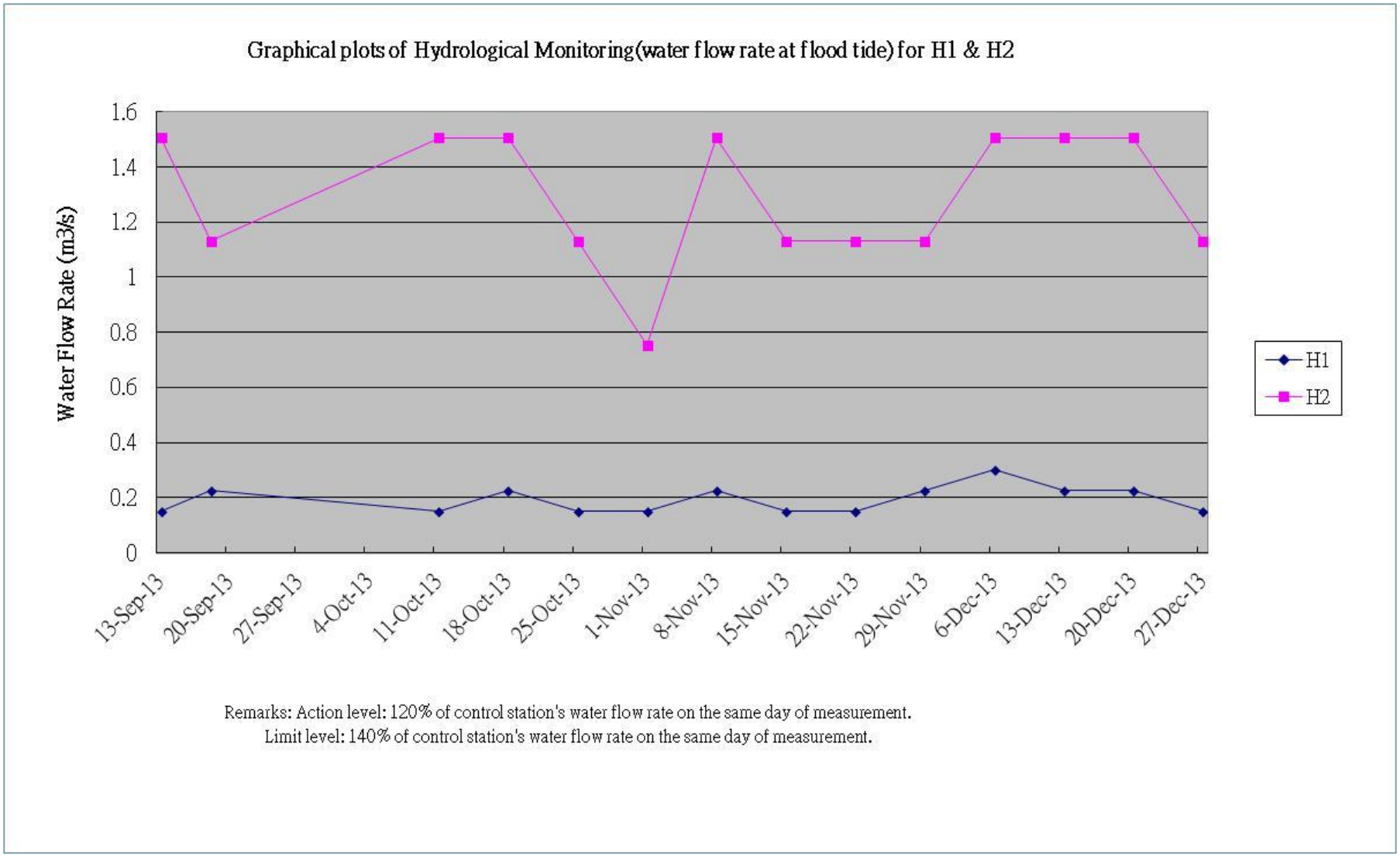

Graphical plots of SS (ebb tide) for W1&W2
SS (mg/L)
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
2-Sep-13
7-Sep-13
12-Sep-13
17-Sep-13
22-Sep-13
27-Sep-13
2-Oct-13
7-Oct-13
12-Oct-13
17-Oct-13
22-Oct-13
27-Oct-13
1-Nov-13
6-Nov-13
11-Nov-13
16-Nov-13
21-Nov-13
26-Nov-13
1-Dec-13
6-Dec-13
11-Dec-13
16-Dec-13
21-Dec-13
26-Dec-13
W1
W2
C2
W2 action level
W2 limit level
Remarks: Action limit is 95% of baseline data or 120% of upsteam control station's SS
Limit level is 99% of baseline data or 130% of upsteam control station's SS

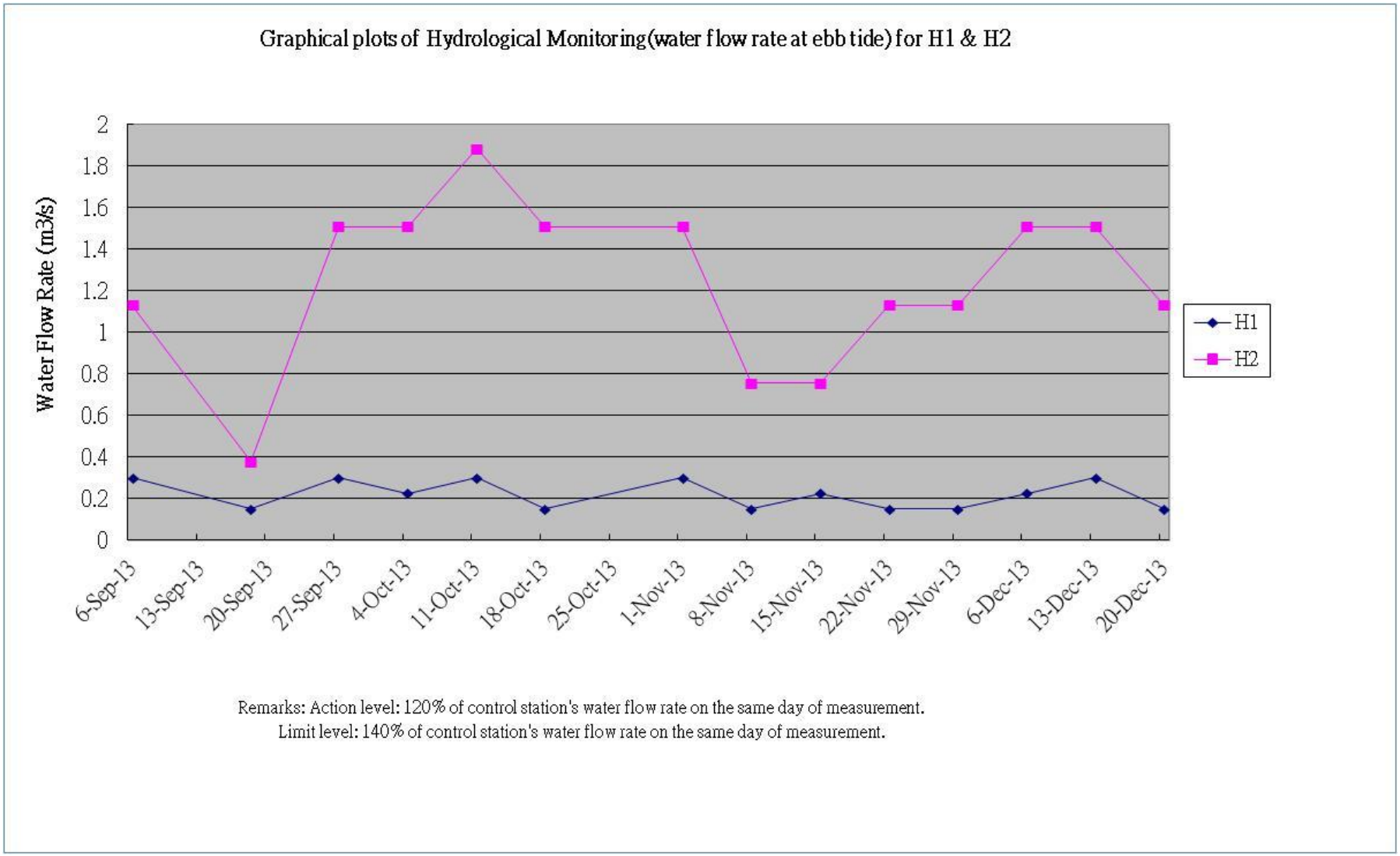

Graphical plots of SS (flood tide) for W1&W2
SS (mg/L)
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
13-Sep-13
18-Sep-13
23-Sep-13
28-Sep-13
3-Oct-13
8-Oct-13
13-Oct-13
18-Oct-13
23-Oct-13
28-Oct-13
2-Nov-13
7-Nov-13
12-Nov-13
17-Nov-13
22-Nov-13
27-Nov-13
2-Dec-13
7-Dec-13
12-Dec-13
17-Dec-13
22-Dec-13
27-Dec-13
W1
W2
C1
W2 action level
W2 limit level
Remarks: Action limit is 95% of baseline data or 120% of upsteam control station's SS
Limit level is 99% of baseline data or 130% of upsteam control station's SS


Graphical plots of Noise for M1 & AL1
Noise {dB(A)}
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
4-Sep-13
9-Sep-13
14-Sep-13
19-Sep-13
24-Sep-13
29-Sep-13
4-Oct-13
9-Oct-13
14-Oct-13
19-Oct-13
24-Oct-13
29-Oct-13
3-Nov-13
8-Nov-13
13-Nov-13
18-Nov-13
23-Nov-13
28-Nov-13
3-Dec-13
8-Dec-13
13-Dec-13
18-Dec-13
23-Dec-13
M1
AL1
M1 & AL1 limit level
Remarks: Action limit is when one documented complaint is received


Graphical plots of Hydrological Monitoring(water depth at flood tide) for H1 & H2
Water Depth (m)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
13-Sep-13
20-Sep-13
27-Sep-13
4-Oct-13
11-Oct-13
18-Oct-13
25-Oct-13
1-Nov-13
8-Nov-13
15-Nov-13
22-Nov-13
29-Nov-13
6-Dec-13
13-Dec-13
20-Dec-13
27-Dec-13
H1
H2
H1 action level
H1 limit level
Remarks: Action level: 80% of baseline water depth.
Limit level: 60% of baseline water depth.


Graphical plots of Hydrological Monitoring(water depth at ebb tide) for H1 & H2
Water Depth (m)
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
6-Sep-13
13-Sep-13
20-Sep-13
27-Sep-13
4-Oct-13
11-Oct-13
18-Oct-13
25-Oct-13
1-Nov-13
8-Nov-13
15-Nov-13
22-Nov-13
29-Nov-13
6-Dec-13
13-Dec-13
20-Dec-13
H1
H2
H1 action level
H1 limit level
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
Water Flow Rate (m3/s)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
13-Sep-13
20-Sep-13
27-Sep-13
4-Oct-13
11-Oct-13
18-Oct-13
25-Oct-13
1-Nov-13
8-Nov-13
15-Nov-13
22-Nov-13
29-Nov-13
6-Dec-13
13-Dec-13
20-Dec-13
27-Dec-13
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
Water Flow Rate (m3/s)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
6-Sep-13
13-Sep-13
20-Sep-13
27-Sep-13
4-Oct-13
11-Oct-13
18-Oct-13
25-Oct-13
1-Nov-13
8-Nov-13
15-Nov-13
22-Nov-13
29-Nov-13
6-Dec-13
13-Dec-13
20-Dec-13
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: Photo of Wai Ha River in December 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
	
Photo 5. Wai Ha River at W2	**Photo 6.** Wai Ha River at C1

	
Photo 7. Wai Ha River at W2	**Photo 8.** Wai Ha River at C1