

Drainage Service Department

Monthly Environmental Monitoring & Auditing report for

Contract No.DC/2009/22

Drainage Improvement in Shuen Wan, Tai Po – Contract 1

January 2012

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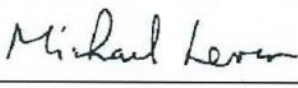
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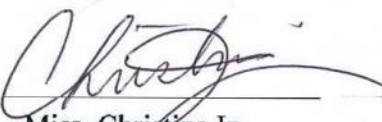
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TABLE OF CONTENT

EXECUTIVE SUMMARY	v
1 Introduction	1
2 Construction Stage	2
2.1 Construction activities in the reporting period	2
2.2 Construction activities for the coming month	2
2.3 Environmental Status	3
3 Noise Monitoring	4
3.1 Monitoring Parameters and Methodology	4
3.2 Monitoring Equipment	4
3.3 Monitoring Locations	5
3.4 Monitoring Results and Interpretation.....	8
3.5 Action and Limit level for Construction noise	8
3.6 Monitoring Schedule for the next reporting period.....	9
4 Water Monitoring	11
4.1 Water Quality Monitoring Parameters and methodology	11
4.2 Monitoring Equipment	11
4.3 Monitoring Locations	12
4.4 Monitoring Frequency.....	14
4.5 Monitoring Results and Interpretation.....	14
4.6 Action and limit level for Water Quality	17
4.7 Monitoring Schedule for the next reporting period.....	22
5 Hydrological Characteristics Monitoring	23
5.1 Hydrological Characteristics Monitoring Parameters and methodology	23
5.2 Monitoring Equipment	23
5.3 Monitoring Locations	23
5.4 Monitoring Frequency.....	25
5.5 Monitoring Results and Interpretation.....	25
5.6 Action and limit level for Hydrological Characteristics	25
5.7 Monitoring Schedule for the next reporting period.....	30
6 Ecological Monitoring of ECA	31
6.1 Introduction	31
6.2 Ecological Monitoring of ECA	31
6.3 Monitoring Results	36
6.4 Management Activities.....	40
6.5 Implication of the Survey Findings	41
6.6 Recommendations	41

7	Landscape and Visual	42
7.1	Introduction	42
7.2	Scope of Monitoring.....	42
7.3	Landscape and Visual Monitoring Results	44
7.4	Audit Schedule	52
8	Action taken in Event of Exceedance	53
9	Construction waste disposal.....	54
10	Status of Permits and Licenses obtained	56
11	Compliant Log.....	57
12	Site Environmental Audits	58
12.1	Site Inspection	58
12.2	Compliance with legal and Contractual requirement.....	60
12.3	Implementation status and effectiveness of the mitigation measures.....	61
13	Future Key issues and recommendations	62
14	Conclusions	63

LIST OF APPENDIXES

Appendix A: Site Location

Appendix B: Key Personal Contact information chart

Appendix C: Calibration Certificates for measuring instruments

Appendix D: Construction Noise Monitoring Data

Appendix E: Water Quality Monitoring Data

Appendix F: Hydrological Characteristics Monitoring Data

Appendix G: Landscape and Visual Monitoring Photos

Appendix H: Implementation status of environmental protection and mitigation measures

Appendix I: Construction programme

Appendix J: Three month rolling programme

Appendix K: Graphical plots of trends of monitored parameters

Appendix L: List of recorded vegetation and relative abundance and list of transplanted trees in the Ecological Compensatory Area (ECA) during construction phase in January 2012

Appendix M: Ecological monitoring report

Appendix N: Photo of fish pond at Area C and Wai Ha River at January 2012

EXECUTIVE SUMMARY

This is the eleventh 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 of January 2012 to 31st January 2012. The major site activities in this reporting period were mainly pumping station construction, Removal of sheetpile for the for pumping station, excavation works for proposed intake structure and plant maintenance.

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 9 abnormal incidents of water quality criteria were recorded in this reporting month. It was observed that the river was redirected and narrowed for construction of mechanical penstocks; and increases the speed of water current. Proper mitigation measures was 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 exceedance of Turbidity and Total suspended solid were believed to be mainly attributed by high water flow rate. The exceedance of DO were believed to be mainly attributed by natural fluctuation; , since the recorded levels of DO at control station had also exceeded its baseline limit level, the exceedances recorded at 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 ecological monitoring of the Ecological Compensatory Area (ECA) of the project is conducted. Details of the findings are referred to sections 6.2.

Visual and landscape monitoring has been conducted for the project. Details of the observations are referred to sections 7.3.

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 & C 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 eleventh 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 appointed by Kwan Lee – Kuly Joint Venture, prepares 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 January 2012 to 31st January 2012. This included the noise monitoring, water quality monitoring, hydrological characteristics monitoring, ecological 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 – Construction for Proposed Stormwater Pumping Station.

Area A – Erection of formwork up to +5.15mPD for the Proposed Stormwater Pumping Station.

Area A – Removal of sheetpile for the Proposed Stormwater Pumping Station.

Area A – Road reinstatement for Ting Kok Road.

Area A – Trial pit excavation.

Area A – Temporary flow diversion for the proposed concrete structure at the mouth of Wai Ha River.

Area A – Erection of formwork for the proposed concrete structure at the mouth of Wai Ha River.

Area A – Steel reinforcement bars fixing for the proposed concrete structure at the mouth of Wai Ha River.

Area A – Excavation for the proposed intake structure.

Area A – Installation of first layer of waling for the proposed intake structure.

Area B – Excavation for bay 7.

Area B – Rebar fixing and erection of formwork for bay 7 at Tung Tsz Nursery.

Area C – In Maintenance Period.

2.2 Construction activities for the coming month

Proposed key construction works in the coming month will include:

Area A (Pumping Station)

1. Erection formwork and falsework for the proposed Stormwater Pumping Station up to +5.15mPD ground floor slab.
2. Steel reinforcement bars fixing for the proposed Stormwater Pumping Station up to +5.15mPD ground floor slab.
3. Concreting the proposed Stormwater Pumping Station up to +5.15mPD.

4. Construction for flow meter chamber.
5. Installation sheetpile for DN1200 drain & transformer room.
6. Construction ground beam for the proposed transformer room.
7. Construction discharge chamber for the proposed Stormwater Pumping Station.
8. Installation of multi-part cover and backfilling for desilting chamber.
9. Construction of DN2100 along Ting Kok Road (CH120 to 160)
10. Construction of intake structure and Penstock.

Area B (Tung Tsz Nursery)

1. Excavation for the construction of box culvert in Tung Tsz Nursery
2. Construction of box culvert bay 7 and 6
3. Backfilling for bay 7 and 6

Area C (HCA)

1. In Maintenance Period

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 949	IEC 651 Type 1 IEC 804 Type 1	2
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.

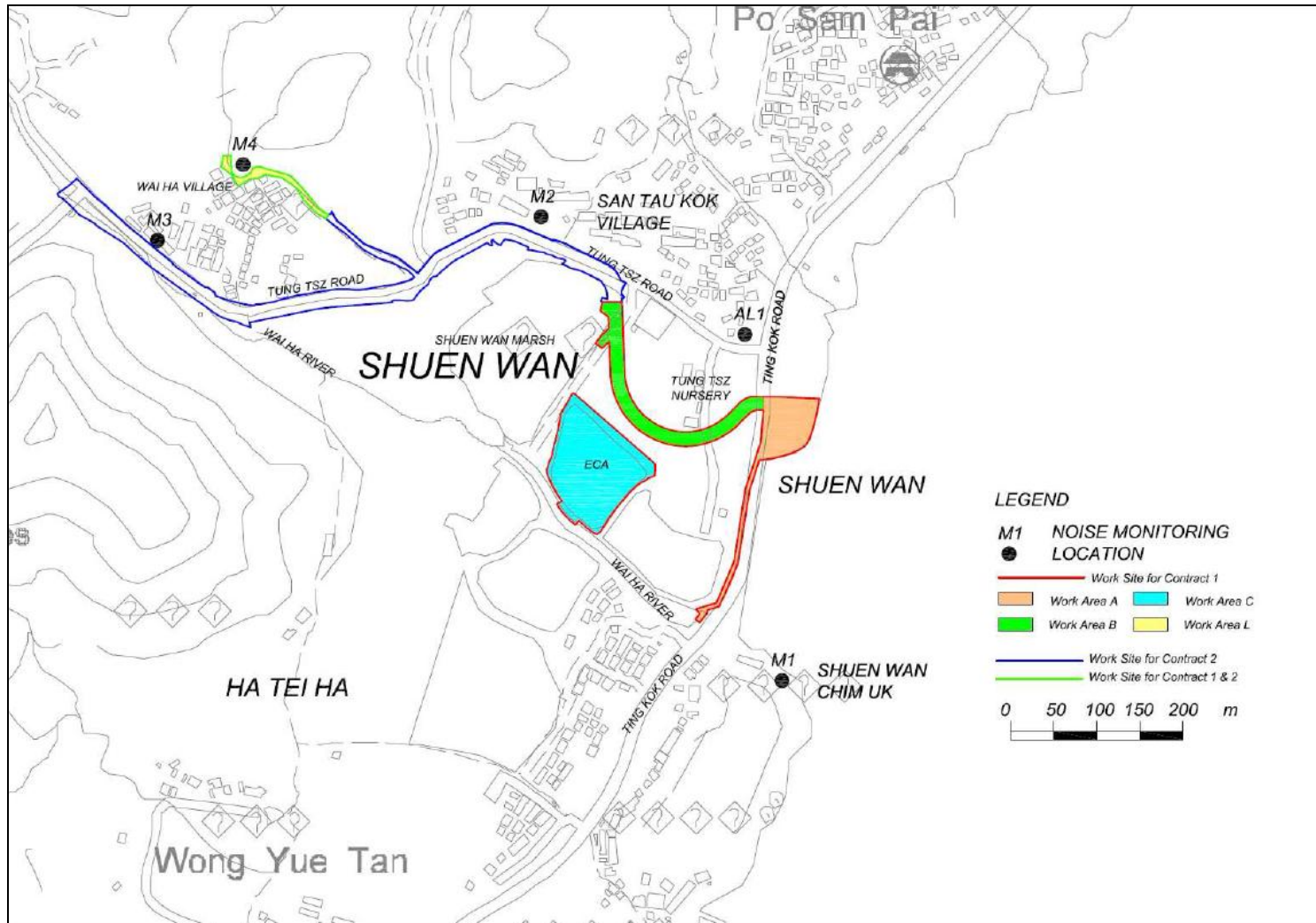


Figure 3.3.1 Impact noise monitoring locations

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 51.8dB (A) and 55.1dB (A), and AL1, ranged between 58.5dB (A) and 60.3dB (A), were within the limit levels and therefore, no exceedance was found.

Location	Parameter	Date*	Time	L _{Aeq} dB(A)	Limit dB(A)	Exceedance	Weather
M1	L _{eq} 30mins	5-Jan-12	11:38	55.1	75	N	Cloudy
M1	L _{eq} 30mins	12-Jan-12	11:31	52.8	75	N	Cloudy
M1	L _{eq} 30mins	19-Jan-12	11:21	51.8	75	N	Cloudy
AL1	L _{eq} 30mins	5-Jan-12	11:03	58.5	75	N	Cloudy
AL1	L _{eq} 30mins	12-Jan-12	10:59	56.9	75	N	Cloudy
AL1	L _{eq} 30mins	19-Jan-12	10:45	60.3	75	N	Cloudy

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

There was no noise monitoring between 22/1 and 28/1 due to the site closure.

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)
<p>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.</p>		

3.6 Monitoring Schedule for the next reporting period

Noise monitoring schedule is proposed to be carried out on 1st, 8th, 15th, 22nd and 29th of February 2012.

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 mitigation effectiveness.	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 are properly implemented.	1. Submit noise mitigation proposals to IEC. 2. Implement noise mitigation proposals.

<p>Limit Level</p>	<ol style="list-style-type: none"> 1. Notify IEC, ER, EPD and Contractor. 2. Identify source. 3. Repeat measurements to confirm findings. 4. Increase monitoring frequency. 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented. 6. Inform IEC, ER and EPD the causes and actions taken for the exceedances. 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results. 8. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Discuss amongst ER, ET, and Contractor on the potential remedial actions. 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly. 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of 2. Notify Contractor. 3. Require Contractor 4. Check remedial measures properly implemented. 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance. 2. Submit proposals for remedial actions to 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.
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4 Water Monitoring

4.1 Water Quality Monitoring Parameters and methodology

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

4.2 Monitoring Equipment

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

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

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

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

Suspended solids were determined by the water samples collected from the monitoring locations for further analysis in accredited HOKLAS laboratory. Water samples were contained by polythene bottles, packed in ice (cooled in 4°C without frozen) and delivered to the laboratory for analysis as soon as possible after collection.

4.3 Monitoring Locations

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

Table 4.3.1 – Water Quality Monitoring Stations

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

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

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.

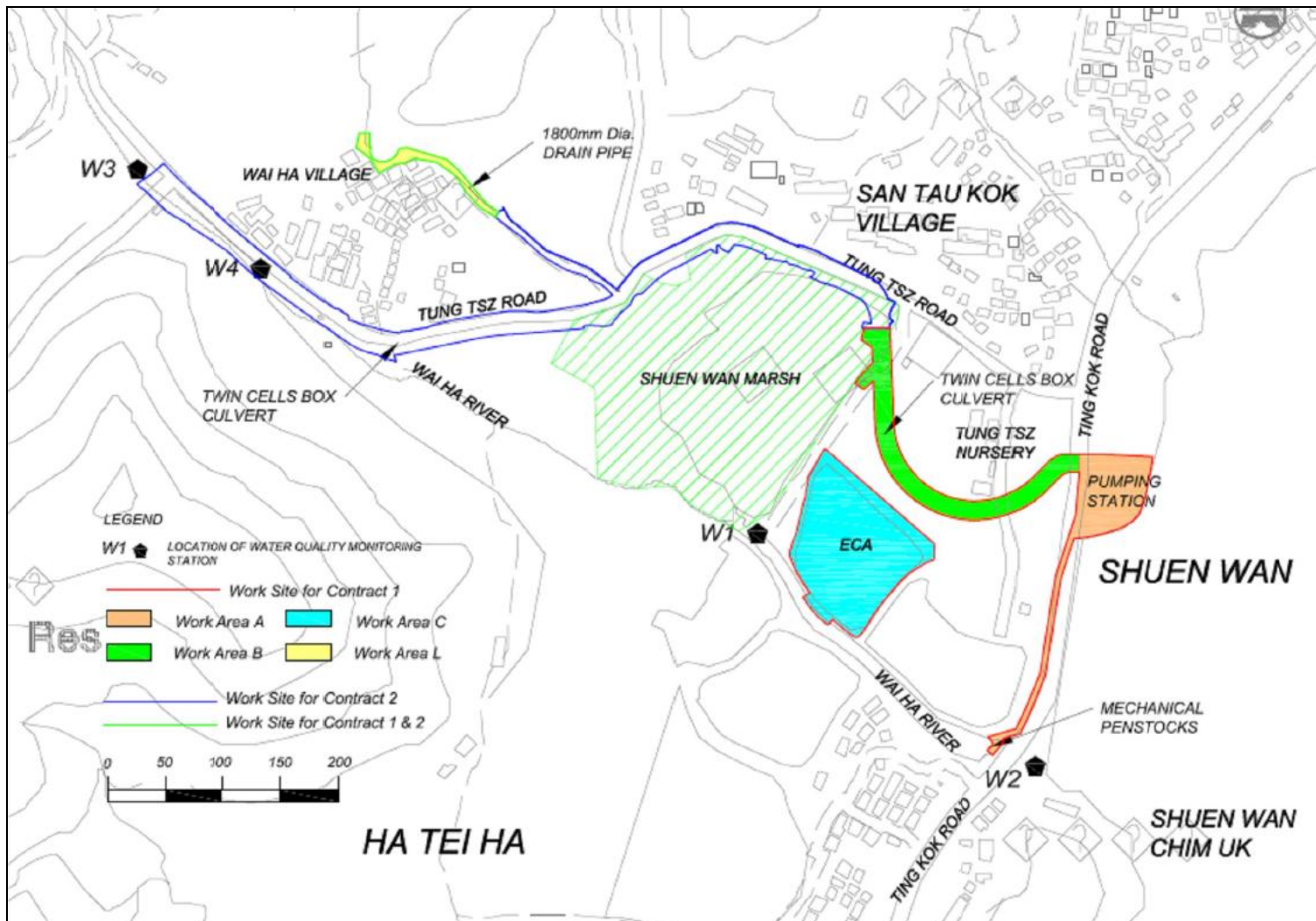


Figure 4.3.1 Water Quality Monitoring Locations

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 3rd, 5th, 7th, 10th, 12th, 14th, 17th, 19th, 21st and 30th of January 2012.

There was no water monitoring between 22/1 and 28/1 due to the site closure.

4.5 Monitoring Results and Interpretation

Water quality monitoring was carried out ten 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 9 abnormal incidents of water quality limits (Dissolved Oxygen, Suspended Solid and Turbidity) were recorded in this reporting month according to the established action and limit levels. ET has arranged site investigations for the abnormal incidents and it was observed that the river was redirected and narrowed for construction of mechanical penstocks; and increases the speed of water current. Proper mitigation measures was 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 exceedance of Turbidity and Total suspended solid were believed to be mainly attributed by high water flow rate. The exceedance of DO were believed to be mainly attributed by natural fluctuation; , since the recorded levels of DO at control station had also exceeded its baseline limit level, the exceedances recorded at were unlikely to be related to the Project. The water condition of Wai Ha River is presented in photo attached in **Appendix N**.

Details information of these incidents was presented in Section 8.

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

	Average of Monitoring Results					
	<i>Temperature</i> (°C)	<i>Turbidity</i> (NTU)	<i>pH</i>	<i>Dissolved</i> <i>Oxygen</i> (mg/L)	<i>Dissolved</i> <i>Oxygen</i> (%)	<i>Suspended</i> <i>Solids</i> (mg/L)
W1	18.15	3.6	7.63	7.38	75.00	2.78
W2	18.08	9.2	7.79	7.33	74.00	7.22

Table 4.5.2 Interpretations of abnormal incidents recorded in the reporting month

Date	Tide	Parameter	Interpretations
3/1/2012	Flood	Turbidity	Incident was regarded as high river flow rate since river redirected and narrowed was observed.
		DO	
7/1/2012	Ebb	Turbidity	Incident was regarded as high river flow rate since river redirected and narrowed was observed.
10/1/2012	Ebb	Turbidity	Incident was regarded as high river flow rate since river redirected and narrowed was observed.
		Suspended Solids	
12/1/2012	Ebb	Turbidity	Incident was regarded as high river flow rate since river redirected and narrowed was observed.
14/1/2012	Ebb	Turbidity	Incident was regarded as high river flow rate since river redirected and narrowed was observed.
17/1/2012	Flood	DO	Incident was regarded as high river flow rate since river redirected and narrowed was observed.
19/1/2012	Ebb	Turbidity	Incident was regarded as high river flow rate since river redirected and narrowed was observed.
21/1/2012	Ebb	Turbidity	Incident was regarded as high river flow rate since river redirected and narrowed was observed.
		Suspended Solids	
30/1/2012	Flood	Turbidity	Incident was regarded as high river flow rate since river redirected and narrowed was observed.

Table 4.5.3 Construction work conducted during abnormal incidents period

Date	Area	Construction works conducted
3/1/2012	A	Screen Channels and Wet Wells General housekeeping. Stripping off formwork panels from wall at inlet Channel. Fromwork shuttering for walls of penstock structure at existing box culvert. Excavation for Intake Structure and fabricating the lower layer of I-beam waling for sheetpile cofferdam.
	B	Excavating for box culvert trench and fabricating the lower layer of I-Beam walings for Bay 7A
	C	In maintenance period
7/1/2012	A	Erecting F4 formwork panels and installing walings for walls at Wet Wells #1 & #2. Erecting scaffolding and shuttering for soffit of ground beams GB1, GB2 and for soffit. Patching up tie bolt holes on walls of Wet Wells #1 & #2.. Bulk excavation to lower haul road level and backfilling between sheetpile shoring and walls W3-W5
	B	Excavating for box culvert trench to formation level for Bay 7A
	C	In maintenance period
10/1/2012	A	Installing copper tape and earth plate outside base slab. Erecting F4 formwork panels for walls at Screen Channels. Backfilling between sheetpile shoring and walls W3-W7. Dismantling top layer of I-beam walings and erecting sheetpile stop end shoring at wall W1/W8 to facilitate backfilling.
	B	Excavating for box culvert trench to formation level for Bay 7A
	C	In maintenance period
12/1/2012	A	Formwork shuttering for walls at inlet channel and screen channels. Backfilling between sheetpile shoring and walls. Dismantling top layer of i-beam walings from sheetpile cofferdam.
	B	Laying and compaction of rubber and then placing blinding concrete at Bay 7A
	C	In maintenance period
14/1/2012	A	Formwork shuttering for walls at inlet channel and screen channels. Ectracting sheet piles and backfilling between sheet pile at pumping station. Formwork shuttering for walls of cofferdam at existing box culvert and

		excavating for intake structure and fabricating I-beam waling of sheetpile cofferdam.
	B	Formwork shuttering for base slab for Bay 7.
	C	In maintenance period
17/1/2012	A	Extracting sheetpile from cofferdam od Pump Station and General housekeeping. Shuttering and concreting for walls of confferdam ar existing box culver for the intake structure.
	B	Excavating for trial pit at footpath to expose underground utilities at Bay 7A
	C	In maintenance period
19/1/2012	A	Extracting sheetpile from cofferdam od Pump Station and trimming down haul road around pump station. Breaking up concrete wall of cofferdam for flow diversion.
	B	Concreting of base slab at Bay 7
	C	In maintenance period
21/1/2012	A	No activities
	B	No activities
	C	No activities
30/1/2012	A	No activities
	B	No activities
	C	No activities

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 or 1 percentile of baseline data

pH	N/A	6.0 – 9.0
SS in mg/L	95 percentile of baseline data or 120% of upstream control station's SS	99 percentile of baseline data or 130% of upstream control station's SS
Turbidity in NTU	95 percentile of baseline data or 120% of upstream control station's Turbidity	99 percentile of baseline data or 130% of upstream control station's Turbidity

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

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

Remarks:

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

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

Table 4.6.3 Event and action Plan for Water Quality

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

<p>Action level being exceeded by more than two consecutive sampling days</p>	<ol style="list-style-type: none"> 1. Repeat in-situ measurements to confirm findings; 2. Identify reasons for non-compliance and source(s) of impact; 3. Inform IEC, Contractor and Engineer; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, Engineer and Contractor; 6. Ensure mitigation measures are implemented. 7. Prepare to increase the monitoring frequency to daily; 8. Repeat measurement on next day of exceedance. 	<ol style="list-style-type: none"> 1. Discuss mitigation measures with ET, Engineer and Contractor; 2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly; 3. Assess effectiveness of implemented mitigation measures. 	<ol style="list-style-type: none"> 1. Discuss proposed mitigation measures with IEC, ET and Contractor; 2. Make agreement on mitigation measures to be implemented; 3. Assess effectiveness of implemented mitigation measures. 	<ol style="list-style-type: none"> 1. Inform Engineer and confirm in writing notification of the non-compliance; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes in working methods; 5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days; 6. Implement agreed mitigation measures.
LIMIT LEVEL				
<p>Limit level being exceeded by one sampling day</p>	<ol style="list-style-type: none"> 1. Repeat in-situ measurements to confirm findings; 2. Identify reasons for non-compliance and source(s) of 	<ol style="list-style-type: none"> 1. Discuss mitigation measures with ET, Engineer and Contractor; 2. Review 	<ol style="list-style-type: none"> 1. Discuss proposed mitigation measures with IEC, ET and Contractor; 	<ol style="list-style-type: none"> 1. Inform Engineer and confirm in writing notification of the non-compliance; 2. Rectify

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

	<p>Engineer and Contractor;</p> <p>6. Ensure mitigation measures are implemented.</p> <p>7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days.</p>	<p>implemented mitigation measures.</p>	<p>be implemented;</p> <p>4. Assess effectiveness of implemented mitigation measures;</p> <p>5. Consider and if necessary instruct Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit Level.</p>	<p>mitigation measures to IEC and Engineer within three working days;</p> <p>6. Implement agreed mitigation measures;</p> <p>7. As directed by the Engineer, slow down or stop all or part of the construction activities until no exceedance of Limit level.</p>
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4.7 Monitoring Schedule for the next reporting period

Water quality monitoring schedule is proposed to be carried out on 1st, 3rd, 6th, 8th, 10th, 13th, 15th, 17th, 20th, 22nd, 24th, 27th, 29th and 31st of February 2012.

5 Hydrological Characteristics Monitoring

5.1 Hydrological Characteristics Monitoring Parameters and methodology

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

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

5.2 Monitoring Equipment

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

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

5.3 Monitoring Locations

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

Table 5.3.1 – Water Quality Monitoring Stations

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

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

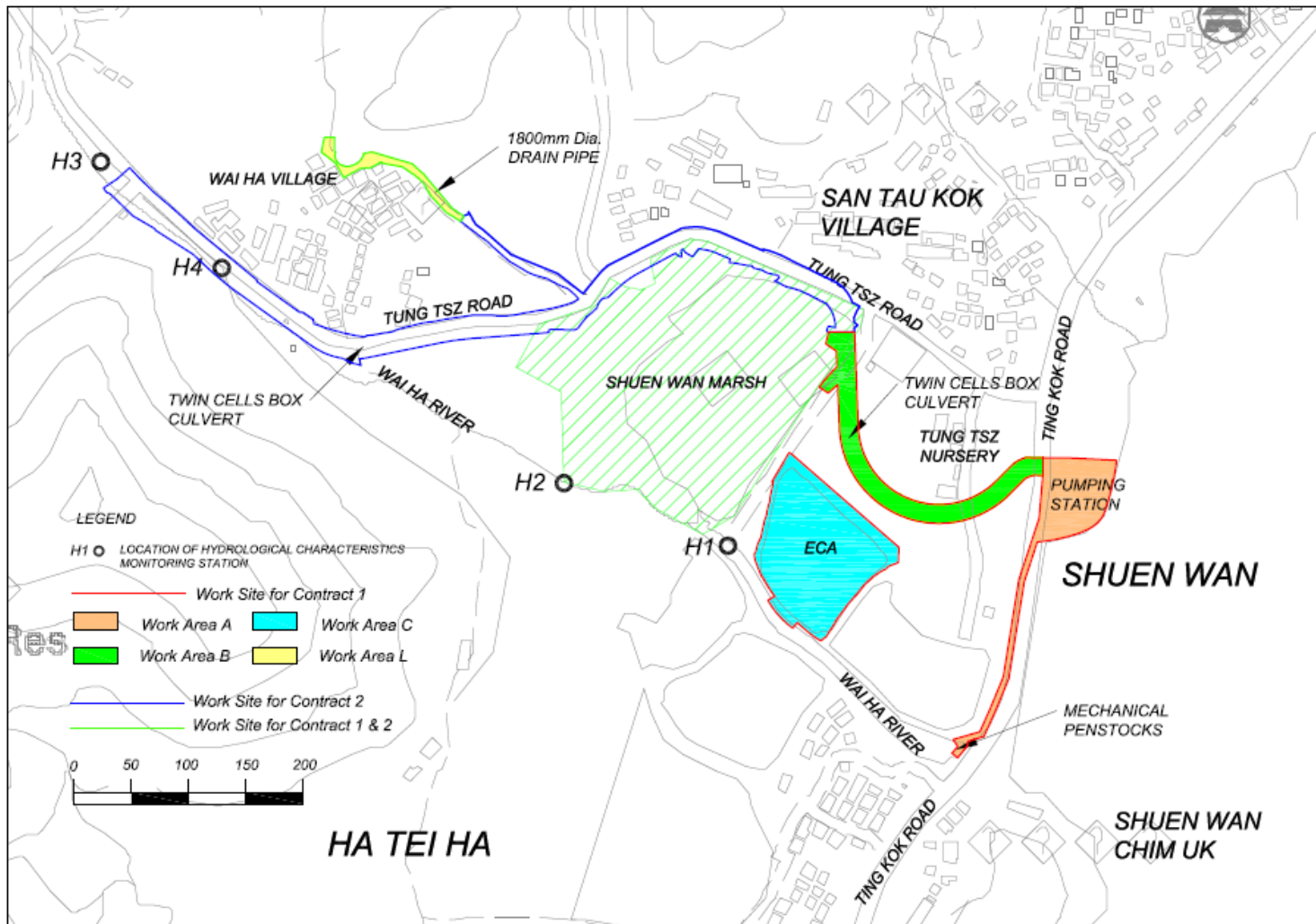


Figure 5.3.1 Hydrological Characteristics Monitoring Locations

5.4 Monitoring Frequency

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

Monitoring was carried out on 7th, 14th and 21st of January 2011.

There were no hydrological characteristics monitoring between 22/1 and 28/1 due to the site closure.

5.5 Monitoring Results and Interpretation

Hydrological characteristics monitoring was carried out three 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	~0.49*	0.100
H2	~0.16*	0.323

*: Since the water levels were too low for the depth detector to determine, tape measure was instead adopted for estimation.

Details of the monitoring data were presented in Appendix F.

5.6 Action and limit level for Hydrological Characteristics

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

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

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

Table 5.6.2 Event and action Plan for Hydrological Characteristics

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

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

	frequency to daily; 8. Repeat measurement on next day of exceedance.			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	<ol style="list-style-type: none"> 1. Repeat in-situ measurements to confirm findings; 2. Identify reasons for non-compliance and source(s) of impact; 3. Inform AFCDD, 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 	<ol style="list-style-type: none"> 1. Discuss mitigation measures with ET, Engineer and Contractor; 2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly; 3. Assess effectiveness of implemented mitigation measures. 	<ol style="list-style-type: none"> 1. Discuss proposed mitigation measures with IEC, ET and Contractor; 2. Request Contractor to critically review the working methods; 3. Make agreement on mitigation measures to be implemented; 4. Assess effectiveness of implemented mitigation measures. 	<ol style="list-style-type: none"> 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

	of Limit level.			measures.
Limit level being exceeded by more than two consecutive sampling days	<ol style="list-style-type: none"> 1. Repeat in-situ measurements to confirm findings; 2. Identify reasons for non-compliance and source(s) of impact; 3. Inform 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. 	<ol style="list-style-type: none"> 1. Discuss mitigation measures with ET, Engineer and Contractor; 2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly; 3. Assess effectiveness of implemented mitigation measures. 	<ol style="list-style-type: none"> 1. Discuss proposed mitigation measures with IEC, ET and Contractor; 2. Request Contractor to critically review the working methods; 3. Make agreement on mitigation measures to be implemented; 4. Assess effectiveness of implemented mitigation measures; 5. Consider and if necessary instruct Contractor to slow down or to stop all or part of the construction activities until no exceedance 	<ol style="list-style-type: none"> 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; 7. As directed by the Engineer, slow down or stop all or part of the construction activities until no exceedance of Limit level.

			of Limit Level.	
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5.7 Monitoring Schedule for the next reporting period

Hydrological characteristics monitoring schedule is proposed to be carried out on 3rd, 10th, 17th and 24th of February 2012.

6 Ecological Monitoring of ECA

6.1 Introduction

The Ecological Monitoring of the Ecological Compensatory Area (ECA) 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 6 of the approved updated EM&A Manual (approved by EPD on 7th November 2011) and the approved updated Habitat Creation Plan (HCP) (approved by EPD on 8th December 2011) of the Project.

This report documents monitoring findings on the site inspections in the ECA undertaken in January 2012.

6.2 Ecological Monitoring of ECA

6.2.1 Scope of Monitoring

A specific ecological monitoring programme and ecological monitoring requirements of the ECA are detailed in Section 7 of the approved Habitat Creation Plan (HCP) and Section 6.18 of the approved updated Environmental Monitoring & Audit (EM&A) Manual of the Project.

During the construction phase of the ECA, monthly monitoring of vegetation health (including the planted, retained and transplanted trees and shrubs, and the proposed planting) and weekly site inspections should be undertaken. Monthly

monitoring of in situ water quality will be carried out once the ECA is filled with water from the nearby Wai Ha River.

During the 12-month establishment phase of the ECA, monitoring of habitat types, vegetation cover, intertidal fauna and other fauna (including avifauna, herpetofauna, fish, odonates and butterflies) will be undertaken on a six-monthly basis, while the vegetation health and in situ water quality will be monitored monthly. Site inspections will be conducted twice per month.

6.2.2 Monitoring Methodology during the construction phase

Monitoring of vegetation health

Monthly monitoring of the health condition of the retained and transplanted trees and vegetation will be conducted. Following planting of vegetation in the ECA, monitoring of the growth and health conditions of the planted vegetation in the created habitats (i.e. brackish marsh, mangrove, woodland areas of planted trees and shrubs, and wooded areas with retained and (trans)planted trees) within the ECA is to be conducted during the construction and establishment phases. General health and growth status of the retained trees within the ECA are recorded and recommendation of appropriate tree care will be made to the maintenance party.

All planted, retained and transplanted trees and shrubs will be surveyed to update their growth and health status. Any signs of pests and/ or poor growth of

planted, retained and transplanted trees and shrubs will be recorded. Appropriate treatment or removal of pests will be implemented if necessary. Supplemental planting will be arranged if needed.

A fixed transect line will be run through the wetland habitats (including intertidal mudflat, brackish marsh and mangrove) and the general growth and health of the planted vegetation along both sides of the transect will be inspected and evaluated. Any adverse plant health, such as dieback of planted species, will be noted and supplemental planting will be arranged. Any signs of pests which cause adverse health problems to the plants will be identified and recorded.

Monitoring of water quality

Since there will be free movement of brackish river water in and out of the ECA, water quality in the ECA will be largely dependent on water quality in the river. In this open system it is not appropriate to set specific targets for water quality parameters. Nevertheless, baseline data on water quality, in particular seasonal patterns, would potentially be useful long term management of the ECA. Once the ECA is filled with water during the construction phase of the ECA, in-situ water quality will be measured once per month during both Construction and Establishment Phases. Parameters, including temperature, pH, salinity, turbidity and dissolved oxygen, will be monitored. Additional measurements of these parameters should also be made by the ecologist in response to unexpected events (e.g. algal blooms or fish die-offs) in order to inform remedial

management measures.

Site inspection

Weekly site inspection will be carried out by the Wetland Specialist to update the status and monitor the progress of the construction of the ECA. Any adverse ecological impact resulting from the construction should be identified and remedial action should be undertaken.

6.2.3 Monitoring Methodology during the establishment phase

Monitoring of vegetation health

Same monitoring methodology as in Section 7.2.2.

Monitoring of water quality

Same monitoring methodology as in Section 7.2.2.

Site inspection

Site inspection during the establishment phase of the ECA will be conducted twice per month for monitoring the health and condition of the wetland during the establishment period. Any unsatisfied health and habitat criteria of the wetland will be identified and remedial action should be recommended.

Twice monthly establishment phase monitoring has been commenced in November 2011.

Monitoring of habitat types and vegetation cover

Monitoring of habitat types and vegetation cover will be conducted twice during the 12 month Establishment Phase of the ECA; specifically at the end of the dry season and the end of the subsequent wet season after completion of the planting work. The monitoring aims to determine the exact extent of the wetland habitats and vegetation cover (i.e. open water, intertidal mudflat, brackish marsh and mangrove) during the establishment period and control any excessive colonization of unwanted vegetation specific habitats.

Monitoring of intertidal fauna

As the ECA largely comprises an intertidal mudflat, monitoring for intertidal fauna will be conducted. Recolonisation will take time; accordingly monitoring will be tentatively conducted in February 2012 and August 2012. As the important aim of monitoring of intertidal fauna in the ECA is to examine the diversity of the colonising community, a qualitative manner by walk-through survey (i.e. walk through the site with species and relative abundance recorded) will be conducted. Core sampling will also be conducted at different levels to record infauna. Three samples at each level (low, middle and high) will be collected during each monitoring event and the monitoring will be conducted at low tide.

Monitoring of other fauna

Monitoring of other faunal groups, including birds, herpetofauna, fish, odonate and butterflies, will be conducted. Monitoring of any aquatic invertebrates will be covered by the intertidal surveys. Since the site will be intertidal, it is considered unsuitable for local amphibian species. Therefore, no nighttime survey for detection of mating calls of amphibians is necessary and only daytime surveys are needed. Monitoring of these faunal groups will be conducted on a walk-through survey basis. The surveyor will walk through the site, recording and counting the fauna observed. Microhabitats for herpetofauna will be actively searched. This monitoring will be conducted twice within the establishment period (once in the dry season (tentatively in February 2012) and once in the wet season (tentatively in August 2012)).

Monitoring of wild mammals is not necessary in this case; however, if signs of wild mammals are observed (such as footprints) during any field surveys, these will be recorded.

6.2.4 Monitoring time and weather condition

Site inspection and monitoring of vegetation, fauna groups and water quality should be carried out during day-time with calm weather. Monitoring of birds should commence within one hour of sunrise, when is the peak activity period for birds. Other fauna groups shall be undertaken during the warmer part of the monitoring day.

6.3 Monitoring Results

6.3.1 Description of vegetation monitoring in Ecological Compensatory Area

The vegetation monitoring during the construction period was conducted on a monthly basis in the Ecological Compensatory Area (ECA) during the establishment period in January 2012. The growth and health of the recorded vegetation was inspected and detail vegetation information was shown in **Appendix L**.

Monitoring of transplanted trees were carried out and continued since the first transplantation (**Appendix L(B)**).

Three specimens of protected species *Pavetta hongkongensis* were transplanted to ECA. Weekly monitoring was carried out since transplantation on 20th December 2011.

All trees surveyed were evaluated according to the following criteria (Webb 1991)

- Trees of good form, moderate to large size and in good health are classified as **good**;
- Trees of reasonable form, with few or no visible defects or health problems are classified as being **fair**;
- Trees that are of poor form, badly damaged or clearly suffering from decay die back or the effects of very heavy vine growth are classified as **poor**.

6.3.2 Description of vegetations and remarks

Vegetation monitoring in the ECA was carried out on site and growth/health conditions were recorded.

A total of 21 plant species were retained or newly succeed within ECA in which 6 of them were retained plant species including *Terminalia catappa*, *Coccoloba orbiculatus*, *Mangifera indica*, *Dimocarpus longan*, *Michelia x alba* and *Macaranga tanarius*. Detailed information of the recorded vegetation is given in **Appendix L**. Ecological monitoring report was shown in **Appendix M**.

The general growth/health of the retained or newly succeed vegetations were in fair condition.

The trees transplanted from works area within Contract 1 and 2 to ECA, including 13 *Bombax ceiba*, 2 *Melaleuca quinquenervia* and 1 *Celtis sinensis*, were in fair condition since the transplantation in June (**Appendix L (B)**).

A total of 370 trees were newly planted for amenity purpose within the ECA since September 2011. The 370 individual trees were randomly planted at different zones, except zone for F, within ECA as showed in Figure **6.3.2.1**.

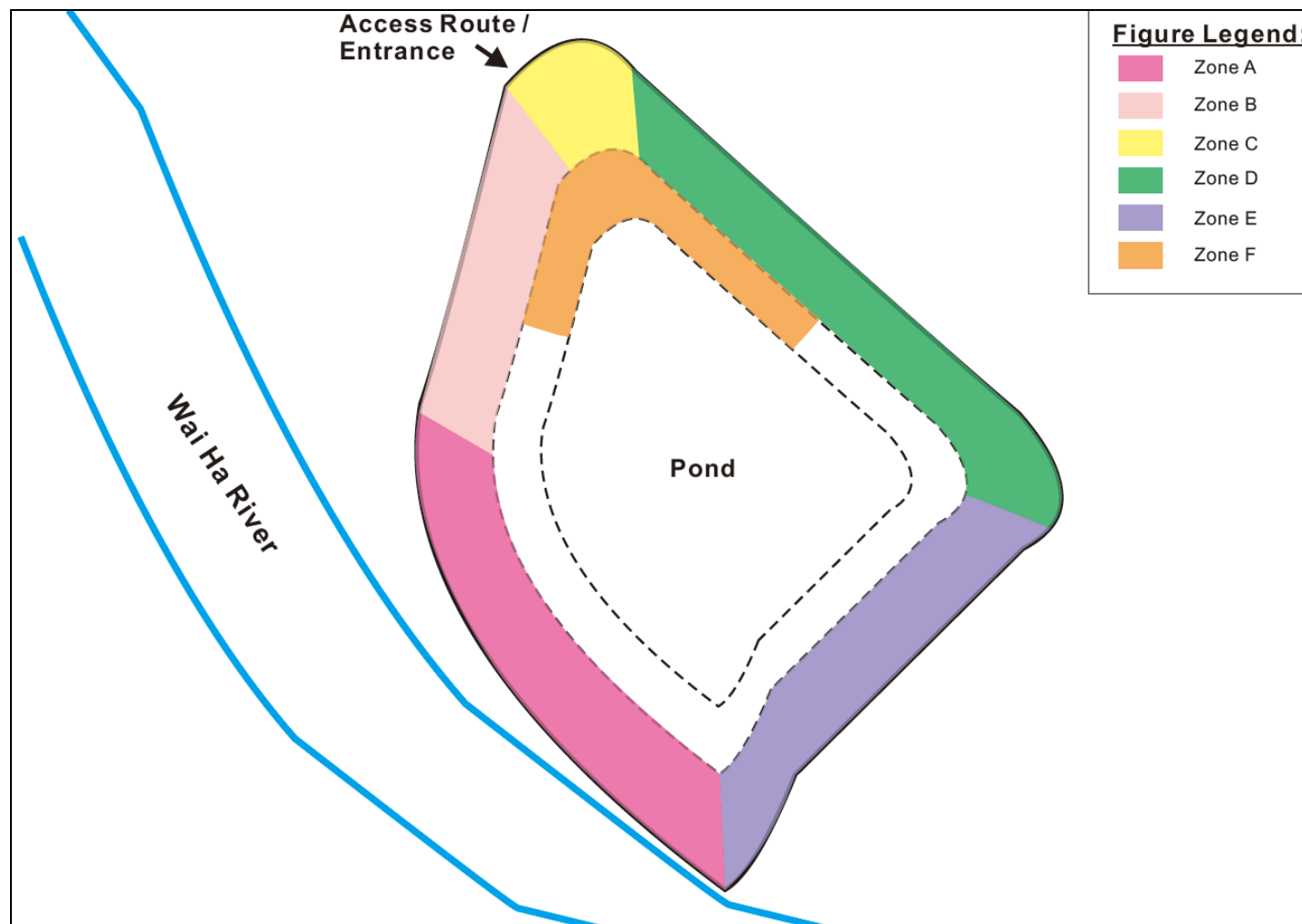


Figure 6.3.2.1 Landscape floor plan of ECA during establishment phase in November 2011.

The newly planted trees included *Celtis sinensis* (95), *Hibiscus tiliaceus* (114), *Macaranga tanarius* (57), *Ficus superb var japonica* (28) and *Viburnum odoratissimum* (76).

Newly planted trees in Zone A, B and C were in fair condition.

However, trees in Zone D and E were in poor condition in terms of sparse crown and yellow leaves. These were:

- *Hibiscus tiliaceus*: tag no. 55 – 60; 64 – 77; 238 – 241; 245 – 252; 257 – 261 & 264.
- *Ficus superb var japonica*: tag no. 38, 39
- *Macaranga tanarius*: tag no. 321
- *Celtis sinensis*: tag no. 12, 18, 130

Mangrove seedlings were planted in Zone F, but most of them were in poor to fair condition. Regular irrigation and soil texture improvement are recommended.

Three specimens of protected species *Pavetta hongkongensis* were transplanted from work area under Contract 2 to ECA at Zone D on 20th December 2011. Weekly monitoring was carried out and their overall conditions are fair so far (**Appendix L(C)**). Representative photographs of the transplanted *P. hongkongensis* are showed on **Figure 6.3.2.2**.



Figure 2.2a. Specimens 1 & 2.



Figure 2.2b. Specimen 3.

Figure 6.3.2.2. Representative photographs of transplanted *Pavetta hongkongensis* in ECA since the first transplantation in Jan 2012.

Regular watering is recommended to improve the condition of the planted or transplanted plants. Relevant mitigation measures will be proposed when necessary.

There is no sign of pest outbreak or dieback took place in the current monitoring.

6.3.3 Summary

In total, 21 trees, shrubs, climbers and herbs were retained or newly succeed in the ECA during the establishment period in January 2012. A total of 16 trees and three specimens of protected species *Pavetta hongkongensis* were transplanted to ECA. All of them were in fair condition. In addition, 370 trees, including *Celtis sinensis*, *Hibiscus tiliaceus*, *Macaranga tanarius*, *Ficus superb var japonica* and *Viburnum odoratissimum*, were newly planted in ECA since September 2011 for amenity purpose. Although there is no sign of pest outbreak or dieback, regular watering and close monitoring are still be recommended.

6.3.4 References

Webb, R (ed.) 1991, Tree Planting & Maintenance in Hong Kong, Hong Kong Government, Hong Kong

6.3.5 Monitoring of Water Quality

The point of linkage between the ECA and Wai Ha River at the southern pond bund of the wetland was completed on 30th August 2011. The constructed wetland habitats in the ECA have been filled with the tidal water from Wai Ha River. Monitoring of in situ water quality in the ECA was commenced in September 2011 by the IEC's ecologist.

6.3.6 Site Inspections

Twice monthly establishment phase monitoring has been commenced in November 2011. Two site inspections were carried out on 6th and 26th January 2012. Table 7-1 summarizes the observations and recommendations for each site inspection.

Table 6-1. Observations and recommendations for each site inspection, December 2011.

Inspection Date	Observation	Recommendation
6 January 2012	<p>A routine site inspection to update the ecological function of the created wetland (Photo 1) and status of the planted trees and shrubs. The planted trees had been thoroughly watered recently. The partly fallen compensatory tree (Tree No. 13) was replanted and supported, but it was in poor health condition (Photo 2). No leaves were observed on its canopy.</p> <p>The Wetland Specialist had informed the Contractor that the watering practice had been done appropriately by the appointed landscape contractor and advised the Contractor to continue regular and adequate watering on all planted and transplanted trees and shrubs throughout the establishment phase.</p>	Not applicable.
26 January 2012	<p>The second site inspection of the created wetland in January 2012 (Photos 3-4). No large trash and rubbish were washed into the ECA by regular tidal movement and stream flow.</p> <p>Many of the planted compensatory trees and shrubs have established satisfactorily, but some of the planted trees of <i>Hibiscus tiliacues</i> and <i>Celtis sinensis</i> show poor physiological condition. No new leaves were found on the canopies of these trees. Four transplanted trees (including <i>Celtis sinensis</i> and <i>Bombax ceiba</i>) showed very poor condition and suspected to be dead specimens.</p>	<p>The Contractor should have regular check on the status of all planted and transplanted trees and shrubs in the ECA.</p> <p>The Contractor should schedule the planting programme for replacing the compensatory trees/shrubs showing poor health/ dead symptoms.</p>

Photo 1. General view of the ECA as observed on 6th January 2012.



Photo 2. The partly fallen compensatory tree (Tree No. N13) was replanted and supported as observed on 6th January 2012.



Photo 3. General view of the ECA as observed on 26th January 2012.



Photo 4. General view of the ECA as observed on 26th January 2012.



6.4 Management Activities

6.4.1 Ecological Issues/ Management Activities

No significant ecological issues were identified from the site inspection by the Wetland Specialist in January 2012.

The ECA has been maintained in acceptable condition, in which its normal ecological function has been achieved. The Contractor should maintain frequent and adequate watering for all planted and transplanted terrestrial plants throughout the establishment period of the ECA.

6.5 Implication of the Survey Findings

6.5.1 Implication to the Wetland design of the ECA

No implication to the wetland design from these two site inspections in January 2012.

6.6 Recommendations

Adequate watering on the three transplanted protected shrubs of *Pavetta hongkongensis* was observed. However, the Contractor should undertake regular monitoring, and maintain frequent and adequate watering of all planted terrestrial trees and shrubs throughout the establishment period of the ECA. In addition, the Contractor should schedule the planting programme for replacing the compensatory trees/shrubs showing poor health/ dead symptoms. The planted wetland herbs need longer time for them to regenerate and colonize the wetland area. Replacement of these wetland herbs should be considered at a later stage.

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 7th November 2011) 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 14 February 2011.

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

7.2 Scope of Monitoring

7.2.1 Monitoring Objectives

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

7.2.2 Monitoring during Construction Phase

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

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

7.2.3 Monitoring during Operational Phase

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

- Viewing area formation by planting with shrubs, grasses and benches along the area;
- Architectural design of the pump house will help it fit into the existing suburban, natural to semi-natural surroundings;
- Landscape design of pump house by providing sufficient planting around its boundary fence;
- Enhancement planting along Tung Tsz Road with shrubs/ trees of suitable species to help protect the stream and marshes;

- Construction of box culvert should be with at least 1.0m soil depth for enhancement planting;
- Transplanting of existing affected trees to adjacent locations should be carried out;
- Preparation for transplanting is needed to allow sufficient time for root pruning and rootball preparation prior to transplanting; and
- Reinstatement of affected area should be carried out to check that the works areas are properly reinstated.

7.3 Landscape and Visual Monitoring Results

7.3.1 Monitoring Date(s)

This monthly Landscape and Visual Monitoring (January 2012) 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 26th January 2012. Area A under Contract 1 was unable to access on 26th January 2012 as the site was closed for Chinese New Year (Photo 1).

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

The bi-weekly monitoring for Contract 2 was also undertaken on 11th and 26th January 2012. The monitoring findings and recommendation will be submitted in a separate Monthly EM&A Report under Contract DC/2010/02

7.3.2 Visual Screen

No follow-up action by the Contractor is required as from the Monthly EM&A Report for December 2011.

Observation

Construction hoardings have been erected in Area A along the entire site boundary. As observed on 26th January 2012, the work for building an automatic mechanical penstock at Wai Ha River estuary has commenced. Temporary construction hoardings have been

erected around this works area (**Photo 2**).

A section of temporary hoarding has been erected from northwest to southwest parts of Tung Tsz Nursery in Area B (approximately along the works boundary from Trees U42 to U62), whilst line of hoardings have been maintained to the western part of Area B falling within the northwestern part of Tung Tsz Nursery.

A line of chain link fence has been erected to replace the temporary hoarding and surrounded Area C (**Photo 3**).

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 December 2011*.

Observation

Area A (Based on the monitoring conducted 11th January 2012)

Provision of dust control measure (such as vehicle wheel washing facilities) was observed at the exit point of Area A.

Used water for washing vehicle wheel and groundwater from the excavated sites were pumped into the silt/sand removal facilities for filtration before discharging into the manhole adjacent to Area A.

Area B

Used water was collected and drained directly to the sedimentation tank placed adjacent to the fenced Area C. The water was further filtrated through the silt/sand removal facilities in the tank before discharging into the manhole adjacent to Area C.

Area C

The establishment phase of the Ecological Compensatory Area (ECA) has commenced and the pond of the ECA is connected with the Wai Ha River to the south. No water resulting from any construction works or wetland maintenance practice was pumped out from the ECA.

Recommendation

No specific recommendation is required.

7.3.4 Pollution Control

All used water for washing vehicle wheel and construction works was filtrated and drained to the manholes, as following the recommendation stated in *Monthly EM&A Report for December 2011*.

Observation

Area A (Based on the monitoring conducted on 11th January 2012)

Provision of vehicle wheel washing facilities was observed at the exit point of Area A to reduce the contamination to the surrounding habitats in Plover Cove. Used water for washing vehicle wheel and groundwater from the excavated sites were pumped into the silt/sand removal facilities for filtration before discharging into the manhole adjacent to Area A. The drainage pipes were maintained appropriately to discharge the used water to the manhole at Ting Kok Road.

Area B

No direct discharge of contaminants or any fluid was observed within the active works area during the inspections. All used water was collected and drained directly to the sedimentation tank placed adjacent to the fenced Area C. This water was further filtrated through the silt/sand removal facilities in the tank before discharging into the manhole adjacent to Area C.

Area C

The pond of the ECA was observed to be connected to Wai Ha River directly as following the scheme design of Habitat Compensatory Plan (**Photo 4**). No direct discharge of turbid water into the adjacent Wai Ha River was observed.

Recommendation

No specific recommendation is required for Areas A, B and C. As a reminder, the Contractor should regularly check the condition of the drainage pipe and ensure that the used water should be appropriately filtrated and discharged to the manhole/other discharge point 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

As observed in January 2012, active construction works within Tung Tsz Nursery was still mainly restricted within the fenced areas to the southwest of the nursery. Other designed works areas within nursery have been under the normal operation and maintenance of Tung Tsz Nursery.

The health condition of the *Grevillea robusta* (U58) has been closely monitored on a bi-weekly basis and regular watering of the retained trees and transplanted trees was anticipated. New leaves were observed on its branches.

The works practice and maintenance of trees within the nursery generally follow the recommendation as stated in *Monthly EM&A Report for December 2011*. Any observed issues related to the liaison with the nursery are highlighted in this section.

Observation

The temporary hoarding and hoarding footings have been maintained from northwest to southwest parts of Tung Tsz Nursery since April 2011. The major construction work within Area B has been restricted within this fenced area.

Poor health condition for the transplanted tree U58 *Grevillea robusta* was reported since

late April 2011. Regular monitoring for the subject tree was conducted bi-weekly. Tree defects of chlorotic leaves were still found but new leaves were observed on the tree branches. Health condition of this transplanted tree has remained poor in January 2012 (**Photo 5**) but its structure has still remained in fair condition.

No additional tree transplantation work were reported by the Main Contractor and observed during the inspections in January 2012.

Recommendation

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

All transplanted trees should be watered regularly (e.g. at least every two days) by the appointed landscape contractor.

Regular monitoring and watering of *Grevillea robusta* (U58) are still recommended to be the major treatment to the tree. The appointed landscape contractor and the Contractor should closely monitor the health conditions throughout the establishment period.

7.3.6 Existing Trees within Works Areas

Tree Protection Zones (TPZs) in Areas A and B were demarcated within the construction sites as following the recommendation stated in the *Monthly EM&A Report for December 2011*, but minor observation of temporary storage of construction materials were recorded in Area A (see details in the following section).

Regular watering of the retained trees, transplanted trees and the compensatory planting was anticipated. Maintenance of the existing trees within the works areas generally follows the recommendation as stated in *Monthly EM&A Report for December 2011*, except the observations as highlighted in the following sections. Observation

Observation

Area A (Based on the monitoring conducted on 11th January 2012)

TPZs with temporary storage of construction materials were recorded again for trees to be transplanted (E16 to E20) at the southwestern part of Area A (**Photos 6-7**). Locations of the construction hoardings, which were erected to form the TPZs, were adjusted by the site workers to facilitate the storage of materials.

No significant damages on the crowns, trunks and roots of the remaining trees were observed during the monitoring on 11th January 2012 in Area A.

Area B

Trees, including retained and transplanted specimens, within the nursery were maintained generally in fair condition, with no significant damages on tree crowns, trunks and roots observed during the monitoring in January 2012. Small watersprouts and new leaves were observed on the trunk and branches of the transplanted tree U58 but its physiological condition has still remained in poor after the transplant.

The health conditions of U34 (**Photo 8**), U35 (**Photo 9**) and U37 (**Photo 10**) were found to be poor, with no leaves in the canopies and dried, loose tree bark. The tree tag of U35 was still found on the ground.

The planter for a palm to be transplanted (A36) has not yet repaired by the Contractor since July 2011. The palm has been supported by two guying ropes to prevent tree failure (**Photo 11**). Broken planters for 3 trees (U54 and two existing trees with no tag next to U54) were observed at their temporary receptor sites within the active works area to the northwest of the nursery (**Photo 12**). Those planters were surrounded by orange construction nets to prevent further damage to the remained planters.

As reported in the Monthly EM&A Report for December 2011, a sheet of shading net was still found tying around the trunk of the transplanted tree U57 since the transplantation in April 2011 (**Photo 13**).

As reported in the Monthly EM&A Report for December 2011, sprouts developed from the tree to be transplanted (T97) were removed by the government department as a routine vegetation maintenance practice. No sprout was found during the monitoring conducted in

January 2012 (**Photo 14**).

No significant damages on the crowns, trunks and roots of the remaining trees were observed during the monitoring in January 2012 in Area B.

Area C

The existing trees were maintained generally in fair health condition, except that some of the planted *Hibiscus tiliaceus* and *Celtis sinensis* showing poor health conditions (e.g. no leaves and dry tree bark) as a result of the transplantation shock. No branch pruning and tree felling were observed in the monitoring. No significant damages on the crowns, trunks and roots on trees within Area C were observed during the monitoring in January 2012.

No leaves were observed on the transplanted trees T152 (**Photo 15**), T153 (**Photo 16**), T250 (**Photo 17**) and one newly transplanted tree (*Bombax ceiba*)_without a tree tag (**Photo 18**). This untagged *Bombax ceiba* (possibly T150 from Area A) has been transplanted from Area A to Area C since November 2011. These four trees were suspected dying with poor health condition, possibly due to transplantation shock and as unsuitable species for transplantation.

The three transplanted specimens (Tree No.: PH01, PH02 and PH03) of the protected shrub species of conservation interest *Pavetta hongkongensis* have remained in fair health condition (**Photos 19-20**). Regular watering has been maintained as a routine maintenance practice throughout the establishment period.

Recommendations

Area A

Maintenance of proper TPZs with no temporarily stored construction materials should be continued throughout the construction period. The Contractor should continue notifying the on-site workers not to stockpile soil/construction materials or place construction equipments within the TPZs.

All retained trees or trees to be transplanted should be watered regularly (e.g. at least

every two days) by the appointed landscape contractor. The Contractor should conduct regular inspection on the health condition and protection measures of each existing trees within the Area A.

Area B

All transplanted trees should be watered regularly (e.g. at least every two days) by the appointed landscape contractor. This is a necessary maintenance practice to improve the survival rates and growth for trees showing poor health conditions as a result of the transplantation shock. Regular check of the tree health should be conducted.

Regular inspection on the tree health of U58, U34, U35 and U37 should be undertaken to update their health conditions and any tree defects. If these trees are found to be dead specimens for a prolonged period in the wet season, the Contractor should replace these specimens for compensation.

The Contractor has been informed to repair the planters of A36, U54 and the two untagged trees adjacent to U54 as soon as possible. In addition, the Contractor should ensure that all planters have been properly maintained. Manual weeding of overgrowth vegetation within the tree planters is recommended.

Tree tag of U35 should be re-tagged on the tree trunk to facilitate the on-site tree maintenance. In order to facilitate the monitoring of the trees and provide proper tree maintenance practice, the Contractor is recommended to have regular site check on all trees within the Project Area.

The shading net tied on the trunk of U57 should be removed as soon as possible.

Area C

All transplanted trees, planted compensatory trees and the three transplanted individuals of *Pavetta hongkongensis* should be watered regularly (e.g. at least every two days) by the appointed landscape contractor. Regular check of the health conditions of these trees should be conducted. If these trees are found to be dead specimens for a prolonged period in the wet season, the Contractor should replace these specimens for compensation.

7.3.7 Construction Lights

No follow-up action on maintenance of construction light is required as from the *Monthly EM&A Report for December 2011*.

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 Main Contractor.

Recommendation

No specific recommendation is required.

7.4 Audit Schedule

The next bi-weekly Landscape & Visual Monitoring in February 2012 is scheduled to be conducted in the weeks of 6th and 20th February 2012.

8 Action taken in Event of Exceedance

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

During the reporting month there was no exceedance for noise, hydrological characteristics, and ecological measurements recorded; therefore, no actions were taken.

For water quality monitoring, total 9 abnormal incidents of water quality limits (Dissolved Oxygen, Suspended solids and Turbidity) were recorded in this reporting month according to the established level. ET has arranged site investigations for the abnormal incidents and it was observed that the river was redirected and narrowed for construction of mechanical penstocks; and increases the speed of water current. Proper mitigation measures was 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 exceedance of Turbidity and Total suspended solid were believed to be mainly attributed by high water flow rate. The exceedance of DO were believed to be mainly attributed by natural fluctuation; , since the recorded levels of DO at control station had also exceeded its baseline limit level, the exceedances recorded at were unlikely to be related to the Project. The water condition of Wai Ha River is presented in photo attached in **Appendix N**.

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 (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)
Mar-11	0.330	0.00	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.055
Apr-11	0.280	0.00	0.00	0.00	0.28	0.00	0.00	0.00	0.00	0.00	0.02
May-11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Jun-11	5.475	0.00	5.475	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
July-11	3.200	0.00	2.85	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aug-11	1.608	0.00	0.868	0.00	0.00	0.740	0.00	0.00	0.00	0.00	0.00
Spet-11	0.045	0.00	0.04	0.00	0.005	0.00	0.00	0.00	0.00	0.00	0.00
Oct-11	0.425	0.00	0.41	0.00	0.015	0.00	0.00	0.00	0.00	0.00	0.00
Nov-11	0.330	0.00	0.00	0.315	0.015	0.00	0.00	0.00	0.00	0.00	0.00
Dec-11	0.065	0.00	0.06	0.00	0.005	0.00	0.00	0.00	0.00	0.00	0.02
Jan-12	0.010		0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.005
Total	11.758	0.00	9.713	0.665	0.655	0.74	0.00	0.00	0.00	0.00	0.12
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)
	37.37	8.27	12.09	0.00	25.28	2.1	10	2	0.5	1	1

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 Licence	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
Mar 2011	0	0	0	0
April 2011	0	0	0	0
May 2011	0	0	0	0
June 2011	0	0	0	0
July 2011	0	0	0	0
August 2011	0	0	0	0
September 2011	0	0	0	0
October 2011	0	0	0	0
November 2011	0	0	0	0
December 2011	0	0	0	0
January 2012	0	0	0	0
Total	0	0	0	0

12 Site Environmental Audits

12.1 Site Inspection

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

Within this reporting period, site inspections were conducted on 5th, 12th, 20th and 31st of January 2012. 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	Remarks
1, 8, 15, Dec 2011	Construction was waste was observed at Area A	Observation	Contractor was reminded that C & D waste should be stored at proper location. Contractor should assign licensed waste collector to collect and dispose observed waste as soon as possible	Outstanding	-	Part of Construction waste was removed by contractor at 8, 19 and 30 Dec 2011
8 & 30 Dec 2011	Damaged protective fence was observed at Area A	Observation	Contractor was reminded to replace the fences to provide a protective zone for the trees.	Damaged tree protective fence was repaired by contractor	5 Jan 2012	The issue was rectified at 19 Dec 2011, but reappeared at 30 Dec 2011
15 Dec 2011	General wastes were observed at	Observation	Contractor was advised to clean the general wastes or	Outstanding	-	-

Date	Findings	Identification	Advice from ET	Action taken	Closing date	Remarks
	Area A		store at proper location for temporary storage.			
15 & 30 Dec 2011	Construction wastes were observed inside the tree protective zone	Observation	Contractor was reminded to remove the construction waste from tree protective zone and set up the tree protective fence.	Construction waste was removed by contractor	5 Jan 12	-
30 Dec 2011	Earthy stockpile was observed without cover at Area A	Observation	Contractor was reminded that earthy stockpile should be covered with tarpaulin for dust suppression.	Earthy stockpile was removed by contractor	12 Jan 12	-
5 Jan 2012	Construction materials were observed at Ting Kok Road.	Observation	Contractor was reminded to clean the construction materials.	Construction waste was cleaned by contractor	12 Jan 12	-
5 Jan 2012	Construction material was observed without cover at Area B	Observation	Contractor was reminded that earthy stockpile should be cover with tarpaulin for dust suppression.	Earthy stockpile at Area B was covered with tarpaulin	31 Jan 12	-
12 Jan 12	Damaged tree protective fence was observed at Area A	Observation	Contractor was reminded that damaged tree protective fence should be repaired or replace.	Damaged tree protective fence at Area A was repair by contractor	31 Jan 12	-

Date	Findings	Identification	Advice from ET	Action taken	Closing date	Remarks
12 Jan 12	Earthy stockpile was observed without cover at Ting Kok Road	Observation	Contractor was reminded that earthy stockpile should be covered with tarpaulin for dust suppression.	Earthy stockpile at Ting Kok Road was removed by contractor	20 Jan 12	-
12 Jan 12	Exposed tree's root was observed at Area B.	Observation	Contractor was reminded to cover the exposed roots by using the soil and set up the protective zone around the tree.	Exposed tree's root at Area B was covered by contractor	20 Jan 12	-
20 Jan 12	Exposed tree's roots were observed at Area A.	Observation	Contractor was reminded to cover the exposed roots by using the soil.	Outstanding	-	-
20 Jan 12	Stagnant water was observed At Area B.	Observation	Contractor was reminded to remove the stagnant water immediately to prevent the mosquito breeding.	Stagnant water at Area B was removed by contractor	31 Jan 12	-
31 Jan 12	Stagnant water was observed At Area A	Observation	Contractor was reminded to remove the stagnant water immediately to prevent the mosquito breeding.	Outstanding	-	-

12.2 Compliance with legal and Contractual requirement

There was no non-compliance recorded for the month of January 2012.

12.3 Implementation status and effectiveness of the mitigation measures

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

As there were some ongoing follow up practices, contractor was reminded to regularly review and rectify the discrepancy once found and maintain good site condition. The contractor implemented various environmental mitigation measures as recommended in the Environmental Permit and Final Mitigation Measures Report.

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

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

13 Future Key issues and recommendations

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

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

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

14 Conclusions

Pumping station construction, Concreting works for box culvert and pumping station and plant maintenance 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 31st of January 2012.

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

For water quality monitoring, total 9 abnormal accidents of water quality limits (Dissolved Oxygen, Suspended solids and Turbidity) were recorded in this reporting month according to the established level. T has arranged site investigations for the abnormal incidents and it was observed that the river was redirected and narrowed for construction of mechanical penstocks; and increases the speed of water current. Proper mitigation measures was 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 exceedance of Turbidity and Total suspended solid were believed to be mainly attributed by high water flow rate. The exceedance of DO were believed to be mainly attributed by natural fluctuation; , since the recorded levels of DO at control station had also exceeded its baseline limit level, the exceedances recorded at were unlikely to be related to the Project.

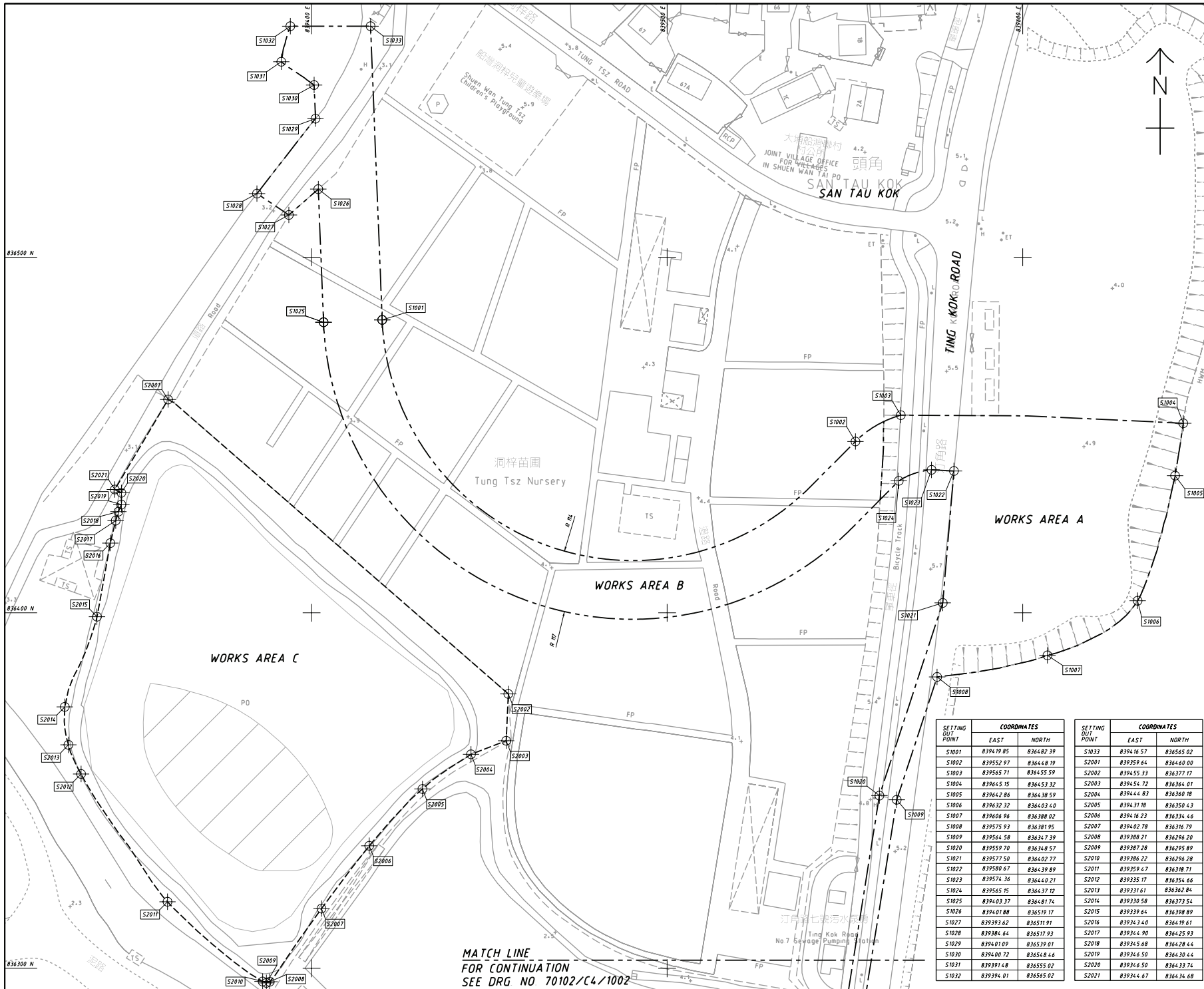
For ecological monitoring survey, all vegetations recorded were in fair condition, with no significance sign of health deterioration for the retained trees. In addition, Ecological water quality monitoring at ECA was conducted on 31/1 with result: Turbidity: 1.3NTU; Temperature: 18°C; DO: 6.96mg/L; pH: 7.16.

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

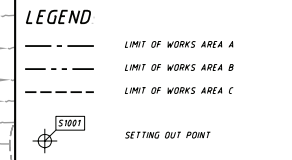
ET has reminded the contractor to provide environmental pollution control measures wherever necessary, and to keep a good environmental management at site practice.

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



- 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 2.50 BEYOND THE LIMIT OF WORKS AREAS EXCLUDING PRIVATE AREAS



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

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

DRAINAGE IMPROVEMENT
WORKS IN SHUEN WAN TAI PO - CONTRACT 1

SETTING OUT PLAN FOR
WORKS AREA A, B AND C

SHEET 1 OF 2

AECOM

DRGNQ. 70102/C4/1001A
圖紙編號

DESIGNED BY CPWU	CONTRACT NO. DC/2009/22	DR. APPROVED DML
DRAWN BY LWL	STATUS 11/09	
SCALE A1 : 1 500	DIMENSIONS ARE IN METRES	

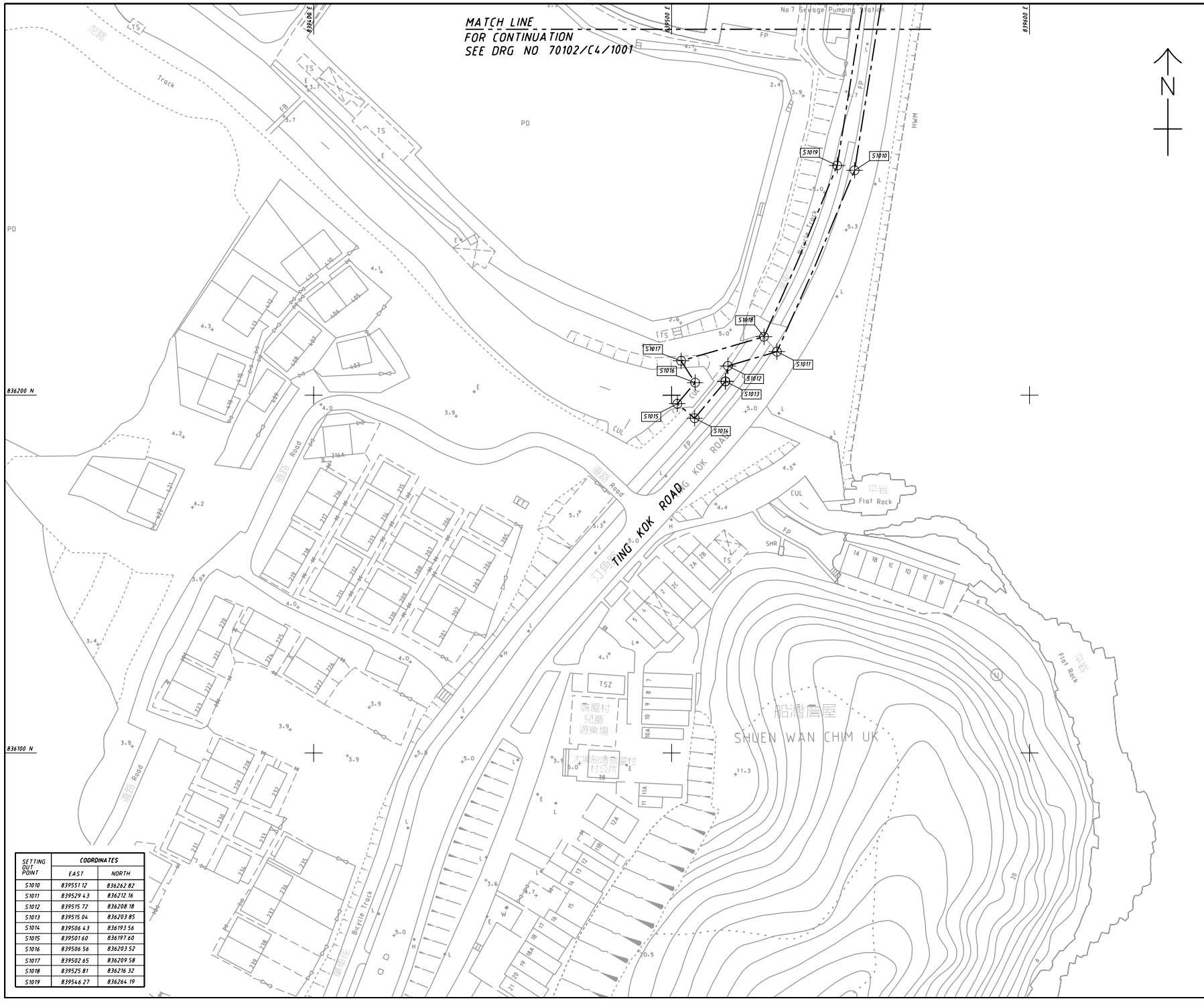
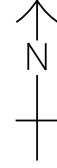
SETTING OUT POINT	COORDINATES		SETTING OUT POINT	COORDINATES	
	EAST	NORTH		EAST	NORTH
S1001	839419.85	836487.39	S1033	839416.57	836565.02
S1002	839552.87	836448.19	S2001	839359.64	836440.00
S1003	839565.71	836455.59	S2002	839455.33	836377.17
S1004	839645.15	836453.32	S2003	839454.72	836364.01
S1005	839642.86	836438.59	S2004	839444.83	836360.18
S1006	839632.32	836403.40	S2005	839431.18	836350.43
S1007	839606.96	836388.02	S2006	839416.23	836334.46
S1008	839575.93	836381.95	S2007	839402.78	836316.79
S1009	839564.58	836347.39	S2008	839388.21	836294.20
S1020	839559.70	836348.57	S2009	839387.28	836295.89
S1021	839577.50	836402.77	S2010	839386.22	836296.28
S1022	839580.67	836439.89	S2011	839359.47	836318.71
S1023	839574.36	836440.21	S2012	839335.17	836354.66
S1024	839565.15	836437.12	S2013	839331.61	836362.84
S1025	839403.37	836481.74	S2014	839330.58	836373.54
S1026	839401.88	836519.17	S2015	839339.64	836398.89
S1027	839393.62	836517.93	S2016	839343.40	836419.61
S1028	839384.64	836517.93	S2017	839344.90	836425.93
S1029	839401.09	836539.01	S2018	839345.68	836428.44
S1030	839400.72	836540.44	S2019	839346.50	836430.44
S1031	839391.48	836555.02	S2020	839346.50	836433.74
S1032	839394.01	836565.02	S2021	839347.67	836434.68

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

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

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

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



836200 N

836100 N

2010-2-5 13:32:23

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

TENDER DRAWING	ECYPRC14	09-09
NO.	DATE	SCALE

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

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

SETTING OUT PLAN FOR
WORKS AREA A, B AND C

SHEET 2 OF 2

AECOM

DRG. NO. 70102/C4/1002
圖紙編號

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

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Appendix B: Key Personal Contact information chart

Post	Name	Contact No.	Contact Fax	e-mail
Project Manager	Mr. W. K. Chan	6821 1136	2674 6688	dc200922jv_pmcwk@yahoo.com.hk
Site Agent	Mr. C. L. Wong	9280 0166	2674 6688	dc200922jv_sa@yahoo.com.hk
Environmental Officer / Sub-agent	Mr. K. M. Ma	9552 1734	2674 6688	dc200922jv_suba@yahoo.com.hk
Environmental Supervisor	Mr. Anthony Chan	9179 2092	2674 6688	anthony277@hotmail.com
Asia Ecological Consultants Ltd. (Wetland Specialist)	Dr. Mike Leven	2486 2885	2471 8389	mrleven@asiaecol.com.hk
Environmental Pioneers & Solutions Limited (Environmental Team)	Miss. Goldie Fung	2556 9172	2856 2010	goldiefung@fseng.com.hk

Appendix C: Calibration Certificates for measuring instruments



Calibration Certificate

Certificate No. **11494**

Page 1 of 3 Pages

Customer : Environmental Pioneers and Solutions Limited

Address : Flat B, 6/F., Hop Shi Factory Building, 29 Lee Chung Street, Chai Wan, Hong Kong.

Order No. : Q10260

Date of receipt : 15-Mar-11

Item Tested

Description : Digital Sound Level Meter

Manufacturer : SVAN

Model : 949

Serial No. : 8571

Test Conditions

Date of Test : 17-Mar-11

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 651 Type 1 & IEC 804 Type 1 specification.

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

Main Test equipment used:


<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S017A	Multi-Function Generator	07279	SCL-HKSAR
S024	Sound Level Calibrator	04062	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: 21-Mar-11

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

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Calibration Certificate

Certificate No. 11494

Page 2 of 3 Pages

Results :

1. SPL Accuracy

UUT Setting				Applied Value (dB)	UUT Reading (dB)
Level Range	Octave Filter	Weight	Response		
105 dB	OFF	A	Fast	94.0	93.9
			Slow		93.9
		C	Fast		93.9
130 dB	OFF	A	Fast	94.0	94.0
			Slow		94.0
		C	Fast		94.0
	OFF	A	Fast	114.0	113.8
			Slow		113.8
		C	Fast		113.8

IEC 651 Type 1 Spec. : ± 0.7 dB

Uncertainty : ± 0.1 dB

2. Level Stability : 0.0 dB

IEC 651 Type 1 Spec. : ± 0.3 dB

Uncertainty : ± 0.01 dB

3. Linearity

3.1 Level Linearity

UUT Range (dB)	Applied Value (dB)	UUT Reading (dB)	Variation (dB)	IEC 651 Type 1 Spec. (inside Primary)
130	114.0	114.0	0.0	± 0.7 dB
	104.0	104.0	0.0	
	94.0	94.0 (Ref.)	--	
105	84.0	84.2	-0.2	
	74.0	74.1	-0.1	
	64.0	64.1	-0.1	
	54.0	54.2	-0.2	

Uncertainty : ± 0.1 dB



Calibration Certificate

Certificate No. 11494

Page 3 of 3 Pages

3.2 Differential level linearity

UUT Range (dB)	Applied Value (dB)	UUT Reading (dB)	Variation (dB)	IEC 651 Type 1 Spec.
130	84.0	84.1	-0.1	± 0.4 dB
	94.0	94.0 (Ref.)	0.0	
	95.0	95.0	0.0	± 0.2 dB

Uncertainty : ± 0.1 dB

4. Frequency Weighting

A weighting

Frequency	Attenuation (dB)	IEC 651 Type 1 Spec.
31.5 Hz	-39.8	- 39.4 dB, ± 1.5 dB
63 Hz	-26.5	- 26.2 dB, ± 1.5 dB
125 Hz	-16.5	- 16.1 dB, ± 1 dB
250 Hz	-9.0	- 8.6 dB, ± 1 dB
500 Hz	-3.4	- 3.2 dB, ± 1 dB
1 kHz	0.0 (Ref)	0 dB, ± 1 dB
2 kHz	+1.6	+ 1.2 dB, ± 1 dB
4 kHz	+1.6	+ 1.0 dB, ± 1 dB
8 kHz	-0.5	- 1.1 dB, + 1.5 dB ~ -3 dB
16 kHz	-6.3	- 6.6 dB, + 3 dB ~ -∞

Uncertainty : ± 0.1 dB

5. Time Averaging

Applied Burst duty Factor	Applied Leq. Value (dB)	UUT Reading (dB)	IEC 804 Type 1 Spec.
continuous	50.0	--	--
1/10	50.0	50.3	± 0.5 dB
1/10 ²	50.0	49.8	
1/10 ³	50.0	50.0	± 1.0 dB
1/10 ⁴	50.0	50.0	

Uncertainty : ± 0.1 dB

Remarks : 1. UUT : Unit-Under-Test

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

3. Atmospheric Pressure : 1 012 hPa.

----- END -----



Calibration Certificate

Certificate No. **11218**

Page **1** of **3** Pages

Customer : Environmental Pioneers and Solutions Limited

Address : Flat B, 6/F., Hop Shi Factory Building, 29 Lee Chung Street, Chai Wan, Hong Kong.

Order No. : Q10260

Date of receipt : 1-Mar-11

Item Tested

Description : Digital Sound Level Meter

Manufacturer : SVAN

Model : 949

Serial No. : 8569

Test Conditions

Date of Test : 14-Mar-11

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 651 Type 1 & IEC 804 Type 1 specification after adjustment.

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


Main Test equipment used:

<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S017A	Multi-Function Generator	07279	SCL-HKSAR
S024	Sound Level Calibrator	04062	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: 15-Mar-11

This Certificate is issued by:

Hong Kong Calibration Ltd.

Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.

Tel: 2425 8801 Fax: 2425 8646



Calibration Certificate

Certificate No. 11218

Page 2 of 3 Pages

Results :

1. SPL Accuracy

UUT Setting				Applied Value (dB)	UUT Reading (dB)	
Level Range	Octave Filter	Weight	Response		Before Adjust.	After Adjust.
105 dB	OFF	A	Fast	94.0	*92.2	93.9
			Slow		--	93.9
		C	Fast		--	93.9
130 dB	OFF	A	Fast	94.0	--	93.9
			Slow		--	93.9
		C	Fast		--	93.9
	OFF	A	Fast	114.0	--	113.9
			Slow		--	113.9
		C	Fast		--	113.9

IEC 651 Type 1 Spec. : ± 0.7 dB

Uncertainty : ± 0.1 dB

2. Level Stability : 0.0 dB

IEC 651 Type 1 Spec. : ± 0.3 dB

Uncertainty : ± 0.01 dB

3. Linearity

3.1 Level Linearity

UUT Range	Applied Value (dB)	UUT Reading (dB)	Variation (dB)	IEC 651 Type 1 Spec. (inside Primary)
130	114.0	113.9	0.0	± 0.7 dB
	104.0	103.9	0.0	
	94.0	93.9 (Ref.)	--	
105	84.0	83.9	0.0	
	74.0	74.0	+0.1	
	64.0	64.1	-0.2	
	54.0	54.1	-0.2	

Uncertainty : ± 0.1 dB



Calibration Certificate

Certificate No. 11218

Page 3 of 3 Pages

3.2 Differential level linearity

UUT Range	Applied Value (dB)	UUT Reading (dB)	Variation (dB)	IEC 651 Type 1 Spec.
130	84.0	83.9	0.0	± 0.4 dB
	94.0	93.9 (Ref.)	--	
	95.0	95.0	-0.1	± 0.2 dB

Uncertainty : ± 0.1 dB

4. Frequency Weighting

A weighting

Frequency	Attenuation (dB)	IEC 651 Type 1 Spec.
31.5 Hz	-39.7	- 39.4 dB, ± 1.5 dB
63 Hz	-26.5	- 26.2 dB, ± 1.5 dB
125 Hz	-16.5	- 16.1 dB, ± 1 dB
250 Hz	-9.0	- 8.6 dB, ± 1 dB
500 Hz	-3.5	- 3.2 dB, ± 1 dB
1 kHz	0.0 (Ref)	0 dB, ± 1 dB
2 kHz	+1.5	+ 1.2 dB, ± 1 dB
4 kHz	+1.4	+ 1.0 dB, ± 1 dB
8 kHz	-0.7	- 1.1 dB, + 1.5 dB ~ -3 dB
16 kHz	-6.6	- 6.6 dB, + 3 dB ~ -∞

Uncertainty : ± 0.1 dB

5. Time Averaging

Applied Burst duty Factor	Applied Leq. Value (dB)	UUT Reading (dB)	IEC 804 Type 1 Spec.
continuous	40.0	--	--
1/10	40.0	40.1	± 0.5 dB
1/10 ²	40.0	40.0	
1/10 ³	40.0	40.2	± 1.0 dB
1/10 ⁴	40.0	40.0	

Uncertainty : ± 0.1 dB

Remarks : 1. UUT : Unit-Under-Test

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

3. Atmospheric Pressure : 1 010 hPa.

4. *Out of Specification

----- END -----



Calibration Certificate

Certificate No. 11495

Page 1 of 2 Pages

Customer : Environmental Pioneers and Solutions Limited

Address : Flat B, 6/F., Hop Shi Factory Building, 29 Lee Chung Street, Chai Wan, Hong Kong.

Order No. : Q10260

Date of receipt : 15-Mar-11

Item Tested

Description : Sound Level Calibrator

Manufacturer : Svantek

Model : SV30A

Serial No. : 7908

Test Conditions

Date of Test : 17-Mar-11

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 Class 1 specification.

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

Main Test equipment used:

<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S014	Spectrum Analyzer	03926	NIM-PRC & SCL-HKSAR
S024	Sound Level Calibrator	04062	NIM-PRC & SCL-HKSAR
S041	Universal Counter	04461	SCL-HKSAR
S206	Sound Level Meter	04462	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: 21-Mar-11

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

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Calibration Certificate

Certificate No. 11495

Page 2 of 2 Pages

Results :

1. Level Accuracy

UUT Nominal Value (dB)	Measured Value (dB)	IEC 942 Class 1 Spec.
94	94.08	± 0.3 dB
114	114.18	

Uncertainty : ± 0.1 dB

2. Frequency

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

Uncertainty : ± 3.6 x 10⁻⁶

3. Level Stability : 0.0 dB

IEC 942 Class 1 Spec. : ± 0.1 dB

Uncertainty : ± 0.01 dB

4. Total Harmonic Distortion : < 1.0 %

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 : 1012 hPa.

----- END -----



Calibration Certificate

Certificate No. 17082

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. : Q12881

Date of receipt : 28-Nov-11

Item Tested

Description : Portable Level-Velocity Logger

Manufacturer : Greyline

Model : Stingray

Serial No. : 45525

Test Conditions

Date of Test : 6-Dec-11

Supply Voltage : --

Ambient Temperature : $(23 \pm 3)^{\circ}\text{C}$

Relative Humidity : $(50 \pm 25) \%$

Test Specifications

Calibration check.

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

Test Results

All results were within the tolerance(s).

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

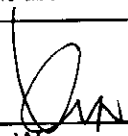
Main Test equipment used:

<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S179	Std. Tape	10789	NIM-PRC
S136A	Stop Watch	07481	SCL-HKSAR
S223	Std. Thermometer	13173	NIM-PRC


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

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

Calibrated by :


Y. K. Wong

Approved by :


Dorothy Cheuk

Date: 7-Dec-11

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

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Calibration Certificate

Certificate No. 17082

Page 2 of 2 Pages

Results :

1. Flow Rate

Applied Value (Ft/s)	UUT Reading (Ft/s)	Tolerance	Uncertainty
1.67	1.6	$\pm 5\%$	$\pm 1\%$

2. Level

Applied Value (Ft)	UUT Reading (Ft)	Tolerance	Uncertainty
1.00	1.00	$\pm 5\%$	$\pm 0.1\%$
1.75	1.75		
3.00	3.00		

3. Temperature

Applied Value (°C)	UUT Reading (°C)	Tolerance	Uncertainty
23.0	24	$\pm 2\text{ }^{\circ}\text{C}$	$\pm 0.2\text{ }^{\circ}\text{C}$

Remarks : 1. UUT : Unit-Under-Test

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

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

S/N : 10D18289

----- END -----



ALS Technichem (HK) Pty Ltd

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

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

WORK ORDER: HK1125080
LABORATORY: HONG KONG
DATE RECEIVED: 24/10/2011
DATE OF ISSUE: 02/11/2011

COMMENTS

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

Scope of Test: Conductivity, Dissolved Oxygen, pH, Temperature and Turbidity
Description: Multi-meter
Brand Name: DKK-TOA
Model No.: WQC-24
Serial No.: 617892
Equipment No.: --
Date of Calibration: 26 October, 2011

NOTES

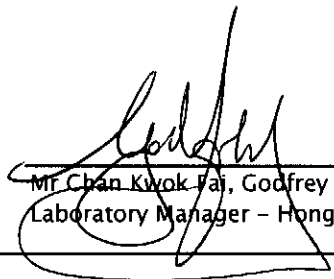
This is the Final Report and supersedes any preliminary report with this batch number.
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

ISSUING LABORATORY: HONG KONG

Address

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

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


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

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Page 1 of 3

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

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1125080
Date of Issue: 02/11/2011
Client: ENVIRONMENTAL PIONEERS & SOLUTIONS LTD



Description: Multi-meter
Brand Name: DKK-TOA
Model No.: WQC-24
Serial No.: 617892
Equipment No.: --

Date of Calibration: 26 October, 2011 **Date of next Calibration:** 26 January, 2012

Parameters:

Conductivity

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

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
146.9	133	-9.5
6667	6660	-0.1
12890	12700	-1.5
58670	56700	-3.4
Tolerance Limit (%)		10.0

Dissolved Oxygen

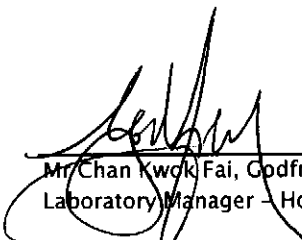
Method Ref: APHA (21st edition), 4500G: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
5.04	5.00	-0.04
6.48	6.52	0.04
7.47	7.66	0.19
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)
4.00	3.93	-0.07
7.00	7.06	0.06
10.0	10.01	0.01
Tolerance Limit (±unit)		0.2


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

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



Work Order: HK1125080
Date of Issue: 02/11/2011
Client: ENVIRONMENTAL PIONEERS & SOLUTIONS LTD

Description: Multi-meter
Brand Name: DKK-TOA
Model No.: WQC-24
Serial No.: 617892
Equipment No.: --
Date of Calibration: 26 October, 2011 **Date of next Calibration:** 26 January, 2012

Parameters:

Temperature

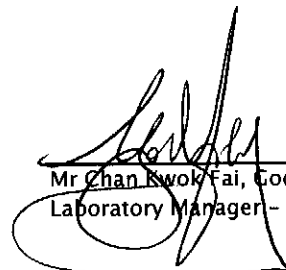
Method Ref: Section 6 of International Accreditation New Zealand Technical
Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
11.0	10.2	-0.8
25.0	24.1	-0.9
40.0	39.0	-1.0
	Tolerance Limit (°C)	2.0

Turbidity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0.00	0.0	--
4.00	4.3	7.5
40.0	43.6	9.0
80.0	86.3	7.9
400	420	5.0
800	853	6.6
	Tolerance Limit (±%)	10.0


 Mr Chan Kwok Fai, Godfrey
 Laboratory Manager - Hong Kong



ALS Technichem (HK) Pty Ltd

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

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

WORK ORDER: HK1200205
AMENDMENT: 1
LABORATORY: HONG KONG
DATE RECEIVED: 04/01/2012
DATE OF ISSUE: 02/02/2012

PROJECT: --

COMMENTS

It is certified that the item under calibration/checking has been calibrated/checked by corresponding calibrated equipment in the laboratory.

Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of ALS will be followed.

Scope of Test: Conductivity, Dissolved Oxygen, Salinity, Temperature and Turbidity
Description: Multi-meter
Brand Name: DKK-TOA
Model No.: WQC-24
Serial No.: 682337
Equipment No.: --
Date of Calibration: 10 January, 2012

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

ISSUING LABORATORY: HONG KONG

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Mr Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong

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Page 1 of 3

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ALS TECHNICHEM (HK) PTY LTD Part of the ALS Laboratory Group A Campbell Brothers Limited Company

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



Work Order: HK1200205
Amendment: 1
Date of Issue: 02/02/2012
Client: ENVIRONMENTAL PIONEERS & SOLUTIONS LTD

Description: Multi-meter
Brand Name: DKK-TOA
Model No.: WQC-24
Serial No.: 682337
Equipment No.: --
Date of Calibration: 10 January, 2012 **Date of next Calibration:** 10 April, 2012

Parameters:

Conductivity

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

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
146.9	141.0	-4.0
6667	6490	-2.7
12890	12700	-1.5
58670	59000	0.6
	Tolerance Limit (%)	10.0

Dissolved Oxygen

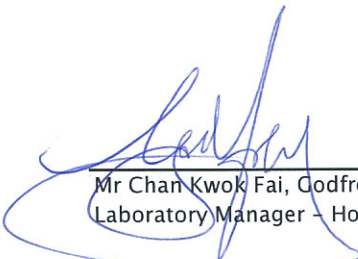
Method Ref: APHA (21st edition), 4500O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
5.58	5.45	-0.13
6.79	6.63	-0.16
8.62	8.48	-0.14
	Tolerance Limit (±mg/L)	0.20

Salinity

Method Ref: APHA (21st edition), 2520B

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.0	--
10	10.2	2.0
20	20.7	3.5
30	30.7	2.3
	Tolerance Limit (±%)	10.0


 Mr Chan Kwok Fai, Godfrey
 Laboratory Manager – Hong Kong

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1200205
Amendment: 1
Date of Issue: 02/02/2012
Client: ENVIRONMENTAL PIONEERS & SOLUTIONS LTD



Description: Multi-meter
Brand Name: DKK-TOA
Model No.: WQC-24
Serial No.: 682337
Equipment No.: --

Date of Calibration: 10 January, 2012 **Date of next Calibration:** 10 April, 2012

Parameters:

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)
14.0	14.4	0.4
20.5	20.3	-0.2
34.0	34.5	0.5
Tolerance Limit (°C)		2.0

Turbidity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.6	--
4	4.3	7.5
40	43.8	9.5
80	87.8	9.8
400	430.1	7.5
800	837.2	4.7
Tolerance Limit (±%)		10.0

Appendix D: Construction Noise Monitoring Data

There was no noise monitoring between 22/1 and 28/1 due to the site closure.

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		5/1/2012	5/1/2012
Weather Condition		Cloudy	Cloudy
Measurement Start Time (hh:mm)		11:38	11:03
Measurement Time Length (mins)		30 mins	
SLM Model & S/N		SVAN 949	
Wind Speed (m/s)		0.5	0.12
Measurement Results	L _{eq} (dB(A))	55.1	58.5
	L ₁₀ (dB(A))	55.9	61.4
	L ₉₀ (dB(A))	39.4	42.1
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

Prepared by:

Lai Chi Hang



5/1/2012

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		12/1/2012	12/1/2012
Weather Condition		Cloudy	Cloudy
Measurement Start Time (hh:mm)		11:31	10:59
Measurement Time Length (mins)		30 mins	
SLM Model & S/N		SVAN 949	
Wind Speed (m/s)		1.65	0
Measurement Results	L _{eq} (dB(A))	52.8	56.9
	L ₁₀ (dB(A))	54.7	58.6
	L ₉₀ (dB(A))	43.2	44.6
Major Construction Noise Source(s) During Monitoring		The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities
Other Noise Source(s) During Monitoring		– Background Noise – Traffic Noise	– Background Noise – Traffic Noise

Name

Signature

Date

Prepared by:

Lai Chi Hang



12/1/2012

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		19/1/2012	19/1/2012
Weather Condition		Cloudy	Cloudy
Measurement Start Time (hh:mm)		11:21	10:45
Measurement Time Length (mins)		30 mins	
SLM Model & S/N		SVAN 949	
Wind Speed (m/s)		2.2	0.84
Measurement Results	L _{eq} (dB(A))	51.8	60.3
	L ₁₀ (dB(A))	54.2	63.3
	L ₉₀ (dB(A))	40.0	52.5
Major Construction Noise Source(s) During Monitoring		The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities
Other Noise Source(s) During Monitoring		– Background Noise – Traffic Noise	– Background Noise – Traffic Noise

Name

Signature

Date

Prepared by:

Lai Chi Hang



19/1/2012

Appendix E: Water Quality Monitoring Data

There was no water monitoring between 22/1 and 28/1 due to the site closure.

Remark:

Red highlighting: The value is exceeding limit level.

Yellow highlighting: The value is exceeding action level but within limit level.

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

Date of Sampling : 3/1/2012

Weather : Cloudy

Monitoring Location	W1	W2	
Time (hhmm)	14:11	13:46	
Tide Mode	Mid-flood		
River Condition	Normal	Turbid	
Water Depth (m)	<1	<1	
pH value	7.92	7.75	
Salinity (ppt)	0.5	11.5	
Temperature (°C)	19.3	19.3	
Turbidity (NTU)	1.0	5.9	5.9
DO (mg/L)	7.30	7.08	
DO Saturation (%)	82%	73%	
Suspended Solids (mg/L)	2.4	4.0	4.0

Remark or Observation : _____

Name

Signature

Date

Prepared By : Lai Chi Hang



3/1/2012

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

Date of Sampling : 5/1/2012

Weather : Cloudy

Monitoring Location	W1	W2	
Time (hhmm)	10:25	10:03	
Tide Mode	Mid-ebb		
River Condition	Turbid	Normal	
Water Depth (m)	<1	<1	
pH value	7.77	7.60	
Salinity (ppt)	1.4	10.7	
Temperature (°C)	15.3	15.9	
Turbidity (NTU)	6.2	1.8	1.8
DO (mg/L)	7.88	7.71	
DO Saturation (%)	77%	76%	
Suspended Solids (mg/L)	3.8	4.8	4.8

Remark or Observation : _____

Name

Signature

Date

Prepared By : Lai Chi Hang



5/1/2012

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

Date of Sampling : 7/1/2012

Weather : Cloudy

Monitoring Location	W1	W2	
Time (hhmm)	12:30	12:00	
Tide Mode	Mid-ebb		
River Condition	Normal	Turbid	
Water Depth (m)	<1	<1	
pH value	7.81	7.80	
Salinity (ppt)	1.5	11.8	
Temperature (°C)	16.2	16	
Turbidity (NTU)	1.00	6.8	6.8
DO (mg/L)	7.61	7.34	
DO Saturation (%)	78%	76%	
Suspended Solids (mg/L)	5.6	4.4	4.4

Remark or Observation : _____

Name

Signature

Date

Prepared By : Lai Chi Hang



7/1/2012

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

Date of Sampling : 10/1/2012

Weather : Cloudy

Monitoring Location	W1	W2	
Time (hhmm)	12:00	12:20	
Tide Mode	mid-ebb		
River Condition	Normal	Turbid	
Water Depth (m)	<1	<1	
pH value	7.59	7.91	
Salinity (ppt)	2.7	15.1	
Temperature (°C)	17.5	17.3	
Turbidity (NTU)	0.4	21.3	21.3
DO (mg/L)	7.22	7.18	
DO Saturation (%)	74%	73%	
Suspended Solids (mg/L)	1.8	17.0	17.0

Remark or Observation : _____

Name

Signature

Date

Prepared By : Lai Chi Hang



10/1/2012

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

Date of Sampling : 14/1/2012

Weather : Rainy

Monitoring Location	W1	W2	
Time (hhmm)	15:40	16:01	
Tide Mode	mid-ebb		
River Condition	Turbid	Turbid	
Water Depth (m)	<1	<1	
pH value	7.43	7.87	
Salinity (ppt)	31	15.2	
Temperature (°C)	19.2	18.9	
Turbidity (NTU)	5.0	4.8	4.8
DO (mg/L)	7.14	6.90	
DO Saturation (%)	53%	51%	
Suspended Solids (mg/L)	3.8	2.2	2.2

Remark or Observation : _____

Name

Signature

Date

Prepared By : Lai Chi Hang



14/1/2012

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

Date of Sampling : 17/1/2012

Weather : Sunny

Monitoring Location	W1	W2	
Time (hhmm)	14:00	13:36	
Tide Mode	mid-flood		
River Condition	Normal	Normal	
Water Depth (m)	<1	<1	
pH value	8.01	8.60	
Salinity (ppt)	2.8	27.3	
Temperature (°C)	19.4	18.3	
Turbidity (NTU)	2.9	2.0	2.0
DO (mg/L)	6.15	6.55	
DO Saturation (%)	66%	72%	
Suspended Solids (mg/L)	3.0	3.4	3.4

Remark or Observation : _____

Name

Signature

Date

Prepared By : Lai Chi Hang



17/1/2012

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

Date of Sampling : 19/1/2012

Weather : Cloudy

Monitoring Location	W1	W2	
Time (hhmm)	10:00	9:35	
Tide Mode	Mid-ebb		
River Condition	Normal	Turbid	
Water Depth (m)	<1	<1	
pH value	7.49	7.53	
Salinity (ppt)	0.9	11.4	
Temperature (°C)	20.4	20.2	
Turbidity (NTU)	1.5	20.0	20.0
DO (mg/L)	7.68	7.45	
DO Saturation (%)	85%	76%	
Suspended Solids (mg/L)	1.00	15.0	15.0

Remark or Observation : _____

Name

Signature

Date

Prepared By : Lai Chi Hang



19/1/2012

Appendix F: Hydrological Characteristics Monitoring Data

There was no Hydrological Characteristics monitoring between 22/1 and 28/1 due to the site closure.

Location	Position	Tide	Date**	Time	Weather	Water Depth (m)*	Water Flow (m/s)	Water Flow (m ³ /s)
H1	Mid	Flood	7-Jan-2012	15:30	Cloudy	0.37	0.30	0.375
H1	Mid	Flood	14-Jan-2012	10:50	Rainy	0.37	0.06	0.075
H1	Mid	Flood	21-Jan-2012	15:55	Cloudy	1.03	0.06	0.075
H1	Mid	Flood	28-Jan-2012					0.000
H2	Mid	Flood	7-Jan-2012	16:30	Cloudy	0.06	0.06	0.377
H2	Mid	Flood	14-Jan-2012	11:15	Rainy	0.24	0.06	0.377
H2	Mid	Flood	21-Jan-2012	16:45	Cloudy	0.12	0.06	0.377
H2	Mid	Flood	28-Jan-2012					0.000
H1	Mid	Ebb	7-Jan-2012	12:30	Cloudy	0.37	0.12	0.075
H1	Mid	Ebb	14-Jan-2012	15:40	Rainy	0.24	0.06	0.075
H1	Mid	Ebb	21-Jan-2012	11:36	Cloudy	0.43	0.06	0.075
H1	Mid	Ebb	28-Jan-2012					0.000
H2	Mid	Ebb	7-Jan-2012	11:30	Cloudy	0.06	0.06	0.377
H2	Mid	Ebb	14-Jan-2012	16:30	Rainy	0.18	0.06	0.377
H2	Mid	Ebb	21-Jan-2012	12:00	Cloudy	0.18	0.12	0.754
H2	Mid	Ebb	28-Jan-2012					0.000

* : Since the water levels were too low for the depth detector to determine, a tape measure was used for estimation.

Appendix G: Landscape and Visual Monitoring Photos



Photo 1 – Area A was closed on 26th January, 2012 due to Chinese New Year holidays.



Photo 2 – The newly commenced works at the end of Wai Ha River.



Photo 3 – The chain link fences were established to surround Area C.



Photo 4 – No polluted water was observed in the pond of the ECA and the adjacent Wai Ha River.



Photo 5 – Overall view of the transplanted tree U58 *Grevillea robusta*, new leaves were observed on the tree branches.



Photo 6 – Temporary stored construction materials were observed within the TPZs in Area A.



Photo 7 – Temporary stored construction materials were observed within the TPZs.



Photo 8 – Declining health condition of U34.



Photo 9 – Declining health condition of U35.



Photo 10 – Declining health condition of U37.



Photo 11 – Broken planter of A36 in Area B.

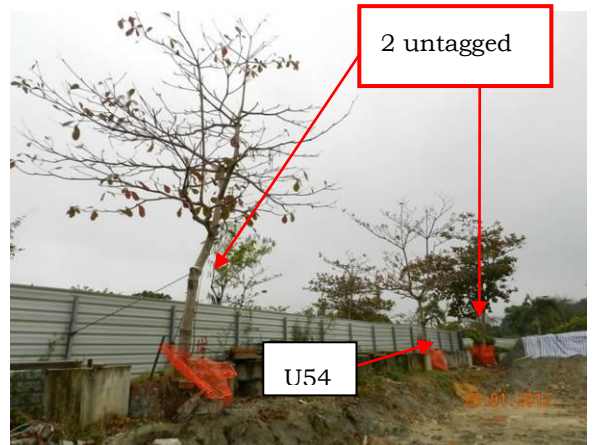


Photo 12 – Broken planters of U54 and two untagged trees next to U54 in Area B.



Photo 13 – The trunk of U57 was covered by a sheet of shading net, which should be removed as soon as possible.



Photo 14 – No sprouts was observed on the remaining tree part of T97.



Photo 15 – Poor condition of the transplanted tree T152 in Area C.



Photo 16 – Poor condition of the transplanted tree T153 in Area C.



Photo 17 – Poor condition of the transplanted tree T250 in Area C.



Photo 18 – Poor health condition of the transplanted, untagged tree in Area C.



Photo 19 – The protected shrubs *Pavetta hongkongensis* (PH01 and PH02) showed fair health condition in Area C.



Photo 20 – The protected shrub *Pavetta hongkongensis* (PH03) showed fair health condition in Area C.

Appendix H:

A)

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

B)

Implementation status of environmental protection and mitigation measures

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

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

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

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

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

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concern to Address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		positioning of construction plant should be at the maximum possible distance from ASRs. ■ Stockpiled excavated materials should be covered with tarpaulin, and should be removed off-site within 24 hours to avoid any odour nuisance arising.					
C <i>Water Quality Impact</i>							
S5.29	4.5	Construction Site Run-off and Drainage: ■ Before commencing any site formation work, all sewer and drainage connections shall be sealed to prevent debris, soil, sand etc. from entering public	To minimize water quality impacts	Contractor	Works sites	Construction phase	ProPECC PN 1/94 Construction Site Drainage

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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	Outstanding
	Cover excavated or stockpile of dusty material by impervious sheeting or sprayed with water					Implemented
	Use tarpaulin to cover dusty materials on vehicles					Implemented
4.5	Provide silt trap and oil interceptor to remove the oil, lubricants, grease, silt, grit and debris from the wastewater before pumped to the public storm water drainage system	To minimize water quality impact	Construction Site	Construction phase	EIAO-TM WPCO	Implemented
4.5	During rainstorms, exposed slope/soil surfaces shall be covered by a tarpaulin or other means. Others measures that need to be implemented before, during, and after rainstorms as summarized in ProPECC PN 1/94 shall be followed					Not applicable

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

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

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & main concern to Address	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?	Implementation status
5.5	A recording system for the amount of wastes generated, recycled and disposed should be proposed	To reduce waste management impacts	Works areas	Construction phase	ETWB TCW	Implemented
5.9	Adopt a trip ticket system for the disposal of C&D materials				No. 19/2005	Implemented
5.11	All general refuse should be segregated and stored in enclosed bins or compaction units				ETWB TCW NO. 31/2004	Implemented
5.10	Contractor should be a required to register with the EPD as a Chemical Waste Producer and to follow the guidelines states in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.	To minimize the environmental impacts associated with the handling, transportation and disposal of chemical waste.	Work site	Construction phase	EIAO-TM Waste Disposal (Chemical Waste)(General) Regulation	Implemented
	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	<p>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.</p> <p>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.</p>	To minimize the impacts on the stream and natural river bank.	Whole site	Construction phase	EIAO-TM	Implemented
6.6	<p>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.</p> <p>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.</p> <p>Planting pits should be provided in the gabion bank to allow the re-establishment of riparian vegetation.</p>	To minimize the impacts on the stream and natural river bank.	Whole site	Construction phase	EIAO-TM	No applicable

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

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

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

Appendix I: Construction programme

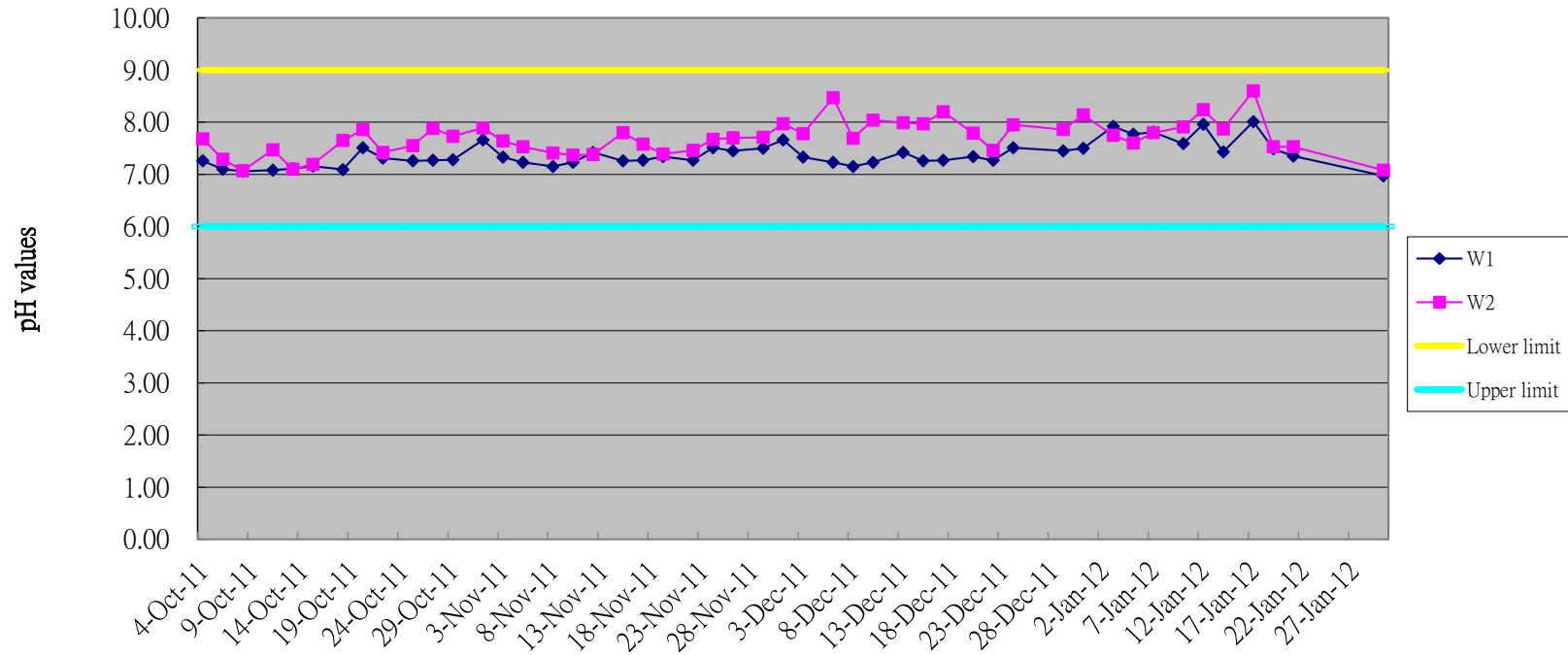
Appendix J: Three month rolling programme

Master Programme (Rev. 6)

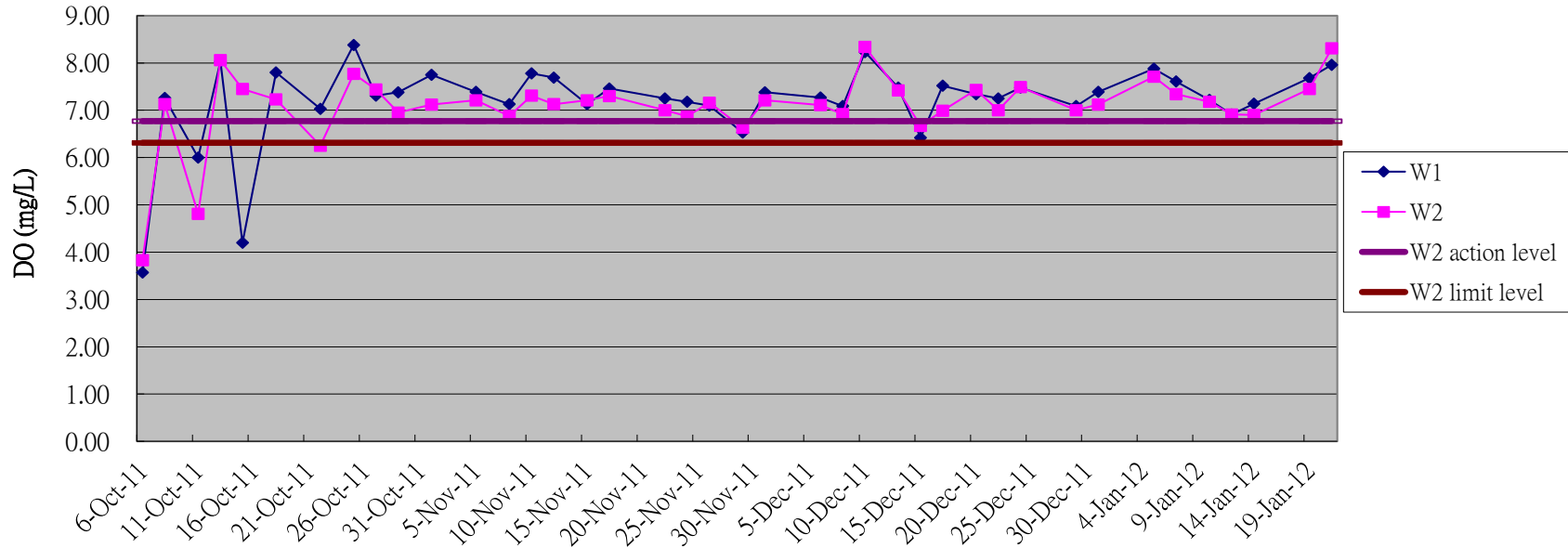
ID	ID no. in Rev. 5	ID no. in Rev. 4	ID no. in Rev. 3	ID no. in Rev. 2	Task Name	Duration	Start	Finish	Predecessors	Successors	2010				2011				2012				2013			
											1st Quarter Jan Feb Mar	2nd Quarter Apr May Jun	3rd Quarter Jul Aug Sep	4th Quarter Oct Nov Dec	1st Quarter Jan Feb Mar	2nd Quarter Apr May Jun	3rd Quarter Jul Aug Sep	4th Quarter Oct Nov Dec	1st Quarter Jan Feb Mar	2nd Quarter Apr May Jun	3rd Quarter Jul Aug	4th Quarter Oct Nov Dec	1st Quarter Jan Feb Mar	2nd Quarter Apr May Jun	3rd Quarter Jul Aug	
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																		
33	33	33	33	33	Pumping Station	915 days	Fri 26/2/10	Tue 28/8/12																		
45	45	45	44	43	Main Structure of Pumping Station	815 days	Sun 6/6/10	Tue 28/8/12																		
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																
53	53	53	52	51	E & M	815 days	Sun 6/6/10	Tue 28/8/12																		
57	57	57	56	55	Plumbing & E&M works	150 days	Sun 22/1/12	Tue 19/6/12	56,47	58FS-30 days																
60	60	60	59	58	External Structure	220 days	Sun 22/1/12	Tue 28/8/12																		
61	61	61	61	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	Construction of 2nos. of 1500mm dia. Drainage Pipes	50 days	Thu 22/3/12	Thu 10/5/12	63	65																
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																
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																
79	79	79	78	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																
82	82	82	80	79	Twin Cell Box Culvert	915 days	Fri 26/2/10	Tue 28/8/12																		
93	93	93	91	89	Box Culvert at Chainage 0 - 25	150 days	Wed 1/2/12	Fri 29/6/12	98	102																
98	98	98	96	94	Box Culvert at Chainage 225 - 275	95 days	Sat 29/10/11	Tue 31/1/12	97	93																
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																
104	104	104	102	99	Dia. 2100mm Drainage Pipe	915 days	Fri 26/2/10	Tue 28/8/12																		
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	121	E & M Works	120 days	Fri 2/3/12	Fri 29/6/12	122,120	124																

Appendix K. Graphical plots of trends of monitored parameter

Graphical plots of pH values W1&W2

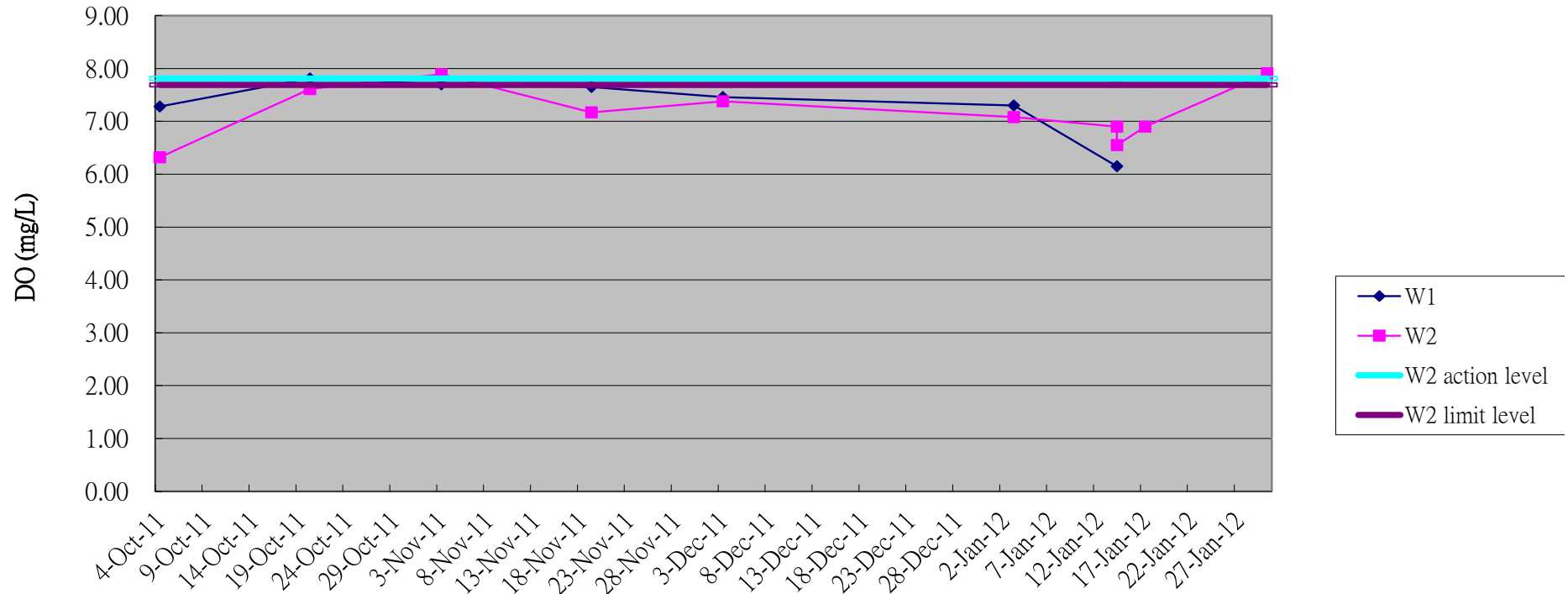


Graphical plots of DO (ebb tide) for W1&W2



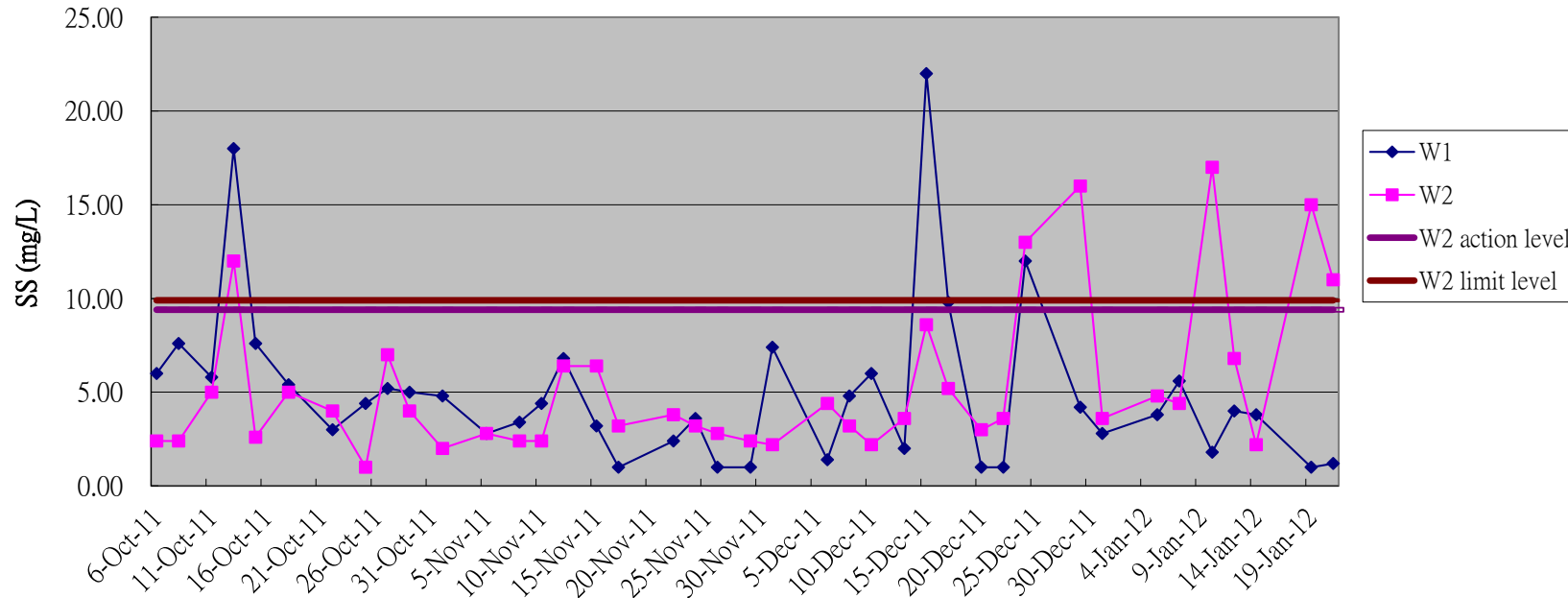
Remarks: Action level: 5 percentile of baceline data
 Limit level: 1 percentile of baceline data

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



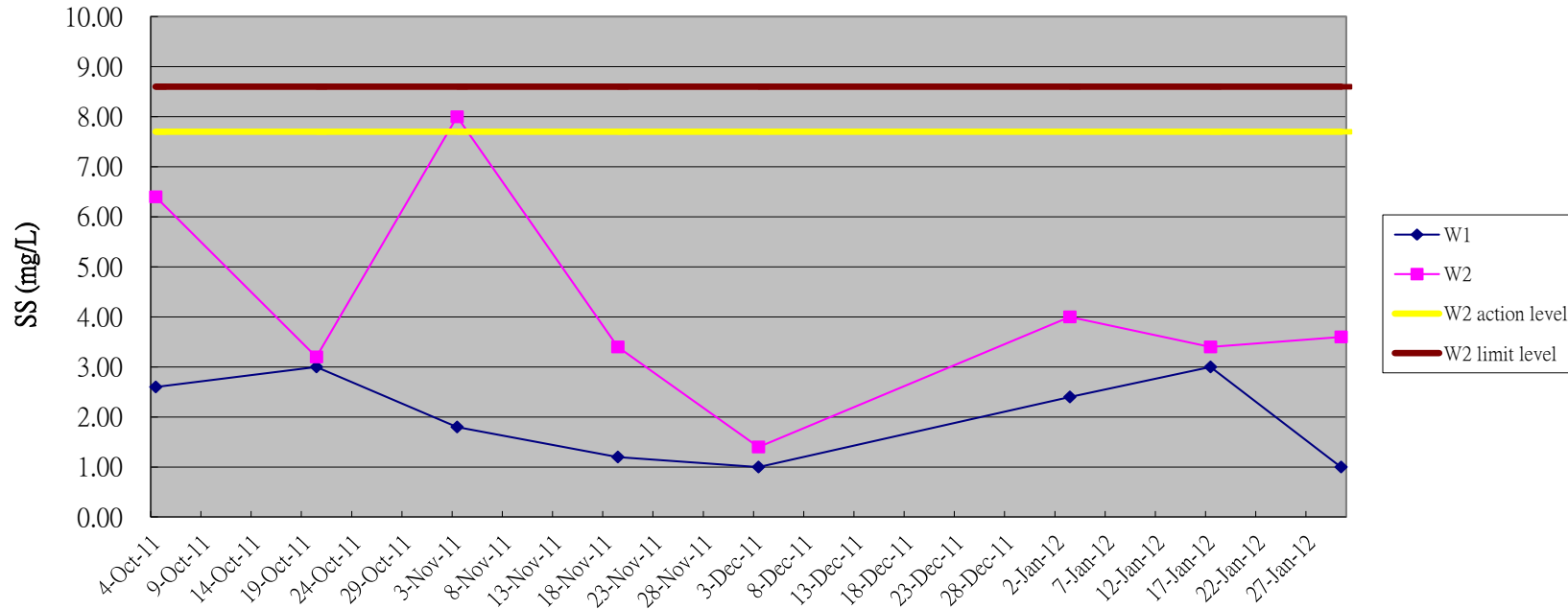
Remarks: Action level: 5 percentile of baseline data
Limit level: 1 percentile of baseline data

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



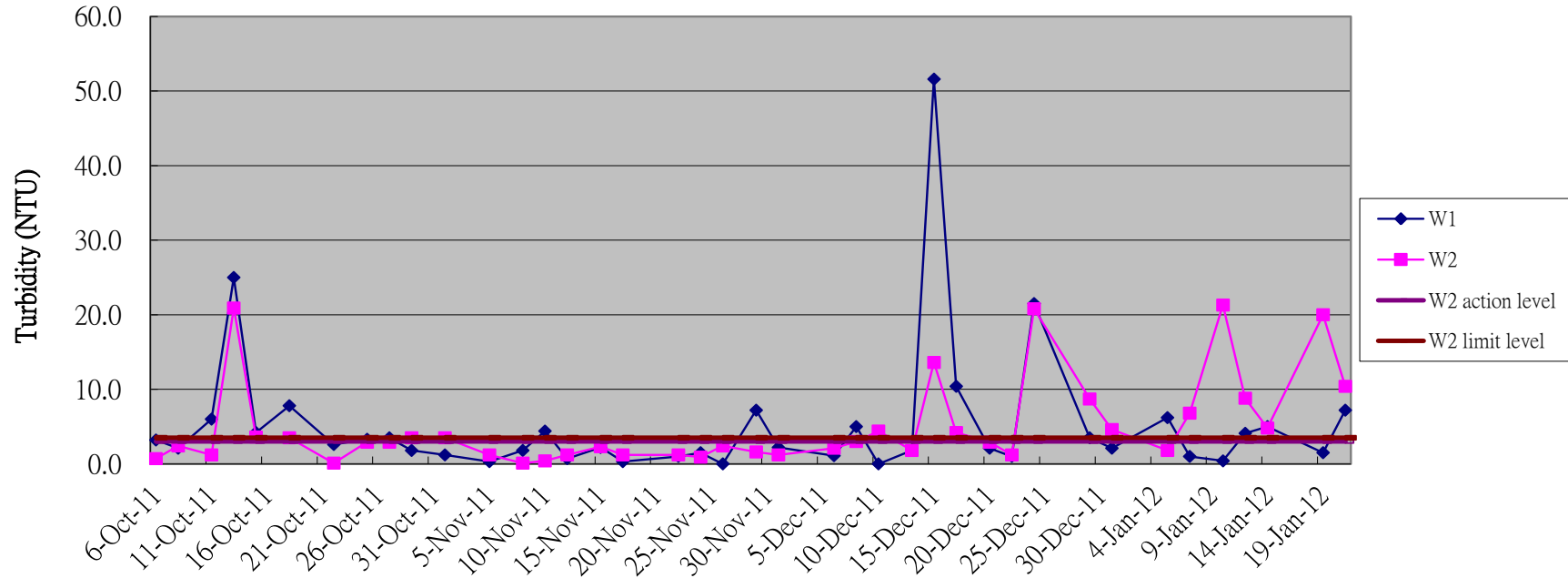
Remarks: Action limit is 95% of baseline data or 120% of upstream control station's SS
 Limit level is 99% of baseline data or 130% of upstream control station's SS

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



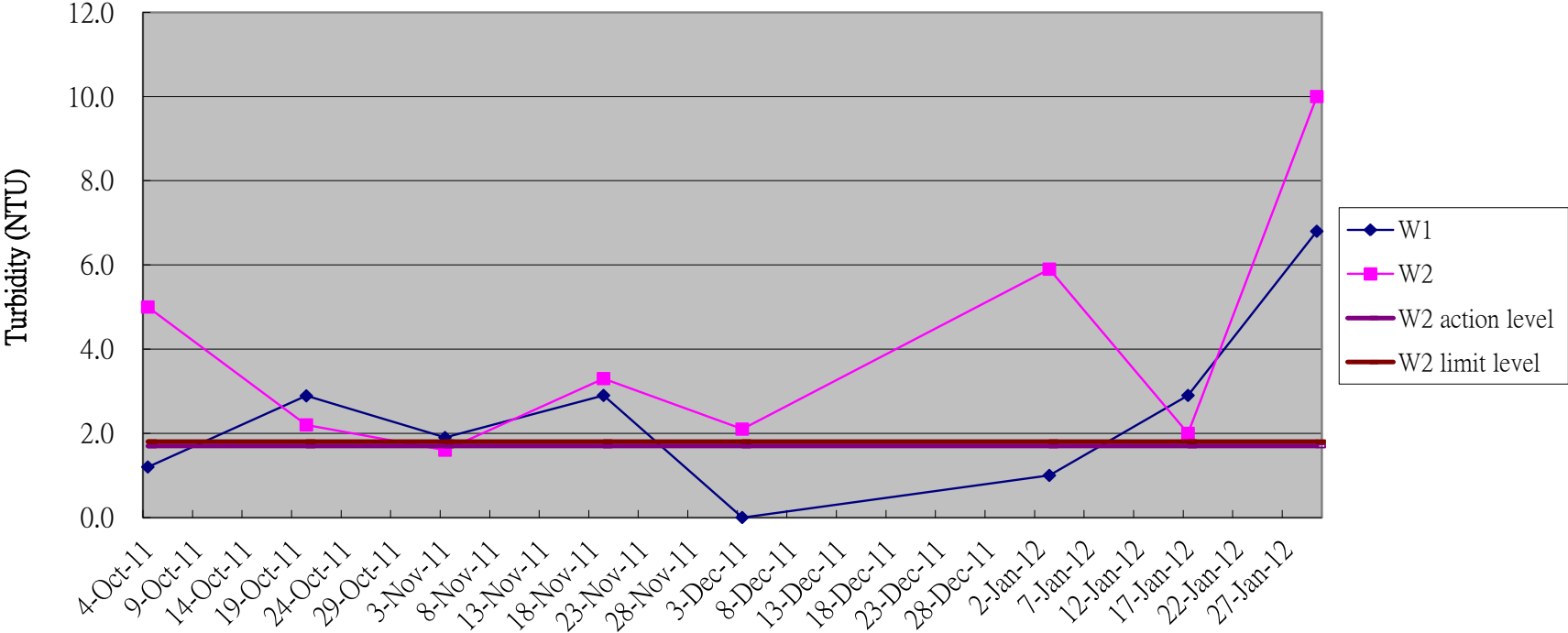
Remarks: Action limit is 95% of baseline data or 120% of upstream control station's SS
Limit level is 99% of baseline data or 130% of upstream control station's SS

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



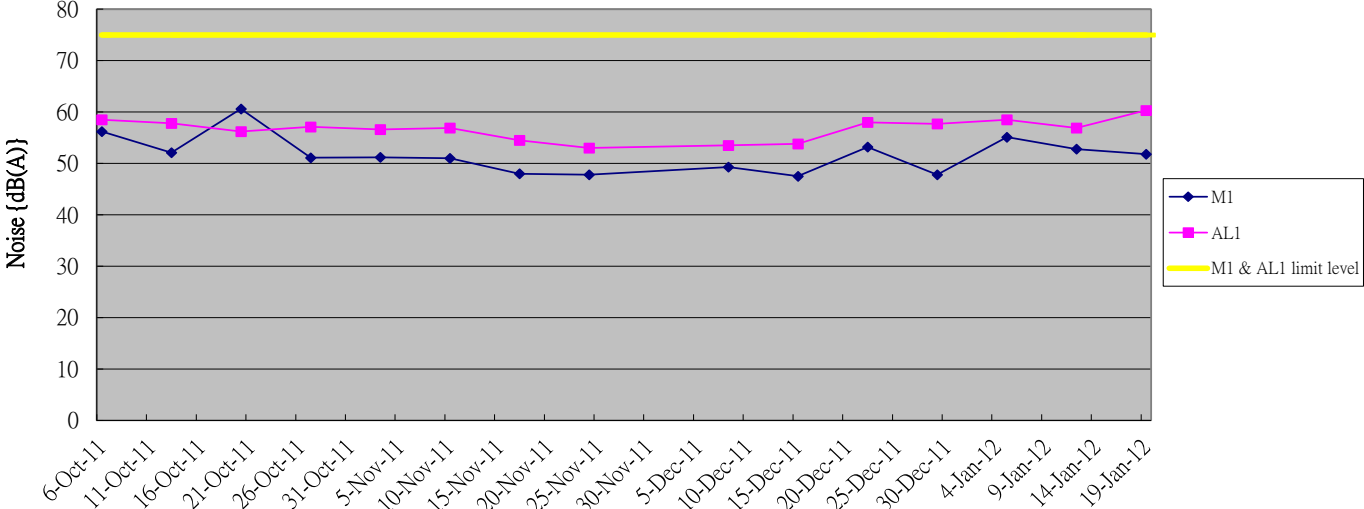
Remarks: Action limit is 95% of baseline data or 120% of upstream control station's Turbidity
Limit level is 99% of baseline data or 130% of upstream control station's Turbidity

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



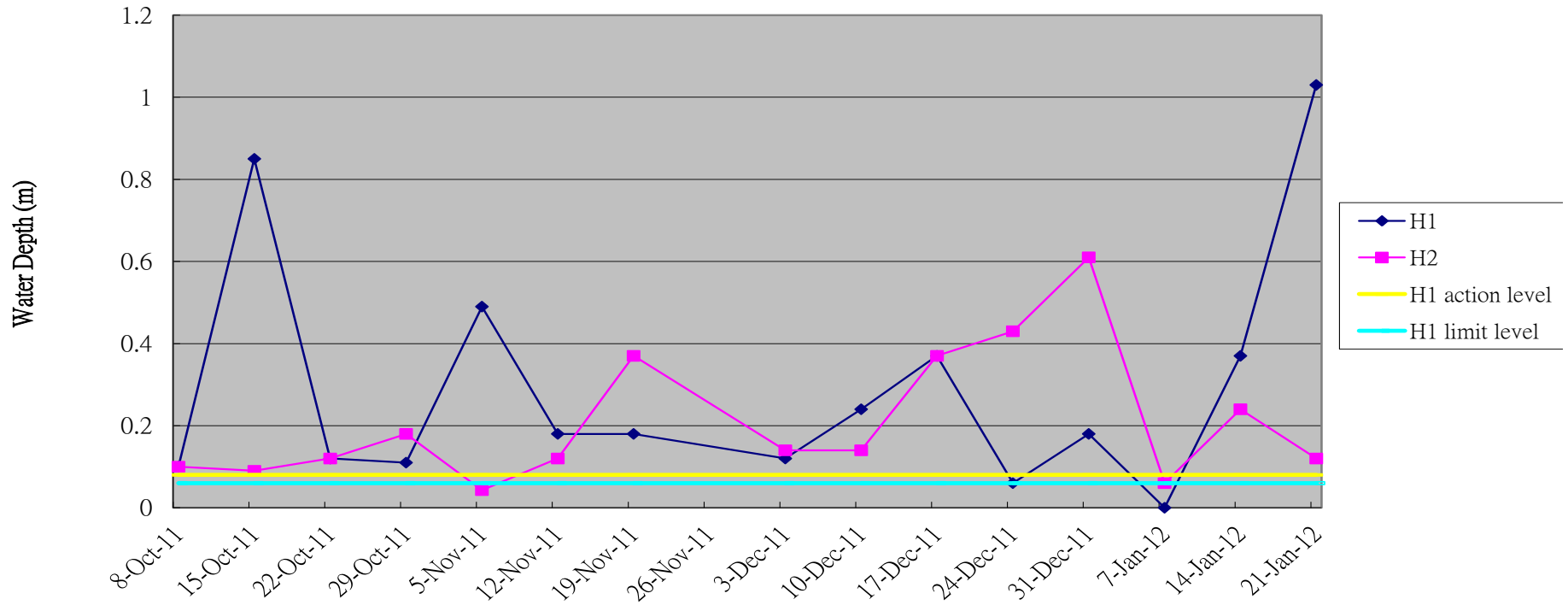
Remarks: Action limit is 95% of baseline data or 120% of upstream control station's Turbidity
 Limit level is 99% of baseline data or 130% of upstream control station's Turbidity

Graphical plots of Noise for M1 & AL1



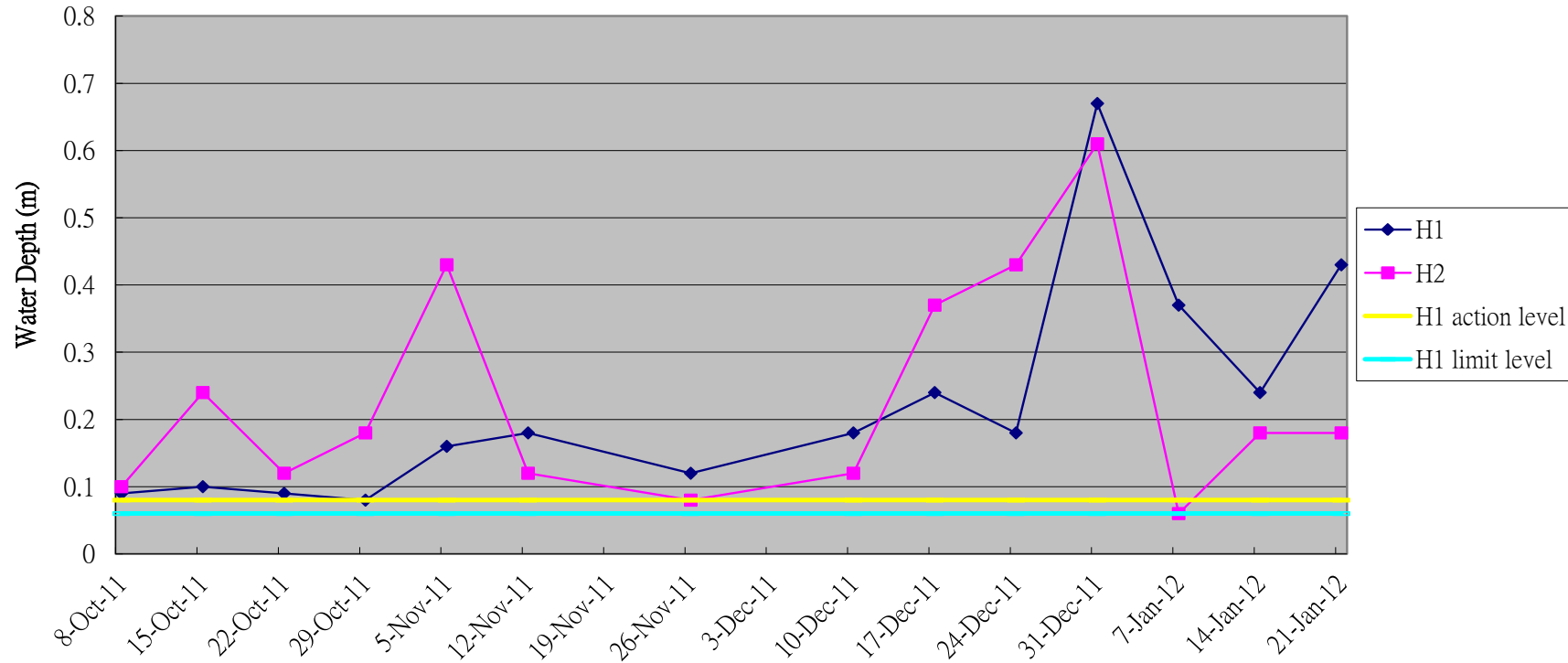
Remarks: Action limit is when one documented complaint is received

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



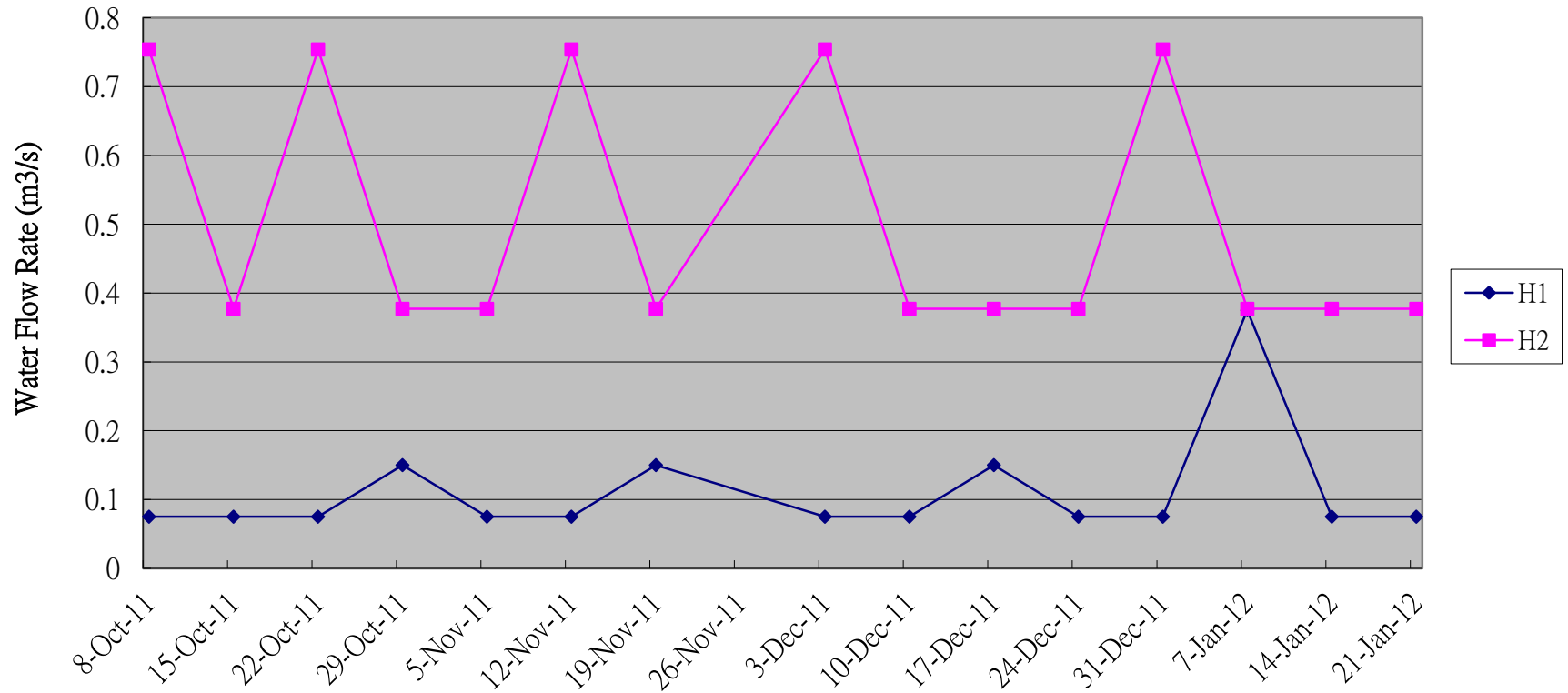
Remarks: Action level: 80% of baseline water depth.
Limit level: 60% of baseline water depth.

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



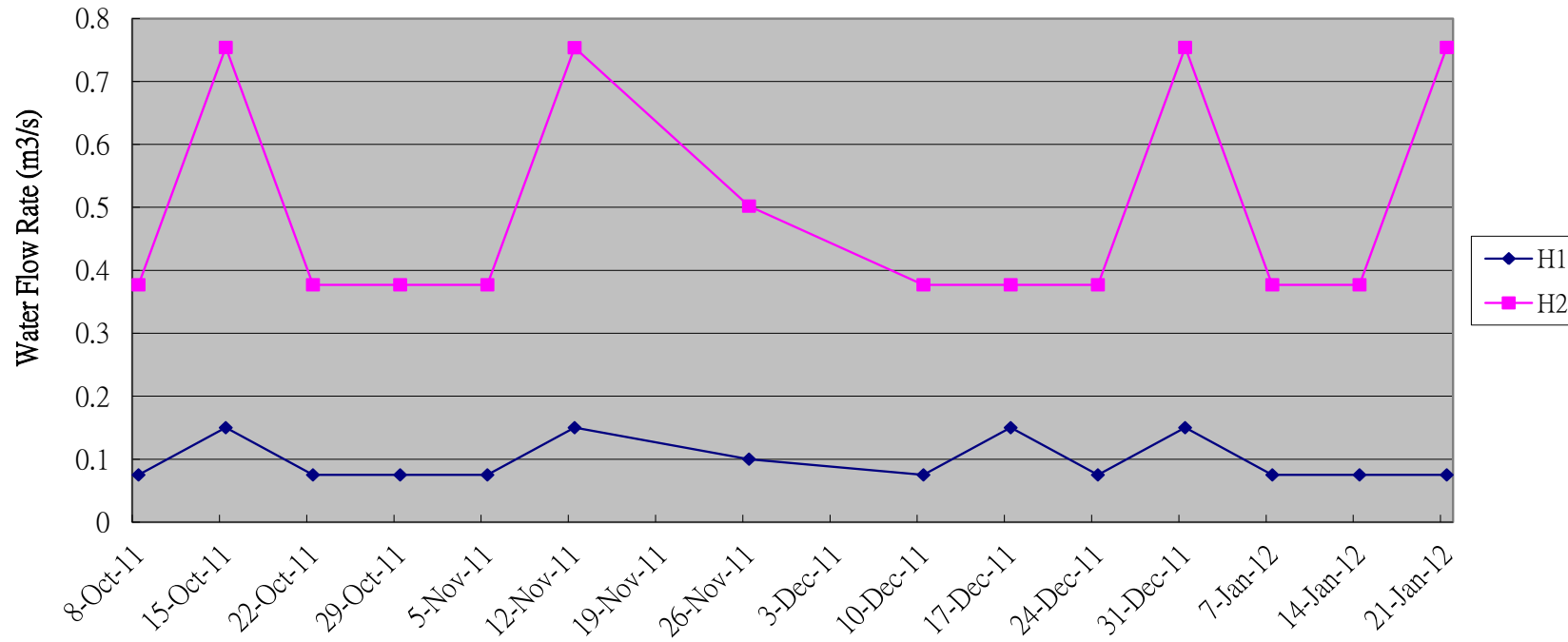
Remarks: Action level: 80% of baseline water depth.
Limit level: 60% of baseline water depth.

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



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

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



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

Appendix L.

A). List of recorded vegetation and relative abundance in the Ecological Compensatory Area (ECA) during construction phase in January 2012.

B). List of transplanted trees in the Ecological Compensatory Area (ECA) during construction phase in January 2012.

Appendix L(A). List of recorded vegetations and relative abundance in the ECA during establishment phase in January 2012.

Species	*Status in Hong Kong	Growth form	¹Status in ECA	²Relative abundance	Condition
<i>Bidens bipinnata</i>	E	Herbs	S	+	Fair
<i>Panicum maximum</i>	E	Herbs	S	+	Fair
<i>Celtis sinensis</i>	N	Trees	S	+	Fair
<i>Terminalia catappa</i>	E	Trees	R	+	Fair
<i>Cocculus orbiculatus</i>	N	Climbers	R	+	Fair
<i>Mangifera indica</i>	E	Trees	R	+	Fair
<i>Dimocarpus longan</i>	E	Trees	R	+	Fair
<i>Michelia x alba</i>	E	Trees	R	+	Fair
<i>Oxalis corniculata</i>	N	Herbs	S	+	Fair
<i>Stephania longa</i>	N	Climbers	S	+	Fair
<i>Leucaena leucocephala</i>	E	Shrubs	S	+	Fair
<i>Amaranthus viridis</i>	N	Herbs	S	+	Fair
<i>Solanum nigrum</i>	N	Herbs	S	+	Fair
<i>Paspalum dialatum</i>	E	Perennial Herb	S	+	Fair
<i>Mikania micrantha</i>	E	Climbing Herb	S	+	Fair
<i>Macaranga tanarius</i>	N	Tree	R	+	Fair
<i>Cassia surattensis</i>	E	Shrub or Small Tree	S	+	Fair
<i>Conyza sumatrensis</i>	E	Herb	S	+	Fair
<i>Sansevieria trifasciata Prain</i>	E	Perennial Herb	S	+	Fair
<i>Alocasia odora</i>	N	Perennial Herb	S	+	Fair
<i>Livistona chinensis</i>	E	Tree Palm	S	+	Fair
Total number of species	21				

Key:

*Status in Hong Kong

E = Exotic

N = Native

¹Status in ECA:

R = retained

S = newly succeed

²Relative abundance:

+ = Present

++ = Common

+++ = Abundant

Appendix L (B). List of trees transplanted from Work Areas of Contract 1 & 2 to ECA during establishment phase in January 2012.

Tree No.	Species Name	*Status in Hong Kong	Growth form	Date of transplantation	Condition	Remarks
T150	<i>Bombax ceiba</i>	E	Tree	22/6/2011	Fair	
T151	<i>Bombax ceiba</i>	E	Tree	22/6/2011	Fair	Sparse crown with some newly emerged small leaves
T152	<i>Bombax ceiba</i>	E	Tree	22/6/2011	Fair	Sparse crown with some newly emerged small leaves
T153	<i>Bombax ceiba</i>	E	Tree	22/6/2011	Fair	Sparse crown with some newly emerged small leaves
T154	<i>Bombax ceiba</i>	E	Tree	14/6/2011	Fair	
T155	<i>Bombax ceiba</i>	E	Tree	14/6/2011	Fair	
T156	<i>Bombax ceiba</i>	E	Tree	14/6/2011	Fair	
T157	<i>Bombax ceiba</i>	E	Tree	14/6/2011	Fair	
T158	<i>Bombax ceiba</i>	E	Tree	14/6/2011	Fair	
T159	<i>Bombax ceiba</i>	E	Tree	14/6/2011	Fair	
T160	<i>Bombax ceiba</i>	E	Tree	14/6/2011	Fair	
T161	<i>Bombax ceiba</i>	E	Tree	14/6/2011	Fair	
T162	<i>Bombax ceiba</i>	E	Tree	14/6/2011	Fair	
T250	<i>Celtis sinensis</i>	N	Tree	22/6/2011	Poor	Injured and dried bark
T165	<i>Melaleuca quinquenervia</i>	E	Tree	22/6/2011	Fair	
T168	<i>Melaleuca quinquenervia</i>	E	Tree	Nov 2011	Fair	

Appendix L(C). Condition of transplanted species *Pavetta hongkongensis* in ECA since 20th Dec 2011.

Specimen No.	Species Name	Growth Form	Height (m)	Date of transplantation	Condition	Remarks
PH01	<i>Pavetta hongkongensis</i>	Tree / Shrub	2	20 th Dec 2011	Fair	
PH02	<i>Pavetta hongkongensis</i>	Tree / Shrub	2	20 th Dec 2011	Fair	
PH03	<i>Pavetta hongkongensis</i>	Tree / Shrub	1	20 th Dec 2011	Fair	

Date of weekly monitoring: 4 Jan, 13 Jan, 17 Jan and 28 Jan.

Appendix M: Ecological monitoring report

Agreement No. DP/01/2010
Drainage Improvement Works in Shatin and Tai Po:
Ecological Monitoring in area under Contract 1
(Report 6a for Jan 2012)

Prepared for:
Drainage Services Department

Prepared by:
ENVIRON Hong Kong Limited

Date:
Feb 2011

Reference Number:
R2408_V1.0

Agreement No. DP/01/2010
Drainage Improvement Works in Shatin and Tai Po:
Ecological Monitoring in area under Contract 1
(Report 6a for Jan 2012)

Prepared by:



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Approved by:



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Report\201201\120208\6a*

Contents

	Page
1. Introduction	1
1.1 Project description	1
2. Highlights of this report	1
3. Summary of construction activities for the month	2
4. Monitoring Methodology	2
4.1 Vegetation survey	2
4.2 Avifauna	2
4.3 Herpetofauna	3
4.4 Butterflies and Odonata	3
4.5 Mammals.....	3
4.6 Aquatic fauna.....	3
5. Monitoring data.....	4
5.1 Vegetation survey	4
5.2 Birds watch	4
5.3 Herpetofauna	4
5.4 Butterflies	4
5.5 Odonata.....	4
5.6 Mammal	4
5.7 Aquatic fauna.....	4
6. Remedial measures adopted to the adverse condition	5
7. Record of complains and remedial measures.....	5
8. Review of the monitoring results.....	5
9. Forecast of works programme and monitoring requirements	5
10. Comments and summary	6
11. References	7

List of Tables

- Table 1: List of riparian vegetation and coverage (%) recorded from two stream sampling points under Contract 1 (i.e. SEMP 1, 2).
- Table 2: List of vegetation recorded from works area under Contracts 1 and 100 m buffer area in the impact monitoring survey conducted in January 2012. Vegetation species presents in the identified location was indicated by “V”.
- Table 3: List of avifauna species and maximum counts recorded from the impact monitoring survey in January 2012 at work area under Contracts 1 and 100 m buffer area.
- Table 4: Relative abundance of aquatic species recorded in Wai Ha River within the 100 m buffer of works boundary under Contracts 1 in the impact monitoring survey during January 2012.

List of Figures

- Figure 1: Map showing the ecological monitoring transect and the boundary of assessment area.
- Figure 2: SEMP 1, the first sampling point of Wai Ha River under Contract 1.
- Figure 3: SEMP 2, the second sampling point along Wai Ha River under Contract 1.

1. Introduction

1.1 Project description

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

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

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

The outline of this ecological monitoring report was as follow:

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

This is the report No. 6 ecological monitoring conducted on 19th January 2012 within the works boundary under Contract 1 and area within 100 m from the works boundary.

2. Highlights of this report

- Field survey was conducted on 19th January 2012
- Construction activities of Contract 1 was continued since March 2011
- Lower number of species was observed within the works area under Contract 1, in particular stream ecological monitoring point 2 (SEMP 2) due to recent river diversion for Ecological Compensatory Area (ECA) construction.
- Habitats in the 100 m buffer area retain its natural condition.

3. Summary of construction activities for the month

Major construction activities carried out in Contract 1 by the contractor during the present monitoring period (January 2012) includes:

- **Pumping station (Area A):**
 - Construction for Proposed Stormwater Pumping Station.
 - Erection of formwork up to +5.15mPD for the Proposed Stormwater Pumping Station.
 - Removal of sheetpile for the Proposed Stormwater Pumping Station.
 - Road reinstatement for Ting Kok Road.
 - Trial pit excavation.
 - Temporary flow diversion for the proposed concrete structure at the mouth of Wai Ha River.
 - Erection of formwork for the proposed concrete structure at the mouth of Wai Ha River.
 - Steel reinforcement bars fixing for the proposed concrete structure at the mouth of Wai Ha River.
 - Excavation for the proposed intake structure.
 - Installation of first layer of waling for the proposed intake structure.

- **Tung Tsz Nursery Community Garden (Area B)**
 - Excavation for bay 7.
 - Rebar fixing and erection of formwork for bay 7 at Tung Tsz Nursery.

- **ECA (Area C)**
 - In maintenance stage

4. Monitoring Methodology

Ecological monitoring methods were generally followed those described in the baseline ecological surveys (DC/2009/22). However, sampling area maybe reduced because of habitat change, for instance, deforestation and channel modification due to drainage works, where sampling was not applicable. Survey data and evaluation are detailed in the following sections.

4.1 Vegetation survey

Vegetation survey was performed along the designated transects (Figure 1) for ecological monitoring as described in the project specifications to monitor the vegetation health which could be adversely influenced by any bad site practice. Qualitative data of plants within the works boundary and wetland vegetation in the 100 m buffer area of Contract 1 adjacent to construction site and wetland was recorded. Riparian vegetation including aquatic and emergent at 4 stream ecological monitoring points (hereinafter referred to as "SEMP") under Contract 1 (i.e. SEPM 1 & 2; Figure 2 & 3) along the affected stream channel and

riparian habitat was recorded in terms of species, relative abundance and average heights. Any signs of damages and adverse health problems directly caused by the works were recorded and reported. Nomenclature and protection status of the species followed those documented in the AFCD website (www.hkbiodiversity.net) and Hong Kong Herbarium (2004).

4.2 Avifauna

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

4.3 Herpetofauna

Herpetofauna groups are considered to be inactive during dry season (November to March), thus detailed herpetofauna monitoring was not conducted in the current survey.

4.4 Butterflies and Odonata

Odonata and butterfly are considered to be inactive during dry season (November to March), thus detailed monitoring was not conducted in the current survey.

4.5 Mammals

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

4.6 Aquatic fauna

Monitoring of aquatic fauna was carried out mainly by bank-side observation, sometimes with the aid of binoculars, at two stream ecological monitoring points under Contract 1 (i.e. SEMP 1 & 2). These points are selected for covering representative sections of Wai Ha River and are shown in Figure 1. Netting and fish traps were also deployed at these points to collect supplementary data. Aquatic fauna seen/collected was identified in situ to the lowest possible taxon and relative abundance was presented.

5. Monitoring data

5.1 Vegetation survey

The habitats identified in area under Contract 1 are marine, recreational fish pond, river course, wooded area, mangrove, marsh and developed area (including village). Vegetation were found in wooded area, mangrove, marsh, develop area and river bank. During the current monitoring period, some riparian climbers (*Cocculus orbiculatus*) at SEMP 2 was removed due to direct conflict with the construction of ECA. The riparian vegetations were dominated by *Leucaena leucocephala* and *Plantago* major with average coverage ranged from 15% to 40% (Table 1). A list of plant species recorded from different habitats within the assessment area under Contract 1 is presented on Table 2. A total of 128 species were recorded within the assessment boundary of Contract 1 in which 121 species were recorded within the buffer area, while 47 and species recorded within the work areas under Contract 1. No protected species were recorded.

5.2 Birds watch

A total of 19 bird species were recorded in the current survey under Contract 1 (Table 3). In the work area under Contract 1, 6 bird species were recorded in which none are considered to be of conservation concern. A total of 17 bird species were recorded in the 100m buffer area in which one wetland dependent species *Ardeola bacchus* is recognized as being regional conservation concern, though it is common in suitable habitats in Hong Kong (Viney et al., 2005).

5.3 Herpetofauna

It is not recorded in the current survey.

5.4 Butterflies

It is not recorded in the current survey.

5.5 Odonata

It is not recorded in the current survey.

5.6 Mammal

No mammals or trace of mammals was observed within the assessment area.

5.7 Aquatic fauna

Under Contract 1 (i.e. SEMP 1 & 2), a total of 9 fish species, 2 crustaceans, 1 bivalve and 1 snail were recorded and most of them were residing in brackish environments (Table 4).

Some river works were carried out in SEMP 1 as showed in Figure 2. Overall, no protected or rare species were recorded.

6. Remedial measures adopted to the adverse condition

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

7. Record of complains and remedial measures

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

8. Review of the monitoring results

During the present survey period, construction activities were carried out at works area under Contract 1, while 100 m buffer area remains natural. Much of the construction activities are carried out at Tung Tsz Nursery and pumping station under Contract 1. In general, low numbers of species were recorded within the works area under Contract 1 than that of 100 m buffer area because of the associated constructions and urbanized in nature. It is noted that the diversity of aquatic fauna in SEMP 2 under Contract 1 is relatively lower because of the recent river works at SEMP 1 where has been regarded as the corridor for aquatic fauna to move between Wai Ha River and the marine area outside the assessment area. However, most of the construction activities are restricted in the developed area with low ecological significance. As mitigation measures recommended in the EM&A Manual were properly implemented during the current survey, and hence the residual environmental impacts would be minimized.

9. Forecast of works programme and monitoring requirements

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

Area A (Pumping Station)

- Erection formwork and falsework for the proposed Stormwater Pumping Station up to +5.15mPD ground floor slab.
- Steel reinforcement bars fixing for the proposed Stormwater Pumping Station up to +5.15mPD ground floor slab.
- Concreting the proposed Stormwater Pumping Station up to +5.15mPD.
- Construction for flow meter chamber.
- Installation sheetpile for DN1200 drain & transformer room.
- Construction ground beam for the proposed transformer room.
- Construction discharge chamber for the proposed Stormwater Pumping Station.
- Installation of multi-part cover and backfilling for desilting chamber.
- Construction of DN2100 along Ting Kok Road (CH120 to 160)
- Construction of intake structure and Penstock.

Area B (Tung Tsz Nursery)

- Excavation for the construction of box culvert in Tung Tsz Nursery
- Construction of box culvert bay 7 and 6
- Backfilling for bay 7 and 6

Area C (ECA)

- In Maintenance Period

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

10. Comments and summary

The bi-monthly ecological impact monitoring under Contracts 1 (excluding the ECA) was conducted in January 2012 and relevant flora and fauna data were collected according to project specification and EM & A Manual. As indicated by the low diversity and abundance of species recorded within the work areas, habitats within the work boundary under Contracts 1 offer few ecological opportunities for inhabitation of fauna and flora. Given that the construction activities are restricted in the developed area with proper mitigation measures being implemented, disturbances associated with the current construction activities are largely affecting area with low ecological significance. On the other hand, the natural habitats in the 100 m buffer area are retained at acceptable condition, and hence the 100 m buffer area has not been significantly affected by the construction works.

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Figure

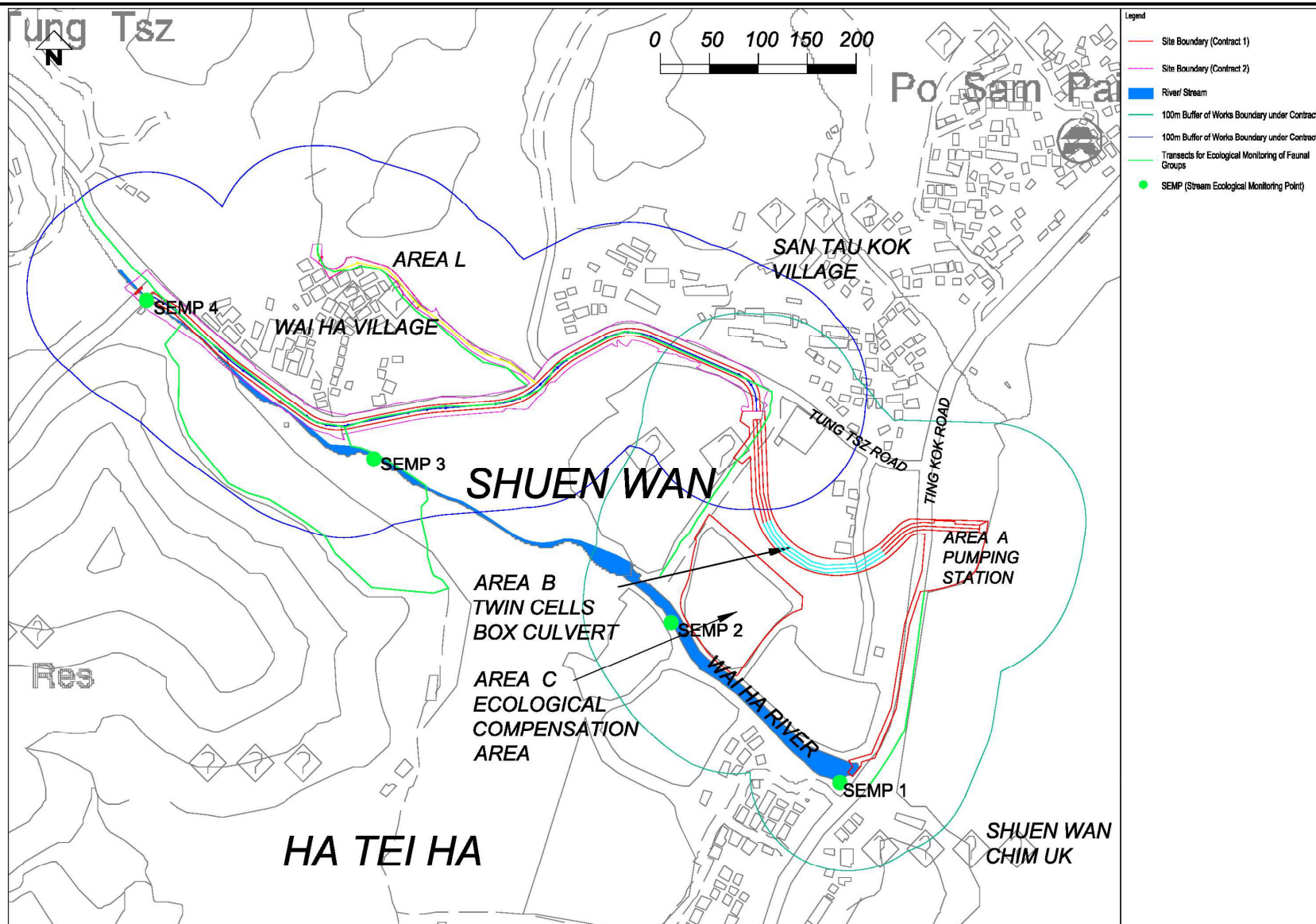


Figure: 1

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

Project: Agreement No. DP/01/2010 Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 1 (Jan 2012, Report6a)

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Figure: 2

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

Project: Agreement No. DP/01/2010 Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 1 (Jan 2012, Report6a)

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Date: Feb 2012



Figure: 3

Title: SEMP 2, the second sampling point along Wai Ha River under Contract 1.

Project: Agreement No. DP/01/2010 Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 1 (Jan 2012, Report6a)

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Table

Table 1. List of riparian vegetation and coverage (%) recorded from two stream sampling points under Contract 1 (i.e. SEMP 1, 2).

Species	Family	Growth form	Sampling point	SEMP 1		SEMP 2	
			Status in Hong Kong	Height (cm)	%	Height (cm)	%
<i>Albizia lebbbeck</i>	MIMOSACEAE	Tree	E			400	10
<i>Amaranthus viridis</i>	AMARANTHACEAE	Herb	N	30	1		
<i>Arundinella nepalensis</i>	POACEAE	Perennial Herb	N			150	2
<i>Bidens alba</i>	ASTERACEAE	Herb	E	30	10		
<i>Celtis sinensis</i>	ULMACEAE	Tree	N			500	10
<i>Digitaria ciliaris</i>	POACEAE	Herb	N	20	1		
<i>Eclipta prostrata</i>	ASTERACEAE	Perennial herb	N	30	1		
<i>Ficus virens</i>	MORACEAE	Tree	N	100	1		
<i>Kandelia obovata</i>	RHIZOPHORACEAE	Shrub or Small Tree	N			150	4
<i>Leucaena leucocephala</i>	MIMOSACEAE	Small Tree	E			600	40
<i>Macaranga tanarius</i>	EUPHORBIACEAE	Tree	N			100	1
<i>Mikania micrantha</i>	ASTERACEAE	Climbing Herb	E	10	1		
<i>Pennisetum alopecuroides</i>	POACEAE	Perennial Herb	N	250	10		
<i>Plantago major</i>	PLANTAGINACEAE	Perennial herb	N	30	15		
Bare	n/a	n/a	n/a	n/a	60	n/a	33

*Key:

E = Exotic

N = Native

n/a = not available

Table 2. List of vegetation recorded from works area under Contracts 1 and 100 m buffer area in the impact monitoring survey conducted in January 2012. Vegetation species presents in the identified location was indicated by “V”.

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

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

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

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

Habitat	Species name	Family	Growth form	*Status in Hong Kong	Work Area under Contract 1	100 m buffer area under Contract 1
	<i>Piper hancei</i>	PIPERACEAE	Climber: Vine	N		V
	<i>Dimocarpus longan</i>	SAPINDACEAE	Tree	E		V
	<i>Paederia scandens</i>	RUBIACEAE	Climber: Vine	N		V
	<i>Cleistocalyx operculatus</i>	MYRTACEAE	Tree	N		V
	<i>Antidesma bunius</i>	EUPHORBIACEAE	Tree	N		V
	<i>Litsea monopetala</i>	LAURACEAE	Small Tree	N		V
	<i>Microcos paniculata</i>	TILIACEAE	Shrub or Small Tree	N		V
	<i>Maesa perlarius</i>	MYRSINACEAE	Shrub	N		V
	<i>Boehmeria nivea (L.) Gaudich.</i>	URTICACEAE	Subshrub or shrub	E		V
	<i>Mallotus apelta</i>	EUPHORBIACEAE	Shrub or Small Tree	N		V
	<i>Sapindus saponaria</i>	SAPINDACEAE	Tree	N		V
	<i>Aporosa dioica</i>	EUPHORBIACEAE	Tree	N		V
	<i>Wedelia chinensis</i>	ASTERACEAE	Perennial Herb	N		V
	<i>Carica papaya</i>	CARICACEAE	Tree	E		V
	<i>Rubus reflexus</i>	ROSACEAE	Climbing Shrub	N		V
	<i>Brassica rapa</i>	BRASSICACEAE (CRUCIFERAE)	Biennial Herb	E		V
	<i>Mucuna championii Benth.</i>	FABACEAE	Climbing Vine	N		V
	<i>Pinus massoniana</i>	PINACEAE	Tree	N		V
Ting Kok Nursery Community Garden	<i>Bauhinia purpurea</i>	CAESALPINIACEAE	Tree	E	V	
	<i>Callistemon viminalis</i>	MYRTACEAE	Tree	E	V	
	<i>Dillenia indica</i>	DILLENIACEAE	Tree	E	V	

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

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

***Key:**

E = Exotic

N = Native

Table 3. List of avifauna species and maximum counts recorded from the impact monitoring survey in January 2012 at work area under Contracts 1 and 100 m buffer area.

Species	Common name	Habitat	Conservation status in Hong Kong	Work area: Contract 1	100m buffer area
<i>Acridotheres cristatellus</i>	Crested Myna			2	2
<i>Amaurornis phoenicurus</i>	White-breasted Water hen	W			1
<i>Ardea cinerea</i>	Grey Heron	W			1
<i>Ardeola bacchus</i>	Chinese Pond Heron	W	PRC (RC)		2
<i>Casmerodius alba</i>	Great Egret	W			2
<i>Copsychus saularis</i>	Oriental Magpie Robin			1	
<i>Egretta garzetta</i>	Little Egret	W			3
<i>Garrulax perspicillatus</i>	Masked Laughing thrush				3
<i>Motacilla alba</i>	White Wagtail				1
<i>Motacilla cinerea</i>	Grey Wagtail				2
<i>Orthotomus sutorius</i>	Common Tailorbird				1
<i>Passer montanus</i>	Eurasian Tree Sparrow			3	~ 10
<i>Phylloscopus borealis</i>	Arctic Warbler				1
<i>Prinia flaviventris</i>	Yellow-bellied Prinia				1
<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul				3
<i>Pycnonotus sinensis</i>	Chinese Bulbul				1
<i>Streptopelia chinensis</i>	Spotted Dove			2	3
<i>Sturnus nigricollis</i>	Black-collared Starling			2	
<i>Zosterops japonicus</i>	Japanese White-eye			4	4
Total number of species:			19	6	17

*** Key:**

GC= Global Concern W = Wetland dependent species
 LC = Local Concern RC = Regional Concern
 NT = Near Threatened PRC = Potential Regional Concern

Table 4. Relative abundance of aquatic species recorded in Wai Ha River within the 100 m buffer of works boundary under Contracts 1 in the impact monitoring survey during January 2012.

Species	Common name	¹ Life-cycle characteristics	² Origin	SEMP 1	SEMP 2
<i>Ambassis gymnocephalus</i>	Glassperch	M	N	+	
<i>Cyprinus carpio</i>	Common Carp	F	I		+
<i>Gerres macracanthus</i>	Longspine Silverbidy	M	N	+	
<i>Mugil cephalus</i>	Flatehead Grey Mullet	M	N	+	
<i>Opsariichthys evolans</i>	Minnow	F	N	+	
<i>Oreochromis mossambicus</i>	Mozambique Tilapa	F	I	++	+
<i>Oreochromis niloticus</i>	Nile Tilapa	F	I	++	+
<i>Poecilia reticulata</i>	Guppy	F	I		+
<i>Tilapia zillii</i>	Redbelly Tilapa	F	I	+	
<i>Sesarma (Perisesarma) bidens</i>	Sesarmine crab	M	N		+
<i>Uca arcuata</i>	Fiddler Crab	M	N		+
<i>Saccostrea cucullata</i>	Rock Oyster	M	N	++	+
<i>Cerithidea cingulata</i>	Mud snail	M	N	+	
Total number of species:	13			9	7

Key:

Relative abundance:

+ : Species exists in the survey area

++ : Species common in the survey area

+++ : Species abundant in the survey area

¹ Life-cycle characteristics:

M = Marine vagrant

F = Freshwater species

²Origin:

N = Native

I = Introduced; / = not available

Appendix N. Photo of Wai Ha River at January 2012



Photo 1. Wai Ha River at W2



Photo 2. Wai Ha River at W2



Photo3. Wai Ha River at W1



Photo4. Wai Ha River at W1



Photo5. One river outlet was closed off for installation of mechanical penstock



Photo6. River was redirect and narrowed causing high speed of water current.



Photo7. The barrier was installed to avoid site water release to the river