

Drainage Service Department

Monthly Environmental Monitoring & Auditing report for

Contract No.DC/2009/22

Drainage Improvement in Shuen Wan, Tai Po – Contract 1

April 2012

Environmental Pioneers & Solutions Limited

Flat A, 19/F, Chaiwan Industrial Building,
20 Lee Chung Street, Chai Wan, Hong Kong


Tel: 2556 9172

Fax: 2856 2010

APPROVAL SHEET

The Contents of this report have been

Certified by:

Signature: 

Date: 11-5-2012

Miss. Goldie Fung
(Environmental Team Leader)

Ecologist (Asia Ecological Consultants Ltd.)

Signature: 

Date: 11 May 2012

Dr. Michael Leven
(Ecologist)

RLA (Environmental Resources Management)

Signature: 

Date: 9/5/2012

Miss. Christina Ip
(RLA)

and Verified by:

IEC (ENVIRON Hong Kong Limited)

Signature: 

Date: 11 May 2012

Mr. Tony Cheng
(IEC)

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	7
3.5 Action and Limit level for Construction noise.....	7
3.6 Monitoring Schedule for the next reporting period	8
4 Water Monitoring.....	10
4.1 Water Quality Monitoring Parameters and methodology	10
4.2 Monitoring Equipment	10
4.3 Monitoring Locations.....	11
4.4 Monitoring Frequency	13
4.5 Monitoring Results and Interpretation	13
4.6 Action and limit level for Water Quality	18
4.7 Monitoring Schedule for the next reporting period	23
5 Hydrological Characteristics Monitoring	24
5.1 Hydrological Characteristics Monitoring Parameters and methodology	24
5.2 Monitoring Equipment	24
5.3 Monitoring Locations.....	24
5.4 Monitoring Frequency	26
5.5 Monitoring Results and Interpretation	26
5.6 Action and limit level for Hydrological Characteristics.....	26
5.7 Monitoring Schedule for the next reporting period	31
6 Ecological Monitoring of ECA.....	32
6.1 Introduction	32
6.2 Ecological Monitoring of ECA.....	32
6.3 Monitoring Results.....	38
6.4 Management Activities.....	42
6.5 Implication of the Survey Findings	42

6.6	Recommendations	43
7	Landscape and Visual	44
7.1	Introduction	44
7.2	Scope of Monitoring	44
7.3	Landscape and Visual Monitoring Results.....	46
7.4	Audit Schedule	55
8	Action taken in Event of Exceedance	56
9	Construction waste disposal	57
10	Status of Permits and Licenses obtained	59
11	Compliant Log	60
12	Site Environmental Audits	61
12.1	Site Inspection	61
12.2	Compliance with legal and Contractual requirement	63
12.3	Implementation status and effectiveness of the mitigation measures 63	
13	Future Key issues and recommendations	63
14	Conclusions	64

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 April 2012

Appendix M: Photo of fish pond at Area C and Wai Ha River at April 2012

EXECUTIVE SUMMARY

This is the fourteenth 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 April 2012 to 30th April 2012. The major site activities in this reporting period were mainly erection of falseworks and formwork for the proposed screen house, concreting for the proposed transformer room & switch base slab up to +1.5mPD, Construction of flowmeter chamber, steel reinforcement bars fixed for the proposed transformer room switch room up to 11.05mPD, Excavation for the proposed DN2100 storm relief drain (CH120 to CH160) at Ting Kok Road, laying of 11 nos. of DN2100 concrete pipes and excavation for the construction of box culvert (CH55 to Ch85).

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 10 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 and for the extremely high level of turbidity and SS recorded on 20/4, it were believed to be mainly attributed by adverse weather.

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 fourteenth 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 April 2012 to 30th April 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 – Erection of falseworks and formwork for the proposed screen house.

Area A – Concreting for the proposed Transformer Room & Switchroom base slab up to +5.15mPD.

Area A – Construction of flowmeter chamber.

Area A – Steel reinforcement bars fixed for the proposed transformer room and Switch room up to 11.05mPD.

Area A – Excavation for the proposed DN2100 Storm relief drain (CH120 to CH160) at Ting Kok Road.

Area A – Laying of 11 nos. of DN2100 concrete pipes.

Area B – Excavation for construction of box culvert (CH55 to CH85)

Area B – Installation of first and second layer of waling (CH55 to CH85)

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. Construction of CLP transformer room.
2. Construction of switch room, screen house and store room.
3. Construction of pile cap for the proposed Stormwater Pumping Station at +3.65mPD.
4. Construction of flowmeter chamber.
5. Construction of DN2100 Storm relief drains (CH80 to CH120) at Ting Kok Road.
6. Construction of receiving pit for cross road DN2800 twin pipe.

Area B (Tung Tsz Nursery)

1. Excavation for the construction of box culvert in Tung Tsz Nursery
2. Construction of box culvert bay 6 and 5
3. Erection of hoarding for stage 2.

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.

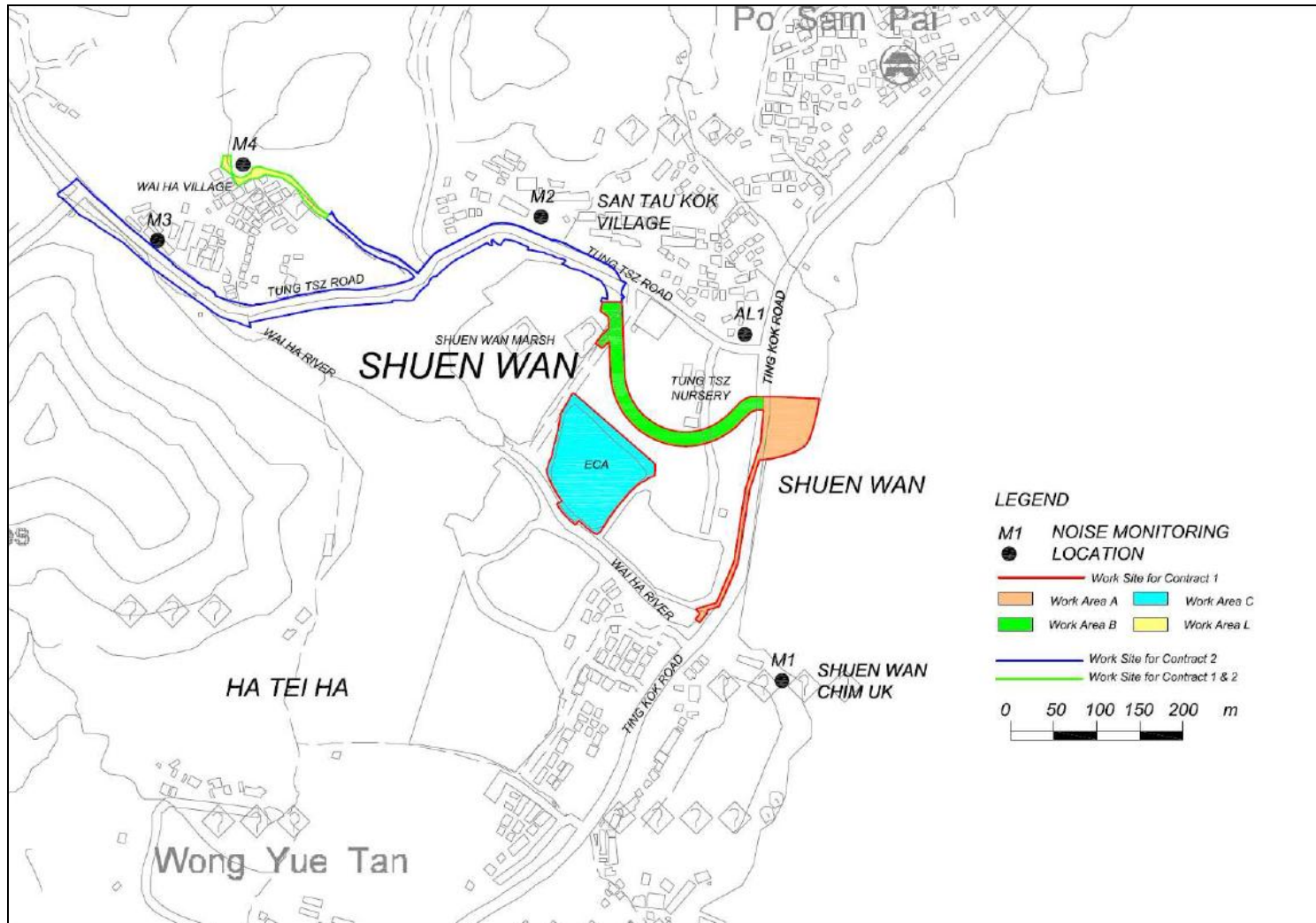


Figure 3.3.1 Impact noise monitoring locations

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 60.4dB (A) and 61.7dB (A), and AL1, ranged between 61.4dB (A) and 67.6dB (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	2-Apr-12	11:22	60.6	75	N	Sunny
M1	L _{eq} 30mins	12-Apr-12	13:00	61.7	75	N	Sunny
M1	L _{eq} 30mins	18-Apr-12	13:00	60.4	75	N	Cloudy
M1	L _{eq} 30mins	25-Apr-12	11:29	60.7	75	N	Cloudy
AL1	L _{eq} 30mins	2-Apr-12	10:48	63.8	75	N	Sunny
AL1	L _{eq} 30mins	12-Apr-12	11:14	65.7	75	N	Sunny
AL1	L _{eq} 30mins	18-Apr-12	13:34	67.6	75	N	Cloudy
AL1	L _{eq} 30mins	25-Apr-12	13:15	61.4	75	N	Cloudy

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

3.5 Action and Limit level for Construction noise

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

There was no exceedance recorded in the reporting period.

Table 3.5.1 Action and Limit Levels for Construction noise

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

3.6 Monitoring Schedule for the next reporting period

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

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.

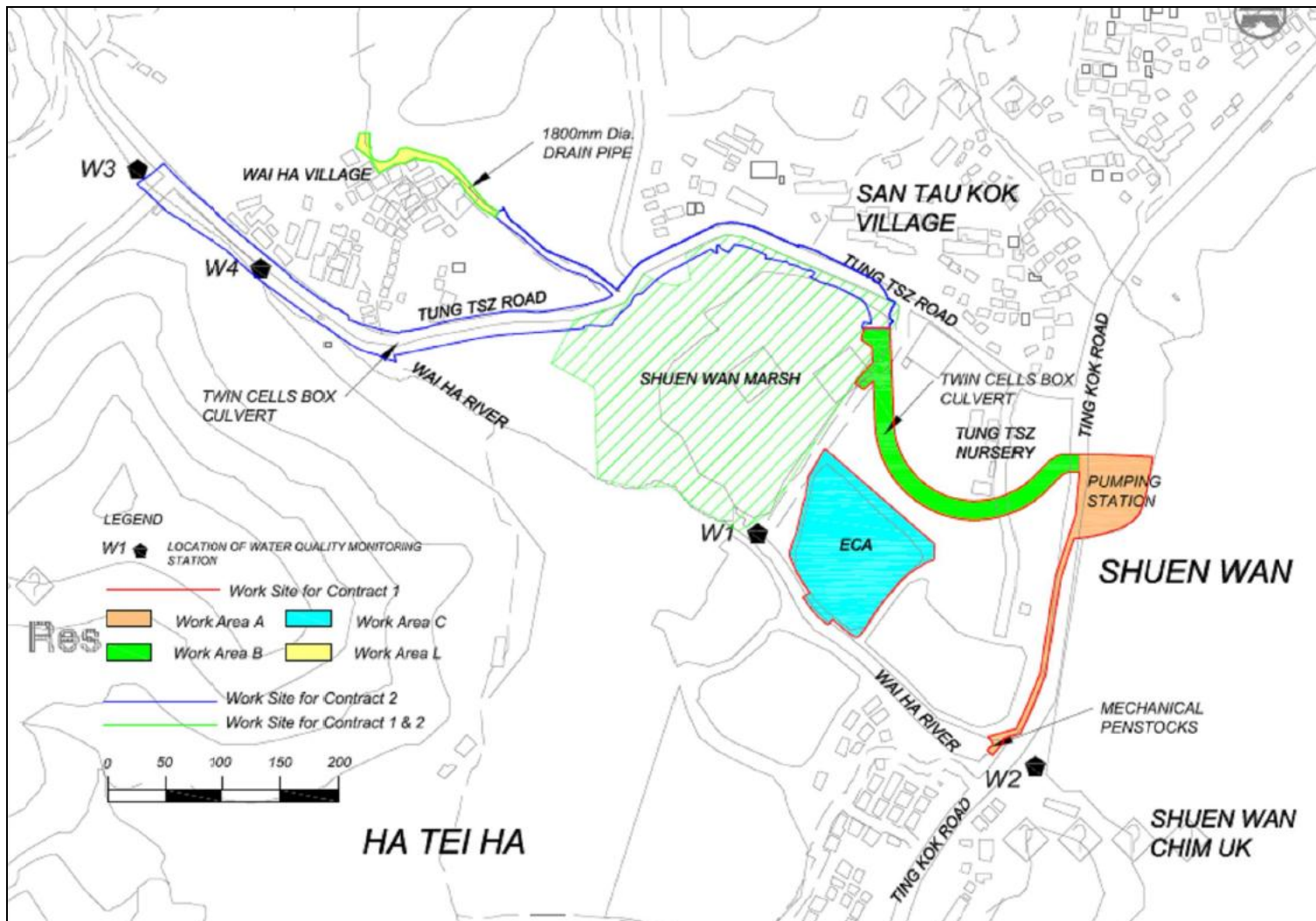


Figure 4.3.1 Water Quality Monitoring Locations

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 2nd, 5th, 10th, 12th, 14th, 16th, 18th, 20th, 23rd, 25th, 27th and 30th of April 2012.

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 10 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 and for the extremely high level of turbidity and SS recorded on 20/4, it were believed to be mainly attributed by adverse weather. 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.

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	23.90	28.3	7.46	6.77	77.0	16.68
W2	24.32	22.2	7.60	6.70	75.0	12.30

Table 4.5.2 Interpretations of abnormal incidents recorded in the reporting month

Date	Tide	Parameter	Interpretations
2/4/2012	Ebb	Turbidity	Incident was regarded as high river flow rate since river redirected and narrowed was observed.
5/4/2012	Ebb	DO	Incident was regarded as high river flow rate since river redirected and narrowed was observed.
12/4/2012	Ebb	Turbidity	Incident was regarded as high river flow rate since river redirected and narrowed was observed.
14/4/2012	Flood	DO	Natural fluctuation
16/4/2012	Ebb	Turbidity	Incident was regarded as high river flow rate since river redirected and narrowed was observed.
		DO	
18/4/2012	Ebb	Turbidity	Incident was regarded as high river flow rate since river redirected and narrowed was observed.
20/4/2012	Ebb	Turbidity	Muddy water from upstream because of adverse weather conditions
		SS	
23/4/2012	Ebb	Turbidity	Muddy water from upstream because of adverse weather condition
		SS	
25/4/2012	Ebb	Turbidity	Incident was regarded as high river flow rate since river redirected and narrowed was observed.
30/4/2012	Flood	Turbidity	Natural fluctuation
		DO	
		SS	

Table 4.5.3 Construction work conducted during abnormal incidents period

Date	Area	Construction works conducted
2/4/2012	A	Fixing rebars for +5.15 mPD floor slab of Transformer Room and Switchroom Shuttering for soffit of roof (between RB3 & RB6) of Screen house Fabricating the intermediate layer of I-beam walings & struts for Ø 2100 pipe trench at Ch.144~148 to formation level Cart away excavated materials to Area B Concreting for walls and top slab of Intake Structure
	B	Bay 5 – Fabricating top layer of I-beam walings and struts for box culvert trench at Ch.54~60
	C	In maintenance period
5/4/2012	A	Cutting and bending reinforcement bars for beams and roof slab of switchroom and Screen House Concreting for columns, beating walls and +5.15mPD floor slab of Transformer Room & switchroom. Shuttering for soffit of roof (between RB6 & RB9) for Screen house Fabricating the intermediate layer of I-beam walings & struts for Ø 2100 pipe trench at Ch.126~138 Cement frouting to consolidate the Ø 2100 pipe trench side at Ch.144 for stoppage of infilled sand Excavating for Ø 2100 pipe trench at Ch.120~126 to -0.5mPD Dismantling the tie bolts from wall formwork of Intake Structure
	B	Bay 5 – Fabricating top layer of I-beam walings and struts for box culvert trench at Ch. 60~65
	C	In maintenance period
12/4/2012	A	Cutting and bending reinforcement bars for beams and roof slab of switchroom, Transformer Room and Screen House Formwork shuttering for wall (around RB14) of Switchroom Laying G.I concealed conduits on wall formwork at Switchroom and Screen House Erecting Bamboo scaffolding around Pump Station Fabricating the intermediate layer of I-beam walings & struts for Ø 2100 pipe trench at Ch.120~126 Prepatation works for laying Ø 2100 concrete pipe at Ch. 148~160
	B	Bay 5&6 – Fabricating top layer of I-beam walings for shoring of box culvert trech at Ch.60~75

	C	In maintenance period
14/4/2012	A	Rebar fixing for walls (under roof beam RB7 & RB8) of Transformer Room & Switch room Formwork shuttering for wall (under roof beam RB12) of Switchroom Fixing tie bolts for wall formwork (under roof beam RB14 & RB15) of Switchroom Bay 20 – Installing sheet piles for plug end shoring adjacent to pump station Excavating for Ø 2100 pipe trench at Ch. 140~144 to formation level Rebar fixing and concreting for Ø 2100 concrete prebedding at Ch. 148~160 Cart away excavated materials to Area B
	B	Bay 5&6 – Fabricating top layer of I-beam walings for shoring of box culvert trench at Ch.60~75
	C	In maintenance period
16/4/2012	A	Rebar fixing for walls (under roof beam RB10 & RB11) of Transformer Room Fixing tie bolts for wall formwork (under roof beam RB14 & RB15) of Switchroom Excavating for Ø 2100 pipe trench at Ch. 136~144 to formation level Laying geotextile against sheetpile shoring of Ø 2100 pipe trench at Ch. 148~160 prior to laying bedding
	B	Bay 5&6 – Preparing I-beam for shoring of box culvert trench at Ch.60~65
	C	In maintenance period
18/4/2012	A	Erecting scaffolding as falsework for roof construction for switchroom Formwork shuttering for soffit of roof slab (between RB2 & RB5) and beams (RB5 & RB13) of Switchroom Excavating for Ø 2100 pipe trench at Ch. 132~136 to formation level
	B	Relocating of planters with site boundary to areas appointed LCSD Bay 5 – Fabrication of top layer of I-beam walings and sstruts for plug end shoring Bay 6 – Excavating for box culvert trench at Ch. 80~85 to -2.5 mPD
	C	In maintenance period
20/4/2012	A	Formwork shuttering for wall (under roof beam RB9) at Screen House Laying concealed conduits on wall formwork (under roof beam RB8) at Switchroom (2 M/Lab)

		Excavating for Ø 2100 pipe trench at Ch. 128~132 to formation level Dismantling intermediate layer of I-beam walings and struts from shoring of Ø 2100 pipe trench at Ch. 154~160 Cart away excavated materials to Area B Concreting to pipe bedding at Ch.138~146
	B	Relocation of Planters within site boundary to areas appointed by LCSD Bay 6 – Excavating for box culvert trench at Ch. 70~75 to -2.5mPD
	C	In maintenance period
23/4/2012	A	Formwork shuttering for wall (under roof beam RB1) at Transformer Room Laying concealed conduits on wall formwork (under roof beam RB7, RB10 & RB11) at Transformer Room Driving sheet piles for plug end shoring of Ø 2100 pipe trench at Ch. 122 Excavating for Ø 2100 pipe trench at Ch. 128~132 to formation level Cart away excavated materials to Area B
	B	Placing PC blocks along site boundary at Ch. 130~210 as footings of post for hoarding Stripping off existing geotextile membrane at planting areas and relocating existing planters to areas appointed by LCSD Shuttering for concrete slab for re-routing of existing access
	C	In maintenance period
25/4/2012	A	Formwork shuttering for wall (under roof beam RB10 & RB11) and columns (CD1 & CE11) of transformer Room Shuttering for soffit of beams (RB1, RB11 and RB13) for Transformer Room Laying 4 nos. Ø 2100 concrete pipe (@3m long) at Ch. 136~148
	B	Concreting for temporary access at ch. 130~193 outside site boundary for re-routing of access Placing PC blocks along site boundary at Ch. 218~273 as footing of post for hoarding Fabricating steel framework for site hoarding at Ch. 130~218
	C	In maintenance period
30/4/2012	A	Fixing tie bolts and strutting to wall formwork (under roof beams RB7, RB20~RB13) at Transformer Room Shuttering for soffit of slab and beams (RB7, RB10 and RB12) for Transformer Room Saw Cutting Ø 2100 concrete pipe into cut-length and then laying

		between re-circulation manhole and pump station Laying 3 nos. Ø 2100 concrete pipe (@3m long) at Ch. 127~136
	B	Breaking up concrete footpath and 300 u-channel at Ch.240~280 Erecting site hoarding at Ch.130~Ch. 220
	C	In maintenance period

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>
--	---	---	--	---

4.7 Monitoring Schedule for the next reporting period

Water quality monitoring schedule is proposed to be carried out on 2nd, 4th, 7th, 9th, 11th, 14th, 16th, 18th, 21st, 23rd, 25th, 28th and 30th of May 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.

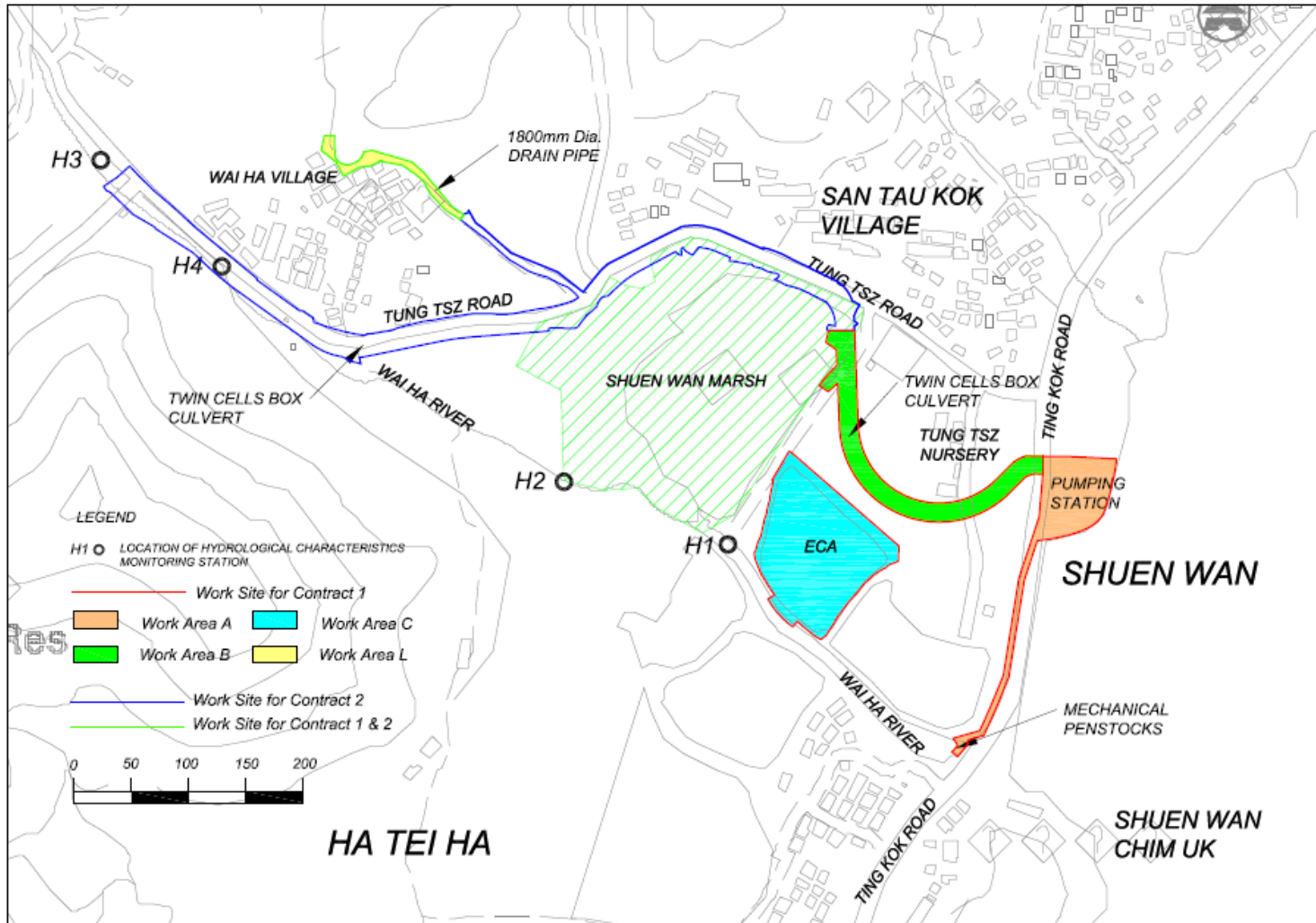


Figure 5.3.1 Hydrological Characteristics Monitoring Locations

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 5th, 14th, 20th and 27th of April 2012.

5.5 Monitoring Results and Interpretation

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

Table 5.5 Summary of Water Quality Monitoring Results

	Average of Monitoring Results	
	Water Depth (m)	Water Flow Rate (m ³ /s)
H1	~0.31*	0.133
H2	~0.264*	1.185

*: 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 measures are implemented. 	<ol style="list-style-type: none"> Discuss mitigation measures with ET, Engineer and Contractor; Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly; Assess effectiveness of implemented mitigation measures. 	<ol style="list-style-type: none"> Discuss proposed mitigation measures with IEC, ET and Contractor; Make agreement on mitigation measures to be implemented; Assess effectiveness of implemented mitigation measures. 	<ol style="list-style-type: none"> Inform Engineer and confirm in writing notification of the non-compliance; Rectify unacceptable practice; Check working methods and any excavation works or dewatering processes; Consider changes in working methods and plans; Discuss with ET, IEC and

	7. Repeat measurement on next day of exceedance.			<p>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 frequency to daily;</p> <p>8. Repeat measurement</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 mitigation measures to IEC</p>

	on next day of exceedance.			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 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. 	<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 measures.
Limit level	1. Repeat in-situ	1. Discuss	1. Discuss	1. Inform Engineer

<p>being exceeded by more than two consecutive sampling days</p>	<p>measurements to confirm findings;</p> <ol style="list-style-type: none"> 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. 	<p>mitigation measures with ET, Engineer and Contractor;</p> <ol style="list-style-type: none"> 2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly; 3. Assess effectiveness of implemented mitigation measures. 	<p>proposed mitigation measures with IEC, ET and Contractor;</p> <ol style="list-style-type: none"> 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 of Limit Level. 	<p>and confirm in writing notification of the non-compliance;</p> <ol style="list-style-type: none"> 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.
--	--	---	---	---

5.7 Monitoring Schedule for the next reporting period

Hydrological characteristics monitoring schedule is proposed to be carried out on 4th, 11th, 18th and 25th of May 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 April 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 health monitoring during the construction and establishment period required to be conducted on a monthly basis in the Ecological Compensatory Area (ECA). The growth and health of the recorded vegetation was inspected in April 2012 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 23 plant species were retained or newly re-colonized within ECA in which 6 of them were retained plant species including *Terminalia catappa*, *Cocculus orbiculatus*, *Mangifera indica*, *Dimocarpus longan*, *Michelia x alba* and *Macaranga tanarius*. Some green algae, such as *c.f. Ulothrix sp.* and *Enteromorpha sp.* were re-colonized in the water body or attached to the substratum in the ECA. Those algae could attract algae feeding organisms and it also provide mirco-habitat for some marine or brackish water species especially juveniles. Detailed information of the recorded vegetation is given in **Appendix L**.

The general growth/health of the retained or newly re-colonized vegetations was in fair condition.

The trees transplanted from works area under 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, except for

Celtis sinensis (**Appendix L(B)**). However, *Celtis sinensis* (T250) is in poor condition with injured bark & dehydrated crown. Replacement of this tree is suggested if the condition of the tree can no longer be improved.

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 for zone F, as showed in **Figure 6.3.2.1**.

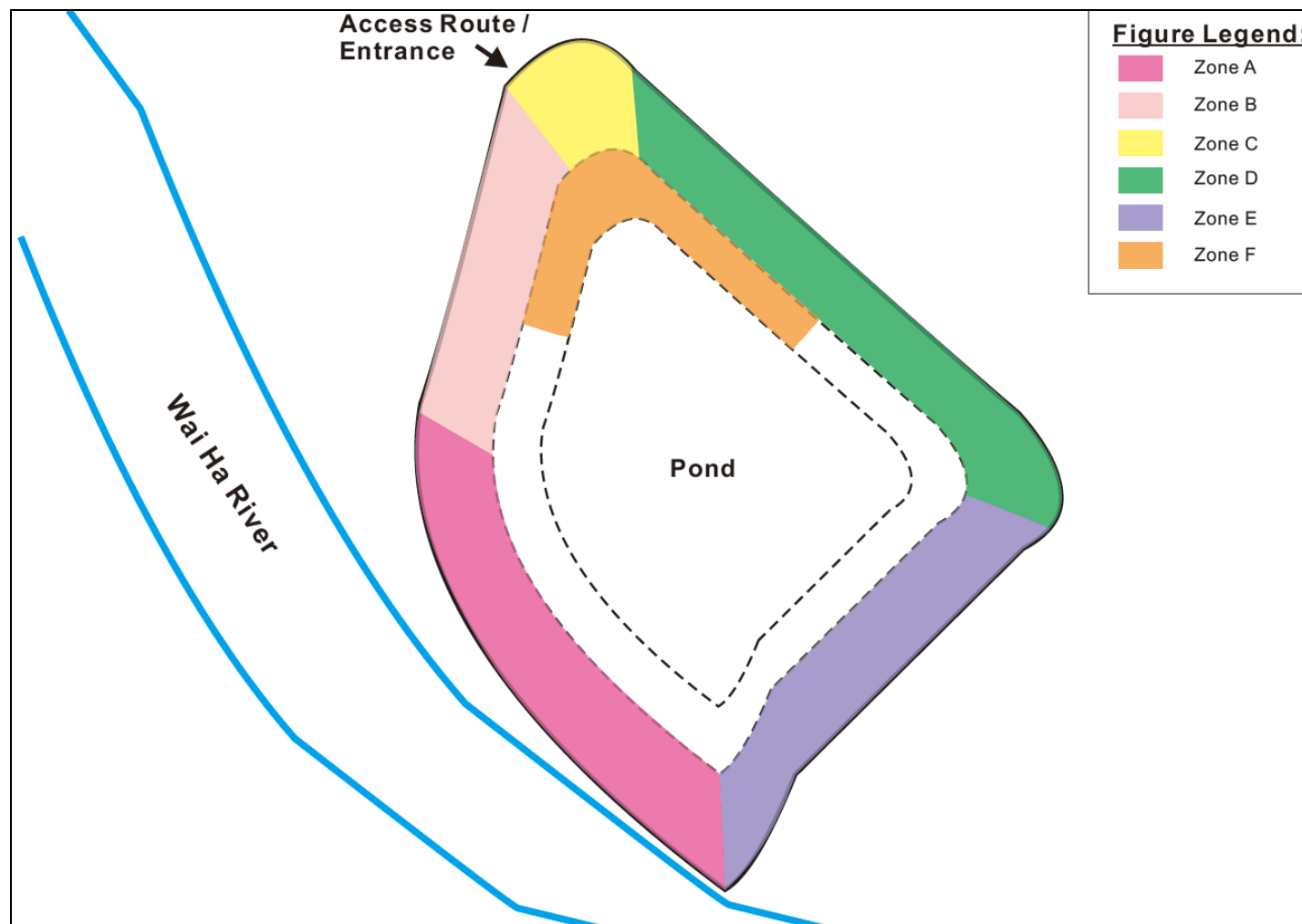


Figure 6.3.2.1 Landscape floor plan of ECA during establishment phase.

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, except for *Celtis sinensis* (tag no. 195, 222) were in poor condition in terms of sparse crown.

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

- *Hibiscus tiliaceus*: tag no. 55 - 60; 64 - 68, 70 - 77; 238 - 241; 253; 257 - 261 & 264.
- *Ficus superb var japonica*: tag no. 38, 39
- *Macaranga tanarius*: tag no. 321
- *Celtis sinensis*: tag no. 12, 13, 15, 18, 21, 34, 35, 121, 130 - 132, 135, 191

Those planted tree poor condition were caused during trans-location or plantation. It is expect most of them would be recovered and the health condition would be improved in coming growing season. There are some trees in poor condition in terms of dehydrated crown with no foliage. These are:

- *Viburnum odoratissimum*: tag no. 113, 362, 380.
- *Celtis sinensis*: tag no. 132
- *Hibiscus tiliaceus*: tag no.69
- *Macaranga tanarius*: tag no. 158
-

Replacement of these trees is suggested if the condition of the trees can no longer be improved.

Mangrove seedlings were planted in Zone F, but most of them were in poor to fair condition. It is expected they may grow better in wet season.

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 Apr. 2012.

Regular watering is recommended to improve the condition of the planted or transplanted plants during non-raining period. 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, 23 species of trees, shrubs, climbers and herbs were retained or naturally colonized in the ECA during initial establishment period. Starting in August 2011, a total of 16 tree 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. In addition, Ecological water quality monitoring at ECA was conducted on 30/4 with result: Turbidity: 13.3NTU; Temperature: 28.4°C; DO: 4.98mg/L; pH: 6.3.

6.3.6 Site Inspections

Twice monthly establishment phase monitoring has commenced in November 2011. Two site inspections were carried out on 5th and 23rd April 2012. An additional site visit with the Project’s Engineer, Main Contractor and landscape contractor was carried out on 19th April 2012. Table 1 summarizes the observations and recommendations for each site inspection.

Table 6-1. Observations and recommendations for each site inspection, April 2012.

Inspection Dates	Observation	Recommendations
5 April 2012	<p>Routine site inspection and a joint site visit with the representatives of the Main Contractor and the Project’s Engineer (AECOM). The 41 newly replaced compensatory trees, which were replaced by the landscape contractor on 29th March 2012, were inspected. These replaced trees were generally in fair to good condition (e.g. some of the planted compensatory trees <i>Viburnum odoratissimum</i> were flowering), except that the replaced trees of <i>Celtis sinensis</i> showed sparse foliage and this species needs longer time to adapt the new site environment.</p> <p>Minor selective pruning work of branches was performed by the landscape contractor before the date of inspection. As observed, the planted shrubs <i>Bridelia tomentosa</i> (Photo 1) and the growth performance of shrubs <i>Scaevola taccada</i> were good (Photo 2), while replacement planting is required for some of the planted shrubs <i>Melastoma sanguineum</i> with dry leaves.</p> <p>A few propagules of mangrove <i>Kandelia obovata</i> and small individuals of wetland herb <i>Suaeda australis</i> were naturally established along the edge of the created marshy and mangrove area. These wetland herbs did not cause impact to the wetland function and are a welcome indicator that the site is becoming established as an intertidal wetland.</p>	<p>The Contractor was reminded to replace the rest of the compensatory trees showing poor growth performance. In particular, the replaced trees should not be planted too deep into the soil.</p>
19 April 2012 (Additional)	<p>An additional site visit with the representatives of the Main Contractor, Project’s Engineer and landscape contractor.</p>	<p>The landscape contractor should maintain regular watering of all newly replaced</p>

Inspection Dates	Observation	Recommendations
site visit)	<p>As informed by the Main Contractor, a total of 60 compensatory trees were replaced by the landscape contractor on 29th March and 10th April 2012. Any remaining compensatory trees showing poor growth performance and/or tree form for a prolonged period would be replaced subsequently.</p> <p>As informed by the Main Contractor, the upper 2/3 of the wetland pond bank would be hydroseeded to reduce soil erosion and enrich the greening effect in the ECA.</p>	<p>compensatory trees, other compensatory trees and the transplanted shrubs (i.e. <i>Pavetta hongkongensis</i>) and trees in the whole ECA.</p>
23 April 2012	<p>This was the second site inspection in April 2012. The site condition and wetland function were basically satisfactory (Photos 3-4). The wetland plant establishment and growth were reviewed. Wetland herbs <i>Cyperus malaccensis</i> and <i>Bacopa monieri</i> have showed satisfactory regeneration and growth in the created marshy area. Other planted wetland herbs show poor recovery after the dry season and replacement planting of these herbs at suitable grade level is required in this wet season. The three transplanted shrubs of conservation interest, <i>Pavetta hongkongensis</i>, were in fair health condition. Newly regenerated leaves were found on these shrubs.</p> <p>The growth performance of the compensatory trees was inspected and they were generally in fair condition. Understory of the existing trees along the northern to northeastern boundaries of the ECA was overgrown by some unwanted herbs (e.g. <i>Bidens alba</i>) (Photo 5).</p>	<p>The Contractor should work with the landscape contractor on the arrangement of the replacement planting of the wetland herbs. The Contractor is advised to weed the unwanted herbs along the northern to northeastern boundaries of the ECA.</p>

Photo 1. Many planted shrubs *Bridelia tomentosa* have regenerated new leaves.



Photo 2. Many planted shrubs *Scaevola taccada* have showed satisfactory growth performance throughout the establishment period.



Photo 3. General view of the ECA.



Photo 4. General view of the ECA.



Photo 5. Understory of the existing trees along the northern to northeastern boundaries of the ECA was overgrown by some unwanted herbs.



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 from the site inspections in April 2012.

The ECA has been maintained in basically good condition. The planted trees and shrubs have showed good sign of regeneration since the onset of the wet season, though replacement planting of shrubs and trees with poor physiological and/or structural condition is needed. Since the wetland herbs were planted in late wet season, some of the wetland herbs (except *Cyperus malaccensis* and *Bacopa monnieri*) show unsatisfactory establishment after the dry season. The Contractor should work with the landscape contractor on the arrangement of the replacement planting of the wetland herbs in this wet season.

As abovementioned, the Contractor is advised to weed the unwanted herbs (e.g. herb *Bidens alba*, climber *Mikania micrantha* and seedlings of weedy tree *Leucaena leucocephala*) along the northern to northeastern boundaries 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 April 2012.

6.6 Recommendations

The Contractor should undertake regular monitoring, and maintain frequent and adequate watering of all planted, replaced and transplanted terrestrial trees (including the newly planted compensatory trees for the replacement) and shrubs (including the shrubs of conservation interest *Pavetta hongkongensis*) throughout the establishment period of the ECA. The Contractor is advised to provide an appropriate planting programme for replacing the remaining compensatory trees/shrubs/herbs showing poor health/dead symptoms. In addition, the replacement trees and shrubs with healthy and structurally balanced form are preferred.

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 14th February 2011.

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

7.2 Scope of Monitoring

7.2.1 Monitoring Objectives

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

7.2.2 Monitoring during Construction Phase

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

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

7.2.3 Monitoring during Operational Phase

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

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

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

7.3 Landscape and Visual Monitoring Results

7.3.1 Monitoring Date(s)

This monthly Landscape and Visual Monitoring (April 2012) was conducted to cover only Areas A, B and C of Contract 1 of the Project. The bi-weekly monitoring was conducted on 5th and 19th April 2012

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

The bi-weekly monitoring for Contract 2 was also undertaken on 9th and 22nd March 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 March 2012*.

Observation

Construction hoardings have been erected in Area A along the entire site boundary. As the work for building an automatic mechanical penstock at Wai Ha River estuary has commenced, temporary construction hoardings (**Photo 1**) have been erected around this

works area.

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 (**Photo 2**). As observed during the monitoring on 19th April 2012, caution tapes were aligned from southwest to eastern parts of the Nursery (**Photo 3**). New section of construction works is supposed to commence soon.

A line of chain link fence has been maintained around the boundary of Area C since the onset of its establishment period.

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 March 2012*.

Observation

Area A

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. No unauthorized discharge of contaminated water/ sewerage was observed during the monitoring.

Area B

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

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 directly. No water resulting from normal 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 filtered and drained to the manholes, as following the recommendation stated in *Monthly EM&A Report for March 2012*.

Observation

Area A

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. No direct discharge of polluted water into the adjacent Wai Ha River was observed from the works area for building the automatic mechanical penstock at Wai Ha River estuary.

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 filtered 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 filtered 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 April 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 the 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 March 2012*. Any observed

issues related to the liaison with the nursery are highlighted in this section.

Observation

As abovementioned in Section “Visual Screen”, the temporary hoarding has been erected from northwest to southwest parts of Tung Tsz Nursery in Area B since April 2011. The major construction work within Area B has been restricted within this fenced area. Caution tapes were aligned from southwest to eastern parts of the Nursery. Phase 2 construction works within the nursery may commence soon

Regular monitoring for the transplanted tree U58 *Grevillea robusta* was conducted bi-weekly. Tree defects of chlorotic leaves and poor physiological performance were still found. New leaves were observed on the tree branches and even watersprouts on the tree trunk. Health condition of this transplanted tree has remained fairly poor in April 2012 (**Photo 5**) but its structure has still remained in fair condition.

No additional tree transplantation work were reported by the Contractor and observed during the inspections in April 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 March 2012*, but observation of stockpiling of construction materials within or close to the TPZs were still recorded in Area A (see details in the following section). The shading net tied on the trunk of U57 has still remained since the tree transplantation in April 2011.

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 March 2012*, except the observations as highlighted in the following sections.

Observation

Area A

TPZs with temporary storage of construction materials were still observed 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 often adjusted by the site workers to facilitate their storage of materials. These construction materials were often placed within or close to the TPZs and there were potential damage to the trunks and roots of these trees to be transplanted.

The tree health of three relocated *Melaleuca cajuputi* subsp. *cumingiana* (E22, E33 and E34) on the eastern side of Area A next to the site hoarding was regularly monitored (**Photo 8-9**). Spare foliage with only chlorotic leaves was found on these three trees. Health condition of these trees has remained poor as a result of the transplantation shock and poor transplantation skill in planting them too deep in the soil. The tree tags on E33 and E34 were still missing. Temporary storage of construction materials were observed close to the trunk of E22, which would potentially further damage the trunk and root of the tree (**Photo 10**). An orange construction net forming a TPZ was observed at the lower trunk of E22 (**Photo 8**), while proper TPZs for the transplanted trees E33 and E34 were still missing (**Photo 9**).

As observed in the monitoring on 5th April 2012, the injured part of the tree to be felled E44 (*Macaranga tanarius* var. *tomentosa*) which was recorded in March 2012, was found

pruned and wrapped by burlap (**Photo 11**). The tree tag was still missing.

No other significant damages on the crowns, trunks and roots of the remaining trees were observed during the monitoring in April 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 April 2012. Small watersprouts and new leaves were observed on the trunk and branches of the transplanted tree U58 (*Grevillea robusta*) but its physiological condition has still remained fairly poor after the transplant.

The health conditions of U34 (**Photo 12**), U35 (**Photo 13**) and U37 (**Photo 14**) were found to be very poor, with no leaves in the canopies and dried, loose tree bark.

The planter for a palm to be transplanted (A36) has not yet repaired by the time of the inspections in April 2012. The palm has been supported by two guying ropes to prevent tree failure since the report of broken planter in July 2011 (**Photo 15**). As observed, new roots have been developed from this palm (A36). 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 16**). Those planters have been surrounded by orange construction nets to prevent further damage to the remained planters since December 2011. No further damage on their planters was observed in April 2012.

As observed since January 2012, no sprout has been developed from the stump of the tree to be transplanted T97 (*Lagerstroemia speciosa*) since the removal of its watersprouts by the government department in December 2011 (**Photo 17**)

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

Area C

The existing trees were maintained generally in fair health condition, except that a few planted *Hibiscus tiliaceus* and *Celtis sinensis* showing poor health conditions (e.g. no leaves and dry tree bark). 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 April 2012.

According to the contractor, 60 compensatory trees were replaced by the landscape contractor on 29th March and 10th April 2012. The replaced trees include those *Hibiscus tiliaceus*, *Celtis sinensis*, *Ficus subpisocarpa* and *Macaranga tanarius* var. *tomentosa* with poor tree form or growth performance. The planted shrubs with poor growth performance will be replaced by the landscape contractor later

No leaves were observed on the transplanted trees T152 (**Photo 18**), T153 (**Photo 19**), T250 (**Photo 20**) and one newly transplanted tree (*Bombax ceiba*) without a tree tag (possibly T149) (**Photo 21**). These four transplanted trees have showed poor growth performance since their transplantation in 2011. Fungal infection has been developed along the dry tree bark of the transplanted tree T250. 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 22-23**). Newly regenerated leaves were observed on PH01 and PH02. 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 has been the major tree management issue in Areas A, B and C. The Contractor should continue notifying the on-site workers not to stockpile soil/construction materials or place construction equipments within and close to the TPZs. Any temporarily stored construction materials/ equipments should be removed immediately. This is particularly

important for the relocated trees (E22, and suspected E33 and E34) as they perform poor in health due to the result of the transplantation shock.

All retained trees or trees to be transplanted should be watered regularly (e.g. at least every two days) by the landscape contractor. The Contractor should conduct regular inspection on the health condition and protection measures of each existing trees within the Area A. Soil surrounding the trunk bases of the relocated trees (E22, and suspected E33 and E34) has to be removed to level off the grade difference. In particular, regular watering should be applied on the three recently relocated trees (i.e. E22 and suspected E33 and E34) with regard to their poor health condition.

Area B

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

The shading net tied on the trunk of U57 in Area B should be removed as soon as possible. The Contractor should have regular site check on the conditions of the trees and tree tags within the Project Area.

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 any of 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 March 2012*.

Observation

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

Recommendation

No specific recommendation is required.

7.4 Audit Schedule

The next bi-weekly Landscape & Visual Monitoring in May 2012 is scheduled to be conducted in the weeks of 1st, 14th and 28th May 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 10 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 and for the extremely high level of turbidity and SS recorded on 20/4, it were believed to be mainly attributed by adverse weather. 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)
Year2010	0.02	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.015
Year2011	12.453	0.00	9.703	0.665	0.685	0.556	0.00	0.00	0.00	0.00	0.15
Jan-12	0.010	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.005
Feb-12	0.130	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mar-12	0.125	0.00	0.125	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Apr-12	0.265	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Total	13.003	0.00	11.072	0.665	0.71	0.556	0.00	0.00	0.00	0.00	0.19
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
Year 2011	0	0	0	0
January 2012	0	0	0	0
February 2012	0	0	0	0
March 2012	0	0	0	0
April 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 3rd, 12th, 19th and 24th of April 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 11	Construction 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	Construction waste was removed by contractor	5 Jan 12	Part of Construction waste was removed by contractor at 8, 19 and 30 Dec 2011
1,9, 15, 23 & 30 Mar 12 3 Apr 12	Tree protection zone was not provided at area A.	Observation	Contractor was reminded to set up the tree protection fence.	Tree protection zone was set up by contractor	12 Apr 12	
23 & 30 Mar 12 3, 12, 19 & 24 Apr	Construction materials were observed inside the tree	Observation	Contractor was reminded to remove the construction materials.	Outstanding		

Date	Findings	Identification	Advice from ET	Action taken	Closing date	Remarks
12	protection zone at Area A.					
30 Mar 12 3 Apr 12	Construction materials were observed at the cycle track of Ting Kok Road at Area A.	Observation	Contractor was reminded to clean the construction materials.	Construction materials were cleaned by contractor	12 Apr 12	
30 Mar 12 3 Apr	Haul road was dry and dusty at Area A.	Observation	Contractor was reminded that routine watering should be implemented.	Water spraying was implemented by contractor for dust suppression	12 Apr 12	
12 Apr 12	Fuel containers were not placed inside the drip tray at Ting Kok Road.	Observation	Contractor was reminded to provide the drip trays for all chemical materials.	Fuel containers were removed by contractor	19 Apr 12	
19 & 24 Apr 12	Damaged tree protection fence was observed at Area A.	Observation	Contractor was reminded to repair or replace the tree protection fence.	Outstanding		
24 Apr 12	Construction materials were observed inside the tree protection zone.	Observation	Contractor was reminded to remove the construction materials.	Outstanding		
24 Apr 12	Accumulation of general wastes were observed at Area A	Observation	Contractor was reminded to clean the general wastes as soon as possible	Outstanding		

12.2 Compliance with legal and Contractual requirement

There was no non-compliance recorded for the month of April 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 issued to be considered should at least include:

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

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

14 Conclusions

Erection of falseworks and formwork for the proposed screen house, concreting for the proposed transformer room & switch base slab up to +1.5mPD, Construction of flowmeter chamber, steel reinforcement bars fixed for the proposed transformer room switch room up to 11.05mPD, Excavation for the proposed DN2100 storm relief drain (CH120 to CH160) at Ting Kok Road, laying of 11 nos. of DN2100 concrete pipes and excavation for the construction of box culvert (CH55 to Ch85) 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 24th of April 2012.

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

For water quality monitoring, total 10 abnormal accidents 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 and for the extremely high level of turbidity and SS recorded on 20/4, it were believed to be mainly attributed by adverse weather. 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

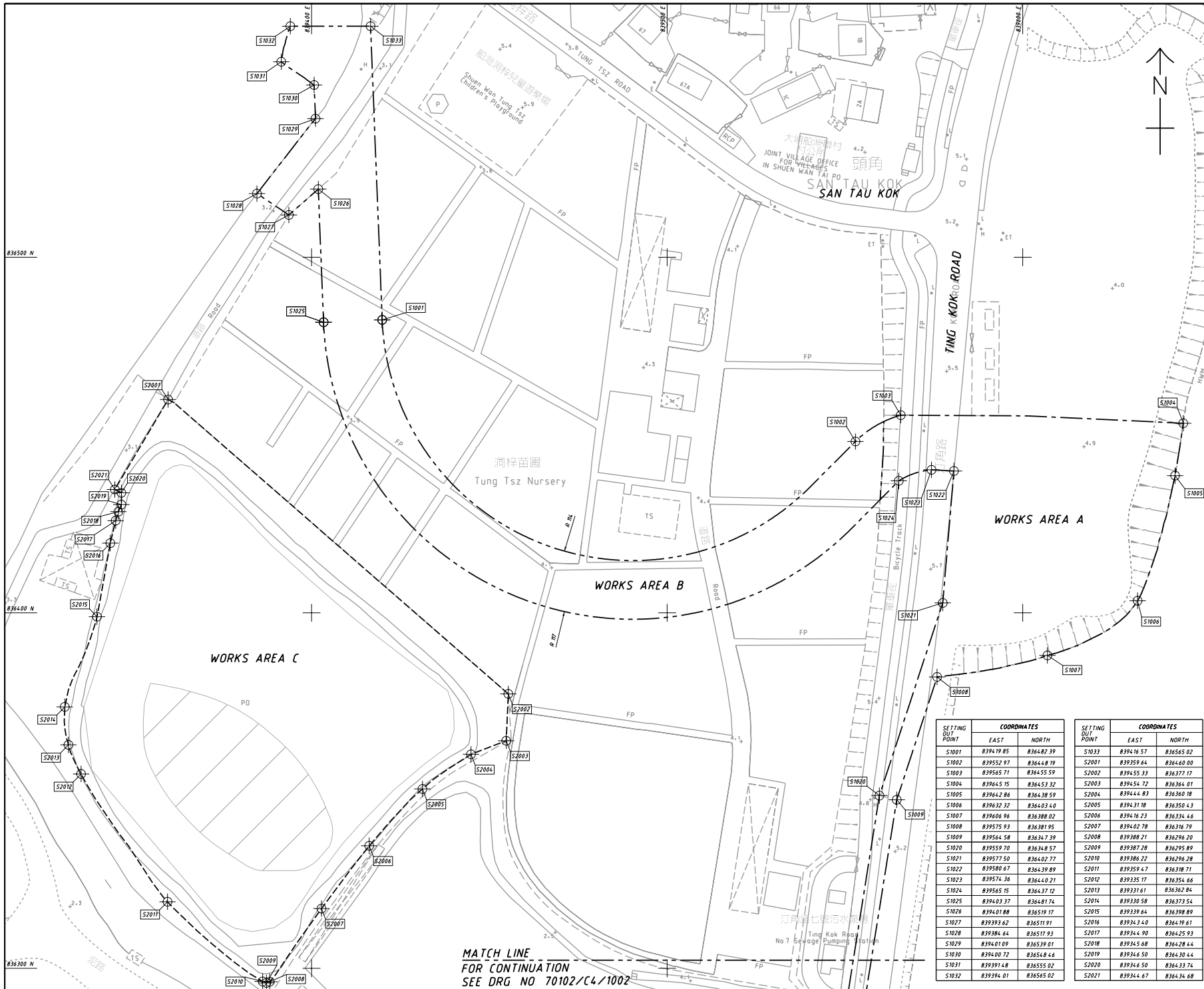
on 30/4 with result: Turbidity: 13.3NTU; Temperature: 28.4°C; DO: 4.98mg/L; pH: 6.3.

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

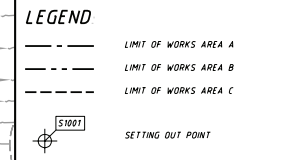
ET has reminded the contractor to provide environmental pollution control measures wherever necessary, and to keep a good environmental management at site practice.

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 HK1980 COORDINATES SYSTEM
 - 3 ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED
 - 4 THE PUBLIC CLEANING AREA SHALL BE THE AREAS WITHIN 2.50 BEYOND THE LIMIT OF WORKS AREAS EXCLUDING PRIVATE AREAS



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

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

DRAINAGE IMPROVEMENT
WORKS IN SHUEN WAN TAI PO - CONTRACT 1

SETTING OUT PLAN FOR
WORKS AREA A, B AND C

SHEET 1 OF 2

AECOM

DRGNQ. 70102/C4/1001A
圖紙編號

DESIGNED BY CPWU	CONTRACT NO. DC/2009/22	DR. APPROVED DML
DRAWN BY LWL	STATUS 1/10	
SCALE A1 : 1 500	DIMENSIONS ARE IN METRES	

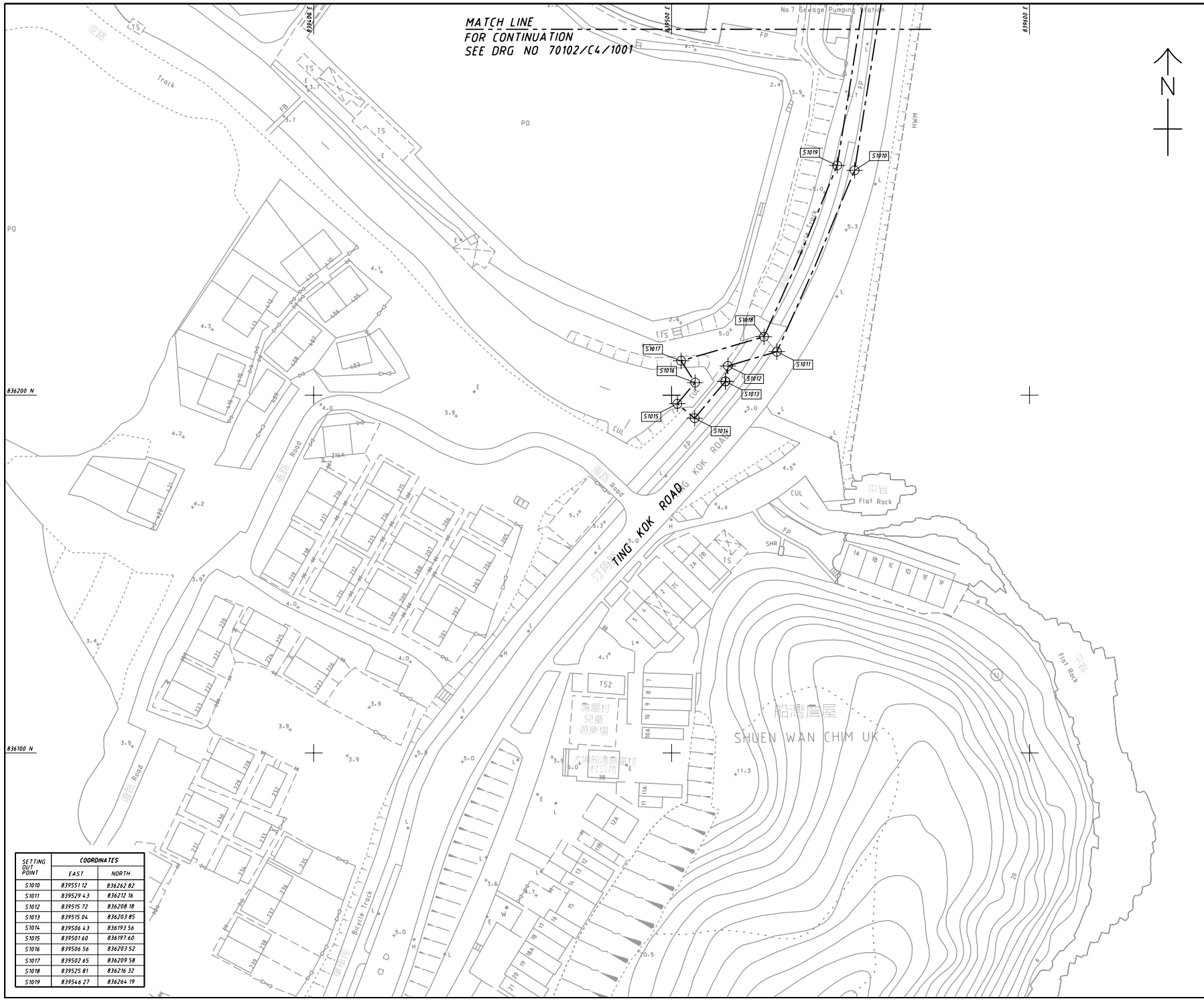
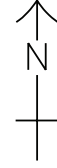
SETTING OUT POINT	COORDINATES		SETTING OUT POINT	COORDINATES	
	EAST	NORTH		EAST	NORTH
S1001	8394.19 85	8364.87 39	S1033	8394.16 57	836565 02
S1002	839552 87	836448 19	S2001	839359 64	836440 00
S1003	839565 71	836455 59	S2002	839455 33	836377 17
S1004	839645 15	836453 32	S2003	839454 72	836364 01
S1005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

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

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

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

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



836200 N

836100 N

2010-2-5 13:32:23

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

TENDER DRAWING	ECYPRC14	09-09
DRAINAGE SERVICES DEPARTMENT, THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION		
DRAINAGE IMPROVEMENT WORKS IN SHUEN WAN, TAI PO - CONTRACT 1		
SETTING OUT PLAN FOR WORKS AREA A, B AND C		
SHEET 2 OF 2		
AECOM		
DRG. NO. 圖紙編號	70102/C4/1002	
DESIGNED BY 設計	CP/WU	CONTRACT NO. 合約編號
DRAWN BY 繪圖	LWL	STATUS 狀態
SCALE 比例	A1:1 500	APPROVED BY 核准人
DIMENSIONS ARE IN 尺寸單位	METRES	DATE 日期
© COPYRIGHT RESERVED 版權所有		

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. **21289**

Page 1 of 3 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. : Q20468

Date of receipt : 2-Mar-12

Item Tested

Description : Digital Sound Level Meter

Manufacturer : SVAN

Model : 949

Serial No. : 8571

Test Conditions

Date of Test : 5-Mar-12

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:

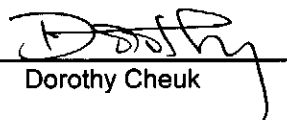
<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S017A	Multi-Function Generator	07279	SCL-HKSAR
S024	Sound Level Calibrator	15136	NIM-PRC & SCL-HKSAR

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: 7-Mar-12

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. 21289

Page 2 of 3 Pages

Results :

1. SPL Accuracy

Level Range	UUT Setting			Applied Value (dB)	UUT Reading (dB)	
	Octave Filter	Weight	Response		Before adjust	After adjust
105 dB	OFF	A	Fast	94.0	*92.0	94.0
			Slow		--	94.0
		C	Fast		--	94.0
130 dB	OFF	A	Fast	94.0	--	94.0
			Slow		--	94.0
		C	Fast		--	94.0
	OFF	A	Fast	114.0	--	114.1
			Slow		--	114.1
		C	Fast		--	114.1

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	84.0	0.0	
	74.0	74.0	0.0	
	64.0	64.0	0.0	
	54.0	54.0	0.0	

Uncertainty : ± 0.1 dB



Calibration Certificate

Certificate No. 21289

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	84.0	0.0	± 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	-40.4	- 39.4 dB, ± 1.5 dB
63 Hz	-27.2	- 26.2 dB, ± 1.5 dB
125 Hz	-17.0	- 16.1 dB, ± 1 dB
250 Hz	-9.4	- 8.6 dB, ± 1 dB
500 Hz	-2.6	- 3.2 dB, ± 1 dB
1 kHz	0.0 (Ref)	0 dB, ± 1 dB
2 kHz	+1.8	+ 1.2 dB, ± 1 dB
4 kHz	+1.8	+ 1.0 dB, ± 1 dB
8 kHz	-0.4	- 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	50.2	± 0.5 dB
1/10 ²	50.0	49.8	
1/10 ³	50.0	50.1	± 1.0 dB
1/10 ⁴	50.0	49.9	

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 : 1 001 hPa.

4. *Out of specification.

----- END -----



Calibration Certificate

Certificate No. 21290

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. : Q20468

Date of receipt : 2-Mar-12

Item Tested

Description : Sound Level Calibrator

Manufacturer : Svantek

Model : SV30A

Serial No. : 7908

Test Conditions

Date of Test : 5-Mar-12

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	13535	NIM-PRC & SCL-HKSAR
S024	Sound Level Calibrator	15136	NIM-PRC & SCL-HKSAR
S041	Universal Counter	15610	SCL-HKSAR
S206	Sound Level Meter	16338	SCL-HKSAR

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

The test equipment used for calibration are traceable to International System of Units (SI).

The test results apply to the above Unit-Under-Test only

Calibrated by : 
P. F. Wong

Approved by : 
Dorothy Cheuk

Date: 7-Mar-12

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. 21290

Page 2 of 2 Pages

Results :

1. Level Accuracy

UUT Nominal Value (dB)	Measured Value (dB)	IEC 942 Class 1 Spec.
94	94.10	± 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 : < 0.8 %

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 : 1001 hPa.

----- 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.

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

PROJECT: --

COMMENTS

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

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

NOTES

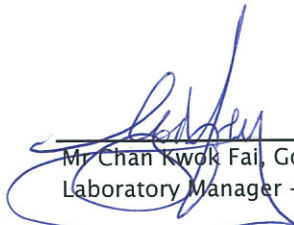
This is the Final Report and supersedes any preliminary report with this batch number.
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

ISSUING LABORATORY: HONG KONG

Address

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

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


Mr Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong

This report may not be reproduced except with prior written approval from ALS Technichem (HK) Pty Ltd.

Page 1 of 3

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

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

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



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

Parameters:

Conductivity

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

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

Dissolved Oxygen

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

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

pH Value

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

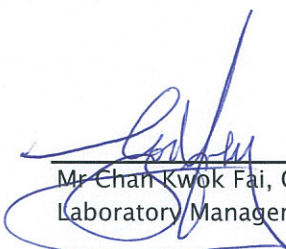
Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.05	0.05
7.0	7.10	0.10
10.0	10.08	0.08
Tolerance Limit (\pm unit)		0.20

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical

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

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


 Mr Chan Kwok Fai, Godfrey
 Laboratory Manager - Hong Kong

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

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



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

Parameters:

Turbidity

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

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


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

Appendix D: Construction Noise Monitoring Data

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

Noise Monitoring Data Sheet

Monitoring Location		M1	AL1
Monitoring Method		Façade	Façade
Date of Monitoring		2/4/2012	2/4/2012
Weather Condition		Sunny	Sunny
Measurement Start Time (hh:mm)		11:22	10:48
Measurement Time Length (mins)		30 mins	
SLM Model & S/N		SVAN 955	
Wind Speed (m/s)		0.9	0.78
Measurement Results	L _{eq} (dB(A))	60.6	63.8
	L ₁₀ (dB(A))	62.9	67.1
	L ₉₀ (dB(A))	68.3	49.7
Major Construction Noise Source(s) During Monitoring		The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities
Other Noise Source(s) During Monitoring		– Background Noise – Traffic Noise	– Background Noise – Traffic Noise

Name

Signature

Date

Prepared by:

Lai Chi Hang



2/4/2012

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		12/4/2012	12/4/2012
Weather Condition		Sunny	Sunny
Measurement Start Time (hh:mm)		13:00	11:14
Measurement Time Length (mins)		30 mins	
SLM Model & S/N		SVAN 955	
Wind Speed (m/s)		1.34	0.6
Measurement Results	L _{eq} (dB(A))	61.7	65.7
	L ₁₀ (dB(A))	65.3	67.8
	L ₉₀ (dB(A))	53.0	52.0
Major Construction Noise Source(s) During Monitoring		The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities	The measured noise level was dominated by the background noise in the immediate vicinity of the monitoring location due to its large distance from the construction activities
Other Noise Source(s) During Monitoring		– Background Noise – Traffic Noise	– Background Noise – Traffic Noise

Name

Signature

Date

Perpared by:

Lai Chi Hang



12/4/2012

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		18/4/2012	18/4/2012
Weather Condition		Cloudy	cloudy
Measurement Start Time (hh:mm)		13:00	13:34
Measurement Time Length (mins)		30 mins	
SLM Model & S/N		SVAN 955	
Wind Speed (m/s)		1.24	1.44
Measurement Results	L _{eq} (dB(A))	60.4	67.6
	L ₁₀ (dB(A))	63.1	70.5
	L ₉₀ (dB(A))	51.3	60.0
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



18/4/2012

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		25/4/2012	25/4/2012
Weather Condition		Cloudy	Cloudy
Measurement Start Time (hh:mm)		11:29	13:15
Measurement Time Length (mins)		30 mins	
SLM Model & S/N		SVAN 955	
Wind Speed (m/s)		0.67	0
Measurement Results	L _{eq} (dB(A))	60.7	61.4
	L ₁₀ (dB(A))	64.8	64.8
	L ₉₀ (dB(A))	49.2	50.0
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



25/4/2012

Appendix E: Water Quality Monitoring Data

Remark:

Red highlighting: The value is exceeding limit level.

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

Environmental Pioneers and Solutions Limited

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

Date of Sampling : 2/4/2012

Weather : Cloudy

Monitoring Location	W1	W2	
Time (hhmm)	10:26	10:05	
Tide Mode	Mid-ebb		
River Condition	Normal	Turbid	
Water Depth (m)	<1	<1	
pH value	7.42	7.41	
Salinity (ppt)	1.1	9.4	
Temperature (°C)	21.1	21.5	
Turbidity (NTU)	2.1	6.5	6.5
DO (mg/L)	7.06	7.21	
DO Saturation (%)	72%	73%	
Suspended Solids (mg/L)	1.4	6.4	6.4


Remark or Observation : _____

Name

Signature

Date

Prepared By : Lai Chi Hang



2/4/2012

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

Date of Sampling : 5/4/2012

Weather : Foggy

Monitoring Location	W1	W2	
Time (hhmm)	12:37	12:07	
Tide Mode	Mid-ebb		
River Condition	Normal	Normal	
Water Depth (m)	<1	<1	
pH value	7.39	7.33	
Salinity (ppt)	2.2	13.2	
Temperature (°C)	21.8	22.3	
Turbidity (NTU)	1.6	2.9	2.9
DO (mg/L)	7.02	6.26	
DO Saturation (%)	75%	62%	
Suspended Solids (mg/L)	3.8	1.4	1.4


Remark or Observation : _____

Name

Signature

Date

Prepared By : Lai Chi Hang



5/4/2012

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

Date of Sampling : 10/4/2012

Weather : Cloudy

Monitoring Location	W1	W2	
Time (hhmm)	15:00	15:30	
Tide Mode	Mid-ebb		
River Condition	Normal	Normal	
Water Depth (m)	<1	<1	
pH value	7.51	7.92	
Salinity (ppt)	10.3	16.4	
Temperature (°C)	23.2	24.4	
Turbidity (NTU)	3.50	2.4	2.4
DO (mg/L)	7.42	6.91	
DO Saturation (%)	87%	85%	
Suspended Solids (mg/L)	7.0	4.0	4.0

Remark or Observation : _____

Name

Signature

Date

Prepared By : Lai Chi Hang



10/4/2012

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

Date of Sampling : 12/4/2012

Weather : Sunny

Monitoring Location	W1	W2	
Time (hhmm)	16:00	16:30	
Tide Mode	Mid-ebb		
River Condition	Normal	Turbid	
Water Depth (m)	<1	<1	
pH value	8.06	8.34	
Salinity (ppt)	13.5	24.5	
Temperature (°C)	27.1	27.1	
Turbidity (NTU)	3.9	4.7	4.7
DO (mg/L)	6.96	7.12	
DO Saturation (%)	88%	90%	
Suspended Solids (mg/L)	8.4	8.0	8.0


Remark or Observation : _____

Name

Signature

Date

Prepared By : Lai Chi Hang



12/4/2012

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


Date of Sampling : 14/4/2012

Weather : Sunny

Monitoring Location	W1	W2	
Time (hhmm)	12:36	11:53	
Tide Mode	Mid-flood		
River Condition	Normal	Normal	
Water Depth (m)	<1	<1	
pH value	7.36	7.83	
Salinity (ppt)	1.7	19.2	
Temperature (°C)	25.7	26.3	
Turbidity (NTU)	4.8	1.4	1.4
DO (mg/L)	6.69	7.19	
DO Saturation (%)	80%	84%	
Suspended Solids (mg/L)	1.8	2.4	2.4

Remark or Observation : _____

Name **Signature** **Date**

Prepared By : Lai Chi Hang  14/4/2012

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

Date of Sampling : 16/4/2012

Weather : Cloudy

Monitoring Location	W1	W2	
Time (hhmm)	10:22	9:50	
Tide Mode	Mid-ebb		
River Condition	Turbid	Turbid	
Water Depth (m)	<1	<1	
pH value	7.33	7.12	
Salinity (ppt)	0.8	7.2	
Temperature (°C)	24.8	25.2	
Turbidity (NTU)	9.8	8.6	8.6
DO (mg/L)	6.53	5.72	
DO Saturation (%)	73%	58%	
Suspended Solids (mg/L)	5.0	5.0	5.0


Remark or Observation : _____

Name

Signature

Date

Prepared By : Lai Chi Hang



16/4/2012

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

Date of Sampling : 18/4/2012

Weather : Cloudy

Monitoring Location	W1	W2	
Time (hhmm)	11:45	11:20	
Tide Mode	Mid-ebb		
River Condition	Turbid	Normal	
Water Depth (m)	<1	<1	
pH value	7.25	7.26	
Salinity (ppt)	7.2	15.3	
Temperature (°C)	22.7	23.2	
Turbidity (NTU)	4.6	3.5	3.5
DO (mg/L)	6.58	7.01	
DO Saturation (%)	74%	78%	
Suspended Solids (mg/L)	5.2	7.0	7.0


Remark or Observation : _____

Name

Signature

Date

Prepared By : Lai Chi Hang



18/4/2012

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

Date of Sampling : 20/4/2012

Weather : Rainy

Monitoring Location	W1	W2	
Time (hhmm)	13:00	12:12	
Tide Mode	Mid-ebb		
River Condition	Turbid	Turbid	
Water Depth (m)	<1	<1	
pH value	7.38	7.37	
Salinity (ppt)	0.7	1.3	
Temperature (°C)	22.1	22	
Turbidity (NTU)	218.3	203.5	203.5
DO (mg/L)	6.72	6.92	
DO Saturation (%)	76%	78%	
Suspended Solids (mg/L)	130.00	82.00	82.00


Remark or Observation : _____

Name

Signature

Date

Prepared By : Lai Chi Hang



20/4/2012

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

Date of Sampling : 23/4/2012

Weather : Rainy

Monitoring Location	W1	W2	
Time (hhmm)	13:47	13:15	
Tide Mode	Mid-ebb		
River Condition	Turbid	Turbid	
Water Depth (m)	<1	<1	
pH value	7.25	7.54	
Salinity (ppt)	13.7	17	
Temperature (°C)	24.2	24.8	
Turbidity (NTU)	19.3	11.8	11.8
DO (mg/L)	6.43	6.60	
DO Saturation (%)	67%	69%	
Suspended Solids (mg/L)	8.20	12.00	12.00


Remark or Observation : _____

Name

Signature

Date

Prepared By : Lai Chi Hang



23/4/2012

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

Date of Sampling : 25/4/2012

Weather : Cloudy

Monitoring Location	W1	W2	
Time (hhmm)	13:00	12:41	
Tide Mode	Mid-ebb		
River Condition	Turbid	Turbid	
Water Depth (m)	<1	<1	
pH value	7.77	8.01	
Salinity (ppt)	14.8	21.6	
Temperature (°C)	24.7	24.8	
Turbidity (NTU)	37.2	4.9	4.9
DO (mg/L)	6.86	6.84	
DO Saturation (%)	84%	84%	
Suspended Solids (mg/L)	17.00	2.00	2.00


Remark or Observation : _____

Name

Signature

Date

Prepared By : Lai Chi Hang



25/4/2012

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

Date of Sampling : 27/4/2012

Weather : Cloudy

Monitoring Location	W1	W2	
Time (hhmm)	14:26	14:57	
Tide Mode	Mid-ebb		
River Condition	Normal	Normal	
Water Depth (m)	<1	<1	
pH value	7.49	7.95	
Salinity (ppt)	12.2	22.1	
Temperature (°C)	23.5	24.2	
Turbidity (NTU)	1.3	2.9	2.9
DO (mg/L)	6.45	6.72	
DO Saturation (%)	75%	79%	
Suspended Solids (mg/L)	1.40	5.40	5.40


Remark or Observation : _____

Name

Signature

Date

Prepared By : Lai Chi Hang



27/4/2012

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

Date of Sampling : 30/4/2012

Weather : Cloudy

Monitoring Location	W1	W2	
Time (hhmm)	12:42	12:14	
Tide Mode	Mid-flood		
River Condition	Turbid	Turbid	
Water Depth (m)	<1	<1	
pH value	7.26	7.14	
Salinity (ppt)	0.2	6.4	
Temperature (°C)	25.9	26	
Turbidity (NTU)	32.7	13.3	13.3
DO (mg/L)	6.55	5.93	
DO Saturation (%)	73%	60%	
Suspended Solids (mg/L)	11.00	12.00	12.00


Remark or Observation : _____

Name

Signature

Date

Prepared By : Lai Chi hang



30/4/2012

Appendix F: Hydrological Characteristics Monitoring Data

Location	Position	Tide	Date**	Time	Weather	Water Depth (m)*	Water Flow (m/s)	Water Flow (m ³ /s)
H1	Mid	Flood	5-Apr-2012	16:25	Rainy	0.12	0.24	0.300
H1	Mid	Flood	14-Apr-2012	12:36	Sunny	0.24	0.06	0.075
H1	Mid	Flood	20-Apr-2012					0.000
H1	Mid	Flood	27-Apr-2012					0.000
H2	Mid	Flood	5-Apr-2012	17:30	Rainy	0.54	1.09	6.845
H2	Mid	Flood	14-Apr-2012	13:00	Sunny	0.06	0.06	0.377
H2	Mid	Flood	20-Apr-2012					0.000
H2	Mid	Flood	27-Apr-2012					0.000
H1	Mid	Ebb	5-Apr-2012	12:37	Foggy	0.06	0.06	0.075
H1	Mid	Ebb	14-Apr-2012					0.000
H1	Mid	Ebb	20-Apr-2012	13:00	Rainy	0.54	0.37	0.463
H1	Mid	Ebb	27-Apr-2012	14:26	Cloudy	0.6	0.12	0.150
H2	Mid	Ebb	5-Apr-2012	13:00	Foggy	0.12	0.30	0.375
H2	Mid	Ebb	14-Apr-2012					0.000
H2	Mid	Ebb	20-Apr-2012	13:30	Rainy	0.24	0.18	1.130
H2	Mid	Ebb	27-Apr-2012	15:00	Cloudy	0.36	0.12	0.754

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

** : Only one mid-tide is within working hours of construction activity on 14 Apr, 20 Apr and 27 Apr.

Appendix G: Landscape and Visual Monitoring Photos



Photo 1 – A temporary hoarding was established to surround the work at Wai Ha River estuary.



Photo 2 – A temporary hoarding was established to surround Area B within Tung Tsz Nursery.



Photo 3 – Caution tapes were aligned from southwest to eastern parts of Tung Tsz Nursery.



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 – Temporarily stored construction materials were observed within the TPZs in Area A.



Photo 7 – Temporarily stored construction materials were observed within the TPZs in Area A.



Photo 8 – E22 was in poor health condition after the relocation in Area A.



Photo 9 – E33 and E34 were in poor health condition after relocation in Area A.



Photo 10 – Stockpiling of construction materials were observed close to the trunk of E22 within the TPZ.



Photo 11 – The injured part of the retained tree E44 was found pruned and wrapped by burlap



Photo 12 – Declining health condition of U34 in Area B.



Photo 13 – Declining health condition of U35 in Area B.



Photo 14 – Declining health condition of U37 in Area B.



Photo 15 – Planter of A36 was still found broken in Area B.



Photo 16 – Broken planters of U54 and two untagged trees (as indicated) next to U54 in Area B.



Photo 17 – No sprout was observed on the remaining tree part of T97 in Area B.



Photo 18 – Poor condition of the transplanted tree T152 in Area C.



Photo 19 – Poor condition of the transplanted tree T153 in Area C.



Photo 20 – Poor condition of the transplanted tree T250 in Area C.



Photo 21 – Poor health condition of the transplanted, untagged tree (possibly T149) in Area C.



Photo 22 – The protected shrubs *Pavetta hongkongensis* (PH01 and PH02) showed fair health condition in Area C.



Photo 23 – 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	Any unused chemicals or those with remaining functional capacity shall be recycled.	To achieve waste reduction	Works areas	Construction phase	EIAO-TM	Not applicable
	Recycle scrap metals or abandoned equipment					Implemented

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

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

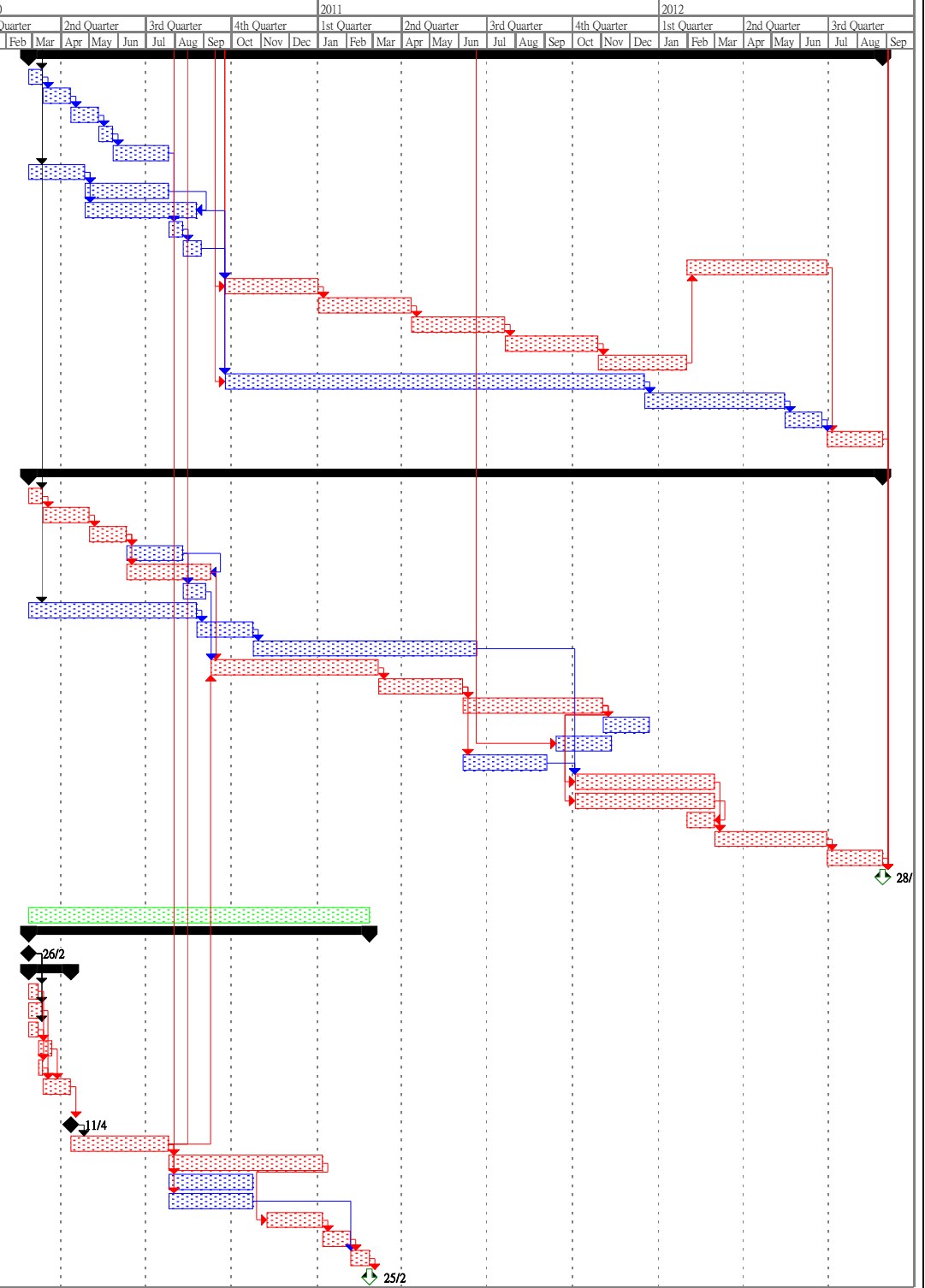
EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & main concern to Address	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?	Implementation status
6.8	<p>The construction of the proposed box-culvert would have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

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

Appendix I: Construction programme

Master Programme (Rev. 6)

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



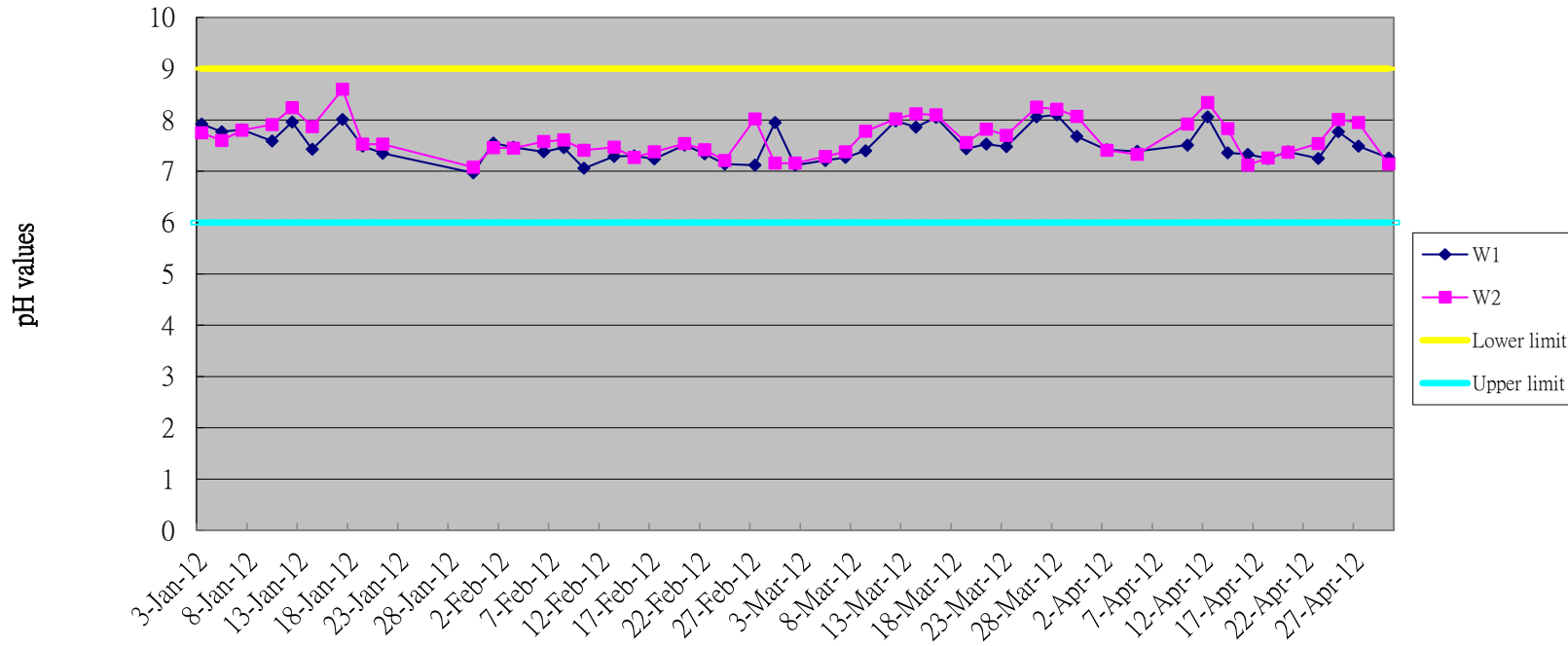
Appendix J: Three month rolling programme

Master Programme (Rev. 6)

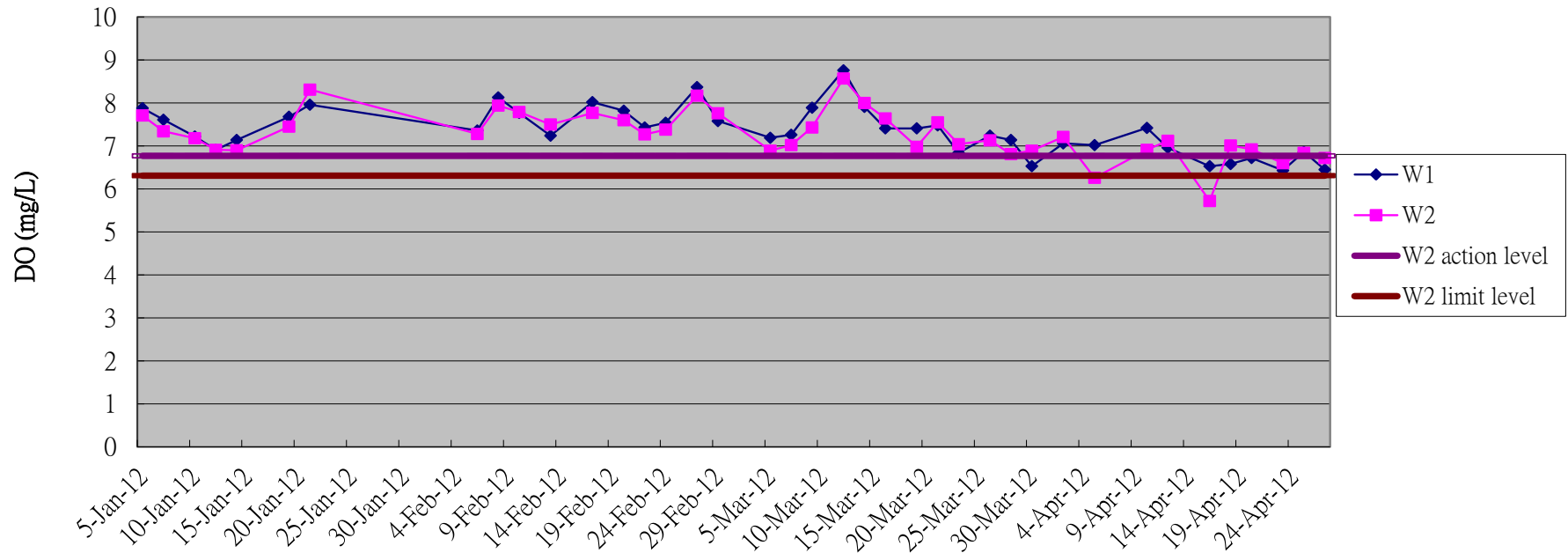
ID	ID no. in Rev. 5	ID no. in Rev. 4	ID no. in Rev. 3	ID no. in Rev. 2	Task Name	Duration	Start	Finish	Predecessors	Successors	2010												2011												2012												2013												
											1st Quarter			2nd Quarter			3rd Quarter			4th Quarter			1st Quarter			2nd Quarter			3rd Quarter			4th Quarter			1st Quarter			2nd Quarter			3rd Quarter			4th Quarter															
											Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep				
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																																																			
50	50	50	49	48	Internal Finishing Works	70 days	Mon 12/3/12	Sun 20/5/12	48																																																		
51	51	51	50	49	External Finishing Works	100 days	Mon 21/5/12	Tue 28/8/12	50,49																																																		
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																																																	
58	58	58	57	56	Final Testing Works	100 days	Mon 21/5/12	Tue 28/8/12	57FS-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																																																			
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	65	65	65	63	2 nos. of Outfall Structures	110 days	Fri 11/5/12	Tue 28/8/12	64																																																		
67	67	67	66	65	Tide Level Monitoring Chamber	220 days	Sun 22/1/12	Tue 28/8/12																																																			
70	70	70	69	68	Construction of Pipe & Tide Level Monitoring Chambers	50 days	Thu 22/3/12	Thu 10/5/12	69																																																		
71	71	71	70	69	Outfall Structure	110 days	Fri 11/5/12	Tue 28/8/12	70																																																		
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																																																		
76	76	76	75	74	Surface Drainage System & Catchpits	60 days	Thu 22/3/12	Sun 20/5/12	75																																																		
77	77	77	76	76	Concrete Pavement	20 days	Mon 21/5/12	Sat 9/6/12	76																																																		
78	78	78	77	77	Landscaping Works	60 days	Sat 30/6/12	Tue 28/8/12	77,74																																																		
79	79	79	78		225mm dia. Sewer Across Ting Kok Road and Connection to Existing Manholes	120 days	Thu 22/3/12	Thu 19/7/12	75																																																		
80	80	80			Sewer Manhole SM1	40 days	Fri 20/7/12	Tue 28/8/12	79																																																		
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																																																		
100	100	100	98	96	Box Culvert at Chainage 300 - 350 (Including Outfall & Desilting Chamber)	150 days	Sun 18/12/11	Tue 15/5/12	99																																																		
101	101	101	99		1200mm dia. Drainage Pipe	40 days	Wed 16/5/12	Sun 24/6/12	100																																																		
102	102	102	100	97	Reinstallation and Reinstatement of Existing Structure, Facilities and Trees	60 days	Sat 30/6/12	Tue 28/8/12	93,101																																																		
104	104	104	102	99	Dia. 2100mm Drainage Pipe	915 days	Fri 26/2/10	Tue 28/8/12																																																			
123	123	123	121		E & M Works	120 days	Fri 2/3/12	Fri 29/6/12	122,120																																																		
124	124	124	122		Misc. Works & Reinstatement	60 days	Sat 30/6/12	Tue 28/8/12	123																																																		

Appendix K. Graphical plots of trends of monitored parameter

Graphical plots of pH values W1&W2

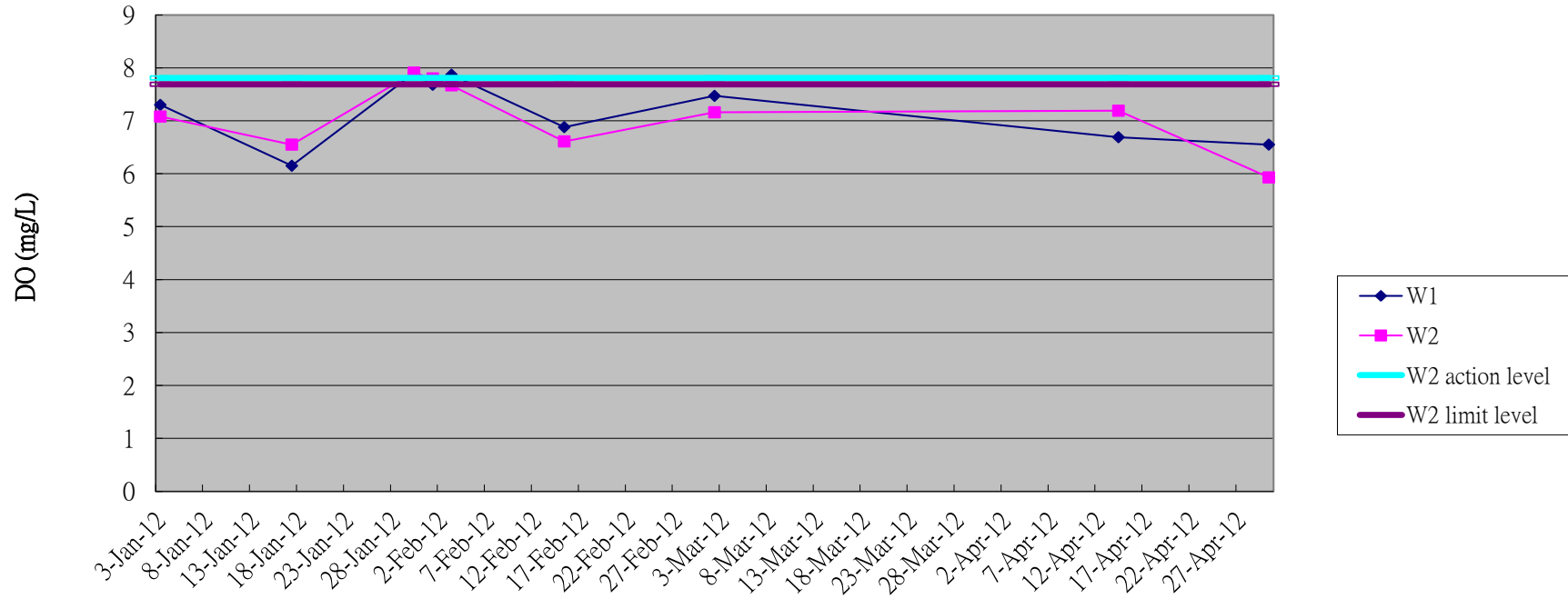


Graphical plots of DO (ebb tide) for W1&W2



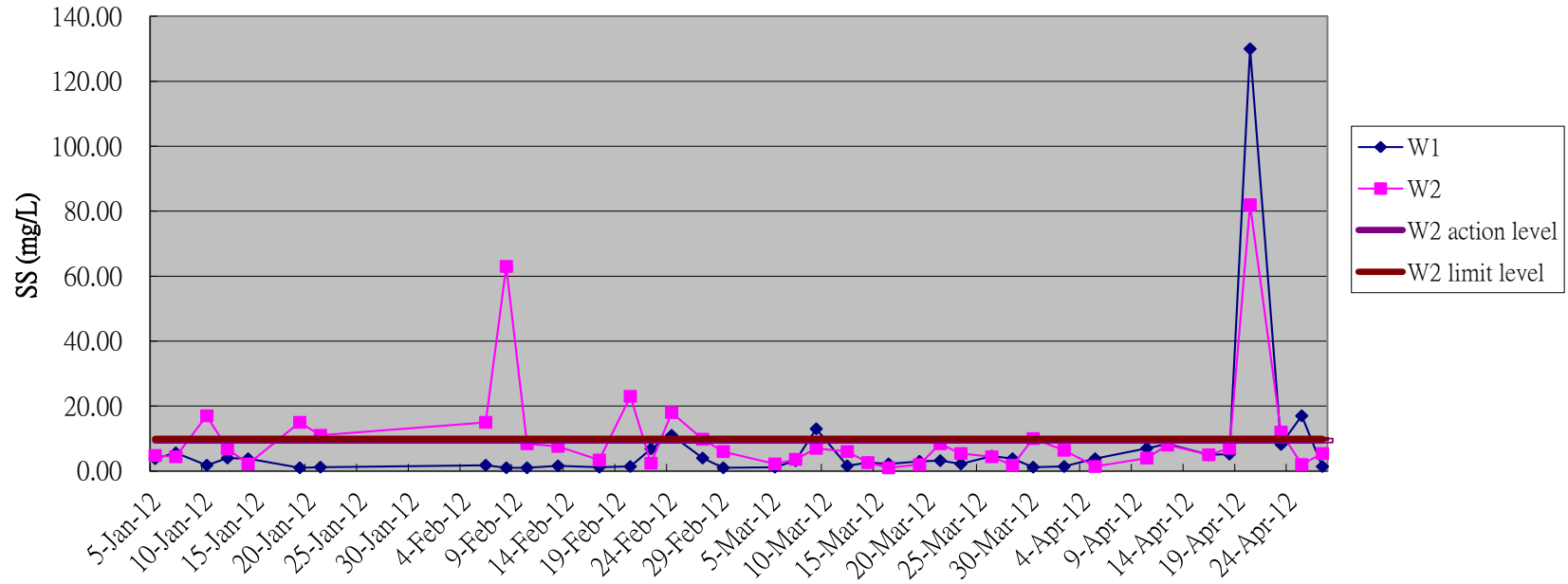
Remarks: Action level: 5 percentile of baceline data
Limit level: 1 percentile of baceline data

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



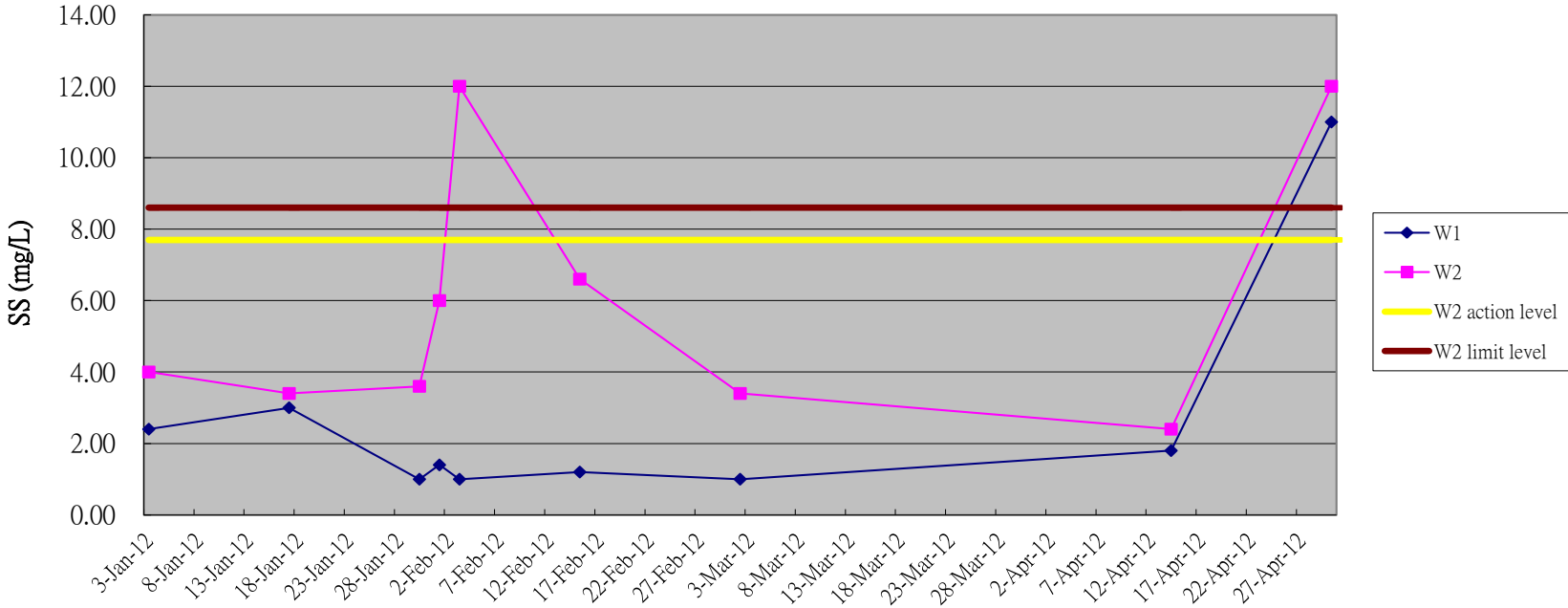
Remarks: Action level: 5 percentile of baceline data
Limit level: 1 percentile of baceline data

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



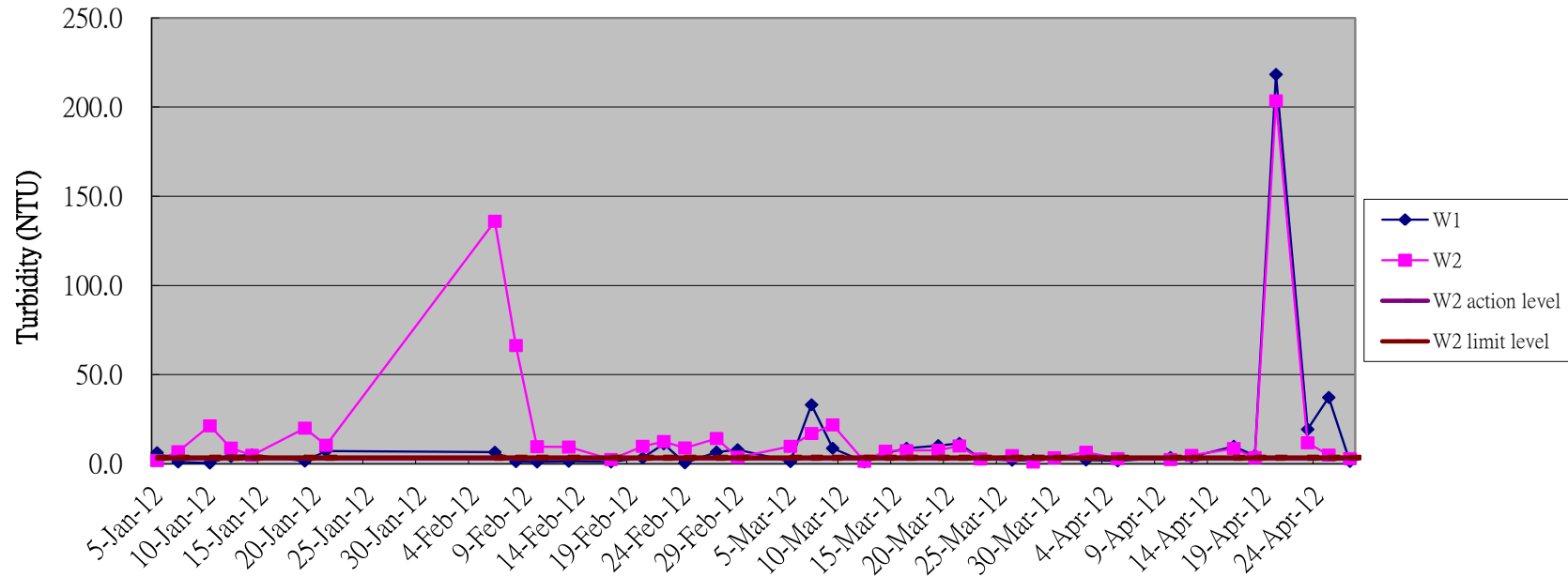
Remarks: Action limit is 95% of baseline data or 120% of upstream control station's SS
 Limit level is 99% of baseline data or 130% of upstream control station's SS

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



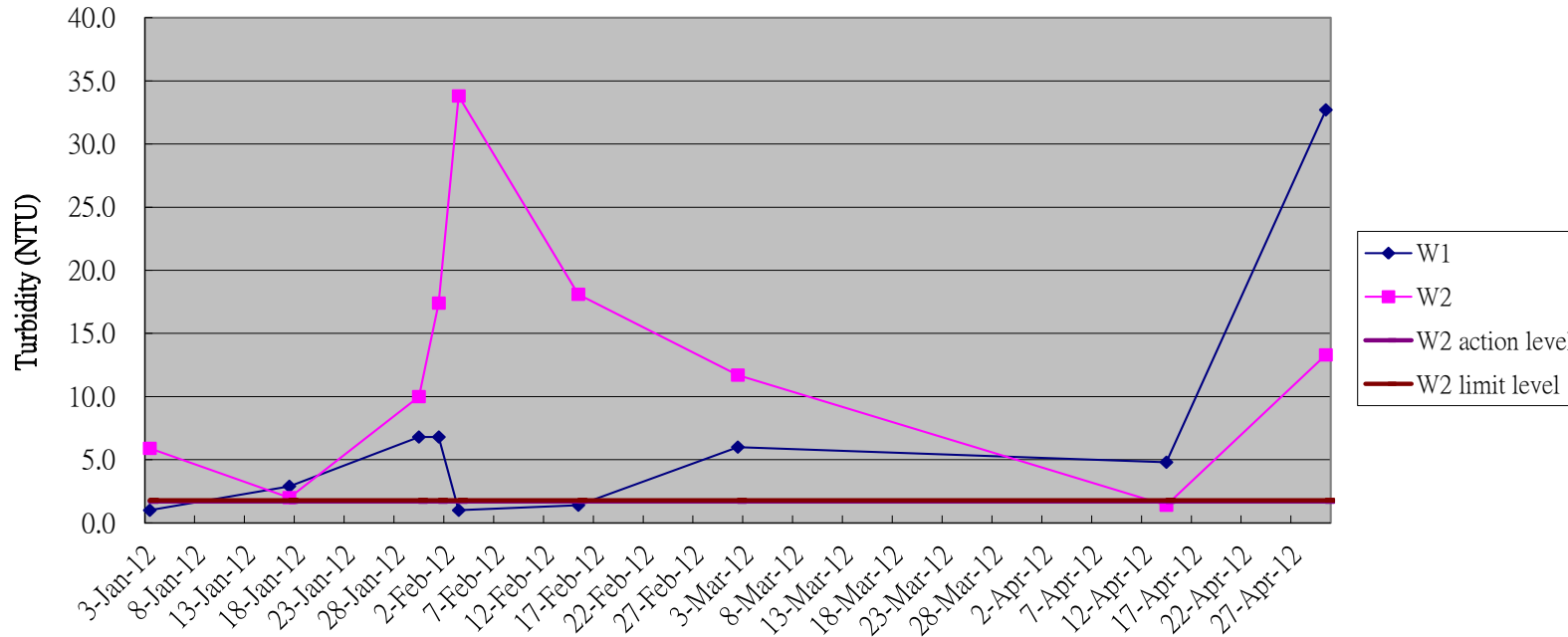
Remarks: Action limit is 95% of baseline data or 120% of upstream control station's SS
Limit level is 99% of baseline data or 130% of upstream control station's SS

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



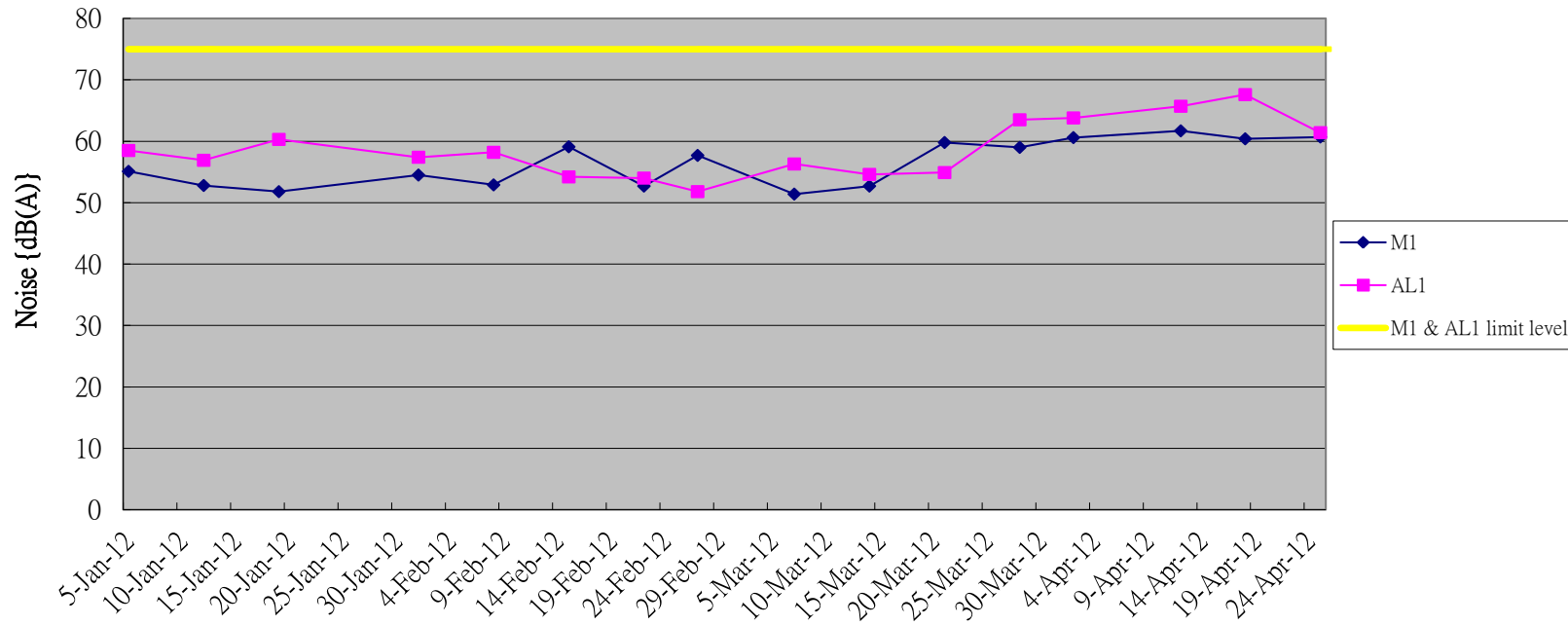
Remarks: Action limit is 95% of baseline data or 120% of upsteam control station's Turbidity
 Limit level is 99% of baseline data or 130% of upsteam control station's Turbidity

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



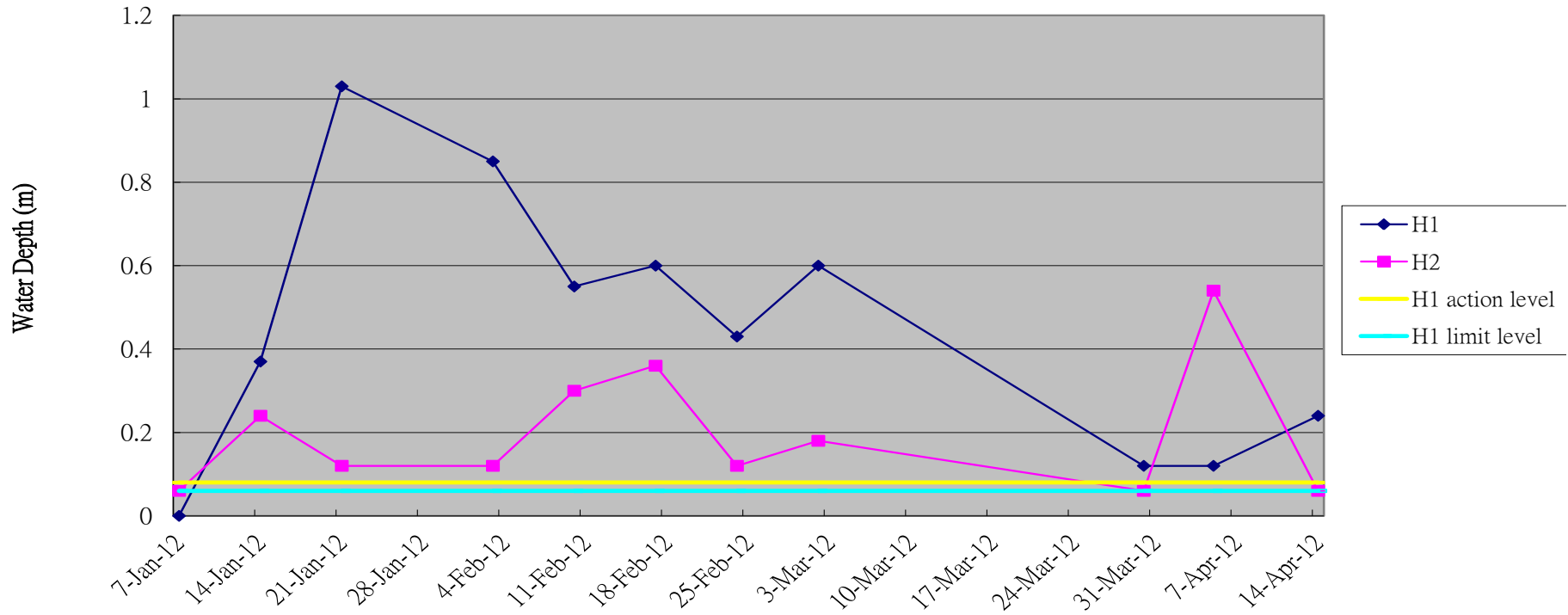
Remarks: Action limit is 95% of baseline data or 120% of upstream control station's Turbidity
Limit level is 99% of baseline data or 130% of upstream control station's Turbidity

Graphical plots of Noise for M1 & AL1



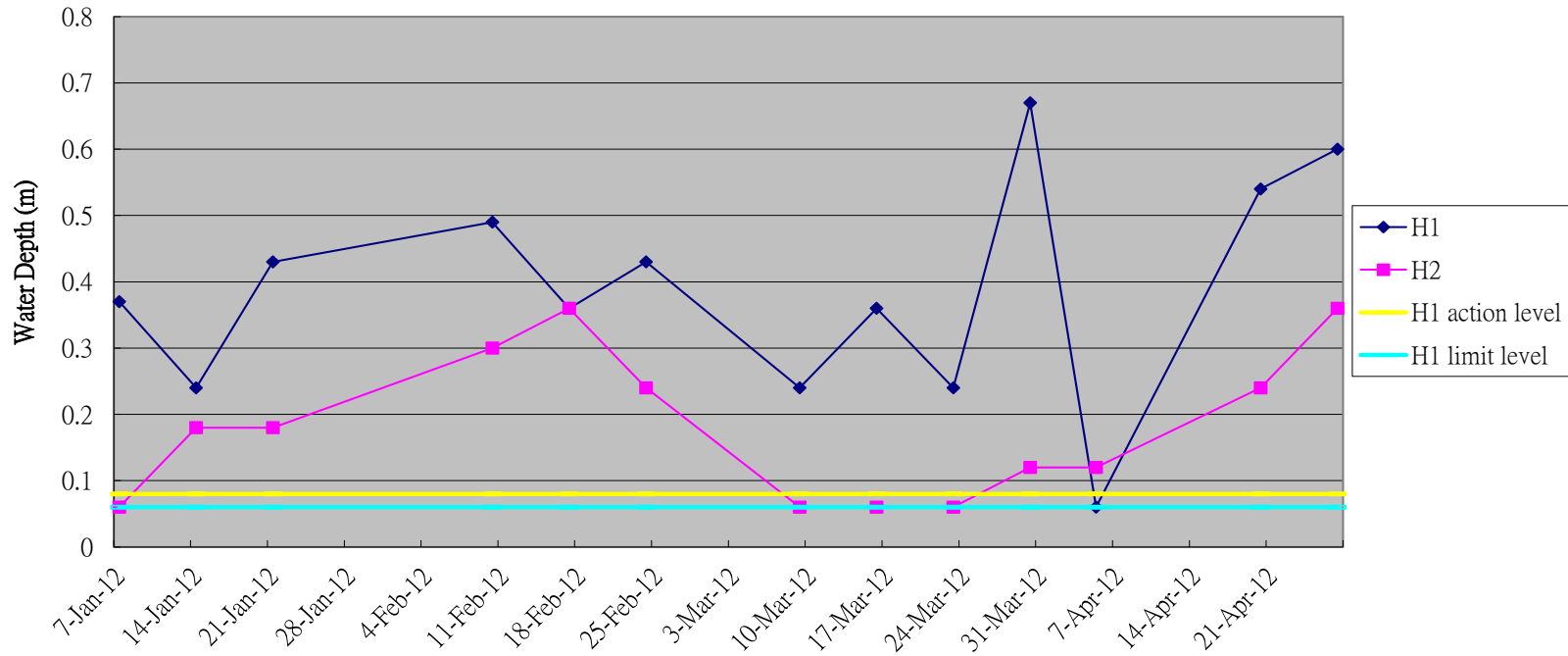
Remarks: Action limit is when one documented complaint is received

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



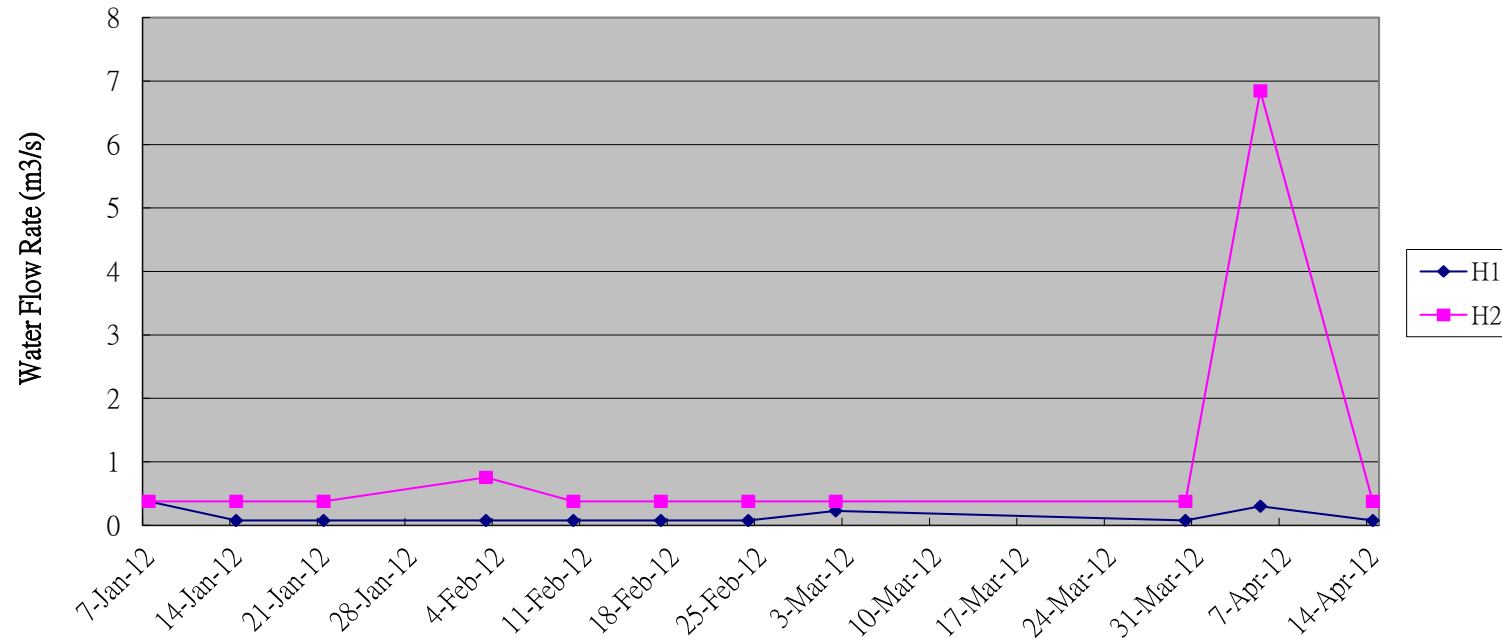
Remarks: Action level: 80% of baseline water depth.
 Limit level: 60% of baseline water depth.

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



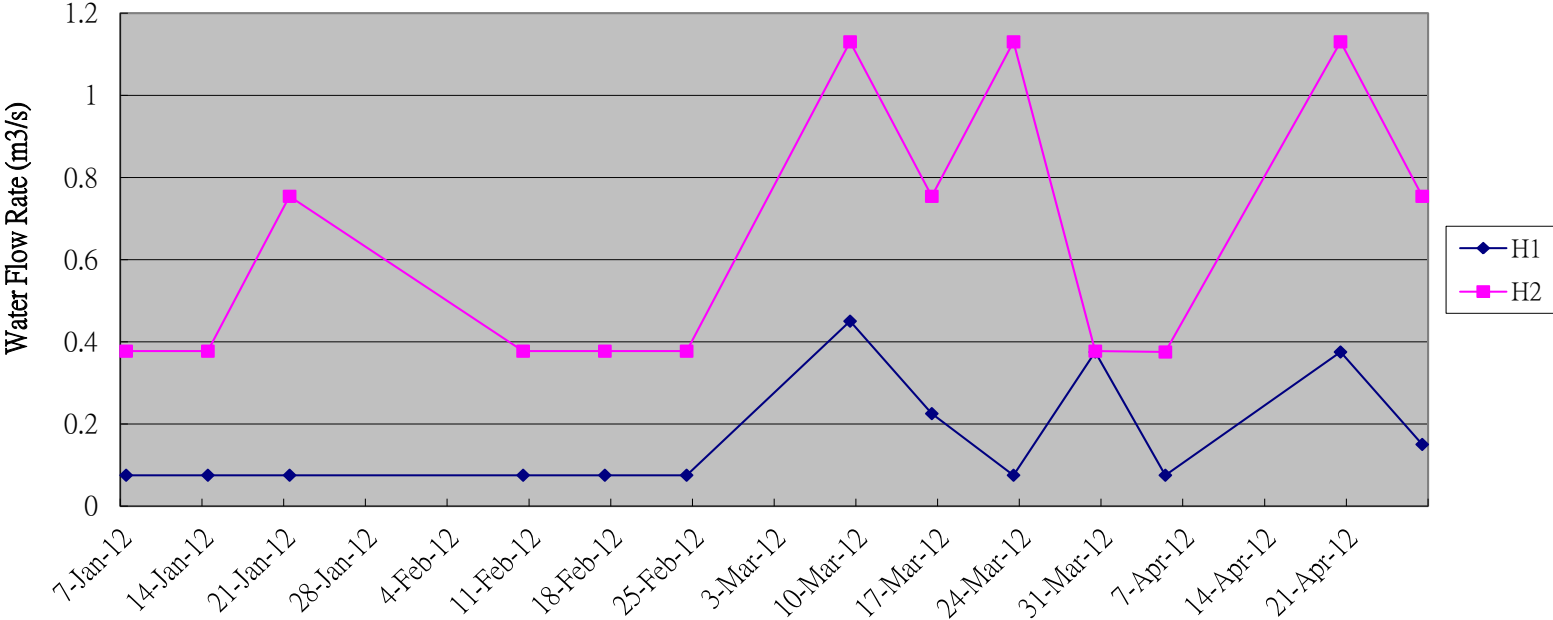
Remarks: Action level: 80% of baseline water depth.
Limit level: 60% of baseline water depth.

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 April 2012.

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

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

Appendix L(A). List of recorded vegetations and relative abundance in the ECA during establishment phase in April 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</i> Prain	E	Perennial Herb	S	+	Fair
<i>Alocasia odora</i>	N	Perennial Herb	S	+	Fair
<i>Livistona chinensis</i>	E	Tree Palm	S	+	Fair
<i>c.f. Ulothrix sp.</i>	N	Algae	S	+	Fair
<i>Enteromorpha sp.</i>	N	Algae	S	+	Fair
Total number of species	23				

Key:

¹Status in ECA:

²Relative abundance:

*Status in Hong Kong

E = Exotic

N = Native

R = retained

S = naturally colonized

+ = Present

++ = Common

+++ = Abundant

Appendix L(B). List of trees transplanted from Work Areas of Contract 1 & 2 to ECA during establishment phase in April 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	
T152	<i>Bombax ceiba</i>	E	Tree	22/6/2011	Fair	
T153	<i>Bombax ceiba</i>	E	Tree	22/6/2011	Fair	
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, Dehydrated Crown
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, 28 Jan, 3 Feb, 6 Feb, 15 Feb, 22 Feb, 1 Mar, 6 Mar, 12 Mar, 18 Mar, 29 Mar, 27 Apr 2012.

Appendix M. Photo of Wai Ha River at April 2012



Photo 1. Wai Ha River at W2



Photo 2. Wai Ha River at W2



Photo 3. Wai Ha River at W2



Photo 4. Wai Ha River at W2



Photo5. Wai Ha River at W1



Photo6. Wai Ha River at W1



Photo7. Wai Ha River at W1



Photo8. Wai Ha River at W1