PROJECT NO.: TCS/00553/11

**CONTRACT NO. DC/2009/22**
**DRAINAGE IMPROVEMENT WORKS IN SHUEN WAN (OPERATION PHASE)**

**CONTRACT NO. DC/2010/02**
**DRAINAGE IMPROVEMENT WORKS IN SHUEN WAN AND SHEK WU WAI**

# MONTHLY ENVIRONMENTAL MONITORING AND AUDIT REPORT (NO.43) – JANUARY 2015

PREPARED FOR
**KWAN LEE-KULY JOINT VENTURE**

Quality Index

| Date | Reference No. | Prepared By | Certified by |
|---|---|---|---|
| 6 March 2015 | TCS00553/11/600/R0411v2 |  Ben Tam (Environmental Consultant) |  T.W. Tam (Environmental Team Leader) |

| Ver. | Date | Description |
|---|---|---|
| 1 | 9 February 2015 | First submission |
| 2 | 6 March 2015 | Amended against IEC comments dated 5 March 2015 |
| | | |

Ref.: DSDSHUWNEM00_0_0689L.15 10 March 2015

Drainage Services Department
Drainage Projects Division
44 & 45/F., Revenue Tower
5 Gloucester Road,
Wan Chai, Hong Kong

By Fax (2827 8700) and Post

Attention: Mr. H.K.Chan and Mr. So Chi Ho

Dear Sirs,

**Re: Agreement No. DP 01/2010**
**Services as Independent Environmental Checker for the Drainage Improvement Works in Sha Tin and Tai Po under Contract No. DC/2009/22 & DC/2010/02**
**Monthly Environmental Monitoring and Audit Report for January 2015**

Reference is made to Environment Team's submission of the Monthly Environmental Monitoring and Audit Report for December 2014 by Email on 10 March 2015 (entitled "DC/2010/02 - Monthly Impact EM&A Report (Contract 2) No.43 – January 2015").

Please be informed that we have no comment on the captioned revised report. We write to verify the captioned submission in accordance with Condition 5.4 of EP-303/2008.

Thank you very much for your kind attention and please do not hesitate to contact Mr. Tony Cheng (3465 - 2822) should you have any queries.

Yours sincerely,

Tony Cheng
Independent Environmental Checker

| | | | |
|---|---|---|---|
| c.c. | AUES | Attn: Mr. T. W. Tam | By Fax: 2959 6079 |
| | Kwan Lee-Kuly JV | Attn: Mr. W. K. Chan | By Fax: 2674 6688 |

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## EXECUTIVE SUMMARY

ES.01. This is **43rd** Monthly Environmental Monitoring and Audit (EM&A) Report for designated works of *DSD Contract No. DC/2009/22* (hereafter "Contract 1") and *DC/2010/02* (hereafter "Contract 2") - *Drainage Improvement in Shuen Wan* under Environmental Permit No.EP-303/2008, covering a period from **1 to 31 January 2015** (hereinafter 'the Reporting Period').

ES.02. EM&A programmes conducted in the Reporting Period, DC/2009/22 was Operation Phase and DC/2010/02 continued perform Construction Phase which based on EPD, RE, IEC and ET agreement in December 2014.

### ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

ES.03. Environmental monitoring activities for the Project under the Operation and Construction Phases of EM&A programmes in this Reporting Period are summarized in the following table.

| Environmental Aspect | Monitoring Parameters / Inspection | Contract 1 | Contract 2 |
|---|---|---|---|
| Construction Noise | $L_{eq\ (30min)}$ Daytime – M1, M2, M3, M4 & AL1 | NA | **25 Occasions** |
| Water Quality | Local Stream Water Sampling (W1, W2, W3 and W4 | NA | **13 days** |
| | Hydrological characteristics measurement – H1, H2, H3 and H4 | **5 days** | **5 days** |
| Inspection / Audit | Regular weekly site inspection by the RE and Main Contractor | NA | **4 events** |
| | Independent Environmental inspection by the ET | NA | **5 events** |
| Ecological | Ecological Monitoring | **1 event** | **1 event** |
| Landscape & Visual | Bi-weekly Inspection by a registered Landscape Architect | NA | **2 events** |

ES.04. For ecological monitoring, bi-monthly construction phase monitoring for Contract 2 was conducted on ***30 January 2015*** and quarterly operation phase monitoring for Contract 1 of operation Phase was undertaken on ***30 January 2015***.

ES.05. For landscape and visual inspection, no operation phase monitoring of Contract 1 was conducted in this Reporting Period. However, construction phase of landscape and visual inspection of Contract 2 was carried out on **6** and **20 January 2015**. The monthly Landscape & Visual Report of Contract 2 (**January 2015**) has been signed by the registered Landscape Architect.

### SITE INSPECTION

ES.06. No joint site inspection was carried in the Reporting Period. Regular weekly environmental site performed by the Contractor and RE on **7**, **14**, **21** and **28 January 2015**. Moreover. ET was independently to undertake site inspection on **3, 8, 19, 23 and 30 January 2015** during stream water quality monitoring.

ES.07. Weekly site inspection of Contract 2 by ET was carried out on **3, 8, 16, 23 and 30 January 2015**. There were no construction activities conducted at Wai Ha River and non-compliance was noted. During site inspections, rectify minor defects and reconstruct a refuse station was observed. These construction activities are under the Contract 2 to carry out.

### ENVIRONMENTAL COMPLAINT

ES.08. No written or verbal complaint was recorded in this Reporting Period.

### NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

ES.09. No environmental summons or successful prosecutions were recorded in this Reporting Period.

**REPORTING CHANGE**

ES.10. No report changes were made in this Reporting Period.

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# 1.0 INTRODUCTION

## PROJECT BACKGROUND

1.01 ***Kwan Lee-Kuly Joint Venture*** (hereinafter 'KLKJV') has been awarded by Drainage Services Department (hereinafter 'DSD') of the Contract No. DC/2010/02 - Drainage Improvement in Shuen Wan and Shek Wu Wai (hereinafter 'the Project'). For the Project, construction works at Tung Tsz Road Shuen Wan is part of the Drainage Improvement works amongst Shatin and Tai Po and it is defined as a "Designated Project" which controlled under Environmental Permit EP-303/2008. On the other hand, Shek Wu Wai San Tin is a non-designated project work.

1.02 The Works at Tung Tsz Road Shuen Wan was divided two DSD Contracts i.e. DC/2009/22 (hereinafter called the "Contract 1") and DC/2010/02 (hereinafter called the "Contract 2"). The Project site boundary is shown in ***Appendix A***. The construction works of Contract 1 was commenced in ***August 2010*** and finished in ***November 2014***. Moreover, the construction works of Contract 2 was commencement in ***May 2011*** and still not yet finished. Hence, EM&A program implemented for Contract 1 is Operation Phase and Contract 2 is Construction Phase which based on EPD, RE and IEC with the ET of Contract 2 agreement in ***December 2014***.

1.03 As instructed by DSD, Action-United Environmental Services and Consulting (AUES) as the Environmental Team (ET) of Contract 2 would take over all relevant EM&A programmes of the Project after ***November 2014***.

1.04 This is the **43rd** Monthly EM&A Report which combined Contract 1 and Contract 2, was presented relevant monitoring results and inspection findings for the Reporting Period from ***1*** to ***31 January 2015***.

## REPORT STRUCTURE

1.05 The Monthly Environmental Monitoring and Audit (EM&A) Report is structured into the following sections:-.

| | |
|---|---|
| SECTION 1 | INTRODUCTION |
| SECTION 2 | PROJECT ORGANIZATION AND WORKS PROGRESS AND SUBMISSION |
| SECTION 3 | EM&A PROGRAM REQUIREMENT FOR THE PROJECT |
| SECTION 4 | IMPACT MONITORING RESULTS |
| SECTION 5 | SITE INSPECTIONS |
| SECTION 6 | ENVIRONMENTAL COMPLAINTS AND NON-COMPLIANCE |
| SECTION 7 | IMPLEMENTATION STATUES OF MITIGATION MEASURES |
| SECTION 8 | CONCLUSIONS AND RECOMMENDATION |

## 2.0 PROJECT ORGANIZATION AND WORKS PROGRESS AND SUBMISSION

### PROJECT ORGANIZATION AND MANAGEMENT STRUCTURE

2.01 Organization structure and contact details of relevant parties with respect to on-site environmental management are shown in ***Appendix B***.

### WORKS PROGRESS

2.02 For the Contract 1, no construction activity was conducted at Tung Tsz Road Shuen Wan. However, rectify minor defects and reconstruction refuse station was conducted in this reporting period by the Contract 2. The master construction programs of Contract 2 are enclosed in ***Appendix C***

### SUMMARY OF ENVIRONMENTAL SUBMISSIONS

2.03 Summary of the relevant permits, licences, and/or notifications on environmental protection for this Project in this Reporting Period is presented in ***Table 2-1***.

**Table 2-1 Status of Environmental Licenses and Permits**

| Item | Description | License/Permit Status |
|---|---|---|
| 1 | Air Pollution Control (Construction Dust) | Notified EPD on 17 October 2011 |
| 2 | Chemical Waste Producer Registration (WPN5213-727-K2972-02) | Approved on 28 October 2011 |
| 3 | Water Pollution Control Ordinance (Discharge License) WT00009528-2011 | Valid to 31 July 2016 |
| 4 | Billing Account for Disposal of Construction Waste (Account No.: 7012838) | Effective |

## 3.0 EM&A PROGRAM REQUIREMENT

3.01 EM&A requirements of the Construction and Operation Phases to according the PP, EIAR, Environmental Permit EP303/2008 (hereinafter 'the EP'), and the associated updated EM&A Manual, is presented in below sub-section.

### MONITORING PARAMETERS

3.02 According to the updated EM&A Manual of the Project, the Construction and Operation Phases monitoring requirement has showed in ***Table 3-1***.

**Table 3-1 Summary of Monitoring Parameters for the Project**

| Environmental Aspect | Construction Phase | Operation Phase |
|---|---|---|
| Construction Noise Monitoring | • A-weighted equivalent continuous sound pressure level (30min) (hereinafter 'Leq(30min)' during the normal working hours | No requirement |
| Water Quality Monitoring | • In Situ Measurement - Temperature, Dissolved Oxygen, Dissolved Oxygen Saturation, pH and Turbidity<br>• Laboratory Analysis - Suspended Solids | No requirement |
| Hydrological Characteristics Monitoring | • In-situ measurement including water flow and depth | • In-situ measurement including water flow and depth |
| Ecological Monitoring and Audit | • Monitor and audit the proper implementation of mitigation measures stipulated in EIA report and the updated EM&A Manual | • Monitor and inspect including the vegetation, fauna (includes avifauna, herpetofauna, odonate and butterfly) and Stream (includes fish and macroinvertebrates) |
| Landscape and Visual Monitoring | • Inspect and audit the implementation and maintenance of landscape and visual mitigation measures | • Inspect and audit the implementation and maintenance of landscape and visual mitigation measures |

*Remarks:*
*(*) the monitoring is carried out by IEC*
*(#) The monitoring is carried out by the registered Landscape Architect*

### MONITORING LOCATIONS

3.03 Monitoring locations have been proposed in the updated EM&A Manual. Graphic plot to show in ***Appendix D*** and summarized in ***Table 3-2***.

**Table 3-2 Designated Monitoring Locations of the EM&A Programme**

| Aspect | Location ID | Address |
|---|---|---|
| Construction Noise | M1 | 14, Shuen Wan Chim Uk |
| | AL1 | Joint Village Office for Villages in Shuen Wan, Tai PO |
| | M2 | 150, San Tau Kok |
| | M3 | 31, Wai Ha |
| | M4 | Block 15, Treasure Spot Garden |
| Water Quality | (#) W1 | Between the Shuen Wan Marsh and ECA<br>• Co-ordinates: E839301, N836386<br>• Existing River Bed Level: +1.75mPD). |

| Aspect | Location ID | Address |
|---|---|---|
| | W2 | Between Tolo Harbour and Proposed Penstock<br>• Co-ordinates: E839542, N836184<br>• Exiting River Bed Level: +1.48mPD) |
| | (*) W3 | Upstream of Tung Tze Shan Road<br>• Co-ordinates: E838760, N836714<br>• Exiting River Bed Level: +5.08mPD) |
| | W4 | Wai Ha Village 29D<br>• Co-ordinates: E838865, N836621<br>• Exiting River Bed Level: +4.05mPD) |
| Hydrological | H1 | Between the Shuen Wan Marsh and ECA<br>• Coordinates: E839306, N836379) |
| | H2 | Route 10 Sam Kung Temple<br>• Coordinates: E839163, N836433 |
| | H3 | Upstream of Tung Tze Shan Road<br>• Coordinates: E838760, N836714 |
| | H4 | Wai Ha Village 29D<br>• Coordinates: E838865, N836621 |
| Ecology | Areas within 100m of the works boundary under Contract 1 and Contract 2 | |
| Landscape & Visual | As within and adjacent to the construction sites and works areas under the Contract 1 and Contract 2 | |

**MONITORING FREQUENCY OF CONSTRUCTION PHASE**

3.04 According to the updated EM&A Manual, frequency and duration of the Construction Phase monitoring are summarized below.

***Construction Noise***

Frequency: Once a week during 0700-1900 on normal weekdays for $L_{eq(30min)}$

If the construction work undertake at restricted hour, the monitoring frequency of construction noise will be conducted in accordance with the related Construction Noise Permit requirement.

Duration: Throughout the construction period when the major construction activities are undertaken

***Water Quality***

Frequency: Three times a week. The interval between 2 sets monitoring are not less than 36 hours

Duration: throughout construction phase of Contract 2 to underway (in accordance with the Updated EM&A Manual Section 4.27).

***Hydrological Characteristics***

Frequency: Once per week at mid-flood and mid-ebb tides

Duration: During the construction phase of Contract 2 to undertake; and one year after the construction is complete as operation phase monitoring (in accordance with the Updated EM&A Manual Section 4.32).

***Ecology***

3.05 In according with Section 6.17 of the Updated EM&A Manual, ecological monitoring should be conducted by the Independent Environmental Checker (hereinafter 'IEC'). Monitoring programme details should be agreed with the Agriculture, Fisheries and Conservation Department (AFCD). Moreover, the IEC should submit reports on the findings of each monitoring trip, and a final report summarizing the monitoring results over the entire monitoring period to AFCD and Environmental Protection Department (EPD). Hence, no monitoring or surveying should be carried out by ET of the Project.

***Landscape & Visual***

3.06 According to Section 7.4 of the Updated EM&A Manual, site inspection bi-weekly should be performed to check the implementation and maintenance of landscape and visual mitigation measures whether to full realize.

**MONITORING FREQUENCY OF OPERATION PHASE**

***Hydrological Characteristics***

Frequency: Once per week at mid-flood and mid-ebb tides

Duration: One year after the construction is complete as operation phase monitoring (in accordance with the Updated EM&A Manual Section 4.32).

***Ecology***

3.07 In according with Section 6.17 of the Updated EM&A Manual, the Operation Phase ecological monitoring would be to conduct by the Independent Environmental Checker (hereinafter 'IEC'). Regular checking and monitoring by quarter month would be performed for one year duration

***Landscape & Visual***

3.08 According to Section 7.5 of the Updated EM&A Manual, all landscape and visual mitigation measures would be monitored quarterly during the first year of the Operation Phase to check on the effectiveness of the mitigations.

**MONITORING EQUIPMENT**

***Noise Monitoring***

3.09 Sound level meter in compliance with the *International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1)* specifications shall be used for noise monitoring. The sound level meter shall be checked with an acoustic calibrator. The wind speed shall be check with a portable wind speed meter, which capable to measure wind speed in m/s.

***Water Quality Monitoring***

3.10 **Dissolved Oxygen and Temperature Measuring Equipment** – The instrument should be a portable and weatherproof dissolved oxygen (DO) measuring instrument complete with cable and sensor, and use a DC power source. The equipment should be capable of measuring DO level in the range of 0 – 20mg L-1 and 0 – 200% saturation; and temperature of 0 – 45 degree Celsius.

3.11 **pH Meter** – The instrument shall consist of a potentiometer, a glass electrode, a reference electrode and a temperature-compensating device. It shall be readable to 0.1 pH in arrange of 0 to 14.

3.12 **Turbidity (NTU) Measuring Equipment** – The instrument should be a portable and weatherproof turbidity measuring instrument using a DC power source. It should have a photoelectric sensor capable of measuring turbidity between 0 - 1000 NTU.

3.13 **Water Sampling Equipment** – A water sampler should comprise a transparent PVC cylinder, with a capacity of not less than 2 litres, which can be effectively sealed with latex cups at both ends. The sampler should have a positive latching system to keep it open and prevent premature closure until released by a messenger when the sampler is at the selected water depth.

3.14 **Water Depth Detector** – A portable, battery-operated echo sounder should be used for the determination of water depth at each designated monitoring station. The unit can either be hand held or affixed to the bottom of the work boat.

3.15 **Sample Containers and Storage** – Water samples for SS should be stored in high density polythene bottles with no preservative added, packed in ice (cooled to 4°C without being frozen).

3.16 **Suspended Solids Analysis** – Analysis of suspended solids shall be carried out in a HOKLAS or

other international accredited laboratory.

***Hydrological Characteristics***

3.17 **Water Depth Detector** - A portable, battery-operated echo sounder shall be used for the determination of water depth at each designated monitoring station.

3.18 **Stream water flow Equipment** –A portable, battery-operated flow meter should be used for the determination of water flow rate at each designated monitoring location and record in $m^3/s$.

3.19 The monitoring equipment using for the Project's EM&A program were proposed by the ET and verified by the IEC prior commencement of the monitoring. Details of the equipment used for impact monitoring are listed in ***Table 3-3***.

**Table 3-3 Monitoring Equipment Used in EM&A Program**

| Equipment | Model |
|---|---|
| ***Construction Noise*** | |
| Integrating Sound Level Meter | B&K Type 2238 |
| Calibrator | B&K Type 4231 |
| Portable Wind Speed Indicator | Testo Anemometer |
| ***Water quality*** | |
| Water Depth Detector | Eagle Sonar |
| Water Sampler | A transparent PVC cylinder / bucket |
| Thermometer & DO meter | YSI DO Meter 550A or YSI Professional Plus or YSI Sonde6820 / 650MDS |
| pH meter | YSI pH10N or YSI Professional Plus or YSI Sonde 6820 / 650MDS |
| Turbidimeter | Hach 2100Q or YSI Sonde 6820 / 650MDS |
| Sample Container | High density polythene bottles (provided by laboratory) |
| Storage Container | 'Willow' 33-litre plastic cool box |
| Suspended Solids | HOKLAS-accredited laboratory (ALS Technichem (HK) Pty Ltd) |
| **Hydrological Characteristics** | |
| Water flow meter | GLOBAL WATER model FP211 |
| Water Depth Detector | Eagle Sonar or an appropriate steel ruler or rope with appropriate weight |

**MONITORING METHODOLOGY**

***Noise Monitoring***

3.20 Noise measurements were taken in terms of the A-weighted equivalent sound pressure level ($L_{eq}$) measured in decibels (dB). Supplementary statistical results ($L_{10}$ and $L_{90}$) were also obtained for reference.

3.21 Sound level meter as listed in ***Table 3-3*** are complied with the *International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1)* specifications, as recommended in Technical Memorandum (TM) issued under the *Noise Control Ordinance (NCO)*.

3.22 During the monitoring, all noise measurements were performed with the meter set to FAST response and on the A-weighted equivalent continuous sound pressure level ($L_{eq}$). $Leq_{(30min)}$ in six consecutive $Leq_{(5min)}$ measurements were used as the monitoring parameter for the time period between 0700-1900 hours on weekdays; and also $Leq_{(15min)}$ in three consecutive $Leq_{(5min)}$ measurements is used as monitoring parameter for other time periods (e.g. during restricted hours), if necessary.

3.23 During the course of measurement, the sound level meter is mounted on a tripod with a height of 1.2m above ground and placed at the assessment point and oriented such that the microphone is pointed to the site with the microphone facing perpendicular to the line of sight. The windshield

is fitted for all measurements. The assessment point is normally set as free-field situation for the measurement.

3.24 Prior to noise measurement, the accuracy of the sound level meter is checked by an acoustic calibrator which generated a known sound pressure level at a known frequency. The checking was performed before and after the noise measurement.

***Water Quality***

3.25 Water quality monitoring are conducted at the depth below:-

- Three depths: 1m below water surface, 1m above river bed and at mid-depth when the water depth exceeds 6m, or
- If the water depth is between 3m and 6m, two depths: 1m below water surface and 1m above river bed, and or
- If the water depth is less than 3m, 1 sample at mid-depth is taken

3.26 Water depths are determined prior to measurement and sampling, using a portable battery operated depth detector, brand named 'Eagle Sonar', if the depths exceed 1.5 meter. If the depth between 1.5 meter and 1 meter, plastic tape measurement tied with appropriate weight are used the depth estimation. For the depth well below 1 meter, an appropriate steel ruler or rope with appropriate weight are used for the depth measurement.

3.27 A transparent PVC cylinder, with a capacity of not less than 2 litres, is used for water sampling. The water sampler is lowered into the water body at a predetermined depth. The trigger system of the sampler is activated with a messenger and opening ends of the sampler are closed accordingly then the sample of water is collected. If the water depth is less than 500mm, a water bucket is be used as a water sampler to minimize the possibility of the latching system disturbing sediment during water sampling

3.28 A portable YSI DO Meter 550A or YSI Professional Plus is used for in-situ DO measurement. The DO meter is capable of measuring DO in the range of 0 - 20 mg/L and 0 - 200 % saturation and checked against water saturated ambient air on each monitoring day prior to monitoring. Although the DO Meter automatically compensates ambient water temperature to a standard temperature of $20^0$C for ease of comparison of the data under the changing reality, the temperature readings of the DO Meter are be recorded in the field data sheets. The equipment calibration is performed on quarterly basis.

3.29 A portable YSI pH10N Meter or or YSI Professional Plus is used for in-situ pH measurement. The pH meter is capable of measuring pH in the range of 0 – 14 and readable to 0.1. Standard buffer solutions of pH 7 and pH 10 are used for calibration of the instrument before and after measurement. The equipment calibration is performed on quarterly basis.

3.30 A portable Hach 2100Q Turbidity Meter is be used for in-situ turbidity measurement. The turbidity meter is capable of measuring turbidity in the range of 0 – 1000 NTU. The equipment calibration is performed on quarterly basis.

3.31 Water samples are contained in screw-cap PE (Poly-Ethylene) bottles, which are provided and pretreated and 'PE' (Poly-Ethylene) sampling bottles provided and pre-treated according to corresponding analytical requirements. Where appropriate, the sampling bottles are rinsed with the water to be contained. Water sample is then transferred from the sampler to the sample bottles.

3.32 One liter or 500 mL water sample are collected from each depth for SS determination. The collected samples are stored in a cool box maintained at $4^0$C and delivered to laboratory upon completion of the sampling by end of each sampling day.

3.33 All water samples are analyzed with Suspended Solids (SS) as specified in the updated *EM&A Manual* by a local HOKLAS-accredited testing laboratory (ALS Technichem (HK) Pty Ltd HOKLAS registration no. 66). SS are determined by the laboratory upon receipt of the water

samples using HOKLAS accredited analytical method. The detection limits and testing method are shown below in ***Table 3-4***. The certificate of ALS Technichem (HK) Pty Ltd is provided in ***Appendix E***.

**Table 3-4 Testing Method and Detection limit of Suspended Solids**

| Determinant | Testing Method | Detection Limit |
|---|---|---|
| Suspended solid | Determination use HOKLAS accredited analytical methods namely ALS Method EA-025 (based on APHA 2540 D) | 2mg/L |

***Hydrological Characteristics***

3.34 A portable, water flow meter, brand named "*GLOBAL WATER model FP211*" are used to determine the water current flow at the designated monitoring stations. A water flow velocity is measured at mid depth of current water body or 0.5m below water level.

3.35 Water depths are determined prior to measurement, using a portable battery operated depth detector, brand named 'Eagle Sonar', if the depths exceed 1.5 meter. If the depth between 1.5 meter and 1 meter, plastic tape measurement tied with appropriate weight are used the depth estimation. For the depths well below 1 meter, an appropriate steel ruler or rope with appropriate weight are used for the depth measurement.

## OTHERS MONITORING IMPLEMENTATION FOR THE PROJECT

***Ecology***

3.36 Ecological monitoring and reporting should be performed by IEC. No equipment and procedure are presented in the EM&A Monthly Report.

***Landscape and Visual***

3.37 A registered Landscape Architect as member of the ET is employed by the Contractor to undertake site inspection. Site inspection will undertake once every three months during the first year of the Operation Phase to check on the effectiveness of the mitigations.

## DETERMINATION OF ACTION/LIMIT (A/L) LEVELS

3.38 The re-established performance criteria for construction noise, water quality and hydrological, namely Action and Limit levels is used for the Project are listed in ***Tables 3-5, 3-6,*** and ***3-7***.

**Table 3-5 Action and Limit Levels for Construction Noise**

| Location | Time Period | Action Level in dB(A) | Limit Level in dB(A) |
|---|---|---|---|
| M1, AL1, M2, M3, M4 | Daytime 0700 – 1900 hrs on normal weekdays | When one documented complaint is received | 75* dB(A) |
| | 1900 – 2300 on all days and 0700 – 2300 on general holidays (including Sundays | | 60/65/70 dB(A)** |
| | 2300 – 0700 on all days | | 45/50/55 dB(A)** |

*Note:* * *Reduces to 70dB(A) for schools and 65dB(A) during the school examination periods.*
** *To be selected based on the Area Sensitivity Rating of A/B/C, and the conditions of the applicable CNP(s) must be followed*

**Table 3-6 Action and Limit Levels for Water Quality**

| Parameter | Performance Criteria | Impact Station | | |
|---|---|---|---|---|
| | | W1 | W2 | W4 |
| DO Concentration (mg/L) | Action Level | 7.27 | 7.26 | 9.27 |
| | Limit Level | 4.00 | 4.00 | 4.00 |
| pH | Action Level | NA | NA | NA |
| | Limit Level | 6 - 9 | 6 - 9 | 6 - 9 |

| Parameter | Performance Criteria | Impact Station | | |
|---|---|---|---|---|
| | | W1 | W2 | W4 |
| Turbidity (NTU) | Action Level | 4.77 | 2.46 | 3.32 |
| | Limit Level | 5.26 | 3.42 | 4.52 |
| Suspended Solids (mg/L) | Action Level | 9.73 | 8.89 | 6.98 |
| | Limit Level | 10.77 | 9.75 | 7.66 |

*Notes:*

- *The proposed Action/Limit Levels of DO are established to be used 5%-ile/1%-ile of all the baseline data;*
- *The proposed Action/Limit Levels of Turbidity and SS are established to be used 95%-ile/99%-ile of all the baseline data;*
- *For DO, non-compliance of the water quality limits occur is when monitoring result lower than the action/limit levels;*
- *For turbidity and SS, non-compliance of the water quality limits occurs is when monitoring result higher than the limits; and*
- *For pH, non-compliance of the quality limit occur is when monitoring result lower than 6 and higher than 9; and*
- *All the figures given in the table are used for reference only and the EPD may amend the figures whenever it is considered necessary*

**Table 3-7 Action and Limit Levels for Hydrological Characteristics**

| Parameter | Acceptance Criteria | Monitoring Station | |
|---|---|---|---|
| | | H1 | H2 |
| Water Depth (m) | Action Level | 0.08 (80% of baseline water depth) | 0.40 (80% of baseline water depth) |
| | Limit Level | 0.06 (60% of baseline water depth) | 0.30 (60% of baseline water depth) |
| Volumetric Flow Rate (Q), $m^3/s$ | Action Level | 120% of control station's water flow rate on the same day of measurement | 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 | 140% of control station's water flow rate on the same day of measurement |

3.39 The locations H3 and H4 are a reference measurement point in order to monitor any changes in the hydrological characteristics of Wai Ha River arising from the work Contract 2 to affect the Shuen Wan Marsh.

3.40 Should non-compliance of the environmental quality criteria occurs, remedial actions will be triggered according to the Event and Action Plan enclosed in ***Appendix F***.

### EQUIPMENT CALIBRATION

3.41 The sound level meter and calibrator are calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme in yearly basis.

3.42 All the water quality monitoring equipment such as the DO, pH and Turbidity meters are calibrated by HOKLAS accredited laboratory of three month intervals.

3.43 A portable, water flow meter, brand named "*GLOBAL WATER model FP211*" is calibrated in yearly basis.

3.44 All updated calibration certificates of the monitoring equipment used for the impact monitoring program in this Reporting Period are attached in ***Appendix E***.

### METEOROLOGICAL INFORMATION

3.45 The meteorological information is obtained from Tai Po and Shatin Stations of the Hong Kong

Observatory (HKO) and the summary is shown ***Appendix H***.

**DATA MANAGEMENT AND DATA QA/QC CONTROL**

3.46 The impact monitoring data are handled by the ET's systematic data recording and management, which complies with in-house Quality Management System. Standard Field Data Sheets (FDS) are used in the impact monitoring program.

3.47 The monitoring data recorded in the equipment e.g. noise meter and Multi-parameter Water Quality Monitoring System are downloaded directly from the equipment at the end of each monitoring day. The downloaded monitoring data are input into a computerized database properly maintained by the ET. The laboratory results are input directly into the computerized database and QA/QC checked by personnel other than those who input the data. For monitoring activities require laboratory analysis, the local laboratory follows the QA/QC requirements as set out under the HOKLAS scheme for all laboratory testing.

## 4.0 MONITORING RESULTS OF CONTRACT 2 OF CONSTRUCTION PHASE

4.01 The monitoring schedule had been issued to relevant parties before each Reporting Period which presented in ***Appendix G***. The works undertaken during the Reporting Period are illustrated in ***Appendix C.*** The monitoring results are presented in the following sub-sections.

### RESULTS OF CONSTRUCTION NOISE MONITORING

4.02 In this Reporting Period, the noise monitoring results at the all designated locations M1, AL1, M2, M3 and M4 are summarized in ***Table 4-1***. The detail monitoring data are presented in ***Appendix I***. The graphical plot is shown in ***Appendix J***.

**Table 4-1 Summary of Construction Noise ($L_{Aeq30min}$) Monitoring Results, dB(A)**

| Date | M1(*) | AL1(*) | M2(*) | M3(*) | M4(*) |
|---|---|---|---|---|---|
| 3-Jan-15 | 61 | 57 | 61 | 59 | 48 |
| 8-Jan-15 | 58 | 59 | 63 | 59 | 53 |
| 16-Jan-15 | 59 | 62 | 61 | 59 | 50 |
| 23-Jan-15 | 60 | 66 | 64 | 66 | 47 |
| 26-Jan-15 | 60 | 62 | 63 | 63 | 52 |
| **Limit Level** | **75 dB(A)** | | | | |

*Remarks:*
(*) *The monitoring is undertaken under free field situation. A façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines*

4.03 The sound meter was set in a free field situation at the all designated monitoring locations, therefore a façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines.

4.04 No noise complaint (which is an Action Level exceedance) was received in this Reporting Period. As shown in ***Table 4-1,*** all the noise monitoring result are well below 75dB(A) and no Action or Limit Level exceedance was triggered during this Reporting Period. The graphical plot is shown in ***Appendix J***.

### RESULTS OF LOCAL STREAM WATER QUALITY MONITORING

4.05 In this Reporting Period, **13** sampling days were performed at all designated measurement points for local stream water quality monitoring. The monitoring results including in-situ measurements and laboratory testing results are provided in ***Appendix I***. The graphical plots are shown in ***Appendix J***.

4.06 Monitoring results of 3 key parameters: dissolved oxygen (DO), turbidity and suspended solids in this Reporting Period, are summarized in ***Tables 4-2, 4-3 and 4-4***.

**Table 4-2 Water Quality Results Summary for Dissolved Oxygen (DO), mg/L**

| Sampling date | W1 (ebb) | W1 (flood) | W2 | W3 | W4 |
|---|---|---|---|---|---|
| 3-Jan-15 | ***6.21*** | ***6.16*** | ***7.09*** | 7.98 | ***7.43*** |
| 6-Jan-15 | ***6.74*** | ***6.92*** | ***6.66*** | 6.69 | ***6.94*** |
| 8-Jan-15 | 7.28 | ***6.79*** | 7.69 | 7.36 | ***8.61*** |
| 10-Jan-15 | ***6.58*** | ***7.13*** | 7.53 | 8.05 | ***8.93*** |
| 12-Jan-15 | ***6.06*** | ***5.42*** | ***6.90*** | 7.78 | ***8.16*** |
| 14-Jan-15 | 7.73 | ***6.63*** | ***6.74*** | 8.37 | 9.30 |
| 16-Jan-15 | 7.73 | 7.64 | ***6.68*** | 8.75 | ***9.18*** |
| 19-Jan-15 | 7.95 | 7.46 | 8.64 | 7.35 | ***8.91*** |
| 21-Jan-15 | 8.26 | 8.42 | 8.49 | 8.60 | ***8.28*** |
| 23-Jan-15 | 9.39 | 7.82 | 9.11 | 8.88 | 10.30 |
| 26-Jan-15 | ***7.09*** | ***6.44*** | ***6.52*** | 7.74 | **9.24** |
| 28-Jan-15 | 8.96 | 8.07 | 8.38 | 8.45 | 9.88 |
| 30-Jan-15 | ***7.20*** | ***6.60*** | ***6.98*** | 7.47 | ***8.24*** |

***Remarks:*** ***Bold and Italic is indicated exceeded Action Level***

**Table 4-3 Water Quality Results Summary for Turbidity, NTU**

| Sampling date | W1 (ebb) | W1 (flood) | W2 | W3 | W4 |
|---|---|---|---|---|---|
| 3-Jan-15 | 2.60 | 2.99 | ***2.96*** | 1.46 | 1.77 |
| 6-Jan-15 | 3.02 | 3.28 | **3.87** | 6.07 | **5.49** |
| 8-Jan-15 | ***4.87*** | **5.59** | **5.61** | 3.80 | **4.80** |
| 10-Jan-15 | 3.79 | 3.53 | **3.50** | 1.78 | 2.24 |
| 12-Jan-15 | **16.50** | **20.40** | **9.22** | 6.40 | **7.73** |
| 14-Jan-15 | **12.75** | **15.45** | **5.30** | 3.21 | 2.48 |
| 16-Jan-15 | **8.28** | **10.45** | 2.06 | 1.76 | 1.37 |
| 19-Jan-15 | 4.20 | ***5.23*** | **6.98** | 4.41 | ***3.97*** |
| 21-Jan-15 | 2.64 | 3.14 | ***2.87*** | 1.60 | 1.96 |
| 23-Jan-15 | 3.96 | 4.54 | **3.72** | 0.80 | 1.09 |
| 26-Jan-15 | 2.83 | 2.52 | 2.14 | 1.46 | 1.26 |
| 28-Jan-15 | **9.27** | **12.60** | **9.49** | 4.67 | ***3.59*** |
| 30-Jan-15 | **10.35** | **12.55** | **12.60** | 7.20 | **6.80** |

- *Bold and Italic is indicated exceeded Action Level*; *Bold with underline is indicated exceeded Limit Level*

**Table 4-4 Water Quality Results Summary for Suspended Solids (SS), mg/L**

| Sampling date | W1 (ebb) | W1 (flood) | W2 | W3 | W4 |
|---|---|---|---|---|---|
| 3-Jan-15 | 4.0 | 5.0 | 3.5 | <2.0 | <2.0 |
| 6-Jan-15 | 5.0 | 5.0 | 5.0 | <2.0 | <2.0 |
| 8-Jan-15 | 3.0 | 2.0 | 5.0 | 3.0 | 2.0 |
| 10-Jan-15 | 3.0 | 2.0 | 4.5 | <2.0 | <2.0 |
| 12-Jan-15 | **11.0** | **12.0** | **11.5** | 4.0 | 4.0 |
| 14-Jan-15 | 8.0 | 8.0 | 5.5 | <2.0 | <2.0 |
| 16-Jan-15 | **12.0** | **12.0** | 5.0 | 2.0 | 2.0 |
| 19-Jan-15 | 6.0 | 7.0 | 5.0 | 4.0 | 5.0 |
| 21-Jan-15 | 2.0 | 4.0 | 6.0 | 2.0 | 2.0 |
| 23-Jan-15 | 5.0 | 9.0 | ***9.5*** | <2.0 | <2.0 |
| 26-Jan-15 | <2.0 | <2.0 | 5.5 | 4.0 | 5.0 |
| 28-Jan-15 | 8.0 | ***10.0*** | **12.0** | 3.0 | 3.0 |
| 30-Jan-15 | 4.0 | 3.0 | 7.0 | 2.0 | 2.0 |

- *Bold and Italic is indicated exceeded Action Level*; *Bold with underline is indicated exceeded Limit Level*

4.07 During the Reporting Period, field measurements showed that stream water temperatures were within 15.9℃ to 26.8℃ and pH values within 6.6 to 8.9.

4.08 A statistics of exceedances for the three parameters: dissolved oxygen (DO), turbidity and suspended solids are shown in ***Table 4-5***.

**Table 4-5 Statistics Water Quality Exceedance**

| Station | DO | | Turbidity | | SS | | Total Exceedance | |
|---|---|---|---|---|---|---|---|---|
| | Action | Limit | Action | Limit | Action | Limit | Action | Limit |
| W1 | **14** | 0 | **2** | **11** | **1** | **4** | **17** | **15** |
| W2 | **7** | 0 | **2** | **9** | **1** | **2** | **10** | **11** |
| W4 | **10** | 0 | **2** | **4** | 0 | 0 | **12** | **4** |
| **No. of Exceedance** | **31** | **0** | **6** | **24** | **2** | **6** | **39** | **30** |

4.09 As shown in ***Table 4-4***, a total of **69** Action/ Limit Level exceedances, namely **31** exceedances in dissolved oxygen, **30** exceedances in turbidity and **8** exceedances in SS were recorded in this Reporting Period. NOEs were issued to notify EPD, IEC, the Contractor and RE upon confirmation of the results.

4.10 According to the Contractor's information and onsite observation, construction activities undertaken in this reporting period is included minor defects rectify and reconstruction the refuse station. The active construction activities would not disturb the water body. The investigation results for the exceedances are summarized as follows:

- For the DO exceedances, the construction activities comprised none of DO depleting characteristics. Hence, all exceedances of DO should be natural variation of the river and not related to the Project works.
- Impact monitoring point W2, there were 2 (two) Action and 9 (nine) Limit Levels Turbidity exceedances detectable. Addition, one Action and two Limit Levels exceedances of SS were recorded on 12, 23 and 28 January 2015. Since Contract 1 has completed and no construction activities close to W2 was carried out by Contract 2, it is concluded that the exceedances were not project related.
- Impact monitoring point W4, no SS exceedance was recorded; however, Turbidity was found 2 (two) Action and 4 (four) Limit Levels exceedances. As reviewed Table 4-4, turbidity levels recorded in the control station (W3) at the same days are similar to W4 or higher than, therefore it is concluded that the exceedances at W4 were likely due to natural variation and not related to the project.
- For the monitoring point W1, a total 32 Action and Limit Levels exceedances which include 14 exceedances of DO (Action Level Exceedance), 13 exceedances of Turbidity (two Action and eleven Limit Levels Exceedances), and 5 exceedances of SS (one Action and four Limit Levels Exceedance), were recorded in the reporting period. Since Contract 1 has completed and W1 is located to nearly a sea-shore, marine water of Tolo Harbour during flood tidal should be to affect it. Therefore, it is considered that the exceedances in W1 were not related to the works under the Project

**RESULTS OF HYDROLOGICAL CHARACTERISTICS MONITORING**

4.11 In this Reporting Period, hydrological characteristics measurements were carried out on **3, 8, 19, 23 and 26 January 2015.** The detailed measurement results in this Reporting Period are presented in ***Tables 4-6***.

**Table 4-6 Detailed monitoring results of hydrological characteristics at Designated Measurement Points**

| Measurement | | Tide Condition | River Width (m) | Water Depth (m) | Cut Section ($m^2$) | Velocity Flow Rate (m/s) | Average Volumetric Flow Rate (Q), $m^3/s$ |
|---|---|---|---|---|---|---|---|
| Point | Time | | | | | | |
| **Date: 3 January 2015** | | | | | | | |
| H1 | 17:48 | Flood | 5.50 | 0.44 | 2.4200 | 0.6 | 1.452 |
| | 11:24 | Ebb | 5.50 | 0.38 | 2.0900 | 0.4 | 0.836 |
| H2 | 17:26 | Flood | 4.70 | 0.37 | 1.7390 | 0.1 | 0.174 |
| | 11:32 | Ebb | 4.70 | 0.36 | 1.6920 | <0.1 | <0.169 |
| H3 | 17:02 | Flood | 7.45 | 0.38 | 2.8310 | 0.4 | 1.132 |
| | 10:46 | Ebb | 7.45 | 0.36 | 2.6820 | 0.3 | 0.805 |
| H4 | 17:17 | Flood | 2.74 | 0.27 | 0.7398 | 0.4 | 0.296 |
| | 11:09 | Ebb | 2.74 | 0.24 | 0.6576 | 0.3 | 0.197 |
| **Date: 8 January 2015** | | | | | | | |
| H1 | 10:59 | Flood | 5.50 | 0.38 | 2.0900 | 0.4 | 0.836 |
| | 15:36 | Ebb | 5.50 | 0.34 | 1.8700 | 0.2 | 0.374 |
| H2 | 09:42 | Flood | 4.70 | 0.32 | 1.5040 | 0.1 | 0.150 |
| | 14:06 | Ebb | 4.70 | 0.30 | 1.4100 | <0.1 | <0.141 |
| H3 | 09:19 | Flood | 7.45 | 0.30 | 2.2350 | 0.2 | 0.447 |
| | 13:43 | Ebb | 7.45 | 0.28 | 2.0860 | 0.2 | 0.417 |
| H4 | 09:28 | Flood | 2.74 | 0.29 | 0.7946 | 0.2 | 0.159 |
| | 13:58 | Ebb | 2.74 | 0.27 | 0.7398 | 0.2 | 0.148 |

| Measurement | | Tide Condition | River Width (m) | Water Depth (m) | Cut Section ($m^2$) | Velocity Flow Rate (m/s) | Average Volumetric Flow Rate (Q), $m^3/s$ |
|---|---|---|---|---|---|---|---|
| Point | Time | | | | | | |
| **Date: 16 January 2015** | | | | | | | |
| H1 | 15:19 | Flood | 5.50 | 0.43 | 2.3650 | 0.4 | 0.946 |
| | 10:28 | Ebb | 5.50 | 0.38 | 2.0900 | 0.3 | 0.627 |
| H2 | 16:31 | Flood | 4.70 | 0.34 | 1.5980 | 0.1 | 0.160 |
| | 11:24 | Ebb | 4.70 | 0.32 | 1.5040 | <0.1 | <0.150 |
| H3 | 16:00 | Flood | 7.45 | 0.37 | 2.7565 | 0.2 | 0.551 |
| | 11:07 | Ebb | 7.45 | 0.35 | 2.6075 | 0.1 | 0.261 |
| H4 | 16:15 | Flood | 2.74 | 0.26 | 0.7124 | 0.2 | 0.142 |
| | 11:15 | Ebb | 2.74 | 0.24 | 0.6576 | 0.1 | 0.066 |
| **Date: 23 January 2015** | | | | | | | |
| H1 | 10:45 | Flood | 5.50 | 0.44 | 2.4200 | 0.4 | 0.968 |
| | 14:43 | Ebb | 5.50 | 0.42 | 2.3100 | 0.3 | 0.693 |
| H2 | 10:16 | Flood | 4.70 | 0.35 | 1.6450 | 0.1 | 0.165 |
| | 14:28 | Ebb | 4.70 | 0.32 | 1.5040 | 0.1 | 0.150 |
| H3 | 09:56 | Flood | 7.45 | 0.36 | 2.6820 | 0.2 | 0.536 |
| | 14:13 | Ebb | 7.45 | 0.33 | 2.4585 | 0.2 | 0.492 |
| H4 | 10:07 | Flood | 2.74 | 0.28 | 0.7672 | 0.2 | 0.153 |
| | 14:21 | Ebb | 2.74 | 0.26 | 0.7124 | 0.2 | 0.142 |
| **Date: 26 January 2015** | | | | | | | |
| H1 | 10:52 | Flood | 5.50 | 0.44 | 2.4200 | 0.4 | 0.968 |
| | 15:11 | Ebb | 5.50 | 0.41 | 2.2550 | 0.3 | 0.677 |
| H2 | 10:26 | Flood | 4.70 | 0.31 | 1.4570 | 0.1 | 0.146 |
| | 14:56 | Ebb | 4.70 | 0.30 | 1.4100 | <0.1 | <0.141 |
| H3 | 10:11 | Flood | 7.45 | 0.34 | 2.5330 | 0.3 | 0.760 |
| | 14:42 | Ebb | 7.45 | 0.33 | 2.4585 | 0.2 | 0.492 |
| H4 | 10:22 | Flood | 2.74 | 0.26 | 0.7124 | 0.2 | 0.142 |
| | 14:51 | Ebb | 2.74 | 0.25 | 0.6850 | 0.2 | 0.137 |

4.12 Hydrological characteristics results of the all measurement points are summarized in ***Tables 4-7*** and ***4-8***.

**Table 4-7 Summarized Hydrological Characteristics of Water Depth, m**

| Date | Mid-Flood | | | | Mid-Ebb | | | |
|---|---|---|---|---|---|---|---|---|
| | H1 | H2 | H3 | H4 | H1 | H2 | H3 | H4 |
| 3-Jan-15 | 0.44 | 0.37 | 0.38 | 0.27 | 0.38 | 0.36 | 0.36 | 0.24 |
| 8-Jan-15 | 0.38 | 0.32 | 0.30 | 0.29 | 0.34 | 0.30 | 0.28 | 0.27 |
| 16-Jan-15 | 0.43 | 0.34 | 0.37 | 0.26 | 0.38 | 0.32 | 0.35 | 0.24 |
| 23-Jan-15 | 0.44 | 0.35 | 0.36 | 0.28 | 0.42 | 0.32 | 0.33 | 0.26 |
| 26-Jan-15 | 0.44 | 0.31 | 0.34 | 0.26 | 0.41 | 0.30 | 0.33 | 0.25 |

**Table 4-8 Summarized Hydrological Characteristics of Average Volumetric flow rate (Q), $m^3/s$**

| Date | Mid-Flood | | | | Mid-Ebb | | | |
|---|---|---|---|---|---|---|---|---|
| | H1 | H2 | H3 | H4 | H1 | H2 | H3 | H4 |
| 3-Jan-15 | 1.452 | 0.174 | 1.132 | 0.296 | 0.836 | <0.169 | 0.805 | 0.197 |
| 8-Jan-15 | 0.836 | 0.150 | 0.447 | 0.159 | 0.374 | <0.141 | 0.417 | 0.148 |
| 16-Jan-15 | 0.946 | 0.160 | 0.551 | 0.142 | 0.627 | <0.150 | 0.261 | 0.066 |
| 23-Jan-15 | 0.968 | 0.165 | 0.536 | 0.153 | 0.693 | 0.150 | 0.492 | 0.142 |
| 26-Jan-15 | 0.968 | 0.146 | 0.760 | 0.142 | 0.677 | <0.141 | 0.492 | 0.137 |

4.13 To compare the monitoring data between the Reporting Period (rainy season) and baseline

monitoring period, the currently water depth and volumetric flow rate has insignificant change. Furthermore, no exceedance in water depth and water flow rate was found in this Reporting Period.

**RESULTS OF ECOLOGICAL MONITORING**

4.14 According to updated EM&A Manual Section 6.17, bi-monthly ecological monitoring is conducted by the IEC – ENVIRON Hong Kong Limited. In brief, the monitoring tasks include regular check on the retained and transplanted trees and shrubs, monitoring on fauna groups and aquatic fauna within the works area and any ecologically sensitive area within 100 m of the works boundary.

4.15 In the Reporting Period, the ecological monitoring carried out by the IEC is on ***30 January 2015*** since bi-monthly ecological monitoring on the previous time was undertaken in ***November 2014***. The detailed monitoring report is presented in ***Appendix M***.

## 5.0 MONITORING RESULTS OF CONTRACT 1 OF OPERATION PHASE

5.01 The Operation Phase monitoring schedule has issued to relevant parties before the Reporting Period and attached in ***Appendix G***. The monitoring results are presented in the following sub-sections.

### RESULTS OF HYDROLOGICAL CHARACTERISTICS MONITORING

5.02 For Contract 1 Operation Phase, hydrological characteristics measurement at H1 and H2 was conducted on **3, 8, 19, 23 and 26 January 2015**. The detailed measurement results were presented in ***Tables 4-6, 4-7 and 4-8*** of ***Section 4*** of this report. Graphical Plots of Hydrological Characteristics shows in ***Appendix D.***

### RESULTS OF ECOLOGICAL MONITORING

5.03 According to updated EM&A Manual Section 6.20, quarterly ecological monitoring is conducted by the IEC – ENVIRON Hong Kong Limited. In brief, the monitoring tasks include regular check on the retained and transplanted trees and shrubs, monitoring on fauna groups and aquatic fauna within the works area and any ecologically sensitive area within 100 m of the works boundary of the Contract 1.

5.04 In the Reporting Period, ecological monitoring under the ***Contract 1*** was carried out by the IEC on ***30 January 2015***. The detailed monitoring report is presented in ***Appendix N.***

## 6.0 WASTE MANAGEMENT

6.01 Waste management was carried out by an on-site Environmental Officer or an Environmental Supervisor from time to time.

RECORDS OF WASTE QUANTITIES

6.02 All types of waste arising from the construction work are classified into the following:

- Construction & Demolition (C&D) Material;
- Chemical Waste;
- General Refuse; and
- Excavated Soil.

6.03 The quantities of waste for disposal in this Reporting Period are summarized in ***Table 5-1*** and ***5-2*** and the Monthly Summary Waste Flow Table is shown in ***Appendix K***. Whenever possible, materials were reused on-site as far as practicable.

**Table 5-1 Summary of Quantities of Inert C&D Materials**

| Type of Waste | Quantity | Disposal Location |
|---|---|---|
| C&D Materials (Inert) ($m^3$) | 0 | - |
| Reused in this Contract (Inert) ($m^3$) | 0 | - |
| Reused in other Projects (Inert) ($m^3$) | 0 | - |
| Disposal as Public Fill (Inert) ($m^3$) | 0 | - |

**Table 5-2 Summary of Quantities of C&D Wastes**

| Type of Waste | Quantity | Disposal Location |
|---|---|---|
| Recycled Metal (kg) | 0 | - |
| Recycled Paper / Cardboard Packing (kg) | 0 | - |
| Recycled Plastic (kg) | 0 | - |
| Chemical Wastes (kg) | 0 | - |
| General Refuses ($m^3$) | 15 | Local refuse station |

6.04 To control over the site performance on waste management, the Contractor shall ensure that all solid and liquid waste management works are in full compliance with the relevant license/permit requirements, such as the effluent discharge license and the chemical waste producer registration. The Contractor is also reminded to implement the recommended environmental mitigation measures according to the EM&A Manual based on actual site conditions.

## 7.0 SITE INSPECTION

### REGULAR SITE INSPECTION AND MONTHLY AUDIT

7.01 According to the Updated Environmental Monitoring and Audit Manual stipulation, regular site inspection to evaluate the project environmental performance should be carried out during Construction Phase but it is not required for the Operation Phase.

7.02 During joint site inspection by the Main Contractor, RE, IEC and ET with EPD on 4 December 2014, EPD accepted that EM&A programmes of DC/2009/22 (Contract 1) changed to operation phase in view of the construction works under the contract has completed. Since Wai Ha Tsuen pathway reinstatement and Wai Ha River minor defects rectify work under Contract 2 have not yet completed, EM&A programme for Contract 2 should be continued in the Reporting Period.

7.03 Regular weekly environmental site was performed by the Contractor and RE on **7**, **14**, **21** and **28 January 2015**. Moreover. ET was to undertake independent site inspection on **3, 8, 19, 23 and 30 January 2015**. During site inspection by ET, no non-compliance was observed and the Contractor was reminded to maintain the work area cleanness and tidiness.

### LANDSCAPE AND VISUAL INSPECTION

**Operation Phase of Contract 1**

7.04 According to Section 7.5 of the Updated EM&A Manual, quarterly landscape and visual inspection shall carry out quarterly during the first year of the Operation Phase of **Contract 1**.

7.05 Since construction phase of Contract 1 is completed on 26 November 2014 and accepted by EPD on 4 December 2014. Quarterly landscape and visual inspection is scheduled to conduct in February 2015. Hence no landscape and visual inspection was performed in the Reporting Period for **Contract 1**.

**Construction Phase of Contract 2**

7.06 In this Reporting Period, landscape and visual inspection was carried on **6** and **20 January 2015** for the **Contract 2.** The stand-alone of monthly Landscape & Visual Report signed by the registered Landscape Architect is enclosed in ***Appendix L***.

7.07 The next bi-weekly Landscape & Visual Monitoring in **February 2015** is scheduled to be conducted in the weeks of **2** and **16 February 2015**.

## 8.0 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

### ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION

8.01 For the Project, no environmental complaint, summons and prosecution was received in this Reporting Period. The statistical summary table of environmental complaint for the **Contract 2** is presented in ***Tables 8-1, 8-2*** and ***8-3***.

**Table 8-1 Statistical Summary of Environmental Complaints**

| Reporting Period | Environmental Complaint Statistics | | |
|---|---|---|---|
| | Frequency | Cumulative | Complaint Nature |
| July 2011 –December 2014 | 1 | 1 | Air Quality (1) |
| January 2015 | 0 | 1 | Air Quality (1) |

**Table 8-2 Statistical Summary of Environmental Summons**

| Reporting Period | Environmental Summons Statistics | | |
|---|---|---|---|
| | Frequency | Cumulative | Complaint Nature |
| July 2011 –December 2014 | 0 | 0 | NA |
| January 2015 | 0 | 0 | NA |

**Table 8-3 Statistical Summary of Environmental Prosecution**

| Reporting Period | Environmental Prosecution Statistics | | |
|---|---|---|---|
| | Frequency | Cumulative | Complaint Nature |
| July 2011 –December 2014 | 0 | 0 | NA |
| January 2015 | 0 | 0 | NA |

## 9.0 IMPLEMENTATION STATUS OF MITIGATION MEASURES

9.01 According to the Updated Environmental Monitoring and Audit Manual, mitigation measures recommended for the Construction and Operation Phases are summarized as follows.

**Noise Mitigation Measure**

(a) Only well-maintained plant should be operated on-site and plant shall be serviced regularly during the construction program;

(b) Silencers or mufflers on construction equipment should be utilized and shall be properly maintained during the construction program;

(c) Mobile plant, if any, should be sited as far from NSRs as possible;

(d) Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum;

(e) Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs;

(f) Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activities;

(g) Use of quieter plants to carry out the construction tasks proposed for the Project;

(h) Use about 3.5m high of temporary noise barriers as screened the noisy PMEs to carry out construction of box culvert and site clearance.

(i) Low Impact Method, such as using PMEs smaller in size and to be enclosed by noise enclosure, should be adopted for the construction of box culvert and pipe laying in Wai Ha; and

(j) Use of noise enclosure during the works area for pipe laying in Wai Ha.

**Dust Mitigation Measure**

(a) Use of regular watering to reduce dust emissions from exposed site surfaces and unpaved road, with complete coverage, particularly during dry weather;

(b) Use of frequent watering for particularly dusty static construction areas and areas close to ASRs;

(c) Tarpaulin covering of all dusty vehicle loads transported to, from and between site location;

(d) Establishment and use of vehicle wheel and body washing facilities at the exit points of the site;

(e) Routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs;

(f) Stockpiled excavated materials should be covered with tarpaulin and should be removed offsite within 24 hours to avoid any odour nuisance arising.

**Local Stream Water Quality Mitigation Measure**

(a) Before commencing any site formation work, all sewer and drainage connections shall be sealed to prevent debris, soil, sand etc. from entering public sewers/drains;

(b) 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;

(c) 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 facilities and erosion and sediment control structures shall be inspected monthly and maintained to ensure proper and efficient operation al all times and particularly during rainstorms

(d) Water pumped out from excavated pits shall be discharged into sill removal facilities;

(e) During rainstorms, exposed slope/soil surfaces shall be covered by a tarpaulin or other means. Other measures that need to be implemented before, during, and after rainstorms as summarized in ProPECC PN 1/94 shall be followed

(f) Exposed soil areas shall be minimized to reduce potential for increased siltation and contamination of runoff

(g) 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;

(h) Open stockpiles of construction materials or construction wastes on-site shall be covered with tarpaulin or similar fabric during rainstorms;

(i) 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 01 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;

(j) 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 0.1 at least 300mm from ground level and +2.5 mPD (whichever is greater) to provide adequate allowance for the built-up water level during rainstorm events Unpolluted surface runoff within the works area should then be collected and directed into the existing drainage system;

(k) 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;

(l) Tarpaulin sheets would be used to cover the excavation areas during heavy rainstorms. This would prevent the ingress of rainwater into the trench minimizing the risk of muddy water getting into Wai Ha River and the adjacent Conservation Area;

(m) Any concrete washing water would be contained inside the works site surrounded by the extended sheet piles. A pump sump at the bottom 0f the trench would be provided to pump any excess water during concrete washing;

(n) 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;

(o) Debris and refuse generated on-site should be collected, handled and disposed of properly to avoid entering the Wai Ha River and fish ponds at Shuen Wan. Stockpiles of cement and other construction materials should be kept covered when not being used.

(p) 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 01 the largest tank The bund should be drained of rainwater after a rain event

(q) Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site. A licensed contractor would be responsible for appropriate disposal and maintenance of these facilities;

(r) 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 should 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 April.

**Waste Mitigation Measures**

(a) The Contractor shall observe and comply with the Waste Disposal Ordinance (WDO) and its subsidiary regulations.

(b) The Contractor shall submit to the Engineer for approval a Waste Management Plan with appropriate mitigation measures including the allocation of an area for waste segregation and shall ensure that the day-to-day site operations comply with the approved waste management plan.

(c) The Contractor shall minimize the generation of waste from his work. Avoidance and minimization of waste generation can be achieved through changing or improving design and practices, careful planning and good site management.

(d) The reuse and recycling of waste shall be practised as far as possible. The recycling materials shall include paper/cardboard, timber and metal etc.

(e) The Contractor shall ensure that Construction and Demolition (C&D) materials are sorted into public fill (inert portion) and C&D waste (non-inert portion). The public fill which comprises soil, rock, concrete, brick, cement plaster/mortar, inert building debris, aggregates and asphalt shall be reused in earth filling, reclamation or site formation works. The C&D waste which comprises metal, timber, paper, glass, junk and general garbage shall be reused or recycled where possible and, as the last resort, disposal of at landfills.

(f) The Contractor shall record the amount of wastes generated, recycled and disposed of (including the disposal sites). The Contractor shall use a trip ticket system for the disposal of C&D materials to any designated public filling facility and/or landfill.

(g) In order to avoid dust or odour impacts, any vehicles leaving a works area carrying construction waste or public fill shall have their load covered.

(h) To avoid the excessive use of wood, reusable steel shutters shall be used as a preferred alternative to formwork and falsework where possible.

(i) The Contractor shall observe and comply with the Waste Disposal (Chemical Waste) (General) Regulation. The Contractor shall apply for registration as chemical waste producer under the Waste Disposal (Chemical Waste) (General) Regulation when chemical waste is produced. All chemical waste shall be properly stored, labeled, packaged and collected in accordance with the Regulation.

**Ecology**

- To minimize sedimentation, de-silting should be limited to the dry season
- Waste material produced during de-silting should be disposed of in a timely and appropriate manner

**Landscape and visual**

- 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
- Reinstatement of affected area should be carried out to check that the works areas are properly reinstated

## 10.0 CONCLUSIONS AND RECOMMENTATIONS

### CONCLUSIONS

10.01 This is the **43rd** monthly EM&A report as combined the Contract 1 and Contract 2 presented the Project Construction and Operation Phases monitoring results with inspection findings for the Reporting Period of **1 to 31 January 2015**.

10.02 No noise complaint (which is an Action Level exceedance) was received in this Reporting Period.

10.03 The hydrological characteristics of water depth and water flow rate as compared baseline monitoring period, the currently water depth and volumetric flow rate has insignificant change.

10.04 In the Reporting Period, ecological monitoring in Area under the Project for Contracts 1 and 2 was performed by IEC on ***30 January 2015***. Furthermore, bi-weekly landscape and visual inspection of **Contract 2** was carried out on ***6*** and ***20 January 2015*** and no quarterly inspection conducted for **Contract 1**. The monthly Landscape & Visual Report of **Contract 2** (**January 2015**) has been signed by the registered Landscape Architect.

10.05 Regular weekly environmental site was performed by the Contractor and RE on **7**, **14**, **21** and **28 January 2015**. Moreover. ET was to undertake independent site inspection on **3, 8, 19, 23 and 30 January 2015**. During each event site inspection by ET, it was observed that Wai Ha River minor defects rectify work under Contract 2 of the Project is still in progress. Moreover, extra construction works in refuse station was in progress and it is predicted to be completed in end-February 2015. No non-compliance has observed during the inspection.

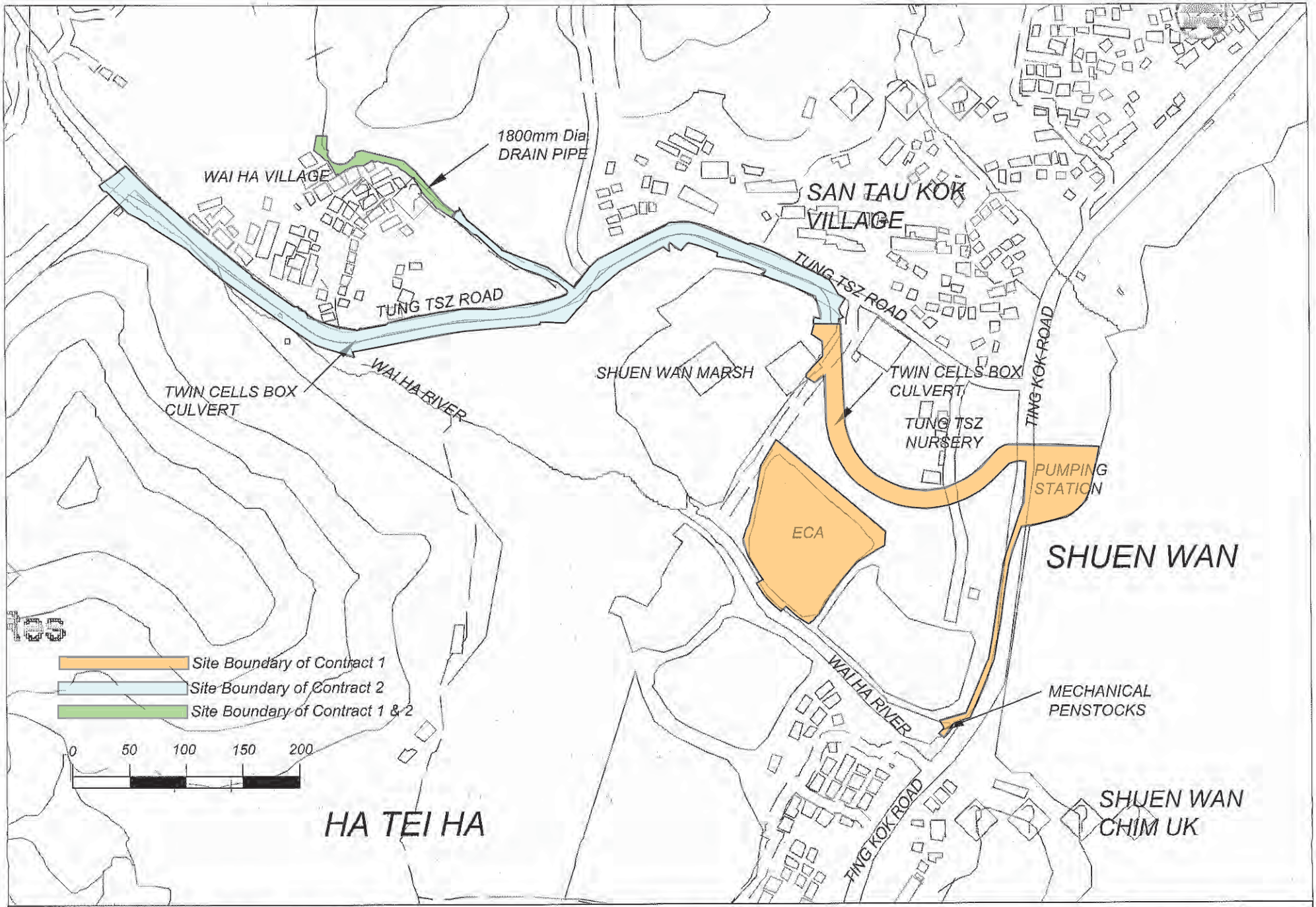
10.06 No documented complaint, notification of summons or successful prosecution was received in the Reporting Period.

### RECOMMENDATIONS

10.07 Due to Wai Ha River minor defects rectify work is still in progress. Mitigation measures for construction dust, noise and wastewater discharge with the required monitoring shall be properly to maintain and perform until to the Project of all works completion.

# Appendix A

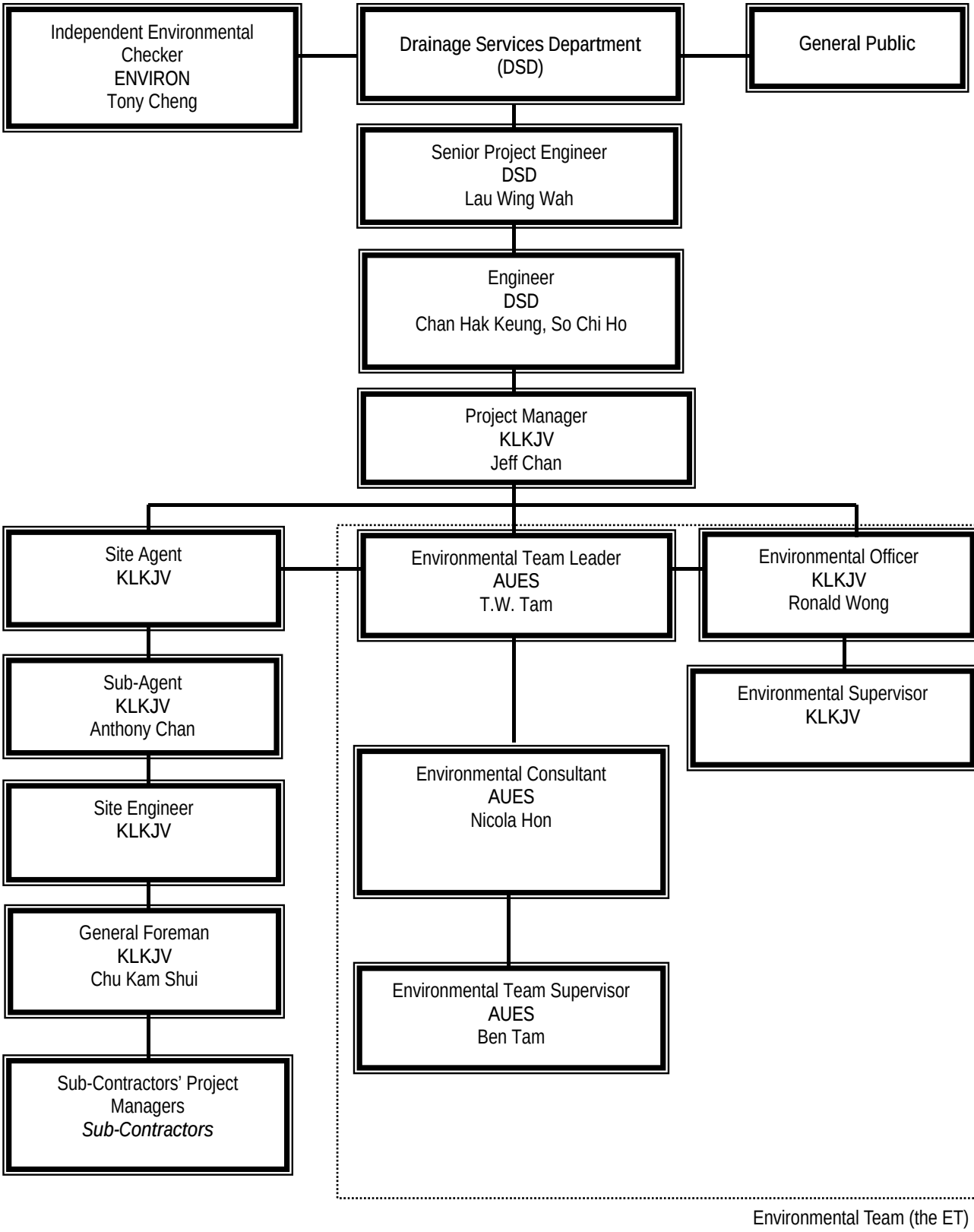
# Project Location at Shuen Wan




**Site Location Plan of DSD Contract 1 and Contract at Shuen Wan**

# Appendix B

# Organization Chart and the Key Contact Person




Environmental Management Organization

## Contact Details of Key Personnel

| Organization | Project Role | Name of Key Staff | Tel No. | Fax No. |
|---|---|---|---|---|
| DSD | Employer | Mr. Luk Wai Hung | 2594 7400 | 2827 8700 |
| DSD | Senior Engineer | Mr. Lau Wing Wah | 2594 7402 | 2827 8700 |
| DSD | Engineer | Mr. Chan Hak Keung | 2594 7596 | 2827 8700 |
| DSD | Engineer | Mr. So Chi Ho | 2594 7356 | 2827 8700 |
| DSD | Senior Inspector | Mr. Tso Si On | 6778 2708 | 2827 8700 |
| ENVIRON | Independent Environmental Checker | Mr. Tong Cheng | 3465-2888 | 3465-2899 |
| KLKJV | Project Director | Mr. Poon Chi Yeung Francis | 2674 3888 | 2674 9988 |
| KLKJV | Project Manager | Mr. Jeff Chan | 2674 3888 | 2674 9988 |
| KLKJV | Sub- Agent | Mr. Anthony Chan | 2674 3888 | 2674 9988 |
| KLKJV | Site Forman | Mr. Chu Kam Shui | 2674 3888 | 2674 9988 |
| KLKJV | Environmental Officer | Mr. Ronald Wong | 2674 3888 | 2674 9988 |
| AUES | Environmental Team Leader | Mr. T.W. Tam | 2959-6059 | 2959-6079 |
| AUES | Environmental Consultant | Miss. Nicola Hon | 2959-6059 | 2959-6079 |
| AUES | Environmental Supervisor | Mr. Ben Tam | 2959-6059 | 2959-6079 |

**Legends:**

*DSD (Employer) – Drainage Services Department*

*DSD (Engineer) – Drainage Services Department*

*KLKJV (Main Contractor) – Kwan Lee-Kuly Joint Venture*

*ENVIRON (IEC) – ENVIRON Hong Kong Limited*

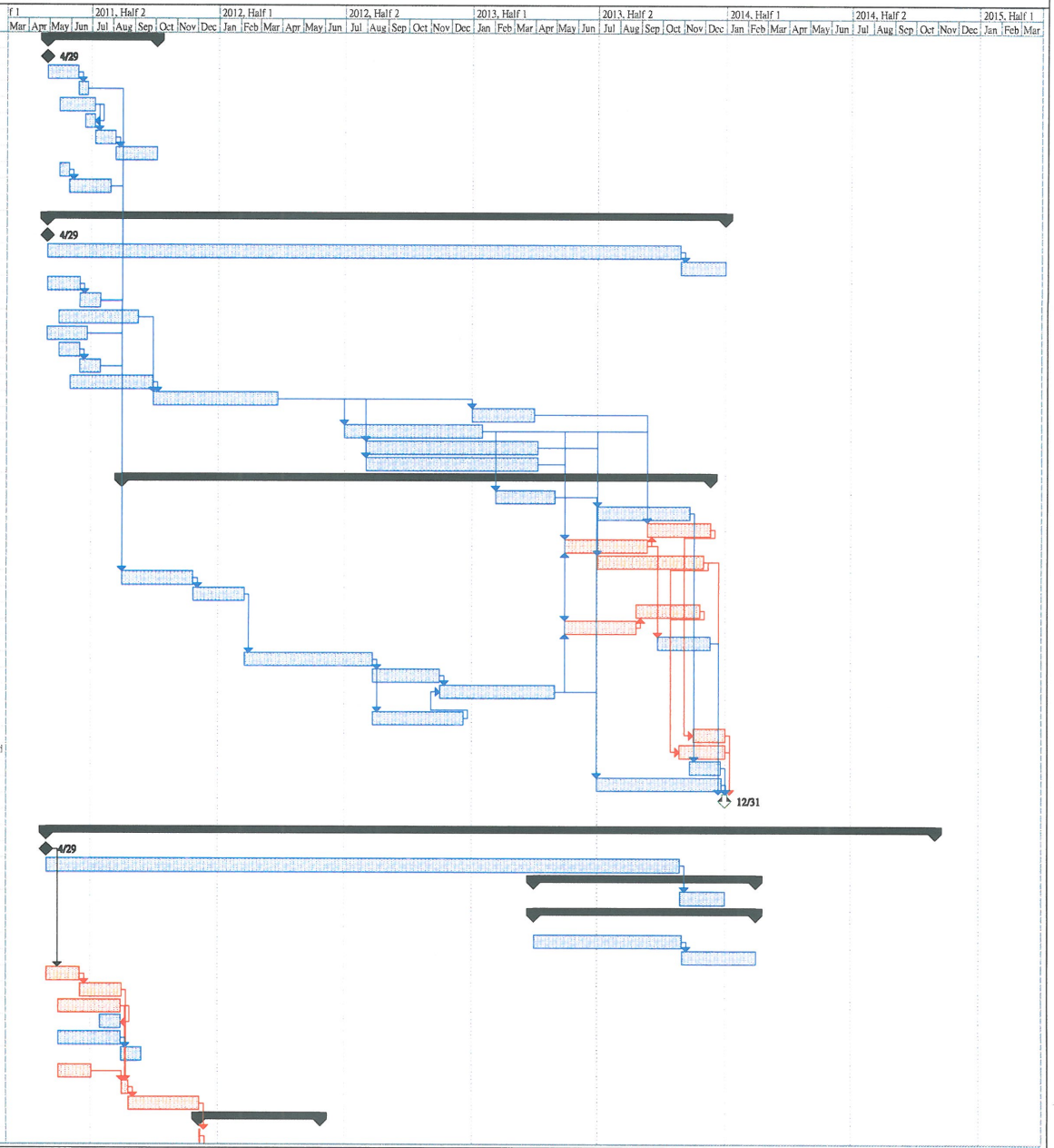
*AUES (ET) – Action-United Environmental Services & Consulting*

# Appendix C

# Master Construction Programs

**Contract No.: DC/2010/02**
**Contract Title: Drainage Improvement Works in Shuen Wan and Shek Wu Wai**
**Updated Programme (No. 6)**

| ID | Task Name | Duration | Start | Finish | Predecessors |
|---|---|---|---|---|---|
| 1 | **Preliminary Works** | **158 days** | **Fri 11 Apr 29** | **Mon 11 Oct 3** | |
| 2 | Commencement of Works | 0 days | Fri 11 Apr 29 | Fri 11 Apr 29 | |
| 3 | Site Clearance | 44 days | Fri 11 Apr 29 | Sat 11 Jun 11 | |
| 4 | Record Survey | 14 days | Sun 11 Jun 12 | Sat 11 Jun 25 | 3 |
| 5 | Design & Construction of Hoarding | 51 days | Mon 11 May 16 | Tue 11 Jul 5 | |
| 6 | Signboard (Type B) | 14 days | Wed 11 Jun 22 | Tue 11 Jul 5 | 5FF |
| 7 | Design & Approval of Engineer's Site Office | 30 days | Wed 11 Jul 6 | Thu 11 Aug 4 | 5 |
| 8 | Construction of Engineer's Site Office | 60 days | Fri 11 Aug 5 | Mon 11 Oct 3 | 7 |
| 9 | Pre-construction Condition Survey | 14 days | Mon 11 May 16 | Sun 11 May 29 | |
| 10 | Relocation of Existing Shrines (2 Nos.) | 60 days | Mon 11 May 30 | Thu 11 Jul 28 | 9 |
| 11 | | | | | |
| 12 | **Section I (Construction Works in Shuen Wan)** | **978 days** | **Fri 11 Apr 29** | **Tue 13 Dec 31** | |
| 13 | **Commencement of Works** | 0 days | Fri 11 Apr 29 | Fri 11 Apr 29 | |
| 14 | **Original Contract Period** | 913 days | Fri 11 Apr 29 | Sun 13 Oct 27 | |
| 15 | **Extension of Time - due to Inclement Weather** | 65 days | Mon 13 Oct 28 | Tue 13 Dec 31 | 14 |
| 16 | Design of TTA | 47 days | Fri 11 Apr 29 | Tue 11 Jun 14 | |
| 17 | Submission of TTA to TMLG for Approval | 30 days | Wed 11 Jun 15 | Thu 11 Jul 14 | 16 |
| 18 | Excavation Permit | 115 days | Mon 11 May 16 | Wed 11 Sep 7 | |
| 19 | Submission & approval of caluclation & MS for BC (including trench ELS/slope) | 58 days | Fri 11 Apr 29 | Sat 11 Jun 25 | |
| 20 | Notify EPD on commencement (one month advance notice) | 30 days | Mon 11 May 16 | Tue 11 Jun 14 | |
| 21 | Tree Felling | 30 days | Wed 11 Jun 15 | Thu 11 Jul 14 | 20 |
| 22 | Utility detection and diversion programme | 120 days | Wed 11 Jun 1 | Wed 11 Sep 28 | |
| 23 | Utilities corordination | 180 days | Thu 11 Sep 29 | Mon 12 Mar 26 | 18,22 |
| 24 | Tempory disconnection of fire hydrant (Bay 7) | 90 days | Tue 13 Jan 1 | Sun 13 Mar 31 | 23 |
| 25 | CLP's overhead pole diversion (bay 1 to Bay 15) | 199 days | Sun 12 Jul 1 | Tue 13 Jan 15 | 23 |
| 26 | Relocation/ diversion of light post (near Bay 13) | 248 days | Wed 12 Aug 1 | Fri 13 Apr 5 | 23 |
| 27 | Relocation/ diversion of light post (near Bay 32) | 248 days | Wed 12 Aug 1 | Fri 13 Apr 5 | 23 |
| 28 | **Construction of Single Cell (approx. 724m)** | **849 days** | **Mon 11 Aug 15** | **Tue 13 Dec 10** | |
| 29 | **Intake of Box Culvert - in progress** | 86 days | Mon 13 Feb 4 | Tue 13 Apr 30 | 25 |
| 30 | from CH67 to CH127 (Bay 1,2,3,4,5) | 133 days | Mon 13 Jul 1 | Sun 13 Nov 10 | 25 |
| 31 | from CH127 to CH152 (Bay 6,7) | 91 days | Wed 13 Sep 11 | Tue 13 Dec 10 | 32,24,25 |
| 32 | from CH152 to CH200 (Bay 8,9,10,11) | 119 days | Wed 13 May 15 | Tue 13 Sep 10 | 41,25 |
| 33 | from CH200 to CH297 (Bay 12,13,14,15,16,17,18,19) | 153 days | Mon 13 Jul 1 | Sat 13 Nov 30 | 26,25 |
| 34 | **from CH297 to CH334 (Bay 20,21,22) completed** | **103 days** | **Mon 11 Aug 15** | **Fri 11 Nov 25** | **17,19,21,10,4** |
| 35 | **from CH334 TO CH395 (Bay 23,24,25,26,27) completed** | **74 days** | **Sat 11 Nov 26** | **Tue 12 Feb 7** | **34** |
| 36 | from CH395 to CH419 (Bay 28,29) | 92 days | Mon 13 Aug 26 | Mon 13 Nov 25 | 37 |
| 37 | From CH419 to CH455 (Bay 30,31,32) | 103 days | Wed 13 May 15 | Sun 13 Aug 25 | 41,27 |
| 38 | from CH455 to CH480 (Bay 33,34) | 76 days | Thu 13 Sep 26 | Tue 13 Dec 10 | 32FS+15 days |
| 39 | **from CH480 to CH541 (Bay 35,36,37,38,39) completed** | **185 days** | **Wed 12 Feb 8** | **Fri 12 Aug 10** | **35** |
| 40 | **from CH541 to CH577 (Bay 40,41,42) completed** | 97 days | Sat 12 Aug 11 | Thu 12 Nov 15 | 39 |
| 41 | **from CH577 to CH674 (Bay 43,44,45,46,47,48,49,50) in progress** | 166 days | Fri 12 Nov 16 | Tue 13 Apr 30 | 40,42FS-44 days |
| 42 | **from CH674 to CH732 (Bay 51,52,53,54,55) completed** | 131 days | Sat 12 Aug 11 | Wed 12 Dec 19 | 39 |
| 43 | RCP (above Bay 6) | 46 days | Sat 13 Nov 16 | Tue 13 Dec 31 | 31FS-25 days |
| 44 | CCTV Inspection | 66 days | Sun 13 Oct 27 | Tue 13 Dec 31 | 36FS-30 days,33FS-35 d |
| 45 | Installation of Type 2 Railing at Upstream (CH67 to CH240) | 45 days | Mon 13 Nov 11 | Wed 13 Dec 25 | 30 |
| 46 | Landscape Softwork | 180 days | Sun 13 Jan 30 | Thu 13 Dec 26 | 29,41FS+60 days |
| 47 | **Completion of Section I** | 0 days | Tue 13 Dec 31 | Tue 13 Dec 31 | 46,45,43,44,33,38 |
| 48 | | | | | |
| 49 | **Section II (Construction Works in Shek Wu Wai)** | **1281 days** | **Fri 11 Apr 29** | **Thu 14 Oct 30** | |
| 50 | Commence of Works | 0 days | Fri 11 Apr 29 | Fri 11 Apr 29 | |
| 51 | Original Contract Period | 913 days | Fri 11 Apr 29 | Sun 13 Oct 27 | |
| 52 | **Extension of Time** | **320 days** | **Mon 13 Apr 1** | **Fri 14 Feb 14** | |
| 53 | EOT due to inclement weather | 65 days | Mon 13 Oct 28 | Tue 13 Dec 31 | 51 |
| 54 | **Utilities in conflict with Construction of Box Culvert at downstream** | **320 days** | **Mon 13 Apr 1** | **Fri 14 Feb 14** | |
| 55 | utilities diversions | 213 days | Mon 13 Apr 1 | Wed 13 Oct 30 | |
| 56 | construction of remaining works | 107 days | Thu 13 Oct 31 | Fri 14 Feb 14 | 55 |
| 57 | Design of TTA | 48 days | Fri 11 Apr 29 | Wed 11 Jun 15 | 50 |
| 58 | Submission of TTA to TMLG for Approval | 60 days | Thu 11 Jun 16 | Sun 11 Aug 14 | 57 |
| 59 | Excavation Permit | 90 days | Mon 11 May 16 | Sat 11 Aug 13 | |
| 60 | Temp. Work Design | 30 days | Fri 11 Jul 15 | Sat 11 Aug 13 | 59FF |
| 61 | Site Investigation for Utilities | 90 days | Mon 11 May 16 | Sat 11 Aug 13 | |
| 62 | Submit Program for Utilities Diversion | 30 days | Sun 11 Aug 14 | Mon 11 Sep 12 | 61 |
| 63 | Site Clearance and Tree Felling | 48 days | Mon 11 May 16 | Sat 11 Jul 2 | |
| 64 | Implement Stage 1 of TTA | 10 days | Mon 11 Aug 15 | Wed 11 Aug 24 | 58,59,63 |
| 65 | Temp. Steel Decking and temporary carriageway | 102 days | Thu 11 Aug 25 | Sun 11 Dec 4 | 64 |
| 66 | **Box Culvert Construction** | **175 days** | **Mon 11 Dec 5** | **Sun 12 May 27** | |
| 67 | Implement Stage 2 of TTA | 1 day | Mon 11 Dec 5 | Mon 11 Dec 5 | 65 |

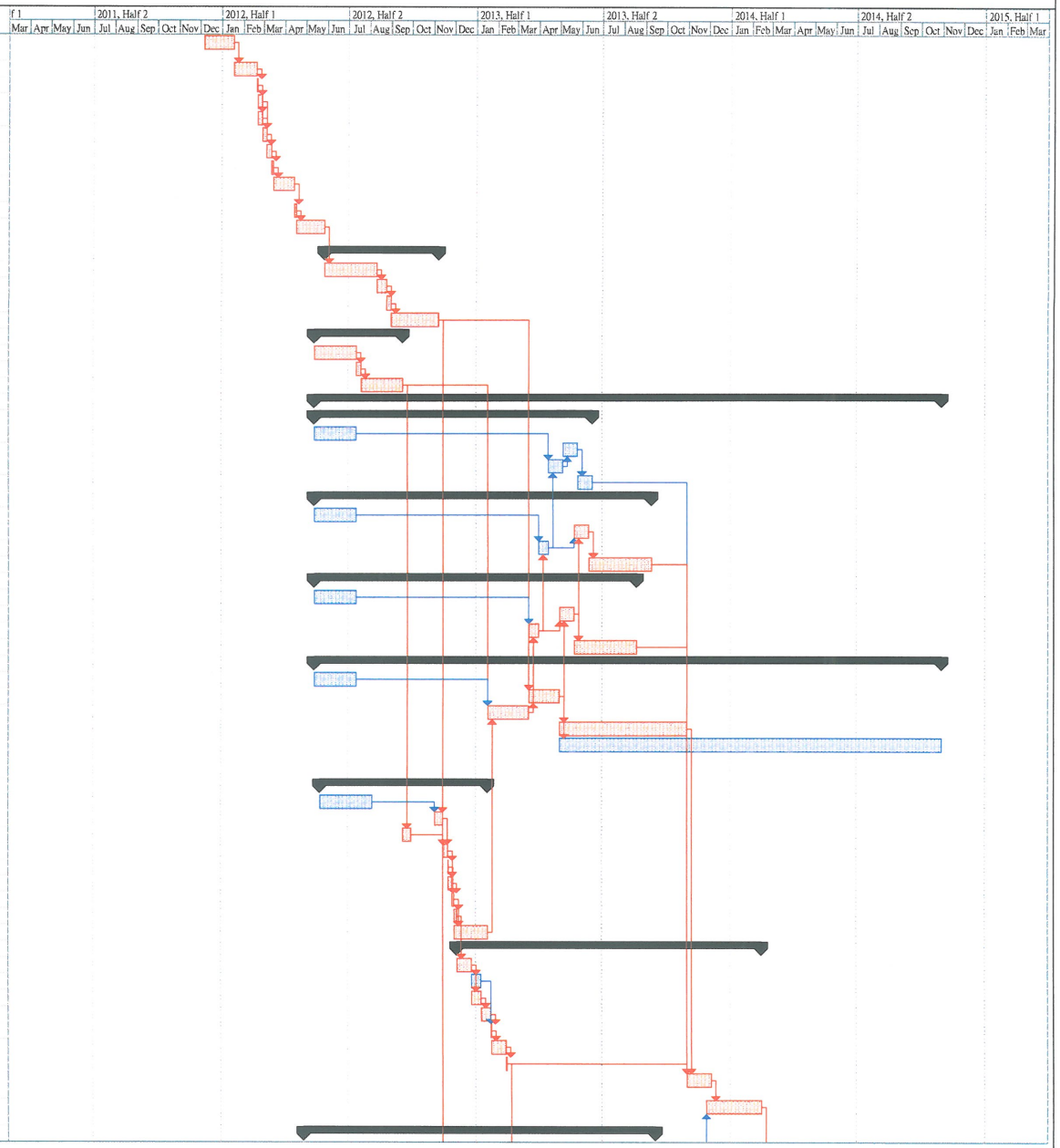



Data Date: 09 Jan 2013
Printed on : 30 March 2013

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

**Contract No.: DC/2010/02**
**Contract Title: Drainage Improvement Works in Shuen Wan and Shek Wu Wai**
**Updated Programme (No. 6)**

| ID | Task Name | Duration | Start | Finish | Predecessors |
|---|---|---|---|---|---|
| 68 | Construction of Box Culvert along Castle Peak Road (West Bound ) including demolition of ex. BC | 43 days | Tue 11 Dec 6 | Tue 12 Jan 17 | 67 |
| 69 | Temporary carriageway for stage 3 TTA | 33 days | Wed 12 Jan 18 | Sun 12 Feb 19 | 68 |
| 70 | Implement Stage 3 of TTA | 1 day | Mon 12 Feb 20 | Mon 12 Feb 20 | 69 |
| 71 | Trial pit for utilities | 7 days | Tue 12 Feb 21 | Mon 12 Feb 27 | 70 |
| 72 | Construction of steel footbridge | 7 days | Tue 12 Feb 21 | Mon 12 Feb 27 | 70 |
| 73 | Installation of steel sheet piles | 6 days | Tue 12 Feb 28 | Sun 12 Mar 4 | 72,71 |
| 74 | Temporary support for utilities | 7 days | Mon 12 Mar 5 | Sun 12 Mar 11 | 73 |
| 75 | Demolish Exisiting Box Culvert (East Bound) | 3 days | Mon 12 Mar 12 | Wed 12 Mar 14 | 74 |
| 76 | Construction of Base Slab & Wall of Box Culvert along Castle Peak Road (East Bound) | 30 days | Thu 12 Mar 15 | Fri 12 Apr 13 | 75 |
| 77 | Remove Temporary flow diversion | 3 days | Sat 12 Apr 14 | Mon 12 Apr 16 | 76 |
| 78 | Construction of 3.5m wide top slab of box culvert along Castle Peak Road (East Bound) | 41 days | Tue 12 Apr 17 | Sun 12 May 27 | 77 |
| 79 | **Construction of RW1 wing wall portion** | **164 days** | **Mon 12 May 28** | **Wed 12 Nov 7** | |
| 80 | CLP (overhead pole) - cable laying | 75 days | Mon 12 May 28 | Fri 12 Aug 10 | 78 |
| 81 | CLP (overhead pole) - changing over | 14 days | Sat 12 Aug 11 | Fri 12 Aug 24 | 80 |
| 82 | *CLP (overhead pole) - removal of overhead pole* | *7 days* | *Sat 12 Aug 25* | *Fri 12 Aug 31* | *81* |
| 83 | Retaining wall RW1 - wing wall portion | 68 days | Sat 12 Sep 1 | Wed 12 Nov 7 | 82 |
| 84 | **Construction of RW2 (wing wall)** | **127 days** | **Mon 12 May 14** | **Mon 12 Sep 17** | |
| 85 | PCCW - XP application | 60 days | Mon 12 May 14 | Thu 12 Jul 12 | |
| 86 | PCCW - demolition of existing joint box/ cable drawpit | 7 days | Fri 12 Jul 13 | Thu 12 Jul 19 | 85 |
| 87 | Retaining wall RW2 (wing wall) | 60 days | Fri 12 Jul 20 | Mon 12 Sep 17 | 86 |
| 88 | **Utilities Diversion by UU** | **900 days** | **Mon 12 May 14** | **Thu 14 Oct 30** | |
| 89 | **CLP (2no. 11kV cables)** | **399 days** | **Mon 12 May 14** | **Sun 13 Jun 16** | |
| 90 | CLP (2 no. 11kV cables) - XP application | 60 days | Mon 12 May 14 | Thu 12 Jul 12 | |
| 91 | CLP (2 no. 11kV cables) - ducting & cable works (near RW1) | 21 days | Mon 13 May 6 | Sun 13 May 26 | 92 |
| 92 | CLP (2 no. 11kV cables) - ducting & cable works (near RW2) | 21 days | Mon 13 Apr 15 | Sun 13 May 5 | 90,97 |
| 93 | CLP (2 no. 11kV cables) - changing over | 21 days | Mon 13 May 27 | Sun 13 Jun 16 | 91 |
| 94 | **NWT** | **484 days** | **Mon 12 May 14** | **Mon 13 Sep 9** | |
| 95 | NWT - XP application | 60 days | Mon 12 May 14 | Thu 12 Jul 12 | |
| 96 | NWT - manholes & ducting construction works (near RW1) | 21 days | Wed 13 May 22 | Tue 13 Jun 11 | 97,101 |
| 97 | NWT - manholes & ducting construction works (near RW2) | 14 days | Mon 13 Apr 1 | Sun 13 Apr 14 | 95,102 |
| 98 | NWT - diversion & changing over | 90 days | Wed 13 Jun 12 | Mon 13 Sep 9 | 96 |
| 99 | **HGC** | **463 days** | **Mon 12 May 14** | **Mon 13 Aug 19** | |
| 100 | HGC - XP application | 60 days | Mon 12 May 14 | Thu 12 Jul 12 | |
| 101 | HGC - manholes & ducting construction works (near RW1) | 21 days | Wed 13 May 1 | Tue 13 May 21 | 102,106 |
| 102 | HGC - manholes & ducting construction works (near RW2) | 14 days | Mon 13 Mar 18 | Sun 13 Mar 31 | 100,107 |
| 103 | HGC - diversion & changing over | 90 days | Wed 13 May 22 | Mon 13 Aug 19 | 101 |
| 104 | **PCCW** | **900 days** | **Mon 12 May 14** | **Thu 14 Oct 30** | |
| 105 | PCCW - XP application | 60 days | Mon 12 May 14 | Thu 12 Jul 12 | |
| 106 | PCCW - manholes & ducting construction works (near RW1) | 44 days | Mon 13 Mar 18 | Tue 13 Apr 30 | 83,107 |
| 107 | PCCW - manholes & ducting construction works (near RW2) | 59 days | Fri 13 Jan 18 | Sun 13 Mar 17 | 87,105,119 |
| 108 | PCCW - diversion & changing over (local cables) | 183 days | Wed 13 May 1 | Wed 13 Oct 30 | 106 |
| 109 | PCCW - diversion & changing over (overseas cables - about 4 nos.) - to be hanged up for construction of remaining Box Culvert | 548 days | Wed 13 May 1 | Thu 14 Oct 30 | 106 |
| 110 | **WSD** | **241 days** | **Tue 12 May 22** | **Thu 13 Jan 17** | |
| 111 | WSD - material delivery | 75 days | Tue 12 May 22 | Sat 12 Aug 4 | |
| 112 | WSD - pipes frabrication, installation & laying (near RW1) | 12 days | Sat 12 Nov 3 | Wed 12 Nov 14 | 83FS-5 days,111 |
| 113 | WSD - pipes frabrication, installation & laying (near RW2) | 12 days | Tue 12 Sep 18 | Sat 12 Sep 29 | 87 |
| 114 | WSD - excavation of connection points | 7 days | Thu 12 Nov 15 | Wed 12 Nov 21 | 112,113 |
| 115 | WSD - inspection of connection points with WSD | 1 day | Thu 12 Nov 22 | Thu 12 Nov 22 | 114 |
| 116 | WSD - swabling/ flushing/ sterilization | 6 days | Thu 12 Nov 22 | Tue 12 Nov 27 | 114 |
| 117 | WSD - shutdown & commissioning by WSD | 3 days | Wed 12 Nov 28 | Fri 12 Nov 30 | 116,115 |
| 118 | WSD - removal of disused pipes/ reinstatement | 4 days | Sat 12 Dec 1 | Tue 12 Dec 4 | 117 |
| 119 | WSD - diversion of 3 nos. dia.25 pipes | 48 days | Sat 12 Dec 1 | Thu 13 Jan 17 | 117 |
| 120 | **Remaining box culvert** | **437 days** | **Wed 12 Dec 5** | **Fri 14 Feb 14** | |
| 121 | Construction of top slab of box culvert for East Bound | 21 days | Wed 12 Dec 5 | Tue 12 Dec 25 | 118 |
| 122 | Construction of temp. footway at downstream | 14 days | Wed 12 Dec 26 | Tue 13 Jan 8 | 121 |
| 123 | Backfilling and removal of temporary works | 14 days | Wed 12 Dec 26 | Tue 13 Jan 8 | 121 |
| 124 | Temporary road surface for East Bound | 14 days | Wed 13 Jan 9 | Tue 13 Jan 22 | 123 |
| 125 | Resume the east bound traffic | 1 day | Wed 13 Jan 23 | Wed 13 Jan 23 | 122,124 |
| 126 | Temporary road surface for West Bound | 21 days | Thu 13 Jan 24 | Wed 13 Feb 13 | 125 |
| 127 | Resume Castle Peak Road traffic for both direction | 1 day | Thu 13 Feb 14 | Thu 13 Feb 14 | 126 |
| 128 | Construction of remaining top slab of box culvert and footpath at downstream | 35 days | Thu 13 Oct 31 | Wed 13 Dec 4 | 127,108,93,98,103 |
| 129 | Implementation of TTA, Permanent road surface & Paving block for footpath and associated works | 79 days | Thu 13 Nov 28 | Fri 14 Feb 14 | 128FS-7 days,136 |
| 130 | **Retaining Wall RW1 & Access Ramp** | **505 days** | **Sun 12 Apr 29** | **Sun 13 Sep 15** | |

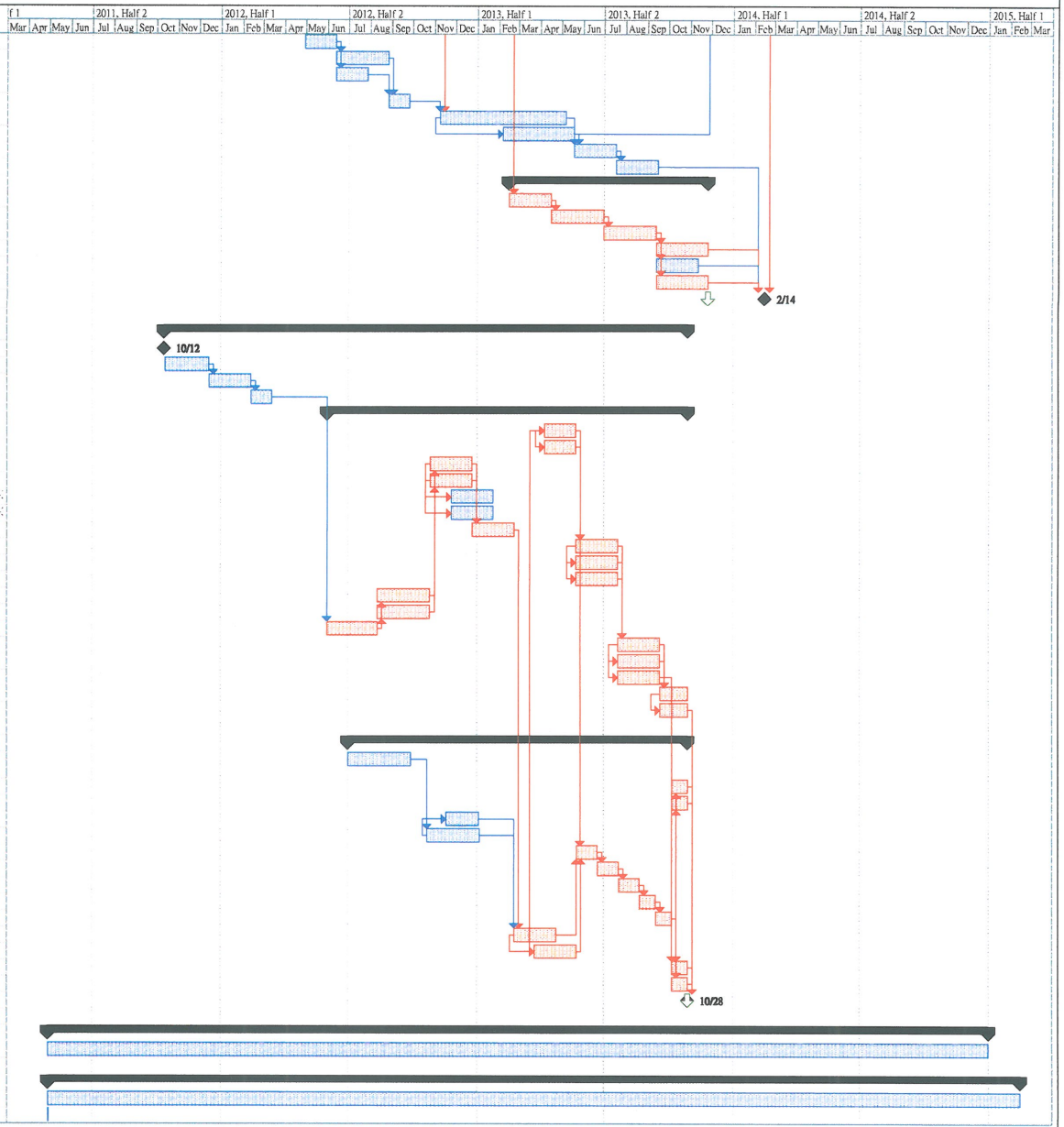



Data Date: 09 Jan 2013
Printed on : 30 March 2013

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

**Contract No.: DC/2010/02**
**Contract Title: Drainage Improvement Works in Shuen Wan and Shek Wu Wai**
**Updated Programme (No. 6)**

| ID | Task Name | Duration | Start | Finish | Predecessors |
|---|---|---|---|---|---|
| 131 | Design & submission of TTA (San Tin Tsuen Road) for construction RW1 | 45 days | Sun 12 Apr 29 | Tue 12 Jun 12 | |
| 132 | Relocation of fire hydrant | 75 days | Wed 12 Jun 13 | Sun 12 Aug 26 | 131 |
| 133 | Coordination with RMO & TD to finalize the implementation date of TTA at San Tin Tsuen Road | 45 days | Wed 12 Jun 13 | Fri 12 Jul 27 | 131 |
| 134 | Implementation of TTA at San Tin Tsuen Road | 30 days | Mon 12 Aug 27 | Tue 12 Sep 25 | 132,133 |
| 135 | Construction of RW1 | 180 days | Thu 12 Nov 8 | Mon 13 May 6 | 83,134 |
| 136 | Construction of access ramp | 102 days | Wed 13 Feb 6 | Sat 13 May 18 | 135SS+90 days |
| 137 | Construction of concrete parapet | 60 days | Sun 13 May 19 | Wed 13 Jul 17 | 136,135 |
| 138 | Installation of railing and vehicular gate | 60 days | Thu 13 Jul 18 | Sun 13 Sep 15 | 137 |
| 139 | **Retaining Wall RW3 & RW4** | **284 days** | **Fri 13 Feb 15** | **Mon 13 Nov 25** | |
| 140 | Removal of steel road bridge at upstream | 60 days | Fri 13 Feb 15 | Mon 13 Apr 15 | 127 |
| 141 | Construction of RW4 | 75 days | Tue 13 Apr 16 | Sat 13 Jun 29 | 140 |
| 142 | Construction of RW3 | 75 days | Sun 13 Jun 30 | Thu 13 Sep 12 | 141 |
| 143 | UU diversion/ permanent works | 74 days | Fri 13 Sep 13 | Mon 13 Nov 25 | 142 |
| 144 | Installation of Type 2 railing and construction of flood wall | 60 days | Fri 13 Sep 13 | Mon 13 Nov 11 | 142 |
| 145 | Reinstatement of footpath and planter areas | 74 days | Fri 13 Sep 13 | Mon 13 Nov 25 | 142 |
| 146 | **Completion of Section II** | 0 days | Fri 14 Feb 14 | Fri 14 Feb 14 | 145,138,143,144,129 |
| 147 | | | | | |
| 148 | **Section III (Construction Works in Wai Ha Village)** | **748 days** | **Wed 11 Oct 12** | **Mon 13 Oct 28** | |
| 149 | Commence of Works | 0 days | Wed 11 Oct 12 | Wed 11 Oct 12 | |
| 150 | Design of 2.4m x 0.9m Box Culvert | 63 days | Thu 11 Oct 13 | Wed 11 Dec 14 | |
| 151 | Submission of design & works proposal for Approval | 60 days | Thu 11 Dec 15 | Sun 12 Feb 12 | 150 |
| 152 | Site Clearance & trial pits | 30 days | Mon 12 Feb 13 | Tue 12 Mar 13 | 151 |
| 153 | **Construction of Box Culvert (approx. 200m) Bay 1 to Bay 16** | **515 days** | **Fri 12 Jun 1** | **Mon 13 Oct 28** | |
| 154 | Bay 1 | 45 days | Sun 13 Apr 7 | Tue 13 May 21 | 185SS+14 days |
| 155 | Bay 2 | 45 days | Sun 13 Apr 7 | Tue 13 May 21 | 154SS |
| 156 | Bay 3 | 60 days | Fri 12 Oct 26 | Mon 12 Dec 24 | 164,165 |
| 157 | Bay 4 | 60 days | Fri 12 Oct 26 | Mon 12 Dec 24 | 164,165 |
| 158 | Bay 5 | 60 days | Sun 12 Nov 25 | Wed 13 Jan 23 | 156SS+30 days,157SS+. |
| 159 | Bay 6 | 60 days | Sun 12 Nov 25 | Wed 13 Jan 23 | 156SS+30 days,157SS+. |
| 160 | Bay 7 | 60 days | Tue 12 Dec 25 | Fri 13 Feb 22 | 156,157 |
| 161 | Bay 8 | 60 days | Wed 13 May 22 | Sat 13 Jul 20 | 154,155 |
| 162 | Bay 9 | 60 days | Wed 13 May 22 | Sat 13 Jul 20 | 161SS |
| 163 | Bay 10 | 60 days | Wed 13 May 22 | Sat 13 Jul 20 | 161SS |
| 164 | Bay 11 | 75 days | Sun 12 Aug 12 | Thu 12 Oct 25 | 166 |
| 165 | Bay 12 | 75 days | Sun 12 Aug 12 | Thu 12 Oct 25 | 166 |
| 166 | Bay 13 | 72 days | Fri 12 Jun 1 | Sat 12 Aug 11 | 152 |
| 167 | Bay 14 | 60 days | Sun 13 Jul 21 | Wed 13 Sep 18 | 161,162,163 |
| 168 | Bay 15 | 60 days | Sun 13 Jul 21 | Wed 13 Sep 18 | 167SS |
| 169 | Bay 16 | 60 days | Sun 13 Jul 21 | Wed 13 Sep 18 | 167SS |
| 170 | Bay 17 | 40 days | Thu 13 Sep 19 | Mon 13 Oct 28 | 167,168,169 |
| 171 | Bay 18 and Outfall | 40 days | Thu 13 Sep 19 | Mon 13 Oct 28 | 170SS |
| 172 | | | | | |
| 173 | **Construction of box culvert (1m x 1m) Bay 1 to Bay 8 (approx. 95m)** | **485 days** | **Sun 12 Jul 1** | **Mon 13 Oct 28** | |
| 174 | Notification to villagers regarding traffic arrangement for construction of 1m x 1m box culvert | 90 days | Sun 12 Jul 1 | Fri 12 Sep 28 | |
| 175 | Intake headwall | 23 days | Sun 13 Oct 6 | Mon 13 Oct 28 | 183 |
| 176 | Bay 1 | 23 days | Sun 13 Oct 6 | Mon 13 Oct 28 | 183 |
| 177 | Bay 2 | 47 days | Sun 12 Nov 18 | Thu 13 Jan 3 | 178SS+27 days |
| 178 | Bay 3 | 75 days | Mon 12 Oct 22 | Fri 13 Jan 4 | 174 |
| 179 | Bay 4 | 30 days | Thu 13 May 23 | Fri 13 Jun 21 | 154,155,184,185 |
| 180 | Bay 5 | 30 days | Sat 13 Jun 22 | Sun 13 Jul 21 | 179 |
| 181 | Bay 6 | 30 days | Mon 13 Jul 22 | Tue 13 Aug 20 | 180 |
| 182 | Bay 7 | 23 days | Wed 13 Aug 21 | Thu 13 Sep 12 | 181 |
| 183 | Bay 8 | 23 days | Fri 13 Sep 13 | Sat 13 Oct 5 | 182 |
| 184 | Bay 9 | 60 days | Sat 13 Feb 23 | Tue 13 Apr 23 | 177,178,160 |
| 185 | Bay 10 | 60 days | Sun 13 Mar 24 | Wed 13 May 22 | 184SS+29 days |
| 186 | CCTV inspection of box culvert | 23 days | Sun 13 Oct 6 | Mon 13 Oct 28 | 183,169 |
| 187 | Grouting of existing 900mm storm drain | 23 days | Sun 13 Oct 6 | Mon 13 Oct 28 | 183 |
| 188 | **Completion of Section III** | 0 days | Mon 13 Oct 28 | Mon 13 Oct 28 | 171,175,176,186,187 |
| 189 | | | | | |
| 190 | **Section IV (Portion A1 and A2, Shuen Wan)** | **1343 days** | **Fri 11 Apr 29** | **Wed 14 Dec 31** | |
| 191 | Landscape Establishment Works and preservation & protection of trees | 1343 days | Fri 11 Apr 29 | Wed 14 Dec 31 | |
| 192 | | | | | |
| 193 | **Section V (Portion B, Sheck Wu Wai)** | **1388 days?** | **Fri 11 Apr 29** | **Sat 15 Feb 14** | |
| 194 | Landscape Establishment Works and preservation & protection of trees | 1388 days | Fri 11 Apr 29 | Sat 15 Feb 14 | |
| 195 | | 1 day? | Fri 11 Apr 29 | Fri 11 Apr 29 | |

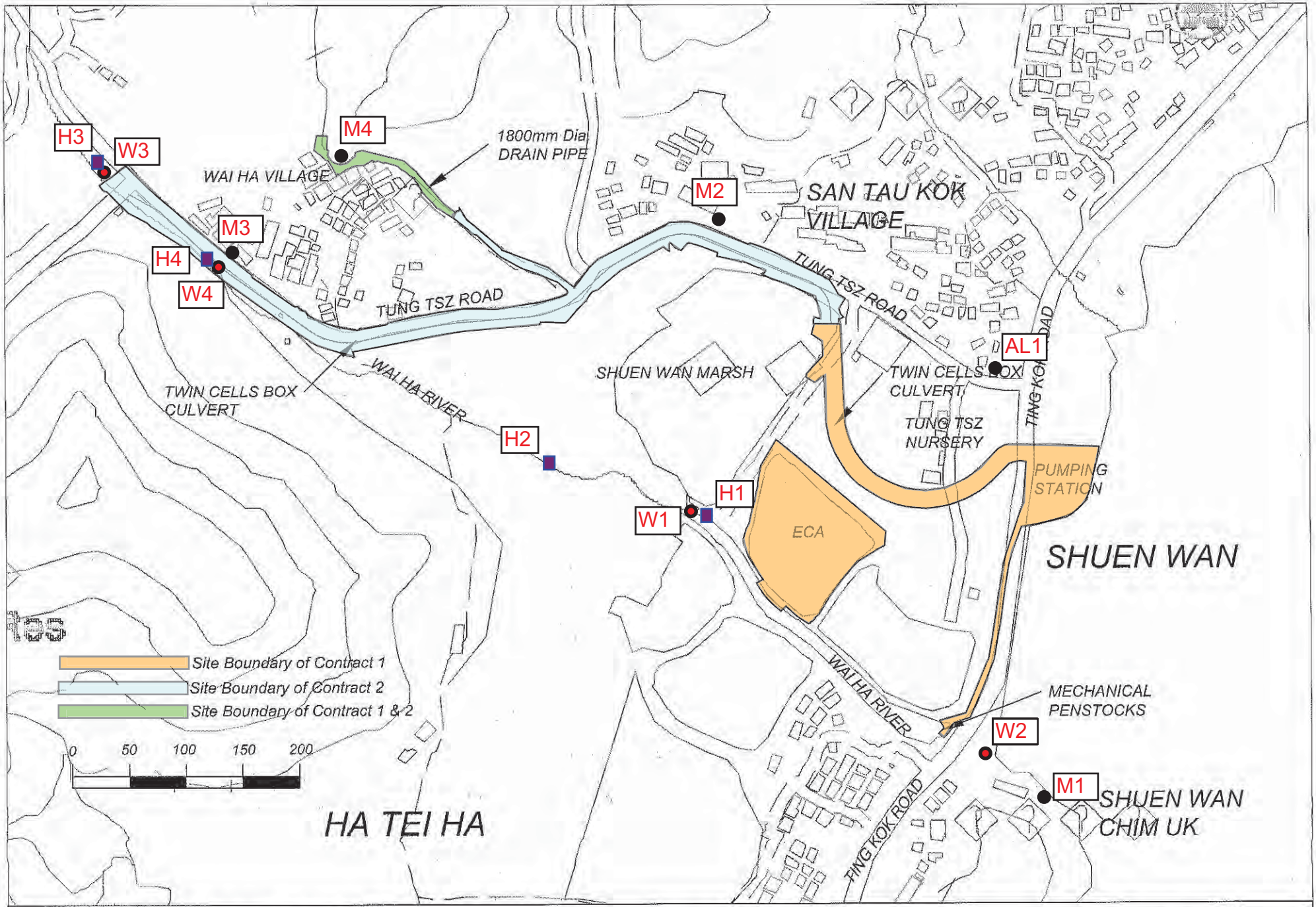



Data Date: 09 Jan 2013
Printed on : 30 March 2013

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

# Appendix D

# Environmental Monitoring Locations




**All Environmental Monitoring Locations**

# Appendix E

# Calibration certificates of the monitoring equipment and Certificate of ALS Technichem (HK) Pty Ltd

## Equipment Calibration List

| Items | Aspect | Description of Equipment | Date of Calibration | Date of Next Calibration |
|---|---|---|---|---|
| 1 | Noise | Rion Sound Level Meter (Serial No. 00410247 ) | 29 Apr 14 | 29 Apr 15 |
| 2 | | Rion Sound Calibrator (Serial No. 34246492) | 28 Feb 14 | 28 Feb 15 |
| 3 | Water | YSI 55A (Serial No. 05F2063AZ) | 7 Oct 14 | 7 Jan 15 |
| 3a* | | YSI Pro 20 (Serial No. 12C100570) | 6 Jan 15 | 6 Apr 15 |
| 4 | | Turbidmeter HACH 2100Q (Serial No. 11030C008499) | 24 Oct 14 | 24 Jan 15 |
| 4a* | | Turbidmeter HACH 2100Q (Serial No. 12060C018266) | 13 Jan 15 | 13 Apr 15 |
| 5* | | pH meter 8685 (Serial No. 1067687) | 24 Oct 14 | 24 Jan 15 |
| 5a* | | pH meter 8685 (Serial No. 212632) | 15 Jan 15 | 15 Apr 15 |

Remarks: (*) Updated Calibration Certificate is attached

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# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

| | | | |
|---|---|---|---|
| **CONTACT:** | MR BEN TAM | **WORK ORDER:** | HK1500371 |
| **CLIENT:** | ACTION UNITED ENVIRO SERVICES | **LABORATORY:** | HONG KONG |
| **ADDRESS:** | RM A 20/F., GOLDEN KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T., HONG KONG | **DATE RECEIVED:** | 06/01/2015 |
| | | **DATE OF ISSUE:** | 14/01/2015 |

## COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.
The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.
The "Next Calibration Date" is recommended according to best practice principals as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

| | |
|---|---|
| Scope of Test: | Dissolved Oxygen and Temperature |
| Description: | Multifunctional Meter |
| Brand Name: | YSI |
| Model No.: | Pro 20 |
| Serial No.: | 12C100570 |
| Equipment No.: | -- |
| Date of Calibration: | 06 January, 2015 |

## 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.

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

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

**Work Order:** HK1500371
**Date of Issue:** 14/01/2015
**Client:** ACTION UNITED ENVIRO SERVICES

Description: Multifunctional Meter
Brand Name: YSI
Model No.: Pro 20
Serial No.: 12C100570
Equipment No.: --
Date of Calibration: 06 January, 2015 Date of next Calibration: 06 April, 2015

**Parameters:**

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

| Expected Reading (mg/L) | Displayed Reading (mg/L) | Tolerance (mg/L) |
|---|---|---|
| 4.58 | 4.46 | -0.12 |
| 6.52 | 6.56 | +0.04 |
| 8.72 | 8.74 | +0.02 |
| | Tolerance Limit (mg/L) | ±0.20 |

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

| Reading of Ref. thermometer (°C) | Displayed Reading (°C) | Tolerance (°C) |
|---|---|---|
| 11.0 | 11.3 | +0.3 |
| 20.0 | 20.6 | +0.6 |
| 36.0 | 35.7 | -0.3 |
| | Tolerance Limit (°C) | ±2.0 |

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

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# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

| | | | |
|---|---|---|---|
| **CONTACT:** | MR BEN TAM | **WORK ORDER:** | HK1500369 |
| **CLIENT:** | ACTION UNITED ENVIRO SERVICES | **LABORATORY:** | HONG KONG |
| **ADDRESS:** | RM A 20/F., GOLDEN KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T., HONG KONG | **DATE RECEIVED:** | 06/01/2015 |
| | | **DATE OF ISSUE:** | 13/01/2015 |

## COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.
The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.
The "Next Calibration Date" is recommended according to best practice principals as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

| | |
|---|---|
| Scope of Test: | Turbidity |
| Equipment Type: | Turbidimeter |
| Brand Name: | HANNA |
| Model No.: | 2100Q |
| Serial No.: | 12060C018266 |
| Equipment No.: | -- |
| Date of Calibration: | 13 January, 2015 |

## 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.

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

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

**Work Order:** HK1500369
**Date of Issue:** 13/01/2015
**Client:** ACTION UNITED ENVIRO SERVICES

Equipment Type: Turbidimeter
Brand Name: HANNA
Model No.: 2100Q
Serial No.: 12060C018266
Equipment No.: --
Date of Calibration: 13 January, 2015 Date of next Calibration: 13 April, 2015

**Parameters:**

**Turbidity**

**Method Ref: APHA 21st Ed. 2130B**

| Expected Reading (NTU) | Displayed Reading (NTU) | Tolerance (%) |
|---|---|---|
| 0 | 0.13 | -- |
| 4 | 3.98 | -0.5 |
| 40 | 41.6 | +4.0 |
| 80 | 82.3 | +2.9 |
| 400 | 393 | -1.8 |
| 800 | 797 | -0.4 |
| | Tolerance Limit (%) | ±10.0 |

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

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# *REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION*

| | | | |
|---|---|---|---|
| **CONTACT:** | MR BEN TAM | **WORK ORDER:** | HK1434242 |
| **CLIENT:** | ACTION UNITED ENVIRO SERVICES | **LABORATORY:** | HONG KONG |
| **ADDRESS:** | RM A 20/F., GOLDEN KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T., HONG KONG | **DATE RECEIVED:** | 21/10/2014 |
| | | **DATE OF ISSUE:** | 27/10/2014 |

## COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.
The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.
The "Next Calibration Date" is recommended according to best practice principals as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

| | |
|---|---|
| Scope of Test: | pH |
| Description: | pH Meter |
| Brand Name: | -- |
| Model No.: | 8685 |
| Serial No.: | 1067687 |
| Equipment No.: | -- |
| Date of Calibration: | 24 October, 2014 |

## 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.

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

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

**Work Order:** HK1434242
**Date of Issue:** 27/10/2014
**Client:** ACTION UNITED ENVIRO SERVICES

Description: pH Meter
Brand Name: --
Model No.: 8685
Serial No.: 1067687
Equipment No.: --
Date of Calibration: 24 October, 2014 Date of next Calibration: 24 January, 2015

**Parameters:**

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

| Expected Reading (pH Unit) | Displayed Reading (pH Unit) | Tolerance (pH unit) |
|---|---|---|
| 4.0 | 4.0 | 0.00 |
| 7.0 | 6.9 | -0.10 |
| 10.0 | 9.9 | -0.10 |
| | Tolerance Limit (pH Unit) | ±0.20 |

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

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# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

| | | | |
|---|---|---|---|
| **CONTACT:** | MR BEN TAM | **WORK ORDER:** | HK1500375 |
| **CLIENT:** | ACTION UNITED ENVIRO SERVICES | **LABORATORY:** | HONG KONG |
| **ADDRESS:** | RM A 20/F., GOLDEN KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T., HONG KONG | **DATE RECEIVED:** | 06/01/2015 |
| | | **DATE OF ISSUE:** | 16/01/2015 |

## COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.
The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.
The "Next Calibration Date" is recommended according to best practice principals as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

| | |
|---|---|
| Scope of Test: | pH |
| Description: | pH Meter |
| Brand Name: | -- |
| Model No.: | 8685 |
| Serial No.: | 212632 |
| Equipment No.: | -- |
| Date of Calibration: | 15 January, 2015 |

## 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.

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

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

**Work Order:** HK1500375
**Date of Issue:** 16/01/2015
**Client:** ACTION UNITED ENVIRO SERVICES

Description: pH Meter
Brand Name: --
Model No.: 8685
Serial No.: 212632
Equipment No.: --
Date of Calibration: 15 January, 2015 Date of next Calibration: 15 April, 2015

**Parameters:**

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

| Expected Reading (pH Unit) | Displayed Reading (pH Unit) | Tolerance (pH unit) |
|---|---|---|
| 4.0 | 3.9 | -0.10 |
| 7.0 | 7.1 | +0.10 |
| 10.0 | 9.9 | -0.10 |
| | Tolerance Limit (pH Unit) | ±0.20 |

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

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

# Appendix F

# Event and Action Plan

## Event Action Plan for Construction Noise

| EVENT | ACTION | | | |
|---|---|---|---|---|
| | ET Leader | IEC | ER | Contractor |
| Action Level | 1. Notify IEC and Contractor<br>2. Carry out investigation.<br>3. Report the results of investigation to the IEC, ER and Contractor.<br>4. Discuss with the Contractor and formulate remedial measures<br>5. Increase monitoring frequency to check mitigation effectiveness. | 1. Review the analyzed results submitted by the ET.<br>2. Review the proposed remedial measures by the Contractor and advise the ER accordingly<br>3. Supervise the implementation of remedial measures | 1. Confirm receipt of notification of failure in writing<br>2. Notify Contractor<br>3. Require Contractor to propose 'remedial measures for the analyzed noise problem<br>4. Check remedial measures are properly implemented. | 1. Submit noise mitigation proposals to IEC<br>2. Implement noise mitigation proposals |
| Limit Level | 1. Notify IEC, ER, EPD and Contractor<br>2. Identify source.<br>3. Repeat measurements to confirm findings<br>4. Increase monitoring frequency.<br>5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented<br>6. Inform IEC, ER and EPD the causes and actions taken for the exceedances<br>7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results<br>8. If exceedance stops, cease additional monitoring. | 1. Discuss amongst ER, ET, and Contractor on the potential remedial actions<br>2. Review Contractor's' remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly<br>3. Supervise the implementation of remedial measures | 1. Confirm receipt of notification of failure in writing<br>2. Notify Contractor<br>3. Require Contractor to propose remedial measures for the analyzed noise problem<br>4. Check remedial measures properly implemented.<br>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 | 1. Take immediate action to avoid further exceedance<br>2. Submit proposals for remedial actions to IEC within 3 working days of notification<br>3. Implement the agreed proposals<br>4. Resubmit proposals if problem still not under control<br>5. Stop the relevant portion of works as determined by the ER until the exceedance is abated |

## Event and action Plan for Water Quality

| Event | ET Leader | IEC | ER | Contractor |
|---|---|---|---|---|
| ACTION LEVEL | | | | |
| Action level being exceeded by one sampling day | 1. Repeat in-situ measurements to confirm findings;<br>2. Identify reasons for non-compliance and source(s) of impact;<br>3. Inform IEC, Contractor and Engineer;<br>4. Check monitoring data, all plant, equipment and Contractor's working methods;<br>5. Discuss mitigation measures with IEC, Engineer and Contractor;<br>6. Ensure mitigation measures are implemented.<br>7. Repeat measurement on next day of exceedance. | 1. Discuss mitigation measures with ET, Engineer and Contractor;<br>2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly;<br>3. Assess effectiveness of implemented mitigation measures. | 1. Discuss proposed mitigation measures with IEC, ET and Contractor;<br>2. Make agreement on mitigation measures to be implemented;<br>3. Assess effectiveness of implemented mitigation measures. | 1. Inform Engineer and confirm in writing notification of the non-compliance;<br>2. Rectify unacceptable practice;<br>3. Check all plant and equipment;<br>4. Consider changes in working methods;<br>5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days;<br>6. Implement agreed mitigation measures. |
| Action level being exceeded by more than two consecutive sampling days | 1. Repeat in-situ measurements to confirm findings;<br>2. Identify reasons for non-compliance and source(s) of impact;<br>3. Inform IEC, Contractor and Engineer;<br>4. Check monitoring data, all plant, equipment and Contractor's working methods;<br>5. Discuss mitigation measures with IEC, Engineer and Contractor;<br>6. Ensure mitigation measures are implemented.<br>7. Prepare to increase the monitoring frequency to daily;<br>8. Repeat measurement on next day of exeedance. | 1. Discuss mitigation measures with ET, Engineer and Contractor;<br>2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly;<br>3. Assess effectiveness of implemented mitigation measures. | 1. Discuss proposed mitigation measures with IEC, ET and Contractor;<br>2. Make agreement on mitigation measures to be implemented;<br>3. Assess effectiveness of implemented mitigation measures. | 1. Inform Engineer and confirm in writing notification of the non-compliance;<br>2. Rectify unacceptable practice;<br>3. Check all plant and equipment;<br>4. Consider changes in working methods;<br>5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days;<br>6. Implement agreed mitigation measures |
| LIMIT LEVEL | | | | |
| Limit level being exceeded by one sampling day | 1. Repeat in-situ measurements to confirm findings;<br>2. Identify reasons for non-compliance and source(s) of impact;<br>3. Inform EPD, IEC, Contractor and Engineer;<br>4. Check monitoring data, all plant, equipment and Contractor's working methods;<br>5. Discuss mitigation measures with IEC, Engineer and Contractor;<br>6. Ensure mitigation measures are implemented;<br>7. Increase the monitoring frequency to daily until no exceedance of Limit Level. | 1. Discuss mitigation measures with ET, Engineer and Contractor;<br>2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly;<br>3. Assess effectiveness of implemented mitigation measures. | 1. Discuss proposed mitigation measures with IEC, ET and Contractor;<br>2. Request Contractor to critically review the working methods;<br>3. Make agreement on mitigation measures to be implemented;<br>4. Assess effectiveness of implemented mitigation measures. | 1. Inform Engineer and confirm in writing notification of the non-compliance;<br>2. Rectify unacceptable practice;<br>3. Check all plant and equipment;<br>4. Consider changes in working methods;<br>5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days;<br>6. Implement agreed mitigation measures. |
| Limit level being exceeded by more than two consecutive sampling days | 1. Repeat in-situ measurements to confirm findings;<br>2. Identify reasons for non-compliance and source(s) of impact;<br>3. Inform EPD, IEC, Contractor and Engineer;<br>4. Check monitoring data, all plant, equipment and Contractor's working methods;<br>5. Discuss mitigation measures with IEC, Engineer and Contractor;<br>6. Ensure mitigation measures are implemented.<br>7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days. | 1. Discuss mitigation measures with ET, Engineer and Contractor;<br>2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly;<br>3. Assess effectiveness of implemented mitigation measures. | 1. Discuss proposed mitigation measures with IEC, ET and Contractor;<br>2. Request Contractor to critically review the working methods;<br>3. Make agreement on mitigation measures to be implemented;<br>4. Assess effectiveness of implemented mitigation measures;<br>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. | 1. Inform Engineer and confirm in writing notification of the non-compliance;<br>2. Rectify unacceptable practice;<br>3. Check all plant and equipment;<br>4. Consider changes in working methods;<br>5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days;<br>6. Implement agreed mitigation measures;<br>7. As directed by the Engineer, slow down or stop all or part of the construction activities until no exceedance of Limit level. |

# Event and action Plan for Hydrological Characteristics

| Event | ET Leader | IEC | ER | Contractor |
|---|---|---|---|---|
| ACTION LEVEL | | | | |
| Action level being exceeded by one sampling day | 1. Repeat in-situ measurements to confirm findings;<br>2. Identify reasons for non-compliance and source(s) of impact;<br>3. Inform IEC, Contractor and Engineer;<br>4. Check monitoring data, Contractor's working methods and any excavation works or dewatering processes;<br>5. Discuss mitigation measures with IEC, Engineer and Contractor;<br>6. Ensure mitigation measures are implemented.<br>7. Repeat measurement on next day of exceedance. | 1. Discuss mitigation measures with ET, Engineer and Contractor;<br>2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly;<br>3. Assess effectiveness of implemented mitigation measures. | 1. Discuss proposed mitigation measures with IEC, ET and Contractor;<br>2. Make agreement on mitigation measures to be implemented;<br>3. Assess effectiveness of implemented mitigation measures. | 1. Inform Engineer and confirm in writing notification of the non-compliance;<br>2. Rectify unacceptable practice;<br>3. Check working methods and any excavation works or dewatering processes;<br>4. Consider changes in working methods and plans;<br>5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days;<br>6. Implement agreed mitigation measures. |
| Action level being exceeded by more than two consecutive sampling days | 1. Repeat in-situ measurements to confirm findings;<br>2. Identify reasons for non-compliance and source(s) of impact;<br>3. Inform IEC, Contractor and Engineer;<br>4. Check monitoring data, Contractor's working methods and any excavation works or dewatering processes;<br>5. Discuss mitigation measures with IEC, Engineer and Contractor;<br>6. Ensure mitigation measures are implemented.<br>7. Prepare to increase the monitoring frequency to daily;<br>8. Repeat measurement on next day of exeedance. | 1. Discuss mitigation measures with ET, Engineer and Contractor;<br>2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly;<br>3. Assess effectiveness of implemented mitigation measures. | 1. Discuss proposed mitigation measures with IEC, ET and Contractor;<br>2. Make agreement on mitigation measures to be implemented;<br>3. Assess effectiveness of implemented mitigation measures. | 1. Inform Engineer and confirm in writing notification of the non-compliance;<br>2. Rectify unacceptable practice;<br>3. Check working methods and any excavation works or dewatering processes;<br>4. Consider changes in working methods and plans;<br>5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days;<br>6. Implement agreed mitigation measures |
| LIMIT LEVEL | | | | |
| Limit level being exceeded by one sampling day | 1. Repeat in-situ measurements to confirm findings;<br>2. Identify reasons for non-compliance and source(s) of impact;<br>3. Inform AFCD, IEC, Contractor and Engineer;<br>4. Check monitoring data, and Contractor's working methods and any excavation works or dewatering processes;<br>5. Discuss mitigation measures with IEC, Engineer and Contractor;<br>6. Ensure mitigation measures are implemented;<br>7. Increase the monitoring frequency to daily until no exceedance of Limit level. | 1. Discuss mitigation measures with ET, Engineer and Contractor;<br>2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly;<br>3. Assess effectiveness of implemented mitigation measures. | 1. Discuss proposed mitigation measures with IEC, ET and Contractor;<br>2. Request Contractor to critically review the working methods;<br>3. Make agreement on mitigation measures to be implemented;<br>4. Assess effectiveness of implemented mitigation measures. | 1. Inform Engineer and confirm in writing notification of the non-compliance;<br>2. Rectify unacceptable practice;<br>3. Check working methods and any excavation works or dewatering processes;<br>4. Consider changes in working methods and plans;<br>5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days;<br>6. Implement agreed mitigation measures. |
| Limit level being exceeded by more than two consecutive sampling days | 1. Repeat in-situ measurements to confirm findings;<br>2. Identify reasons for non-compliance and source(s) of impact;<br>3. Inform AFCD, IEC, Contractor and Engineer;<br>4. Check monitoring data and Contractor's working methods and any excavation works or dewatering processes;<br>5. Discuss mitigation measures with IEC, Engineer and Contractor;<br>6. Ensure mitigation measures are implemented.<br>7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days. | 1. Discuss mitigation measures with ET, Engineer and Contractor;<br>2. Review proposals on mitigation measures submitted by Contractor and advise the Engineer accordingly;<br>3. Assess effectiveness of implemented mitigation measures. | 1. Discuss proposed mitigation measures with IEC, ET and Contractor;<br>2. Request Contractor to critically review the working methods;<br>3. Make agreement on mitigation measures to be implemented;<br>4. Assess effectiveness of implemented mitigation measures;<br>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. | 1. Inform Engineer and confirm in writing notification of the non-compliance;<br>2. Rectify unacceptable practice;<br>3. Check working methods and any excavation works or dewatering processes;<br>4. Consider changes in working methods and plans;<br>5. Discuss with ET, IEC and Engineer and propose mitigation measures to IEC and Engineer within three working days;<br>6. Implement agreed mitigation measures;<br>7. As directed by the Engineer, slow down or stop all or part of the construction activities until no exceedance of Limit level. |

# Appendix G

# Monitoring Schedule in Reporting Period and the Coming Month

## Monitoring Schedule in this Reporting Period – January 2015

| Date | | Water Monitoring | | Noise Monitoring | Weekly Site Inspection |
|---|---|---|---|---|---|
| | | Sampling and In-situ Measurement | Hydrological Characteristics | | |
| Thu | 1-Jan-15 | | | | |
| Fri | 2-Jan-15 | | | | |
| Sat | 3-Jan-15 | W1, W2, W3, W4 | H1, H2, H3, H4 | M1, AL1, M2, M3, M4 | Contract 2 |
| Sun | 4-Jan-15 | | | | |
| Mon | 5-Jan-15 | | | | |
| Tue | 6-Jan-15 | W1, W2, W3, W4 | | | |
| Wed | 7-Jan-15 | | | | |
| Thu | 8-Jan-15 | W1, W2, W3, W4 | H1, H2, H3, H4 | M1, AL1, M2, M3, M4 | Contract 2 |
| Fri | 9-Jan-15 | | | | |
| Sat | 10-Jan-15 | W1, W2, W3, W4 | | | |
| Sun | 11-Jan-15 | | | | |
| Mon | 12-Jan-15 | W1, W2, W3, W4 | | | |
| Tue | 13-Jan-15 | | | | |
| Wed | 14-Jan-15 | W1, W2, W3, W4 | | | |
| Thu | 15-Jan-15 | | | | |
| Fri | 16-Jan-15 | W1, W2, W3, W4 | H1, H2, H3, H4 | M1, AL1, M2, M3, M4 | Contract 2 |
| Sat | 17-Jan-15 | | | | |
| Sun | 18-Jan-15 | | | | |
| Mon | 19-Jan-15 | W1, W2, W3, W4 | | | |
| Tue | 20-Jan-15 | | | | |
| Wed | 21-Jan-15 | W1, W2, W3, W4 | | | |
| Thu | 22-Jan-15 | | | | |
| Fri | 23-Jan-15 | W1, W2, W3, W4 | H1, H2, H3, H4 | M1, AL1, M2, M3, M4 | Contract 2 |
| Sat | 24-Jan-15 | | | | |
| Sun | 25-Jan-15 | | | | |
| Mon | 26-Jan-15 | W1, W2, W3, W4 | H1, H2, H3, H4 | M1, AL1, M2, M3, M4 | Contract 2 |
| Tue | 27-Jan-15 | | | | |
| Wed | 28-Jan-15 | W1, W2, W3, W4 | | | |
| Thu | 29-Jan-15 | | | | |
| Fri | 30-Jan-15 | W1, W2, W3, W4 | | | |
| Sat | 31-Jan-15 | | | | |

| | |
|---|---|
| | Monitoring Day |
| | Sunday or Public Holiday |

## Monitoring Schedule for next Reporting Period – February 2015

| Date | | Stream Monitoring | | Noise Monitoring |
|---|---|---|---|---|
| | | Water Sampling | Water Sampling | |
| Sun | 1-Feb-15 | | | |
| Mon | 2-Feb-15 | **W1, W2, W3, W4** | | |
| Tue | 3-Feb-15 | | | |
| Wed | 4-Feb-15 | **W1, W2, W3, W4** | **H1, H2, H3, H4** | **M1, AL1,M2, M3, M4** |
| Thu | 5-Feb-15 | | | |
| Fri | 6-Feb-15 | **W1, W2, W3, W4** | | |
| Sat | 7-Feb-15 | | | |
| Sun | 8-Feb-15 | | | |
| Mon | 9-Feb-15 | | | |
| Tue | 10-Feb-15 | **W1, W2, W3, W4** | | |
| Wed | 11-Feb-15 | | | |
| Thu | 12-Feb-15 | **W1, W2, W3, W4** | **H1, H2, H3, H4** | **M1, AL1,M2, M3, M4** |
| Fri | 13-Feb-15 | | | |
| Sat | 14-Feb-15 | **W1, W2, W3, W4** | | |
| Sun | 15-Feb-15 | | | |
| Mon | 16-Feb-15 | **W1, W2, W3, W4** | **H1, H2, H3, H4** | **M1, AL1,M2, M3, M4** |
| Tue | 17-Feb-15 | | | |
| Wed | 18-Feb-15 | **W1, W2, W3, W4** | | |
| Thu | 19-Feb-15 | **Chinese New Year** | | |
| Fri | 20-Feb-15 | **Chinese New Year** | | |
| Sat | 21-Feb-15 | **Chinese New Year** | | |
| Sun | 22-Feb-15 | | | |
| Mon | 23-Feb-15 | **W1, W2, W3, W4** | | |
| Tue | 24-Feb-15 | | | |
| Wed | 25-Feb-15 | **W1, W2, W3, W4** | | |
| Thu | 26-Feb-15 | | | |
| Fri | 27-Feb-15 | **W1, W2, W3, W4** | **H1, H2, H3, H4** | **M1, AL1,M2, M3, M4** |
| Sat | 28-Feb-15 | | | |

| | |
|---|---|
| | Monitoring Day |
| | Sunday or Public Holiday |

# Appendix H

# Meteorological Data of Reporting Period

## Meteorological Data in Reporting Period

| Date | | Weather | Total Rainfall (mm) | Tai Po Station | | Shatin Station | |
|---|---|---|---|---|---|---|---|
| | | | | Mean Air Temp. (°C) | Mean Relative Humidity (%) | Wind Speed (km/h) | Wind Direction |
| 1-Jan-15 | Thu | Some haze. Cloudy and significantly cooler overnight. Moderate to fresh north to northeasterly winds. | 0 | 15.2 | 59.7 | 6.6 | NE |
| 2-Jan-15 | Fri | Some haze. Cloudy and significantly cooler overnight. Moderate to fresh north to northeasterly winds. | 0 | 15.0 | 65.7 | 7.5 | N.NE |
| 3-Jan-15 | Sat | Fine and dry. Moderate northeasterly winds, fresh at times. | 0 | Maintenance | | 7.0 | N.NE |
| 4-Jan-15 | Sun | Mainly fine and dry. Moderate east to northeasterly winds, fresh offshore. | 0 | Maintenance | | 8.0 | E/NE |
| 5-Jan-15 | Mon | Some haze. Cloudy and significantly cooler overnight. Moderate to fresh north to northeasterly winds. | 0 | 18.9 | 81.2 | 8.1 | E |
| 6-Jan-15 | Tue | Some haze. Cloudy and significantly cooler overnight. Moderate to fresh north to northeasterly winds. | 0 | 20.7 | 82.0 | 6.5 | NE |
| 7-Jan-15 | Wed | Some haze. Cloudy and significantly cooler overnight. Moderate to fresh north to northeasterly winds. | 0.1 | 15.1 | 80.5 | 5.9 | N/NE |
| 8-Jan-15 | Thu | Fine and dry. Moderate northeasterly winds, fresh at times. | 0 | 14.6 | 61.5 | 8.0 | NE |
| 9-Jan-15 | Fri | Mainly fine and dry. Moderate east to northeasterly winds, fresh offshore. | 0 | 14.9 | 65.0 | 6.4 | N/NE |
| 10-Jan-15 | Sat | Mainly fine and dry. Moderate east to northeasterly winds, fresh offshore. | 0 | 14.9 | 63.5 | 7.5 | N |
| 11-Jan-15 | Sun | Overcast with occasional rain. Fresh north to northeasterly winds. | Trace | 16.4 | 62.2 | 8.0 | N |
| 12-Jan-15 | Mon | Overcast with occasional rain. Fresh north to northeasterly winds. | 14.9 | 13.9 | 79.2 | 9.4 | N/NE |
| 13-Jan-15 | Tue | One or two light rain patches at first. It will be cold. Moderate north to northeasterly winds, fresh at first. | 25.8 | 11.6 | 88.7 | 10.0 | N |
| 14-Jan-15 | Wed | Fine and dry. Moderate northeasterly winds. | 0 | 13.1 | 66.5 | 11.1 | NE |
| 15-Jan-15 | Thu | Fine and dry. Moderate northeasterly winds. | 0 | 12.3 | 65.0 | 6.6 | N/NE |
| 16-Jan-15 | Fri | Fine and dry. Moderate northeasterly winds. | 0 | 16.6 | 64.5 | 6.0 | N/NE |
| 17-Jan-15 | Sat | Mainly fine. Moderate to fresh easterly winds. | 0 | 14.6 | 64.5 | 9.0 | E/SE |
| 18-Jan-15 | Sun | Mainly fine. Moderate to fresh easterly winds. | 0 | 15.8 | 60.7 | 6.4 | N/NE |
| 19-Jan-15 | Mon | Fine. Very dry in the afternoon. Moderate easterly to northeasterly winds, occasionally fresh later. | 0 | 14.6 | 47.5 | 7.3 | N/NE |
| 20-Jan-15 | Tue | Sunny periods in the afternoon. Cloudy tonight. Fresh easterly winds. | 0 | 15.3 | 63.5 | 5.5 | N/NE |
| 21-Jan-15 | Wed | Mainly fine. Moderate to fresh easterly winds. | Trace | 16.3 | 64.7 | 4.5 | E/NE |
| 22-Jan-15 | Thu | Fine and dry. Moderate northeasterly winds. | 0 | 16.2 | 51.0 | 6.5 | N |
| 23-Jan-15 | Fri | Mainly fine. Moderate to fresh easterly winds. | 0 | 15.0 | 62.2 | 8.2 | E |
| 24-Jan-15 | Sat | Mainly fine. Moderate to fresh easterly winds. | 0.9 | 17.1 | 78.2 | 8.2 | E/NE |
| 25-Jan-15 | Sun | Fine. Very dry in the afternoon. Moderate easterly to northeasterly winds, occasionally fresh later. | Trace | 18.5 | 81.5 | 7.3 | E/SE |
| 26-Jan-15 | Mon | Sunny periods in the afternoon. Cloudy tonight. Fresh easterly winds. | 0 | 18.0 | 82.5 | 7.5 | E/NE |
| 27-Jan-15 | Tue | Mainly fine. Moderate to fresh easterly winds. | 0 | 18.7 | 80.5 | 9.1 | E/SE |
| 28-Jan-15 | Wed | Sunny periods in the afternoon. Cloudy tonight. Fresh easterly winds. | Trace | 16.4 | 77.2 | 9.0 | E/NE |
| 29-Jan-15 | Thu | Mainly fine. Moderate to fresh easterly winds. | Trace | 16.0 | 75.7 | 8.9 | E/NE |
| 30-Jan-15 | Fri | Mainly fine. Moderate to fresh easterly winds. | 0 | 16.1 | 78.2 | 5.5 | N/NE |
| 31-Jan-15 | Sat | Mainly fine. Moderate to fresh easterly winds. | Trace | 13.7 | 83.7 | 5.1 | N |

** The record was downloaded from The Hong Kong Observatory Weather Stations*

# Appendix I

# Data Base of Monitoring Results

## Construction Noise Measurement Data

### Designated Monitoring Station – M1 (14, Shuen Wan Chim Uk)

| Date | Start Time | 1st $Leq_{5min}$ | 2nd $Leq_{5min}$ | 3rd $Leq_{5min}$ | 4th $Leq_{5min}$ | 5th $Leq_{5min}$ | 6th $Leq_{5min}$ | $Leq_{30min}$ | Corrected* $Leq_{30min}$ |
|---|---|---|---|---|---|---|---|---|---|
| 3-Jan-15 | 13:00 | 59.3 | 57.2 | 57.2 | 58.4 | 58.7 | 58.5 | 58.3 | 61 |
| 8-Jan-15 | 11:07 | 55.5 | 53.6 | 55.3 | 56.1 | 55.5 | 55.3 | 55.3 | 58 |
| 16-Jan-15 | 15:25 | 54.4 | 57.1 | 53.6 | 55.0 | 56.1 | 56.8 | 55.7 | 59 |
| 23-Jan-15 | 10:58 | 56.8 | 58.0 | 57.0 | 57.3 | 57.8 | 57.3 | 57.4 | 60 |
| 26-Jan-15 | 10:41 | 56.7 | 54.5 | 53.4 | 56.1 | 59.1 | 57.0 | 56.5 | 60 |
| **Limit Level** | | - | | | | | | **> 75 dB(A)** | |

(*) A façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines.

### Designated Monitoring Station – AL1 (Joint Village Office for Villages in Shuen Wan, Tai Po)

| Date | Start Time | 1st $Leq_{5min}$ | 2nd $Leq_{5min}$ | 3rd $Leq_{5min}$ | 4th $Leq_{5min}$ | 5th $Leq_{5min}$ | 6th $Leq_{5min}$ | $Leq_{30min}$ | Corrected* $Leq_{30min}$ |
|---|---|---|---|---|---|---|---|---|---|
| 3-Jan-15 | 13:34 | 53.5 | 54.9 | 54.0 | 53.5 | 55.1 | 52.4 | 54.0 | 57 |
| 8-Jan-15 | 11:40 | 56.1 | 58.2 | 54.5 | 53.2 | 54.1 | 55.2 | 55.5 | 59 |
| 16-Jan-15 | 14:52 | 58.3 | 57.6 | 59.1 | 58.7 | 58.5 | 59.4 | 58.6 | 62 |
| 23-Jan-15 | 11:34 | 62.2 | 63.4 | 62.6 | 65.0 | 62.7 | 63.9 | 63.4 | 66 |
| 26-Jan-15 | 11:14 | 57.7 | 59.0 | 61.3 | 56.8 | 60.6 | 57.3 | 59.1 | 62 |
| **Limit Level** | | - | | | | | | **> 75 dB(A)** | |

(*) A façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines.

### Designated Monitoring Station - M2 (150, San Tau Kok)

| Date | Start Time | 1st $Leq_{5min}$ | 2nd $Leq_{5min}$ | 3rd $Leq_{5min}$ | 4th $Leq_{5min}$ | 5th $Leq_{5min}$ | 6th $Leq_{5min}$ | $Leq_{30min}$ | Corrected* $Leq_{30min}$ |
|---|---|---|---|---|---|---|---|---|---|
| 3-Jan-15 | 14:50 | 57.0 | 58.3 | 56.9 | 57.4 | 60.5 | 59.0 | 58.4 | 61 |
| 8-Jan-15 | 14:49 | 60.8 | 58.9 | 60.1 | 60.0 | 61.6 | 60.5 | 60.4 | 63 |
| 16-Jan-15 | 14:19 | 57.6 | 56.3 | 58.7 | 56.7 | 58.7 | 56.8 | 57.6 | 61 |
| 23-Jan-15 | 11:12 | 64.3 | 58.2 | 59.5 | 58.1 | 61.2 | 59.3 | 60.7 | 64 |
| 26-Jan-15 | 13:36 | 58.5 | 58.4 | 59.4 | 58.8 | 59.8 | 62.5 | 59.8 | 63 |
| **Limit Level** | | - | | | | | | **> 75 dB(A)** | |

(*) A façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines.

### Designated Monitoring Station – M3 (31,Wai Ha)

| Date | Start Time | 1st $Leq_{5min}$ | 2nd $Leq_{5min}$ | 3rd $Leq_{5min}$ | 4th $Leq_{5min}$ | 5th $Leq_{5min}$ | 6th $Leq_{5min}$ | $Leq_{30min}$ | Corrected* $Leq_{30min}$ |
|---|---|---|---|---|---|---|---|---|---|
| 3-Jan-15 | 11:17 | 56.0 | 53.1 | 55.6 | 55.2 | 57.1 | 57.8 | 56.0 | 59 |
| 8-Jan-15 | 13:00 | 57.2 | 56.6 | 54.5 | 55.6 | 56.8 | 55.1 | 56.1 | 59 |
| 16-Jan-15 | 13:08 | 56.6 | 56.6 | 57.8 | 55.5 | 55.2 | 56.7 | 56.5 | 59 |
| 23-Jan-15 | 09:57 | 66.0 | 64.2 | 59.1 | 63.7 | 62.5 | 56.9 | 63.0 | 66 |
| 26-Jan-15 | 09:40 | 57.6 | 59.9 | 62.4 | 57.4 | 56.1 | 62.4 | 60.0 | 63 |
| **Limit Level** | | - | | | | | | **> 75 dB(A)** | |

(*) A façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines.

### Designated Monitoring Station – M4 (Block 15, Treasure Spot Garden)

| Date | Start Time | 1st $Leq_{5min}$ | 2nd $Leq_{5min}$ | 3rd $Leq_{5min}$ | 4th $Leq_{5min}$ | 5th $Leq_{5min}$ | 6th $Leq_{5min}$ | $Leq_{30min}$ | Corrected* $Leq_{30min}$ |
|---|---|---|---|---|---|---|---|---|---|
| 3-Jan-15 | 14:14 | 42.9 | 45.0 | 44.1 | 47.1 | 46.4 | 44.3 | 45.2 | 48 |
| 8-Jan-15 | 14:15 | 51.4 | 49.7 | 52.9 | 49.7 | 49.2 | 45.8 | 50.3 | 53 |
| 16-Jan-15 | 13:42 | 46.6 | 44.5 | 46.5 | 47.9 | 48.0 | 46.9 | 46.9 | 50 |
| 23-Jan-15 | 10:35 | 41.3 | 44.7 | 39.8 | 47.0 | 45.3 | 44.8 | 44.4 | 47 |
| 26-Jan-15 | 13:00 | 46.1 | 47.5 | 53.3 | 44.4 | 47.8 | 44.9 | 48.5 | 52 |
| **Limit Level** | | - | | | | | | **> 75 dB(A)** | |

(*) A façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines.

**DSD Contract No. DC/2010/02**
**Contract No. - Drainage Improvement in Shuen Wan and Shek Wu Wai**
**Summary of Water Quality Monitoring Results**

AUES

| Location | Action/ Limit Level | DO (mg/L) | | DO (%) | | Turbidity (NTU) | | pH | | SS(mg/L) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 (impact) | | Action | 7.27 | Action | n/a | Action | 4.77 | Action | n/a | Action | 9.73 |
| | | Limit | 4 | Limit | n/a | Limit | 5.26 | Limit | n/a | Limit | 10.77 |
| W2 (impact) | | Action | 7.26 | Action | n/a | Action | 2.46 | Action | n/a | Action | 8.89 |
| | | Limit | 4 | Limit | n/a | Limit | 3.42 | Limit | n/a | Limit | 9.75 |
| W3 (control) | | n/a | | n/a | | n/a | | n/a | | n/a | |
| W4 (impact) | | Action | 9.27 | Action | n/a | Action | 3.32 | Action | n/a | Action | 6.98 |
| | | Limit | 4 | Limit | n/a | Limit | 4.52 | Limit | n/a | Limit | 7.66 |

| Date | 3-Jan-15 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| W1 - ebb (impact) | 12:27 | 0.38 | 22.5 | 22.5 | 6.23 | 6.2 | 73.9 | 73.8 | 2.61 | 2.6 | 7.8 | 7.8 | 4 | 4.0 |
| | | | 22.5 | | 6.19 | | 73.7 | | 2.58 | | 7.8 | | 4 | |
| W1- flood (impact) | 17:49 | 0.44 | 23.7 | 23.7 | 6.17 | 6.2 | 73.7 | 73.4 | 2.92 | 3.0 | 7.9 | 7.9 | 5 | 5.0 |
| | | | 23.7 | | 6.14 | | 73.1 | | 3.06 | | 7.9 | | 5 | |
| W2-Edd (Impact) | 11:44 | 0.39 | 20.5 | 20.5 | 7.42 | 7.5 | 84.6 | 85.6 | 2.77 | 2.8 | 7.8 | 7.8 | 4 | 4.0 |
| | | | 20.5 | | 7.53 | | 86.5 | | 2.74 | | 7.8 | | 4 | |
| W2-Flood (Impact) | 18:04 | 0.43 | 21.7 | 21.7 | 6.83 | 6.7 | 77.8 | 77.0 | 3.1 | 3.2 | 7.8 | 7.8 | 3 | 3.0 |
| | | | 21.7 | | 6.59 | | 76.2 | | 3.21 | | 7.8 | | 3 | |
| W3 (control) | 10:47 | 0.36 | 20.3 | 20.3 | 8.05 | 8.0 | 93.1 | 92.0 | 1.46 | 1.5 | 8.6 | 8.6 | <2 | 2.0 |
| | | | 20.3 | | 7.91 | | 90.9 | | 1.45 | | 8.6 | | <2 | |
| W4 (impact) | 11:06 | 0.24 | 20 | 20.0 | 7.52 | 7.4 | 87.7 | 85.8 | 1.73 | 1.8 | 8.4 | 8.4 | <2 | 2.0 |
| | | | 20 | | 7.33 | | 83.9 | | 1.81 | | 8.4 | | <2 | |

| Date | 6-Jan-15 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| W1 - ebb (impact) | 13:22 | 0.38 | 25.6 | 25.6 | 6.63 | 6.7 | 80.6 | 83.2 | 2.92 | 3.0 | 7.5 | 7.5 | 5 | 5.0 |
| | | | 25.6 | | 6.84 | | 85.7 | | 3.11 | | 7.4 | | 5 | |
| W1- flood (impact) | 16:55 | 0.41 | 25.9 | 25.9 | 6.95 | 6.9 | 87.8 | 87.5 | 3.36 | 3.3 | 7.2 | 7.3 | 5 | 5.0 |
| | | | 25.9 | | 6.88 | | 87.2 | | 3.2 | | 7.3 | | 5 | |
| W2-Edd (Impact) | 13:41 | 0.38 | 26.5 | 26.5 | 6.84 | 6.8 | 83.9 | 82.7 | 3.82 | 3.7 | 7.4 | 7.4 | 5 | 5.0 |
| | | | 26.5 | | 6.71 | | 81.5 | | 3.61 | | 7.4 | | 5 | |
| W2-Flood (Impact) | 17:09 | 0.44 | 26.3 | 26.3 | 6.64 | 6.5 | 82.4 | 80.7 | 4.05 | 4.0 | 7.2 | 7.2 | 5 | 5.0 |
| | | | 26.3 | | 6.43 | | 78.9 | | 3.99 | | 7.2 | | 5 | |
| W3 (control) | 16:12 | 0.36 | 26.7 | 26.7 | 6.73 | 6.7 | 84.5 | 83.7 | 6.11 | 6.1 | 8.7 | 8.7 | <2 | 2.0 |
| | | | 26.7 | | 6.64 | | 82.8 | | 6.03 | | 8.7 | | <2 | |
| W4 (impact) | 16:38 | 0.28 | 26.8 | 26.8 | 6.91 | 6.9 | 88.5 | 88.6 | 5.57 | 5.5 | 8.4 | 8.4 | <2 | 2.0 |
| | | | 26.8 | | 6.97 | | 88.7 | | 5.41 | | 8.4 | | <2 | |

| Date | 8-Jan-15 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| W1 - ebb (impact) | 15:38 | 0.34 | 20.4 | 20.4 | 7.25 | 7.3 | 88.7 | 89.0 | 4.99 | 4.9 | 8.4 | 8.4 | 3 | 3.0 |
| | | | 20.4 | | 7.31 | | 89.3 | | 4.75 | | 8.4 | | 3 | |
| W1- flood (impact) | 11:01 | 0.38 | 19.4 | 19.4 | 6.77 | 6.8 | 82.7 | 83.0 | 5.67 | 5.6 | 8.2 | 8.2 | 2 | 2.0 |
| | | | 19.4 | | 6.81 | | 83.2 | | 5.5 | | 8.2 | | 2 | |
| W2-Edd (Impact) | 15:24 | 0.41 | 20.8 | 20.8 | 8.57 | 8.7 | 108.2 | 109.9 | 4.49 | 4.6 | 8.4 | 8.4 | 5 | 5.0 |
| | | | 20.8 | | 8.82 | | 111.5 | | 4.79 | | 8.4 | | 5 | |
| W2-Flood (Impact) | 10:44 | 0.44 | 19.3 | 19.3 | 6.68 | 6.7 | 86.7 | 86.8 | 6.48 | 6.6 | 8.2 | 8.3 | 5 | 5.0 |
| | | | 19.3 | | 6.7 | | 86.9 | | 6.68 | | 8.3 | | 5 | |
| W3 (control) | 13:45 | 0.28 | 19.2 | 19.2 | 7.41 | 7.4 | 80.2 | 79.7 | 3.97 | 3.8 | 8.9 | 8.9 | 3 | 3.0 |
| | | | 19.2 | | 7.31 | | 79.1 | | 3.62 | | 8.9 | | 3 | |
| W4 (impact) | 14:00 | 0.27 | 18.9 | 18.9 | 8.63 | 8.6 | 92.9 | 92.6 | 4.7 | 4.8 | 8.4 | 8.4 | 2 | 2.0 |
| | | | 18.9 | | 8.58 | | 92.2 | | 4.89 | | 8.3 | | 2 | |

| Date | 10-Jan-15 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| W1 - ebb (impact) | 14:10 | 0.39 | 19.1 | 19.1 | 6.61 | 6.6 | 85 | 84.6 | 3.89 | 3.8 | 8.2 | 8.2 | 3 | 3.0 |
| | | | 19.1 | | 6.54 | | 84.1 | | 3.68 | | 8.2 | | 3 | |
| W1- flood (impact) | 9:19 | 0.42 | 18.3 | 18.3 | 7.22 | 7.1 | 92.8 | 91.7 | 3.44 | 3.5 | 8.1 | 8.1 | 2 | 2.0 |
| | | | 18.3 | | 7.04 | | 90.5 | | 3.62 | | 8.1 | | 2 | |
| W2-Edd (Impact) | 14;23 | 0.42 | 18.1 | 18.1 | 7.29 | 7.3 | 93 | 93.0 | 3.66 | 3.8 | 8.4 | 8.4 | 5 | 5.0 |
| | | | 18.1 | | 7.29 | | 92.9 | | 3.84 | | 8.4 | | 5 | |
| W2-Flood (Impact) | 9:28 | 0.44 | 19 | 19.0 | 7.86 | 7.8 | 94.2 | 93.7 | 3.21 | 3.3 | 8.3 | 8.3 | 4 | 4.0 |
| | | | 19 | | 7.68 | | 93.1 | | 3.29 | | 8.3 | | 4 | |
| W3 (control) | 13:42 | 0.31 | 18.4 | 18.4 | 8.13 | 8.0 | 86.5 | 85.7 | 1.7 | 1.8 | 8.6 | 8.6 | <2 | 2.0 |
| | | | 18.4 | | 7.96 | | 84.8 | | 1.85 | | 8.6 | | <2 | |
| W4 (impact) | 13:54 | 0.26 | 18.3 | 18.3 | 8.92 | 8.9 | 94.9 | 95.0 | 2.39 | 2.2 | 8.1 | 8.1 | <2 | 2.0 |
| | | | 18.3 | | 8.94 | | 95.1 | | 2.09 | | 8 | | <2 | |

| Date | 12-Jan-15 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| W1 - ebb (impact) | 17:06 | 0.22 | 15.9 | 15.9 | 6.08 | 6.1 | 66.2 | 66.1 | 16.7 | 16.5 | 7.5 | 7.5 | 11 | 11.0 |
| | | | 15.9 | | 6.03 | | 65.9 | | 16.3 | | 7.5 | | 11 | |
| W1- flood (impact) | 10:58 | 0.26 | 16.8 | 16.8 | 5.44 | 5.4 | 59.5 | 59.3 | 20.2 | 20.4 | 7.5 | 7.5 | 12 | 12.0 |
| | | | 16.8 | | 5.4 | | 59.1 | | 20.6 | | 7.5 | | 12 | |
| W2-Edd (Impact) | 17:20 | 0.57 | 16 | 16.0 | 6.77 | 6.8 | 79.9 | 79.8 | 9.83 | 9.9 | 8.1 | 8.1 | 12 | 12.0 |
| | | | 16 | | 6.75 | | 79.6 | | 10 | | 8.1 | | 12 | |
| W2-Flood (Impact) | 11:12 | 0.59 | 17.3 | 17.3 | 7.03 | 7.0 | 82.7 | 82.7 | 8.48 | 8.5 | 8 | 8.0 | 11 | 11.0 |
| | | | 17.3 | | 7.03 | | 82.6 | | 8.56 | | 8 | | 11 | |
| W3 (control) | 10:37 | 0.27 | 16.9 | 16.9 | 7.79 | 7.8 | 80.7 | 80.6 | 6.31 | 6.4 | 8.2 | 8.2 | 4 | 4.0 |
| | | | 16.9 | | 7.77 | | 80.4 | | 6.48 | | 8.2 | | 4 | |
| W4 (impact) | 10:46 | 0.31 | 17.2 | 17.2 | 8.14 | 8.2 | 84.5 | 84.7 | 7.82 | 7.7 | 7.7 | 7.7 | 4 | 4.0 |
| | | | 17.2 | | 8.17 | | 84.9 | | 7.64 | | 7.7 | | 4 | |

| Date | 14-Jan-15 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Time** | **Depth (m)** | **Temp (oC)** | | **DO (mg/L)** | | **DO (%)** | | **Turbidity (NTU)** | | **pH** | | **SS(mg/L)** | |
| W1 - ebb (impact) | 17:10 | 0.40 | 19.2 | 19.2 | 7.56 | 7.7 | 93.8 | 94.2 | 12.4 | 12.8 | 8.2 | 8.2 | 8 | 8.0 |
| | | | 19.2 | | 7.89 | | 94.6 | | 13.1 | | 8.2 | | 8 | |

**DSD Contract No. DC/2010/02**
**Contract No. - Drainage Improvement in Shuen Wan and Shek Wu Wai**
**Summary of Water Quality Monitoring Results**

AUES

| Location | Action / Limit Level | DO (mg/L) | | DO (%) | | Turbidity (NTU) | | pH | | SS(mg/L) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 (impact) | | Action | 7.27 | Action | n/a | Action | 4.77 | Action | n/a | Action | 9.73 |
| | | Limit | 4 | Limit | n/a | Limit | 5.26 | Limit | n/a | Limit | 10.77 |
| W2 (impact) | | Action | 7.26 | Action | n/a | Action | 2.46 | Action | n/a | Action | 8.89 |
| | | Limit | 4 | Limit | n/a | Limit | 3.42 | Limit | n/a | Limit | 9.75 |
| W3 (control) | | n/a | | n/a | | n/a | | n/a | | n/a | |
| W4 (impact) | | Action | 9.27 | Action | n/a | Action | 3.32 | Action | n/a | Action | 6.98 |
| | | Limit | 4 | Limit | n/a | Limit | 4.52 | Limit | n/a | Limit | 7.66 |

| Location | Time | Depth (m) | Temp (oC) | | DO (mg/L) | | DO (%) | | Turbidity (NTU) | | pH | | SS(mg/L) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1- flood (impact) | 9:20 | 0.47 | 18.6 | 18.6 | 6.73 | 6.6 | 86.5 | 85.2 | 16 | 15.5 | 8.1 | 8.1 | 8 | 8.0 |
| | | | 18.6 | | 6.52 | | 83.8 | | 14.9 | | 8.1 | | 8 | |
| W2-Edd (Impact) | 17:31 | 0.44 | 18.6 | 18.6 | 7.37 | 7.3 | 88.2 | 88.0 | 4.07 | 4.1 | 8.2 | 8.2 | 6 | 6.0 |
| | | | 18.6 | | 7.32 | | 87.8 | | 4.22 | | 8.2 | | 6 | |
| W2-Flood (Impact) | 9:33 | 0.53 | 17.8 | 17.8 | 6.16 | 6.1 | 78.1 | 77.7 | 6.53 | 6.4 | 7.9 | 7.9 | 5 | 5.0 |
| | | | 17.8 | | 6.09 | | 77.2 | | 6.36 | | 7.9 | | 5 | |
| W3 (control) | 10:02 | 0.36 | 18.2 | 18.2 | 8.38 | 8.4 | 88.2 | 88.1 | 3.15 | 3.2 | 8.4 | 8.4 | <2 | 2.0 |
| | | | 18.2 | | 8.36 | | 88 | | 3.27 | | 8.4 | | <2 | |
| W4 (impact) | 10:19 | 0.28 | 18 | 18.0 | 9.34 | 9.3 | 98.7 | 98.3 | 2.5 | 2.5 | 7.9 | 7.9 | <2 | 2.0 |
| | | | 18 | | 9.26 | | 97.8 | | 2.46 | | 7.8 | | <2 | |

| Date | 16-Jan-15 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Time | Depth (m) | Temp (oC) | | DO (mg/L) | | DO (%) | | Turbidity (NTU) | | pH | | SS(mg/L) | |
| W1 - ebb (impact) | 10:31 | 0.38 | 17.5 | 17.5 | 7.89 | 7.7 | 94.6 | 94.2 | 8.51 | 8.3 | 8.3 | 8.3 | 12 | 12.0 |
| | | | 17.5 | | 7.56 | | 93.8 | | 8.04 | | 8.3 | | 12 | |
| W1- flood (impact) | 15:17 | 0.43 | 18.3 | 18.3 | 7.16 | 7.2 | 90.1 | 90.4 | 10.7 | 10.5 | 8.2 | 8.2 | 12 | 12.0 |
| | | | 18.3 | | 7.26 | | 90.6 | | 10.2 | | 8.2 | | 12 | |
| W2-Edd (Impact) | 10:43 | 0.47 | 17.3 | 17.3 | 7.34 | 7.4 | 81.8 | 82.5 | 1.67 | 1.7 | 8.3 | 8.3 | 6 | 6.0 |
| | | | 17.3 | | 7.42 | | 83.1 | | 1.74 | | 8.3 | | 6 | |
| W2-Flood (Impact) | 15:39 | 0.51 | 18.4 | 18.4 | 5.94 | 6.0 | 76.3 | 75.8 | 2.52 | 2.4 | 8 | 8.0 | 4 | 4.0 |
| | | | 18.4 | | 6.02 | | 75.3 | | 2.31 | | 8 | | 4 | |
| W3 (control) | 16:02 | 0.37 | 17.8 | 17.8 | 8.82 | 8.8 | 92.9 | 92.2 | 1.64 | 1.8 | 8.5 | 8.5 | 2 | 2.0 |
| | | | 17.8 | | 8.68 | | 91.4 | | 1.87 | | 8.5 | | 2 | |
| W4 (impact) | 16:14 | 0.26 | 18.1 | 18.1 | 9.16 | 9.2 | 97 | 97.2 | 1.32 | 1.4 | 8.1 | 8.1 | 2 | 2.0 |
| | | | 18.1 | | 9.2 | | 97.3 | | 1.42 | | 8.1 | | 2 | |

| Date | 19-Jan-15 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Time | Depth (m) | Temp (oC) | | DO (mg/L) | | DO (%) | | Turbidity (NTU) | | pH | | SS(mg/L) | |
| W1 - ebb (impact) | 10:59 | 0.42 | 17.8 | 17.8 | 7.96 | 7.9 | 102.3 | 102.2 | 4.12 | 4.2 | 8.3 | 8.3 | 6 | 6.0 |
| | | | 17.8 | | 7.93 | | 102 | | 4.28 | | 8.3 | | 6 | |
| W1- flood (impact) | 17:12 | 0.49 | 18.6 | 18.6 | 7.54 | 7.5 | 86.1 | 84.4 | 5.14 | 5.2 | 8.1 | 8.1 | 7 | 7.0 |
| | | | 18.6 | | 7.38 | | 82.6 | | 5.32 | | 8.1 | | 7 | |
| W2-Edd (Impact) | 10:41 | 0.38 | 18 | 18.0 | 9.03 | 9.0 | 116.1 | 116.0 | 6.36 | 6.4 | 8.4 | 8.4 | 5 | 5.0 |
| | | | 18 | | 9.02 | | 115.9 | | 6.51 | | 8.4 | | 5 | |
| W2-Flood (Impact) | 16:49 | 0.47 | 18.8 | 18.8 | 8.19 | 8.3 | 107.1 | 106.2 | 7.61 | 7.5 | 8.3 | 8.3 | 5 | 5.0 |
| | | | 18.8 | | 8.33 | | 105.3 | | 7.44 | | 8.3 | | 5 | |
| W3 (control) | 16:11 | 0.34 | 18.1 | 18.1 | 7.32 | 7.3 | 77.5 | 77.8 | 4.65 | 4.4 | 7.8 | 7.8 | 4 | 4.0 |
| | | | 18.1 | | 7.37 | | 78 | | 4.16 | | 7.7 | | 4 | |
| W4 (impact) | 16:23 | 0.25 | 18 | 18.0 | 8.92 | 8.9 | 94.3 | 94.1 | 4.12 | 4.0 | 7.7 | 7.7 | 5 | 5.0 |
| | | | 18 | | 8.89 | | 93.9 | | 3.82 | | 7.7 | | 5 | |

| Date | 21-Jan-15 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Time | Depth (m) | Temp (oC) | | DO (mg/L) | | DO (%) | | Turbidity (NTU) | | pH | | SS(mg/L) | |
| W1 - ebb (impact) | 14:28 | 0.43 | 18.9 | 18.9 | 8.19 | 8.3 | 100.7 | 100.9 | 2.66 | 2.6 | 8.4 | 8.4 | 2 | 2.0 |
| | | | 18.9 | | 8.33 | | 101.1 | | 2.62 | | 8.4 | | 2 | |
| W1- flood (impact) | 9:13 | 0.48 | 18.2 | 18.2 | 8.38 | 8.4 | 101.1 | 103.2 | 3.2 | 3.1 | 8.1 | 8.1 | 4 | 4.0 |
| | | | 18.2 | | 8.46 | | 105.2 | | 3.07 | | 8.1 | | 4 | |
| W2-Edd (Impact) | 14:02 | 0.46 | 18.7 | 18.7 | 8.39 | 8.4 | 103.9 | 104.6 | 2.65 | 2.6 | 8.4 | 8.4 | 7 | 7.0 |
| | | | 18.7 | | 8.46 | | 105.2 | | 2.54 | | 8.4 | | 7 | |
| W2-Flood (Impact) | 9:00 | 0.52 | 17.8 | 17.8 | 8.55 | 8.6 | 109.8 | 109.9 | 3.01 | 3.1 | 8.2 | 8.2 | 5 | 5.0 |
| | | | 17.8 | | 8.56 | | 110 | | 3.26 | | 8.2 | | 5 | |
| W3 (control) | 13:36 | 0.35 | 18.4 | 18.4 | 8.69 | 8.6 | 92.5 | 91.5 | 1.67 | 1.6 | 8.2 | 8.2 | 2 | 2.0 |
| | | | 18.4 | | 8.5 | | 90.5 | | 1.52 | | 8.2 | | 2 | |
| W4 (impact) | 13:49 | 0.26 | 18.1 | 18.1 | 8.26 | 8.3 | 88 | 88.2 | 1.89 | 2.0 | 8.1 | 8.1 | 2 | 2.0 |
| | | | 18.1 | | 8.29 | | 88.3 | | 2.03 | | 8.1 | | 2 | |

| Date | 23-Jan-15 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Time | Depth (m) | Temp (oC) | | DO (mg/L) | | DO (%) | | Turbidity (NTU) | | pH | | SS(mg/L) | |
| W1 - ebb (impact) | 15:09 | 0.35 | 19.9 | 19.9 | 9.45 | 9.4 | 117.3 | 116.5 | 3.93 | 4.0 | 8.4 | 8.4 | 5 | 5.0 |
| | | | 19.9 | | 9.32 | | 115.7 | | 3.99 | | 8.4 | | 5 | |
| W1- flood (impact) | 10:47 | 0.44 | 17.7 | 17.7 | 7.9 | 7.8 | 96.8 | 96.0 | 4.48 | 4.5 | 8.3 | 8.3 | 9 | 9.0 |
| | | | 17.7 | | 7.73 | | 95.2 | | 4.59 | | 8.3 | | 9 | |
| W2-Edd (Impact) | 14:51 | 0.46 | 20.2 | 20.2 | 10.37 | 10.3 | 130.7 | 130.2 | 3.38 | 3.4 | 8.5 | 8.5 | 5 | 5.0 |
| | | | 20.2 | | 10.29 | | 129.6 | | 3.45 | | 8.5 | | 5 | |
| W2-Flood (Impact) | 10:30 | 0.53 | 18.1 | 18.1 | 7.85 | 7.9 | 99.1 | 99.5 | 4.01 | 4.0 | 8 | 8.1 | 14 | 14.0 |
| | | | 18.1 | | 7.91 | | 99.8 | | 4.03 | | 8.2 | | 14 | |
| W3 (control) | 9:58 | 0.36 | 16.1 | 16.1 | 8.85 | 8.9 | 89.8 | 90.1 | 0.81 | 0.8 | 8.9 | 8.9 | <2 | 2.0 |
| | | | 16.1 | | 8.9 | | 90.4 | | 0.79 | | 8.9 | | <2 | |
| W4 (impact) | 10:09 | 0.28 | 16.6 | 16.6 | 10.38 | 10.3 | 106.5 | 105.7 | 1.04 | 1.1 | 8.2 | 8.2 | <2 | 2.0 |
| | | | 16.6 | | 10.21 | | 104.8 | | 1.14 | | 8.2 | | <2 | |

| Date | 26-Jan-15 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Time | Depth (m) | Temp (oC) | | DO (mg/L) | | DO (%) | | Turbidity (NTU) | | pH | | SS(mg/L) | |
| W1 - ebb (impact) | 15:12 | 0.41 | 20.7 | 20.7 | 7.17 | 7.1 | 94.3 | 93.2 | 2.89 | 2.8 | 8.3 | 8.3 | <2 | 2.0 |
| | | | 20.7 | | 7 | | 92 | | 2.76 | | 8.3 | | <2 | |
| W1- flood (impact) | 10:54 | 0.44 | 20 | 20.0 | 6.51 | 6.4 | 80.9 | 80.1 | 2.56 | 2.5 | 7.6 | 7.6 | <2 | 2.0 |
| | | | 20 | | 6.37 | | 79.3 | | 2.47 | | 7.6 | | <2 | |
| W2-Edd (Impact) | 15:34 | 0.43 | 20.8 | 20.8 | 7.28 | 7.3 | 95.3 | 95.0 | 2.51 | 2.4 | 8.4 | 8.4 | 5 | 5.0 |
| | | | 20.8 | | 7.22 | | 94.6 | | 2.34 | | 8.4 | | 5 | |
| W2-Flood | 10:41 | 0.47 | 20 | 20.0 | 5.82 | 5.8 | 70.5 | 70.1 | 1.88 | 1.8 | 7.9 | 7.9 | 6 | 6.0 |

**DSD Contract No. DC/2010/02**
**Contract No. - Drainage Improvement in Shuen Wan and Shek Wu Wai**
**Summary of Water Quality Monitoring Results**

AUES

| Location | Action / Limit Level | DO (mg/L) | | DO (%) | | Turbidity (NTU) | | pH | | SS(mg/L) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 (impact) | | Action | 7.27 | Action | n/a | Action | 4.77 | Action | n/a | Action | 9.73 |
| | | Limit | 4 | Limit | n/a | Limit | 5.26 | Limit | n/a | Limit | 10.77 |
| W2 (impact) | | Action | 7.26 | Action | n/a | Action | 2.46 | Action | n/a | Action | 8.89 |
| | | Limit | 4 | Limit | n/a | Limit | 3.42 | Limit | n/a | Limit | 9.75 |
| W3 (control) | | n/a | | n/a | | n/a | | n/a | | n/a | |
| W4 (impact) | | Action | 9.27 | Action | n/a | Action | 3.32 | Action | n/a | Action | 6.98 |
| | | Limit | 4 | Limit | n/a | Limit | 4.52 | Limit | n/a | Limit | 7.66 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (Impact) | 10:41 | 0.47 | 20 | 20.0 | 5.75 | 5.6 | 69.6 | 70.1 | 1.81 | 1.8 | 7.9 | 7.9 | 6 | 6.0 |
| W3 (control) | 10:13 | 0.34 | 18.6 | 18.8 | 7.77 | 7.7 | 83.2 | 82.8 | 1.47 | 1.5 | 8.3 | 8.3 | 4 | 4.0 |
| | | | 18.9 | | 7.7 | | 82.4 | | 1.44 | | 8.3 | | 4 | |
| W4 (impact) | 10:24 | 0.26 | 19 | 19.0 | 9.2 | 9.2 | 99.2 | 99.7 | 1.24 | 1.3 | 8.1 | 8.1 | 5 | 5.0 |
| | | | 19 | | 9.28 | | 100.1 | | 1.27 | | 8.1 | | 5 | |

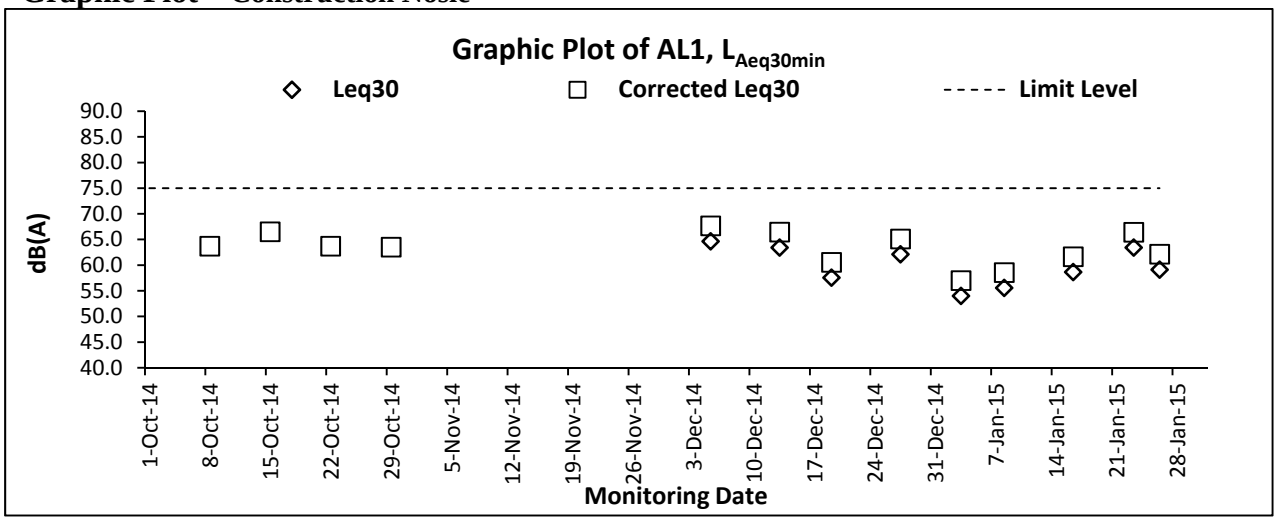
| Date | 28-Jan-15 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Time | Depth (m) | Temp (oC) | | DO (mg/L) | | DO (%) | | Turbidity (NTU) | | pH | | SS(mg/L) | |
| W1 - ebb (impact) | 9:06 | 0.40 | 18.3 | 18.3 | 8.92 | 9.0 | 109.4 | 109.6 | 9.31 | 9.3 | 8.3 | 8.3 | 8 | 8.0 |
| | | | 18.3 | | 8.99 | | 109.7 | | 9.22 | | 8.3 | | 8 | |
| W1- flood (impact) | 15:09 | 0.47 | 19 | 19.0 | 8.05 | 8.1 | 102.2 | 102.6 | 13 | 12.6 | 7.7 | 7.7 | 10 | 10.0 |
| | | | 19 | | 8.08 | | 102.9 | | 12.2 | | 7.7 | | 10 | |
| W2-Edd (Impact) | 9:17 | 0.47 | 18 | 18.0 | 8.54 | 8.6 | 105.4 | 106.2 | 7.26 | 7.3 | 8.4 | 8.4 | 12 | 12.0 |
| | | | 18 | | 8.71 | | 106.9 | | 7.38 | | 8.4 | | 12 | |
| W2-Flood (Impact) | 15:20 | 0.56 | 18.8 | 18.8 | 8.14 | 8.1 | 104.6 | 104.4 | 11.5 | 11.7 | 7.8 | 7.8 | 12 | 12.0 |
| | | | 18.8 | | 8.11 | | 104.1 | | 11.8 | | 7.8 | | 12 | |
| W3 (control) | 14:47 | 0.36 | 18.9 | 18.9 | 8.43 | 8.4 | 98.9 | 98.8 | 4.53 | 4.7 | 8.2 | 8.2 | 3 | 3.0 |
| | | | 18.9 | | 8.46 | | 98.6 | | 4.81 | | 8.2 | | 3 | |
| W4 (impact) | 14:52 | 0.28 | 19.1 | 19.1 | 9.91 | 9.9 | 107 | 106.7 | 3.68 | 3.6 | 8.3 | 8.3 | 3 | 3.0 |
| | | | 19.1 | | 9.85 | | 106.3 | | 3.5 | | 8.3 | | 3 | |

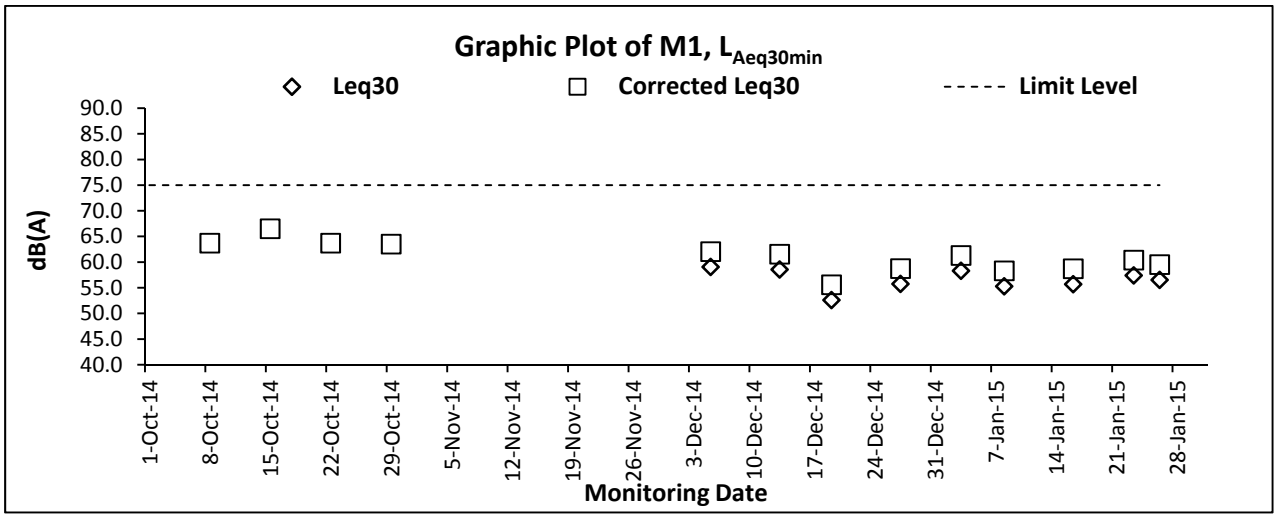
| Date | 30-Jan-15 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Time | Depth (m) | Temp (oC) | | DO (mg/L) | | DO (%) | | Turbidity (NTU) | | pH | | SS(mg/L) | |
| W1 - ebb (impact) | 9:57 | 0.38 | 19 | 19.0 | 7.12 | 7.2 | 76.6 | 77.4 | 10.6 | 10.4 | 6.8 | 6.8 | 4 | 4.0 |
| | | | 19 | | 7.27 | | 78.2 | | 10.1 | | 6.8 | | 4 | |
| W1- flood (impact) | 12:43 | 0.40 | 19.7 | 19.7 | 6.53 | 6.6 | 71 | 71.7 | 13 | 12.6 | 6.6 | 6.6 | 3 | 3.0 |
| | | | 19.7 | | 6.66 | | 72.3 | | 12.1 | | 6.6 | | 3 | |
| W2-Edd (Impact) | 9:44 | 0.42 | 18.1 | 18.1 | 7.25 | 7.2 | 76.7 | 76.1 | 11.6 | 11.2 | 6.9 | 6.9 | 4 | 4.0 |
| | | | 18.1 | | 7.12 | | 75.4 | | 10.8 | | 6.9 | | 4 | |
| W2-Flood (Impact) | 12:27 | 0.45 | 18.3 | 18.3 | 6.84 | 6.8 | 72.7 | 71.9 | 13.8 | 14.0 | 6.7 | 6.7 | 10 | 10.0 |
| | | | 18.3 | | 6.69 | | 71.1 | | 14.2 | | 6.7 | | 10 | |
| W3 (control) | 9:21 | 0.33 | 20.4 | 20.4 | 7.5 | 7.5 | 82.8 | 82.4 | 7.17 | 7.2 | 7.9 | 7.9 | <2 | 2.0 |
| | | | 20.4 | | 7.44 | | 81.9 | | 7.23 | | 7.9 | | <2 | |
| W4 (impact) | 9:36 | 0.25 | 20.2 | 20.2 | 8.26 | 8.2 | 91 | 90.8 | 6.7 | 6.8 | 7.7 | 7.7 | <2 | 2.0 |
| | | | 20.2 | | 8.22 | | 90.5 | | 6.89 | | 7.7 | | <2 | |

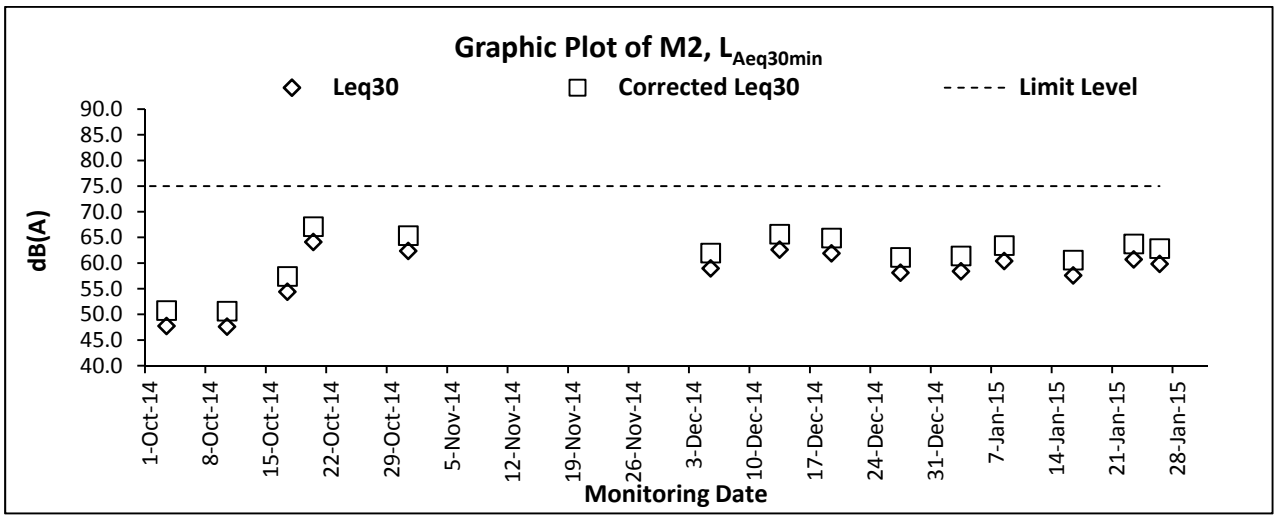
# Appendix J

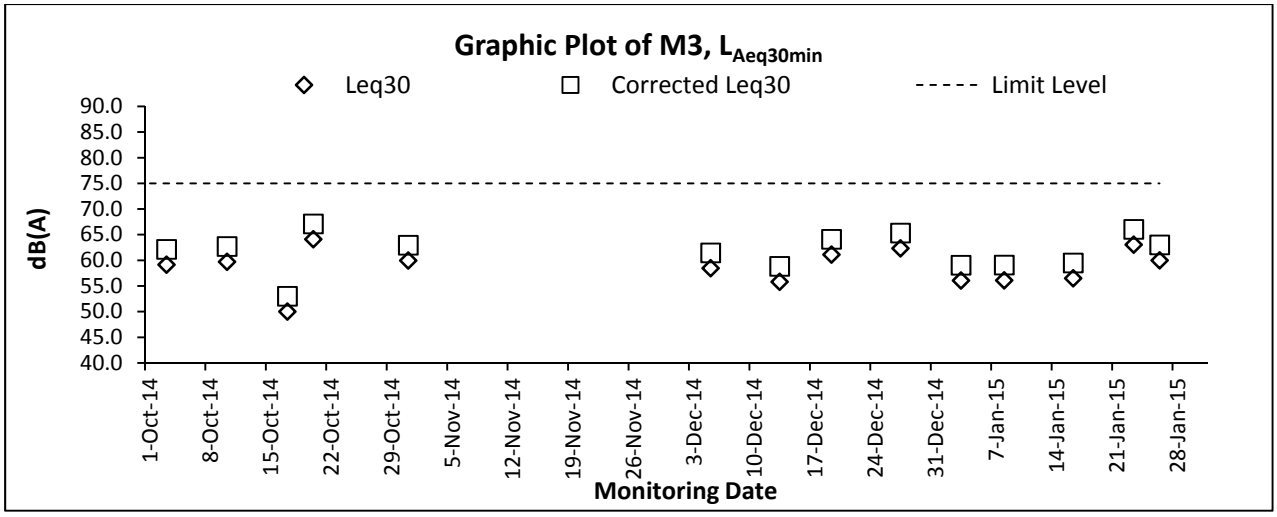
# Graphical Plots of Impact Monitoring – Noise, Water Quality and Hydrological Characteristics

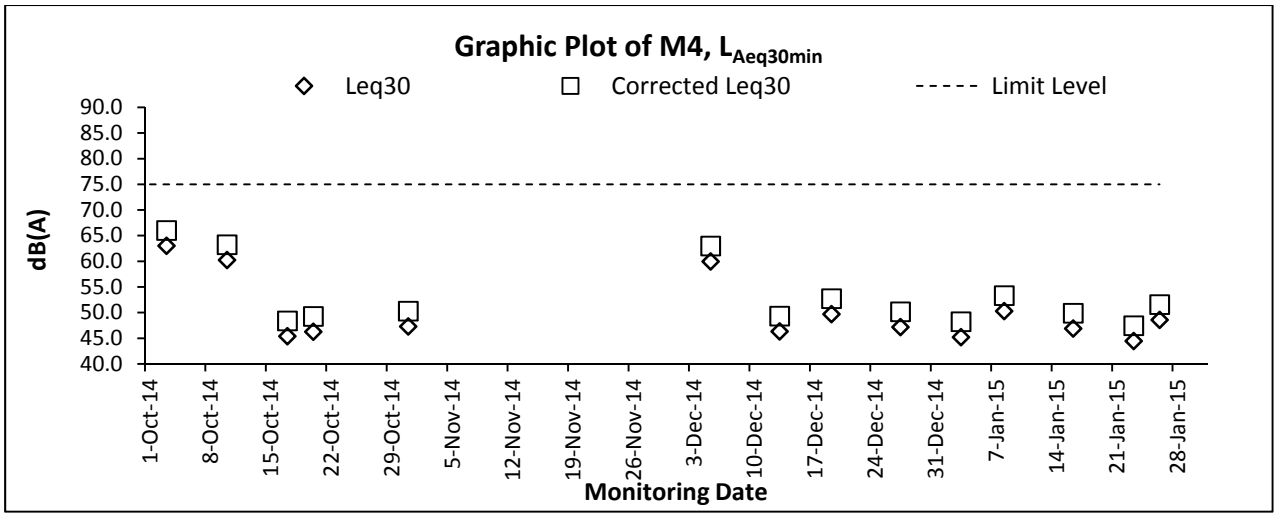
## Graphic Plot – Construction Nosie



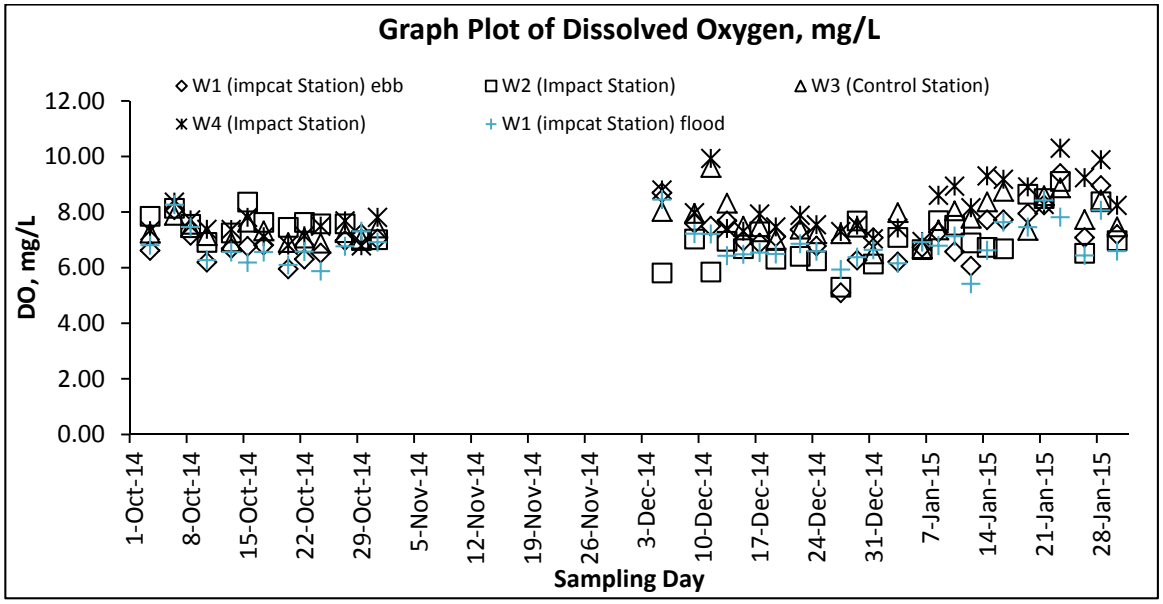



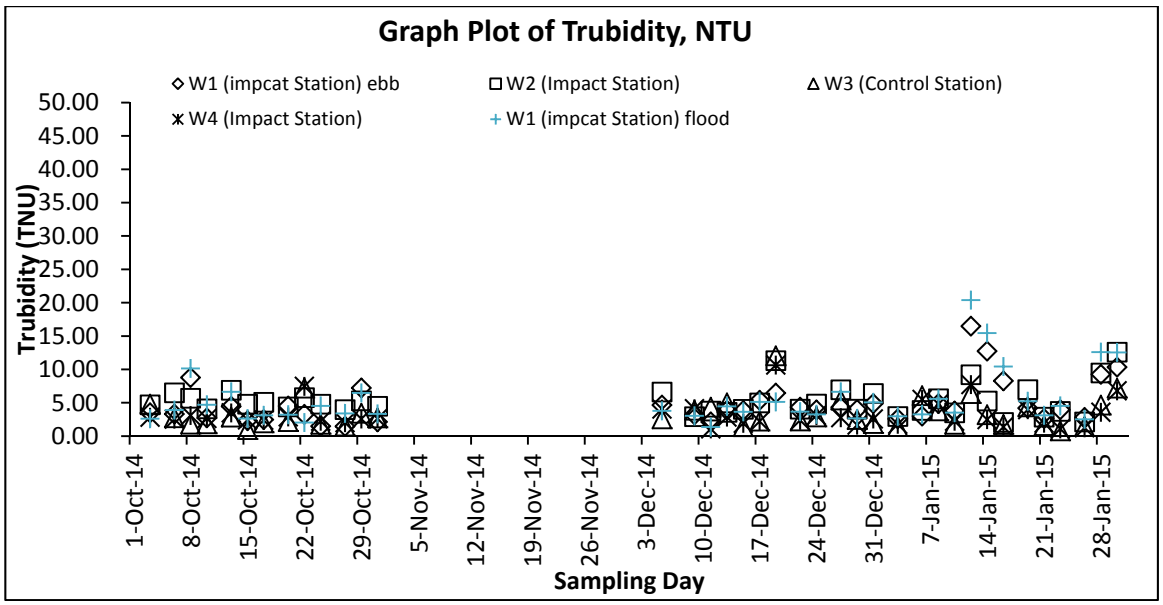



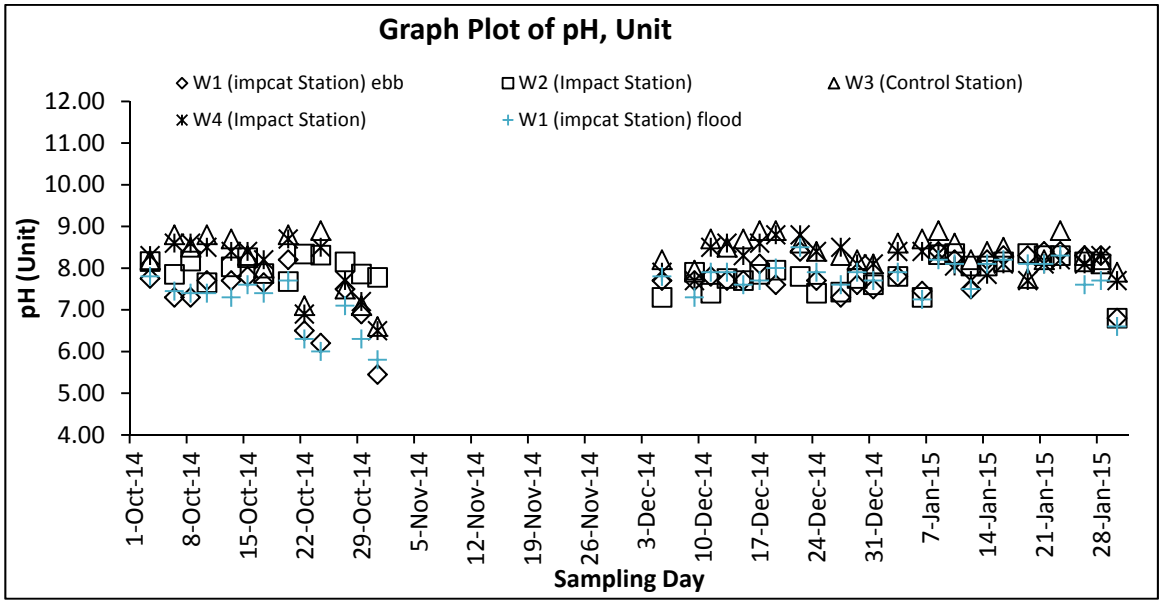

Graphic Plot of M3, $L_{Aeq30min}$
Leq30
Corrected Leq30
Limit Level
dB(A)
90.0
85.0
80.0
75.0
70.0
65.0
60.0
55.0
50.0
45.0
40.0
1-Oct-14
8-Oct-14
15-Oct-14
22-Oct-14
29-Oct-14
5-Nov-14
12-Nov-14
19-Nov-14
26-Nov-14
3-Dec-14
10-Dec-14
17-Dec-14
24-Dec-14
31-Dec-14
7-Jan-15
14-Jan-15
21-Jan-15
28-Jan-15
Monitoring Date

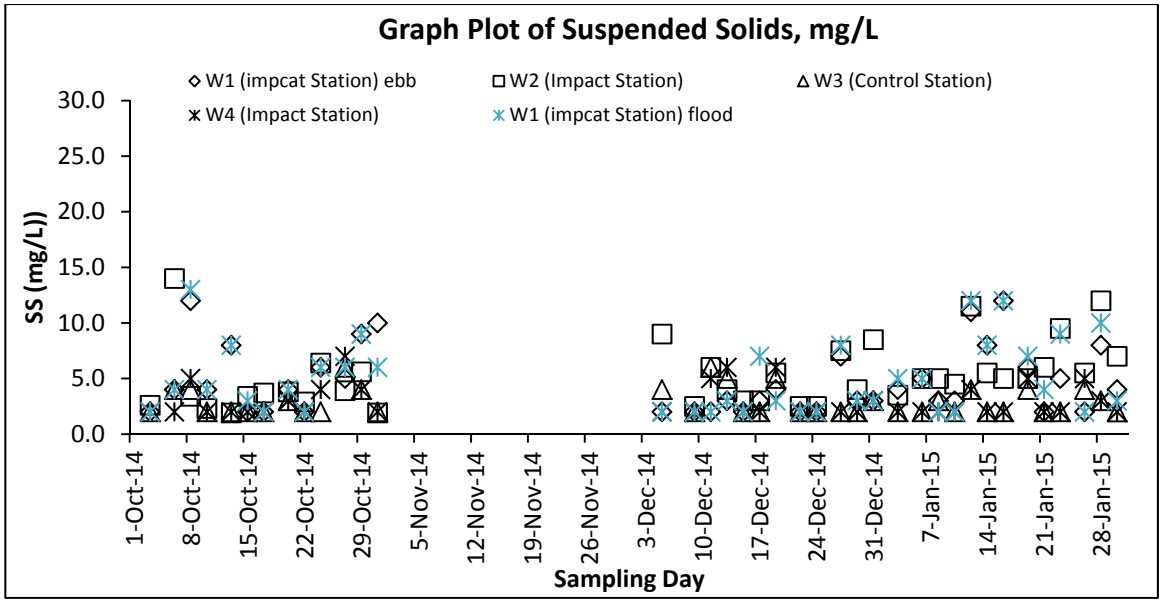

Graphic Plot of M4, $L_{Aeq30min}$
Leq30
Corrected Leq30
Limit Level
dB(A)
90.0
85.0
80.0
75.0
70.0
65.0
60.0
55.0
50.0
45.0
40.0
1-Oct-14
8-Oct-14
15-Oct-14
22-Oct-14
29-Oct-14
5-Nov-14
12-Nov-14
19-Nov-14
26-Nov-14
3-Dec-14
10-Dec-14
17-Dec-14
24-Dec-14
31-Dec-14
7-Jan-15
14-Jan-15
21-Jan-15
28-Jan-15
Monitoring Date

## Graphic Plot – Water Quality

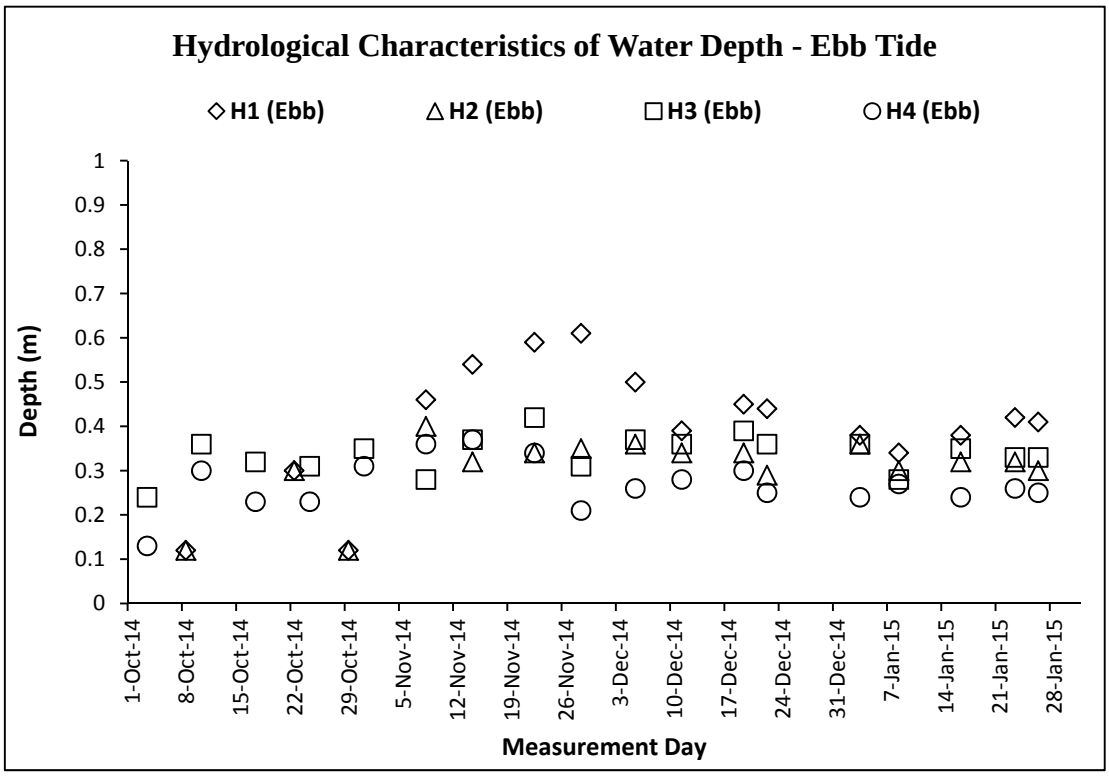


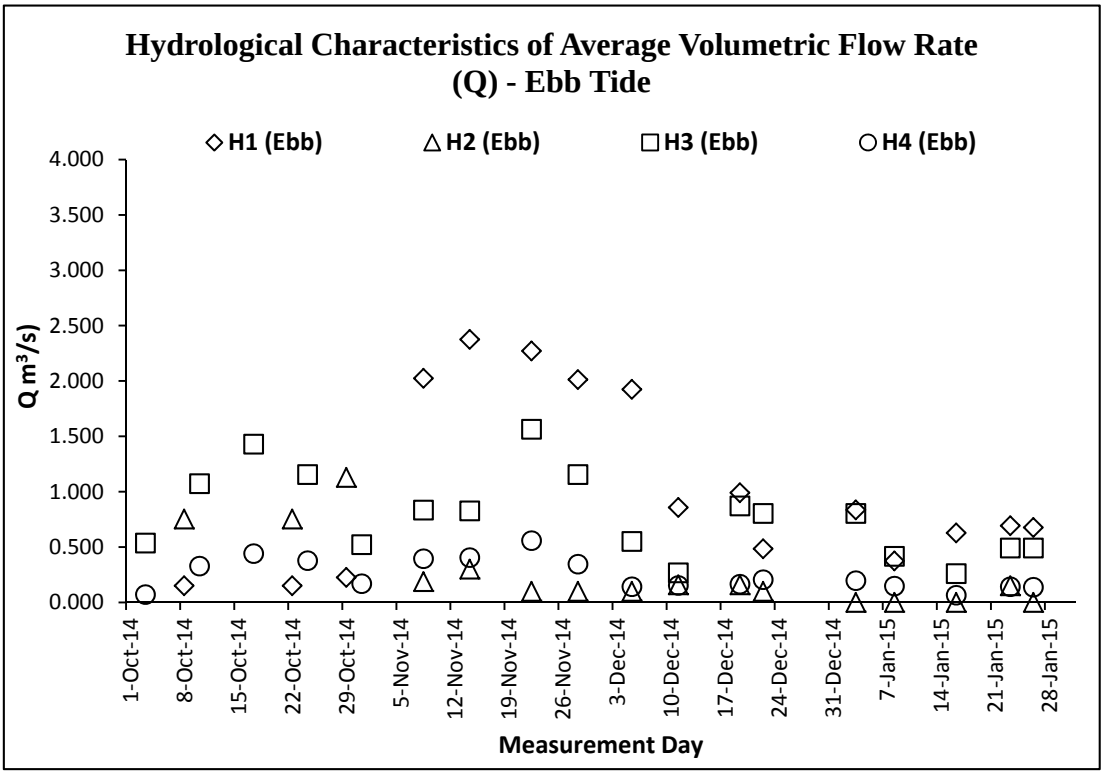



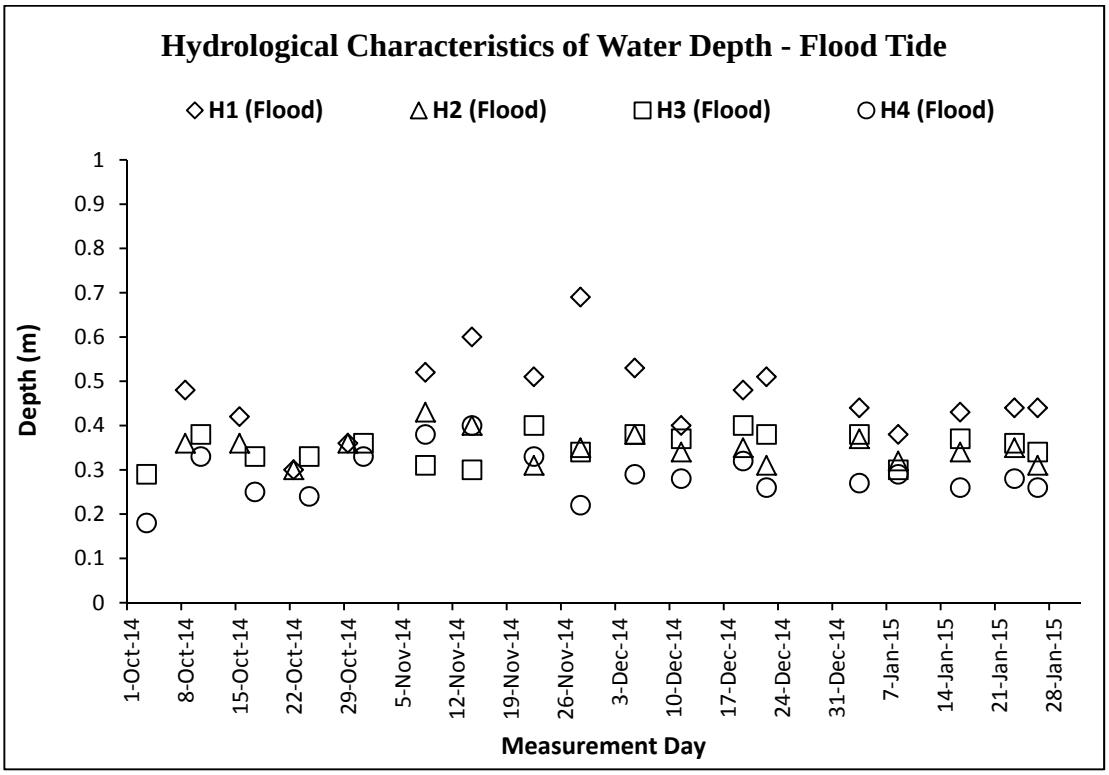

Graph Plot of Suspended Solids, mg/L
W1 (impcat Station) ebb
W2 (Impact Station)
W3 (Control Station)
W4 (Impact Station)
W1 (impcat Station) flood
SS (mg/L))
30.0
25.0
20.0
15.0
10.0
5.0
0.0
1-Oct-14
8-Oct-14
15-Oct-14
22-Oct-14
29-Oct-14
5-Nov-14
12-Nov-14
19-Nov-14
26-Nov-14
3-Dec-14
10-Dec-14
17-Dec-14
24-Dec-14
31-Dec-14
7-Jan-15
14-Jan-15
21-Jan-15
28-Jan-15
Sampling Day

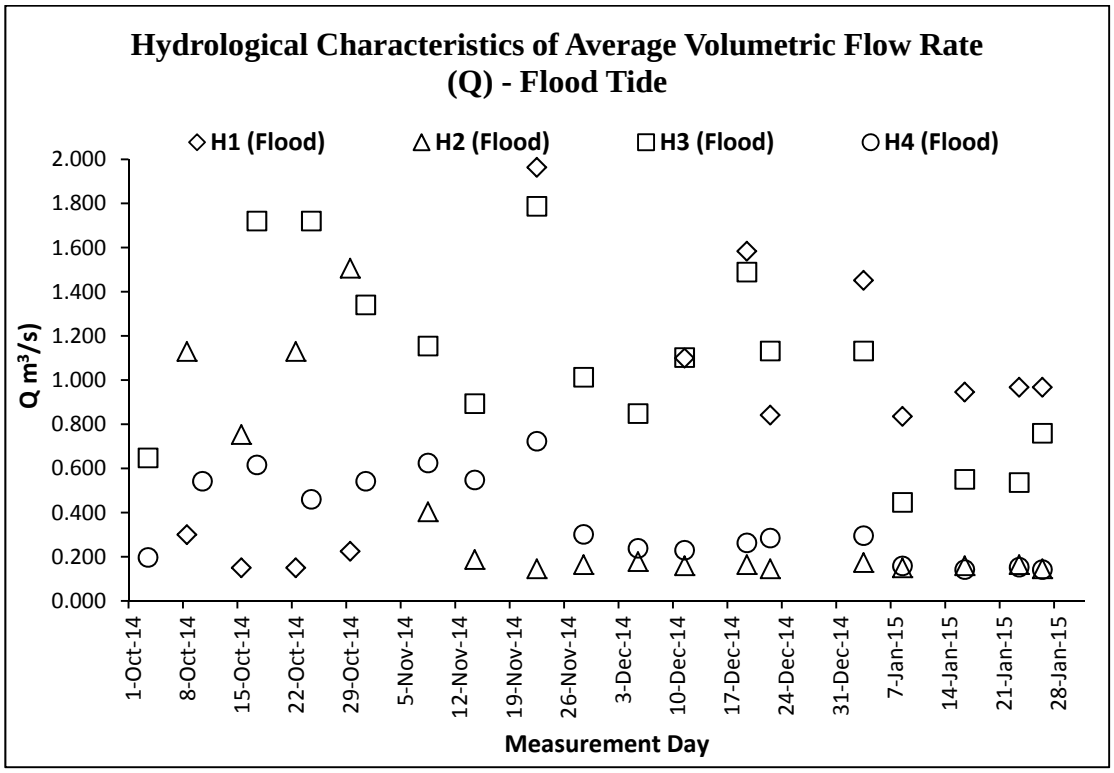
## Graphic Plot – Hydrological Characteristics (Water Depth)



## Graphic Plot – Hydrological Characteristics (Water Flow Rate)



# Appendix K

# Monthly Summary Waste Flow Table

Kwan Lee - Kuly Joint Venture
Environmental Management Plan for Contract No. DC/2010/02
Drainage Improvement Works in Shuen Wan and Shek Wu Wai

Name of Department: DSD

## Monthly Summary Waste Flow Table

| 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 note 3) | Chemical Waste | Others, e.g. general refuse |
| | (in'000m$^3$) | (in'000m$^3$) | (in'000m$^3$) | (in'000m$^3$) | (in'000m$^3$) | (in'000m$^3$) | (in'000kg) | (in'000kg) | (in'000kg) | (in'000kg) | (in'000m$^3$) |
| Jan-14 | 0.435 | - | - | - | 0.435 | - | - | - | - | - | 0.015 |
| Feb-14 | 0.215 | - | - | - | 0.215 | - | - | - | - | - | 0 |
| Mar-14 | 0.036 | - | - | - | 0.036 | - | - | - | - | - | 0 |
| Apr-14 | 0.333 | - | - | - | 0.333 | - | - | - | - | - | 0 |
| May-14 | 0.333 | - | - | - | 0.333 | - | - | - | - | - | 0 |
| Jun-14 | 1.776 | | | | 1.776 | | | | | | 0 |
| Jul-14 | 0.461 | | | | 0.461 | | | | | | 0 |
| Aug-14 | 2.187 | | | | 2.187 | | | | | | 0 |
| Sep-14 | 0.000 | | | | 0.000 | | | | | | 0 |
| Oct-14 | 0.680 | | | | 0.680 | | | | | | 0 |
| Nov-14 | | | | | | | | | | | 0.09 |
| Dec-14 | | | | | | | | | | | 0.015 |
| Jan-15 | | | | | | | | | | | 0.12 |
| | | | | | | | | | | | |
| Total | 6.456 | - | - | - | 6.456 | - | - | - | - | - | 0.24 |

| 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 note 3) | Chemical Waste | Others, e.g. general refuse |
| (in'000m$^3$) | (in'000m$^3$) | (in'000m$^3$) | (in'000m$^3$) | (in'000m$^3$) | (in'000m$^3$) | (in'000kg) | (in'000kg) | (in'000kg) | (in'000kg) | (in'000m$^3$) |
| 23 | 1 | 10 | 0 | 10 | 2 | 5 | 2 | 1 | 1 | 3 |

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)

Summary Table for Work Processes or Activities Requiring Timber for Temporary Works

Contract No.:DC/2010/02

Contract Title: Drainage Improvement Works in Shuen Wan and Shek Wu Wai

| Item No. | Description of Works Process or Activity (see note (a) below) | Justifications for Using Timber in Temporary Construction Works | Est. Quantities of Timber used ($m^3$) | Actual Quantities used ($m^3$) | Remarks |
|---|---|---|---|---|---|
| 1 | Formwork for concreting | Easy handle by manpower | 2 | 1.1 | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |
| | | Total estimated Quantity of timber Used | 2 | | |

Notes: (a) The contractor shall list out all the work items requiring timber for use in temporary construction works. Several minor work items may be grouped into one for ease of updating

(b) 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(5)

# Appendix L

# Landscape & Visual Inspection Report

# Contract No. DC/2009/22 & DC/2010/02
# Drainage Improvement Works in Shuen Wan and Shek Wu Wai
# Bi-weekly Landscape & Visual Monitoring

EM&A (Landscape & Visual) Report (January 2015)
(Issue 1)

Job Ref.: 09/317/161A & 09/317/161D KLKJV-SW
Date: February 2015

# Contract No. DC/2009/22 & DC/2010/02
# Drainage Improvement Works in Shuen Wan and Shek Wu Wai
# Bi-weekly Landscape & Visual Monitoring

EM&A (Landscape & Visual) Report (January 2015)

(Issue 1)

February 2015

| | Name | Signature |
|---|---|---|
| Prepared by: | **Tracy HO** |  |
| Reviewed by: | **Ida YU** |  |
| Date: | **4th February 2015** | |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Tel: +852 2486 2885 Email: aec@aechk.hk

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2 SCOPE OF MONITORING .....1
3 LANDSCAPE & VISUAL MONITORING RESULTS .....2
4 AUDIT SCHEDULE.....9

## LIST OF APPENDICES

Appendix A – Photographs

# 1 INTRODUCTION

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

1.1.2 This monthly monitoring report will detail the scope of landscape and visual monitoring work, monitoring findings and observations, and any recommendation and advice on proper implementation of the landscape mitigation measures in the works areas under Contract 2 of the Project. Besides, since the bi-weekly landscape & visual monitoring for Contract 1 works areas was ended in early December 2014 after the joint site inspection with EPD, which confirmed the completion of construction work within the Contract 1 works area (i.e. Areas A, B and C) on 4th December 2014, no monitoring within Contract 1 works area was conducted. However, an update of the site and tree condition within Contract 1 works area was presented under Section 3.2.

# 2 SCOPE OF MONITORING

## 2.1 Monitoring objectives

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

## 2.2 Monitoring during Construction Phase

2.2.1 The following landscape and visual mitigation measures 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* (Not relevant to Contract 2 of the Project) – 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.

### 2.3 Monitoring during Operational Phase

2.3.1 The following landscape and visual mitigation measures 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 (Not relevant to Contract 2 of the Project);
- Landscape design of pump house by providing sufficient planting around its boundary fence (Not relevant to Contract 2 of the Project);
- 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.

## 3 LANDSCAPE & VISUAL MONITORING RESULTS

### 3.1 Monitoring Date(s)

3.1.1 This monthly Landscape and Visual Monitoring (December 2014) was conducted to cover only areas of Contract 2 of the Project (i.e. the construction of a twin-cell box culvert close to Shuen Wan Conservation Area and Wai Ha River along Tung Tsz Road, and a drainage pipe near Wai Ha Village). The bi-weekly monitoring was conducted on 6th and 20th January 2015.

3.1.2 All photos stated in this section are recorded in **Appendix A**.

### 3.2 Update of Site and Tree Condition within Contract 1 works area

3.2.1 The last bi-weekly landscape & visual monitoring of Contract 1 works area (including Areas A, B and C) was completed on 26th November 2014. The building of pump house (Area A) and automatic mechanical penstock at Wai Ha River estuary, box culvert (Area B) and its associated drainage pipes, and the Ecological Compensatory Area (Area C) were subsequently completed from 2012 to 2014. The proposed landscape planting in Contract 1 works area and reinstatement work (including the affected nursery part in Tung Tsz Nursery and planters along Ting Kok Road) were also completed in 2014. With the official handover of the Ecological Compensatory Area (16th October 2012), the pump house (early June 2014) and the affected nursery part (early December 2014) to AFCD, DSD and LCSD respectively, EPD announced the completion of construction phase of Contract 1 (Contract No. DC/2009/22) after the joint site inspection on 4th December 2014.

3.2.2 As reported in the last *Monthly EM&A Report for December 2014* and general site observation in January 2015, all landscape planting work (including planting of trees, shrubs, mangrove,

groundcover and climbers, and hydroseeding) proposed in the approved Landscape Plan was already completed. Daily operation of the reinstated nursery part was resumed by the Nursery Operator. The transplanted and retained trees within the nursery were handed over to the Nursery. As reported in the last monthly report, a retained tree U50 (*Ficus elastica*) located within Tung Tsz Nursery was removed by the nursery workers in December 2014. In addition, the Contractor also confirmed that the planted vegetation within the pump house (Area A) was formally accepted and handed over to DSD by end of January 2015.

3.2.3 As confirmed by the EPD, the construction phase of Contract 1 (DC/2009/22) was completed and the Operational Phase has commenced in December 2014. Landscape & Visual monitoring during the Operational Phase will be conducted on quarterly basis.

## 3.3 Visual Screen

3.3.1 No follow-up action by the Contractor is required as from the *Monthly EM&A Report for December 2014*. The recommendations listed in Report for December 2014 are reminders for good site practices to be implemented by the Contractor throughout the construction phase.

*Observation*

3.3.2 Temporary hoardings, in the form of construction barriers, have been erected from west to east parts along Tung Tsz Road from the opposite side of Wai Ha to the opposite side of San Tau Kwok. The temporary hoardings lined along the construction site along the access road from Tung Tsz Road towards Treasure Spot Garden II were removed in December 2014, but parts of these hoardings were erected again in January 2015 **(Plate 1)**. Minor civil work in breaking the temporary road by an excavator with hydrohammer was carried out within the hoarded area. **Photos 2-3** show the views of the erected hoardings along the works area under Contract 2.

3.3.3 Almost all construction works for building the box culverts in the works areas along Tung Tsz Road opposite to Wai Ha and San Tau Kok, and next to Wai Ha River have been completed **(Photos 4-6)**, leaving minor civil work continued along the path leading from Tung Tsz Road to Treasure Spot Garden II, and works opposite to Wai Ha area **(Photos 7-8)**. Hydroseeding was applied in the works area along Tung Tsz Road, and planting of compensatory trees was completed in October 2014 **(Photo 9)**.

3.3.4 The temporary parking area was still maintained at the end of the access path to Treasure Spot Garden Phase II **(Photo 10)**. The untagged leaning tree was still guyed at the edge of the area within a Tree Protection Zone (TPZ) **(Photo 11)**.

3.3.5 As reported in the previous *Monthly EM&A Reports*, dumping on the Taro field located along the path towards the Treasure Spot Garden was observed and a paved area created for parking next to the retained tree groups (T088 – T091) has been found since November 2012. Since October 2013, the path to Treasure Spot Garden II has been expanded towards the Taro field due to the reprovision of vehicular access road as requested by the villagers during the works at the entrance of the Treasure Spot Garden.

3.3.6 Construction works have been stopped at the end of the Treasure Spot Garden II near the retained tree T103. The temporary construction barriers and chain-link fence next to T103 were already removed in December 2014.

3.3.7 As reported in the previous submitted Monthly EM&A Reports, a fenced area has been seen on the field next to the construction site along the access to Treasure Spot Garden since

March 2014 **(Photo 12)**. The area was still surrounded by chain-link fence, which was not fenced by the construction works related to the current project as reported by the Contractor.

3.3.8 No hoardings have been erected along the rest of the proposed works area since neither construction works nor any associated preparation works have been commenced.

*Recommendations*

3.3.9 No specific recommendation is required in regard to the observations made in January 2015. However, with regard to the previous dumping incident by other parties on the Taro field near the Treasure Spot Garden, the Contractor is recommended to check the site condition regularly to avoid any extent of dumping or paving of area within the project boundary throughout the construction phase.

3.3.10 For good site practices, the Contractor should also make sure there are no piled rocks, construction materials or programmed construction works influencing the existing trees within the Project Area or the wetland rehabilitation area throughout the construction phase. Otherwise, the Contractor should request the on-site workers to remove those piled rocks or construction materials. As a reminder, the Contractor should keep all construction works within the Project Boundary. The Contractor is also recommended to check the condition of the temporary construction barriers surrounding the works areas, and replace the broken barriers with new barriers.

### 3.4 Contaminant/ Sediment Control

3.4.1 No follow-up action by the Contractor is required as from the *Monthly EM&A Report for December 2014*. The recommendations listed in Report for December 2014 are reminders for good site practices to be implemented by the Contractor throughout the construction phase.

*Observation*

3.4.2 Major construction works in Contract 2 works area were completed in October 2014, leaving minor civil works in areas close to Treasure Spot Garden II and some next to Wai Ha. No used water was released from the works area next to Wai Ha River. The river water was clear **(Photos 13-14)**.

*Recommendations*

3.4.3 For good site practice, the Contractor is suggested to conduct regular checking to ensure no direct discharge or leakage of contaminants or any polluted fluid into the adjacent Wai Ha River and the nearby Shuen Wan marsh. The Contractor should maintain regular check (e.g. daily) on the sedimentation and filtration facilities and appropriate sedimentation beds and/or tanks throughout the construction phase (e.g. check the function of the sedimentation beds and remove surplus sand and gravels deposited along the beds or within the tanks) to make sure all discharged water was filtered appropriately prior to any discharge.

3.4.4 If any construction works were resumed, the Contractor should have *ad hoc* inspection and emergency measures for any accidental spillage of polluted fluid, contaminants or grease from the construction sites. To prevent the impact of the unclear discharge on the nearby vegetated area, it is suggested to overlay PVC liners along the site edge and remove any surplus sand and gravels deposited in the beds and tank even some parts of the construction works may be completed at this stage.

## 3.5 Pollution Control

3.5.1 No follow-up action by the Contractor is required as from the *Monthly EM&A Report for December 2014*. The recommendations listed in Report for December 2014 are reminders for good site practices to be implemented by the Contractor throughout the construction phase.

*Observation*

3.5.2 Major construction works in Contract 2 works area were completed, leaving minor civil works conducted in area near Treasure Spot Garden II and some next to Wai Ha. No used water has been released from the works area nearby Wai Ha River. The river water was clear **(Photos 13-14)**. No direct water discharge into the upper stream of Wai Ha River was observed as all major construction works in Contract 2 works area have been completed **(Photo 15)**.

*Recommendations*

3.5.3 For good site practice, the Contractor should prevent any contaminant and sediment from entering the sensitive water-based habitats (i.e. Shuen Wan marsh and Wai Ha River) and implement pollution control measures to minimize any adverse environmental impacts to the water body throughout the construction phase. The Contractor should maintain appropriate sedimentation beds and/or tanks throughout the construction phase. The Contractor should adopt a good site practice in maintaining appropriate sedimentation beds and filtration tanks as recommended in the above Section for Contaminant/ Sediment Control. Muddy water pumped from the works area should be filtered appropriately through sedimentation beds, or other filtration system prior to the discharge.

3.5.4 The Contractor should have *ad hoc* inspection and emergency measures for any accidental spillage of polluted fluid, contaminants or grease from the construction sites. It is also recommended to overlay PVC liners along the site edge and remove any surplus sand and gravels deposited in the beds and tank so as to prevent the impact of the unclear discharge on the nearby vegetated area.

## 3.6 Liaison with Nursery

3.6.1 The construction undertaken within Tung Tsz Nursery is restricted under Contract 1 of the Project. This monitoring item is not applicable to Contract 2 of the Project.

## 3.7 Existing Trees within Works Areas

3.7.1 Individual trees retained within the active works area have been protected within TPZs. The protection measures (such as the establishment of TPZs) generally follow the recommendations stated in the *Monthly EM&A Report for December 2014*, except that the dead co-dominant trunk of T093 at Treasure Spot Garden II was still not removed in January 2015. Particular observations are highlighted in the following paragraphs.

*Observation*

3.7.2 Most trees which are proposed to be retained within the Project Area were recorded generally in fair health condition and some of the retained trees and their canopies have been naturally covered by invasive climbers spreading from the adjacent natural habitats outside the project boundary.

3.7.3 As stated in Section 3.3, a TPZ was set up with orange construction nets to protect the untagged leaning tree from the newly formed temporary parking area at Treasure Spot Garden Phase II **(Photo 11)**. Rubbish disposed by the villagers was found next to this tree.

3.7.4 As reported in the submitted Reports, the retained trees T167 (*Litsea monopetala*) and T168 (*Celtis sinensis*) were topped after the vegetation clearance in the surrounding works area in November 2013. These trees have been monitored since the topping incident, and both were in fairly poor health condition with vigorous development of epicormics along trunks or branches **(Photo 16)** to form the tree canopies.

3.7.5 The civil works next to the two trees T093 and T094, which are located next to the access path in Treasure Spot Garden II, were completed and the construction materials were removed in the past few months **(Photo 17)**. As reported before, the tree health of T093 has been declining since June 2014. No foliage has been observed on the main tree canopy since October 2014. Cracked tree bark was noted along the tree trunk and branches of one co-dominant trunk of T093, with sign of termite infestation noted along the tree trunk of this co-dominant trunk **(Photos 18-19)**. The Contractor has still not yet removed one of the hazardous tree trunk and its canopy in January 2015. The relatively healthy co-dominant trunk of T093 pointing towards the forested area was still remained.

3.7.6 Construction works at the end of Treasure Spot Garden II have been stopped since July 2014. As observed in January 2015, no excavated soil or rocks were piled around the trunk flare of T103. Rocks were lined around the remaining root ball of T103 **(Photo 20-21)**. As reported in December 2014, the climbers overhanging on the tree canopy and a branch of T103 and the nearby hillside vegetation were removed and pruned by an unknown party with confirmation from the Contractor. Similar observation was noted along the woodland edge, where two retained trees T097 (*Schefflera heptaphylla*) and T098 (*Aquilaria sinensis*) are located, next to the access path in Treasure Spot Garden II **(Photo 22)**. The vegetation was also cleared by an unknown party not related to the current Project.

3.7.7 Sheet piling works were conducted within the tree root zone of a retained tree T025 (*Celtis sinensis*) in June 2013. Due to the close proximity of the erected sheet piles to the tree, root damage by previous sheet piling works was anticipated. The tree was also over-pruned in June 2013. It had been temporarily guyed by strings so as to provide additional support to the tree until September 2014. The tree was quite stable at its location and it was in fair health condition (shed in dry season since it is a deciduous tree) as observed in January 2015 **(Photo 23)**.

3.7.8 Concrete pavement, which was applied for additional parking area for the villagers, was still observed close to the root flare of the tree group T089-091, and the trees were in fair condition **(Photo 24)**.

3.7.9 Excavation work was noted close to the tree group T181-T183 in May 2014 and further planting of ornamental plants on the raised soil ground within this tree group was noted in recent month **(Photo 25)**. According to the information by the Contractor, such excavation work and the planting around the tree group were conducted by a third party to extend and decorate the access path adjacent to these trees. Excavated soil was noted piling around their trunk flares, while the orange construction nets protecting the three trees were also removed by the third party before. These trees have been surrounded by some stones to demarcate the tree group area since May 2014 **(Photo 26)**.

3.7.10 Another two untagged trees (*Cleistocalyx nervosum* and *Macaranga tanarius* var. *tomentosa*) near the tree group T181-T183 but outside the Project boundary were also affected by the

excavation work previously conducted by a party other than the Contractor of this Project. Such observation was reported in the submitted reports.

3.7.11 Branches and trunks of a group of *Leucaena leucocephala* (T031-T036, all are proposed to be removed) along Tung Tsz Road were unskillfully pruned or cut **(Photos 27-28)**. As confirmed by the Contractor, the work was conducted by an unknown party not related to the current Project.

3.7.12 As observed and reported in December 2014, the tree trunk from the tree group of T085-T087 at the junction of Tung Tsz Road and Tung Tsz Shan Road was partly uprooted and significantly leaned towards Wai Ha River **(Photo 29)**. The Contractor was contacted for immediate removal of the leaning tree part. The Contractor reported that its tree roots are in close contact with the underground high-voltage cables and there is a safety concern when removing the leaning tree part. As the leaning tree part is pointing towards Wai Ha River where no target is noted within the tree fall zone, removal of the leaning tree trunk will not be performed. Routine monitoring of its stability have to be continued throughout the construction phase.

3.7.13 All compensatory trees were planted in October 2014, leaving replacement of individual trees of poor condition to be conducted in early wet season. Some individuals of the planted tree species of *Litsea glutinosa* and *Sapium sebiferum* showed transplantation stock. The previously collapsed or uprooted compensatory trees, as reported in *Monthly EM&A Report for December 2014*, were replanted by the landscape contractor. Most of the loose bamboo stakes were generally fastened. As observed on 20th January 2015, one compensatory tree was collapsed **(Photo 30)**.

3.7.14 As reported in December 2014, at least 10 compensatory trees (including *Sapium sebiferum, Hibiscus tiliaceus* and *Cinnamomum burmannii*) were inundated with tidal water in which their root balls were still wet and muddy as inspected in January 2015 **(Photo 31).** The underground roots and overall tree health condition would be affected if the trees are inundated periodically during their establishment period. Other planted compensatory trees were in fair condition **(Photos 32-33)**.

3.7.15 The planted mangrove seedlings of *Kandelia obovata* and *Aegiceras corniculatum* along the sloping area facing Shuen Wan Marsh were in fair condition **(Photo 34)**.

3.7.16 No significant signs of damage on other existing tree crowns, trunks and roots resulting from the construction works were observed in this monthly monitoring.

3.7.17 As Area C under Contract 1 of the Project has been formally handed over to AFCD for management and maintenance since October 2012, no access into the ECA is allowed. Two transplanted shrubs of *Pavetta hongkongensis* (PH-01 and PH-03) were inspected through the fence of Tung Tsz Nursery. PH01 has remained in satisfactory condition **(Photo 35)**. The previously cut PH03 (cut during grass cutting by a third party who maintain the ECA) was cut again in November 2014 and no resprout was noted in January 2015 **(Photo 36)**.

*Recommendations*

3.7.18 Within the active works area, maintenance of TPZs for the retained trees and recently planted compensatory trees should be maintained. Trunk bases of all retained trees and planted compensatory trees should be kept clear, with no stockpiled soil, construction equipments and rubbish allowed around the trunk bases and within the TPZs. If necessary, these retained trees shall be watered regularly to maintain their health, while all planted compensatory trees

should be watered regularly by the appointed landscape contractor (e.g. at least three times per week during dry season). All fallen trees or tree parts of the existing trees maintained within the works area of Contract No. DC/2010/02 should be removed if they pose imminent hazards to the people/property or cause obstruction to the traffic. Any broken tree parts still attached to the trees could be pruned appropriately to prevent their potential hazard to the public and property.

3.7.19 Apart from the routine irrigation of the planted compensatory trees, the Contractor should request the appointed landscape contractor to regularly check the stability and condition of the bamboo stakes during each irrigation activity. Trees of poor quality should be replaced with heavy standard trees by following the standard quality as stipulated in Annex 4 of the approved Landscape Plan. However, for the trees which were affected by tidal water, the Contractor needs to reconsider planting these trees to the areas where will not be influenced by the tide.

3.7.20 Disturbance is prohibited in all TPZs. In any practical circumstances, the contractor should follow Section 8 of Annex 4 of the approved Landscape Plan for protecting the existing trees from any potential damages resulting from the construction works. In addition, the Contractor and the Project Proponent should have routine inspection on any tree remedial works conducted by other party on the trees within the Project Area.

3.7.21 Though the retained tree T103 was stable in structural condition as inspected in January 2015, the Contractor should have close monitoring of the stability and health condition of this tree.

3.7.22 With regard to the previous tree topping incident on the retained trees (such as T088, T089, T167 and T168), as well as T118 and T093 in which the construction work was undertaken close to the tree trunks or other tree parts as reported previously, and potentially damage the tree roots, the Contractor is reminded to monitor all trees protected within the project boundary regularly. The Contractor should also be aware of any potential damage on the trees within the Project Boundary by other contractor(s) undertaking construction work concurrently or tree damage by the villagers. In addition, the Contractor should design and programme the civil works by taking into consideration of providing adequate buffer zone between the tree dripline and the civil work. The works should avoid affecting the tree canopy, trunk and underground root zone with regard to tree dripline as far as possible. These routine tree inspection and site maintenance should be carried out throughout the construction phase.

3.7.23 Tree topping (like the case for T025, T167 and T168 reported previously) should be prohibited and the Contractor should appoint qualified landscape contractor to perform appropriate pruning practice. The pruning works should follow any local, national or international standards for pruning works and relevant tree remedial works. Given that the tree roots of T025 could be damaged by previous sheet piling works and the topped tree exists with unbalanced tree form, the long-term tree stability and health condition should be checked after the previous removal of the guying in October 2014. The Contractor should have close monitoring of tree stability with regard to its unbalanced tree form and health condition.

3.7.24 With regard to poor health and structural condition of a tree T093 and its tree fall zone may influence the public using the access path leading to Treasure Spot Garden II, the Contractor is recommended to remove the whole hazardous co-dominant trunk and its canopy of T093 as soon as possible so as to remove the risk of whole tree failure influencing the targets. As informed by the Contractors, they have been waiting for the Engineer's instruction for carrying out the suggested tree removal work.

3.7.25 As the concrete paved temporary parking area at Treasure Spot Garden Phase II was close to the untagged tree, the roots may be damaged and hence the stability of the tree would be affected. The tree may also be damaged by the parking vehicles. Therefore, the Contractor is advised to maintain the tree protection measures and establish a warning sign to remind the driver to beware of the presence of tree within the tree protection zone. The health and stability of the tree should also be monitored by the Contractor regularly throughout the construction phase.

3.7.26 As there were excavation works (either by the Project or by the third party) close to the trees within the construction works areas before (e.g. T118 as observed in February 2014, between T153 and T155 as observed in April 2014 and pruning work on T103 in December 2014), the Contractor should have close inspection of the stability and health condition of these trees. In addition, for the previous excavation work around tree group of T181-T183 conducted by the third party, the Contractor should regularly check the status of these trees and have close liaison with the third party for maintaining appropriate tree protection during the works.

### 3.8 Construction Light

3.8.1 No follow-up action on maintenance of construction light is required as from the *Monthly EM&A Report for December 2014*.

*Observation*

3.8.2 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*

3.8.3 No specific recommendation is required.

## 4 AUDIT SCHEDULE

4.1.1 The next bi-weekly Landscape & Visual Monitoring in February 2015 is scheduled to be conducted in the weeks of 2nd and 16th February 2015.

# Appendix A

# Photographs

| | |
|---|---|
|  |  |
| **Photo 1** – Temporary hoardings were erected again along part of the access path towards Treasure Spot Garden II. | **Photo 2** – Temporary hoardings and works areas along the access road from Tung Tsz Road to Treasure Spot Garden II. |
|  |  |
| **Photo 3** – Construction works areas along Tung Tsz Road opposite to Wai Ha and Treasure Spot Garden II. | **Photo 4** – Construction works opposite to Wai Ha were already completed, leaving very minor civil work along the edge of Tung Tsz Road. |
|  |  |
| **Photo 5** – No construction work was conducted in an extensive area opposite to Treasure Spot Garden II, and the area was naturally vegetated with grass and a tidal pond was maintained. | **Photo 6** – The box culvert and the associated drainage work were completed at the upper part of Wai Ha River. |


**Photo 7 –** Minor civil work was conducted on the temporary access road in Treasure Spot Garden II.


**Photo 8** – Minor civil work was still carried out in the works area opposite to Wai Ha.

**Photo 9** – Compensatory trees were planted in area opposite to Wai Ha.


**Photo 10** – Temporary parking area has still been maintained at the end of the access path to Treasure Spot Garden Phase II.

**Photo 11** – The untagged tree (indicated by Red arrow) was guyed at the edge of the parking area within a Tree Protection Zone.

**Photo 12** – A fenced area has been seen on the field next to the construction site along the access to Treasure Spot Garden II since March 2014. This is maintained by an unknown party.

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| **Photo 13** – The river water was clear along the middle section of Wai Ha River. | **Photo 14 -** The river water was clear in the upper stream section of Wai Ha River. |
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| **Photo 15** – No direct water discharge into the upper stream of Wai Ha River was observed. | **Photo 16** – Topped trees T167 (indicated by Red arrow) and T168 (indicated by Blue arrow) were in poor health condition with vigorous development of epicormics to form canopies. |
|  |  |
| **Photo 17** – The civil works next to the trees T093 (indicated by red arrow) and T094 (indicated by blue arrow) were completed in the past few months. | **Photo 18** – Co-dominant trunk of T093 (indicated by Red arrow) was in poor condition, with cracked tree bark and sign of termite infestation. |

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|  |  |
| **Photo 19** – Close up view of the co-dominant tree trunk of T093 with cracked tree park. | **Photo 20 –** Branches (indicated by Red arrow) and overgrown vegetation on the retained T103 were pruned by a third party. |
|  |  |
| **Photo 21** – Rocks were lined around the remaining root ball of T103. | **Photo 22** – The hillside vegetation and the retained trees T097 and T098 were cleared by an unknown party in January 2015. |
|  |  |
| **Photo 23** – The retained tree T025 was in fair condition. It shed in the dry season as it is a deciduous tree. | **Photo 24** – Concrete pavement maintained for parking area for the villagers was still observed around the tree group T089-T091. |


**Photo 25** – Planting of ornamental plants was noted on the raised soil ground within the tree group of T181-T183 by a third party.

**Photo 26** – Retained trees T181-T183 have been surrounded by some stones to demarcate the tree group area by the villagers.

**Photo 27** – Branches and trunks of a group of *Leucaena leucocephala* (indicated) along Tung Tsz Road were unskillfully pruned and cut by an unknown party.


**Photo 28** – Close-up view of the pruned and cut trees of the *Leucaena leucocephala* group.

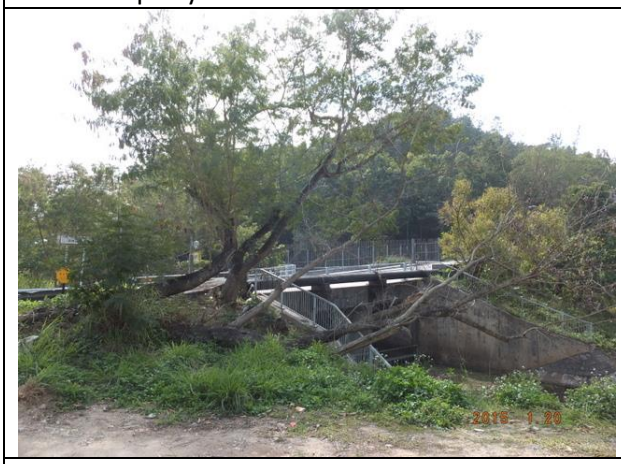

**Photo 29** – The tree trunk from the tree group of T085-T087 at the junction of Tung Tsz Road and Tung Tsz Shan Road was partly uprooted and significantly leaned towards Wai Ha River.

**Photo 30** – A compensatory tree was uprooted.


**Photo 31** – Some compensatory trees were inundated with tidal water.

**Photo 32** – General view of the compensatory trees planted opposite to San Tau Kok.


**Photo 33** – Compensatory trees were planted opposite to Wai Ha area.

**Photo 34** – Mangrove seedlings were planted along the sloping area facing Shuen Wan Marsh.

**Photo 35** – The transplanted shrub of *Pavetta hongkongensis* (PH01) in Area C under Contract 1 has remained in satisfactory condition.

**Photo 36** – The transplanted shrub of *Pavetta hongkongensis* (PH03) was cut by the third party during the recent grass cutting work within Area C. No resprout on the cut specimen was noted.

# Appendix M

# Ecological Monitoring Report in Area under Contract 2

# Agreement No. DP/01/2010
# Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 2 (Report 24b for January 2015)

Prepared for:

**Drainage Services Department**

Prepared by:
**ENVIRON Hong Kong Limited**

Date:
**February 2015**

Reference Number:
R4305_V1.0

ENVIRON

Agreement No. DP/01/2010
Drainage Improvement Works in Shatin and Tai Po:
Ecological Monitoring in area under Contract 2
(Report 24b for January 2015)

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## 1. Introduction

1.1 Project description

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

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

1.3 China-Hong Kong Ecology Consultants Co. was commissioned by ENVIRON Hong Kong Limited to perform the ecological impact monitoring survey for the projects under Contract 2 since July 2011.

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

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

1.5 This is the report No. 24b ecological monitoring conducted on 30$^{th}$ Jan 2015 within the works boundary under Contract 2 and area within 100m from the works boundary.

## 2. Highlights of this report

- Field survey was conducted on 30$^{th}$ Jan 2015
- Construction activities of Contract 2 was observed to be substantially completed during reporting month
- Lower number of species was observed within the works area under Contract 2, but habitats in the 100m buffer area retain its natural condition.

## 3. Summary of construction activities for the month

Major construction activities carried out in Contract 2 at Wai Ha Village and Tung Tsz Road by the contractor during the present monitoring period (Jan 2015) includes:

1. Rectification of minor defects along Box Culvert and landscape planting.

## 4. Monitoring Methodology

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

### 4.1 Vegetation survey

Vegetation survey was performed along the designated transects (Figure 1) for ecological monitoring as described in the project specifications to monitor the vegetation health which could be adversely influenced by any bad site practice. Qualitative data of plants within the works boundary and wetland vegetation in the 100m buffer area of Contract 2 adjacent to construction site and wetland was recorded. Riparian vegetation including aquatic and emergent at 4 stream ecological monitoring points (hereinafter referred to as "SEMP") under Contract 2 (i.e. SEMP 3 & 4; Figure 2 & 3) along the affected stream channel and riparian habitat was recorded in terms of species, relative abundance and average heights. Any signs of damages and adverse health problems directly caused the works were recorded and reported. Nomenclature and protection status of the species followed those documented in the AFCD website (www.hkbiodiversity.net) and Hong Kong Herbarium (2004).

### 4.2 Avifauna

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

### 4.3 Herpetofauna

Herpetofauna groups are considered to be inactive during dry season (November to March), thus detailed herpetofauna monitoring was not conducted. However, any sign/calling of reptiles or amphibians encountered during the in situ survey was recorded.

### 4.4 Butterflies and Odonata

Odonates and butterfly are considered to be inactive during dry season (November to March), thus detailed monitoring was not conducted.

## 4.5 Mammals

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

## 4.6 Aquatic fauna

Monitoring of aquatic fauna was carried out mainly by bank-side observation, sometimes with the aid of binoculars, at two stream ecological monitoring points under Contract 2 (i.e. SEMP 3 & 4). These points are selected for covering representative sections of Wai Ha River and are shown in Figure 1. Netting and fish traps were also deployed at these points to collect supplementary data. Aquatic fauna seen/collected was identified *in situ* to the lowest possible taxon and relative abundance was presented.

# 5. Monitoring data

## 5.1 Vegetation survey

The habitats identified in area under Contract 2 are river course, wooded area, mangrove, marsh and developed area (including village). Vegetation were found in wooded area, mangrove, marsh, develop area and river bank. The riparian vegetation which were dominated by *Leucaena leucocephala* and *Bidens alba* with average coverage ranged from 20% to 30% (Table 1). A list of plant species recorded from different habitats within the assessment area under Contract 2 is presented on Table 2. A total of 207 species were recorded within the assessment boundary in which 207 species were recorded within the buffer area, while 84 species recorded within the work areas under Contract 2. Among them, species protected under Hong Kong ordinance were found in buffer area under Contract 2, namely *Aquilaria sinensis* (Cap. 586), *Cibotium barometz* (Cap. 586). Three individuals of protected species *Pavetta hongkongensis* located within works area of Contract 2 were transplanted to ECA on 20th Dec 2011. Currently, construction work was substantially completed. Some trees were planted along the construction site for landscaped purpose. Moreover, some drainage section has been restored as marsh habitat by planting wetland species such as *Juncus effuses*. In addition, regular vegetation clearance was observed at sampling point of SEMP 3 during reporting month.

## 5.2 Avifauna

A total of 13 bird species were recorded in the current survey (Table 3). In the work area under Contract 2, 7 bird species were recorded which are not considered to be of conservation concern. A total of 8 bird species were recorded in the 100m buffer area in which one bird species was considered to be of conservation concern.

### 5.3 Herpetofauna

No amphibian or reptile was recorded within the assessment area during dry season.

### 5.4 Butterflies

No butterfly was recorded within the assessment area during dry season.

### 5.5 Odonata

No Odonata was recorded within the assessment area during dry season.

### 5.6 Mammal

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

### 5.7 Aquatic fauna

Under Contract 2 (i.e. SEMP 3 & 4), a total of 10 fish species, 1 crustacean, 1 gastropod and 1 arthropod were recorded and most of them were freshwater species (Table 4). *Carassius auratus* was commonly observed at SEMP 3 because of the traditional Buddhist practice from the nearby temple in which captured organisms were released back to nature. In addition, river section at SEMP 3 is relatively natural and the presence of *Parazacco spilurus* may imply that good water quality at this section is maintained. Overall, no protected or rare species were recorded.

## 6. Remedial measures adopted to the adverse condition

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

## 7. Record of complains and remedial measures

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

## 8. Review of the monitoring results

During the present survey period, construction activities were carried out at works area under Contract 2, while 100m buffer area remains natural. Much of the construction activities are carried out along Tung Tsz Road under Contact 2. In general, lower numbers of species were recorded within the works area under Contract 2 than that of 100m buffer area because of the associated constructions and urbanized in nature. Water quality in river section of Contract 2 (i.e. SEMP 3) was maintained at acceptable condition as indicated by the presence of *Parazacco spilurus*. In addition, most of the construction activities are restricted in the developed area with low ecological significance. Currently, construction work was substantially completed. Thus, the impact on downstream of SEMP 4 is anticipated to be minor. As mitigation measures recommended in the EM&A Manual were properly implemented during the current survey, and hence the residual environmental impacts would be minimized.

## 9. Forecast of works programme and monitoring requirements

The tentative construction activities undertaken by the contractor at Wai Ha Village and Tung Tsz Road in the coming month are as follows:

1. Rectification of minor defects along Box Culvert and landscape planting.

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

## 10. Comments and summary

The bi-monthly ecological impact monitoring under Contracts 2 was conducted in January 2015 and relevant flora and fauna data were collected according to project specification and EM&A Manual. As indicated by the low abundance and diversity of species within the work areas, habitats within the work boundary under Contracts 2 offer few ecological opportunities for colonization of fauna and flora. Given that the construction activities are restricted in the developed area with proper mitigation measures being implemented, disturbances associated with the current construction activities are largely affecting area with low ecological significance. On the other hand, the natural habitats in the 100m buffer area are retained at acceptable condition, and hence the 100m buffer area has not been significantly affected by the construction works. Currently, most construction work was substantially completed. Thus, the impact on downstream of SEMP 4 is anticipated to be minor.

## 11. References


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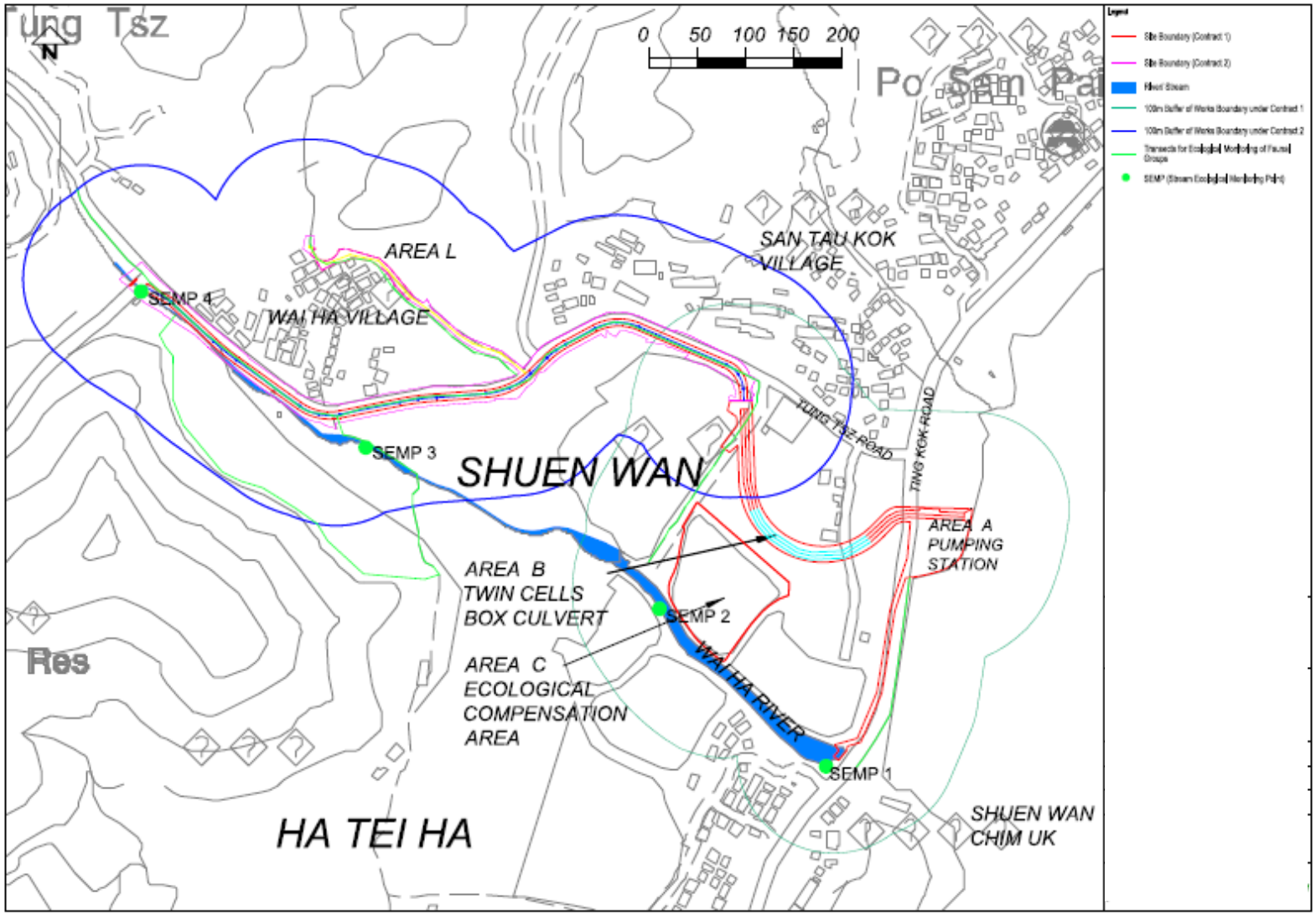
# Figures




| | |
|---|---|
| **Figure:** 1 | ENVIRON |
| **Title:** Map showing the ecological monitoring transect and the boundary of assessment area. | Drawn by: IT |
| | Checked by: SL |
| **Project**: Agreement No. DP/01/2010 Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 2 (January 2015, Report 24b) | Rev.: 1.0 |
| | Date: February 2015 |

| | |
|---|---|
| **Figure:** 2 | ENVIRON |
| **Title:** SEMP 3, the third sampling point of Wai Ha River under Contract 2. | Drawn by: IT |
| | Checked SL |
| Project: Agreement No. DP/01/2010 Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 2 ( January 2015, Report 24b ) | Rev.: 1.0 |
| | Date: February 2015 |

| | |
|---|---|
| **Figure:** 3 | ENVIRON |
| **Title:** SEMP 4, the forth sampling point along Wai Ha River under Contract 2. | Drawn by: IT |
| | Checked SL |
| **Project:** Agreement No. DP/01/2010 Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 2 (January 2015, Report 24b) | Rev.: 1.0 |
| | Date: February 2015 |

# Tables

**Table 1.** List of riparian vegetation and coverage (%) recorded from two stream sampling points under Contract 2 (i.e. SEMP 3 & 4).

| | | | **Sampling point** | **SEMP 3** | | **SEMP 4** | |
|---|---|---|---|---|---|---|---|
| **Species** | **Family** | **Growth form** | **Status in Hong Kong** | **Height (cm)** | **%** | **Height (cm)** | **%** |
| *Bidens alba* | ASTERACEAE | Herb | E | | | 0.9 | 30 |
| *Alocasia odora* | ARACEAE | Shrub | *N* | 1 | 2 | | |
| *Commelina diffusa* | COMMELINACEAE | Herb | N | 0.2 | 2 | 0.3 | 5 |
| *Leucaena leucocephala* | MIMOSACEAE | Small Tree | E | | | 4 | 20 |
| *Microstegium ciliatum* | POACEAE | Perennial Procumbent Herb | N | 0.5 | 2 | | |
| *Pistia stratiotes* | ARACEAE | Floating Aquatic Herb | N | | | | |
| *Polygonum chinensis* | POLYGONACEAE | Herb | N | | | | |
| *Polygonum lapathifolium* | POLYGONACEAE | Herb | N | | | | |
| *Rhaphiolepis salicifolia* | ROSACEAE | Shrub or Small Tree | N | | | | |
| *Spirodela polyrrhiza* | LEMNACEAE | Floating Small Herb | N | | | | |
| *Pueraria lobata* | FABACEAE | Climber | N | | | 0.5 | 10 |
| *Cyclosorus parasiticus* | THELYPTERIDACEAE | Herb | *N* | 0.2 | 2 | | |
| *Wedelia chinensis* | ASTERACEAE | Perennial Herb | N | | | | |
| Bare | n/a | n/a | n/a | n/a | 92 | n/a | 40 |

***Key:**

E = Exotic

N = Native

n/a = not available

**Table 2**. List of vegetation recorded from works area under Contracts 2 and 100m buffer area in the impact monitoring survey. Vegetation species presents in the identified location was indicated by "V".

| Family | Species name | Chinese name | *Status in Hong Kong | S | DA | M | Man | SW | CL | P | Work Area of Contract 2 | 100 m buffer area under Contract 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ACANTHACEAE | *Acanthus ilicifolius* | 老鼠簕 | N | | V | V | V | | | | | V |
| ACANTHACEAE | *Rhinacanthus nasutus* | 靈枝草 | E | | V | | | | | | | V |
| ACROSTICHACEAE | *Acrostichum aureum* | 鹵蕨 | N | | V | V | | | | | | V |
| AGAVACEAE | *Cordyline fruticosa* | 朱蕉 | E | | V | | | | | | | V |
| AGAVACEAE | *Dracaena draco* | 龍血樹 | E | | V | | | | | | | V |
| AGAVACEAE | *Sansevieria trifasciata* | 虎尾蘭 | E | | V | | | | | | | V |
| AMARANTHACEAE | *Amaranthus viridis* | 野莧 | N | | V | V | | | V | V | V | V |
| ANACARDIACEAE | *Mangifera indica* | 杧果 | E | | | | | V | | | | V |
| ANACARDIACEAE | *Rhus hypoleuca* | 白背漆 | N | | | | | V | | | | V |
| ANACARDIACEAE | *Rhus succedanea* | 野漆樹 | N | | | | | V | | | | V |
| ANNONACEAE | *Desmos chinensis* | 假鷹爪 | N | | | | | V | | | | V |
| ANNONACEAE | *Uvaria macrophylla* | 紫玉盤 | N | | | | | V | | | | V |
| APIACEAE | *Coriandrum sativum* | 芫荽 | E | | | | | | V | | | V |
| APOCYNACEAE | *Catharanthus roseus* | 長春花 | N | | V | | | | | | V | V |
| ARACEAE | *Alocasia odora* | 海芋 | N | | V | V | | | | | V | V |
| ARACEAE | *Colocasia esculenta* | 芋 | N | | | | | | V | | | V |
| ARACEAE | *Pistia stratiotes* | 大薸 | N | V | | | | | | | V | V |
| ARALIACEAE | *Acanthopanax gracilistylus* | 五加皮 | E | V | | | | | | | V | V |
| ARALIACEAE | *Schefflera actinophylla* | 傘樹 | E | | V | | | | | | | V |
| ARALIACEAE | *Schefflera heptaphylla* | 鴨腳木 | N | | V | V | | | | | | V |

| Family | Species name | Chinese name | *Status in Hong Kong | S | DA | M | Man | SW | CL | P | Work Area of Contract 2 | 100 m buffer area under Contract 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ARECACEAE | *Archontophoenix alexandrae* | 假檳榔 | E | | V | | | | | | | V |
| ARECACEAE | *Caryota ochlandra* | 魚尾葵 | E | | V | | | | | | | V |
| ARECACEAE | *Chrysalidocarpus lutescens* | 散尾葵 | E | V | V | | | | | | | V |
| ARECACEAE | *Phoenix roebelenii* | 日本葵 | E | | V | | | | | | | V |
| ARECACEAE | *Rhapis excelsa* | 棕竹 | N | | V | | | | | | | V |
| ASTERACEAE | *Bidens alba* | 白花鬼針 | E | V | | | | | | | V | V |
| ASTERACEAE | *Chrysanthemum coronarium* | 茼蒿 | E | | | | | | V | | | V |
| ASTERACEAE | *Conyza canadensis* | 小蓬草 | E | | V | | | V | V | V | V | V |
| ASTERACEAE | *Emilia sonchifolia* | 一點紅 | N | | V | | | | | | V | V |
| ASTERACEAE | *Ageratum conyzoides* | 藿香薊 | E | V | V | | | | V | | | V |
| ASTERACEAE | *Lactuca sativa* | 萵苣 | E | | | | | | V | | | V |
| ASTERACEAE | *Mikania micrantha* | 薇甘菊 | E | V | V | V | | V | V | V | V | V |
| ASTERACEAE | *Pterocypsela indica* | 山萵苣 | N | | V | | | | | | V | V |
| ASTERACEAE | *Wedelia chinensis* | 蟛蜞菊 | N | | V | | | | | V | V | V |
| ASTERACEAE | *Youngia japonica* | 黃鵪菜 | N | | V | | | | | | V | V |
| ASTERACEAE | *Spilanthes paniculata* | 金鈕扣 | N | | V | | | | | | V | V |
| ASTERACEAE | *Artemisia indica* | 五月艾 | N | | V | | | | V | | V | V |
| ASTERACEAE | *Eclipta prostrata* | 鱧腸 | N | V | V | | | | V | | V | V |
| BIGNONIACEAE | *Pyrostegia venusta* | 炮仗花 | E | | V | | | | | | | V |
| BRASSICACEAE | *Brassica rapa* | 大頭菜 | E | | | | | | V | | | V |
| CAESALPINIACEAE | *Bauhinia blakeana* | 洋紫荊 | N | | V | | | | | | | V |
| CAESALPINIACEAE | *Bauhinia variegata* | 宮粉羊蹄 | E | | V | | | | | | | V |
| CAESALPINIACEAE | *Cassia spectabilis* | 美麗決明 | E | | V | | | | | | | V |
| CARICACEAE | *Carica papaya* | 番木瓜 | E | | | | | | | V | | V |

| Family | Species name | Chinese name | *Status in Hong Kong | S | DA | M | Man | SW | CL | P | Work Area of Contract 2 | 100 m buffer area under Contract 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CARYOPHYLLACEAE | *Drymaria diandra* | 荷莲豆 | N | | | | | | V | | V | V |
| CARYOPHYLLACEAE | *Myosoton aquaticum* | 鵝腸菜 | N | | | | | | V | | V | V |
| CASUARINACEAE | *Casuarina equisetifolia* | 木麻黃 | E | | V | | | | | | | V |
| CASUARINACEAE | *Citrus grandis* | 柚 | E | | V | | | | | | | V |
| CHENOPODIACEAE | *Chenopodium ficifolium* | 小藜 | N | | | V | | | V | | V | V |
| CLUSIACEAE | *Cratoxylum cochinchinense* | 黃牛木 | N | | | | | V | | | | V |
| COMBRETACEAE | *Lumnitzera racemosa* | 欖李 | N | | | V | V | | | | V | V |
| COMBRETACEAE | *Terminalia catappa* | 欖仁樹 | E | | V | | | | | | | V |
| COMMELINACEAE | *Commelina diffusa* | 節節草 | N | V | | | | | | | V | V |
| COMMELINACEAE | *Tradescantia spathacea* | 蚌花 | E | | V | | | | | | | V |
| CONNARACEAE | *Rourea microphylla* | 紅葉藤 | N | | | | | V | | | | V |
| CONVOLVULACEAE | *Ipomoea cairica* | 五爪金龍 | E | | V | V | V | V | | | V | V |
| CONVOLVULACEAE | *Merremia hederacea* | 魚黃草 | N | | V | | | | V | V | V | V |
| CONVOLVULACEAE | *Ipomoea aquatica* | 蕹菜 | E | | | V | | | | | V | V |
| CUPRESSACEAE | *Thuja orientalis* | 側柏 | E | | V | | | | | | | V |
| CUPRESSACEAE | *Juniperus chinensis L.* ` | 龍柏 | | | V | | | | | | | V |
| CUSCUTACEAE | *Cuscuta chinensis* | 菟絲子 | N | | | | | | V | | | V |
| CYPERACEAE | *Cyperus flabelliformis* | 風車草 | E | V | | | | | | | V | V |
| CYPERACEAE | *Pycreus polystachyos* | 多枝扁莎 | N | | | V | | | V | | V | V |
| DICKSONIACEAE | *Cibotium barometz* | 金毛狗 | N (Cap. 586) | | | | | V | | | | V |
| ELAEOCARPACEAE | *Elaeocapus haminanensis* | 水石榕 | E | | V | | | | | | | V |
| EQUISETACEAE | *Equisetum debile* | 筆管草 | N | V | | | | | | | | V |
| EUPHORBIACEAE | *Antidesma bunius* | 五月茶 | N | | | | | V | | V | V | V |
| EUPHORBIACEAE | *Aporusa dioica* | 銀柴 | N | | | | | V | | V | | V |

| Family | Species name | Chinese name | *Status in Hong Kong | S | DA | M | Man | SW | CL | P | Work Area of Contract 2 | 100 m buffer area under Contract 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EUPHORBIACEAE | *Bischofia javanica* | 秋風 | N | | | | | | | V | | V |
| EUPHORBIACEAE | *Bridelia insulana* | 禾串树 | N | | | | | V | | | | V |
| EUPHORBIACEAE | *Bridelia tomentosa* | 土蜜樹 | N | | V | | | | | | V | V |
| EUPHORBIACEAE | *Excoecaria agallocha* | 海漆 | N | | | | V | | | | | V |
| EUPHORBIACEAE | *Glochidion eriocarpum* | 毛果算盘 | N | | | | | V | | | | V |
| EUPHORBIACEAE | *Glochidion puberum* | 算盘子 | N | | V | | | | | | | V |
| EUPHORBIACEAE | *Glochidion zeylanicum* | 香港算盤 | N | V | | | | | | | V | V |
| EUPHORBIACEAE | *Macaranga tanarius* | 血桐 | N | | V | V | V | | | | | V |
| EUPHORBIACEAE | *Mallotus apelta* | 白桐 | N | | | | | | | V | | V |
| EUPHORBIACEAE | *Mallotus paniculatus* | 白楸 | N | | | | | V | | | | V |
| EUPHORBIACEAE | *Sapium discolor* | 山烏桕 | N | V | | | | V | | | | V |
| EUPHORBIACEAE | *Euphorbia thymifolia* | 千根草 | | | V | | | | V | | V | V |
| FABACEAE | *Mucuna championii Benth.* | 港油麻藤 | N | | | | | V | | V | | V |
| FABACEAE | *Pueraria lobata* | 葛 | N | | V | V | | | V | | | V |
| FABACEAE | *Sesbania cannabina* | 田菁 | E | | V | | | | | | V | V |
| FABACEAE | *Crotalaria pallida var.obovata* | 豬屎豆 | E | | V | | | | | | V | V |
| FABACEAE | *Desmodium heterocarpon* | 假地豆 | N | | V | | | | | | V | V |
| FABACEAE | *Millettia reticulata* | 雞血藤 | N | | | | | V | | | | V |
| FABACEAE | *Mucuna birdwoodiana* | 白花油麻 | N | V | | | | V | | | V | V |
| FABACEAE | *Uraria crinita* | 貓尾草 | E | | | | | V | | | | V |
| FABACEAE | *Pueraria lobata* | 葛 | N | V | V | | | V | V | V | V | V |
| FLACOURTIACEAE | *Scolopia chinensis* | 刺柊 | N | | | | | | | V | | V |
| GLEICHENIACEAE | *Dicranopteris pedata* | 芒萁 | N | | | | | V | | | | V |
| HALORAGACEAE | *Gonocarpus chinensis* | 黃花小二 | N | | V | | | | V | | V | V |

| Family | Species name | Chinese name | *Status in Hong Kong | S | DA | M | Man | SW | CL | P | Work Area of Contract 2 | 100 m buffer area under Contract 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| JUNCACEAE | *Juncus effusus* | 燈心草 | N | | | V | | | | | V | V |
| LAMIACEAE | *Salvia japonica* | 鼠尾草 | N | | V | | | | | | | V |
| LAURACEAE | *Cinnamomum burmannii* | 陰香 | N | | V | | | V | | | V | V |
| LAURACEAE | *Cinnamomum camphora* | 樟 | N | | | | | V | | | | V |
| LAURACEAE | *Litsea cubeba* | 山蒼樹 | N | | | | | V | | | | V |
| LAURACEAE | *Litsea glutinosa* | 潺槁樹 | N | | V | | | V | | | V | V |
| LAURACEAE | *Litsea monopetala* | 假柿樹 | N | | | | | | | V | V | V |
| LEMNACEAE | *Spirodela polyrrhiza* | 青萍 | N | V | | | | | | | V | V |
| LILIACEAE | *Allium fistulosum* | 蔥 | E | | | | | | V | | | V |
| LILIACEAE | *Disporum cantoniense* | 萬壽竹 | E | | | | | V | | | | V |
| LYGODIACEAE | *Lygodium japonicum* | 海金沙 | N | | V | | | | | | | V |
| MALVACEAE | *Hibiscus rosa-sinensis* | 大紅花 | E | | V | | | | | | | V |
| MALVACEAE | *Hibiscus tiliaceus* | 黃槿 | N | V | | V | | | | | V | V |
| MALVACEAE | *Thespesia populnea* | 恒春黃槿 | N | | | | V | | | | | V |
| MALVACEAE | *Abelmoschus moschatus* | 黃葵 | N | | | V | | | | | V | V |
| MELASTOMATACEAE | *Melastoma candidum* | 野牡丹 | N | | | | | V | | | | V |
| MELASTOMATACEAE | *Melastoma sanguineum* | 毛蒽 | N | | | | | V | | | | V |
| MELIACEAE | *Melia azedarach* | 楝 | E | V | | | | | | | V | V |
| MENISPERMACEAE | *Coculus orbiculatus* | 木防己 | N | V | V | V | | V | V | V | V | V |
| MENISPERMACEAE | *Pericampylus glaucus* | 細圓藤 | N | | V | | | | | | V | V |
| MENISPERMACEAE | *Stephania longa* | 蓑箕篤 | N | | V | | | V | | | | V |
| MIMOSACEAE | *Acacia confusa* | 台灣相思 | E | | V | | | | | | | V |
| MIMOSACEAE | *Albizia lebbeck* | 大葉合歡 | E | V | | | | | | | | V |
| MIMOSACEAE | *Calliandra haematocephala* | 朱纓花 | E | | V | | | | | | | V |

| Family | Species name | Chinese name | *Status in Hong Kong | S | DA | M | Man | SW | CL | P | Work Area of Contract 2 | 100 m buffer area under Contract 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MIMOSACEAE | *Leucaena leucocephala* | 銀合歡 | E | V | V | | | | | | V | V |
| MIMOSACEAE | *Mimosa pudica* | 含羞草 | E | | V | | | | V | | V | V |
| MORACEAE | *Artocarpus macrocarpon* | 菠蘿蜜 | E | | V | | | | | | V | V |
| MORACEAE | *Ficus benjamina* | 垂葉榕 | E | | V | | | | | | V | V |
| MORACEAE | *Ficus elastica* | 印度榕樹 | E | | V | | | | | | | V |
| MORACEAE | *Ficus hispida* | 對葉榕 | N | V | V | V | | | | | V | V |
| MORACEAE | *Ficus microcarpa* | 榕樹 | N | | V | | | V | | | | V |
| MORACEAE | *Ficus simplicissima* | 五指毛桃 | N | | V | | | V | | | | V |
| MORACEAE | *Ficus triangularis* | 三角榕 | E | V | | | | | | | V | V |
| MORACEAE | *Ficus variegata* | 青果榕 | N | | V | | | V | | | | V |
| MORACEAE | *Ficus virens* | 大葉榕 | N | V | V | | | | | | V | V |
| MORACEAE | *Morus alba* | 桑 | N | | V | | | | | | | V |
| MUSACEAE | *Musa x paradisiaca L.* | 大蕉 | E | | V | | | | V | | | V |
| MYRSINACEAE | *Aegiceras corniculatum* | 蠟燭果 | N | | V | V | V | | | | | V |
| MYRSINACEAE | *Ardisia quinquegona* | 羅傘樹 | N | | | | | V | | | | V |
| MYRSINACEAE | *Embelia ribes* | 白花酸藤 | N | | | | | V | | | | V |
| MYRSINACEAE | *Maesa perlarius* | 鯽魚胆 | N | | V | | | | | V | | V |
| MYRTACEAE | *Cleistocalyx operculatus* | 水翁 | N | V | | | | | | V | V | V |
| MYRTACEAE | *Melaleuca quinquenervia* | 白千層 | E | | V | | | | | | | V |
| MYRTACEAE | *Psidium guajava* | 番石榴 | E | | V | | | | | | | V |
| MYRTACEAE | *Syzygium jambos (L.) Alston* | 蒲桃 | E | | V | | | V | | | | V |
| OLEACEAE | *Ligustrum sinensis* | 山指甲 | N | | V | | | | | | | V |
| ONAGRACEAE | *Ludwigia perennis* | 細花丁香 | M | | | V | | | | | V | V |
| OXALIDACEAE | *Averrhoa carambola* | 楊桃 | E | | V | | | | | | | V |

| Family | Species name | Chinese name | *Status in Hong Kong | S | DA | M | Man | SW | CL | P | Work Area of Contract 2 | 100 m buffer area under Contract 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OXALIDACEAE | *Oxalis corniculata* | 酢漿草 | N | | V | | | | | | V | V |
| PANDANACEAE | *Pandanus tectorius* | 露兜樹 | N | | | | V | | | | | V |
| PINACEAE | *Pinus massoniana* | 馬尾松 | N | | | | | | | V | | V |
| PIPERACEAE | *Piper hancei* | 山蒟 | N | | | | | | | V | | V |
| PLANTAGINACEAE | *Plantago major* | 車前草 | N | | V | V | | | | | V | V |
| POACEAE | *Apluda mutica* | 水蔗草 | N | | V | V | | | | | V | V |
| POACEAE | *Arundinella nepalensis* | 石珍芒 | N | V | V | | | V | | | | V |
| POACEAE | *Bambusa sp.* | 竹 | / | | | | | V | | | | V |
| POACEAE | *Coix lacryma-jobi* | 薏苡 | N | V | | | | | | | | V |
| POACEAE | *Cynodon dactylon* | 狗牙根 | N | | V | | | | | | V | V |
| POACEAE | *Digitaria ciliaris* | 升馬唐 | N | | V | V | | | | | | V |
| POACEAE | *Eleusine indica* | 牛筋草 | N | | V | | | | | | V | V |
| POACEAE | *Microstegium ciliatum* | 剛莠竹 | N | V | | | | | | | V | V |
| POACEAE | *Panicum maximum* | 大黍 | E | | | | | | | | V | V |
| POACEAE | *Panicum repens L.* | 鋪地黍 | N | | V | V | | | | | | V |
| POACEAE | *Brachiaria mutica* | 巴拉草 | E | | | V | | | V | | V | V |
| POACEAE | *Pennisetum alopecuroides* | 狼尾草 | N | | V | V | | V | | | | V |
| POACEAE | *Phragmites anstralis* | 蘆葦 | N | | V | V | | | | | | V |
| POACEAE | *Phragmites karka* | 卡開蘆 | N | | | | | | | | | V |
| POACEAE | *Zoysia sp.* | 結縷草 | N | | | V | V | | | | V | V |
| POACEAE | *Eragrostis tenella* | 鯽魚草 | N | | V | | | | V | V | V | V |
| POACEAE | *Chloris virgata* | 虎尾草 | N | | V | V | | | V | V | V | V |
| POACEAE | *Echinochloa crusgalli* | 稗 | N | | V | V | | | V | | V | V |
| POACEAE | *Echinochloa colona* | 光頭稗 | N | | V | | | | V | V | V | V |

| Family | Species name | Chinese name | *Status in Hong Kong | S | DA | M | Man | SW | CL | P | Work Area of Contract 2 | 100 m buffer area under Contract 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POLYGONACEAE | *Polygonum chinensis* | 火炭母 | N | | | | | | V | | | V |
| POLYGONACEAE | *Polygonum hydropiper* | 水蓼 | N | | V | | | | | | | V |
| POLYGONACEAE | *Polygonum lapathifolium* | 大馬蓼 | N | | | V | | | V | | V | V |
| PTERIDACEAE | *Pteris semipinnata* | 半邊旗 | N | | | | | V | | | | V |
| PTERIDIACEAE | *Pteridium aquilinum* | 蕨 | N | | | | | | V | | | V |
| PTERIDACEAE | *Pteris vittata L* | 蜈蚣草 | N | | V | | | | V | | V | V |
| RHIZOPHORACEAE | *Kandelia obovata* | 秋茄樹 | N | | | V | V | | | | | V |
| ROSACEAE | *Eriobotrya japonica* | 枇杷 | E | | V | | | | | | | V |
| ROSACEAE | *Rubus reflexus* | 蛇泡簕 | N | | | | | | | V | V | V |
| RUBIACEAE | *Canthium dicoccum* | 鐵矢 | N | | | | | V | | | | V |
| RUBIACEAE | *Hedyotis hedyotidea* | 牛白藤 | N | | | | | | | | | V |
| RUBIACEAE | *Lasianthus chinensis* | 粗葉木 | N | | | | | V | | | | V |
| RUBIACEAE | *Paederia scandens* | 雞屎藤 | N | | V | | | | | V | | V |
| RUBIACEAE | *Pavetta hongkongensis* | 香港大沙 | N (Cap. 96) | | | | | V | | | | V |
| RUBIACEAE | *Psychotria asiatica* | 九節 | N | | | | | V | | | | V |
| RUBIACEAE | *Psychotria serpens* | 蔓九節 | N | | V | | | | | | | V |
| RUBIACEAE | *Spermacoce stricta* | 豐花草 | N | V | V | | | V | V | V | V | V |
| RUBIACEAE | *Hedyotis corymbosa* | 傘房花耳 | N | V | V | | | V | V | V | V | V |
| RUTACEAE | *Acronychia pedunculata* | 降真香 | N | | | | | V | | | V | V |
| RUTACEAE | *Citrus reticulata* | 柑橘 | E | | V | | | | | | | V |
| RUTACEAE | *Clausena lansium* | 黃皮 | E | | V | | | | | | | V |
| RUTACEAE | *Murraya paniculata* | 九里香 | E | V | V | | | | | | V | V |
| SAPINDACEAE | *Dimocarpus longan* | 龍眼 | E | | V | | | | | V | | V |
| SAPINDACEAE | *Litchi chinensis* | 荔枝 | E | | V | | | | | | | V |

| Family | Species name | Chinese name | *Status in Hong Kong | S | DA | M | Man | SW | CL | P | Work Area of Contract 2 | 100 m buffer area under Contract 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAPINDACEAE | *Sapindus saponaria* | 無患子 | N | | | | | | | V | | V |
| SAPOTACEAE | *Manilkara zapota* | 人心果 | E | V | | | | | | | | V |
| SCROPHULARIACEAE | *Scoparia dulcis* | 野甘草 | N | | V | | | | V | | V | V |
| SCROPHULARIACEAE | *Lindernia crustacea* | 母草 | | V | V | V | | | V | | V | V |
| SELAGINELLACEAE | *Selaginella uncinata* | 翠雲草 | N | | | | | V | | | | V |
| SOLANACEAE | *Lycopersicon esculentum* | 番茄 | E | | | | | | V | | | V |
| SOLANACEAE | *Solanum nigrum* | 龍葵 | N | | V | V | | | | | V | V |
| SOLANACEAE | *Solanum torvum* | 水茄 | E | | | V | | V | | | V | V |
| STERCULIACEAE | *Byttneria aspera* | 刺果藤 | N | | | | | V | | | | V |
| STERCULIACEAE | *Sterculia lanceolata* | 假蘋婆 | N | V | V | | | | | | V | V |
| THYMELAEACEAE | *Aquilaria sinensis* | 土沉香 | N (Cap. 586) | | | | | V | | | | V |
| TILIACEAE | *Microcos paniculata* | 布渣葉 | N | | V | | | | | V | | V |
| THELYPTERIDACEAE | *Cyclosorus parasiticus* | 華南毛蕨 | N | V | V | V | | V | V | V | V | V |
| ULMACEAE | *Celtis sinensis* | 朴樹 | N | | V | | V | | | | V | V |
| URTICACEAE | *Boehmeria nivea* | 苧麻 | E | | | | | | | V | V | V |
| URTICACEAE | *Pouzolzia zeylanica* | 霧水葛 | N | V | V | | | | V | V | V | V |
| VERBENACEAE | *Avicennia marina* | 白骨壤 | N | | | V | V | | | | | V |
| VERBENACEAE | *Clerodendrum inerme* | 苦郎樹 | N | V | | | | | | | | V |
| VERBENACEAE | *Lantana camara* | 馬櫻丹 | E | V | V | | | | | | V | V |

**Note:** “S” = Stream; “SW” = Secondary Woodland; “M” = Marsh; “Man” = Mangrove; “DA” =Developed area; “CL” = Cultivated area; “P” = Plantation

**Table 3.** List of avifauna species and maximum counts recorded from the impact monitoring survey at work area under Contracts 2 and 100m buffer area.

| Common name | Species | Habitat | Conservation status in Hong Kong | Work area: Contract 2 | 100m buffer area |
|---|---|---|---|---|---|
| Chinese Bulbul | *Pycnonotus sinensis* | | -- | | 1 |
| Arctic Warbler | *Phylloscopus* | | | | 1 |
| Common Tailorbird | *Orthotomus sutorius* | | -- | | 1 |
| Crested Myna | *Acridotheres* | | -- | 1 | 3 |
| Great Tit | *Parus* | | | | 1 |
| Masked Laughing thrush | *Garrulax* | | -- | | 3 |
| Oriental Magpie Robin | *Copsychus saularis* | | -- | 1 | |
| Red-whiskered Bulbul | *Pycnonotus jocosus* | | -- | 1 | |
| Rufous-backed Shrike | *Lanius schach* | | -- | | 1 |
| Spotted Dove | *Streptopelia* | | -- | 2 | 2 |
| White-breasted Water hen | *Amaurornis* | | -- | 1 | |
| Grey Wagtail | *Motacilla cinerea* | | | 1 | |
| White Wagtail | *Motacilla alba* | | | 1 | |
| **Total number of species:** | | | | **7** | **8** |

***Key :**

W = Wetland dependent species ; RC = Regional Concern ; LC = Local Concern

**Table 4.** Relative abundance of aquatic species recorded in Wai Ha River within the 100m buffer of works boundary under Contracts 2 in the impact monitoring survey.

| **Species** | **Common name** | **[1]Life-cycle characteristics** | **[2]Origin** | **SEMP 3** | **SEMP 4** |
|---|---|---|---|---|---|
| *Carassius auratus* | Goldfish | F | I | ++ | + |
| *Cirrhinus molitorella* | Mud carp | F | I | ++ | + |
| *Cyprinus carpio* | Common Carp | F | I | + | + |
| *Gambusia affinis* | Mosquito Fish | F | I | ++ | + |
| *Oreochromis niloticus* | Nile Tilapa | F | I | + | |
| *Parazacco spilurus* | Predaceaous Chub | F | N | + | |
| *Poecilia reticulata* | Guppy | F | I | + | + |
| *Puntius semifasciolatus* | Chinese Barb | F | N | + | |
| *Rhinogobius duospilus* | Goby | F | N | + | + |
| *Xiphophorus hellerii* | Swordtail | F | I | + | + |
| *Uca arcuata* | Fiddler Crab | M | N | + | |
| *Pomacea lineata* | Apple snail | F | I | + | |
| *Gerris sp.* | Water Strider | F | / | + | |
| **Total number of species:** | **13** | | | **13** | **7** |

**Key:**

Relative abundance:
+ : Species exists in the survey area
++ : Species common in the survey area
+++ : Species abundant in the survey area

[1] Life-cycle characteristics:
M = Marine vagrant
F = Freshwater species

[2]Origin:
N = Native
I = Introduced; / = not available

# Appendix N

# Ecological Monitoring Report in Area under Contract 1

# Agreement No. DP/01/2010
# Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 1 (Report 24a for January 2015)

Prepared for:

**Drainage Services Department**

Prepared by:
**ENVIRON Hong Kong Limited**

Date:
**February 2015**

Reference Number:
R4314_V1.0

ENVIRON

Agreement No. DP/01/2010
Drainage Improvement Works in Shatin and Tai Po:
Ecological Monitoring in area under Contract 1
(Report 24a for January 2015)

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## 1. Introduction

1.1 Project description

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

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

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

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

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

1.5 This is the report No. 24a ecological monitoring conducted on 30$^{th}$ January 2015 within the works boundary under Contract 1 and area within 100m from the works boundary.

## 2. Highlights of this report

- Field survey was conducted on 30th January 2015
- Construction activities of Contract 1 was completed during reporting month
- Lower number of species was observed within the works area under Contract 1 due to urbanized area in nature.
- Habitats in the 100m buffer area retain its natural condition.

## 3. Monitoring Methodology

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

### 4.1 Vegetation survey

Vegetation survey was performed along the designated transects (Figure 1) for ecological monitoring as described in the project specifications to monitor the vegetation health which could be adversely influenced by any bad site practice. Qualitative data of plants within the works boundary and wetland vegetation in the 100m buffer area of Contract 1 adjacent to construction site and wetland was recorded. Riparian vegetation including aquatic and emergent at 4 stream ecological monitoring points (hereinafter referred to as "SEMP") under Contract 1 ( i.e. SEPM 1; Figure 2 ) along the affected stream channel and riparian habitat was recorded in terms of species, relative abundance and average heights. Any signs of damages and adverse health problems directly caused the works were recorded and reported. Nomenclature and protection status of the species followed those documented in the AFCD website (www.hkbiodiversity.net) and Hong Kong Herbarium (2004).

### 4.2 Avifauna

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

## 4.3 Herpetofauna

Herpetofauna groups are considered to be inactive during dry season (November to March), thus detailed herpetofauna monitoring was not conducted. However, any sign/calling of reptiles or amphibians encountered during the in situ survey was recorded.

## 4.4 Butterflies and Odonata

Odonates and butterfly are considered to be inactive during dry season (November to March), thus detailed monitoring was not conducted.

## 4.5 Mammals

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

## 4.6 Aquatic fauna

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

## 4. Monitoring data

### 5.1 Vegetation survey

The habitats identified in area under Contract 1 are marine, recreational fish pond, river course, wooded area, mangrove, marsh and developed area (including village). Vegetation were found in wooded area, mangrove, marsh, develop area and river bank. Periodic vegetation clearance has been carried out at SEMP 1 only some weeds plant such as *Wedelia chinensis*, *Bidens alba* and *Pennisetum alopecuroides* was recorded, with average coverage of 11%. (Table 1). A list of plant species recorded from different habitats within the assessment area under Contract 1 is presented on Table 2. A total of 127 species were recorded within the assessment boundary of Contract 1 in which 127 species were recorded within the buffer area, while 49 species recorded within the work areas under Contract 1. No protected species were recorded.

### 5.2 Avifauna

A total of 15 bird species were recorded in the current survey under Contract 1(Table 3). In the work area under Contract 1, only 7 common bird species were recorded in which none of them were with conservation interest. A total of 11 bird species were recorded in the 100m buffer area and one species *Ardeola bacchus* is recognized as being regional conservation concern, though it is common in suitable habitats in Hong Kong. (Viney et al., 2005).

### 5.3 Herpetofauna

No amphibian or reptile was recorded within the assessment area during dry season.

### 5.4 Butterflies

No butterfly was recorded within the assessment area during dry season.

### 5.5 Odonata

No Odonata was recorded within the assessment area during dry season.

### 5.6 Mammal

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

### 5.7 Aquatic fauna

Under Contract 1 (i.e. SEMP 1), a total of 8 fish species, 1 bivalve, 1 snail and 2 crustacean were recorded and most of them were residing in brackish environments (Table 4). River works in SEMP 1 was finished as showed in Figure 2. Overall, no protected or rare species were recorded.

## 5. Remedial measures adopted to the adverse condition

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

## 6. Record of complains and remedial measures

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

## 7. Review of the monitoring results

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

## 8. Comments and summary

The quarterly ecological impact monitoring under Contracts 1 (excluding the ECA) was conducted in January 2015 and relevant flora and fauna data were collected according to project specification and EM&A Manual. As indicated by the low diversity and abundance of species recorded within the work areas, habitats within the work boundary under Contracts 1 offer few ecological opportunities for inhabitation of fauna and flora. On the other hand, the natural habitats in the 100m buffer area are retained at acceptable condition.

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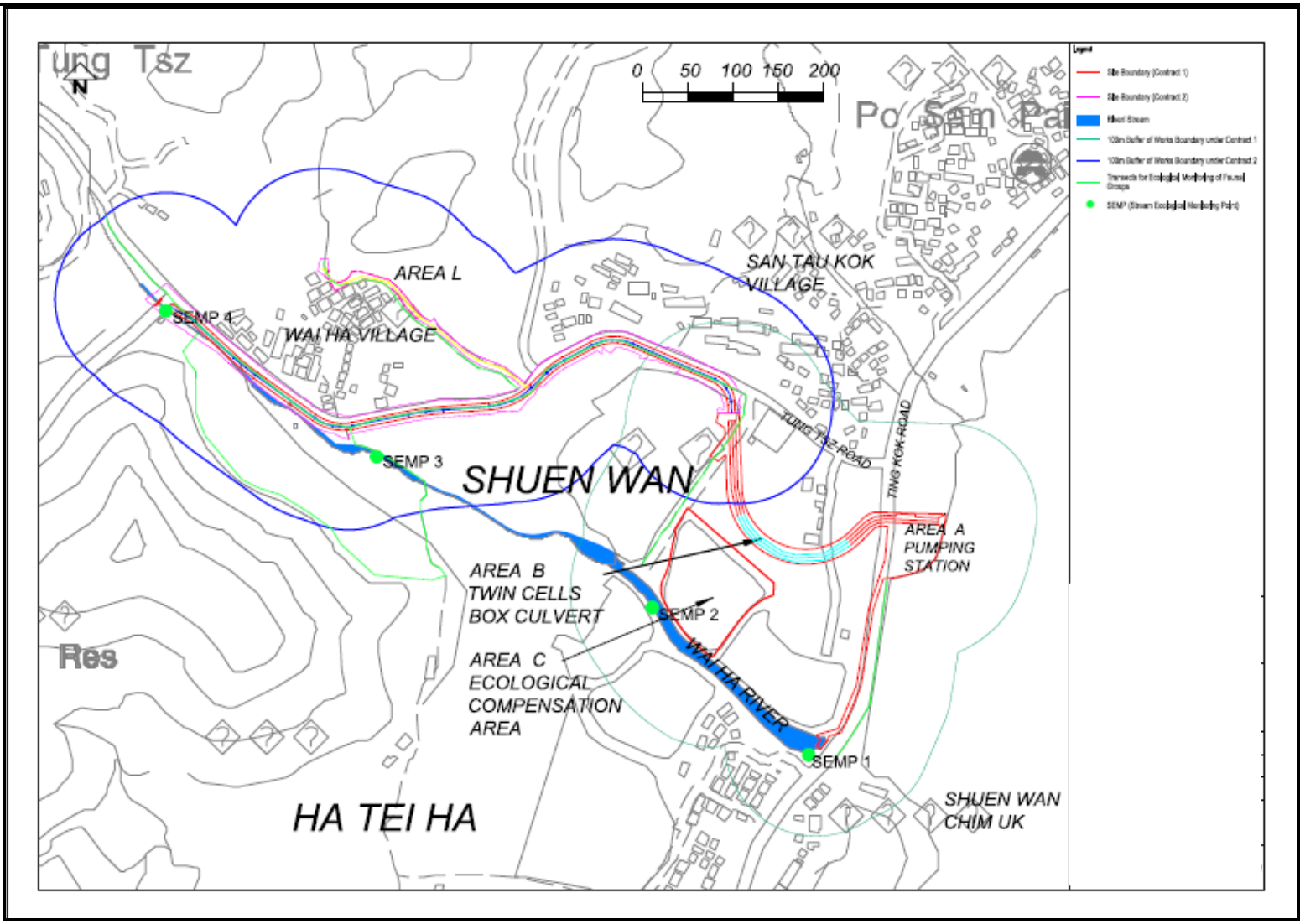
# Figure




| | |
|---|---|
| **Figure:** 1 | ENVIRON |
| **Title:** Map showing the ecological monitoring transect and the boundary of assessment area. | Drawn by: IT |
| | Checked by: SL |
| **Project**: Agreement No. DP/01/2010 Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 1 (January 2015, Report 24a) | Rev.: 1.0 |
| | Date: February 2015 |

| | |
|---|---|
| **Figure:** 2 | ENVIRON |
| **Title:** SEMP 1, the first sampling point of Wai Ha River under Contract 1. | Drawn by: IT |
| | Checked by: SL |
| **Project**: Agreement No. DP/01/2010 Drainage Improvement Works in Shatin and Tai Po: Ecological Monitoring in area under Contract 1 (January 2015, Report 24a ) | Rev.: 1.0 |
| | Date: February 2015 |

# Table

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

| | | | **Sampling point** | **SEMP 1** | |
|---|---|---|---|---|---|
| **Species** | **Family** | **Growth form** | **Status in Hong Kong** | **Height (cm)** | **%** |
| *Albizia lebbeck* | MIMOSACEAE | Tree | E | | |
| *Arundinella nepalensis* | POACEAE | Perennial Herb | N | | |
| *Bidens alba* | ASTERACEAE | Herb | E | 5 | 2 |
| *Celtis sinensis* | ULMACEAE | Tree | N | | |
| *Eclipta prostrata* | ASTERACEAE | Perennial herb | N | 20 | 1 |
| *Ficus virens* | MORACEAE | Tree | N | 100 | 1 |
| *Kandelia obovata* | RHIZOPHORACEAE | Shrub or Small Tree | N | | |
| *Leucaena leucocephala* | MIMOSACEAE | Small Tree | E | | |
| *Macaranga tanarius* | EUPHORBIACEAE | Tree | N | | |
| *Mikania micrantha* | ASTERACEAE | Climbing Herb | E | 10 | 1 |
| *Pennisetum alopecuroides* | POACEAE | Perennial Herb | N | 10 | 2 |
| *Plantago major* | PLANTAGINACEAE | Perennial herb | N | | |
| *Wedelia chinensis* | ASTERACEAE | Perennial herb | N | 5 | 2 |
| *Kandelia obovata* | RHIZOPHORACEAE | | | | |
| Bare | n/a | n/a | n/a | n/a | 89 |

***Key:**

E = Exotic

N = Native

n/a = not available

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

| Family | Species name | Chinese name | *Status in Hong Kong | S | DA | P | N | Man | M | Work Area under Contract 1 | 100 m buffer area under Contract 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ACANTHACEAE | *Acanthus ilicifolius* | 老鼠簕 | N | | | | | V | V | | V |
| ACANTHACEAE | *Rhinacanthus nasutus* | 靈枝草 | E | | V | | | | | | V |
| ACROSTICHACEAE | *Acrostichum aureum* | 鹵蕨 | N | | | | | | V | | V |
| AGAVACEAE | *Cordyline fruticosa* | 朱蕉 | E | | V | | | | | | V |
| AGAVACEAE | *Dracaena draco* | 龍血樹 | E | | V | | | | | | V |
| AGAVACEAE | *Sansevieria trifasciata* | 虎尾蘭 | E | | V | | | | | V | V |
| APOCYNACEAE | *Catharanthus roseus* | 長春花 | N | | V | | | | | | V |
| ARACEAE | *Alocasia odora* | 海芋 | N | V | V | | V | | V | | V |
| ARALIACEAE | *Acanthopanax gracilistylus* | 五加皮 | E | V | | | | | | | V |
| ARALIACEAE | *Schefflera actinophylla* | 傘樹 | E | | V | | | | | | V |
| ARALIACEAE | *Schefflera heptaphylla* | 鴨腳木 | N | | V | | | | V | V | V |
| ARECACEAE | *Archontophoenix alexandrae* | 假檳榔 | E | | V | | | | | | V |
| ARECACEAE | *Caryota ochlandra* | 魚尾葵 | E | | V | | V | | | | V |
| ARECACEAE | *Chrysalidocarpus lutescens* | 散尾葵 | E | | V | | | | | V | V |
| ARECACEAE | *Phoenix roebelenii* | 日本葵 | E | | V | | V | | | | V |
| ARECACEAE | *Rhapis excelsa* | 棕竹 | N | | V | | V | | | | V |
| ASTERACEAE | *Bidens alba* | 白花鬼針草 | E | V | V | | V | | | V | V |
| ASTERACEAE | *Emilia sonchifolia* | 一點紅 | N | | V | | V | | | V | V |
| ASTERACEAE | *Mikania micrantha* | 薇甘菊 | E | V | V | V | V | | V | V | V |

| Family | Species name | Chinese name | *Status in Hong Kong | S | DA | P | N | Man | M | Work Area under Contract 1 | 100 m buffer area under Contract 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ASTERACEAE | *Pterocypsela indica* | 山萵苣 | N | | V | | | | | V | V |
| ASTERACEAE | *Wedelia chinensis* | 蟛蜞菊 | N | V | | V | V | | | V | V |
| ASTERACEAE | *Youngia japonica* | 黃鵪菜 | N | V | V | | V | | | V | V |
| BIGNONIACEAE | *Pyrostegia venusta* | 炮仗花 | E | | V | | V | | | | V |
| BIGNONIACEAE | *Tabebuia chrysantha* | 黃花風鈴木 | E | | | | V | | | V | V |
| BOMBACACEAE | *Bombax ceiba* | 木棉 | E | | V | | V | | | V | V |
| BRASSICACEAE | *Brassica rapa* | 大頭菜 | E | | | V | | | | | V |
| CAESALPINIACEAE | *Bauhinia blakeana* | 洋紫荊 | N | | V | | V | | | V | V |
| CAESALPINIACEAE | *Bauhinia purpurea* | 紅花羊蹄甲 | E | | V | | V | | | V | V |
| CAESALPINIACEAE | *Bauhinia variegata* | 宮粉羊蹄甲 | E | | V | | V | | | V | V |
| CAESALPINIACEAE | *Cassia spectabilis* | 美麗決明 | E | | V | | | | | V | V |
| CAPRIFOLIACEAE | *Lonicera japonica* | 忍冬 | N | | | | V | | | V | V |
| CARICACEAE | *Carica papaya* | 番木瓜 | E | | | V | | | | | V |
| CASUARINACEAE | *Casuarina equisetifolia* | 木麻黃 | E | | V | | | | | V | V |
| CASUARINACEAE | *Citrus grandis* | 柚 | E | | V | | | | | | V |
| COMBRETACEAE | *Lumnitzera racemosa* | 欖李 | N | | V | | | | | V | V |
| COMBRETACEAE | *Terminalia catappa* | 欖仁樹 | E | | V | | | | | V | V |
| COMMELINACEAE | *Commelina diffusa* | 節節草 | N | V | | | | | | | V |
| COMMELINACEAE | *Tradescantia spathacea* | 蚌花 | E | | V | | V | | | V | V |
| CONVOLVULACEAE | *Ipomea cairica* | 五爪金龍 | E | | | V | | | V | V | V |
| CUPRESSACEAE | *Thuja orientalis* | 側柏 | E | | V | | | | | | V |
| CYPERACEAE | *Cyperus flabelliformis* | 風車草 | E | V | | | | | | | V |
| DILLENIACEAE | *Dillenia indica* | 第倫桃 | E | | | | V | | | V | V |

| Family | Species name | Chinese name | *Status in Hong Kong | S | DA | P | N | Man | M | Work Area under Contract 1 | 100 m buffer area under Contract 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ELAEOCARPACEAE | *Elaeocapus haminanensis* | 水石榕 | E | | V | | V | | | | V |
| EUPHORBIACEAE | *Antidesma bunius* | 五月茶 | N | | | V | | | | | V |
| EUPHORBIACEAE | *Aporusa dioica* | 銀柴 | N | | | V | | | | | V |
| EUPHORBIACEAE | *Bischofia javanica* | 秋風 | N | | V | V | V | | | | V |
| EUPHORBIACEAE | *Bridelia tomentosa* | 土蜜樹 | N | V | V | | V | | | V | V |
| EUPHORBIACEAE | *Excoecaria agallocha* | 海漆 | N | | | | | V | | | V |
| EUPHORBIACEAE | *Glochidion zeylanicum* | 香港算盤子 | N | V | | | | | | | V |
| EUPHORBIACEAE | *Macaranga tanarius* | 血桐 | N | V | V | V | V | | | V | V |
| EUPHORBIACEAE | *Mallotus apelta* | 白桐 | N | | | V | | | | | V |
| EUPHORBIACEAE | *Sapium discolor* | 山烏桕 | N | V | | | | | | | V |
| FABACEAE | *Desmodium heterocarpon* | 假地豆 | N | | V | | V | | | | V |
| FABACEAE | *Pueraria lobata* | 葛 | N | V | | | | | V | | V |
| FABACEAE | *Sesbania cannabina* | 田菁 | E | | V | | | | | V | V |
| FABACEAE | *Wisteria sinensis* | 紫藤 | E | | | | V | | | | V |
| FLACOURTIACEAE | *Scolopia chinensis* | 刺柊 | N | | | V | | | | | V |
| GRAMINEAE | *Panicum maximum* | 大黍 | E | | V | | V | | V | V | V |
| LAMIACEAE | *Salvia japonica* | 鼠尾草 | N | | V | | | | | | V |
| LAURACEAE | *Litsea monopetala* | 假柿樹 | N | | | V | | | | | V |
| LYGODIACEAE | *Lygodium japonicum* | 海金沙 | N | | V | | | | | V | V |
| LYTHRACEAE | *Lagerstroemia speciosa* | 大花紫薇 | E | | V | V | V | | | V | V |
| MALVACEAE | *Hibiscus rosa-sinensis* | 大紅花 | E | | V | | V | | | V | V |
| MALVACEAE | *Hibiscus tiliaceus* | 黃槿 | N | V | | | | | V | V | V |
| MALVACEAE | *Thespesia populnea* | 恒春黃槿 | N | | | | | V | | | V |

| Family | Species name | Chinese name | *Status in Hong Kong | S | DA | P | N | Man | M | Work Area under Contract 1 | 100 m buffer area under Contract 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MELIACEAE | *Melia azedarach* | 楝 | E | V | | | | | | | V |
| MENISPERMACEAE | *Coculus orbiculatus* | 木防己 | N | V | | | V | | | | V |
| MENISPERMACEAE | *Pericampylus glaucus* | 細圓藤 | N | | V | | | | | V | V |
| MIMOSACEAE | *Acacia confusa* | 台灣相思 | E | | V | | | | | V | V |
| MIMOSACEAE | *Albizia lebbeck* | 大葉合歡 | E | V | V | | V | | | | V |
| MIMOSACEAE | *Calliandra haematocephala* | 朱纓花 | E | | V | | | | | V | V |
| MIMOSACEAE | *Leucaena leucocephala* | 銀合歡 | E | V | V | V | | | | V | V |
| MORACEAE | *Artocarpus macrocarpon* | 菠蘿蜜 | E | | V | | | | | | V |
| MORACEAE | *Ficus benjamina* | 垂葉榕 | E | | V | | V | | | V | V |
| MORACEAE | *Ficus elastica* | 印度榕樹 | E | | V | | V | | | | V |
| MORACEAE | *Ficus microcarpa* | 榕樹 | N | | V | | V | | | | V |
| MORACEAE | *Ficus hispida* | 對葉榕 | N | V | V | V | | | V | | V |
| MORACEAE | *Ficus simplicissima* | 五指毛桃 | N | | V | | | | | V | V |
| MORACEAE | *Ficus variegata* | 青果榕 | N | | V | | | | | V | V |
| MORACEAE | *Ficus virens* | 大葉榕 | N | V | V | | V | | | V | V |
| MORACEAE | *Morus alba* | 桑 | N | | V | | | | | | V |
| MYRSINACEAE | *Aegiceras corniculatum* | 蠟燭果 | N | | | | | V | V | | V |
| MYRSINACEAE | *Maesa perlarius* | 鯽鱼胆 | N | | | V | | | | | V |
| MYRTACEAE | *Callistemon viminalis* | 串錢柳 | E | | | | V | | | | V |
| MYRTACEAE | *Cleistocalyx operculatus* | 水翁 | N | V | | V | | | | | V |
| MYRTACEAE | *Melaleuca quinquenervia* | 白千層 | E | | V | | | | | V | V |
| MYRTACEAE | *Psidium guajava* | 番石榴 | E | | V | | | | | | V |

| Family | Species name | Chinese name | *Status in Hong Kong | S | DA | P | N | Man | M | Work Area under Contract 1 | 100 m buffer area under Contract 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| OLEACEAE | *Ligustrum sinensis* | 山指甲 | N | | V | V | V | | | | V |
| ONAGRACEAE | *Ludwigia perennis* | 細花丁香蓼 | N | | V | | | | V | V | V |
| OXALIDACEAE | *Averrhoa carambola* | 楊桃 | E | | V | | | | | | V |
| OXALIDACEAE | *Oxalis corniculata* | 酢漿草 | N | | V | | | | | V | V |
| PANDANACEAE | *Pandanus tectorius* | 露兜樹 | N | V | | | | V | | | V |
| PINACEAE | *Pinus massoniana* | 馬尾松 | N | | V | | | | | | V |
| PIPERACEAE | *Piper hancei* | 山蒟 | N | | | V | | | | | V |
| PLANTAGINACEAE | *Plantago major* | 車前草 | N | | V | | V | | V | V | V |
| POACEAE | *Arundinella nepalensis* | 石珍芒 | N | V | | | | | | | V |
| POACEAE | *Cynodon dactylon* | 狗牙根 | N | | V | | V | | | V | V |
| POACEAE | *Digitaria ciliaris* | 升馬唐 | N | | V | | | | V | | V |
| POACEAE | *Eleusine indica* | 牛筋草 | N | | V | | V | | | V | V |
| POACEAE | *Microstegium ciliatum* | 剛莠竹 | N | V | V | | | | | V | V |
| POACEAE | *Panicum repens L.* | 鋪地黍 | N | | V | | | | V | | V |
| POACEAE | *Pennisetum alopecuroides* | 狼尾草 | N | | V | | | | V | | V |
| POACEAE | *Phragmites anstralis* | 蘆葦 | N | | | | | | V | | V |
| POACEAE | *Zoysia sp.* | 結縷草 | N | | | | | V | V | | V |
| POLYGONACEAE | *Polygonum hydropiper* | 水蓼 | N | | V | | | | | | V |
| POLYGONACEAE | *Polygonum lapathifolium* | 大馬蓼 | N | | | | | | V | | V |
| RHIZOPHORACEAE | *Kandelia obovata* | 秋茄樹 | N | | | | | V | V | | V |
| ROSACEAE | *Eriobotrya japonica* | 枇杷 | E | | V | | | | | | V |
| ROSACEAE | *Rubus reflexus* | 蛇泡簕 | N | | | V | | | | | V |

| Family | Species name | Chinese name | *Status in Hong Kong | S | DA | P | N | Man | M | Work Area under Contract 1 | 100 m buffer area under Contract 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| RUBIACEAE | *Paederia scandens* | 雞屎藤 | N | | V | V | V | | V | V | V |
| RUBIACEAE | *Psychotria serpens* | 蔓九節 | N | | V | | | | | V | V |
| RUTACEAE | *Citrus reticulata Blanco* | 柑橘 | E | | V | | | | | | V |
| RUTACEAE | *Clausena lansium* | 黃皮 | E | | V | | | | | | V |
| RUTACEAE | *Murraya paniculata* | 九里香 | E | V | V | | | | | | V |
| SAPINDACEAE | *Dimocarpus longan* | 龍眼 | E | | V | V | | | | | V |
| SAPINDACEAE | *Litchi chinensis* | 荔枝 | E | | V | | | | | | V |
| SAPINDACEAE | *Sapindus saponaria* | 無患子 | N | | V | V | | | | | V |
| SAPOTACEAE | *Manilkara zapota* | 人心果 | E | V | | | | | | | V |
| SOLANACEAE | *Solanum nigrum* | 龍葵 | N | | V | | | | V | | V |
| SOLANACEAE | *Solanum torvum* | 水茄 | E | | | | | | V | | V |
| STERCULIACEAE | *Sterculia lanceolata* | 假蘋婆 | N | V | | | | | | | V |
| TILIACEAE | *Microcos paniculata* | 布渣葉 | N | | | V | | | | | V |
| ULMACEAE | *Celtis sinensis* | 朴樹 | N | V | V | V | | | | V | V |
| URTICACEAE | *Boehmeria nivea* | 苧麻 | E | V | | V | | | | | V |
| VERBENACEAE | *Avicennia marina* | 白骨壤 | N | | | | | V | V | | V |
| VERBENACEAE | *Clerodendrum inerme* | 苦郎樹 | N | V | | | | | | | V |
| VERBENACEAE | *Lantana camara* | 馬櫻丹 | E | V | V | V | V | | | V | V |

**Note:** “S” = Stream; “N” = Ting Kok Nursery Community Garden; “M” = Marsh; “Man” = Mangrove; “DA” =Developed area; “P” = Plantation

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

| **Common name** | **Species** | **Habitat** | **Conservation status in Hong Kong** | **Work area: Contract 1** | **100m buffer area** |
|---|---|---|---|---|---|
| Chinese Bulbul | *Pycnonotus sinensis* | W | | 2 | 2 |
| Chinese Pond Heron | *Ardeola bacchus* | W | RC | | 2 |
| Crested Myna | *Acridotheres cristatellus* | | | 2 | |
| Great Egret | *Casmerodius alba* | W | | | 2 |
| Eurasian Tree Sparrow | *Passer montanus* | | | 1 | |
| Japanese White-eye | *Zosterops japonicus* | | | | 3 |
| Little Egret | *Egretta garzetta* | W | | | 2 |
| Grey Heron | *Ardea cinerea* | W | | | 1 |
| Oriental Magpie Robin | *Copsychus saularis* | | | 1 | |
| Masked Laughing thrush | *Garrulax perspicillatus* | | | | 5 |
| Red-whiskered Bulbul | *Pycnonotus jocosus* | | | 2 | 1 |
| Spotted Dove | *Streptopelia chinensis* | | | 1 | 1 |
| White Wagtail | *Motacilla alba* | | | 1 | |
| Grey Wagtail | *Motacilla cinerea* | | | | 1 |
| Yellow-bellied Prinia | *Prinia flaviventris* | | | | 1 |
| **Total number of species :** | | | | **7** | **11** |

*** Key:**

W = Wetland dependent spices ; RC = Regional Concern

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

| **Species** | **Common name** | **[1]Life-cycle characteristics** | **[2]Origin** | **SEMP 1** |
|---|---|---|---|---|
| *Ambassis gymnocephalus* | Glassperch | M | N | + |
| *Gerres macracanthus* | Longspine Silverbiddy | M | N | + |
| *Mugil cephalus* | Flatehead Grey Mullet | M | N | + |
| *Opsariichthys evolans* | Minnow | F | N | + |
| *Oreochromis mossambicus* | Mozambique Tilapa | F | I | ++ |
| *Oreochromis niloticus* | Nile Tilapa | F | I | ++ |
| *Tilapia zillii* | Redbelly Tilapa | F | I | + |
| *Saccostrea cucullata* | Rock Oyster | M | N | ++ |
| *Cyprinus carpio* | Common Carp | F | I | |
| *Sesarma (Perisesarma) bidens* | Sesarmine crab | M | N | |
| *Uca arcuata* | Fiddler Crab | M | N | |
| *Cerithidea cingulata* | Mud snail | M | N | + |
| **Total number of species:** | **12** | | | **9** |

**Key:**

Relative abundance:
+ : Species exists in the survey area
++ : Species common in the survey area
+++ : Species abundant in the survey area

[1] Life-cycle characteristics:
M = Marine vagrant
F = Freshwater species

[2]Origin:
N = Native
I = Introduced; / = not available