PROJECT NO.: TCS/00553/11

CONTRACT NO. DC/2009/22
DRAINAGE IMPROVEMENT WORKS IN SHUEN WAN

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

MONTHLY ENVIRONMENTAL MONITORING AND AUDIT REPORT FOR OPERATION PHASE– MAY 2015

PREPARED FOR
KWAN LEE-KULY JOINT VENTURE

Quality Index

Date	Reference No.	Prepared By	Certified by
21 June 2015	TCS00553/11/600/R0444v2	 Ben Tam (Environmental Consultant)	 T.W. Tam (Environmental Team Leader)

Ver.	Date	Description
1	16 June 2015	First submission
2	21 July 2015	Amended according to the IEC's comment on 17 June 2015

RAMBOLL ENVIRON

Ref.: DSDSHUWNEM00_0_0706L.15

22 July 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. Max Tai

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 May 2015

Reference is made to Environment Team's submission of the Monthly Environmental Monitoring and Audit Report for May 2015 by Email on 21 July 2015 (entitled "DC/2009/22 & DC/2010/02 – Monthly EM&A Report for Operation Phase – May 2015").

Please be informed that we have no comment on the captioned 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.

Thank you very much for your attention and please feel free to contact the undersigned should you require further information.

Yours faithfully,

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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Ramboll Environ Hong Kong Limited 英環香港有限公司
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EXECUTIVE SUMMARY

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

ES.02. Joint site inspection with EPD, DSD, Contractor, IEC and ET was carried out on 24 March 2015 regarding the proposal of commencement of operation phase of DC/2010/02. EPD accepted that the proposal and the operation phase of DC/2012/02 was commenced from 1 April 2015. Therefore, the EM&A programme for both Contracts 1 and 2 were performed in Operation Phase in the Reporting Period.

ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

ES.03. In the Reporting Period, environmental monitoring activities for the Operation Phase of the Project under the of EM&A programme are summarized in the following table.

Environmental Aspect	Monitoring Parameters / Inspection	Contract 1	Contract 2
		Operation Phase	Operation Phase
Water Quality	Hydrological characteristics measurement – H1, H2, H3 and H4	4 events	4 events
Ecological	Ecological Monitoring	0 event	0 event
Landscape & Visual	Inspection by a registered Landscape Architect	1 event	1 event

ES.04. Operation phase ecological monitoring in area under the Project should be undertaken on a quarterly basis and it was not carried out in this Reporting Period.

ES.05. Operation phase Landscape and visual inspection of the Contracts 1 and 2 should be undertaken on a quarterly basis and they were carried out on 29 and 30 May 2015 respectively.

ES.06. 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.

ENVIRONMENTAL COMPLAINT

ES.07. No written or verbal complaint was recorded in this Reporting Period.

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

ES.08. No environmental summons or successful prosecutions were recorded in this Reporting Period.

REPORTING CHANGE

ES.09. In the Reporting Period, the EM&A programme for both Contracts 1 and 2 were implemented in the Operation Phase according to the updated EM&A Manual.

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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 construction works of Contract 1 was commenced in ***August 2010*** and the Operation Phase was commenced in ***December 2014.*** For Contract 2, the construction works was commenced in ***May 2011*** and the Operation Phase was commenced in ***April 2015.*** The Project site boundary is shown in ***Appendix A***.

1.03 Action-United Environmental Services and Consulting (AUES) was appointed as the Environmental Team (ET) of Contracts 1 and 2 to implement the relevant EM&A programme of the Project.

1.04 This is the Monthly EM&A Report presenting the monitoring results for Operation Phase during the Reporting Period from **1** to **31 May 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 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***.

SUMMARY OF ENVIRONMENTAL SUBMISSIONS

2.02 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 The EM&A requirements for the Operation Phases are according to the PP, EIAR, Environmental Permit EP303/2008 (hereinafter 'the EP'), and the associated updated EM&A Manual and they are presented in below sub-section.

MONITORING PARAMETERS

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

Table 3-1 Summary of Monitoring Parameters for the Project

Environmental Aspect	Requirement / Parameter
Hydrological Characteristics Monitoring	• In-situ measurement including water flow and depth
(*) Ecological Monitoring and Audit	• 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

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. The monitoring location is summarized in ***Table 3-2*** and shown in ***Appendix C.***

Table 3-2 Monitoring Locations of Operation Phase

Aspect	Location ID	Address
Hydrological	H1	Between the Shuen Wan Marsh and ECA • Coordinates: E839306, N836379)
	H2	Route 10 Sam Kung Temple • Coordinates: E839163, N836433
	H3	Upstream of Tung Tze Shan Road • Coordinates: E838760, N836714
	H4	Wai Ha Village 29D • 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 OPERATION PHASE

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

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

3.05 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

3.06 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

Hydrological Characteristics

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

3.08 **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.

3.09 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 for Operation Phase

Equipment	Model
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

Hydrological Characteristics

3.10 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.

3.11 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

3.12 Ecological monitoring and reporting should be performed by IEC. Site survey will be carried out during the construction and 1-year establishment period of the Ecological Compensatory Area. These monitoring events include regular check on the retained and transplanted trees and shrubs, monitoring on fauna groups and aquatic fauna. No equipment and procedure are presented in the EM&A Monthly Report.

Landscape and Visual

3.13 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

3.14 No performance criteria i.e. Action and Limit levels of hydrological is used for the Operation Phase. 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.

4.0 MONITORING RESULTS OF CONTRACT 1 AND 2 FOR OPERATION PHASE

4.01 The operation phase monitoring schedule is presented in ***Appendix D***. The monitoring results are presented in the following sub-sections.

RESULTS OF HYDROLOGICAL CHARACTERISTICS MONITORING

4.02 In this Reporting Period, hydrological characteristics measurements were carried out on **8, 13, 21** and **27 May 2015**. The detailed measurement results in this Reporting Period are presented in ***Tables 4-1*** and the graphical plot area shown in ***Appendix E.***

Table 4-1 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: 8 May 2015							
H1	9:43	Flood	5.5	0.44	2.4200	0.3	0.726
	14:46	Ebb	5.5	0.41	2.2550	0.3	0.677
H2	9:24	Flood	4.7	0.33	1.5510	0.1	0.155
	14:23	Ebb	4.7	0.32	1.5040	0.1	0.150
H3	9:03	Flood	7.45	0.39	2.9055	0.2	0.581
	14:02	Ebb	7.45	0.37	2.7565	0.3	0.827
H4	9:11	Flood	2.74	0.28	0.7672	0.2	0.153
	14:15	Ebb	2.74	0.27	0.7398	0.2	0.148
Date: 13 May 2015							
H1	13:57	Flood	5.5	0.44	2.4200	0.3	0.726
	10:17	Ebb	5.5	0.39	2.1450	0.2	0.429
H2	13:21	Flood	4.7	0.2	0.9400	0.1	0.094
	9:58	Ebb	4.7	0.29	1.3630	0.1	0.136
H3	13:08	Flood	7.45	0.38	2.8310	0.3	0.849
	9:33	Ebb	7.45	0.35	2.6075	0.2	0.522
H4	13:17	Flood	2.74	0.26	0.7124	0.2	0.142
	9:48	Ebb	2.74	0.25	0.6850	0.2	0.137
Date: 21 May 2015							
H1	10:28	Flood	5.5	0.48	2.6400	0.6	1.584
	16:19	Ebb	5.5	0.43	2.3650	0.5	1.183
H2	10:11	Flood	4.7	0.38	1.7860	0.4	0.714
	17:06	Ebb	4.7	0.36	1.6920	0.3	0.508
H3	9:43	Flood	7.45	0.45	3.3525	0.6	2.012
	16:45	Ebb	7.45	0.42	3.1290	0.4	1.252
H4	9:57	Flood	2.74	0.33	0.9042	0.5	0.452
	16:53	Ebb	2.74	0.31	0.8494	0.3	0.255
Date: 27 May 2015							
H1	15:21	Flood	5.5	0.45	2.4750	0.4	0.990
	9:57	Ebb	5.5	0.47	2.5850	0.5	1.293
H2	14:59	Flood	4.7	0.36	1.6920	0.2	0.338
	9:38	Ebb	4.7	0.34	1.5980	0.2	0.320
H3	13:27	Flood	7.45	0.4	2.9800	0.3	0.894
	9:09	Ebb	7.45	0.41	3.0545	0.4	1.222
H4	13:42	Flood	2.74	0.38	1.0412	0.3	0.312
	9:24	Ebb	2.74	0.37	1.0138	0.4	0.406

4.03 Hydrological characteristics results of the all measurement points are summarized in ***Tables 4-2*** and ***4-3***.

Table 4-2 Summarized Hydrological Characteristics of Water Depth, m

Date	Mid-Flood				Mid-Ebb			
	H1	H2	H3	H4	H1	H2	H3	H4
8-May-15	0.44	0.33	0.39	0.28	0.41	0.32	0.37	0.27
13-May-15	0.44	0.20	0.38	0.26	0.39	0.29	0.35	0.25
21-May-15	0.48	0.38	0.45	0.33	0.43	0.36	0.42	0.31
27-May-15	0.45	0.36	0.40	0.38	0.47	0.34	0.41	0.37

Table 4-3 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
8-May-15	0.726	0.155	0.581	0.153	0.677	0.150	0.827	0.148
13-May-15	0.726	0.094	0.849	0.142	0.429	0.136	0.522	0.137
21-May-15	1.584	0.714	2.012	0.452	1.183	0.508	1.252	0.255
27-May-15	0.990	0.338	0.894	0.312	1.293	0.320	1.222	0.406

4.04 To compare the monitoring data between the Reporting Period and baseline monitoring period, the currently water depth and volumetric flow rate has insignificant change.

RESULTS OF ECOLOGICAL MONITORING

4.05 According to updated EM&A Manual, quarterly ecological monitoring shall be conducted and it is undertaken 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.

4.06 No ecological monitoring was carried out in the Reporting Period. The last quarterly ecological monitoring was carried out by the IEC on 24 April 2015 and the next monitoring is scheduled in July 2015.

METEOROLOGICAL INFORMATION

4.07 The meteorological information during the measurement day of Operation Phase would be extracted from Tai Po and Shatin Stations of the Hong Kong Observatory (HKO). The meteorological data during the measurement days are presented in ***Table 4-4.***

Table 4-4 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
8-May-15	Fri	Mainly cloudy with isolated showers. Moderate southerly winds.	0	28.3	76.7	11.4	S/SW
13-May-15	Wed	Mainly cloudy with isolated showers. Moderate easterly winds, becoming southerlies later.	0	25.6	82.2	7.4	E/NE
21-May-15	Thu	Cloudy with showers. There will be a few thunderstorms later. Fresh easterly winds, strong offshore.	12.6	23.9	90	10.5	E/NE
27-May-15	Wed	Mainly cloudy with isolated showers. Moderate south to southwesterly winds.	0.2	28.3	87.5	10.1	SW

5.0 SITE INSPECTION

REGULAR SITE INSPECTION AND MONTHLY AUDIT

5.01 According to the Updated Environmental Monitoring and Audit Manual, regular site inspection to evaluate the project environmental performance is not required during operation phase.

LANDSCAPE AND VISUAL INSPECTION

Operation Phase of Contract 1

5.02 According to Section 7.5 of the Updated EM&A Manual, quarterly landscape and visual inspection shall be carried out during the first year of the Operation Phase.

5.03 The first quarterly Landscape & Visual inspection which signed by the Registered Landscape Architect was undertaken on 2 March 2015. In the Reporting Period, the second quarterly Landscape & Visual inspection of Contract 1 was carried out on **29 May 2015**. The quarterly Landscape & Visual inspection of Contract 1 is shown in **Appendix G.**

Operation Phase of Contract 2

5.04 The operation phase for Contract 2 was stared in April 2015 and the first quarter inspection of landscape and visual for Contract 2 was carried out on **30 May 2015**. The quarterly Landscape & Visual inspection of Contract 2 is shown in **Appendix G.**

6.0 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION

6.01 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 6-1, 6-2*** and ***6-3***.

Table 6-1 Statistical Summary of Environmental Complaints

Reporting Period	Environmental Complaint Statistics		
	Frequency	Cumulative	Complaint Nature
July 2011 –April 2015	1	1	Air Quality (1)
May 2015	0	1	Air Quality (1)

Table 6-2 Statistical Summary of Environmental Summons

Reporting Period	Environmental Summons Statistics		
	Frequency	Cumulative	Complaint Nature
July 2011 –April 2015	0	0	NA
May 2015	0	0	NA

Table 6-3 Statistical Summary of Environmental Prosecution

Reporting Period	Environmental Prosecution Statistics		
	Frequency	Cumulative	Complaint Nature
July 2011 –April 2015	0	0	NA
May 2015	0	0	NA

7.0 IMPLEMENTATION STATUS OF MITIGATION MEASURES

7.01 According to the Updated Environmental Monitoring and Audit Manual, mitigation measures of Operation Phase of the Project is included the Ecological and Landscape & Visual as listed below.

Ecological

- To minimize sedimentation, de-silting should be limited to conduct the dry season; and
- 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

8.0 CONCLUSIONS AND RECOMMENTATIONS

CONCLUSIONS

8.01 This is the monthly EM&A report for Contract 1 and Contract 2 presenting the Operation Phases monitoring results during the Reporting Period of **1** to **31 May 2015**.

8.02 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.

8.03 In the Reporting Period, operation phase ecological monitoring in area under the Project should be undertaken on quarterly basis and it was not carried out in this Reporting Period.

8.04 In the Reporting Period, operation phase Landscape and visual inspection of the Contracts 1 and 2 should be undertaken on quarterly basis and they were carried out 29 and 30 May 2015 respectively.

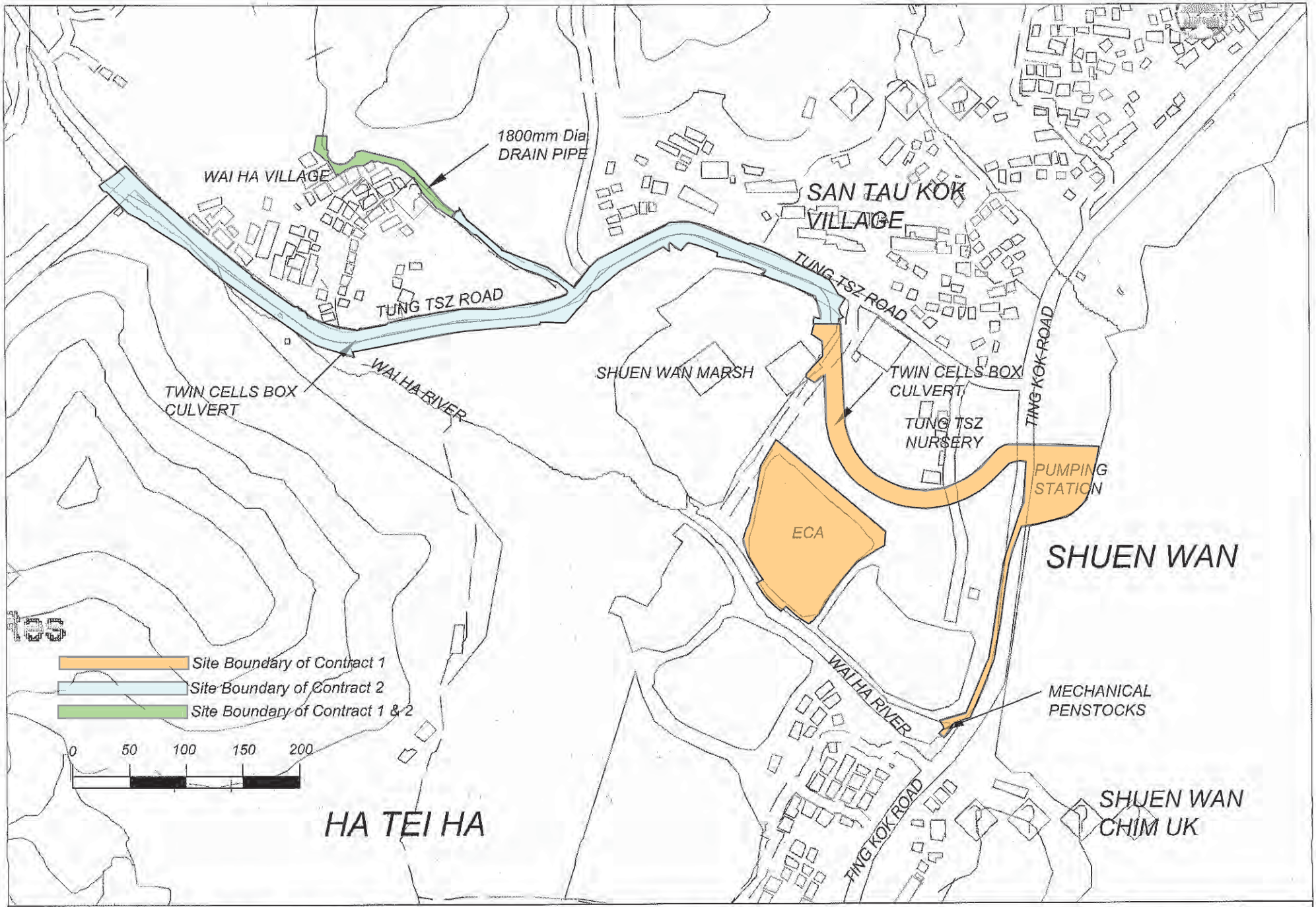
8.05 No documented complaint, notification of summons or successful prosecution was received in the Reporting Period.

RECOMMENDATIONS

8.06 Mitigation Measures of Operation Phase shall fulfill the updated EM&A Manual requirements.

Appendix A

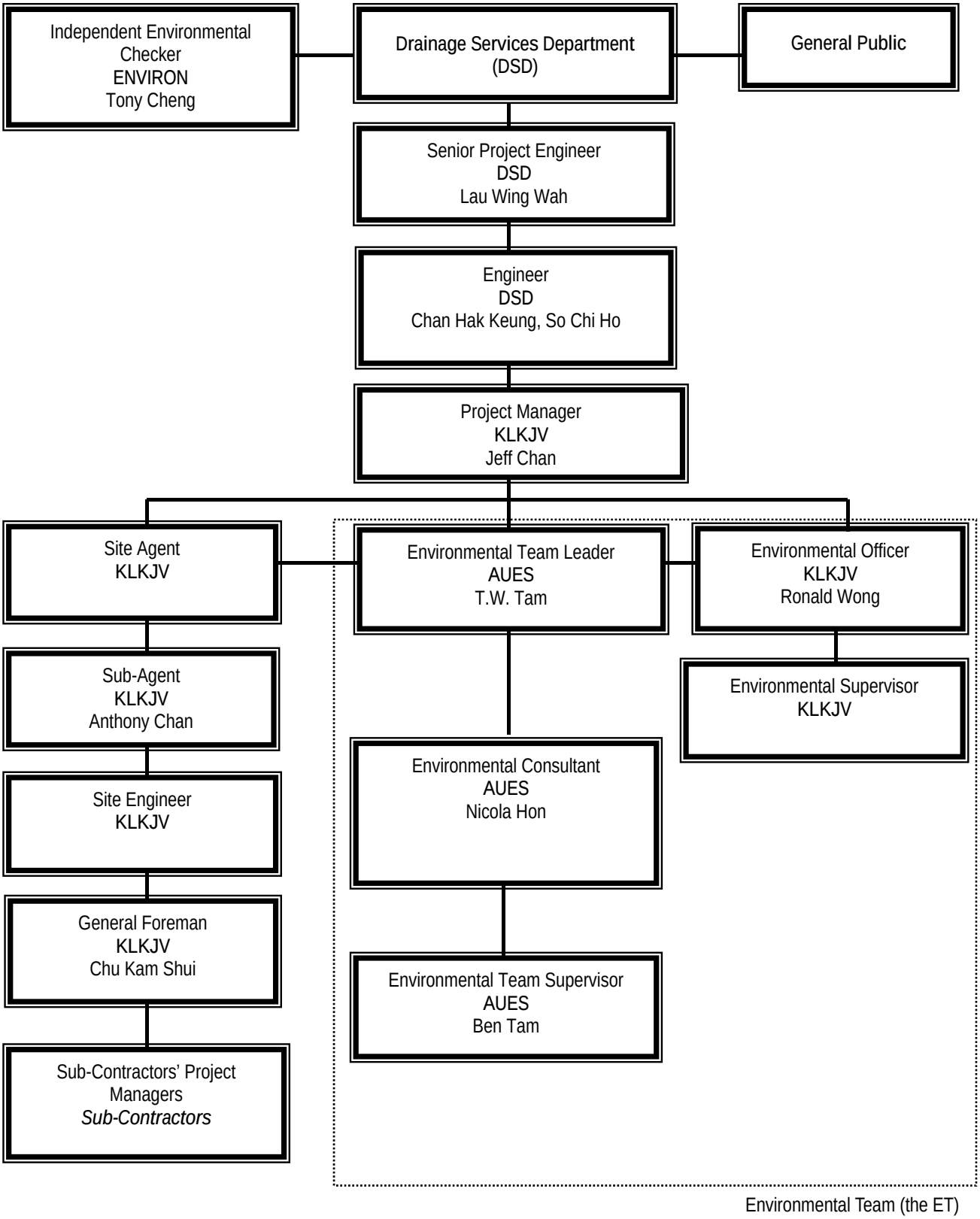
Project Location at Shuen Wan



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

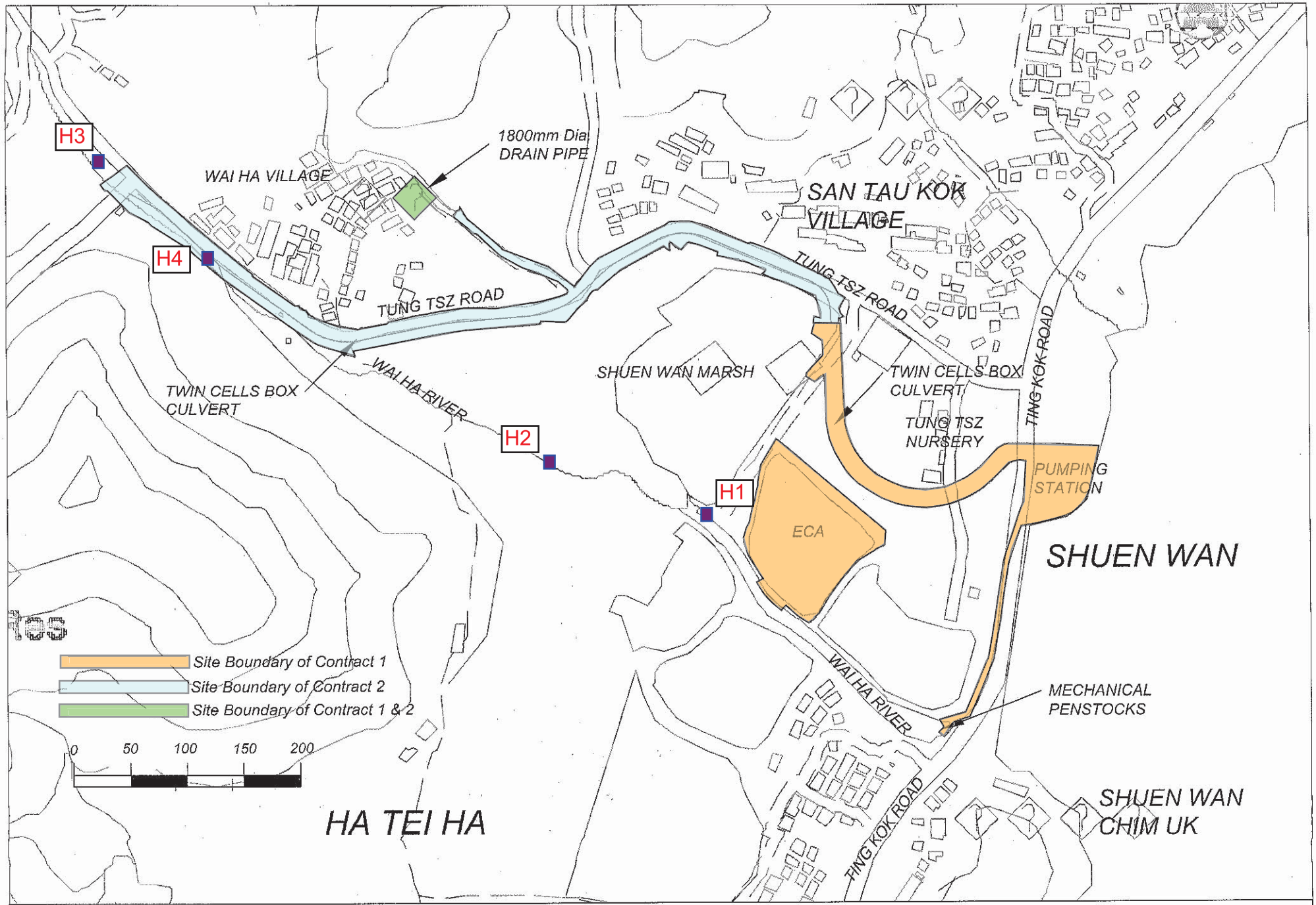
KLKJV (Main Contractor) – Kwan Lee-Kuly Joint Venture

ENVIRON (IEC) – ENVIRON Hong Kong Limited

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

Appendix C

Operation Phase Environmental Monitoring Locations



All Environmental Monitoring Locations

Appendix D

Operation Phase Monitoring Schedule

Monitoring/Inspection Schedule for the coming year (April 2015 to March 2016)

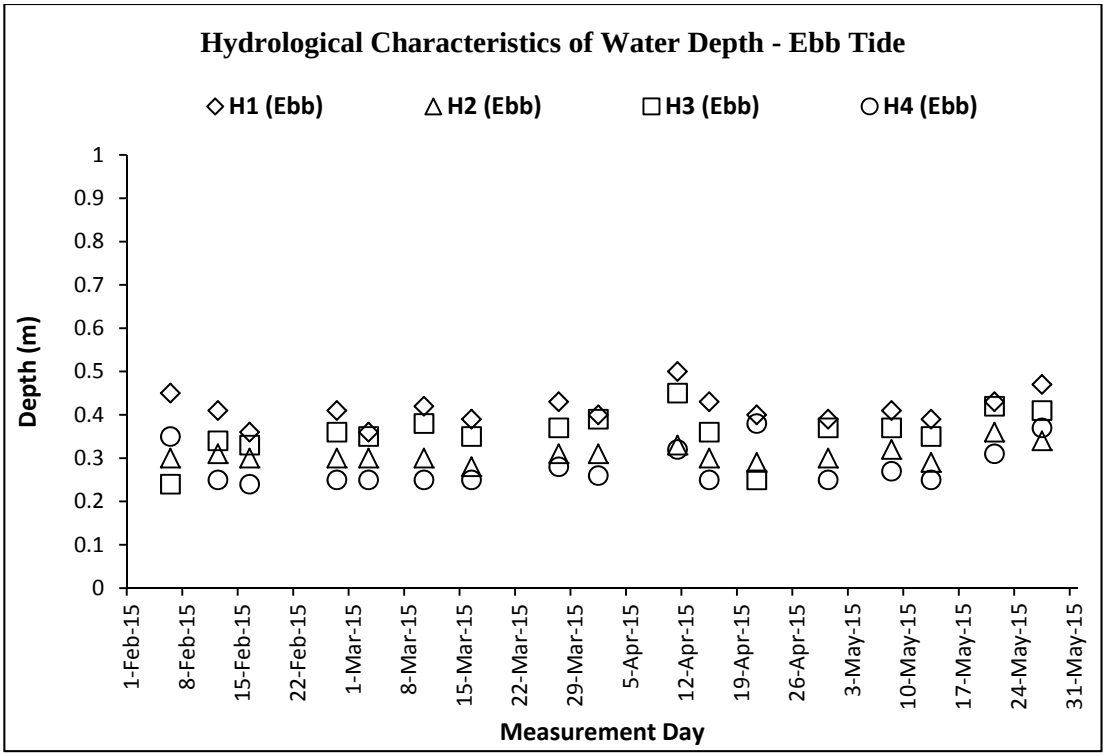
Operational Phase Commencement Date		Hydrological Monitoring											
		Apr-15	**May-15**	**Jun-15**	**Jul-15**	**Aug-15**	**Sep-15**	**Oct-15**	**Nov-15**	**Dec-15**	**Jan-16**	**Feb-16**	**Mar-16**
Contract 1	4-Dec-14	Once per week at mid-flood and mid-ebb tides								N/A	N/A	N/A	N/A
Contract 2	1-Apr-15	Once per week at mid-flood and mid-ebb tides											

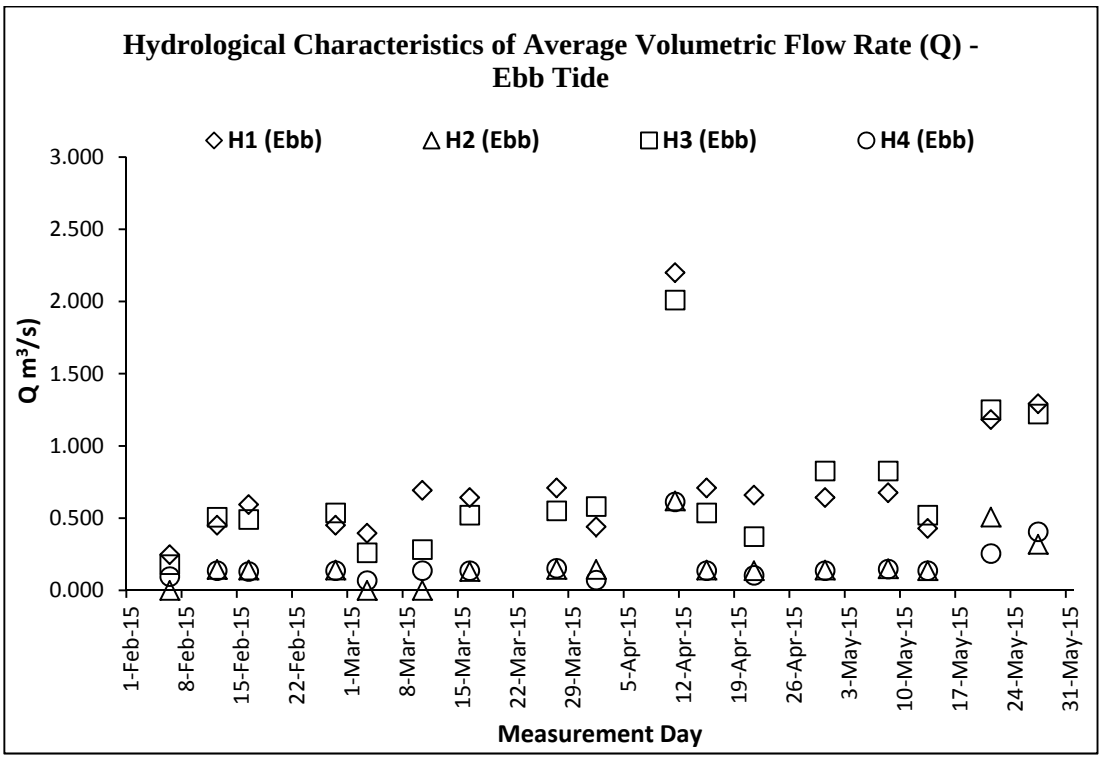
Operational Phase Commencement Date		Landscape & Visual Inspection											
		Apr-15	**May-15**	**Jun-15**	**Jul-15**	**Aug-15**	**Sep-15**	**Oct-15**	**Nov-15**	**Dec-15**	**Jan-16**	**Feb-16**	**Mar-16**
Contract 1	4-Dec-14		×			×			×				
Contract 2	1-Apr-15		×			×			×			×	

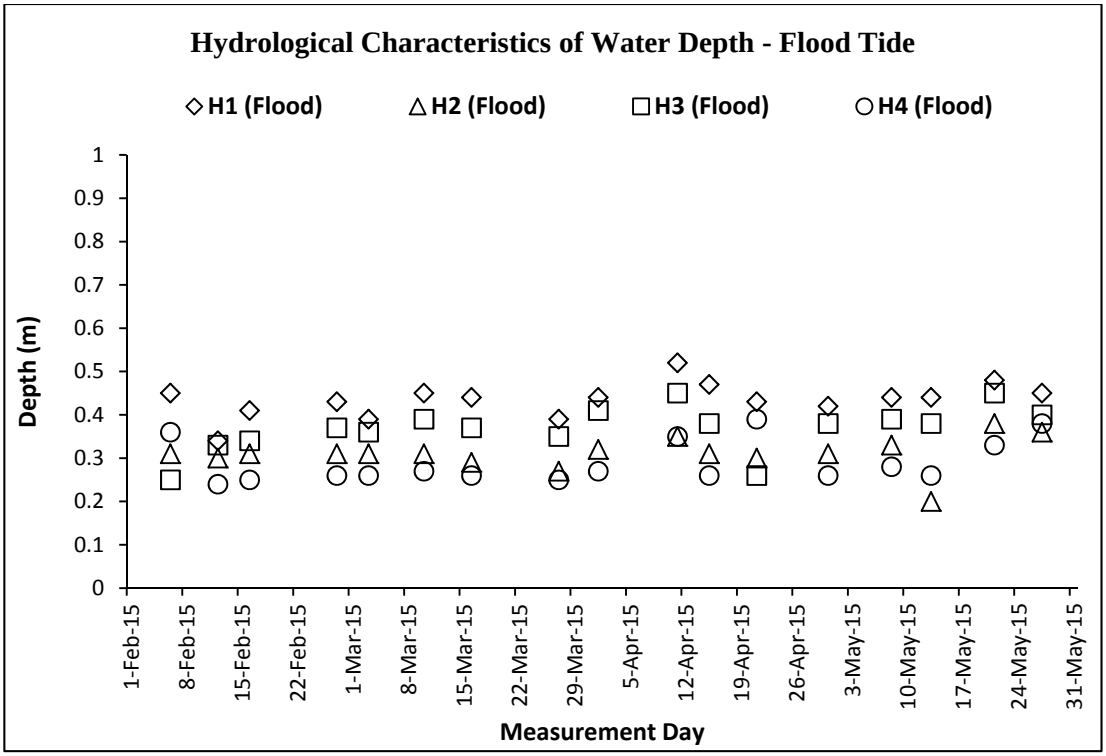
Operational Phase Commencement Date		Ecology Monitoring											
		Apr-15	**May-15**	**Jun-15**	**Jul-15**	**Aug-15**	**Sep-15**	**Oct-15**	**Nov-15**	**Dec-15**	**Jan-16**	**Feb-16**	**Mar-16**
Contract 1	4-Dec-14	×			×			×					
Contract 2	1-Apr-15	×			×			×			×		

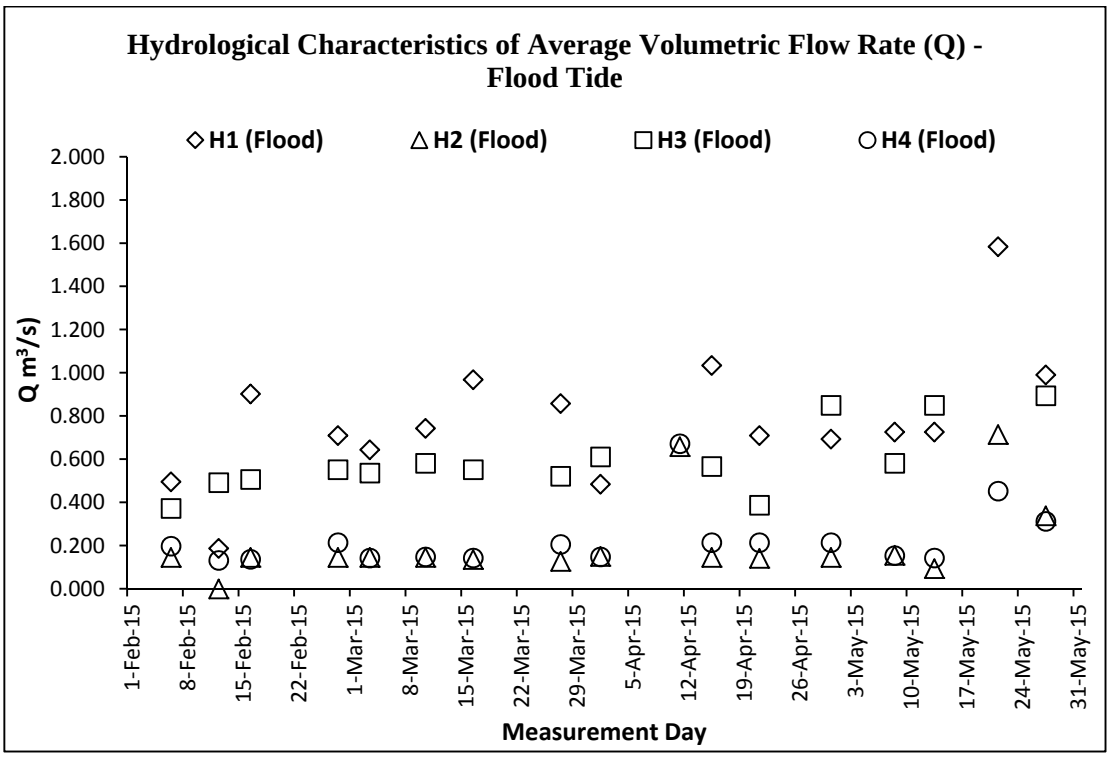
Appendix E

Graphical Plots of Hydrological Characteristics


Hydrological Characteristics of Water Depth - Ebb Tide
H1 (Ebb)
H2 (Ebb)
H3 (Ebb)
H4 (Ebb)
Depth (m)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1-Feb-15
8-Feb-15
15-Feb-15
22-Feb-15
1-Mar-15
8-Mar-15
15-Mar-15
22-Mar-15
29-Mar-15
5-Apr-15
12-Apr-15
19-Apr-15
26-Apr-15
3-May-15
10-May-15
17-May-15
24-May-15
31-May-15
Measurement Day


Hydrological Characteristics of Average Volumetric Flow Rate (Q) - Ebb Tide
H1 (Ebb)
H2 (Ebb)
H3 (Ebb)
H4 (Ebb)
Q m³/s)
3.000
2.500
2.000
1.500
1.000
0.500
0.000
1-Feb-15
8-Feb-15
15-Feb-15
22-Feb-15
1-Mar-15
8-Mar-15
15-Mar-15
22-Mar-15
29-Mar-15
5-Apr-15
12-Apr-15
19-Apr-15
26-Apr-15
3-May-15
10-May-15
17-May-15
24-May-15
31-May-15
Measurement Day


Hydrological Characteristics of Water Depth - Flood Tide
H1 (Flood)
H2 (Flood)
H3 (Flood)
H4 (Flood)
Depth (m)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1-Feb-15
8-Feb-15
15-Feb-15
22-Feb-15
1-Mar-15
8-Mar-15
15-Mar-15
22-Mar-15
29-Mar-15
5-Apr-15
12-Apr-15
19-Apr-15
26-Apr-15
3-May-15
10-May-15
17-May-15
24-May-15
31-May-15
Measurement Day


Hydrological Characteristics of Average Volumetric Flow Rate (Q) - Flood Tide
H1 (Flood)
H2 (Flood)
H3 (Flood)
H4 (Flood)
Q m³/s)
2.000
1.800
1.600
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
1-Feb-15
8-Feb-15
15-Feb-15
22-Feb-15
1-Mar-15
8-Mar-15
15-Mar-15
22-Mar-15
29-Mar-15
5-Apr-15
12-Apr-15
19-Apr-15
26-Apr-15
3-May-15
10-May-15
17-May-15
24-May-15
31-May-15
Measurement Day

Appendix F

Ecological Monitoring Report for Operation Phase

(Not Used)

Appendix G

Quarterly EM&A (Landscape & Visual) Report

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

Quarterly EM&A (Landscape & Visual) Report (May 2015)
(Issue 1)

Job Ref.: 09/317/161G KLKJV-SW
Date: June 2015

Environmental Resources Management

16/F
Berkshire House
25 Westlands Road
Quarry Bay
Hong Kong

Telephone: (852) 2271 3000
Facsimile: (852) 2723 5660
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20 July 2015

Kwan Lee – Kuly Joint Venture
Unit 6, 16/F, Yuen Long Trading Centre
33 Wang Yip Street West
Yuen Long, Hong Kong

Attn.: Nicola Hon

Our ref: 0125606_Cert02_20150720

Dear Shan,

Contract No. DC/2009/22 & DC/2010/02 –
Drainage Improvement in Shuen Wan, Tai Po
Quarterly EM&A (Landscape & Visual) Report – May 2015

Reference is made to the combined Quarterly EM&A (Landscape & Visual) Reports for Contract 1 (2nd) and Contract 2 (1st) for the month of May 2015 (Operational phase), please kindly note that we have no adverse comment on the combined reports.

Should you have any queries, please feel free to contact Mr. Jon Binalay at 2271 3212.

Yours sincerely,
For ERM-Hong Kong, Limited

Kenneth Ng
Landscape Architect

Registered Office
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16/F Berkshire House
25 Westlands Road
Quarry Bay
Hong Kong

Offices worldwide

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

Quarterly EM&A (Landscape & Visual) Report (May 2015)

(Issue 1)

June 2015

	Name	Signature
Prepared by:	**Henry To**	
Reviewed by:	**Ida YU**	
Date:	**17th July 2015**	

Job Ref.: 09/317/161G KLKJV-SW

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CONTENTS

LIST OF APPENDICES

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 The construction work within Contracts 1 (Areas A, B and C) and 2 works areas were completed and formally agreed by EPD. The official commencement dates of the Operation Phase of Contracts 1 and 2 were 4th December 2014 and 1st April 2015 respectively. 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 during Operation Phase in the works areas under Contract 1 and 2 of the Project.

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 to check the effectiveness of the mitigations during the first year of the 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* - Planting of shrubs, grasses and building benches along Ting Kok Road along the shore;
- *Architectural Design for Pump House* – Architectural design to help the pump house fit into the existing suburban, natural to semi-natural surroundings (Not relevant to Contract 2 of the Project);
- *Landscape Design for Pump House* – Provide sufficient planting around its boundary fence (Not relevant to Contract 2 of the Project);
- *Enhancement Planting along Tung Tsz Road* – Planting of shrubs/ trees of suitable species to help protect the stream and marshes;
- *Soil Depth for Enhancement Planting* – Construction of box culvert should be with at least 1.0m soil depth for enhancement planting;
- *Transplanting of Trees to Adjacent Locations* – Transplanting of existing affected trees to adjacent locations should be carried out;
- *Preparation for Transplanting* – Preparation for transplanting is needed to allow sufficient time for root pruning and rootball preparation prior to transplanting; and
- *Reinstatement of Affected Area* – The works area should be properly reinstated to the satisfaction of relevant government departments.

3 LANDSCAPE & VISUAL MONITORING PROGRAMME

3.1 Monitoring Date(s)

3.1.1 This report documents the landscape and visual monitoring findings for the second quarterly monitoring for Contract 1 (DC/2009/22) works areas, and the first quarterly monitoring for Contract 2 (DC/2010/02) works area during the first year of operation phase. The quarterly monitoring for Contract 1 was conducted to cover Areas A, B and C of Contract 1 on 29th May 2015. Area C (i.e. Ecological Compensatory Area (ECA)) was formally handed over to AFCD on 16th October 2012 for management and maintenance. No access into the ECA is allowed after the handover and hence, no quarterly monitoring was carried out in this area. The quarterly monitoring for Contract 2 was conducted on 30th May 2015.

3.1.2 All photos stated for the quarterly monitoring for Contract 1 and 2 are recorded in **Appendices A and B** respectively.

4 QUARTERLY LANDSCAPE & VISUAL MONITORING (OPERATION PHASE) FOR CONTRACT 1 (DC/2009/22)

4.1 Viewing Area Formation

Observations

4.1.1 The roadside planters in Ting Kok Road were hydroseeded and planted with shrubs *Duranta erecta* which were in fair condition as observed in May 2015 **(Photo A1)**.

4.1.2 According to EIA Report of the Project, planters with shrubs and grasses, and putting a few benches were suggested as Landscape & Visual Mitigation Measure (i.e. OM-01) along Ting Kok Road. However, with reference to the approved Landscape Plan of this Project, provision of benches along Ting Kok Road was not included in accordance with the engineering design. Thus only the record of reinstated planters and the monitoring of shrubs and grass along Ting Kok Road were adpoted under this mitigation measure.

Recommendation

4.1.3 The roadside planters in Ting Kok Road were handed over to Highway Department and under maintenance by the corresponding party. No further recommendation on the growth performance of these planters is given from the current observation.

4.2 Architectural Design for Pump House

Observation

4.2.1 As observed in May 2015, the architectural design of the pump house generally follows the proposed materials and color (e.g. a wall of clay cladding to facilitate the development of climbers for vertical greening) as stated in the approved Landscape Plan **(Photo A2)**.

Recommendations

4.2.2 No specific recommendation is required for this mitigation measure.

4.3 Landscape Design for Pump House

Observation

4.3.1 As observed in May 2015, the planted ground cover *Arachis duranensis* on the green roof was in fair condition **(Photo A3)**. Other landscape design (including the planting of ground cover *Iris tectorum*, creeping climbers *Ficus pumila* and *Parthenocissus dalzielii*, shrubs *Ficus microcarpa* (Golden Leaf) and trees *Cinnamomum burmannii* were also in fair condition **(Photo A4)**.

Recommendations

4.3.2 The daily operation of the pump house were handed over to Drainage Services Department and under maintenance by corresponding party. No further recommendation is given from the current observation on the landscape planting within the pump house.

4.4 Soil Depth for Enhancement Planting

Observations

4.4.1 Planting of trees and shrubs were already finished at construction phase. Soil depth on the box culvert was unable to be checked during Operational Phase. Moreover, Area B was handed over back to Tung Tsz Nursery after the construction phase for routine maintenance practice by the nursery. The roadside planters in Ting Kok Road were also handed over to Highway Department and under maintenance by the corresponding party.

Recommendations

4.4.2 No specific recommendation is required for this mitigation measure.

4.5 Transplanting of Trees to Adjacent Locations

Observation

4.5.1 Transplantation of trees was finished during the early construction phase of Contract 1 **(Photo A5)**. The health performance of these transplanted trees had been regularly monitored and reported during the construction phase. Any trees of poor performance were reported to the Contractor and replaced accordingly. Area B was handed over to Tung Tze Nursery after the construction phase, and the transplanted trees were under the maintenance of the Nursery Operator.

4.5.2 Some of the locations of the transplanted trees were different from those proposed in the approved Landscape Plan. Moreover, as reported during the construction phase, gap was observed between the root balls of some transplanted trees and the inner surface of their newly built planters. However, these trees were accepted by the Nursery Operator.

4.5.3 The remaining retained and transplanted trees within the nursery were maintained generally in fair condition, with no significant damage on tree crowns, trunks and roots observed during the monitoring in May 2015.

4.5.4 Trees proposed for transplantation from Area A to Area C were already carried out in 2011 and Area C was handed over to AFCD in October 2012.

Recommendation

4.5.5 Area B was handed over to Tung Tze Nursery which will provide routine maintenance of these transplanted trees. No further recommendation is given under this mitigation measures.

4.6 Preparation for Transplanting

Observation

4.6.1 Transplantation of trees was finished during the construction phase. No preparation of root balls for transplantation could be monitored during the operation phase.

Recomendation

4.6.2 No specific recommendation is required for this mitigation measures.

4.7 Reinstatement of affected area

Observation

4.7.1 The reinstatement works for the original access paths, ground of the nursery beds, basic nursery utility (such as irrigation pipes and lamp posts), shelters for potted plants, planters for transplanting trees, and wire mesh fences within the nursery were finished in Area B as observed in May 2015 **(Photo A6)**. Some of the individual tree planters in the Nursery were broken, but the maintenance of these planters were already handed over and accepted by the Nursery in December 2014 The planters along Ting Kok Road were also reinstated **(Photo A1).**

Recommendation

4.7.2 No specific recommendation is required for this mitigation measures.

5 QUARTERLY LANDSCAPE & VISUAL MONITORING (OPERATION PHASE) FOR CONTRACT 2 (DC/2010/02)

5.1 Viewing Area Formation

5.1.1 This mitigation measure applies on the viewing area and the associated landscape planting lined along Ting Kok Road for having an open view to Plover Cove. The concerned viewing area and landscape planting area fall within the works area under Contract 1. This is not applicable to Contract 2 of the Project.

5.2 Architectural Design for Pump House

5.2.1 The pump house of the Project is located in Area A under Contract 1. This is not applicable to Contract 2 of the Project, and the according monitoring finding was reported above in **Section 4.2**.

5.3 Landscape Design for Pump House

5.3.1 The pump house of the Project is located in Area A under Contract 1. This is not applicable to Contract 2 of the Project, and the according monitoring finding was reported above in **Section 4.3**.

5.4 Enhancement Planting along Tung Tsz Road

Observation

5.4.1 A total of 207 tagged compensatory trees were planted under Contract 2, and the planting work and replacement of trees with poor condition were completed in the end of the construction phase. The health conditions of these compensatory trees were generally in fair condition **(Photos B1-B3)**. However, one of the compensatory tree *Hibiscus tiliaceus* (tree tag no. T127) was removed **(Photo B4)**, this may due to previous tree failure under adverse weather. Four trees showed leaning tree trunks with unstable root balls **(Photo B5)**. Some trees either showed wilt or no leaves in tree canopies **(Photos B6-B7)**, or with tree defects, such as decayed wood on tree trunks and cracked tree bark **(Photos B8-B10)**.

5.4.2 No shrub planting was proposed in the approved Landscape Plan, while hydroseeding was applied on the reinstated soil ground above the alignment of the box-culvert along Tung Tsz Road **(Photo B11)**, as well as the reinstated area above the drain pipe along the access path leading towards Treasure Spot Garden II **(Photo B12)**. Grass germination in these hydroseeded areas was in fair condition, and other native grass species have also naturally established in these areas.

Recommendation

5.4.3 According to the information from DSD and the Contractor, the areas planted with compensatory trees along Tung Tsz Road were handed over to LandsD in May 2015. In principle, LandsD will be responsible for maintaining these vegetated areas and provide *ad hoc* tree maintenance if necessary. Since the areas were officially handed over, implementation of any tree maintenance and management practices within these areas

should inform and discuss with the corresponding government department. While such negotiation is on-going and anticipated to be settled in the coming quarter, if practical, it is recommended to have regular watering for all planted compensatory trees by the appointed landscape contractor within the establishment period. The landscape contractor should replant the leaning tree trunks upright during the routine maintenance practice and should regularly check the stability and condition of the bamboo stakes used to support the compensatory trees. They should also remove the climbers on the bamboo stakes. Trees of less satisfactory health and/or structural condition should be replaced prior to the end of the establishment period of the trees.

5.4.4 For the replacement of the removed compensatory tree due to previous tree failure under adverse weather, the Contractor and DSD will further liaise with the LandsD for any further follow-up action in replacing such compensatory tree within the handed over areas.

5.5 Soil Depth for Enhancement Planting

Observation

5.5.1 A box-culvert of approximately 1.0km long was constructed along Tung Tsz Road and passed through the underground of Tung Tsz Nursery and finally reach the newly built Shuen Wan Storewater Pumping Station **(Photo B13)**. According to the approved Landscape Plan of the Project, the ground above the box-culvert was backfilled with soil and hydroseeded **(Photos B11-B12)**. No compensatory trees were designed to be planted on top of the box-culvert due to the potential maintenance concern by DSD. Compensatory trees were planted mainly to the south and northeast (for trees planted at San Tau Kok) of the box-culvert during the construction phase of Contract 2. Since only hydroseeding was applied on top of the box-culvert, the backfilled soil depth should be adequate for the germination and growth of the grass.

Recommendations

5.5.2 No specific recommendation is required for this mitigation measure.

5.6 Transplanting of Trees to Adjacent Locations

5.6.1 According to the approved Tree Felling Application Report and Landscape Plan of this Project, no existing tree was proposed to be transplanted under Contract 2. This monitoring item was not applicable to Contract 2 of the Project.

5.7 Preparation for Transplanting

5.7.1 As abovementioned, no transplantation of existing tree under Contract 2 was proposed in accordance with the approved Tree Felling Application Report and Landscape Plan of the Project. This monitoring item was not applicable to Contract 2 of the Project.

5.8 Reinstatement of affected area

Observation

5.8.1 The reinstatement works for the original access roads (Tung Tsz Road), access paths to the villages, low-lying wetland areas to the south of San Tau Kok, and planting areas for compensatory trees were inspected **(Photos B14-B17)**. A refuse collection chamber was newly built by the Contractor to facilitate the daily operation by Food and Environmental Hygiene Department (FEHD). All these reinstatement works were completed by end of the

construction phase and these reinstated areas have been used daily by the villagers and government department. Information by the Contractor revealed that these reinstated works were handed over to the corresponding government departments.

Recommendation

5.8.2 No specific recommendation is required for the reinstated areas.

6 AUDIT SCHEDULE

6.1.1 The third quarterly Landscape & Visual Monitoring (during operational phase) for Contract 1 and the second quarterly monitoring will be tentatively scheduled in late-August or early September 2015.

Appendix A

Photographs for Quarterly Monitoring (Operational Phase) for Contract 1 (DC/2009/22)

	
Photo A1 – Planters at Ting Kok Road were hydroseeded and planted with shrubs.	**Photo A2** – General appearance of the pump house in Area A.
	
Photo A3 – View of sloping area with ground cover in the pump house.	**Photo A4** – Landscape design such as *Iris tectorum* and Ficus *microcarpa* (Golden Leaf) were in fair condition.
	
Photo A5 – Example of transplanted trees in Area B.	**Photo A6** – Example of the completed reinstatement works within the nursery (such as lamp posts, shelters for potted plants and new planters for the transplanted tree).

Appendix B
Photographs for Quarterly Monitoring (Operation Phase) for Contract 2 (DC/2010/02)

	
Photo B1 – Overall view of the compensatory trees planted opposite to San Tau Kok.	**Photo B2** – Overall view of the compensatory trees planted opposite to Wai Ha.
	
Photo B3 – Overall view of the compensatory trees planted opposite to Wai Ha.	**Photo B4** – A tagged compensatory tree *Hibiscus tiliaceus* was removed.
	
Photo B5 – A leaning compensatory tree was noted during the quarterly inspection.	**Photo B6** – No leaves were noted on a compensatory tree.

	
Photo B7 – A compensatory tree showed wilt leaves in the whole tree canopy.	**Photo B8** – A compensatory tree with peeled tree bark and decayed wood.
	
Photo B9 – A compensatory tree with cracked tree bark.	**Photo B10** – A compensatory tree with decayed wood.
	
Photo B11 – The soil ground above the alignment of box-culvert was reinstated and hydroseeded.	**Photo B12** – The reinstated area above the drain pipe along the pipe along the access path leading towards the village was hydroseeded.

Photo B13 – The box culvert and the associated drainage work were completed at the upper part of Wai Ha River.

Photo B14 – The original access road (e.g. Tung Tsz Road) was reinstated.

Photo B15 – The access path leading to Treasure Spot Garden II was reinstated.

Photo B16 – The low-lying area with wetland character was reinstated in area opposite to Jade View Villa.

Photo B17 – Both bunds along Wai Ha River were naturally vegetated.