JOB NO.: TCS00757/15

DSD CONTRACT NO. DC/2013/09 – ADVANCE WORKS FOR SHEK WU HUI SEWAGE TREATMENT WORKS – FURTHER EXPANSION PHASE 1A AND SEWERAGE WORKS AT PING CHE ROAD

8TH QUARTERLY ENVIRONMENTAL MONITORING AND AUDIT (EM&A) SUMMARY REPORT (JULY TO SEPTEMBER 2017)

PREPARED FOR

TSUN YIP WATERWORKS CONSTRUCTION CO LTD

Date	Reference No.	Prepared By	Certified By
2 November 2017	TCS00757/15/600/R0100v2	Martin Li (Assistant Environmental Consultant)	Tam Tak Wing (Environmental Team Leader)

Version	Date	Remarks
1	23 October 2017	First Submission
2	2 November 2017	Amended against IEC's comments

ANEWR

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

Your reference:

Our reference: HKDSD201/50/104642

Date: 2 November 2017

Attention: Mr Michael Leung

BY EMAIL & POST
(email: hkleung@dsd.gov.hk)

Dear Sirs

Agreement No.: SP 01/2015
Environmental Monitoring and Audit for
Advance Works for Shek Wu Hui Sewage Treatment Works – Further Expansion Phase 1A
Quarterly Environmental Monitoring and Audit (EM&A) Summary Report for July to September 2017

We refer to emails of 24 October 2017 and 2 November 2017 attaching the 8th Quarterly EM&A Summary Report for July to September 2017 prepared by the Environmental Team (ET) for the captioned project.

We have no further comment and hereby verify the captioned report.

Please do not hesitate to contact the undersigned or our Ms Hazel Chan at 2618 2831 should you have any queries.

Yours faithfully
ANEWR CONSULTING LIMITED

Adi Lee
Independent Environmental Checker

LYMA/LHHN/CYYH/lhmh

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EXECUTIVE SUMMARY

ES.01 This is the **8th** Quarterly Environmental Monitoring and Audit Summary Report for DSD Contract No. DC/2013/09 – Advance Works for Shek Wu Hui Sewage Treatment Works – Further Expansion Phase 1A and Sewerage Works at Ping Che Road (hereinafter referred as "the Contract") under Environmental Permit number FEP-01/474/2013, covering the period from **1 July to 30 September 2017 (**the Reporting Period).

ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

ES.02 Environmental monitoring activities under the EM&A program in this Reporting Period are summarized in the following table.

Issues	Environmental Monitoring Parameters / Inspection	Occasions
Air Quality	1-hour TSP	**96**
	24-hour TSP	**32**
Construction Noise	$L_{Aeq(30min)}$ Daytime	**26**
Inspection / Audit	ET Regular Environmental Site Inspection	**13**
	IEC Monthly Environmental Site Audit	**3**

BREACH OF ACTION AND LIMIT (A/L) LEVELS

ES.03 In the Reporting Period, no exceedance of air quality and construction noise monitoring were recorded. No Notification of Exceedance (NOE) was, therefore, issued. The statistics of environmental exceedance, NOE issued and investigation of exceedance are summarized in the following table.

Environmental Issues	Monitoring Parameters	Action Level	Limit Level	Event & Action		
				NOE Issued	Investigation	Corrective Actions
Air Quality	1-hour TSP	0	0	0	-	-
	24-hour TSP	0	0	0	-	-
Construction Noise	$L_{Aeq(30min)}$	0	0	0	-	-

Note: NOE – Notification of Exceedance

SITE INSPECTION

ES.04 In the Reporting Period, **13** events of joint site inspection to evaluate the site environmental performance by the RE, ET and the Contractor were carried out. No non-compliance was noted.

ENVIRONMENTAL COMPLAINT

ES.05 No environmental complaint was recorded or received in this Reporting Period.

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

ES.06 No environmental summons or successful prosecutions were recorded in this Reporting Period.

REPORTING CHANGE

ES.07 No reporting changes were made in the Reporting Period.

FUTURE KEY ISSUES

ES.08 As dry season is approaching, special attention should be paid on the potential construction dust impact since most of the construction sites are adjacent to villages. The Contractor should fully implement the construction dust mitigation measures properly.

ES.09 Air quality mitigation measures including wheel wash facilities, watering of haul roads and covering of dusty materials with tarpaulin sheet, etc. should be properly maintained. Moreover, the contractor should be to prevent mosquito breeding on site.

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1 INTRODUCTION

1.1 PROJECT BACKGROUND

1.1.1 The existing Shek Wu Hui Sewage Treatment Works (hereafter referred as "SWHSTW") with secondary level treatment to sewage collected from Sheung Shui, Fanling and adjacent areas is operated and maintained by Drainage Services Department (hereafter referred as "DSD"). Based on the preliminary design of the Project, the scope of works for the Project comprises the following major components:

(a) Demolition of the existing Inlet Works and construction of the new Inlet Works, including inlet pumping station, screening and degritting facilities;
(b) Demolition of 4 existing circular Primary Sedimentation Tanks (PSTs) and construction of new rectangular PSTs;
(c) Construction of new pre-membrane screens;
(d) Modification of existing Bioreactor (BR) 1 and 2 to suit the proposed membrane bioreactor (MBR) process;
(e) Construction of a new standby Bioreactor;
(f) Demolition of 4 existing circular Final Sedimentation Tanks (FSTs) and construction of new Membrane Tanks and Membrane Facility Building;
(g) Reconstruction of sludge treatment facilities, including thickening, anaerobic digestion, biogas handling, sludge holding and dewatering facilities; and
(h) Other ancillary works.

1.1.2 According to the Project implementation programme, the construction of most of the above proposed works (hereinafter referred to as "Main Works") will be commencement in 2016 and completion in 2022. Furthermore, Advance Works as part of the above proposed works will carry out before Main Works commencement. The Advance Works will be commencement in third quarter of 2015 and comprise the following major components:

(a) Modification of BR1, through upgrading of electrical and mechanical (E&M) equipment and minor civil works, to suit the proposed MBR process;
(b) Demolition of FSTs 1 and 2 and construction of Membrane Tanks and the first phase of Membrane Facility Building; and
(c) Tree felling and transplanting, to facilitate timely construction of the new Inlet Works during the implementation of Main Works (under review).

1.1.3 The general layout of Advance Works and Main Works of SWHSTW Further Expansion Phase 1A show in ***Appendix A***. Subsequent to Further Expansion Phase 1A, the SWHSTW will be further expanded under separate projects (namely Further Expansion Phase 1B and Phase 2).

1.1.4 In July 2015, Tsun Yip Waterworks Construction Co Ltd (hereinafter referred as "Tsun Yip" or "the Contractor") has awarded the DSD Contract No. DC/2013/09 – ***Advance Works for Shek Wu Hui Sewage Treatment Works – Further Expansion Phase 1A and Sewerage Works at Ping Che Road*** (hereinafter referred as "the Contract"). The Contract is the Advance Works for Shek Wu Hui Sewage Treatment Works as part of SWHSTW Further Expansion which is a Designated Project under Environmental Permit number FEP-01/474/2013 (hereinafter referred as "the FEP-01/474/2013" or "the EP").

1.1.5 The works under the Contract at Shek Wu Hui Sewage Treatment Works will be included the conversion of one existing bioreactor and two existing final sedimentation tanks into one membrane bioreactor. Moreover, construction of about 1.5 kilometres length of sewers at Ping Che Road and other ancillary works will be undertaken. The works of Contract are scheduled to be conduct about 25 months. Layout plan of the Contract is shown in ***Appendix B***.

1.1.6 Action-United Environmental Services & Consulting (hereinafter referred as "AUES") was appointed by the Contractor as an Environmental Team (hereinafter referred as "the ET") to implement the relevant EM&A program in accordance with the Updated EM&A Manual, as well as the associated duties.

1.1.7 As part of the EM&A program, baseline monitoring is required to determine the ambient environmental conditions. Hence baseline monitoring including air quality and noise were carried out between ***28 August 2015*** and ***12 September 2015*** at the proposed locations before construction work commencement. The "Baseline Monitoring Report (TCS00757/15/600/R0014 Version 2)" had submitted to EPD by the DSD before commencement of major construction works and verified by the IEC on 30 September 2015. Further to Tsun Yip's instructions, the EM&A program was commenced on 1 October 2015 and the monitoring schedule had been issued to relevant parties on 29 September 2015.

1.1.8 This is the **8th** Quarterly EM&A Report for the Project presenting the monitoring results and inspection findings for the reporting period from **1 July to 30 September 2017**.

1.2 REPORT STRUCTURE

1.2.1 The Quarterly Environmental Monitoring and Audit (EM&A) Summary Report is structured into the following sections:-

SECTION 1	***INTRODUCTION***
SECTION 2	***PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS***
SECTION 3	***SUMMARY OF MONITORING REQUIREMENT***
SECTION 4	***MONITORING METHODOLOGY***
SECTION 5	***IMPACT MONITORING RESULTS***
SECTION 6	***WASTE MANAGEMENT***
SECTION 7	***SITE INSPECTION***
SECTION 8	***ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE***
SECTION 9	***IMPLEMENTATION STATUS OF MITIGATION MEASURES***
SECTION 10	***CONCLUSIONS AND RECOMMENDATIONS***

2 PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS

2.1 PROJECT ORGANIZATION AND MANAGEMENT STRUCTURE

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

2.2 CONSTRUCTION PROGRESS

2.1.2 3-Month Rolling Programme of the Project is enclosed in ***Appendix D*** and the major construction activities undertaken in this Reporting Period are illustrated in ***Appendix B*** and listed below:-

July 2017

- Dismantle & Erection of formworks, steel fixing works, concreting, and erection of temporary metal falsework (At membrane facility building)
- Excavation, pipe laying of CLP cable duct
- Pipe installation for DN1600 BR1 Effluent Pipe (Near Bioreactor No1)
- Erection of formwork of wall of pretreatment screen chamber (Near Bioreactor No.1)
- Installation of FRP Baffle Wall and Walkway (At Bioreactor No.1)
  Excavation, Installation of sheet pile , Pipelaying for DN1400 RAS Pipe (Near Bioreactor No1)
- Modification of existing signal cable of wifi station

August 2017

- Dismantle & Erection of formworks, steel fixing works, concreting, and erection of temporary metal falsework (At membrane facility building)
- Excavation, pipe laying of CLP cable duct
- Pipe installation for DN1600 BR1 Effluent Pipe (Near Bioreactor No1)
- Erection of formwork of wall of pretreatment screen chamber (Near Bioreactor No.1)
- Installation of FRP Baffle Wall and Walkway (At Bioreactor No.1)
- Excavation, Installation of sheet pile , Pipelaying for DN1400 RAS Pipe (Near Bioreactor No1)
- Installation of DN800 puddle pipe at wall of Bioreactor No.1
- Plastering and painting for the internal finishing for membrane facilities building
- Concreting the base slab of pretreatment screen chamber

September 2017

- Dismantle & Erection of formworks, steel fixing works, concreting, and erection of temporary metal falsework (At membrane facility building)
- Excavation, pipe laying of CLP and E&M cable duct
- Concreting the wall and slab of Membrane Facilities Building
- Erection of formwork of wall of pretreatment screen chamber (Near Bioreactor No.1)
- Installation of FRP Baffle Wall and Walkway (At Bioreactor No.1)
- Excavation, Installation of sheet pile , Pipelaying for DN1400 RAS Pipe
- Installation of DN800 puddle pipe at wall of Bioreactor No.1
- Plastering and painting for the internal finishing for membrane facilities building
- Concreting the wall and top slab of pretreatment screen chamber

2.3 SUMMARY OF ENVIRONMENTAL SUBMISSIONS

2.1.3 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) Regulation	Notified EPD on 30 July 2015
2	Chemical waste Producer Registration (WPN: 5213-624-T3148-04)	Application date: 19/08/2015 Date approved: 18/9/2015
3	Water Pollution Control Ordinance (Discharge License: WT00022503-2015)	Application date: 19/08/2015 Date approved: 18/9/2015
4	Billing Account for Disposal of Construction Waste (Account Number: 7022898)	Granted on 02/09/2015

2.1.4 In accordance with the Further EP No. FEP-01/474/2013 Condition 2.3, an Updated Environmental Monitoring and Audit (EM&A) Manual (TCS00757/15/600/R0012v3) which certified by the Environmental Team (ET) Leader and verified by the Independent Environmental Checker (IEC), has submitted to DSD and EPD endorsement.

2.1.5 Baseline Monitoring Report (TCS00757/15/600/R0014v2) as certified by the ETL and verified by the IEC was submitted to the EPD on 30 September 2015 for endorsement.

3 SUMMARY OF IMPACT MONITORING REQUIREMENT

3.1 GENERAL

3.1.1 The Environmental Monitoring and Audit requirements are set out in the Updated EM&A manual. Environmental issues such as air quality and construction noise were identified as the key issues during the construction phase of Advance Works of the Project. A summary of EM&A programme of construction phase are presented in the sub-sections below.

3.2 MONITORING PARAMETERS

3.2.1 The EM&A programmes of construction phase shall cover the following environmental issues:

- Air quality; and
- Construction noise

3.2.2 A summary of the monitoring parameters is presented in ***Table 3-1*** below

Table 3-1 Summary of EM&A Requirements

Environmental Issue	Parameters
Air Quality	• 1-hour TSP by Real-Time Portable Dust Meter; and • 24-hour TSP by High Volume Air Sampler.
Construction Noise	• $Leq_{(30min)}$ during normal working hours; and • $Leq_{(15min)}$ for the construction works undertaken in Restricted Hours, if necessary.

3.3 MONITORING LOCATIONS

3.3.1 According to the *Updated EM&A Manual of* Advance Works which submitted to EPD on ***25 August 2015***, three air quality sensitive receivers and two construction noise sensitive receivers are proposed to monitor the environmental performance of the Contract. The proposed monitoring locations are summarized in ***Table 3-2*** and shown in ***Appendix E***.

Table 3-2 Proposed Air Quality and Construction Noise Monitoring Locations

Aspect	Station ID	Location	Parameter
Air Quality	AM1	No. 31 Wai Loi Tsuen	1- hour and 24- hour TSP
	AM2	Fu Tei Au	1- hour
	AM2a	RE's Site Office	24- hour TSP
Noise	NM1	No. 31 Wai Loi Tsuen	$L_{eq(30min)}$
	NM2	Fu Tei Au	$L_{eq(30min)}$

3.4 MONITORING FREQUENCY AND PERIOD

3.4.1 The requirements of baseline monitoring are stipulated in *Sections 2.1.7 and 3.2.5* of the Updated *EM&A Manual* and presented as follows.

Air Quality Monitoring

3.4.2 Monitoring frequency for air quality baseline monitoring is as follows:

- 1-Hour TSP 3 sets of 1-hour TSP monitoring shall be carried out once in every six days.
- 24-Hour TSP 24-hour shall be carried out once in every six days.

Noise Monitoring

3.4.3 Construction noise monitoring should be carried out at the designated monitoring station when there are Project-related construction activities being undertaken within a radius of 300m from the monitoring stations. The monitoring frequency should depend on the scale of the

construction activities. An initial guide on the monitoring is to obtain one set of 30-minute measurement at each station between 0700 and 1900 hours on normal weekdays at a frequency of once a week when construction activities are underway.

3.4.4 If construction works are extended to include works during the hours of 1900 - 0700, additional weekly impact monitoring shall be carried out during evening and night-time works. Applicable permits under NCO shall be obtained by the Contractor.

3.5 MONITORING EQUIPMENT

Air Quality Monitoring

3.5.1 The 24-hour and 1-hour TSP levels shall be measured by following the standard high volume sampling method as set out in the *Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B.* If the ET proposes to use a direct reading dust meter to measure 1-hour TSP levels, it shall submit sufficient information to the IEC to approve.

3.5.2 The filter paper of 24-hour TSP measurement shall be determined by HOKLAS accredited laboratory.

3.5.3 All equipment as used air quality monitoring is listed in ***Table 3-3***.

Table 3-3 Air Quality Monitoring Equipment

Equipment	Model
24-Hr TSP	
High Volume Air Sampler	TISCH High Volume Air Sampler, HVS Model TE-5170
Calibration Kit	TISCH Model TE-5025A
1-Hour TSP	
Portable Dust Meter	Sibata LD-3 Laser Dust monitor Particle Mass Profiler & Counter

Wind Data Monitoring Equipment

3.5.4 According to the Updated EM&A Manual Sections 2.1.3.8, alternative methods to obtain representative wind data was proposed by the ET. Meteorological information as extracted from "the Hong Kong Observatory Ta Kwu Ling Station" is alternative method to obtain representative wind data. For Ta Kwu Ling Station, it is located nearby the Project site. Moreover, this station is situated the sea level above 15mPD. The station's wind data monitoring equipment is set above the existing ground ten meters in compliance with the general setting up requirement. Furthermore, this station also can be to provide the humidity, rainfall, and air pressure and temperature etc. meteorological information. In Hong Kong of a lot development projects, weather information extracted from Hong Kong Observatory is common alternative method if weather station installation not allowed.

Noise Monitoring

3.5.5 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 carrying out the noise monitoring. The sound level meter shall be checked using an acoustic calibrator. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in m s^{-1}.

3.5.6 Noise monitoring equipment to be used for baseline monitoring is listed in ***Table 3-4***.

Table 3-4 Construction Noise Monitoring Equipment

Equipment	Model
Integrating Sound Level Meter	Rion NL-52 / B&K 2238
Calibrator	Rion NC-73 / Rion NC-74/ B&K4231

Equipment	Model
Portable Wind Speed Indicator	Testo Anemometer

3.5.7 Sound level meters listed above comply with the *International Electrotechnical Commission Publications 651: 1979 (Type 1)* and *804: 1985 (Type 1)* specifications, as recommended in TM issued under the NCO. The acoustic calibrator and sound level meter to be used in the baseline monitoring will be calibrated yearly.

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

3.6.1 According to the baseline monitoring results and the Updating Environmental Monitoring and Audit Manual stipulation, the air quality and construction noise criteria were set up, namely Action and Limit levels are listed in ***Tables 3-5 & 3-6*** as below.

Table 3-5 Action and Limit Levels for 24-Hr TSP and 1-Hr TSP Air Quality, μg m^{-3}

Monitoring Stations	Action Level ($\mu g/m^3$)		Limit Level ($\mu g/m^3$)	
	1-hour	24-hour	1-hour	24-hour
AM1	286	147	500	260
AM2	276	***NA***	500	***NA***
AM2a	***NA***	155	***NA***	260

Table 3-6 Action and Limit Levels for Construction Noise

Monitoring Stations	Action Level	Limit Level in dB(A)
Time Period: 0700-1900 hours on normal weekdays		
NM1 and NM2	When one documented complaint is received	> 75* dB(A)

Note: (*) Reduces to 70 dB(A) for schools and 65 dB(A) during the school examination periods.

3.7 EVENT ACTION PLAN

3.7.1 If non-compliance or exceedance of the Action/Limit Levels is occurred, actions shall be taken in accordance with the Event Action Plan in ***Appendix F***.

4 MONITORING METHDOLOGY

4.1 AIR QUALITY MONITORING

Monitoring Location

4.1.1 The detailed information of air quality monitoring stations referred to ***Table 3-2*** and the graphical plot of monitoring locations shown in ***Appendix E*** in this report.

Monitoring Equipment

4.1.2 All the monitoring equipment to be used in the EM&A program as listed in ***Table 3-3*** has been agreed with the IEC.

Monitoring Procedures

1-hour TSP

4.1.3 The 1-hour TSP monitor, a Sibata LD-3 Laser Dust monitor Particle Mass Profiler & Counter was used for baseline monitoring, which is a portable, battery-operated laser photometer. The 1-hour TSP meter provides a real time 1-hour TSP measurement based on 90^0 light scattering. The 1-hour TSP monitor consisted of the following:

a. A pump to draw sample aerosol through the optic chamber where TSP is measured;

b. A sheath air system to isolate the aerosol in the chamber to keep the optics clean for maximum reliability; and

c. A built-in data logger compatible with Windows based program to facilitate data collection, analysis and reporting.

4.1.4 The 1-hour TSP meter used is within the valid period, calibrated by the manufacturer prior to purchasing. Zero response of the instrument was checked before and after each monitoring event. Operation of the 1-hour TSP meter was follow manufacturer's Operation and Service Manual.

24-hour TSP

4.1.5 The equipment used for 24-hour TSP measurement is a Tisch Environmental, Inc. Model TE-5170 TSP high volume air sampling system, which complied with EPA Code of Federal Regulation, Appendix B to Part 50. The High Volume Air Sampler (HVS) consists of the following:

a. An anodized aluminum shelter;

b. A 8"x10" stainless steel filter holder;

c. A blower motor assembly;

d. A continuous flow/pressure recorder;

e. A motor speed-voltage control/elapsed time indicator;

f. A 7-day mechanical timer, and

g. A power supply of 220v/50 hz

4.1.6 Prior of 24-hour TSP monitoring, the HVS was calibrated in accordance with the manufacturer's instruction using the NIST-certified standard calibrator (Tisch Calibration Kit Model TE-5028A). The 24-hour TSP Monitoring using the HVS was also processed in accordance with the manufacturer's Operations Manual.

4.1.7 24-hour TSP was collected by the ET on filters of HVS and quantified by a local HOKLAS accredited laboratory, ALS Technichem (HK) Pty Ltd (ALS), upon receipt of the samples. The ET keeps all the sampled 24-hour TSP filters in normal air conditioned room conditions, i.e. 70% HR (Relative Humidity) and 25°C, for six months prior to disposal.

4.2 CONSTRUCTION NOISE MONITORING

Monitoring Location

4.2.1 The detailed information of construction noise monitoring stations referred to ***Table 3-2*** and the graphical plot of monitoring locations shown in ***Appendix E*** in this report.

Monitoring Equipment

4.2.2 All the monitoring equipment to be used in the EM&A program as listed in ***Table 3-3*** has been agreed with the IEC.

Monitoring Procedures

4.2.3 The noise measurement was performed with the meter set to FAST response and on the A-weighted equivalent continuous sound pressure level (Leq). Leq(30min) in six consecutive Leq(5 min) measurements were used as the monitoring parameter throughout the baseline monitoring period.

4.2.4 During the monitoring, the sound level meter was mounted on a tripod at a height of about 1.2 m and placed at the monitoring locations and oriented such that the microphone was pointed to the site with the microphone facing perpendicular to the line of sight. The windshield was fitted for the measurement. For construction noise monitoring, all monitoring stations were conducted 1 m from the exterior of the building façade.

4.2.5 Prior noise measurement, the accuracy of the sound level meter was checked using an acoustic calibrator generating a known sound pressure level at a known frequency. The calibration level from before and after the noise measurement agrees to within 1.0dB.

4.2.6 During the noise measurement, a portable wind speed meter was used to check wind speed (m/s). For baseline noise monitoring, no wind speed was exceeding 5m/s or gusts exceeding 10m/s. Also, noise measurement in time was no fog and rain.

4.3 DATA MANAGEMENT AND DATA QA/QC CONTROL

4.3.1 The monitoring data were handled by the ET's in-house data recording and management system.

4.3.2 The monitoring data recorded in the equipment were downloaded directly from the equipment at the end of each monitoring day. The downloaded monitoring data were input into a computerized database properly maintained by the ET. The laboratory results were input directly into the computerized database and checked by personnel other than those who input the data.

4.3.3 For monitoring parameters that require laboratory analysis, the local laboratory shall follow the QA/QC requirements as set out under the HOKLAS scheme for the relevant laboratory tests.

5 IMPACT MONITORING RESULTS

5.1 GENERAL

5.1.1 Since the major construction work of the Project commenced on 1 October 2015, air quality and nose monitoring at the designated locations were therefore performed.

5.2 RESULTS OF AIR QUALITY MONITORING

5.2.1 In the Reporting Period, a total of **96** events of 1-hour TSP and **32** events of 24-hour TSP monitoring were performed. The summary of air quality monitoring in the Reporting Period is shown in ***Tables 5-1*** and the relevant graphical plots are shown in ***Appendix G***.

Table 5-1 Summary of Air Quality Monitoring Results

Monitoring Location	1-hour TSP (μg/m³)			24-hour TSP (μg/m³)		
	Min	Max	Average	Min	Max	Average
AM1	31	77	57	8	111	32
Record Date	18-Jul-17	22-Aug-17	48 events	12-Aug-17	30-Aug-17	16 events
AM2/ AM2a	42	81	62	18	110	40
Record Date	20-Sep-17	22-Aug-17	48 events	22-Sep-17	30-Aug-17	16 events

5.2.2 In the Reporting Period, the 24-hour and 1-hour TSP monitoring results were below the Action/ Limit Level. No Notification of Exceedances (NOE) of air quality criteria or corrective action was therefore required.

5.3 RESULTS OF CONSTRUCTION NOISE MONITORING

5.3.1 In the Reporting Period, a total of **26** event noise measurements were carried out at the designated locations. During construction noise monitoring, the sound level meter was set in 1m from the exterior of the building façade. Therefore, no façade correction (+3dB(A)) is added according to acoustical principles and EPD guidelines. The construction noise monitoring results at the designated locations are summarized in ***Table 5-2*** and the relevant graphical plots are shown in ***Appendix G***.

Table 5-2 Summary of Construction Noise Monitoring Results

Monitoring Location	Leq, 30min (dB((A))	
	Min	Max
NM1	53	56
Record Date	24-July-17,8&14-Sep-17	6-Jul-17&20-sep-17
NM2	48	51
Record Date	24-Jul-17	6-Jul-17&26-Sep-17

5.3.2 As shown in ***Table 5-2***, the noise level measured at the designated monitoring locations were below 75dB(A). Furthermore, there was no noise complaints (Action Level exceedance) received by the RE, Contractors or DSD in the Reporting Period. Therefore, no Action or Limit Level exceedance was triggered and no corrective action was required.

5.4 CONCLUSION

5.4.1 In view of the monitoring result throughout the Reporting Period, there were no exceedances recorded in respect to air quality and noise monitoring. It indicated that the implemented mitigation measures are effectively to minimize the impact attributable to the construction works. Moreover, the set of data collected under monitoring work are with statistical power to categorically identify or confirm the absence of impact attributable to the works.

6 WASTE MANAGEMENT

6.1 GENERAL WASTE MANAGEMENT

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

6.2 RECORDS OF WASTE QUANTITIES

6.2.1 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.

6.2.2 The quantities of waste for disposal in this Reporting Period are summarized in ***Tables 6-1*** and ***6-2*** and the Summary Waste Flow Table is shown in ***Appendix I***. Whenever possible, materials were reused on-site as far as practicable.

Table 6-1 Summary of Quantities of Inert C&D Materials for the Project

Type of Waste	Quantity					Disposal Location
	Previous months	Jul 17	Aug 17	Sep 17	Cumulated	
C&D Materials (Inert) (in '000m^3)	18.052	0.344	0.461	0.602	19.459	--
Hard Rock and Large Broken Concrete (Inert) (in '000m^3)	1.475	0	0.011	0.016	1.502	--
Reused in this Project (Inert) (in '000 m^3)	2.572	0.1	0.4	0	3.072	--
Reused in other Projects (Inert) (in '000 m^3)	2.228	0	0	0	2.228	--
Disposal as Public Fill (Inert) (in '000 m^3)	11.777	0.244	0.05	0.586	12.657	Tuen Mun 38

Table 6-2 Summary of Quantities of C&D Wastes for the Project

Type of Waste	Quantity					Disposal Location
	Previous months	Jul 17	Aug 17	Sep 17	Cumulated	
Metals ('000kg)	136.57	0	0	0	136.57	--
Paper / Cardboard Packing ('000kg)	0.015	0	0	0	0.015	--
Plastics ('000kg)	0	0	0	0	0	--
Chemical Wastes ('000kg)	0	0	0	0	0	--
General Refuses ('000m^3)	0.391	0.041	0.067	0.082	0.581	NENT

7 SITE INSPECTION

7.1 REQUIREMENTS

7.1.1 According to the Updated EM&A Manual, the environmental site inspection shall be formulation by ET Leader. Weekly environmental site inspections should carry out to confirm the environmental performance.

7.2 FINDINGS / DEFICIENCIES DURING THE REPORTING PERIOD

7.2.1 In the Reporting Period, joint site inspection to evaluate the site environmental performance by the RE, ET and the Contractor has been carried out on **6, 13, 20 and 25 July 2017, 3, 10, 17, 24 and 29 August 2017, 7, 14, 21 and 28 September 2017**. Furthermore, IEC attend site inspection was on **25 July 2017, 29 August 2017 and 28 September 2017.** No non-compliance was noted.

7.2.2 Observations for the site inspections and audit within this Reporting Period are summarized in ***Table 7-1***.

Table 7-1 Site Observations

Date	Findings / Deficiencies	Follow-Up Status
27 June 2017	• Muddy sludge was observed on the ground near main building. The contractor was advised to clean the sludge as soon as possible.	• Suldge was removed from site area. Last observation closed.
	• The contractor was reminded to clean stagnant water near worker rest area.	• Not required for reminder.
6 July 2017	• Chemical container was observed without drip tray. The contractor was advised to provide drip tray for chemical container on-site.	• Chemical container was removed from site. Last observation closed.
	• The contractor was reminded to clean water pounding within site area.	• Not required for reminder.
13 July 2017	• Chemical containers were observed without drip tray on the main building. The contractor was advised to provide drip tray for chemical container on-site.	• Chemical containers were removed from site. Last observation closed.
	• The contractor was reminded to dispose scattered waste such as cans and plastic bottle within main building regularly	• Not required for reminder.
20 July 2017	• Accumulation of stagnant water was observed. The contractor was advised to clear the stagnant water to aviod mosquito breeding.	• Larvicidual oil was sprayed within site area. Last observation closed.
	• The contractor was reminded to perform house-keeping throughout construction period.	• Not required for reminder.
25 July 2017	• No adversed environmental issue was observed during site inspection.	• NA
3 August 2017	• General waste was observed on ground. The contractor was advised to dispose it	• House keeping was performed by

Date	Findings / Deficiencies	Follow-Up Status
	regularly and perform house keeping. • • The contractor was reminded to clear stagnant water within site area after raining.	contractor. Last observation clsoed. • Not required for reminder.
10 August 2017	• The contractor was reminded to place chemical container into drip tray to prevent land contamination. • The contractor was reminded to maintain good housekeeping on site.	• Not required for reminder. • Not required for reminder.
17 August 2017	• General waste was observed on the ground next to main building. The contractor was advised to place general waste inside rubbish bin and dispose it regularly. • • The contractor was reminded to clean crushed stone at the scaffolding access.	• General waste was disposed regularly and stored in designated area. Last observation clsoed. • Not required for reminder.
24 August 2017	• The contractor was reminded to clean the stagnant water after raining. • The contractor was reminded to perform housekeeping on site.	• Not required for reminder. • Not required for reminder.
29 August 2017	• Cans and general waste were observed near main building. The contractor was advised to dispose it regularly. • The contractor was reminded to clean the soil on the vehicle road within site area.	• Cans and general waste were removed. Last observation closed. • Not required for reminder.
7 September 2017	• Accumulation of waste was observed next to main building. The contractor was advised to dispose it regularly. • The contractor was reminded to clean the soil on the vehicle road within site area.	• Accumulation of waste was dipsoed regularly. Last observation clsoed. • Not required for reminder.
14 September 2017	• Accumulation of stagnant water was observed. The contractor was advised to clean the stagnant water to aviod mosquito breeding. • Chemical containers was observed without drip tray at main building. The contractor was advised to place chemical containers inside inside drip tray. • Stockpiles of cement bags were observed at main building. The contractor was advised to cover stockpiles of cement bags with trapaulin sheet to aviod dust emission.	• Accumulation of stagnant water was removed within site area. Last observation clsoed. • Chemical contrainers was cover with tarpaulin sheet totally. Last observation clsoed. • Stockpiles of cement bags was cover with tarpaulin sheet. Last observation clsoed.
21 September 2017	• Accumulation of waste was observed next to main building. The contractor was advised to dispose waste or provide wate storage area on-site.	• Accumulation of waste was disoised. Last observation clsoed.
28	• The Contractor was reminded to spray	• Not required for

Date	Findings / Deficiencies	Follow-Up Status
September 2017	water regularly on unpaved haul road. • The Contractor was reminded to perform housekeeping within site area.	reminder. • Not required for reminder.

8 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

8.1 ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION

8.1.1 No environmental complaint, summons and prosecution was received in this reporting period. The statistical summary table of environmental complaint, environmental summons and environmental prosecution are 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
1 to 31 July 2017	0	0	NA
1 to 31 August 2017	0	0	NA
1 to 30 September 2017	0	0	NA

Table 8-2 Statistical Summary of Environmental Summons

Reporting Period	Environmental Summons Statistics		
	Frequency	Cumulative	Complaint Nature
1 to 31 July 2017	0	0	NA
1 to 31 August 2017	0	0	NA
1 to 30 September 2017	0	0	NA

Table 8-3 Statistical Summary of Environmental Prosecution

Reporting Period	Environmental Prosecution Statistics		
	Frequency	Cumulative	Complaint Nature
1 to 31 July 2017	0	0	NA
1 to 31 August 2017	0	0	NA
1 to 30 September 2017	0	0	NA

9 IMPLEMENTATION STATUS OF MITIGATION MEASURES

9.1 GENERAL REQUIREMENTS

9.1.1 The environmental mitigation measures that recommended in the Implementation Schedule for Environmental Mitigation Measures (ISEMM) in the Updated EM&A Manual covered the issues of dust, noise, water and waste and they are summarized presented in ***Appendix J***.

9.1.2 The Contract under the Project shall be implementing the required environmental mitigation measures according to the Updated EM&A Manual as subject to the site condition. Environmental mitigation measures generally implemented by the Contract in this Reporting Period are summarized in ***Table 9-1***.

Table 9-1 Environmental Mitigation Measures

Issues	Environmental Mitigation Measures
Water Quality	• Wastewater to be treated by the filtration systems i.e. sedimentation tank before to discharge.
Air Quality	• Maintain wet surface on access road • All vehicles must use wheel washing facility before off site • Sprayed water during breaking works • A cleaning truck was regularly performed on the public road to prevent fugitive dust emission
Noise	• Restrain operation time of plants from 07:00 to 19:00 on any working day except for Public Holiday and Sunday. • Keep good maintenance of plants • Shut down the plants when not in used.
Waste and Chemical Management	• On-site sorting prior to disposal • Follow requirements and procedures of the "Trip-ticket System" • Predict required quantity of concrete accurately • Collect the unused fresh concrete at designated locations in the sites for subsequent disposal
General	• The site was generally kept tidy and clean.

9.1.3 Based on monitoring results including air quality and construction noise, it is considered that the environmental mitigation measures implemented by the Contractor in this Reporting Period are effective.

10 CONCLUSIONS AND RECOMMENTATIONS

10.1 CONCLUSIONS

10.1.1 This is the **8th** Quarterly EM&A Report for the Project presenting the monitoring results and inspection findings for the reporting period from **1 July 2017 to 30 September 2017**.

10.1.2 No 24-hour or 1-hour TSP monitoring results that triggered the Action or Limit Levels were recorded. No NOEs or the associated corrective actions were therefore issued.

10.1.3 No noise complaint (which is an Action Level exceedance) was received and no construction noise measurement results that exceeded the Limit Level were recorded in this Reporting Period. No NOEs or the associated corrective actions were therefore issued.

10.1.4 No documented complaint, notification of summons or successful prosecution was received.

10.1.5 In the Reporting Period, **13** events of joint site inspection to evaluate the site environmental performance by the RE, ET and the Contractor were carried out. No non-compliance was noted.

10.1.6 No site inspection was undertaken by any external party in this Reporting Period.

10.2 RECOMMENDATIONS

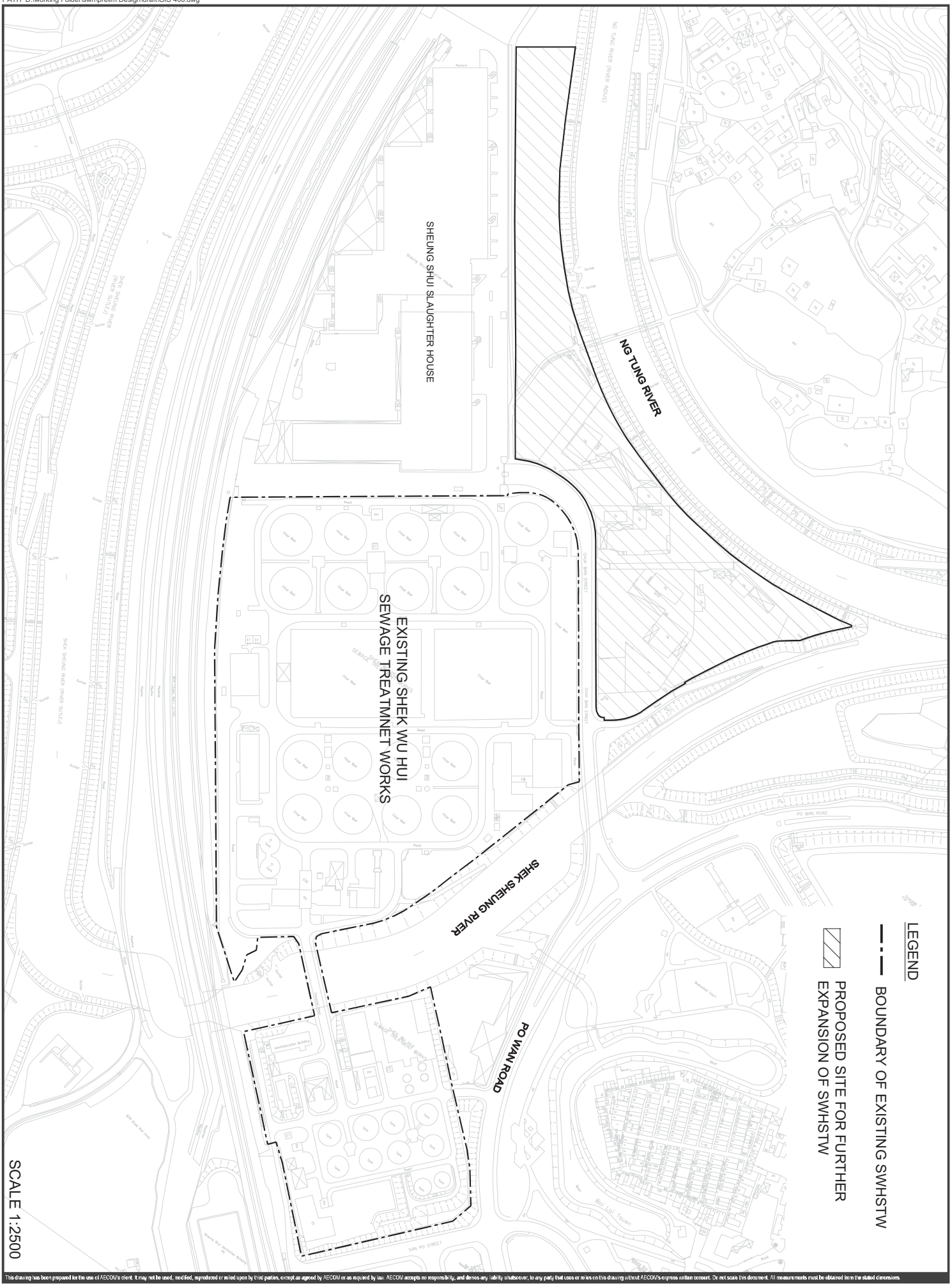
10.2.1 As dry season is approaching, special attention should be paid on the potential construction dust impact since most of the construction sites are adjacent to villages. The Contractor should fully implement the construction dust mitigation measures properly.

10.2.2 Air quality mitigation measures including wheel wash facilities, watering of haul roads and covering of dusty materials with tarpaulin sheet, etc. should be properly maintained.

10.2.3 To control the site performance on waste management, Tsun Yip shall ensure that all solid and liquid waste management works are fully in compliance with the relevant license/permit requirements, such as the effluent discharge licence and the chemical waste producer registration. Tsun Yip is also reminded to implement the recommended environmental mitigation measures according to the Updated Environmental Monitoring and Audit Manual.

Appendix A

GENERAL LAYOUT OF ADVANCE WORKS AND MAIN WORKS OF SWHSTW FURTHER EXPANSION PHASE 1A



AGREEMENT NO. CE 40/2012 (DS)
SHEK WU HUI SEWAGE TREATMENT WORKS
- FURTHER EXPANSION PHASE 1A
- INVESTIGATION
Project No.: 60284037 Date: FEB. 2014

LOCATION OF THE EXISTING SWHSTW AND THE PROPOSED SITE FOR FURTHER EXPANSION

AECOM

Drawing 60284037/EM&AM/400

Plot File by: Chancp1 19/02/2014
PATH D:\working Folder\swh\prelim Design\draft\GIS 401.dwg

Project Management Initials: Checked: CYKY ISO A3 297mm x 420mm

ZONE	EXISTING USAGE	PROPOSED USAGE
A	SLUDGE TREATMENT (SOLID STREAM) AND ANCILLARY FACILITIES	ANCILLARY FACILITIES
B	SEWAGE TREATMENT (LIQUID STEAM)	SEWAGE TREATMENT (LIQUID STREAM)
C	TEMPORARY WORKS SITE	SLUDGE TREATMENT (SOLID STREAM)
D	VACANT	RECLAIMED WATER FACILITIES

SCALE 1:2500

AGREEMENT NO. CE 40/2012 (DS)
SHEK WU HUI SEWAGE TREATMENT WORKS
- FURTHER EXPANSION PHASE 1A
- INVESTIGATION
Project No.: 60284037 Date: FEB. 2014

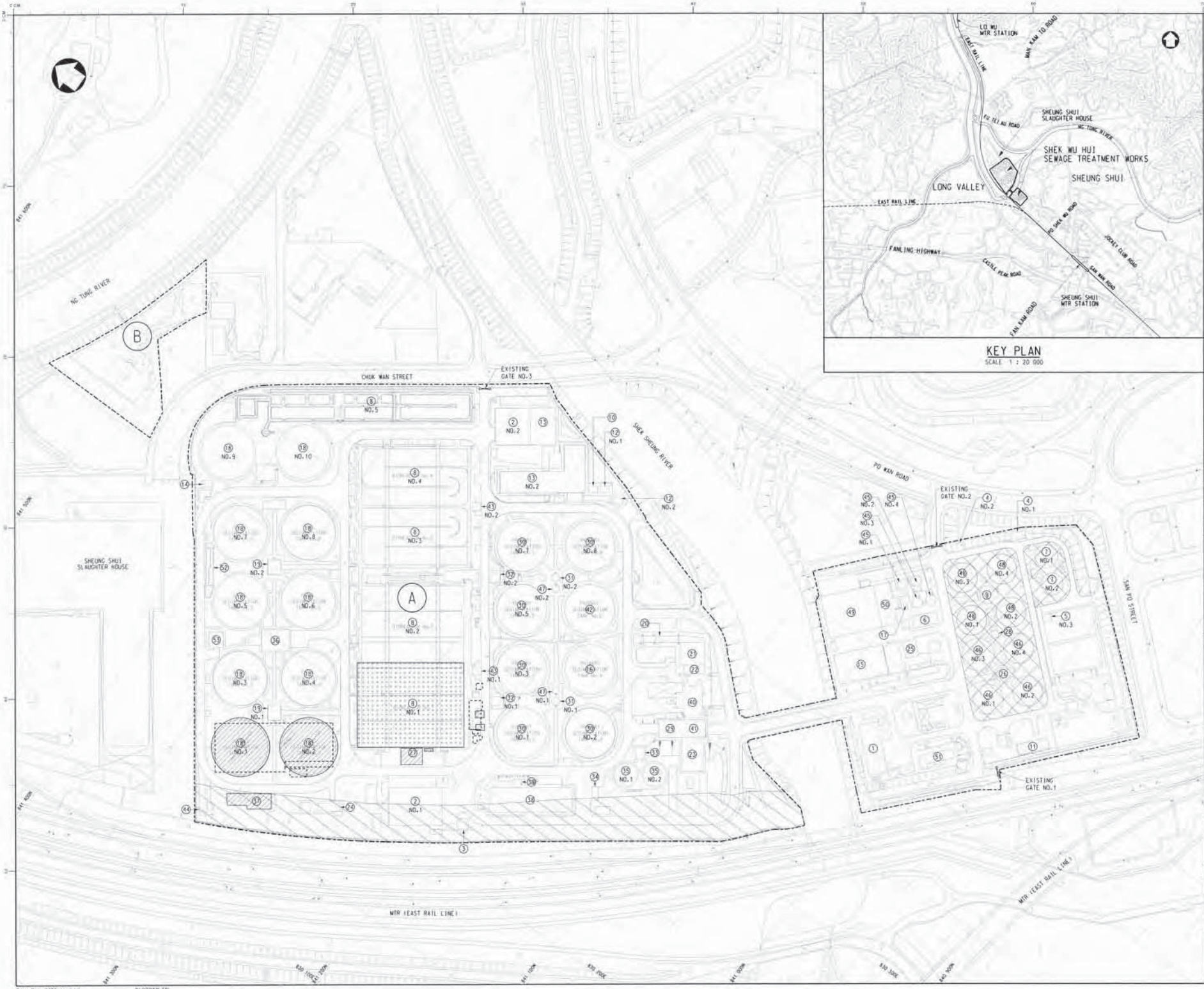
PREFERRED SITE UTILIZATION
ACCORDING TO BRIEF

AECOM

Drawing 60284037/EM&AM/401

Appendix B

LAYOUT PLAN OF ADVANCE WORKS



KEY PLAN
SCALE 1 : 20 000

NOTES :

1. ALL GRIDS REFER TO HONG KONG 1980 GRID.
2. THE CONTRACTOR'S ATTENTION IS DRAWN TO THE REQUIREMENTS OF SCC 22 AND PS CLAUSES 1.66(1)(I) AND PS APPENDIX 1.18 FOR WORKS IN THE VICINITY OF MTR.
3. PORTION 'A' IS INSIDE EXISTING SWHSTW. THE CONTRACTOR'S ATTENTION IS DRAWN TO THE REQUIREMENTS OF PS CLAUSE 1.45 AND 28.27 FOR WORKS INSIDE SWHSTW.
4. THE CONTRACTOR'S ATTENTION IS DRAWN TO PS SECTION 28 FOR THE SAFETY REQUIREMENTS FOR WORKS IN GAS RISK AREA.
5. CHUK WAN STREET IS THE MAIN ACCESS FOR THE SHEUNG SHUI SLAUGHTER HOUSE. THE CONTRACTOR SHALL TAKE SPECIAL PRECAUTION TO ENSURE THE CHUK WAN STREET WILL NOT BE AFFECTED FOR ANY OF HIS WORKS NEARBY.

LEGEND :

- SITE BOUNDARY
- GAS RISK AREA
- AREA WITHIN WHICH SCC 22 AND PS CLAUSES 1.66(1)(I) AND 1.130 & PS APPENDIX 1.39 SHALL APPLY
- EXISTING STRUCTURE TO BE DEMOLISHED
- EXISTING STRUCTURE TO BE MODIFIED
- PROPOSED STRUCTURE
- (A) PORTION A OF THE SITE

no.	date	description	initial
REVISION			

	name	date
designed	K. F. PANG	12 DEC 2014
drawn	C. C. CHAN	12 DEC 2014
checked	K. C. POON	12 DEC 2014
vetted	Ir K. K. LAU	12 DEC 2014

approved

Ir C. H. LAI — Chief Engineer — 12 DEC 2014 — Date

contract no.	DC/2013/09
file no.	SP8/4388DS
project no.	4388DS

contract

ADVANCE WORKS FOR SHEK WU HUI SEWAGE TREATMENT WORKS - FURTHER EXPANSION PHASE 1A AND SEWERAGE WORKS AT PING CHE ROAD

drawing title

PORTION A -

PORTIONS OF THE SITE

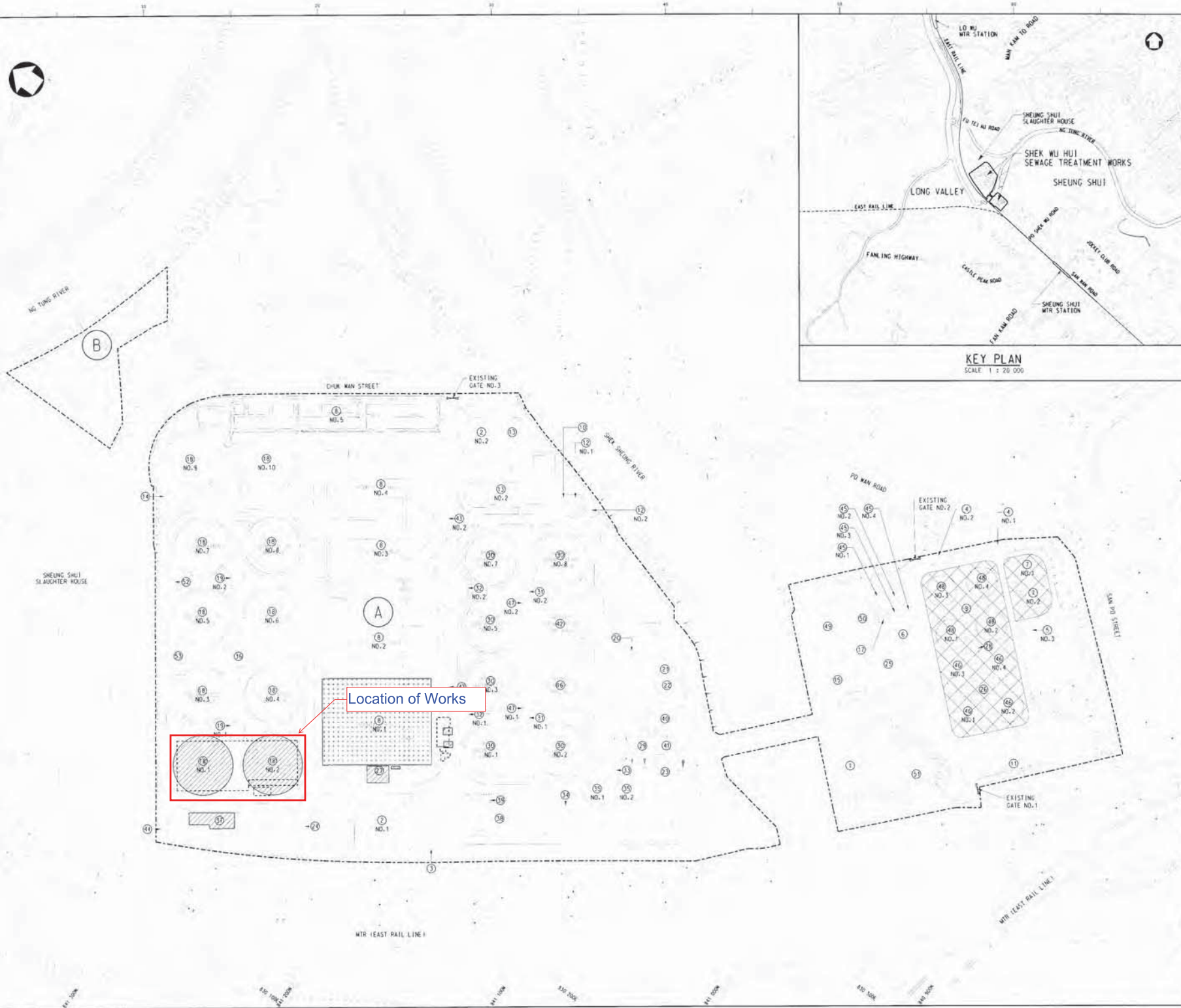
drawing no.	scale
DSP/DC1309/11021	1 : 1000 OR AS SHOWN

office

SEWERAGE PROJECTS DIVISION

DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION

A1 841x594



KEY PLAN
SCALE 1 : 20 000

NOTES:

1. ALL GRIDS REFER TO HONG KONG 1980 GRID.
2. THE CONTRACTOR'S ATTENTION IS DRAWN TO THE REQUIREMENTS OF SCC 22 AND PS CLAUSES 1.66(10) AND PS APPENDIX 1.18 FOR WORKS IN THE VICINITY OF MTR.
3. PORTION 'A' IS INSIDE EXISTING SWMSTW. THE CONTRACTOR'S ATTENTION IS DRAWN TO THE REQUIREMENTS OF PS CLAUSE 1.45 AND 28.27 FOR WORKS INSIDE SWMSTW.
4. THE CONTRACTOR'S ATTENTION IS DRAWN TO PS SECTION 28 FOR THE SAFETY REQUIREMENTS FOR WORKS IN GAS RISK AREA.
5. CHUK WAN STREET IS THE MAIN ACCESS FOR THE SHEUNG SHUI SLAUGHTER HOUSE. THE CONTRACTOR SHALL TAKE SPECIAL PRECAUTION TO ENSURE THE CHUK WAN STREET WILL NOT BE AFFECTED FOR ANY OF HIS WORKS NEARBY.

LEGEND :

- SITE BOUNDARY
- GAS RISK AREA
- EXISTING STRUCTURE TO BE DEMOLISHED
- EXISTING STRUCTURE TO BE MODIFIED
- PROPOSED STRUCTURE
- (A) PORTION A OF THE SITE

FOR TENDER PURPOSES ONLY

no	date	description	initial
A	26 JAN 2015	GENERAL REVISION	E/SDS, W. WONG

REVISION

	name		date
designed	SIGNED	H. F. PANG	12 DEC 2014
drawn	SIGNED	C. C. CHAN	12 DEC 2014
checked	SIGNED	W. C. POON	12 DEC 2014
vetted	SIGNED	Ir W. W. LAU	12 DEC 2014
approved	SIGNED Ir L. K. LAI Chief Engineer		12 DEC 2014 Date

contract no.	DC/2013/09
file no.	SP8/4388DS
project no.	4388DS

contract

ADVANCE WORKS FOR SHEK WU HUI SEWAGE TREATMENT WORKS - FURTHER EXPANSION PHASE 1A AND SEWERAGE WORKS AT PING CHE ROAD

drawing title

PORTION A -

PORTIONS OF THE SITE

drawing no.	scale
DSP/DC1309/11021A	1 : 1000 OR AS SHOWN

office

SEWERAGE PROJECTS DIVISION

DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE
HONG KONG
SPECIAL ADMINISTRATIVE REGION

A1 841x594

Appendix C

ORGANIZATION STRUCTURE AND CONTACT DETAILS OF RELEVANT PARTIES

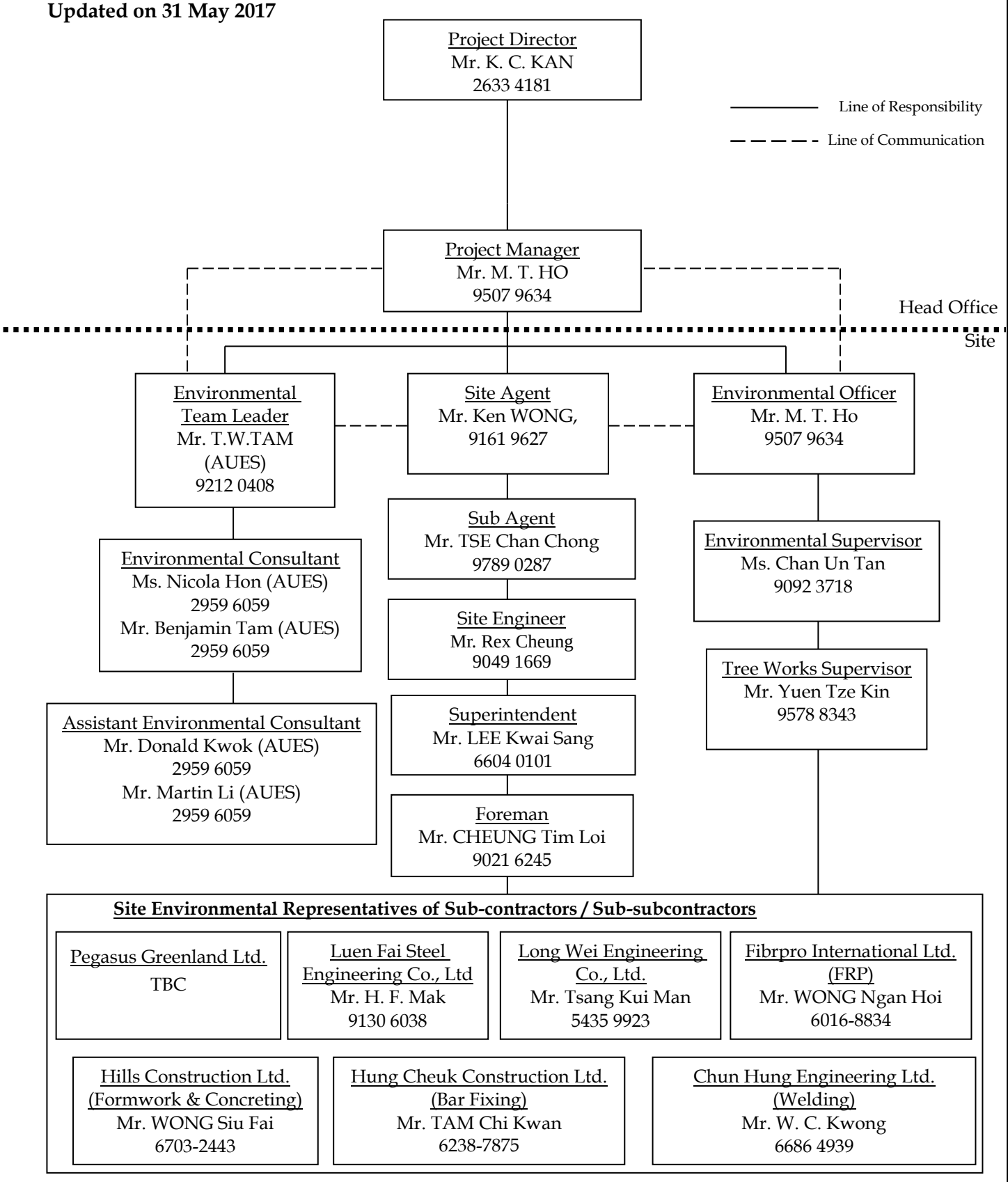
Tsun Yip Waterworks Construction Company Limited
進業水務建築有限公司

Contract No. DC/2013/09

Advance Works for Shek Wu Hui Sewage Treatment Works
- Further Expansion Phase 1A and Sewerage Works at Ping Che Road

SITE ENVIRONMENTAL TEAM ORGANIZATION CHART

Updated on 31 May 2017



Contact Details of Relevant Parties

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
DSD	Resident Site Engineer	Mr. Michael Leung	2594 7463	2827 8700
ANewR	Independent Environmental Checker	Mr. Adi Lee	2618 2836	3007 8648
Tsun Yip	Project Director	Mr. K. C. KAN	2633 4181	2633 4691
Tsun Yip	Project Manager	Mr. M. T. HO	9507 9634	2633 4691
Tsun Yip	Site Agent	Mr. Ken WONG	9161 9627	2633 4691
Tsun Yip	Environmental Officer	Mr. M. T. Ho	9507 9634	2633 4691
AUES	Environmental Team Leader	Mr. T. W. Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Ms. Nicola Hon	2959 6059	2959 6079
AUES	Environmental Consultant	Mr. Ben Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Mr. Martin Li	2959 6059	2959 6079

Legend:

DSD (Employer & Resident Site Engineer) – Drainage Service Department

Tsun Yip (Main Contractor) – Tsun Yip Waterworks Construction Co Ltd

ANEWR (IEC) – ANEWR Consulting Limited

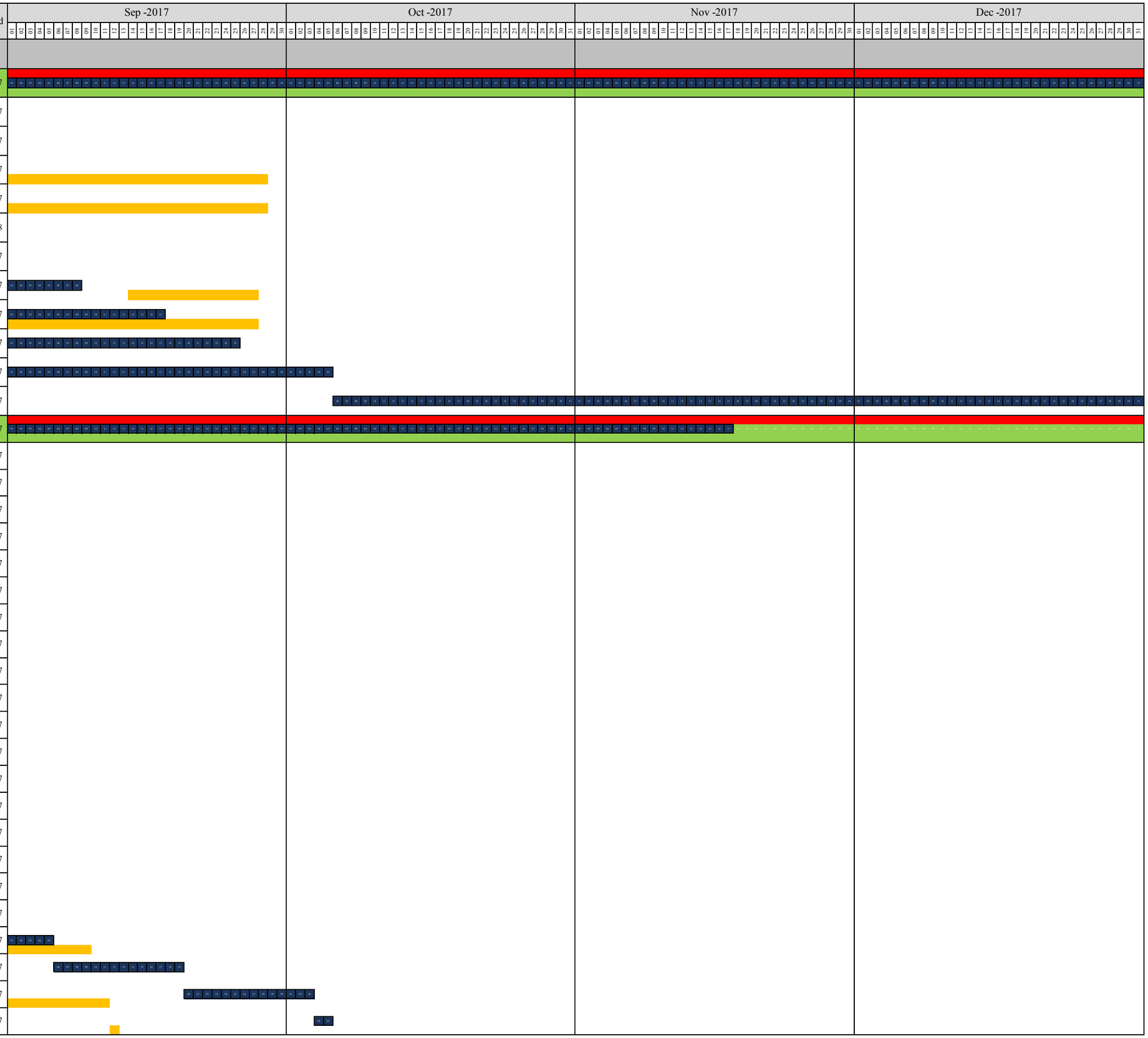
AUES (ET) – Action-United Environmental Services & Consulting

Appendix D

3-MONTH ROLLING PROGRAM

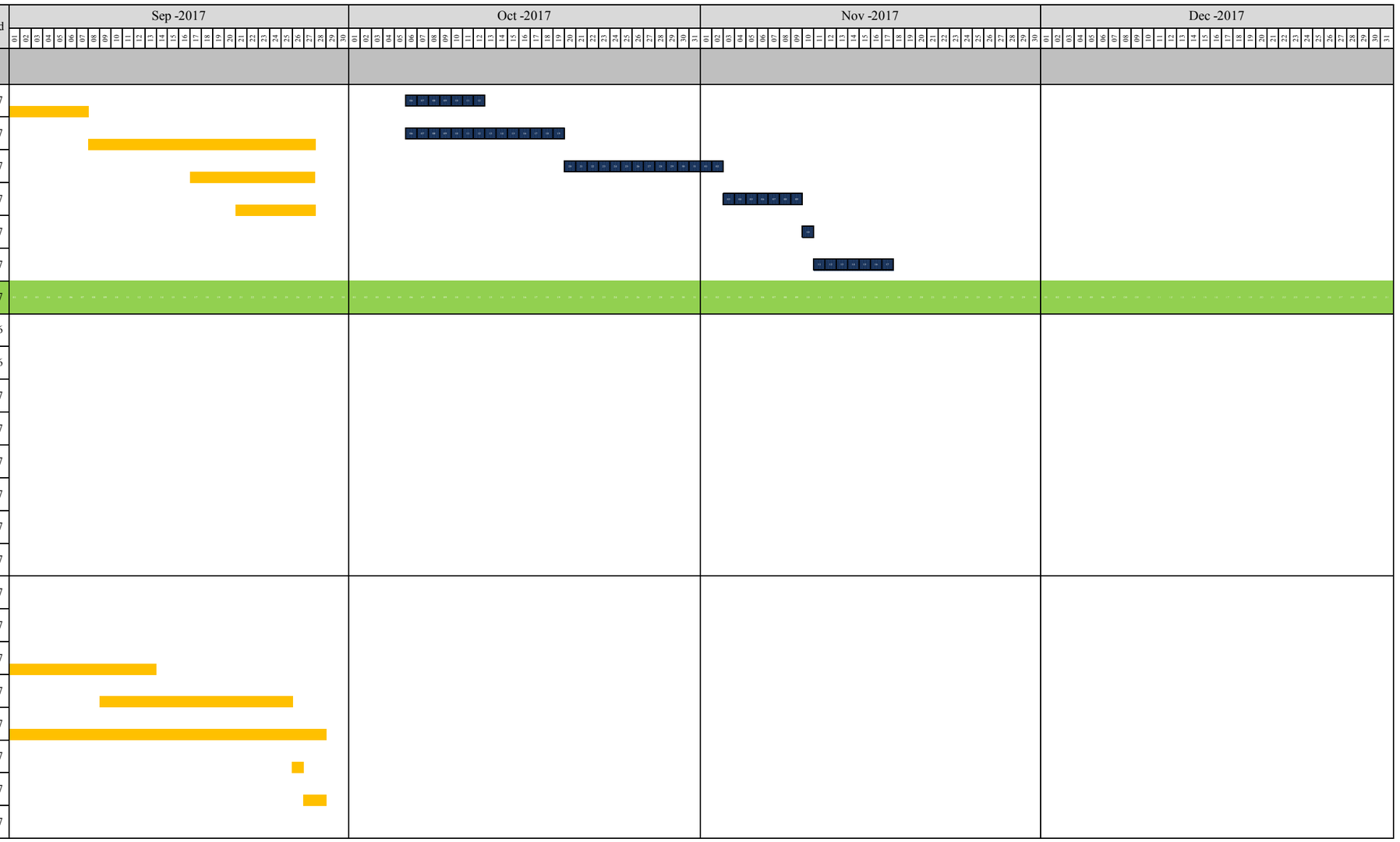
Contract No. DC/2013/09
Advance Works for Shek Wu Hui Sewage Treatment Works - Further Expansion Phase 1A and Sewerage Works at Ping Che Road
3-Month Rolling Programme (Shek Wu Hui Sewage Treatment Works - Section 2) in September 2017

Item	Description	Duration (Days)	% of Completion	Start	Finished
Shek Wu Hui Sewage Treatment Works - Section II					
1	Modification of Bioreactor No.1	427		31/10/16	31/12/17
1.1	Design and Material Delivery of FRP Baffle Wall and Walkway	136	100%	31/10/16	15/03/17
1.2	Installation of FRP Baffle Wall	110	50%	04/02/17	24/05/17
1.3	Installation of FRP Walkway (for Pipe CHE 0-69)	70	90%	01/05/17	09/07/17
1.4	Installation of FRP Walkway (for Pipe CHD 96-165)	70	60%	01/05/17	09/07/17
1.5	Installation of Structual Gantry	40	0%	01/01/18	09/02/18
1.6	Cutting of Existing partition wall of BR1	10	100%	25/07/17	03/08/17
1.7	Installation of DN800 Puddle Flange Pipe	36	80%	04/08/17	08/09/17
1.8	Installation of FRP Pipe support of DN600 air main	70	40%	10/07/17	17/09/17
1.9	Construction of Concrete Pump Pit	40	10%	17/08/17	25/09/17
1.10	Repairing of Existing Joint and Concrete or Screeding (Including Curing)	60	0%	07/08/17	05/10/17
1.11	Painting Waterproofing lining of Wall and Floor of BR1	87	0%	06/10/17	31/12/17
2	Portion B - Construction of Membrane Facilities Building (+6.7mPD - +22.79mPD)	264		27/02/17	17/11/17
2.1	Erection of External Formwork	14	100%	27/02/17	12/03/17
2.2	Steelfixing for Wall (+6.7mPD-+9.15mPD)	14	100%	29/03/17	11/04/17
2.3	Erection of Internal Formwork	14	100%	12/04/17	25/04/17
2.4	Concreting up to +9.15mPD	2	100%	26/04/17	27/04/17
2.5	Curing of Concrete and Dismantle of Formworks	7	100%	28/04/17	04/05/17
2.6	Installation of Falsework and working platform	14	100%	28/04/17	11/05/17
2.7	Steelfixing for Wall (+9.15mPD-+12.95mPD)	10	100%	12/05/17	21/05/17
2.8	Erection of Internal Formwork with corbels	10	100%	22/05/17	31/05/17
2.9	Erection of Formwork for bottom slab and beam for 1/F	14	100%	01/06/17	14/06/17
2.10	Fixing steel bar of beam and slab of 1/F	14	100%	15/06/17	28/06/17
2.11	Concreting up to +12.95mPD	2	100%	29/06/17	30/06/17
2.12	Curing of Concrete and Dismentle of Formworks and Falsework	7	100%	01/07/17	07/07/17
2.13	Erection of Internal Formwork	9	100%	08/07/17	16/07/17
2.14	Steelfixing for Wall (+12.95mPD - +14.45mPD)	9	100%	17/07/17	25/07/17
2.15	Erection of External Formwork	9	100%	26/07/17	03/08/17
2.16	Concreting up to +14.45mPD	1	100%	04/08/17	04/08/17
2.17	Curing of Concrete and Dismentle of Formworks	7	100%	05/08/17	11/08/17
2.18	Installation of Falsework and working platform	14	100%	12/08/17	25/08/17
2.19	Erection of Internal Formwork	11	100%	26/08/17	05/09/17
2.20	Steelfixing for Wall (+14.45mPD-+19.20mPD)	14	100%	06/09/17	19/09/17
2.21	Erection of External Formwork	14	100%	20/09/17	03/10/17
2.22	Concreting up to +19.20mPD	2	100%	04/10/17	05/10/17



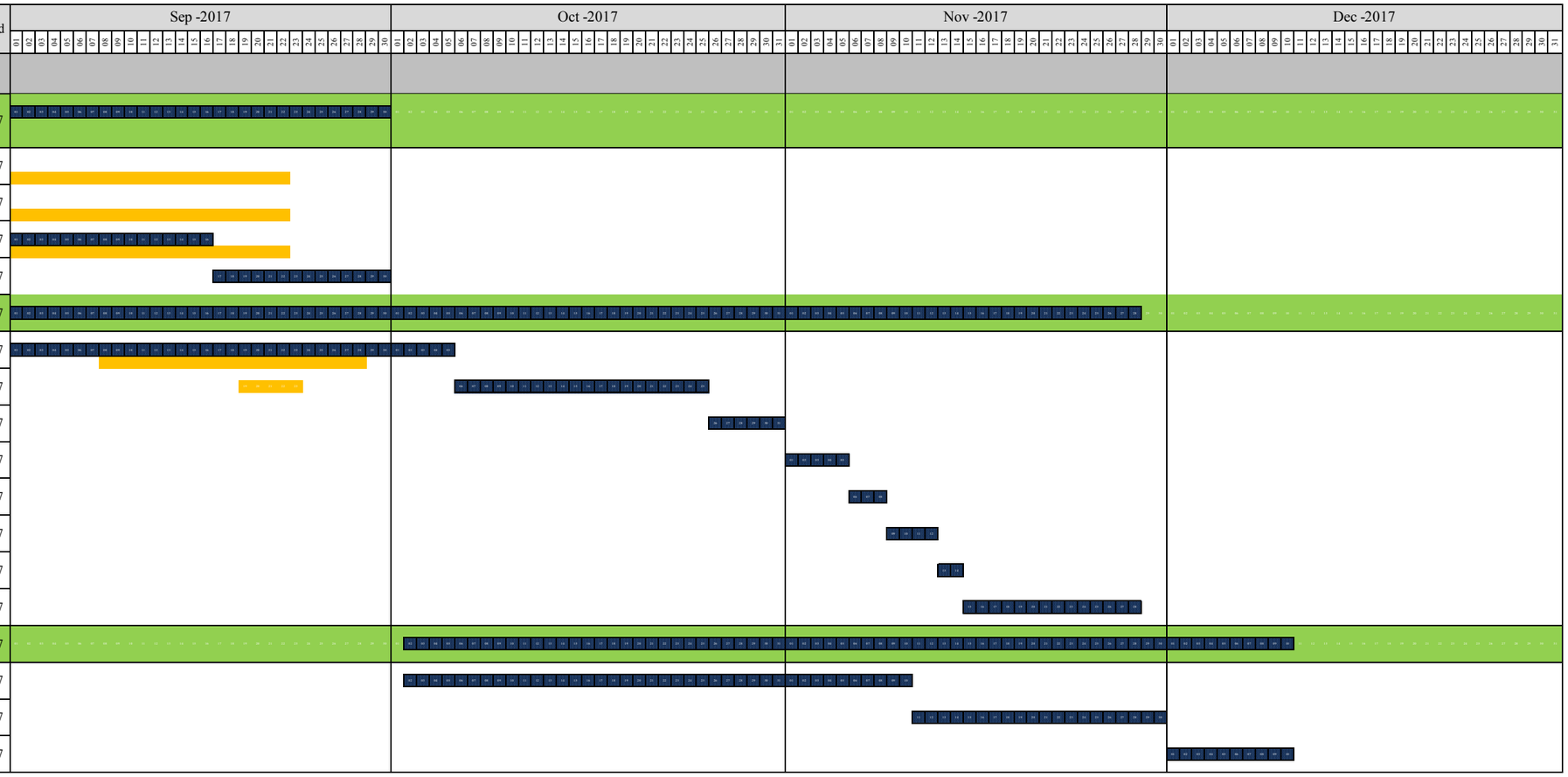
Contract No. DC/2013/09
Advance Works for Shek Wu Hui Sewage Treatment Works - Further Expansion Phase 1A and Sewerage Works at Ping Che Road
3-Month Rolling Programme (Shek Wu Hui Sewage Treatment Works - Section 2) in September 2017

Item	Description	Duration (Days)	% of Completion	Start	Finished
Shek Wu Hui Sewage Treatment Works - Section II					
2.23	Curing of Concrete and Dismentle of Formworks	7	70%	06/10/17	12/10/17
2.24	Erection of Internal Formwork	14	95%	06/10/17	19/10/17
2.25	Steelfixing for Wall (+19.20mPD-+22.79mPD)	14	95%	20/10/17	02/11/17
2.26	Erection of External Formwork	7	95%	03/11/17	09/11/17
2.27	Concreting up to +22.79mPD	1	0%	10/11/17	10/11/17
2.28	Curing of Concrete and Dismentle of Formworks	7	0%	11/11/17	17/11/17
3	Pretreatment Screen Chamber	131		15/03/17	23/07/17
3.1	Installation of DN250 D.I. Replacement Pipe and Pipe Connection	30	100%	01/09/16	30/09/16
3.2	Isolation Works for associated Pipeworks by ST1	7	100%	01/10/16	07/10/16
3.3	Relocation of Public Light	22	100%	05/01/17	26/01/17
3.4	Demolish Existing Pipeworks and Treatment for Connection	21	100%	06/02/17	26/02/17
3.5	Excavation and ELS Installation	50	100%	15/03/17	03/05/17
3.6	Laying Rock Fill and Blinding Layer	7	100%	04/05/17	10/05/17
3.7	Steel fixing for Wall kicker and base slab	12	100%	11/05/17	22/05/17
3.8	Installation of formwork	8	100%	23/05/17	30/05/17
3.9	concreting	1	100%	31/05/17	31/05/17
3.10	formwork removal and curing	2	100%	01/06/17	02/06/17
3.11	Steel fixing for Wall	14	30%	03/06/17	16/06/17
3.12	Installation of formwork	14	30%	17/06/17	30/06/17
3.13	Erection of falsework	10	100%	01/07/17	10/07/17
3.14	Concreting	2	0%	11/07/17	12/07/17
3.15	Curing concrete	3	0%	13/07/17	15/07/17
3.16	Removal of sheetpile and backfilling	10	0%	14/07/17	23/07/17



Contract No. DC/2013/09
Advance Works for Shek Wu Hui Sewage Treatment Works - Further Expansion Phase 1A and Sewerage Works at Ping Che Road
3-Month Rolling Programme (Shek Wu Hui Sewage Treatment Works - Section 2) in September 2017

Item	Description	Duration (Days)	% of Completion	Start	Finished
Shek Wu Hui Sewage Treatment Works - Section II					
4	VO10 - Construction of CLP Cable Duct and Draw Pits (Membrane Building to CLP connection point) 170m	164		20/04/17	30/09/17
4.1	Excavation and Installation of sheetpile	70	80%	20/04/17	28/06/17
4.2	HDPE Cable Duct Pipelaying	40	80%	29/06/17	07/08/17
4.3	Construction of Cable Draw Pit	40	80%	08/08/17	16/09/17
4.4	Reinstatement	14	0%	17/09/17	30/09/17
5	DN1400 DI RAS Pipe (CHC 0 to CHC94)	144		08/07/17	28/11/17
6.1	Excavation and Installation of sheetpile	90	80%	08/07/17	05/10/17
6.2	Pipe Laying	20	60%	06/10/17	25/10/17
6.3	Installation of Bend	6	40%	26/10/17	31/10/17
6.4	Casting the formwork of thrust block	5	40%	01/11/17	05/11/17
6.5	Fixing steel bar of thrust block	3	40%	06/11/17	08/11/17
6.6	Concreting the thrust block	4	40%	09/11/17	12/11/17
6.7	formwork dismantling	2	40%	13/11/17	14/11/17
6.8	backfilling of general fill material	14	60%	15/11/17	28/11/17
7	Pipeline E & Pipeline D CHD96.03 to CHD175.17 air main	70		02/10/17	10/12/17
7.1	Installation of Air main	40	0%	02/10/17	10/11/17
7.2	Welding of Pipe Flange	20	0%	11/11/17	30/11/17
7.3	Installation of Valve	10	0%	01/12/17	10/12/17



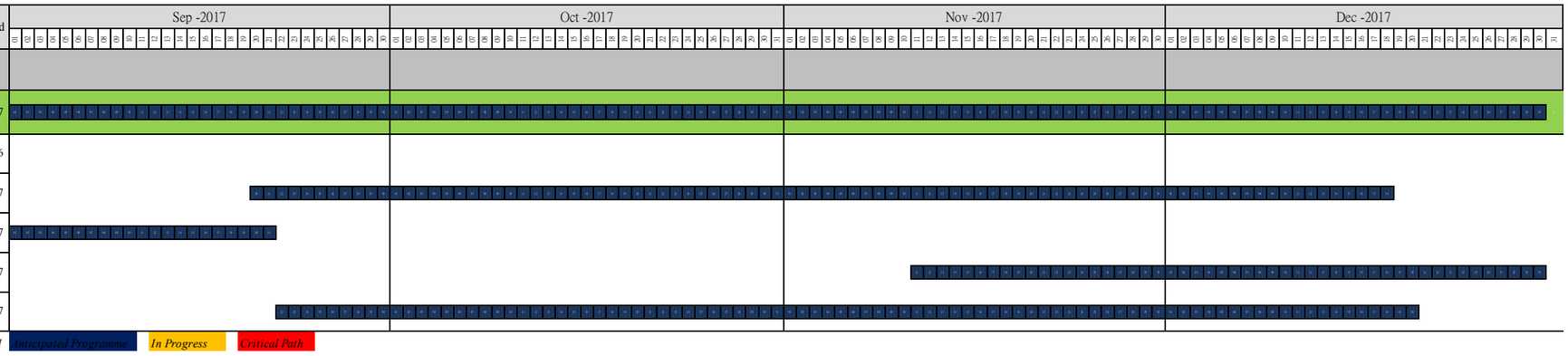
Legend *Anticipated Programme* *In Progress* *Critical Path*

Contract No. DC/2013/09

Advance Works for Shek Wu Hui Sewage Treatment Works - Further Expansion Phase 1A and Sewerage Works at Ping Che Road

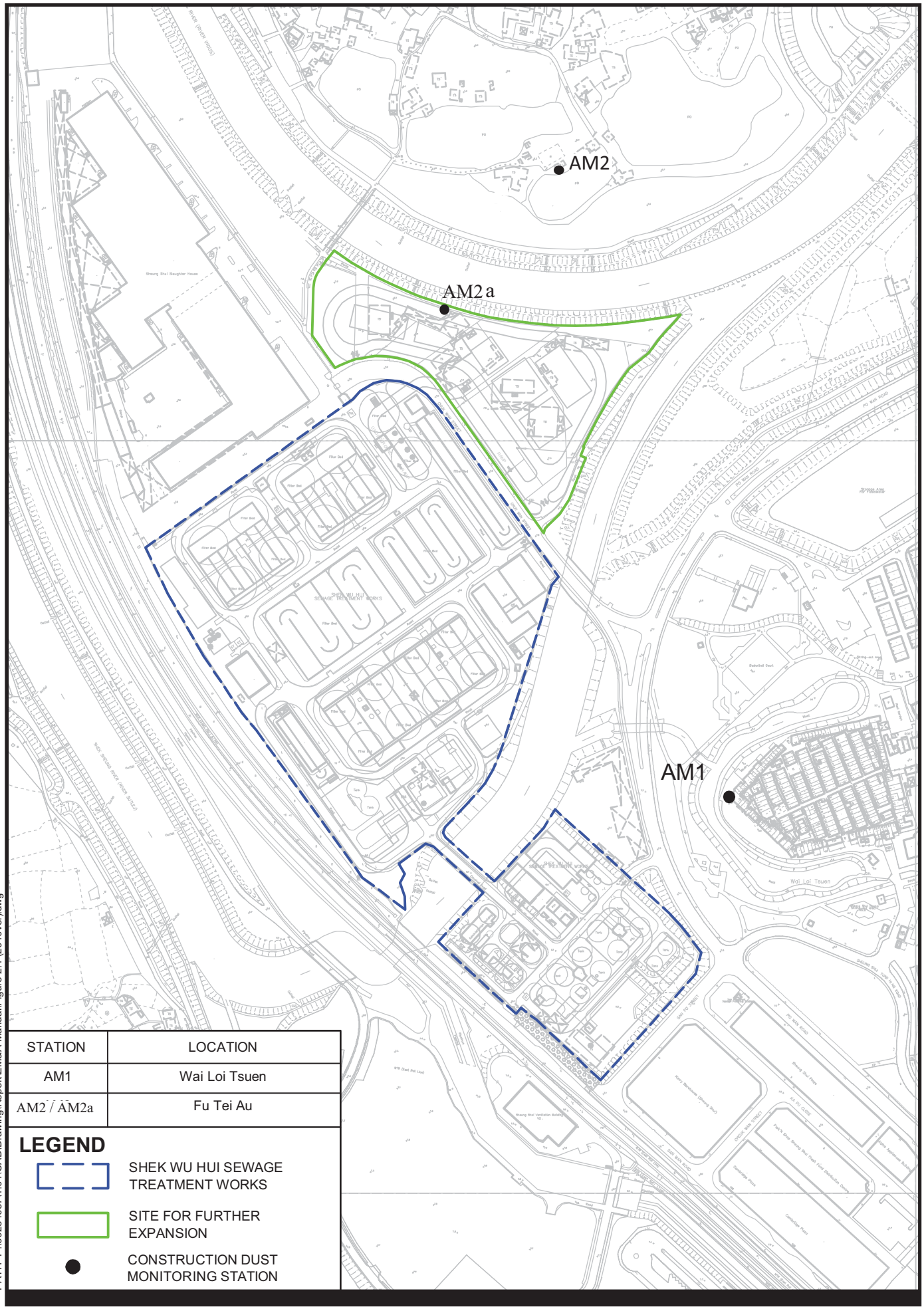
3-Month Rolling Programme (Shek Wu Hui Sewage Treatment Works - Section 3) in September 2017

Item	Description	Duration (Days)	% of Completion	Start	Finished
	Shek Wu Hui Sewage Treatment Works - Section 3				
1	***6x 150mm*** Cable Ducts Installation and Draw Pit Construction	557	28%	22/06/16	30/12/17
1.1	**V.O.9** - Duct Laying (FST8 to FST6 - 69m)	58	100.0%	22/06/16	18/08/16
1.2	**V.O.12** - Remaining CLP cable duct laying (MFB to Compressor Room)	90	0.0%	20/09/17	18/12/17
1.3	**V.O.12** - Remaining cable duct laying (MFB to Compressor Room)	90	25.0%	24/06/17	21/09/17
1.4	**V.O.12** - Remaining Duct Laying (MFB to FST No.3)	50	0.0%	11/11/17	30/12/17
1.5	**V.O.12** - Remaining Duct Laying (outside BR1 to MT)	90	20.0%	22/09/17	20/12/17



Appendix E

PROPOSED MONITORING LOCATIONS



STATION	LOCATION
AM1	Wai Loi Tsuen
AM2 / AM2a	Fu Tei Au

LEGEND

- SHEK WU HUI SEWAGE TREATMENT WORKS
- SITE FOR FURTHER EXPANSION
- CONSTRUCTION DUST MONITORING STATION

ISO A4 210mm x 297mm

Checked:

Project Management Initials:

Plot File by: Shumyjl
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26/02/2014

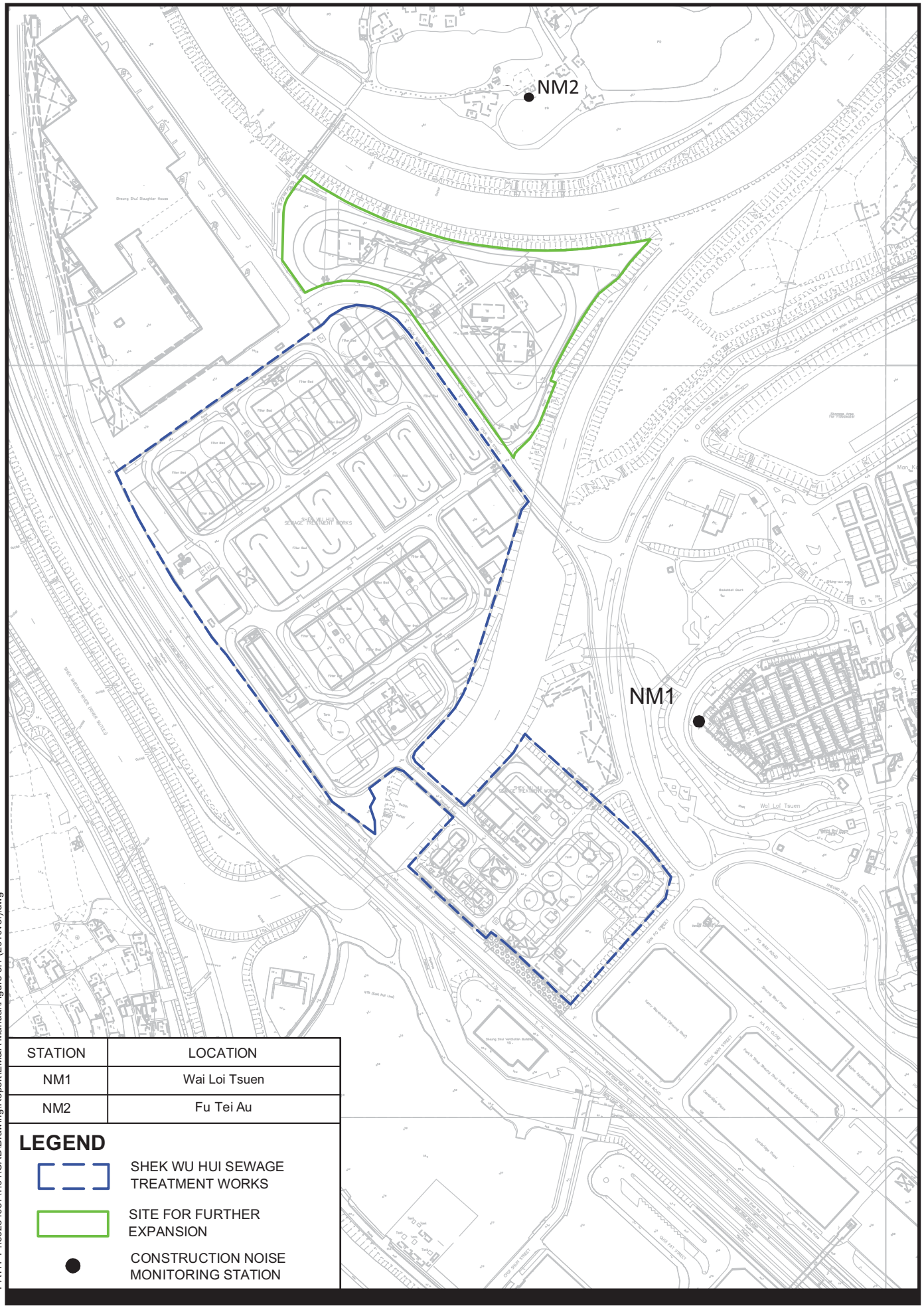
AGREEMENT NO. CE 40/2012 (DS)
SHEK WU HUI SEWAGE TREATMENT WORKS
- FURTHER EXPANSION PHASE 1A
- INVESTIGATION

PROPOSED CONSTRUCTION DUST MONITORING STATIONS FOR CONSTRUCTION PHASE AND OPERATION PHASE

AECOM

Project No.: 60284037 Date: FEB. 2014

Drawing No.
60284037/EM&AM/405



STATION	LOCATION
NM1	Wai Loi Tsuen
NM2	Fu Tei Au

LEGEND

- SHEK WU HUI SEWAGE TREATMENT WORKS
- SITE FOR FURTHER EXPANSION
- CONSTRUCTION NOISE MONITORING STATION

ISO A4 210mm x 297mm

Checked:

Project Management Initials:

Plot File by: Shumyjj
PATH P:\60284037\1.01\CAD\Drawing\Report\EM&A Manual\Figure 3.1 (2010ver).dwg
26/02/2014

AGREEMENT NO. CE 40/2012 (DS)
SHEK WU HUI SEWAGE TREATMENT WORKS
- FURTHER EXPANSION PHASE 1A
- INVESTIGATION

LOCATIONS OF CONSTRUCTION NOISE MONITORING STATIONS

AECOM

Project No.: 60284037 Date: FEB. 2014

Drawing No.
60284037/EM&AM/407

Appendix F

EVENT ACTION PLAN

Event and Action Plan for Construction Dust

Event	Action			
	ET	**IEC**	**ER**	**Contractor**
Action level being exceeded by one sampling	1. Identify source, investigate the causes of complaint and propose remedial measures; 2. Inform IEC and ER; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method.	1. Notify Contractor.	1. Rectify any unacceptable practice; 2. Amend working methods if appropriate.
Action level being exceeded by two or more consecutive sampling	1. Identify source; 2. Inform IEC and ER; 3. Advise the ER on the effectiveness of the proposed remedial measures; 4. Repeat measurements to confirm findings; 5. Increase monitoring frequency to daily; 6. Discuss with IEC and Contractor on remedial actions required; 7. If exceedance continues, arrange meeting with IEC and ER; 8. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ET on the effectiveness of the proposed remedial measures; 5. Supervise Implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Submit proposals for remedial actions to IEC within three working days of notification; 2. Implement the agreed proposals; 3. Amend proposal if appropriate.
Limit level being exceeded by one sampling	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform Contractor ,IEC, ER, and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; 5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within three working days of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate.
Limit level being exceeded by two or more consecutive sampling	1. Notify IEC, ER, Contractor and EPD; 2. Identify source; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with IEC and ER to discuss the remedial actions to be taken; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within three working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

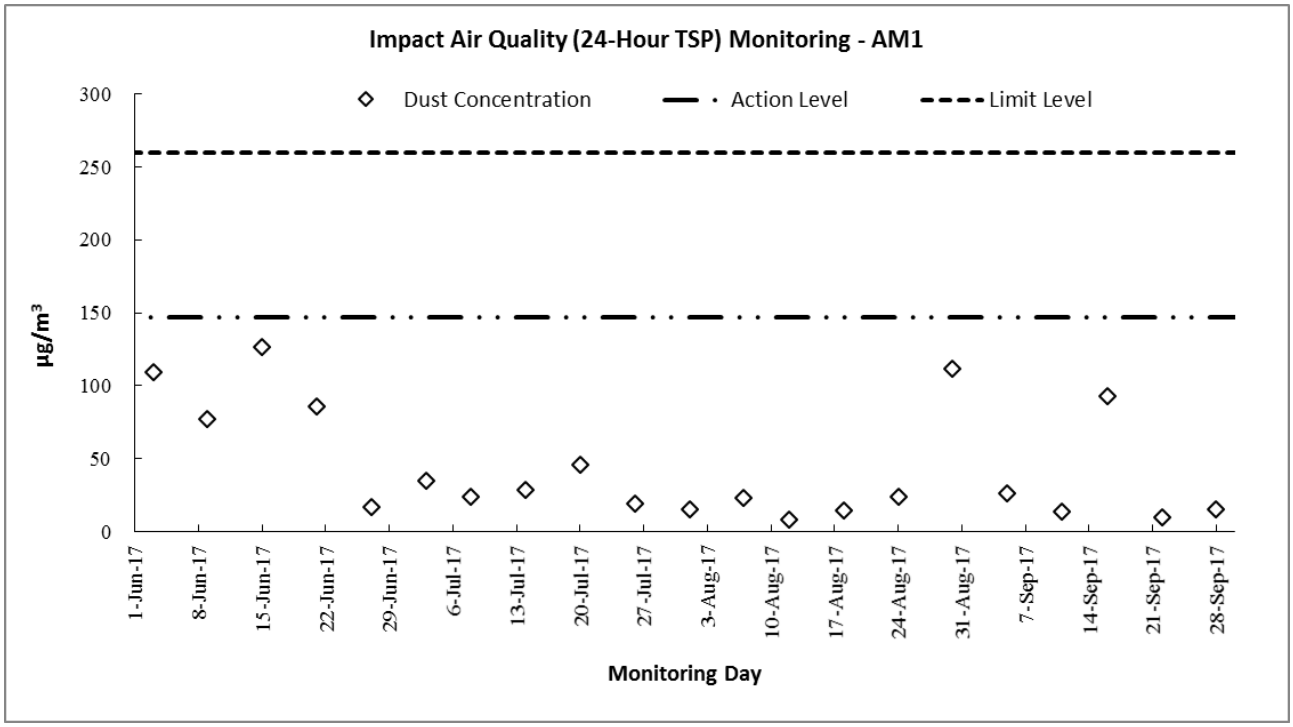
Event and Action Plan for Construction Noise

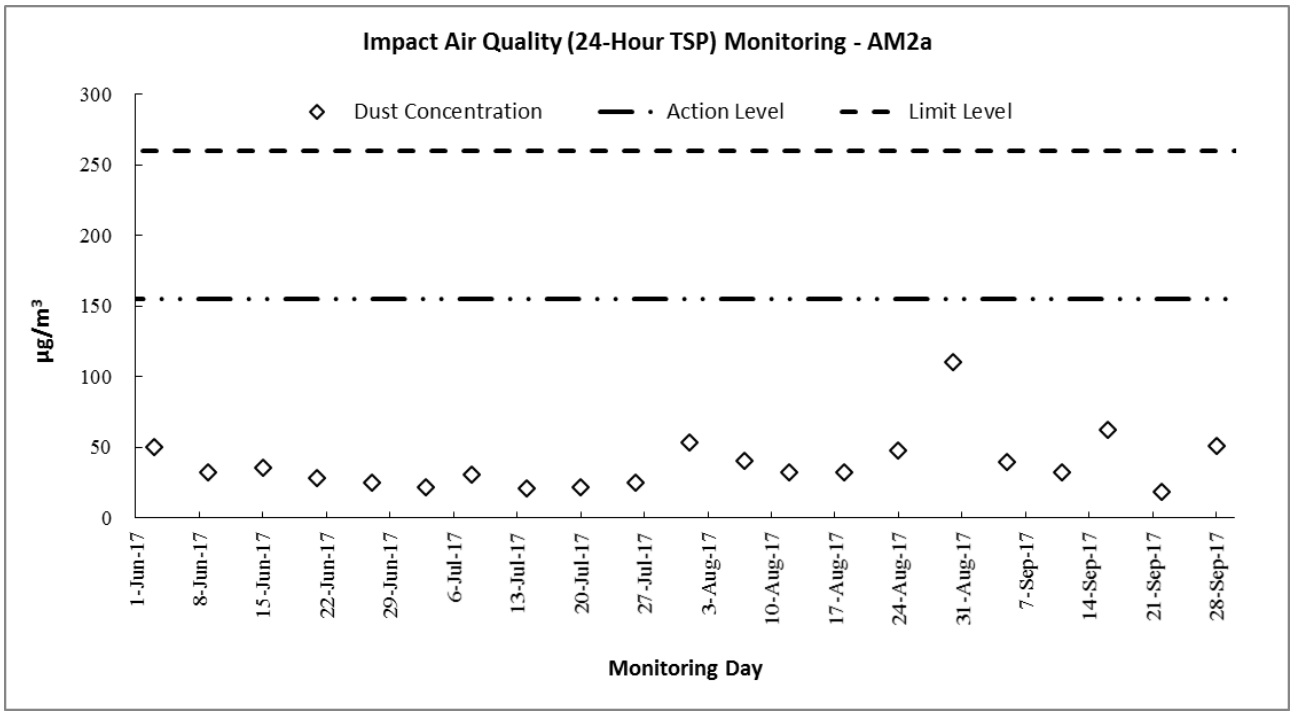
Event	Action			
	ET	**IEC**	**ER**	**Contractor**
Action Level	1. Notify IEC and Contractor; 2. Carry out investigation; 3. Report the results of investigation to the IEC, ER and Contractor; 4. Discuss with the Contractor and formulate remedial measures; 5. Increase monitoring frequency to check mitigation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

Appendix G

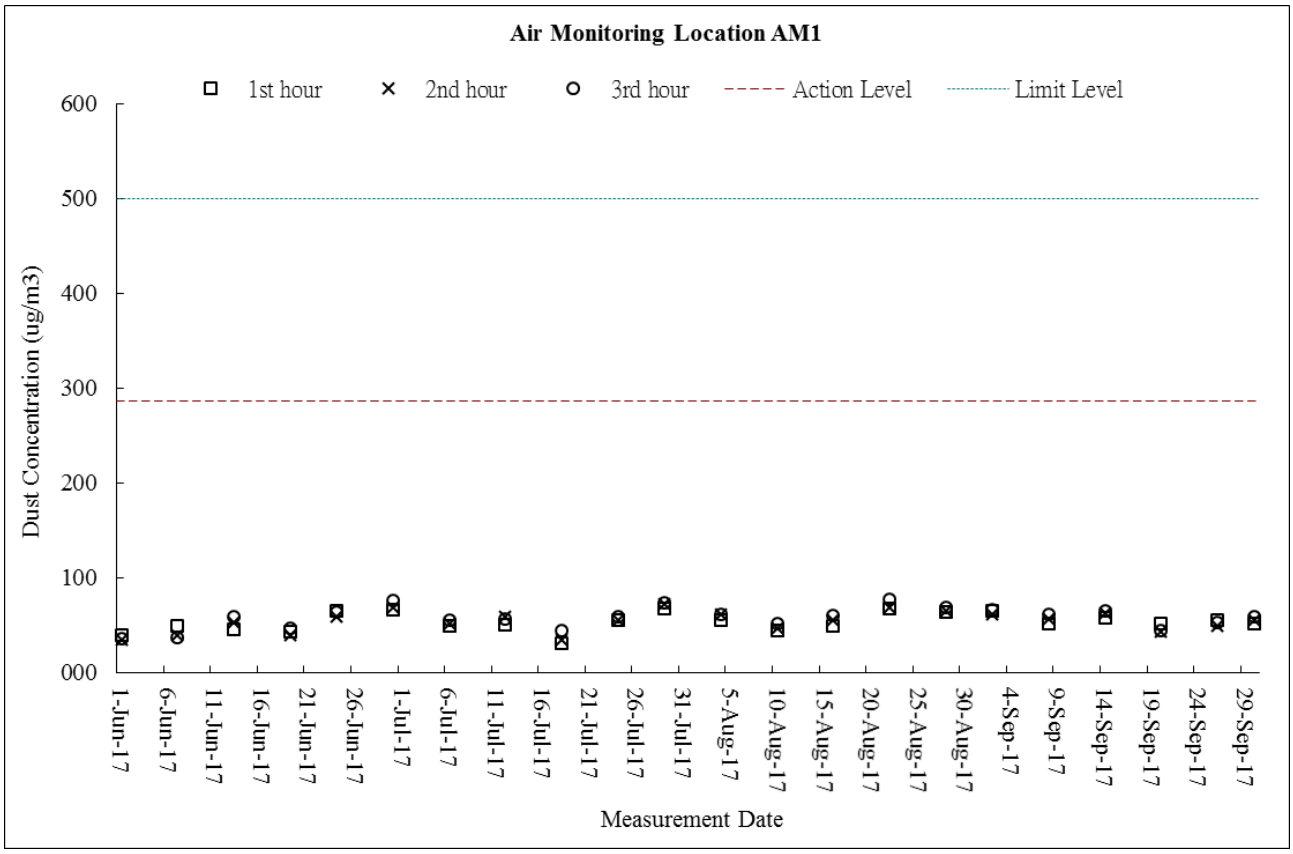
GRAPHICAL PLOTS

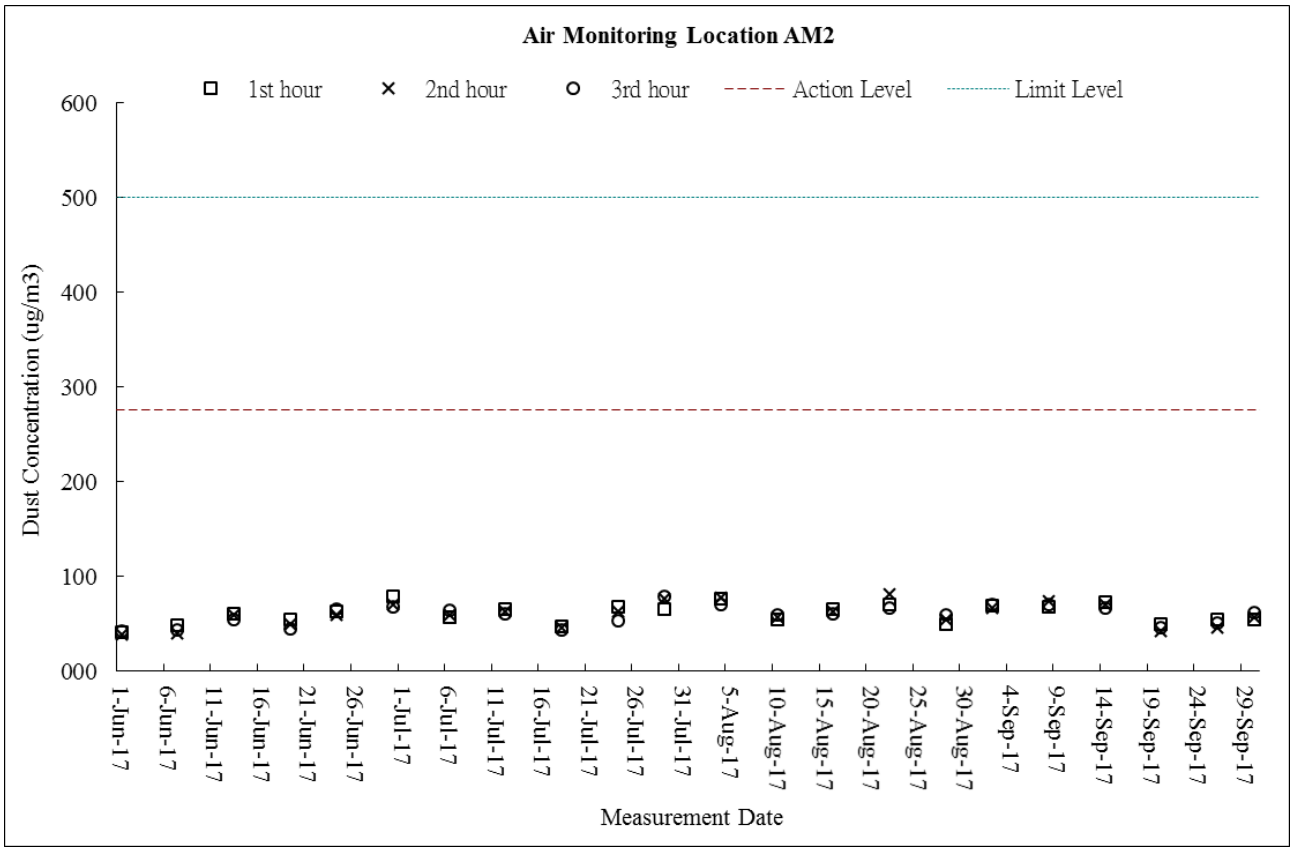
Air Quality – 24-Hour TSP



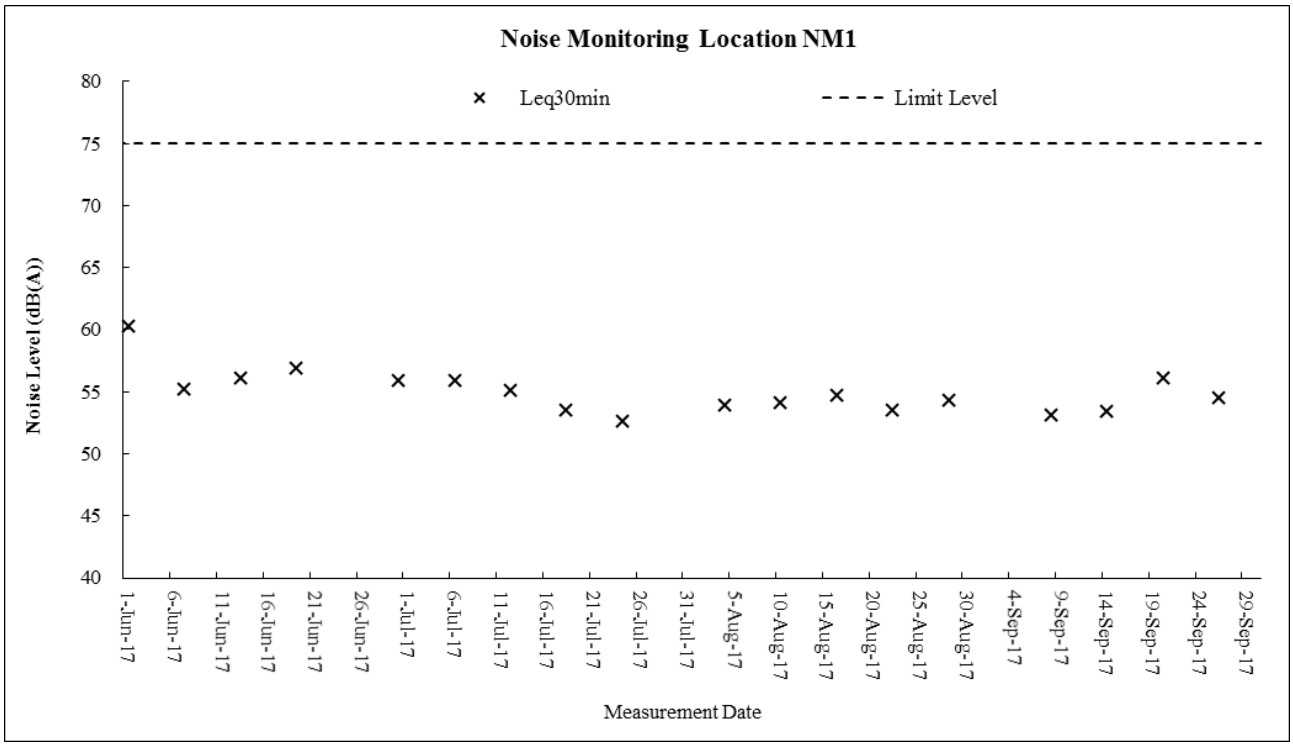


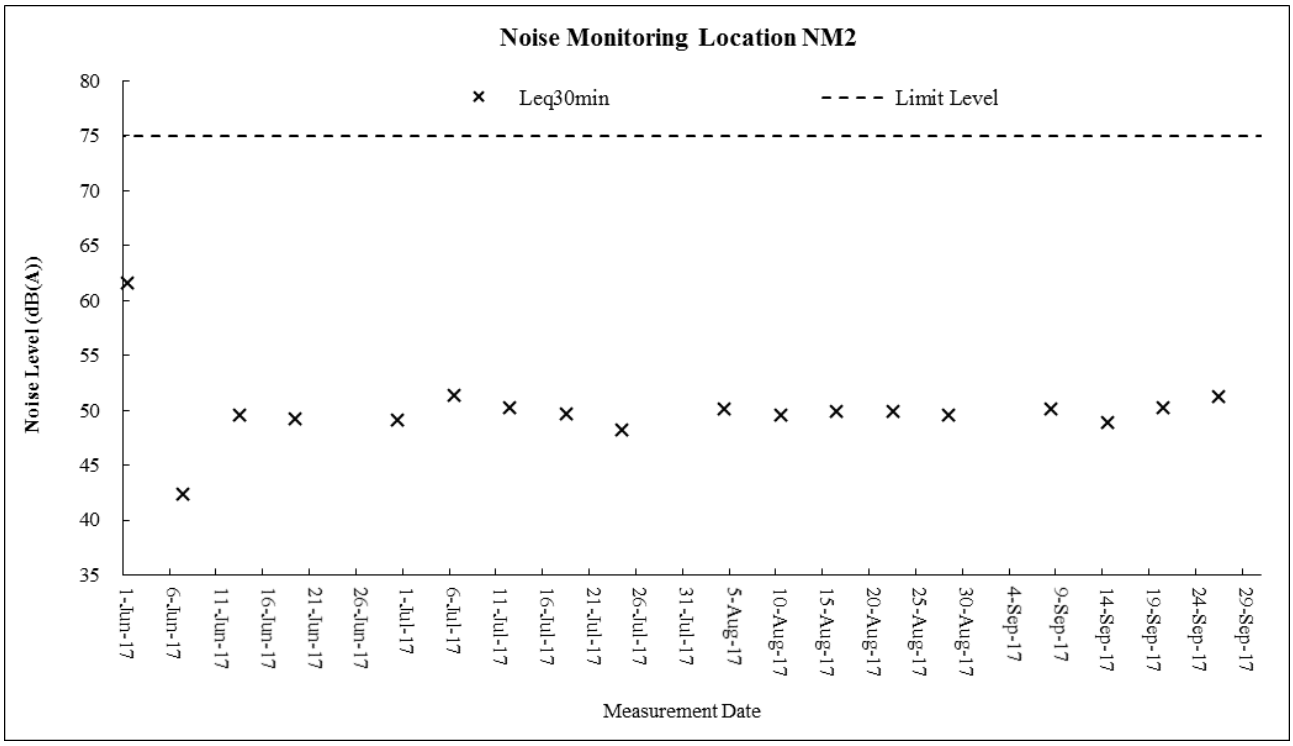
Air Quality – 1-Hour TSP





Construction Noise





Appendix H

METEOROLOGICAL INFORMATION

The weather of July 2017

With a trough of low pressure lingering over the south China coastal region in the early part of the month and frequent tropical cyclone activities over the northern part of the South China Sea in the latter half, July 2017 was cloudier with more rain than usual. The monthly total rainfall was 570.0 millimetres, more than 50 percent above the normal figure of 376.5 millimetres. The accumulated rainfall recorded in the first seven months of the year was 1759.8 millimetres, nearly 20 percent above the normal figure of 1473.3 millimetres for the same period.

The weather of August 2017

August 2017 was hotter than normal and the prolonged heat was relieved by the successive strikes of tropical cyclones Hato and Pakhar within a 5-day period during the latter part of the month. Both cyclones led to the raising of Gale or Storm Signal No.8, with Hato even necessitating the issuance of the Hurricane Signal No.10 on 23 August, the first time since July 2012. The mean temperature recorded in the month was 29.3 degrees, the seventh highest for August on record and 0.7 degree above the August normal of 28.6 degrees. Due to the rain brought by Hato and in particular Pakhar, the monthly total rainfall amounted to 489.1 millimetres, about 13 percent more than the normal figure of 432.2 millimetres. The accumulated rainfall this year up to August was 2248.9 millimetres, a surplus of 18 percent compared to the normal figure of 1905.5 millimetres for the same period.

The weather of September 2017

Hong Kong's weather was unseasonably hot in September 2017. The monthly mean temperature was 29.0 degrees, 1.3 degrees above the normal figure of 27.7 degrees and one of the hottest September since record began in 1884. The month was also drier than usual with a total rainfall of 192.4 millimetres, about 59 percent of the normal figure of 327.6 millimetres. The accumulated rainfall this year up to September was 2441.3 millimetres, a surplus of 9 percent compared to the normal figure of 2233.1 millimetres for the same period.

Appendix I

MONTHLY SUMMARY WASTE FLOW TABLE

Monthly Summary Waste Flow Table

Department: Drainage Services Department Contract No.: DC/2013/09

Contract Title: Advance Works for Shek Wu Hui Sewage Treatment Works - Further Expansion Phase 1A and Sewerage Works at Ping Che Road

Commencement Date: 21-Jul-15 Estimated completion Date: 19-Aug-16 Estimated Contract Sum: 1.56M

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 '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m^3)
Jan 15	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA
Feb 15	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA
Mar 15	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA
Apr 15	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA
May 15	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA
June 15	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA	NIA
Sub-total	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
July 15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Aug 15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sep 15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011
Oct 15	0.035	0.028	0.000	0.000	0.007	0.000	43.790	0.000	0.000	0.000	0.014
Nov 15	1.119	0.263	0.001	0.000	0.855	0.273	44.170	0.000	0.000	0.000	0.000
Dec 15	1.300	0.744	0.001	0.000	0.555	6.123	25.550	0.000	0.000	0.000	0.026
Total	**2.454**	**1.035**	**0.002**	**0.000**	**1.417**	**6.396**	**113.510**	**0.000**	**0.000**	**0.000**	**0.051**

Notes:
(1) The waste flow table should cover the whole construction period of the Contract.
(2) The original estimates of the C&D materials should be the estimates at contract commencement and should not be altered during construction.
(3) Inert C&D materials that are specified in the Contract to be imported for use at the Site shall be separately indicated.
(4) The yearly estimates of the C&D materials should be updated as appropriate taking into account the latest works programme etc.
(5) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.
(6) Broken concrete for recycling into aggregates.

Monthly Summary Waste Flow Table

Department: Drainage Services Department Contract No.: DC/2013/09

Contract Title: Advance Works for Shek Wu Hui Sewage Treatment Works - Further Expansion Phase 1A and Sewerage Works at Ping Che Road

Commencement Date: 21-Jul-2015 Estimated completion Date: 19-Aug-2017 Estimated Contract Sum: 1.56M

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 '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m^3)
Jan-16	0.335	0.111	0.060	0.000	0.164	0.000	0.000	0.000	0.000	0.000	0.000
Feb-16	2.377	0.089	0.050	2.228	0.010	0.000	0.000	0.000	0.000	0.000	0.008
Mar-16	0.141	0.015	0.050	0.000	0.076	0.000	0.000	0.000	0.000	0.000	0.007
Apr-16	0.160	0.010	0.050	0.000	0.100	0.000	0.000	0.000	0.000	0.000	0.023
May-16	0.334	0.000	0.010	0.000	0.324	0.000	0.000	0.000	0.000	0.000	0.026
Jun-16	2.517	0.024	0.300	0.000	2.193	0.000	0.000	0.000	0.000	0.000	0.013
Sub-total	**5.863**	**0.249**	**0.520**	**2.228**	**2.866**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.076**
Jul-16	3.284	0.000	0.150	0.000	3.134	0.000	0.000	0.000	0.000	0.000	0.002
Aug-16	0.396	0.005	0.100	0.000	0.291	0.000	4.720	0.000	0.000	0.000	0.012
Sep-16	0.529	0.000	0.100	0.000	0.429	0.000	0.000	0.000	0.000	0.000	0.008
Oct-16	1.151	0.000	0.300	0.000	0.851	0.000	0.000	0.000	0.000	0.000	0.013
Nov-16	0.266	0.000	0.100	0.000	0.166	0.000	14.700	0.000	0.000	0.000	0.028
Dec-16	0.520	0.022	0.100	0.000	0.398	0.000	0.000	0.000	0.000	0.000	0.019
Total	**12.008**	**0.275**	**1.370**	**2.228**	**8.135**	**0.000**	**19.420**	**0.000**	**0.000**	**0.000**	**0.158**

Notes:
(1) The waste flow table should cover the whole construction period of the Contract.
(2) The original estimates of the C&D materials should be the estimates at contract commencement and should not be altered during construction.
(3) Inert C&D materials that are specified in the Contract to be imported for use at the Site shall be separately indicated.
(4) The yearly estimates of the C&D materials should be updated as appropriate taking into account the latest works programme etc.
(5) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.

Monthly Summary Waste Flow Table

Department: Drainage Services Department Contract No.: DC/2013/09

Contract Title: Advance Works for Shek Wu Hui Sewage Treatment Works - Further Expansion Phase 1A and Sewerage Works at Ping Che Road

Commencement Date: 2015-7-21 Estimated completion Date: 2017-8-19 Estimated Contract Sum: 1.56M

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 '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m^3)
Jan	0.304	0.089	0.100	0.000	0.115	0.000	0.000	0.000	0.000	0.000	0.023
Feb	0.660	0.000	0.400	0.000	0.260	0.000	1.830	0.000	0.000	0.000	0.051
Mar	0.325	0.076	0.200	0.000	0.050	0.000	1.190	0.015	0.000	0.000	0.029
Apr	1.100	0.000	0.200	0.000	0.900	0.000	0.620	0.000	0.000	0.000	0.029
May	0.600	0.000	0.100	0.000	0.500	0.000	0.000	0.000	0.000	0.000	0.019
June	0.600	0.000	0.200	0.000	0.400	0.000	0.000	0.000	0.000	0.000	0.031
Sub-total	**3.590**	**0.165**	**1.200**	**0.000**	**2.225**	**0.000**	**3.640**	**0.015**	**0.000**	**0.000**	**0.182**
July	0.344	0.000	0.100	0.000	0.244	0.000	0.000	0.000	0.000	0.000	0.041
Aug	0.461	0.011	0.400	0.000	0.050	0.000	0.000	0.000	0.000	0.000	0.067
Sep	0.602	0.016	0.000	0.000	0.586	0.000	0.000	0.000	0.000	0.000	0.082
Oct	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Nov	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Dec	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	**4.997**	**0.192**	**1.700**	**0.000**	**3.105**	**0.000**	**3.640**	**0.015**	**0.000**	**0.000**	**0.372**

Notes:
(1) The waste flow table should cover the whole construction period of the Contract.
(2) The original estimates of the C&D materials should be the estimates at contract commencement and should not be altered during construction.
(3) Inert C&D materials that are specified in the Contract to be imported for use at the Site shall be separately indicated.
(4) The yearly estimates of the C&D materials should be updated as appropriate taking into account the latest works programme etc.
(5) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.

Appendix J

IMPLEMENTATION SCHEDULE FOR ENVIRONMENTAL MITIGATION MEASURES (ISEMM)

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve
Air Quality Impact						
S2.4.1.3	Dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation and good site practices: • Any excavated or stockpile of dusty material should be covered entirely by impervious sheeting or sprayed with water to maintain the entire surface wet and then removed or backfilled or reinstated where practicable within 24 hours of the excavation or unloading; • Any dusty material remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads; • A stockpile of dusty material should not be extended beyond the pedestrian barriers, fencing or traffic cones; • The load of dusty materials on a vehicle leaving a construction site should be covered entirely by impervious sheeting to ensure that the dusty materials do not leak from the vehicle; • Where practicable, vehicle washing facilities with high pressure water jet should be provided at every discernible or designated vehicle exit point. The area where vehicle washing takes place and the road section between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores; • When there are open excavation and reinstatement works, hoarding of not less than 2.4m high should be provided as far as practicable along the site boundary with provision for public crossing. Good site practice shall also be adopted by the Contractor to ensure the conditions of the hoardings are properly maintained throughout the construction period. • The portion of any road leading only to construction site that is within 30m of a vehicle entrance or exit should be kept clear of dusty materials; • Surfaces where any pneumatic or power-driven drilling, cutting, polishing or other mechanical breaking operation takes place should be sprayed with water or a dust suppression chemical continuously; • Any area that involves demolition activities should be sprayed with water or a dust suppression chemical immediately prior to, during and immediately after the activities so as to maintain the entire surface wet;	To minimize the dust impact	Contractor	Work Sites	Construction phase of Advance Works and Main Works of Phase 1A	Air Pollution Control Ordinance (APCO) and Air Pollution Control (Construction Dust) Regulation

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve
Air Quality Impact						
	• Where a scaffolding is erected around the perimeter of a building under construction, effective dust screens, sheeting or netting should be provided to enclose the scaffolding from the ground floor level of the building, or a canopy should be provided from the first floor level up to the highest level of the scaffolding; • Any skip hoist for material transport should be totally enclosed by impervious sheeting; • Every stock of more than 20 bags of cement or dry pulverized fuel ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides; • Cement or dry PFA delivered in bulk should be stored in a closed silo fitted with an audible high level alarm which is interlocked with the material filling line and no overfilling is allowed; • Loading, unloading, transfer, handling or storage of bulk cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with an effective fabric filter or equivalent air pollution control system; and • Exposed earth should be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, shortcrete or other suitable surface stabilizer within six months after the last construction activity on the construction site or part of the construction site where the exposed earth lies.					

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve
Noise Impact						
S3.4.1.1	Use of movable barrier, enclosure, acoustic mat and quiet plant. Use of wooden frames barrier with a small-cantilevered upper portion of superficial density not less than 14kg/m² on a skid footing with 25mm thick internal sound absorptive lining.	To minimize construction noise impact arising from the Project at the affected noise sensitive receivers (NSRs)	Contractor	Work Sites	Construction phase of Advance Works and Main Works of Phase 1A	EIAO-TM, Noise Control Ordinance (NCO)
S3.4.1.2	Good Site Practice: • Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction program. • Silencers or mufflers on construction equipment should be utilized and should be properly maintained during the construction program. • Mobile plant, if any, should be sited as far away from NSRs as possible. • Machines and plant (such as trucks) that may be in intermittent use should be shut down between works periods or should be throttled down to a minimum. • 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. • Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activities.	To minimize construction noise impact arising from the Project at the affected NSRs	Contractor	Work Sites	Construction period of Advance Works and Main Works of Phase 1A	EIAO-TM, NCO

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve
Ecological Impact						
S4.2.1.1	Solid dull green noise/visual barriers of at least 2m high shall be erected and maintained between active works area and all areas of ecological importance.	Minimize noise and human disturbances during construction phase.	Contractor	Work Sites	Construction phase of Advance Works and Main Works of Phase 1A	EIAO-TM
S4.2.1.2	Avoid unnecessary lighting.	Minimize mortality impacts on birds.	Design / Contractor/ Plant Operator	Work Sites	Construction phase of Advance Works and Main Works of Phase 1A	EIAO-TM
S4.2.1.3	Good construction site practice to minimise dust generation should be followed on all construction sites. Measures to avoid, minimise and mitigate impacts on air quality are detailed in this schedule	Minimize dust generation from construction sites.	Contractor	Work Sites	Construction phase of Advance Works and Main Works of Phase 1A	EIAO-TM
S4.2.1.4	The following measures to avoid, minimise and mitigate impact on water quality during construction phase shall be implemented • Temporary sewerage and drainage to be designed and installed to collect wastewater and prevent it from entering water bodies; • Proper locations well away from nearby water bodies should be used for temporary storage of materials (i.e. equipment, filling materials, chemicals and fuel) and temporary stockpiles of construction debris and spoil, and these should be identified before commencement of works; • To prevent muddy water entering nearby water bodies, work sites close to nearby water bodies should be isolated, using such items as sandbags or silt curtains with lead edge at bottom and properly supported props. Other protective measures should also be taken to ensure that no pollution or siltation occurs to the water gathering grounds of the work sites; • Construction debris and spoil should be covered and/or properly disposed of as soon as possible to avoid these being washed into nearby water bodies; • Proper locations for discharge outlets of temporary wastewater treatment facilities well away from sensitive receivers should be identified;	Avoid, minimise and mitigate impact on water quality	Contractor	Work Sites	Construction phase of Advance Works and Main Works of Phase 1A	EIAO-TM

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve
Ecological Impact						
	• Adequate lateral support should be erected where necessary in order to prevent soil/mud from slipping into water bodies; • Site boundaries should be clearly marked and any works beyond the boundary strictly prohibited; • Regular water monitoring and site audit should be carried out at adequate points along any watercourses where construction works are underway upstream within their catchments and also on the Ng Tung, Sheung Yue and Shek Sheung Rivers. If the monitoring and audit results show that pollution occurs, adequate measures including temporarily cessation of works should be considered; • Excavation profiles should be properly designed and executed with attention to the relevant requirements for environment, health and safety; • Where soil to be excavated is situated beneath the groundwater table, it may be necessary to lower the groundwater table by installing well points or similar means; • Stockpiling sites should be lined with impermeable sheeting and bunded. Stockpiles should be properly covered by impermeable sheeting to reduce dust emission during dry season or contaminated run-off during rainy season. Watering should be avoided on stockpiles of contaminated soil to minimize contaminated runoff and construction materials should be properly covered and located away from nearby water bodies; and • Supply of suitable clean backfill material after excavation, if required. • Vehicles containing any excavated materials should be suitably covered to limit potential dust emissions or contaminated run-off, and truck bodies and tailgates should be sealed to prevent discharge during transport or during wet season; • Speed control for the trucks carrying contaminated materials should be enforced; • Vehicle wheel washing facilities at construction sites' exit points should be established and used, where necessary; and • Other measures as detailed in this schedule.					

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve
Water Quality Impact						
S5.2.2.1	Construction Site Runoff Practices and measures provided in the Practice Note for Professional Persons on Construction Site Drainage, (PROPECC PN1/94) should be followed where applicable.	Control construction runoff	Contractors	Work Sites	Construction phase of Advance Works and Main Works of Phase 1A	EIAO-TM, WPCO, EIAO
S5.2.2.2 – S5.2.2.3	Sewage from Workforce • Portable chemical toilets and sewage holding tanks should be provided for handling the construction sewage generated by the workforce. A licensed Contractor should be employed to provide appropriate and adequate portable toilets and be responsible for appropriate disposal and maintenance. • Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the nearby environment during the construction phase of the Project. Regular environmental audit on construction site should be conducted in order to provide an effective control of any malpractices and achieve continual improvement of environmental performance on site. It is anticipated that sewage generation during the construction phase of the Project would not cause water quality impact after undertaking all required measures	Handling of site sewage	Contractors	Work Sites	Construction phase of Advance Works and Main Works of Phase 1A	EIAO-TM, WPCO, EIAO

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve
Waste Management						
S6.2.2.1	Good Site Practices and Waste Reduction Measures: • Nomination of an approved person, such as a site manager, to be responsible for the implementation of good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site; • Training of site personnel in site cleanliness, appropriate waste management procedures and concepts of waste reduction, reuse and recycling; • Provision of sufficient waste disposal points and regular collection for disposal; • Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers; • Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors; • An Environmental Management Plan (EMP) should be prepared by the contractor and submitted to the Engineer for approval.	Minimize waste generation during construction	Contractor	Work Sites	Construction phase of Advance Works and Main Works of Phase 1A	Waste Disposal Ordinance (WDO)
S6.2.3.1	Waste Reduction Measures: • Segregate and store different types of waste in different containers, skip or stockpiles to enhance reuse or recycling of materials and their proper disposal; • Proper storage and site practices to minimize the potential for damage and contamination of construction materials; • Plan and stock construction materials carefully to minimize amount of waste generated and avoid unnecessary generation of waste; • Sort out demolition debris and excavated materials from demolition works to recover reusable/recyclable portions (i.e. soil, broken concrete, metal etc.); and • Provide training to workers on the importance of appropriate waste management procedures, including waste reduction, reuse and recycling.	Reduce waste generation	Contractor	Work Sites	Prior to the commencement of construction of Advance Works and Main Works of Phase 1A	WDO
S6.2.4.1 - S6.2.4.2	Storage, Collection and Transportation of Waste Should any temporary storage or stockpiling of waste is required, recommendations to minimize the impacts include: • Waste, such as soil, should be handled and stored well to ensure secure	Minimize waste impacts arising from waste storage	Contractor	Work Sites	Construction phase of Advance Works and Main Works of Phase 1A	WDO

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve
Waste Management						
	containment, thus minimizing the potential of pollution; • Stockpiling area should be provided with covers and water spraying system to prevent materials from wind-blown or being washed away; and • Different locations should be designated to stockpile each material to enhance reuse. • Remove waste in timely manner; • Employ the trucks with cover or enclosed containers for waste transportation; • Obtain relevant waste disposal permits from the appropriate authorities; and • Disposal of waste should be done at licensed waste disposal facilities.					
S6.2.5.2	C&D Materials from Site Formation • Maintain temporary stockpiles and reuse excavated fill material for backfilling; • Carry out on-site sorting; • Make provisions in the Contract documents to allow and promote the use of recycled aggregates where appropriate; • Adopt "selective demolition" technique to demolish the existing structure and facilities with a view to recovering broken concrete effectively for recycling purpose, where possible; and • Implement a trip-ticket system for each works contract to ensure that the disposal of C&D materials are properly documented and verified.	Minimize waste impacts from excavated and C&D materials	Contractor	Work Sites	Construction phase of Advance Works and Main Works of Phase 1A	Land (Miscellaneous Provisions) Ordinance, WDO, ETWB TCW No. 19/2005
S6.2.5.3	C&D Material from Buildings Demolition and New Building Construction • The Contractor should recycle as much as possible of the C&DM on-site. Public fill and C&DM waste should be segregated and stored in different containers or skips to enhance reuse or recycling of materials and their proper disposal. For example, concrete and masonry can be crushed and used as fill, and steel reinforcing bar can be used by scrap steel mills. Different areas of the work sites should be designated for such segregation and storage. • The use of wooden hoardings shall not be allowed. An alternative material, such as metal, aluminium or alloy etc, could be used. • Government has developed a charging policy for the disposal of waste to landfill at present. It will provide additional incentive to reduce the volume of generated waste and ensure proper segregation to allow	Minimize waste impacts from building demolition and new building construction	Contractor	Work Sites	Construction phase of Advance Works and Main Works of Phase 1A	Land (Miscellaneous Provisions) Ordinance, WDO, ETWB TCW No. 19/2005

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve
Waste Management						
	reuse of the inert material on site when implemented. • In order to minimize the impacts of the demolition works, the generated wastes must be cleared as quickly as possible after demolition. Therefore, the demolition and clearance works should be undertaken simultaneously. To facilitate proper segregation of inert and non-inert C&D material arising from demolition works, selective demolition method should be adopted.					
S6.2.5.4	Chemical Waste • If chemical wastes are produced at the construction site, the Contractors should register with EPD as chemical waste producers. • Chemical wastes should be stored in appropriate containers and collected by a licensed chemical waste contractor. Chemical wastes (e.g. spent lubricant oil) should be recycled at an appropriate facility as far as possible, while the chemical waste that cannot be recycled should be disposed of at either the Chemical Waste Treatment Centre, or another licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation	Control the chemical waste and ensure proper storage, handling and disposal	Contractor	Work Sites	Construction phase of Advance Works and Main Works of Phase 1A	Waste Disposal (Chemical Waste General) Regulation, Code of Practice on the Packaging, Labelling and Storage of Chemical Waste
S6.2.5.5	General Refuse • General refuse should be stored in enclosed bins separately from construction and chemical wastes. • Recycling bins should also be placed to encourage recycling. • Preferably enclosed and covered areas should be provided for general refuse collection and routine cleaning for these areas should also be implemented to keep areas clean. • A reputable waste collector should be employed to remove general refuse on a daily basis.	Minimize production of the general refuse and avoid odour, pest and litter impacts	Contractor	Work Sites	Construction phase of Advance Works and Main Works of Phase 1A	Waste Disposal (Chemical Waste General) Regulation, Code of Practice on the Packaging, Labelling and Storage of Chemical Waste

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve
Landscape and Visual						
S7.3.1.1	Good Site Practices • For areas unavoidably disturbed by the Project on a short term basis e.g. works areas, the general principle to try and restore these to their former state to suit future land use, should be adhered to. • With regard to topsoil, where identified, it should be stripped, treated appropriately, and where suitable and practical stored for re-use in the construction of the soft landscape works such as roadside amenity strips, and open space sites.	Minimize the impact to the landscape and visual	Contractor	Work Sites	Prior to construction and construction phase	
S7.3.2.1	MM4 - Tree Protection & Preservation • Existing trees to be retained within the Project Site should be carefully protected during construction. In particular Old and Valuable Trees (OVTs) will be preserved according to ETWB TC (Works) No. 29/2004. Detailed Tree Protection Specification shall be provided in the Contract Specification. Under this specification, the Contractor shall be required to submit, for approval, a detailed working method statement for the protection of trees prior to undertaking any works adjacent to all retained trees, including trees in Contractor's works areas. A detailed tree survey will be carried out for the Tree Removal Application (TRA) process which will be carried out at the later detailed design stage of the Project. The detailed tree survey will propose which trees should be retained, transplanted or felled and will include details of tree protection measures for those trees to be retained.	Protect and Preserve Trees	Designer / Contractor	Work Sites	Prior to construction and construction phase	ETWB TCW No. 10/2013, 29/2004 and 3/2006
S7.3.2.1	MM5 - Tree Transplantation • Trees unavoidably affected by the Project works should be transplanted where practical. Trees should be transplanted straight to their final receptor site and not held in a temporary nursery as far as possible. A detailed Tree Transplanting Specification shall be provided in the Contract Specification, where applicable. Sufficient time for necessary tree root and crown preparation periods shall be allowed in the project programme. A detailed transplanting proposal will be submitted to relevant government departments for approval in accordance with ETWBTC 2/2004 and 3/2006 and final	Transplant Trees where suitable for transplantation	Designer / Contractor	Work Sites where possible. Otherwise consider offsite locations	Prior to construction, construction phase and operation phase	WB TCW No. 10/2013, 3/2006 and 2/2004

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measure	When to implement the measures?	What requirements or standards for the measure to achieve
Landscape and Visual						
	locations of transplanted trees should be agreed prior to commencement of the work.					
S7.3.2.1	MM17 - Light Control • Construction day and night time lighting should be controlled to minimize glare impact to adjacent VSRs during the Construction phase. Street and night time lighting shall also be controlled to minimize glare impact to adjacent VSRs during the operation phase.	To minimize glare impact to adjacent VSRs.	Designer / Contractor	Work Sites and/or the Plant	Construction phase and operation phase	