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

9TH MONTHLY ENVIRONMENTAL MONITORING AND AUDIT (EM&A) REPORT – JUNE 2016

PREPARED FOR

TSUN YIP WATERWORKS CONSTRUCTION CO LTD

Date	Reference No.	Prepared By	Certified By
8 July 2016	TCS00757/15/600/R0037v1	 Martin Li (Assistant Environmental Consultant)	 Tam Tak Wing (Environmental Team Leader)

Version	Date	Remarks
1	8 July 2016	First Submission

ANEWR

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

Your reference:

Our reference: HKDSD201/50/103625

Date: 8 July 2016

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
Monthly EM&A Report for June 2016

We refer to email of 8 July 2016 attaching a Monthly EM&A Report for June 2016 for the captioned project prepared by the Environmental Team (ET) of the captioned project.

We have no comment and hereby verify the Monthly EM&A Report in accordance with Clause 3.3 of the Environmental Permit no. FEP-01/474/2013.

Please do not hesitate to contact the undersigned or our Mr Donald Lee on 2618 2836 should you have any queries.

Yours faithfully
ANEWR CONSULTING LIMITED

Adi Lee
Independent Environmental Checker

LYMA/LMCD/jc

cc Mr Ken Wong – Tsun Yip (email: kenwong@tsunyip.hk)
Ms Nicola Hon – AUES (email: nicolahon@fordbusiness.com)

ANewR Consulting Limited
Unit 517, 5/F, Tower A, Regent Centre
63 Wo Yi Hop Road, Kwai Chung, Hong Kong
Tel: (852) 2618 2836 Fax: (852) 3007 8648
Email: info@anewr.com
Web: www.anewr.com

ISO 9001 : 2008
Certificate No.: CC 3988

EXECUTIVE SUMMARY

ES.01 This is the **9th** Monthly Environmental Monitoring and Audit Report covering the period from **1** to **30 June 2016 (**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	**30**
	24-hour TSP	**12**
Construction Noise	$L_{Aeq(30min)}$ Daytime	**8**
Inspection / Audit	ET Regular Environmental Site Inspection	**4**
	IEC Monthly Environmental Site Audit	**1**

BREACH OF ACTION AND LIMIT (A/L) LEVELS

ES.03 No exceedance of air quality and construction noise monitoring were recorded in this Reporting Period. 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

ENVIRONMENTAL COMPLAINT

ES.04 No environmental complaint was recorded or received in this Reporting Period. The statistics of environmental complaint are summarized in the following table.

Reporting Period	Environmental Complaint Statistics		
	Frequency	Cumulative	Complaint Nature
1 to 30 June 2016	0	0	NA

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

ES.05 No environmental summons or successful prosecutions were recorded in this Reporting Period. The statistics of environmental complaint are summarized in the following tables.

Reporting Period	Environmental Summons Statistics		
	Frequency	Cumulative	Complaint Nature
1 to 30 June 2016	0	0	NA

Reporting Period	Environmental Prosecution Statistics		
	Frequency	Cumulative	Complaint Nature
1 to 30 June 2016	0	0	NA

REPORTING CHANGE

ES.06 There were no reporting changes in the Reporting Period.

SITE INSPECTION BY EXTERNAL PARTIES

ES.07 In the Reporting Period, joint site inspection to evaluate the site environmental performance by the RE, ET and the Contractor was carried out on **7, 14, 21 and 28 June 2016**. Furthermore, IEC attend site inspection was on **28 June 2016.** No non-compliance was noted.

FUTURE KEY ISSUES

ES.08 As wet season is approached, special attention should be paid to avoid ingress of surface runoff into nearby water bodies from the construction site. Water quality mitigation measures should be fully implemented.

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 approved by the IEC on 24 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 **9th** Monthly EM&A Report presenting the monitoring results and inspection findings for the reporting period from **1** to **30 June 2016**.

1.2 REPORT STRUCTURE

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

SECTION 1	***INTRODUCTION***
SECTION 2	***PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS***
SECTION 3	***SUMMARY OF MONITORING REQUIREMENTS***
SECTION 4	***IMPACT MONITORING RESULTS***
SECTION 5	***WASTE MANAGEMENT***
SECTION 6	***SITE INSPECTIONS***
SECTION 7	***ENVIRONMENTAL COMPLAINTS AND NON-COMPLIANCE***
SECTION 8	***IMPLEMENTATION STATUES OF MITIGATION MEASURES***
SECTION 9	***IMPACT FORECAST***
SECTION 10	***CONCLUSIONS AND RECOMMENDATION***

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 Master Construction Program of the Contract is enclosed in ***Appendix D*** and the major construction activities undertaken in this Reporting Month are illustrated in ***Appendix B*** and listed below:-

- Cable Duct Laying (near Bioreactor No.3)
- Proof Drilling of Piling Works, Installation of ELS, Excavation to Formation Level (Membrane Facilities Building)
- Modification of BR1, Concrete Filling and installation of Steel Plate (BR1 Common Channel)
- DN900 Permeate Pipe Laying (Final Sedimentation Tank No.5)
- DN1400 Pipe Laying (Near Bioreactor No.1)
- Re-aligned Existing DN250 DI Pipe (Primary Sedimentation Tank No.2)

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 24 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.

3.1.2 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 programme 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-5028A
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 can also provide the humidity, rainfall, and air pressure and temperature etc. meteorological information. In a lot of Hong Kong development projects, weather information extracted from Hong Kong Observatory is a common alternative method if installation of weather station is 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 impact monitoring is listed in ***Table 3-4***.

Table 3-4 Construction Noise Monitoring Equipment

Equipment	Model
Integrating Sound Level Meter	Rion NL-52 or Rion NL-31
Calibrator	Rion NC-73 / CB-5
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 Updated EM&A Manual, 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 (µg/m^3)		Limit Level (µg/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. A valid calibration certificate is attached in ***Appendix G***.

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 to 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. A valid calibration certificate of the calibration kit with the certificate of HVS calibrated is attached in ***Appendix G***.

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.

4.2.3 Sound level meter listed in ***Table 3-4*** is complied with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications, as recommended in Technical Memorandum (TM) issued under the Noise Control Ordinance (NCO). A valid of calibration certificates including sound level meter and an acoustic were shown in ***Appendix G***.

Monitoring Procedures

4.2.4 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.

4.2.5 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.

4.2.6 Prior to 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.

4.2.7 During the noise measurement, a portable wind speed meter was used to check wind speed (m/s). For impact 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 Air quality and construction noise monitoring scheduled in the Reporting Period is enclosed in ***Appendix H*** and the monitoring results are shown in the following sub-sections.

5.2 RESULTS OF AIR QUALITY MONITORING

5.2.1 The results for 24-hour and 1-hour TSP are summarized in ***Tables 5-1 to 5-2***. The 24-hour TSP data are shown in ***Appendix I*** and graph plots including 1-hour TSP and 24-hour TSP are shown in ***Appendix J***.

Table 5-1 Summary of 1-Hour TSP Monitoring Results, μg/m³

DATE	AM1				AM2			
	Start Time	1st Meas.	2nd Meas.	3rd Meas.	Start Time	1st Meas.	2nd Meas.	3rd Meas.
4-Jun-16	9:27	67	71	77	13:39	96	91	87
10-Jun-16	9:19	62	68	71	13:14	75	81	83
16-Jun-16	9:31	39	42	52	13:25	56	60	62
22-Jun-16	9:48	29	33	35	12:47	30	35	38
27-Jun-16	9:21	48	52	57	13:38	66	72	77
Average (Range)	**54 (29 - 77)**				**67 (30 - 96)**			

Table 5-2 Summary of 24-hour TSP Monitoring Results, μg/m³

Date	AM1	AM2a
3-Jun-16	38	30
8-Jun-16	25	20
14-Jun-16	34	18
22-Jun-16	20	26
25-Jun-16	28	19
30-Jun-16	21	12
Average (Range)	**20 (27 – 38)**	**21 (12 – 30)**

5.2.2 As shown in ***Tables 5-1*** and ***5-2***, 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.

5.2.3 The meteorological data during the Reporting Month is summarized in ***Appendix K***.

5.2.4 Construction dust assessment for short term impact was undertaken in the EIA study. In view of the current contract, monitoring locations AM1 and AM2a are not an ASR during the EIA study and therefore no prediction was made. For 1-hour TSP monitoring location AM2, it is very near the assessment point FLN-E13 in the EIA. According to the EIA prediction, the predicted result for Tier 2 in assessment year 2018 is 91.0μg/m³ for 1-hour TSP and the cumulative 1-hour concentrations would comply with the respective criteria and adverse short-term construction dust impact is not anticipated. It is concluded that the overall 1-hour TSP monitoring result in the Reporting Period is comparable to the EIA prediction.

5.3 RESULTS OF CONSTRUCTION NOISE MONITORING

5.3.1 In the Reporting Period, a total of 8 event noise measurements were carried out at the two 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 5-3.*** The detailed noise monitoring data are presented in ***Appendix I*** and the relevant graphical plots are shown in ***Appendix J***.

Table 5-3 Summary of Construction Noise Monitoring Results, dB(A)

Date	NM1		NM2	
	Time of Measurement	($L_{eq30min}$)	Time of Measurement	($L_{eq30min}$)
10-Jun-16	9:58	56	13:39	50
16-Jun-16	9:39	55	13:28	49
22-Jun-16	9:50	57	13:05	59
27-Jun-16	9:36	56	13:45	51
Limit Level	**75 dB(A)**			

5.3.2 As shown in ***Table 5-3***, the noise level measured at the designated monitoring locations are well 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.

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 Monthly Summary Waste Flow Table is shown in ***Appendix L***. 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
	Prior Months	Reporting Month	Cumulated	
C&D Materials (Inert) (in '000m^3)	5.801	2.517	8.318	--
Reused in this Project (Inert) (in '000 m^3)	0.222	0.300	0.522	--
Reused in other Projects (Inert) (in '000 m^3)	2.228	0	2.228	--
Disposal as Public Fill (Inert) (in '000 m^3)	2.091	2.193	4.284	Tuen Mun 38

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

Type of Waste	Quantity			Disposal Location
	Prior Months	Reporting Month	Cumulated	
Metals (‘000kg)	113.51	0	113.51	--
Paper / Cardboard Packing (‘000kg)	0	0	0	--
Plastics (‘000kg)	0	0	0	--
Chemical Wastes (‘000kg)	0	0	0	--
General Refuses (‘000m^3)	0.104	0.026	0.13	NENT

7 SITE INSPECTION

7.1 REQUIREMENTS

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

7.2 FINDINGS / DEFICIENCIES DURING THE REPORTING MONTH

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 **7, 14, 21 and 28 June 2016**. Furthermore, IEC attend site inspection was on **28 June 2016.** No non-compliance was noted.

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

Table 7-1 Site Observations

Date	Findings / Deficiencies	Follow-Up Status
7 June 2016	• Accumulation of constrution wastes was observed. The Contractor was advised to dispose waste regularly. • The contractor was reminded to clear the mud on the public road.	• Accumulation of construction waste was disposed. • Not required for reminder.
14 June 2016	• The Contractor was advised to dispose the broken sandbags. • The Contractor was advised to clean the stagnant water and dipose it as chemical waste. • The contractor was reminded to maintain the wheel washing area.	• Broken sandbags were disposed. • Stagnant water was removed and the drip tray was well covered to aviod accumulation of stagnant water. • Not required for reminder.
21 June 2016	• The Contractor was reminded to clear the mud on public road. • Chemical containers were reminded to place inside drip tray.	• Not required for reminder. • Not required for reminder.
28 June 2016	• Chemical containers without drip tray was observed. The Contractor should provide drip tray for the containers to avoid land contamination. • The Contractor was reminded to remove stagnant water on site after rainy days.	• To be follow-up in next reporting period.

7.2.3 In the Reporting Period, the overall environmental performance was considered satisfactory.

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 is presented in ***Tables 8-1, 8-2*** and ***8-3***.

Table 8-1 Statistical Summary of Environmental Complaints

Reporting Period	Environmental Complaint Statistics		
	Frequency	Cumulative	Complaint Nature
1 to 30 June 2016	0	0	NA

Table 8-2 Statistical Summary of Environmental Summons

Reporting Period	Environmental Summons Statistics		
	Frequency	Cumulative	Complaint Nature
1 to 30 June 2016	0	0	NA

Table 8-3 Statistical Summary of Environmental Prosecution

Reporting Period	Environmental Prosecution Statistics		
	Frequency	Cumulative	Complaint Nature
1 to 30 June 2016	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 M***.

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 be used wheel washing facility before off site • Spray 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.

9.2 TENTATIVE CONSTRUCTION ACTIVITIES IN THE COMING MONTH

9.2.1 Construction activities listed below will be undertaken in in the coming month for the Contract of the Project.

- Excavation to formation level (excavate 2m depth) and installation of shoring system (At Membrane Facility Building)
- Open trench excavation and pipe laying (Near Final Sedimentation Tank No.5 and Bioreactor No.5)
- Concrete Filling and Installation of Steel Plate (In BR1 & BR2 Common Channel)
- Coring work for DN1400 (At BR2 liquor channel)

9.3 KEY ISSUES FOR THE COMING MONTH

9.3.1 Key issues to be considered in the coming month for the Contract include:

- Implementation of dust suppression measures at all times;
- Potential fugitive dust quality impact due from the dry/loose/exposure soil surface/dusty material;
- Ensure dust suppression measures are implemented properly;
- Implementation of construction noise preventative control measures;
- Management of chemical wastes;
- Follow-up of improvement on general waste management issues; and
- Potential wastewater quality impact due to surface runoff

10 CONCLUSIONS AND RECOMMENTATIONS

10.1 CONCLUSIONS

10.1.1 This is the **9th** Monthly EM&A report, covering the construction period from **1 to 30 June 2016**.

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, joint site inspection to evaluate the site environmental performance by the RE, ET and the Contractor was carried out on **7, 14, 21 and 28 June 2016**. Furthermore, IEC attend site inspection was on **28 June 2016.** No non-compliance was noted.

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

10.2 RECOMMENDATIONS

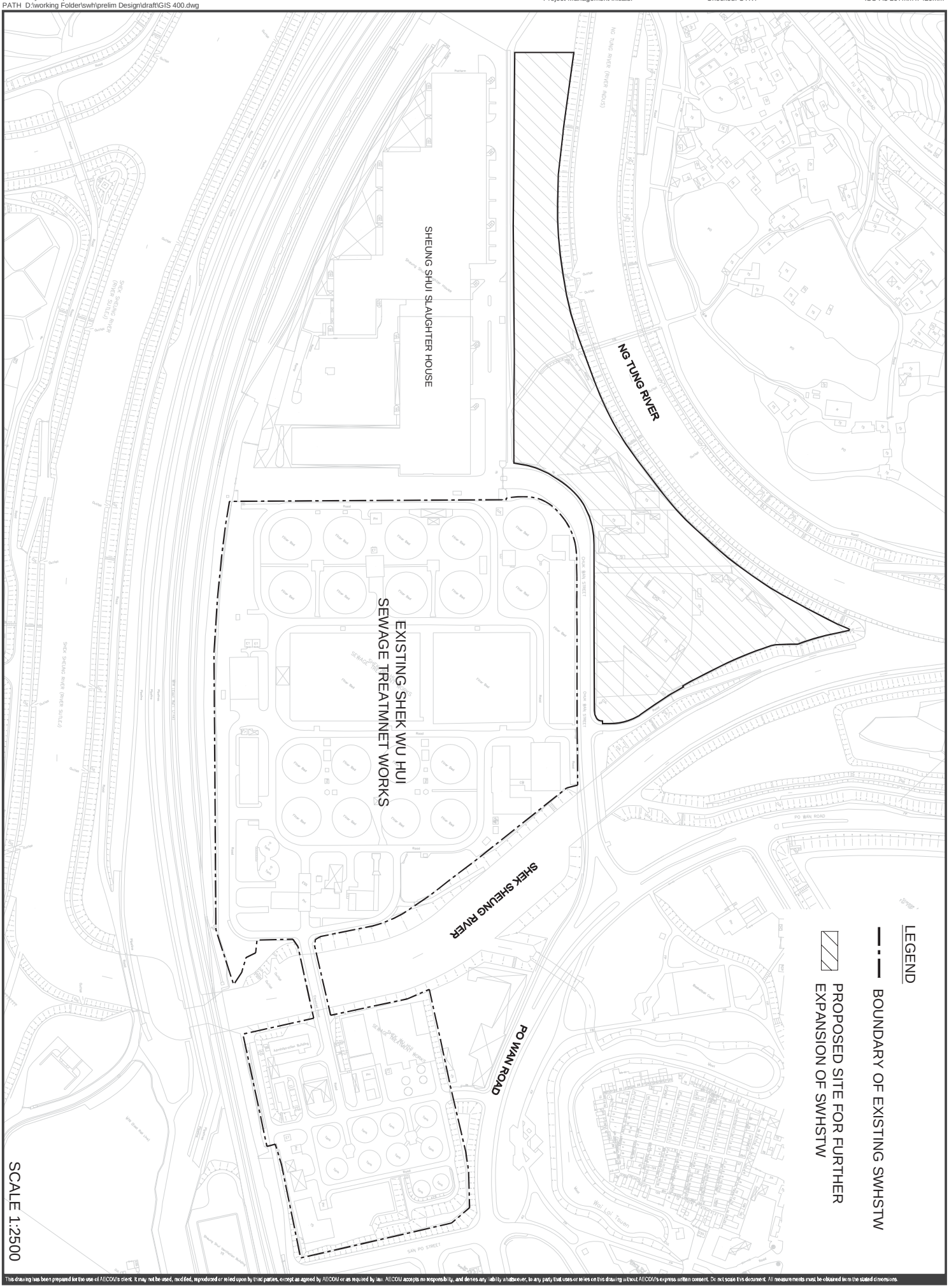
10.2.1 As wet season is approached, special attention should be paid to avoid ingress of surface runoff into nearby water bodies from the construction site. Water quality mitigation measures should be fully implemented.

10.2.2 Moreover, 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 Updating 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

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

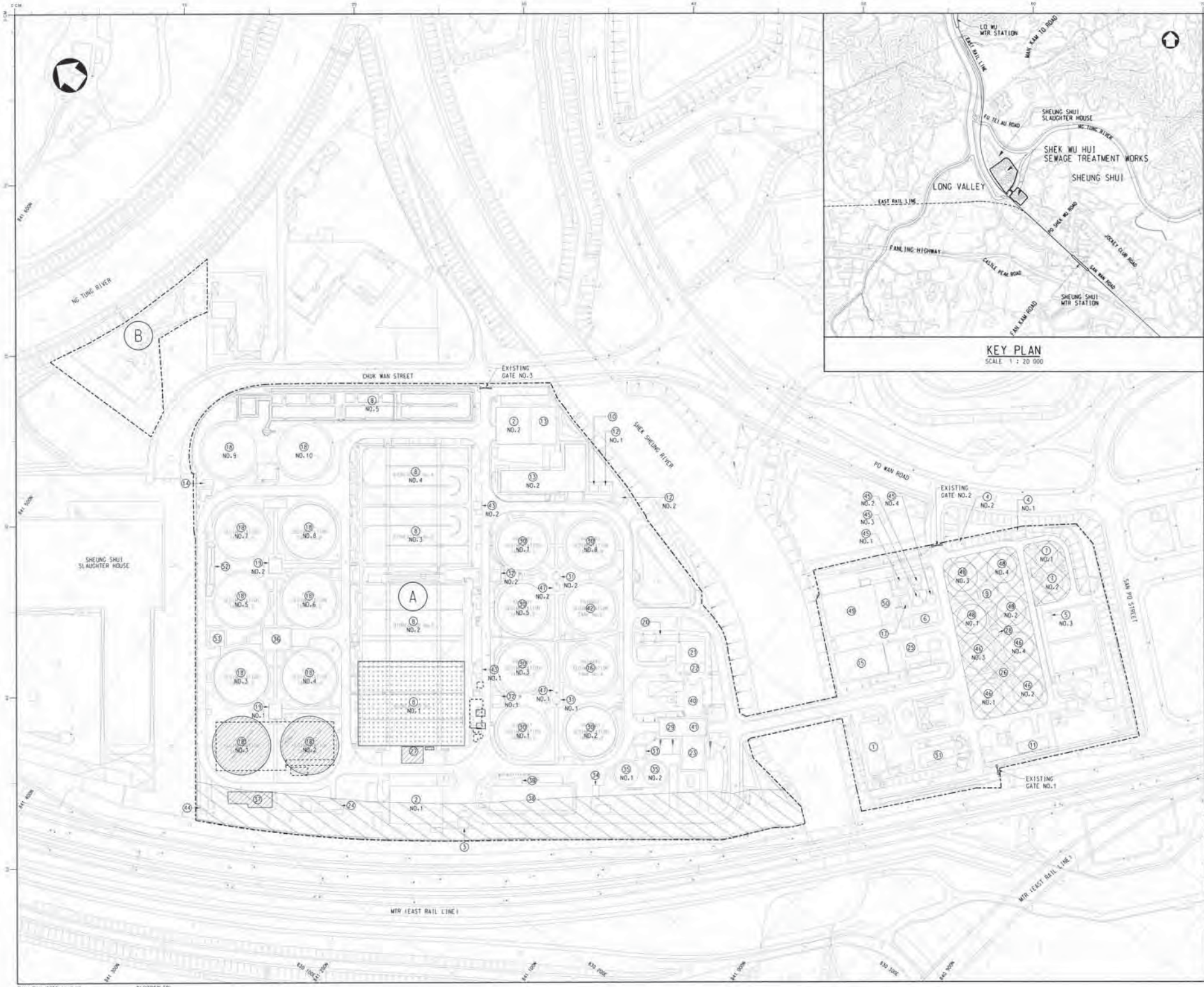
PREFERRED SITE UTILIZATION
ACCORDING TO BRIEF

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)(l) 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)(l) 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	H. F. PANG	12 DEC 2014
drawn	C. C. CHAN	12 DEC 2014
checked	K. C. POON	12 DEC 2014
vetted	Ir W. W. 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 -

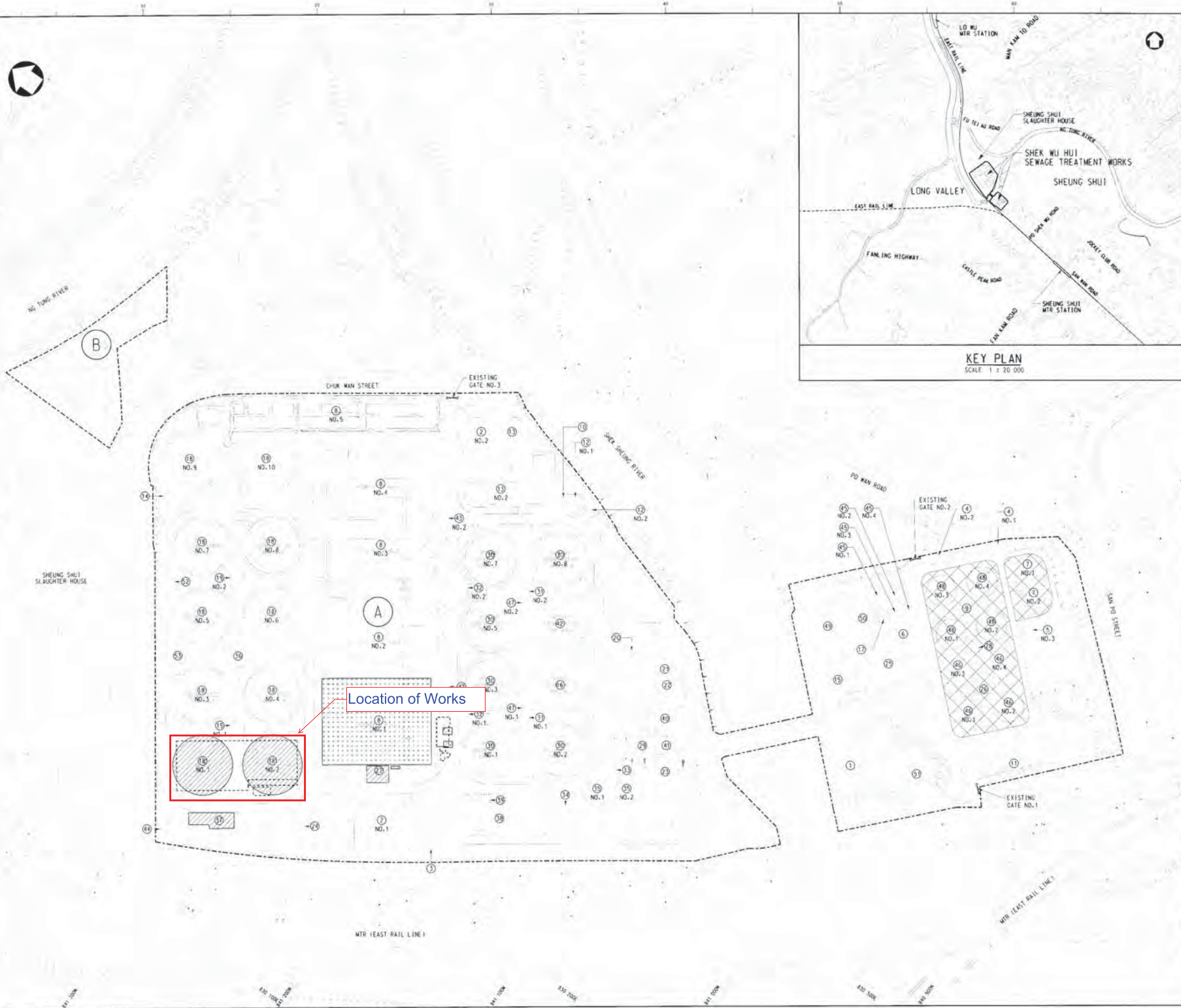
PORTIONS OF THE SITE

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



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 SHWSTW. THE CONTRACTOR'S ATTENTION IS DRAWN TO THE REQUIREMENTS OF PS CLAUSE 1.45 AND 28.27 FOR WORKS INSIDE SHWSTW.
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	

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. K. LAU	12 DEC 2014
approved			

SIGNED
Ir C. 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

Appendix C

ORGANIZATION STRUCTURE AND CONTACT DETAILS OF RELEVANT PARTIES

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	Ms. FONG Ka Ying	6312 1871	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	Assistant 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

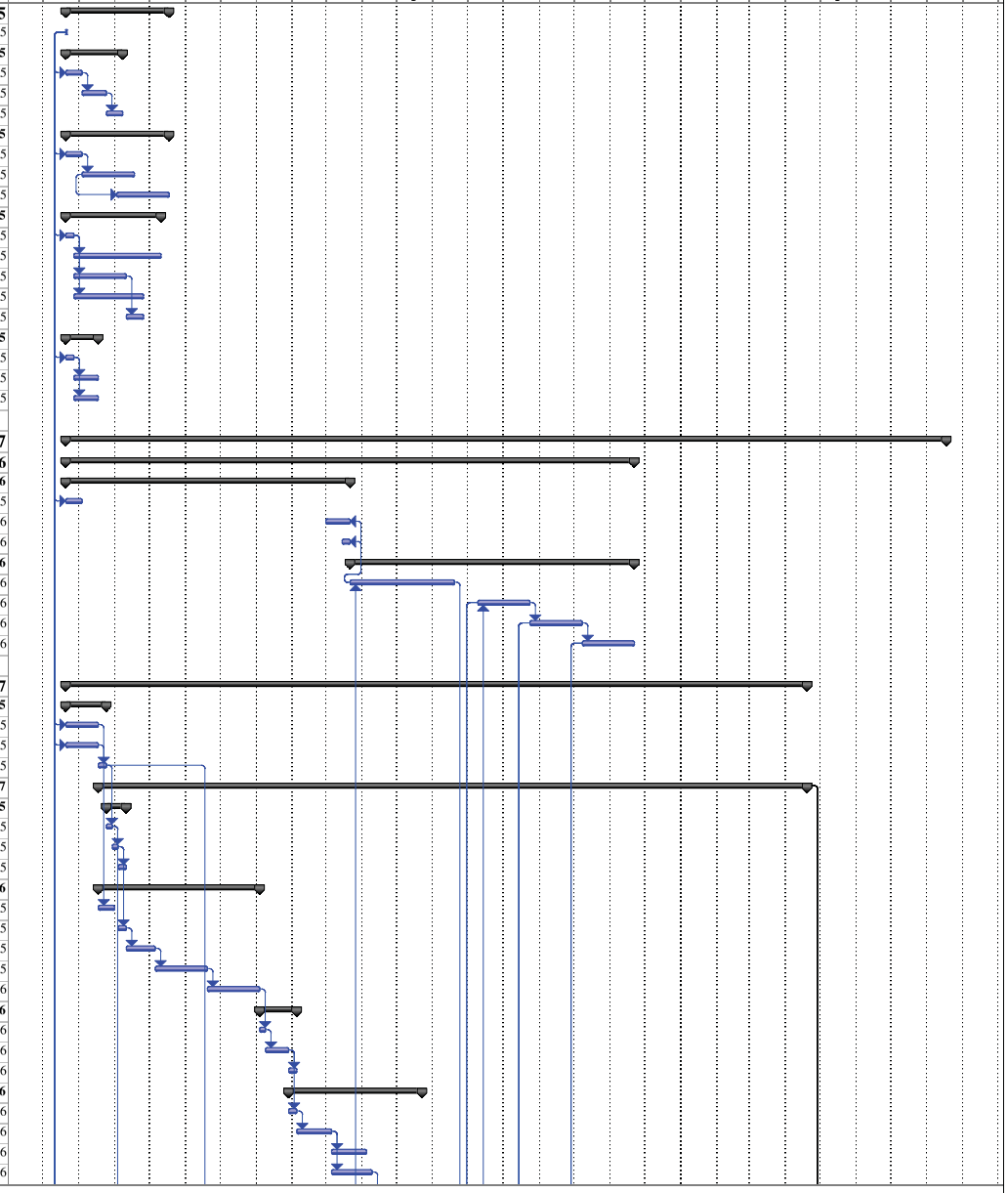
MASTER CONSTRUCTION PROGRAM

Contract DC/2013/09

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

Works Programe (Sep 2015)

ID	Task Name	Duration	Start	Finish
1	**(I) Preliminary Items**	**89 days**	**Tue 21/7/15**	**Sat 17/10/15**
2	Contract Commencement	1 day	Tue 21/7/15	Tue 21/7/15
3	**(a)Implementation of Environmental Monitoring & Audit**	**49 days**	**Tue 21/7/15**	**Mon 7/9/15**
4	Establishment of Environomental Team (ET)	14 days	Tue 21/7/15	Mon 3/8/15
5	Submission of Updated EM&A Manual and Approval	21 days	Tue 4/8/15	Mon 24/8/15
6	Baseline Monitoring	14 days	Tue 25/8/15	Mon 7/9/15
7	**(b) Structural and Condition Monitoring**	**89 days**	**Tue 21/7/15**	**Sat 17/10/15**
8	Proposal of Conditions Survey Specialist and Approval	14 days	Tue 21/7/15	Mon 3/8/15
9	Condition Survey for SWHSTW and Reporting	45 days	Tue 4/8/15	Thu 17/9/15
10	Condition Survey for Ping Che Road and Reporting	45 days	Thu 3/9/15	Sat 17/10/15
11	**(c) Chu Wan Street Site Offices (Portion B)**	**82 days**	**Tue 21/7/15**	**Sat 10/10/15**
12	Site Clearance / Cable Detection / Surveying Works	7 days	Tue 21/7/15	Mon 27/7/15
13	Application for Electiricity / Water Supply / Boardband Sevice	75 days	Tue 28/7/15	Sat 10/10/15
14	Construction of Contractor Office	45 days	Tue 28/7/15	Thu 10/9/15
15	Rennovation Works for Engineer Office	60 days	Tue 28/7/15	Fri 25/9/15
16	Construction of Signboard and General Pavement Works	15 days	Fri 11/9/15	Fri 25/9/15
17	**(d) Ping Che Road Site Office (Portion D)**	**28 days**	**Tue 21/7/15**	**Mon 17/8/15**
18	Site Clearance / Cable Detection / Surveying Works	7 days	Tue 21/7/15	Mon 27/7/15
19	Application for Electiricity / Water Supply / Boardband Sevice	21 days	Tue 28/7/15	Mon 17/8/15
20	Rennovation Works for Engineer Office (Containers)	21 days	Tue 28/7/15	Mon 17/8/15
21				
22	**(II) Works in Shek Wu Hui Sewage Treatment Works**	**759 days**	**Tue 21/7/15**	**Thu 17/8/17**
23	**Section 1**	**490 days**	**Tue 21/7/15**	**Mon 21/11/16**
24	**(a)Estblishment**	**245 days**	**Tue 21/7/15**	**Tue 22/3/16**
25	Discussion for Working Seqence and Site Arrangement with ST1	14 days	Tue 21/7/15	Mon 3/8/15
26	Submission of Method Statement and Documents	21 days	Tue 1/3/16	Tue 22/3/16
27	Application for SWAC and PMAC	7 days	Tue 15/3/16	Tue 22/3/16
28	**(b) Cable and DrawPits (From Exising Control Room to new MFB)**	**245 days**	**Tue 22/3/16**	**Mon 21/11/16**
29	Duct Laying (Existing Control Room to FST7)	90 days	Tue 22/3/16	Sun 19/6/16
30	Duct Laying (FST7 to FST5)	45 days	Sun 10/7/16	Tue 23/8/16
31	Duct Laying (FST5 to FST3)	45 days	Wed 24/8/16	Fri 7/10/16
32	Duct Laying (FST3 to outside MFB)	45 days	Sat 8/10/16	Mon 21/11/16
33				
34	**Section 2**	**639 days**	**Tue 21/7/15**	**Wed 19/4/17**
35	**(a) Establishment**	**35 days**	**Tue 21/7/15**	**Mon 24/8/15**
36	Discussion for Working Seqence and Site Arrangement with ST1	28 days	Tue 21/7/15	Mon 17/8/15
37	Submission of Method Statement and Documents	28 days	Tue 21/7/15	Mon 17/8/15
38	Application for SWAC and PMAC	7 days	Tue 18/8/15	Mon 24/8/15
39	**(b) Membrane Facilitates and Membrane Tanks**	**611 days**	**Tue 18/8/15**	**Wed 19/4/17**
40	**(i) Works by ST1**	**17 days**	**Tue 25/8/15**	**Thu 10/9/15**
41	Empty FST1 and FST2 / Suspension of BR2	5 days	Tue 25/8/15	Sat 29/8/15
42	Isolation Works for FST 1 and FST 2 (Pipe Closing / Disconnect Power and Signal)	5 days	Sun 30/8/15	Thu 3/9/15
43	Dismantle and Return existing equipment to SWHSWTW	7 days	Fri 4/9/15	Thu 10/9/15
44	**(ii) Demolition for Existing FST1 & FST2**	**139 days**	**Tue 18/8/15**	**Sun 3/1/16**
45	General Site Clearance / Surveying Works / Cable Detection/ Inspection Pits	14 days	Tue 18/8/15	Mon 31/8/15
46	Plug and Removal Part of DN675 FST Effluent Pipe / DN450 Sludge Drawoff Pipe / DN800 FST Influent Pipe	7 days	Fri 4/9/15	Thu 10/9/15
47	Demolition Structure of FST1 & FST2 (Up to +3.0mPD)	25 days	Fri 11/9/15	Mon 5/10/15
48	Install Sheetpiles and Struting for Membrance Facilitates and Tanks	45 days	Tue 6/10/15	Thu 19/11/15
49	Demolition Structure of FST1 & FST2 (Up to +0.0mPD)	45 days	Fri 20/11/15	Sun 3/1/16
50	**(iii) Ground Investigation by Drilling Rigs**	**32 days**	**Mon 4/1/16**	**Thu 4/2/16**
51	Excavation for Trial Pits / Determination of GI Locations	5 days	Mon 4/1/16	Fri 8/1/16
52	Drilling (25nos. Size P) / Insitu Testing /Taking Rock Cores	20 days	Sat 9/1/16	Thu 28/1/16
53	Lab Testing / Report Preparation / Determination of Founding Levels	7 days	Fri 29/1/16	Thu 4/2/16
54	**(iv) Piling for Structure**	**115 days**	**Fri 29/1/16**	**Sun 22/5/16**
55	Establisment for Piling Plants / Prepartion Works	7 days	Fri 29/1/16	Thu 4/2/16
56	Construction of Piles (1st Batch - 28nos)	30 days	Fri 5/2/16	Sat 5/3/16
57	Grouting / Curing for Piles (1st Batch)	30 days	Sun 6/3/16	Mon 4/4/16
58	Construction of Piles (2nd Batch - 33 nos)	35 days	Sun 6/3/16	Sat 9/4/16



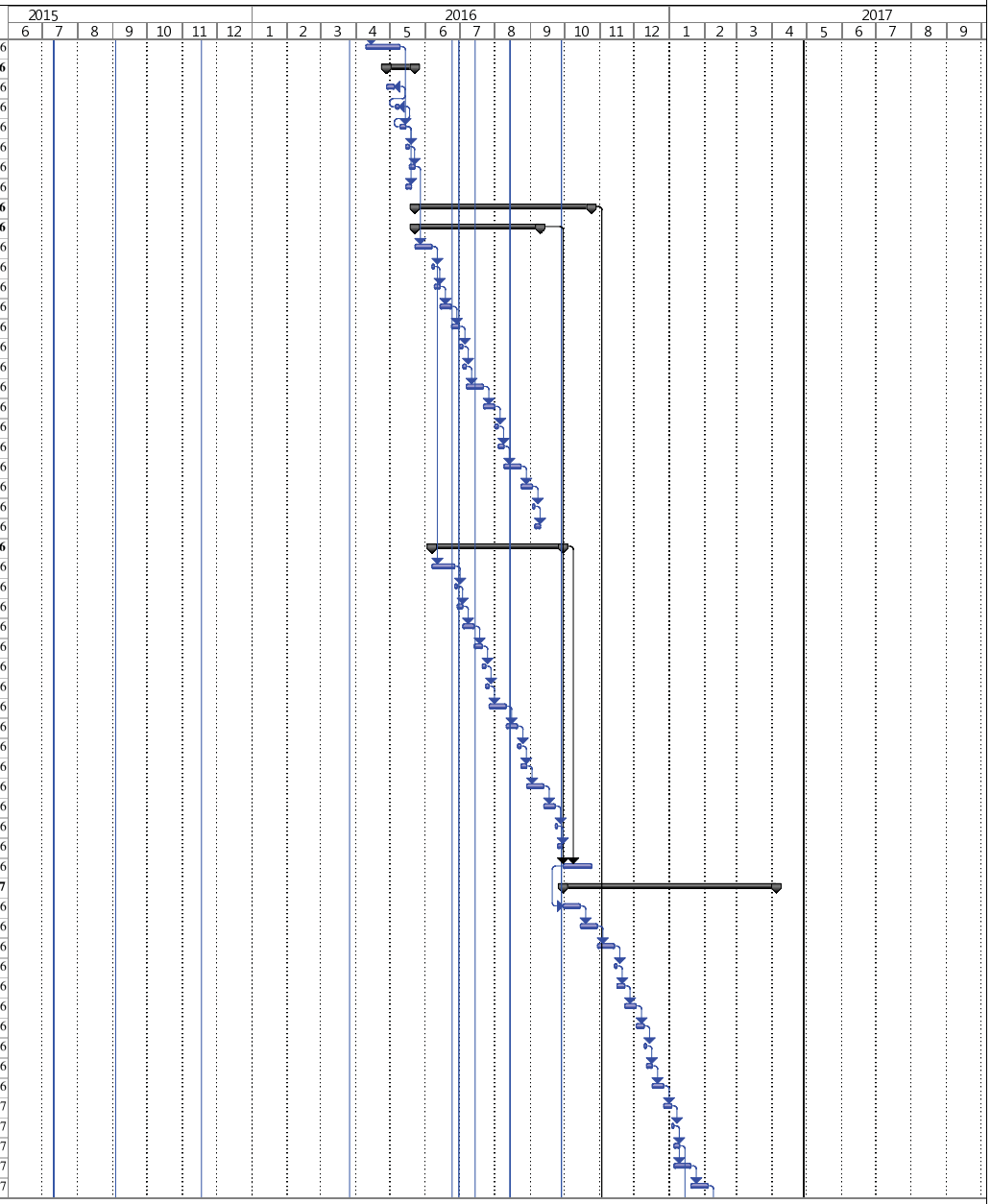
Task Milestone Summary

Contract DC/2013/09

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

Works Programe (Sep 2015)

ID	Task Name	Duration	Start	Finish
59	Grouting / Curing for Piles (2nd Batch)	30 days	Sun 10/4/16	Mon 9/5/16
60	**Pile Testing and Proof drilling**	**25 days**	**Thu 28/4/16**	**Sun 22/5/16**
61	Setting-up of Pile-Load Test System (1st & 2nd pile)	7 days	Thu 28/4/16	Thu 5/5/16
62	Pile-Load Test for Main Piles (1st and 2nd pile)	3 days	Fri 6/5/16	Mon 9/5/16
63	Removal and Resetting of Pile-Load Test System	5 days	Tue 10/5/16	Sat 14/5/16
64	Pile-Load Test for Main Pile (3rd and 4 pile)	3 days	Sun 15/5/16	Tue 17/5/16
65	Removal of Pile-Load Test System	5 days	Wed 18/5/16	Sun 22/5/16
66	Proof Drilling	5 days	Sun 15/5/16	Thu 19/5/16
67	**(v) Construction of Subtructure**	**155 days**	**Mon 23/5/16**	**Mon 24/10/16**
68	**Portion A - Grid C-E / Grid F-G / Grid G+14 - G+28**	**110 days**	**Mon 23/5/16**	**Fri 9/9/16**
69	Excavation to Formation Level (+0.3/+2.4mPD)	15 days	Mon 23/5/16	Mon 6/6/16
70	Laying Blinding Layer	2 days	Tue 7/6/16	Wed 8/6/16
71	Preparation for Pilehead	5 days	Thu 9/6/16	Mon 13/6/16
72	Steelfixing for Membrance Facilitates (up to +1.9mPD) and Membrance Tank (up to +3.9mPD)	10 days	Tue 14/6/16	Thu 23/6/16
73	Installation of formwork / waterstop / other accessory	7 days	Fri 24/6/16	Thu 30/6/16
74	Concreting	3 days	Fri 1/7/16	Sun 3/7/16
75	Curing of concrete / formwork removal / making good works	3 days	Mon 4/7/16	Wed 6/7/16
76	Steelfixing for Membrance Facilitates & Tanks (up to +5.4/+7.5mPD)	15 days	Thu 7/7/16	Thu 21/7/16
77	Installation of formwork / waterstop / other accessory	10 days	Fri 22/7/16	Sun 31/7/16
78	Concreting	3 days	Mon 1/8/16	Wed 3/8/16
79	Curing of concrete / formwork removal / making good works	5 days	Thu 4/8/16	Mon 8/8/16
80	Steelfixing for Membrance Facilitates & Tanks (up to +6.7/7.5mPD)	15 days	Tue 9/8/16	Tue 23/8/16
81	Installation of formwork / waterstop / other accessory	10 days	Wed 24/8/16	Fri 2/9/16
82	Concreting	2 days	Sat 3/9/16	Sun 4/9/16
83	Curing of concrete / formwork removal / making good works	5 days	Mon 5/9/16	Fri 9/9/16
84	**Portion B - Grid A-C / Grid E-F / Grid G-G+14**	**115 days**	**Tue 7/6/16**	**Thu 29/9/16**
85	Excavation to Formation Level (+0.3/+2.4mPD)	20 days	Tue 7/6/16	Sun 26/6/16
86	Laying Blinding Layer	2 days	Mon 27/6/16	Tue 28/6/16
87	Preparation for Pilehead	5 days	Wed 29/6/16	Sun 3/7/16
88	Steelfixing for Membrance Facilitates (up to +1.9mPD) and Membrance Tank (up to +3.9mPD)	10 days	Mon 4/7/16	Wed 13/7/16
89	Installation of formwork / waterstop / other accessory	7 days	Thu 14/7/16	Wed 20/7/16
90	Concreting	3 days	Thu 21/7/16	Sat 23/7/16
91	Curing of concrete / formwork removal / making good works	3 days	Sun 24/7/16	Tue 26/7/16
92	Steelfixing for Membrance Facilitates & Tanks (up to +5.4/+7.5mPD)	15 days	Wed 27/7/16	Wed 10/8/16
93	Installation of formwork / waterstop / other accessory	10 days	Thu 11/8/16	Sat 20/8/16
94	Concreting	3 days	Sun 21/8/16	Tue 23/8/16
95	Curing of concrete / formwork removal / making good works	5 days	Wed 24/8/16	Sun 28/8/16
96	Steelfixing for Membrance Facilitates & Tanks (up to +6.7/7.5mPD)	15 days	Mon 29/8/16	Mon 12/9/16
97	Installation of formwork / waterstop / other accessory	10 days	Tue 13/9/16	Thu 22/9/16
98	Concreting	2 days	Fri 23/9/16	Sat 24/9/16
99	Curing of concrete / formwork removal / making good works	5 days	Sun 25/9/16	Thu 29/9/16
100	Backfilling and Extracting Sheetphile	25 days	Fri 30/9/16	Mon 24/10/16
101	**(vi) Construction of Superstructure**	**187 days**	**Fri 30/9/16**	**Tue 4/4/17**
102	Erect Working Platform and Falsework (up to +11.65mPD)	15 days	Fri 30/9/16	Fri 14/10/16
103	Steelfixing for Membrance Facilitates Bldgs	15 days	Sat 15/10/16	Sat 29/10/16
104	Installation of formwork / other accessory	15 days	Sun 30/10/16	Sun 13/11/16
105	Concreting	2 days	Mon 14/11/16	Tue 15/11/16
106	Curing of concrete / formwork removal / making good works	7 days	Wed 16/11/16	Tue 22/11/16
107	Steelfixing for Membrance Facilitates Bldgs (up tp +12.95mPD)	10 days	Wed 23/11/16	Fri 2/12/16
108	Installation of formwork / other accessory	7 days	Sat 3/12/16	Fri 9/12/16
109	Concreting	2 days	Sat 10/12/16	Sun 11/12/16
110	Curing of concrete / formwork removal / making good works	5 days	Mon 12/12/16	Fri 16/12/16
111	Steelfixing for Membrance Facilitates Bldgs (up tp +14.45mPD)	10 days	Sat 17/12/16	Mon 26/12/16
112	Installation of formwork / other accessory	7 days	Tue 27/12/16	Mon 2/1/17
113	Concreting	2 days	Tue 3/1/17	Wed 4/1/17
114	Curing of concrete / formwork removal / making good works	5 days	Thu 5/1/17	Mon 9/1/17
115	Erect Working Platform and Falsework (up to +19.2mPD)	15 days	Thu 5/1/17	Thu 19/1/17
116	Steelfixing for Membrance Facilitates Bldgs (up tp +19.2mPD)	15 days	Fri 20/1/17	Fri 3/2/17



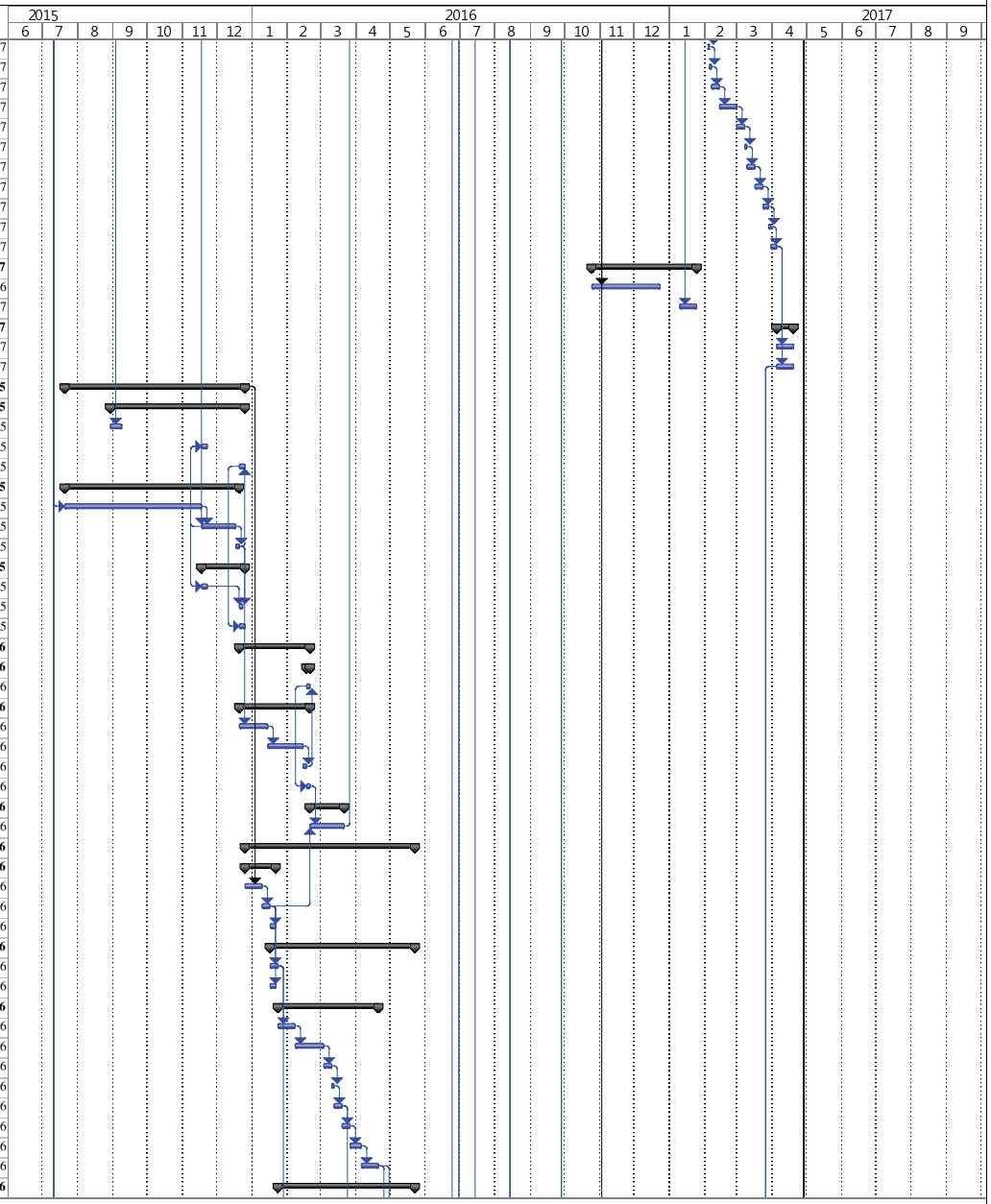
Task Milestone Summary

Contract DC/2013/09

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

Works Programe (Sep 2015)

ID	Task Name	Duration	Start	Finish
117	Installation of formwork / other accessory	1 day	Sat 4/2/17	Sat 4/2/17
118	Concreting	2 days	Sun 5/2/17	Mon 6/2/17
119	Curing of concrete / formwork removal / making good works	7 days	Tue 7/2/17	Mon 13/2/17
120	Steelfixing for Membrance Facilitates Bldgs (up tp +22.79mPD)	15 days	Tue 14/2/17	Tue 28/2/17
121	Installation of formwork / other accessory	7 days	Wed 1/3/17	Tue 7/3/17
122	Concreting	2 days	Wed 8/3/17	Thu 9/3/17
123	Curing of concrete / formwork removal / making good works	7 days	Fri 10/3/17	Thu 16/3/17
124	Steelfixing for Membrance Facilitates Bldgs (up tp +26.00mPD)	7 days	Fri 17/3/17	Thu 23/3/17
125	Installation of formwork / other accessory	5 days	Fri 24/3/17	Tue 28/3/17
126	Concreting	2 days	Wed 29/3/17	Thu 30/3/17
127	Curing of concrete / formwork removal / making good works	5 days	Fri 31/3/17	Tue 4/4/17
128	**(vii)Testing**	**92 days**	**Tue 25/10/16**	**Tue 24/1/17**
129	Water Tightness Test for Membrance Tanks	60 days	Tue 25/10/16	Fri 23/12/16
130	Water Tightness Test for Permeate Storage Tank	15 days	Tue 10/1/17	Tue 24/1/17
131	**(viii) Remaining Works**	**15 days**	**Wed 5/4/17**	**Wed 19/4/17**
132	Plumbing System	15 days	Wed 5/4/17	Wed 19/4/17
133	Cable Ducts to MFB	15 days	Wed 5/4/17	Wed 19/4/17
134	**(c) DN1400 DI BR2 Effluent Pipe**	**158 days**	**Tue 21/7/15**	**Fri 25/12/15**
135	**(i) Works by ST1**	**118 days**	**Sun 30/8/15**	**Fri 25/12/15**
136	Empty BR2	10 days	Sun 30/8/15	Tue 8/9/15
137	Suspension of BR1 for Seperation (on ageed time slot)	5 days	Wed 18/11/15	Sun 22/11/15
138	Suspension of BR1 for Connection (on ageed time slot)	5 days	Mon 21/12/15	Fri 25/12/15
139	**(ii) Pipe Laying Works**	**153 days**	**Tue 21/7/15**	**Sun 20/12/15**
140	Material Ordering	120 days	Tue 21/7/15	Tue 17/11/15
141	Pipe Laying for BR2 Pipe (CHG00-33)	30 days	Wed 18/11/15	Thu 17/12/15
142	Pipe Testing	3 days	Fri 18/12/15	Sun 20/12/15
143	**(iii) Connection Works**	**38 days**	**Wed 18/11/15**	**Fri 25/12/15**
144	Separate Works for BR1 and BR2	5 days	Wed 18/11/15	Sun 22/11/15
145	Connection at BR2	3 days	Mon 21/12/15	Wed 23/12/15
146	Connection at Liquor Channel	5 days	Mon 21/12/15	Fri 25/12/15
147	**(d) Realign Existing DN150 SAS Pipe**	**62 days**	**Mon 21/12/15**	**Sat 20/2/16**
148	**(i) Works by ST1**	**3 days**	**Thu 18/2/16**	**Sat 20/2/16**
149	Suspension of associated system for Connection (on agree time slot)	3 days	Thu 18/2/16	Sat 20/2/16
150	**(ii) Pipe Laying Works**	**62 days**	**Mon 21/12/15**	**Sat 20/2/16**
151	Pipe Laying for SAS Pipe (CH00-CH70)	25 days	Mon 21/12/15	Thu 14/1/16
152	Pipe Laying for SAS Pipe (CH70-162)	31 days	Fri 15/1/16	Sun 14/2/16
153	Testing and new SAS Pipe	3 days	Mon 15/2/16	Wed 17/2/16
154	Connection	3 days	Thu 18/2/16	Sat 20/2/16
155	**(e) DN1400 DI BR1 Effluent Pipe**	**30 days**	**Sun 21/2/16**	**Mon 21/3/16**
156	Pipe Laying for BR1 Pipe (CHF00-16)	30 days	Sun 21/2/16	Mon 21/3/16
157	**(f) Bioreactor No.1 and 2**	**149 days**	**Sat 26/12/15**	**Sun 22/5/16**
158	**(i) Works by ST1**	**27 days**	**Sat 26/12/15**	**Thu 21/1/16**
159	Restore BR2 and Empty BR1	15 days	Sat 26/12/15	Sat 9/1/16
160	Isolation Works for BR1(Pipe Closing / Disconnect Power and Signal)	7 days	Sun 10/1/16	Sat 16/1/16
161	Dismantle and Return existing equipment to SWHSWTW	5 days	Sun 17/1/16	Thu 21/1/16
162	**(ii) Rennovation Works inside BR1**	**127 days**	**Sun 17/1/16**	**Sun 22/5/16**
163	General Cleaning Works / Dismantle Works	7 days	Sun 17/1/16	Sat 23/1/16
164	Plug and Removal Existing DN1200 BR Effluent Pipe	5 days	Sun 17/1/16	Thu 21/1/16
165	**Extended Concrete Walkway**	**88 days**	**Sun 24/1/16**	**Wed 20/4/16**
166	Erection of Working Platform and Falsework	15 days	Sun 24/1/16	Sun 7/2/16
167	Demoltion of upper part of Existing Walls & Prepare Surface	25 days	Mon 8/2/16	Thu 3/3/16
168	Erect Fwk for concrete walkway extended from walls	7 days	Fri 4/3/16	Thu 10/3/16
169	Concreting	2 days	Fri 11/3/16	Sat 12/3/16
170	Curing of concrete / formwork removal / making good works	7 days	Sun 13/3/16	Sat 19/3/16
171	Install Steel Posts	7 days	Sun 20/3/16	Sat 26/3/16
172	Construction of Concrete Pits / 4 Nos of DN800 MLR Pipes	10 days	Sun 27/3/16	Tue 5/4/16
173	Pitching Works for BR1	15 days	Wed 6/4/16	Wed 20/4/16
174	**FRP Baffle Wall / Platforms / Staircase**	**120 days**	**Sun 24/1/16**	**Sun 22/5/16**



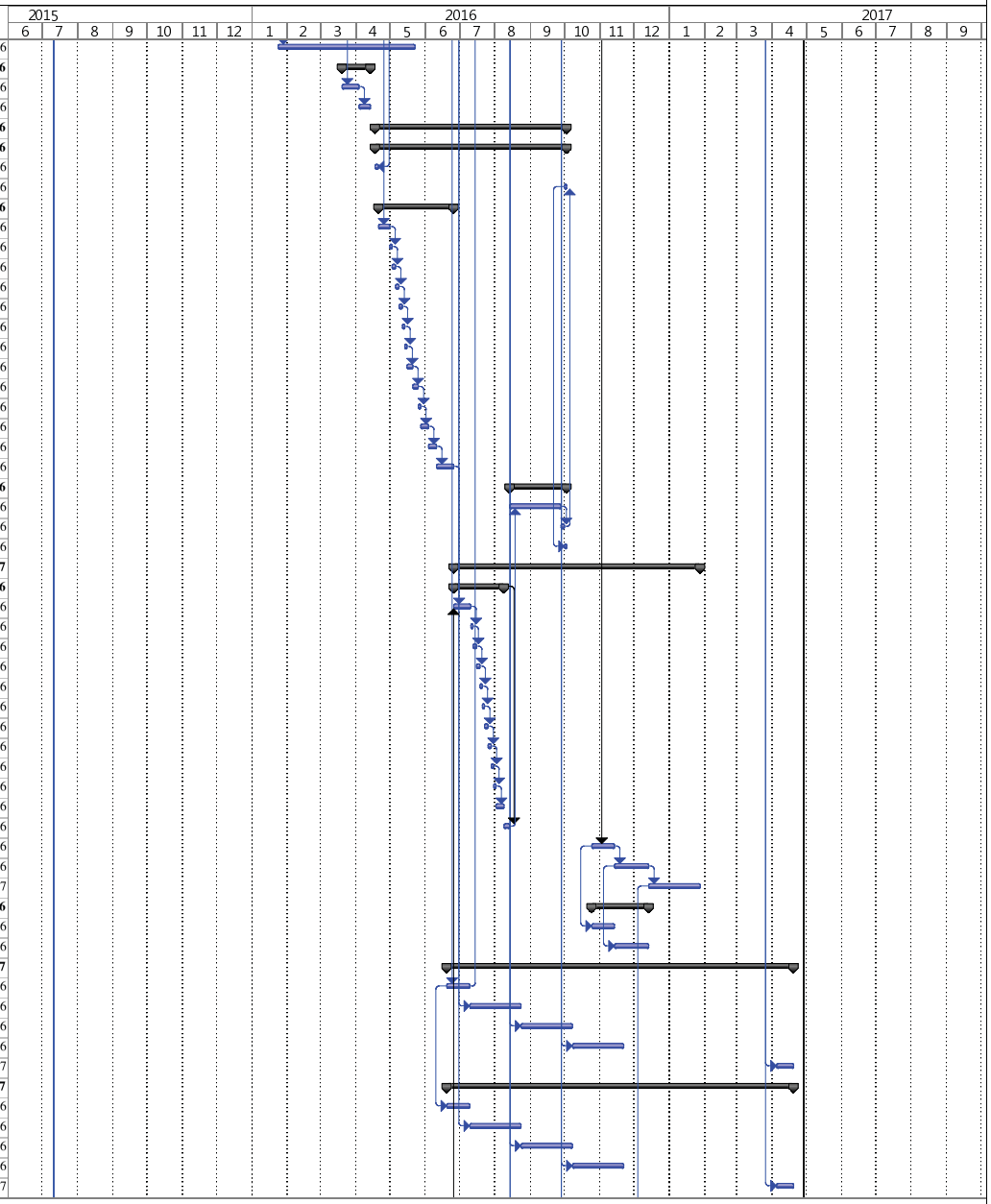
Task Milestone Summary

Contract DC/2013/09

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

Works Programe (Sep 2015)

ID	Task Name	Duration	Start	Finish
175	Design, Supply & Installation	120 days	Sun 24/1/16	Sun 22/5/16
176	**(iii) BR1 MS Air Mains within BR1**	**25 days**	**Sun 20/3/16**	**Wed 13/4/16**
177	Pipe Laying for BR1 Pipe (CHD96-158 & CHE00-62)	15 days	Sun 20/3/16	Sun 3/4/16
178	Pipe Laying for BR1 Pipe (CHD61-96)	10 days	Mon 4/4/16	Wed 13/4/16
179	**(g)Pretreatment Screen Chamber & Flow Meter Chamber**	**168 days**	**Mon 18/4/16**	**Sun 2/10/16**
180	**(i) Works by ST1**	**168 days**	**Mon 18/4/16**	**Sun 2/10/16**
181	Isolation Works for associated Pipeworks (Pipe Closing / Disconnect Power and Signal)	3 days	Mon 18/4/16	Wed 20/4/16
182	Suspension of Sludge Draw Off Chamber No.1 and Distribution Chamber No.1	2 days	Sat 1/10/16	Sun 2/10/16
183	**(ii) Construction of Pretreatment Screen Chamber & Flow Meter Chamber**	**66 days**	**Thu 21/4/16**	**Sat 25/6/16**
184	Excavation and ELS Installation	10 days	Thu 21/4/16	Sat 30/4/16
185	Demolish existing pipeworks and Treatment for connection	2 days	Sun 1/5/16	Mon 2/5/16
186	Lay Rockfills and Blinding	3 days	Tue 3/5/16	Thu 5/5/16
187	Steel Fixing for Chambers (up to +4.5mPD)	3 days	Fri 6/5/16	Sun 8/5/16
188	Installation of formwork / waterstop / other accessory	3 days	Mon 9/5/16	Wed 11/5/16
189	Concreting	2 days	Thu 12/5/16	Fri 13/5/16
190	Curing of concrete / formwork removal / making good works	2 days	Sat 14/5/16	Sun 15/5/16
191	Steel Fixing for Chambers (up to +8.55 / +7.3mPD)	5 days	Mon 16/5/16	Fri 20/5/16
192	Installation of formwork / waterstop / other accessory	5 days	Sat 21/5/16	Wed 25/5/16
193	Concreting	2 days	Thu 26/5/16	Fri 27/5/16
194	Curing of concrete / formwork removal / making good works	7 days	Sat 28/5/16	Fri 3/6/16
195	Remove Sheetpiles and Backfilling	7 days	Sat 4/6/16	Fri 10/6/16
196	Construction of Associated valve Pits	15 days	Sat 11/6/16	Sat 25/6/16
197	**(iii) DN100 Screen Wash Water Pipe / DN 80 Screen Skip Wash Water Pipe**	**50 days**	**Sun 14/8/16**	**Sun 2/10/16**
198	Pipe Laying for Pipe (CHL00-55 & CHK00-68)	45 days	Sun 14/8/16	Tue 27/9/16
199	Testing	3 days	Wed 28/9/16	Fri 30/9/16
200	Connection	2 days	Sat 1/10/16	Sun 2/10/16
201	**(h) DN1400 DI RAS Pipe**	**216 days**	**Sun 26/6/16**	**Fri 27/1/17**
202	**Construction of Concrete Pipe Trough (beside BR1)**	**44 days**	**Sun 26/6/16**	**Mon 8/8/16**
203	Excavation and Sheetpiling	15 days	Sun 26/6/16	Sun 10/7/16
204	Lay Rockfill and Blinding	2 days	Mon 11/7/16	Tue 12/7/16
205	Steel Fixing for Base	3 days	Wed 13/7/16	Fri 15/7/16
206	Installation of formwork / waterstop / other accessory	3 days	Sat 16/7/16	Mon 18/7/16
207	Concreting	2 days	Tue 19/7/16	Wed 20/7/16
208	Curing of concrete / formwork removal / making good works	2 days	Thu 21/7/16	Fri 22/7/16
209	Steel Fixing for Wall	3 days	Sat 23/7/16	Mon 25/7/16
210	Installation of formwork / waterstop / other accessory	3 days	Tue 26/7/16	Thu 28/7/16
211	Concreting	2 days	Fri 29/7/16	Sat 30/7/16
212	Curing of concrete / formwork removal / making good works	2 days	Sun 31/7/16	Mon 1/8/16
213	Remove Sheetpiles and Backfilling	7 days	Tue 2/8/16	Mon 8/8/16
214	Pipe Laying for RAS Pipe (CHC98-153)	5 days	Tue 9/8/16	Sat 13/8/16
215	Pipe Laying for RAS Pipe (CHC75-98)	20 days	Tue 25/10/16	Sun 13/11/16
216	Pipe Laying for RAS Pipe (CHC35-75)	30 days	Mon 14/11/16	Tue 13/12/16
217	Pipe Laying for RAS Pipe (CHC00-35)	45 days	Wed 14/12/16	Fri 27/1/17
218	**(i)BR1 MS Air Mains Outside BR1**	**50 days**	**Tue 25/10/16**	**Tue 13/12/16**
219	Pipe Laying for BR1 Pipe (CHD44-61)	20 days	Tue 25/10/16	Sun 13/11/16
220	Pipe Laying for BR1 Pipe (CHD00-44)	30 days	Mon 14/11/16	Tue 13/12/16
221	**(j) CLP Cable and Drawpits**	**304 days**	**Mon 20/6/16**	**Wed 19/4/17**
222	CLP Cable Ducts with Trench (Outside to FST7)	20 days	Mon 20/6/16	Sat 9/7/16
223	CLP Cable Ducts with Trench (FST7 to FST5)	45 days	Sun 10/7/16	Tue 23/8/16
224	CLP Cable Ducts with Trench (FST5 to FST3)	45 days	Wed 24/8/16	Fri 7/10/16
225	CLP Cable Ducts with Trench (FST3 to Outside MFB)	45 days	Sat 8/10/16	Mon 21/11/16
226	CLP Cable Ducts with Trench (to MFB)	15 days	Wed 5/4/17	Wed 19/4/17
227	**(k)Fresh Watermains and Fire Service Watermains**	**304 days**	**Mon 20/6/16**	**Wed 19/4/17**
228	PipeLaying (Outside to FST7)	20 days	Mon 20/6/16	Sat 9/7/16
229	PipeLaying (FST7 to FST5)	45 days	Sun 10/7/16	Tue 23/8/16
230	PipeLaying (FST5 to FST3)	45 days	Wed 24/8/16	Fri 7/10/16
231	PipeLaying (FST3 to Outside MFB)	45 days	Sat 8/10/16	Mon 21/11/16
232	PipeLaying (toMFB)	15 days	Wed 5/4/17	Wed 19/4/17



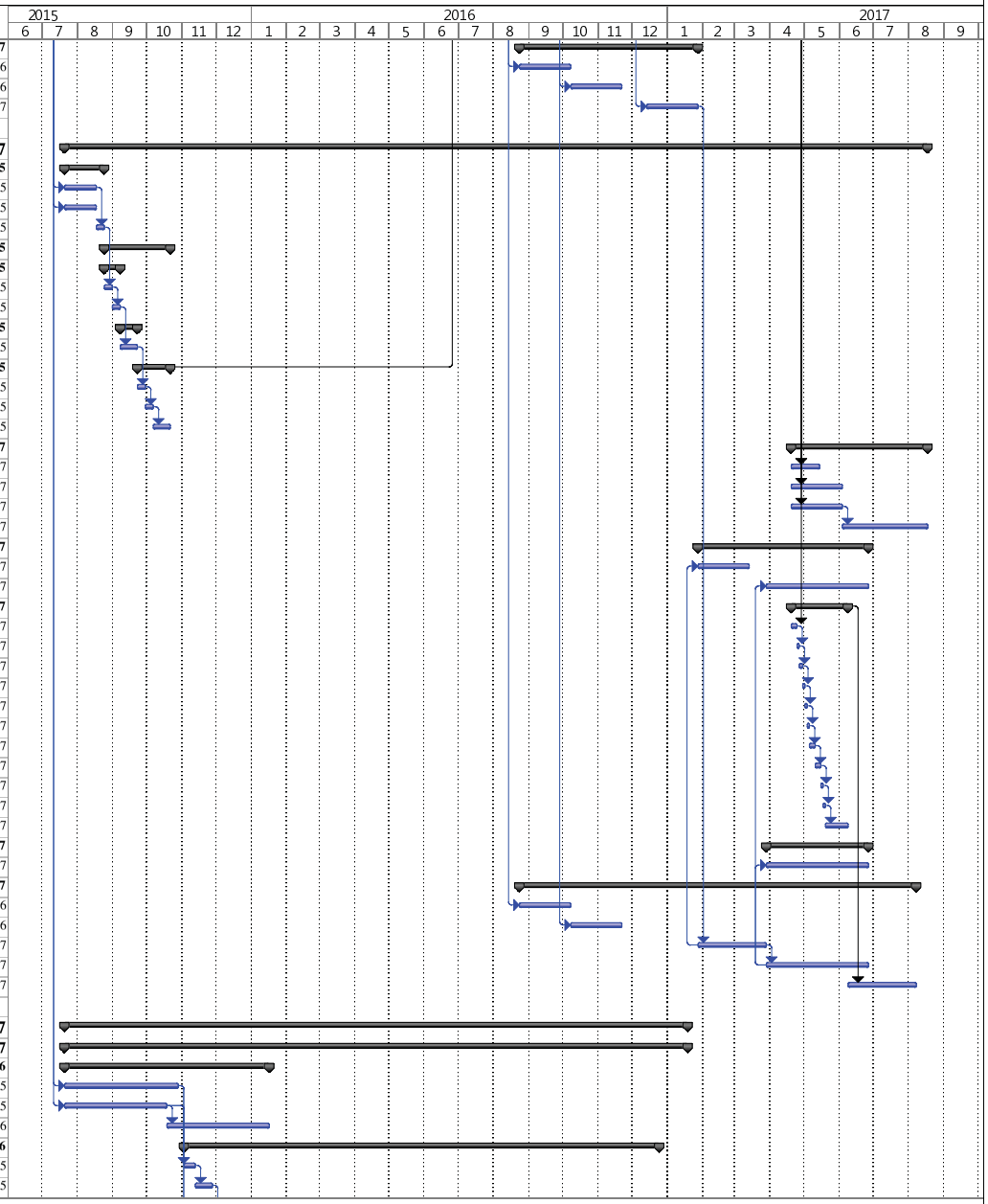
Task Milestone Summary

Contract DC/2013/09

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

Works Programe (Sep 2015)

ID	Task Name	Duration	Start	Finish
233	**(l)DN900 DI Permeate Pipe**	**157 days**	**Wed 24/8/16**	**Fri 27/1/17**
234	Pipe Laying (CHA85-CHA138)	45 days	Wed 24/8/16	Fri 7/10/16
235	Pipe Laying (CHA35-CHA85)	45 days	Sat 8/10/16	Mon 21/11/16
236	Pipe Laying (CHA00-35)	45 days	Wed 14/12/16	Fri 27/1/17
237				
238	**Section 3**	**759 days**	**Tue 21/7/15**	**Thu 17/8/17**
239	**(a) Establishment**	**35 days**	**Tue 21/7/15**	**Mon 24/8/15**
240	Discussion for Working Seqence and Site Arrangement with ST1	28 days	Tue 21/7/15	Mon 17/8/15
241	Submission of Method Statement and Documents	28 days	Tue 21/7/15	Mon 17/8/15
242	Application for SWAC and PMAC	7 days	Tue 18/8/15	Mon 24/8/15
243	**(b) Demolition of Existing Reclaim Water Treatment Facilitates**	**58 days**	**Tue 25/8/15**	**Wed 21/10/15**
244	**(i) Works by ST1**	**14 days**	**Tue 25/8/15**	**Mon 7/9/15**
245	Isolation Works for Reclamed Water Treamanet Facilates (Pipe Closing / Disconnect Power and Signal)	7 days	Tue 25/8/15	Mon 31/8/15
246	Dismantle and Return existing equipment to SWHSWTW	7 days	Tue 1/9/15	Mon 7/9/15
247	**(ii) Demolition of Reclaim Water Treatment Facilitates**	**15 days**	**Tue 8/9/15**	**Tue 22/9/15**
248	General Dismantle and Site Formation Works	15 days	Tue 8/9/15	Tue 22/9/15
249	**(iii) Demolition of Methanol Storage Tanks**	**29 days**	**Wed 23/9/15**	**Wed 21/10/15**
250	General Dismantle Works	7 days	Wed 23/9/15	Tue 29/9/15
251	Erection of Working Platform	7 days	Wed 30/9/15	Tue 6/10/15
252	Removal of Existing Concrete Structure	15 days	Wed 7/10/15	Wed 21/10/15
253	**(c) Building Works for Membrane Facilities and Tanks**	**120 days**	**Thu 20/4/17**	**Thu 17/8/17**
254	Roofing with surface channel	25 days	Thu 20/4/17	Sun 14/5/17
255	Installation of Sundries and FRP items	45 days	Thu 20/4/17	Sat 3/6/17
256	Pumping Station Internal finishing	45 days	Thu 20/4/17	Sat 3/6/17
257	Pumping Station External Wall finishing	75 days	Sun 4/6/17	Thu 17/8/17
258	**(d) Remaining Cable and DrawPits**	**150 days**	**Sat 28/1/17**	**Mon 26/6/17**
259	Duct Laying (East amd South of BR11)	45 days	Sat 28/1/17	Mon 13/3/17
260	Duct Laying (T Junction btw Membrane Tanks / BR1)	90 days	Wed 29/3/17	Mon 26/6/17
261	**(e) Chemical Storage Room**	**50 days**	**Thu 20/4/17**	**Thu 8/6/17**
262	Excavation / Preparation of Footing	5 days	Thu 20/4/17	Mon 24/4/17
263	Laying blinding	2 days	Tue 25/4/17	Wed 26/4/17
264	Steelfixing for Footing	3 days	Thu 27/4/17	Sat 29/4/17
265	Installation of formwork / other accessory	2 days	Sun 30/4/17	Mon 1/5/17
266	Concreting	2 days	Tue 2/5/17	Wed 3/5/17
267	Curing of concrete / formwork removal / making good works	2 days	Thu 4/5/17	Fri 5/5/17
268	Steelfixing for Top Slab and Wall	5 days	Sat 6/5/17	Wed 10/5/17
269	Installation of formwork / other accessory	5 days	Thu 11/5/17	Mon 15/5/17
270	Concreting	2 days	Tue 16/5/17	Wed 17/5/17
271	Curing of concrete / formwork removal / making good works	2 days	Thu 18/5/17	Fri 19/5/17
272	Building Service Works for Chemical Storage Room	20 days	Sat 20/5/17	Thu 8/6/17
273	**(f)DN150 DI SAS Pipe / NaOCl Dosing Pipe and Trench**	**90 days**	**Wed 29/3/17**	**Mon 26/6/17**
274	SAS Pipe (CHH00-49) / Dosing Pipe (CH00-68)	90 days	Wed 29/3/17	Mon 26/6/17
275	**(g) Drainage Works and Roadworks**	**349 days**	**Wed 24/8/16**	**Mon 7/8/17**
276	Storm Drains and Roadworks (FST5 to FST3)	45 days	Wed 24/8/16	Fri 7/10/16
277	Storm Drains and Roadworks (FST3 to outside MFB)	45 days	Sat 8/10/16	Mon 21/11/16
278	Storm Drains and Roadworks (East amd South of BR1)	60 days	Sat 28/1/17	Tue 28/3/17
279	Storm Drains and Roadworks (T Junction btw Membrane Tanks / BR1)	90 days	Wed 29/3/17	Mon 26/6/17
280	Storm Drains and Roadworks (Around Membrane Facilities and Tanks)	60 days	Fri 9/6/17	Mon 7/8/17
281				
282	**Works in Ping Che Road**	**548 days**	**Tue 21/7/15**	**Wed 18/1/17**
283	**Section 4 - Sewerage Works in Ping Che Road**	**548 days**	**Tue 21/7/15**	**Wed 18/1/17**
284	**(a) Preparation Works**	**180 days**	**Tue 21/7/15**	**Sat 16/1/16**
285	Material Submission and Ordering	100 days	Tue 21/7/15	Wed 28/10/15
286	Application for XP	90 days	Tue 21/7/15	Sun 18/10/15
287	Inspection Pits	90 days	Mon 19/10/15	Sat 16/1/16
288	**(b) Work Front A (CH00-CH765)**	**418 days**	**Tue 3/11/15**	**Sat 24/12/16**
289	Pipe Laying for Rising Mains (CH165-CH185) / Under Dwarf Wall	10 days	Tue 3/11/15	Thu 12/11/15
290	Pipe Laying for Rising Mains (CH185-CH205) / Road Crossing	15 days	Fri 13/11/15	Fri 27/11/15



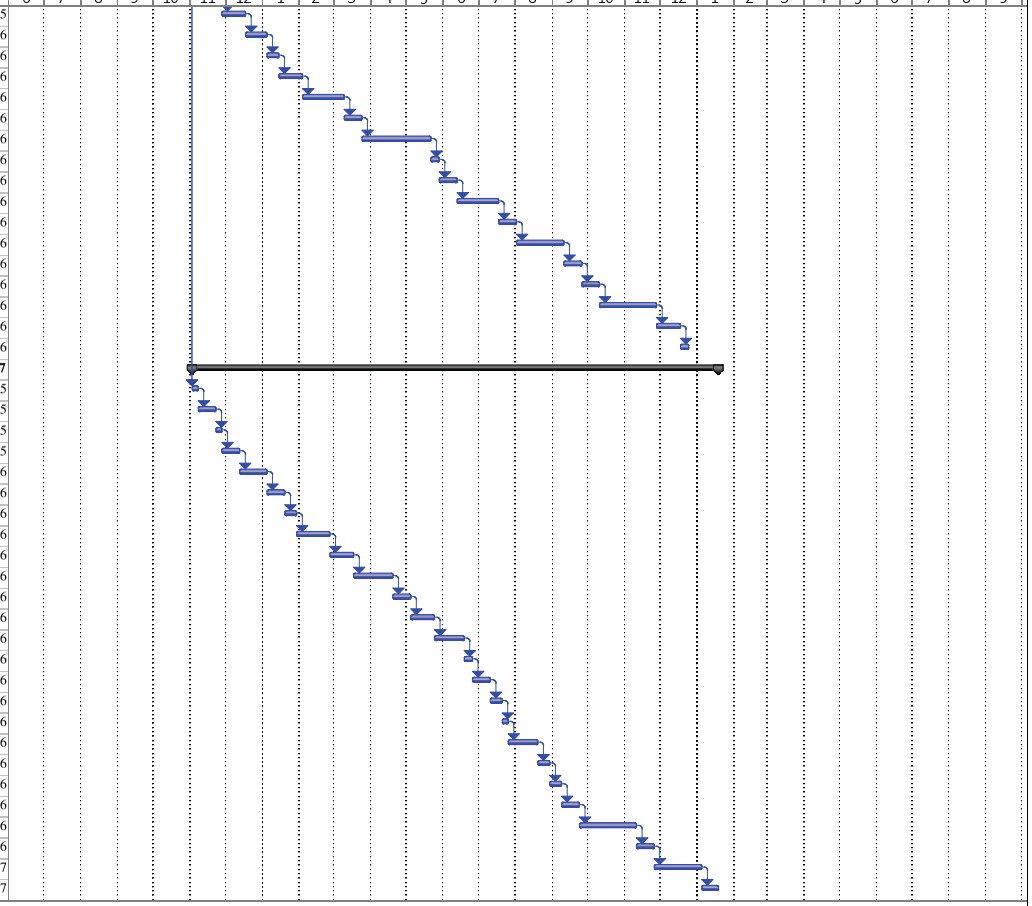
Task Milestone Summary

Contract DC/2013/09

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

Works Programe (Sep 2015)

ID	Task Name	Duration	Start	Finish
291	Pipe Laying for Rising Mains (CH205-CH245) / Under Dwarf Wall	20 days	Sat 28/11/15	Thu 17/12/15
292	Pipe Laying for Rising Mains (CH245-CH295) / Footpath	18 days	Fri 18/12/15	Mon 4/1/16
293	Pipe Laying for Rising Mains (CH295-CH300) / Road Crossing	10 days	Tue 5/1/16	Thu 14/1/16
294	Pipe Laying for Rising Mains (CH300-CH360) / Footpath	20 days	Fri 15/1/16	Wed 3/2/16
295	Pipe Laying for Rising Mains (CH360-CH425) / Under Dwarf Wall	35 days	Thu 4/2/16	Wed 9/3/16
296	Pipe Laying for Rising Mains (CH425-CH445) / Road Crossing	15 days	Thu 10/3/16	Thu 24/3/16
297	Pipe Laying for Rising Mains (CH445-CH560) /Under Dwarf Wall	58 days	Fri 25/3/16	Sat 21/5/16
298	Interim Pressure Test	7 days	Sun 22/5/16	Sat 28/5/16
299	Pipe Laying for Rising Mains (CH560-CH590) / Footpath	15 days	Sun 29/5/16	Sun 12/6/16
300	Pipe Laying for Rising Mains (CH590-CH660) /Under Dwarf Wall	35 days	Mon 13/6/16	Sun 17/7/16
301	Pipe Laying for Rising Mains (CH660-CH670) / Road Crossing	15 days	Mon 18/7/16	Mon 1/8/16
302	Pipe Laying for Rising Mains (CH670-CH750) /Under Dwarf Wall	40 days	Tue 2/8/16	Sat 10/9/16
303	Pipe Laying for Rising Mains (CH750-CH765) / Road Crossing	15 days	Sun 11/9/16	Sun 25/9/16
304	Pipe Laying for Rising Mains (CH155-CH165) / Road Crossing	15 days	Mon 26/9/16	Mon 10/10/16
305	Pipe Laying for Rising Mains (CH60-CH155) / Carpark	48 days	Tue 11/10/16	Sun 27/11/16
306	Pipe Laying for Rising Mains (CH00-CH60) / Footpath	20 days	Mon 28/11/16	Sat 17/12/16
307	Interim Pipe Testing	7 days	Sun 18/12/16	Sat 24/12/16
308	**(c) Work Front B (CH765-CH1540)**	**443 days**	**Tue 3/11/15**	**Wed 18/1/17**
309	Pipe Laying for Rising Mains (CH970-CH980) /Under Dwarf Wall	5 days	Tue 3/11/15	Sat 7/11/15
310	Pipe Laying for Rising Mains (CH980-CH990) /Road Crossing	15 days	Sun 8/11/15	Sun 22/11/15
311	Pipe Laying for Rising Mains (CH990-CH1000) /Under Dwarf Wall	5 days	Mon 23/11/15	Fri 27/11/15
312	Pipe Laying for Rising Mains (CH1000-CH1010) / Road Crossing	15 days	Sat 28/11/15	Sat 12/12/15
313	Pipe Laying for Rising Mains (CH1010-CH1055) /Under Dwarf Wall	23 days	Sun 13/12/15	Mon 4/1/16
314	Pipe Laying for Rising Mains (CH1055-CH1075) / Road Crossing	15 days	Tue 5/1/16	Tue 19/1/16
315	Pipe Laying for Rising Mains (CH1075-CH1095) /Under Dwarf Wall	10 days	Wed 20/1/16	Fri 29/1/16
316	Pipe Laying for Rising Mains (CH1095-CH1180) / Footpath	28 days	Sat 30/1/16	Fri 26/2/16
317	Pipe Laying for Rising Mains (CH1180-CH1205) / Road Crossing	20 days	Sat 27/2/16	Thu 17/3/16
318	Pipe Laying for Rising Mains (CH1205-CH1270) /Under Dwarf Wall	33 days	Fri 18/3/16	Tue 19/4/16
319	Pipe Laying for Rising Mains (CH1270-CH1290) / Road Crossing	15 days	Wed 20/4/16	Wed 4/5/16
320	Pipe Laying for Rising Mains (CH1290-CH1335) / River Crossing	20 days	Thu 5/5/16	Tue 24/5/16
321	Pipe Laying for Rising Mains (CH1335-CH1385) /Under Dwarf Wall	25 days	Wed 25/5/16	Sat 18/6/16
322	Interim Pipe Testing	7 days	Sun 19/6/16	Sat 25/6/16
323	Pipe Laying for Rising Mains (CH1385-CH1410)/ Road Crossing	15 days	Sun 26/6/16	Sun 10/7/16
324	Pipe Laying for Rising Mains (CH1410-CH1430) / Under Dwarf Wall	10 days	Mon 11/7/16	Wed 20/7/16
325	Pipe Laying for Rising Mains (CH1430-CH1440) / Footpath	5 days	Thu 21/7/16	Mon 25/7/16
326	Pipe Laying for Rising Mains (CH1440-CH1495) / Under Dwarf Wall	25 days	Tue 26/7/16	Fri 19/8/16
327	Pipe Laying for Rising Mains (CH1495-CH1520) / Footpath	10 days	Sat 20/8/16	Mon 29/8/16
328	Pipe Laying for Rising Mains (CH1520-CH1540) / Under Draft Wall	10 days	Tue 30/8/16	Thu 8/9/16
329	Pipe Laying for Rising Mains (CH950-CH970) / Road Crossing	15 days	Fri 9/9/16	Fri 23/9/16
330	Pipe Laying for Rising Mains (CH855-CH950) / Under Dwarf Wall	48 days	Sat 24/9/16	Thu 10/11/16
331	Pipe Laying for Rising Mains (CH845-CH855) / Road Crossing	15 days	Fri 11/11/16	Fri 25/11/16
332	Pipe Laying for Rising Mains (CH765-CH845) / Under Dwarf Wall	40 days	Sat 26/11/16	Wed 4/1/17
333	Final Prssure Testing and Swabbing	14 days	Thu 5/1/17	Wed 18/1/17



Task Milestone Summary

Appendix E

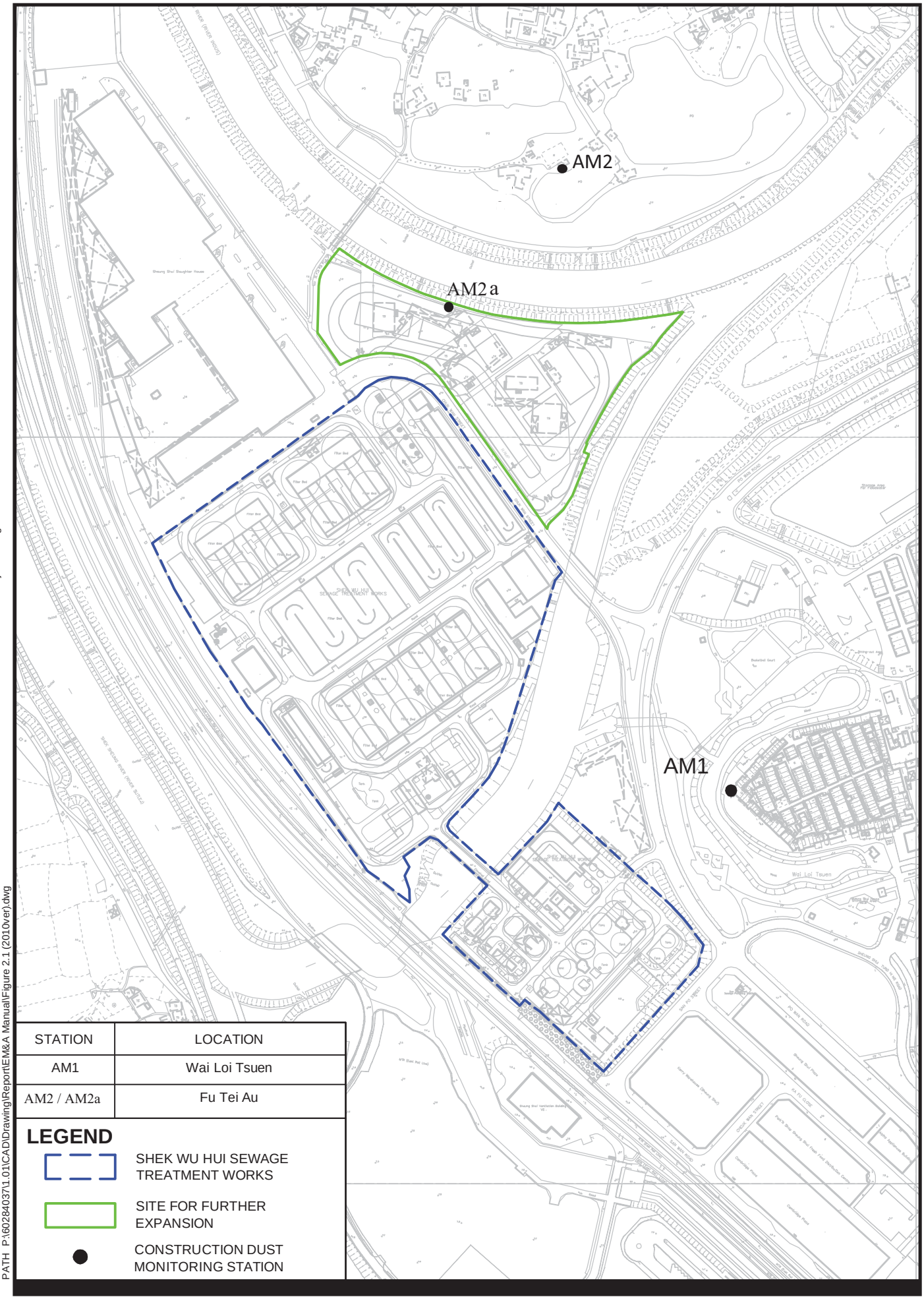
PROPOSED MONITORING LOCATIONS

ISO A4 210mm x 297mm

Checked:

Project Management Initials:

Plot File by: Shumyjl
PATH P:\60284037\1.01\CAD\Drawing\Report\EM&A Manual\Figure 2.1 (2010ver).dwg
26/02/2014



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

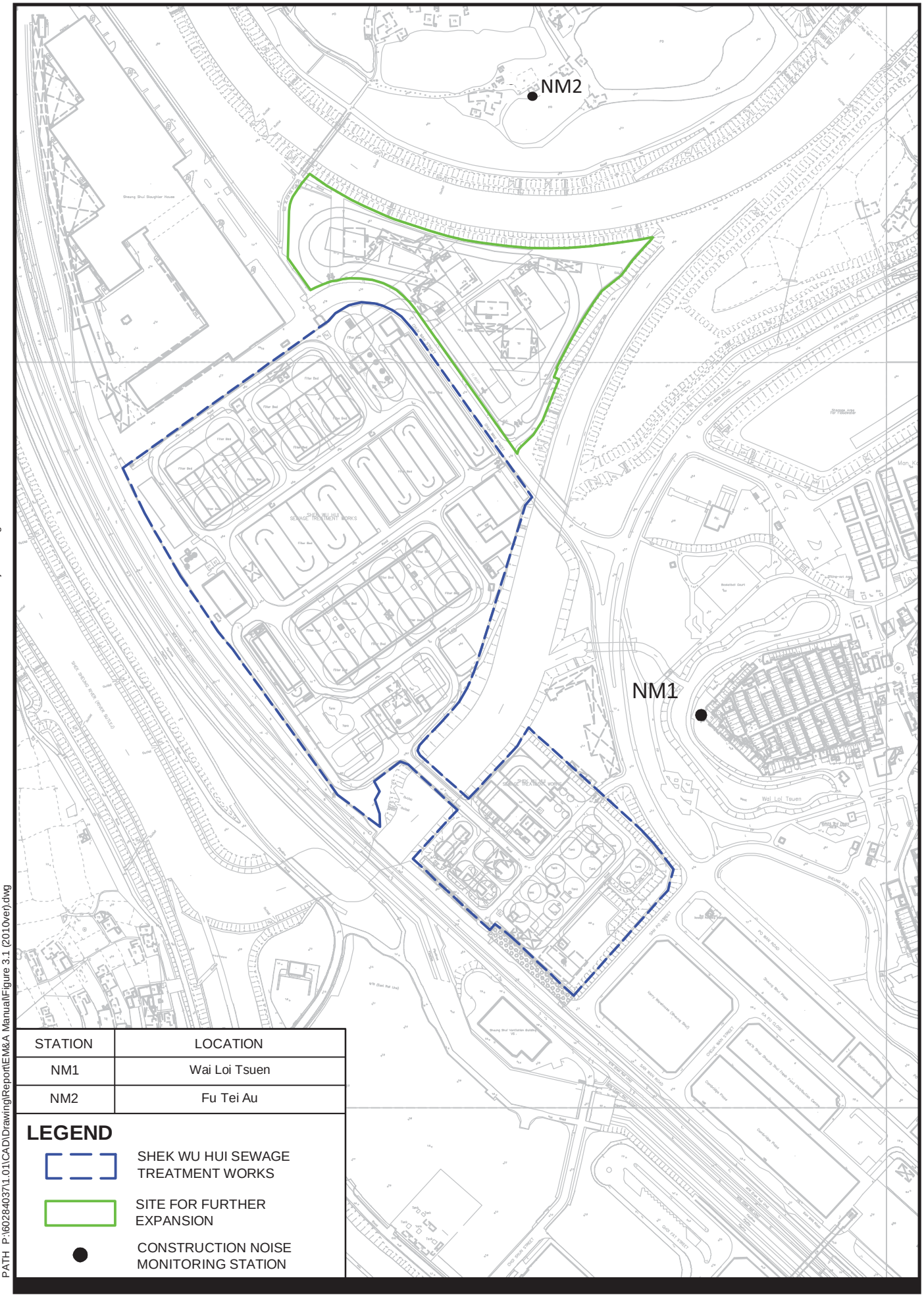
AGREEMENT NO. CE 40/2012 (DS)
SHEK WU HUI SEWAGE TREATMENT WORKS
- FURTHER EXPANSION PHASE 1A
- INVESTIGATION

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: Shumyjl
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

VALID CALIBRATION CERTIFICATES

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : No. 31 Wai Loi Tsuen
Location ID : AM1

Date of Calibration: 28-Apr-16
Next Calibration Date: 29-Jun-16
Technician: K. C. Cheung

CONDITIONS

Sea Level Pressure (hPa)	1013.9	Corrected Pressure (mm Hg)	760.425
Temperature (°C)	24.1	Temperature (K)	297

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.20	6.20	12.4	1.775	51	51.17	Slope = 23.7731
13	5.00	5.00	10.0	1.596	47	47.16	Intercept = 8.7155
10	3.80	3.80	7.6	1.393	41	41.14	Corr. coeff. = 0.9966
7	2.20	2.20	4.4	1.064	33	33.11	
5	1.30	1.30	2.6	0.821	29	29.10	

Calculations :

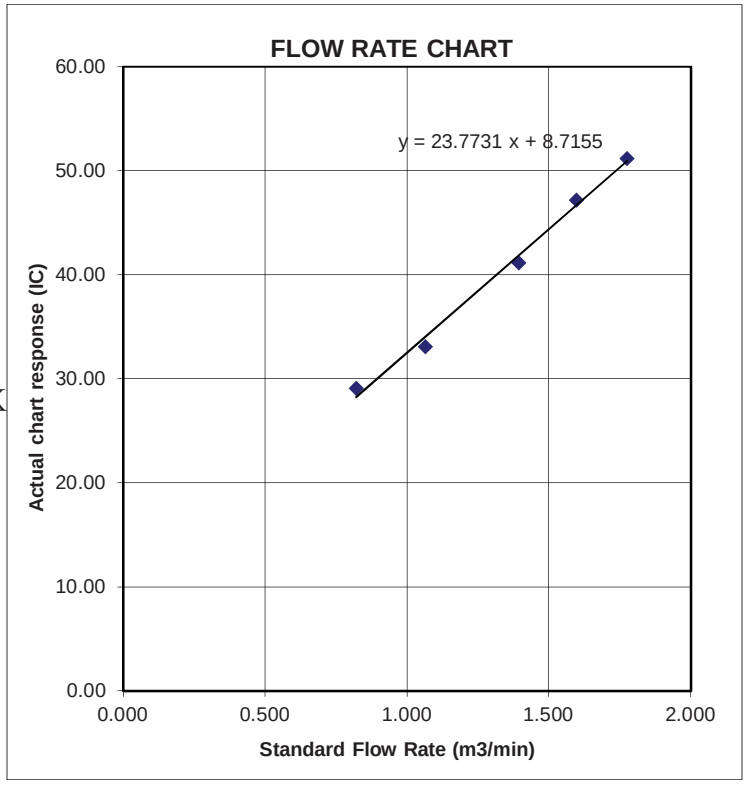
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K
Pstd = actual pressure during calibration (mm Hg

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : No. 31 Wai Loi Tsuen
Location ID : AM1

Date of Calibration: 28-Jun-16
Next Calibration Date: 28-Aug-16
Technician: K. C. Cheung

CONDITIONS

Sea Level Pressure (hPa)	1007.5	Corrected Pressure (mm Hg)	755.625
Temperature (°C)	29.1	Temperature (K)	302

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.30	6.30	12.6	1.769	52	51.15	Slope = 24.0623
13	5.10	5.10	10.2	1.593	47	46.23	Intercept = 8.1803
10	3.90	3.90	7.8	1.395	42	41.31	Corr. coeff. = 0.9990
7	2.10	2.10	4.2	1.028	34	33.44	
5	1.30	1.30	2.6	0.812	28	27.54	

Calculations :

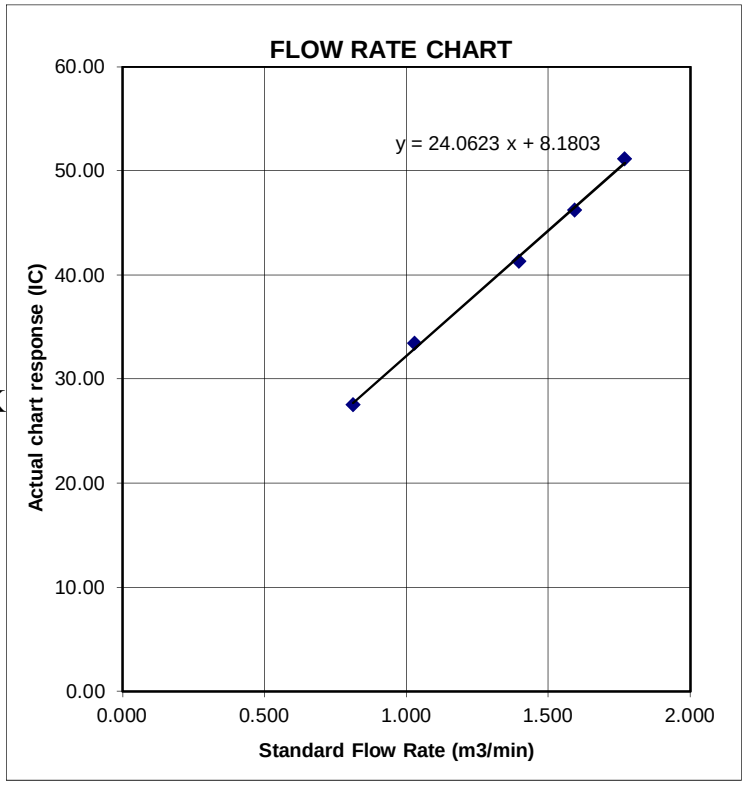
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K
Pstd = actual pressure during calibration (mm Hg

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : RE's Site Office
Location ID : AM2a

Date of Calibration: 28-Apr-16
Next Calibration Date: 28-Jun-16
Technician: K. C. Cheung

CONDITIONS

Sea Level Pressure (hPa)	1013.9	Corrected Pressure (mm Hg)	760.425
Temperature (°C)	24.1	Temperature (K)	297

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected
18	6.20	6.20	12.4	1.775	54	54.18
13	4.90	4.90	9.8	1.580	49	49.16
10	3.80	3.80	7.6	1.393	42	42.14
7	2.30	2.30	4.6	1.087	33	33.11
5	1.50	1.50	3.0	0.881	25	25.08

LINEAR REGRESSION
Slope = 32.5298
Intercept = -2.9682
Corr. coeff. = 0.9984

Calculations :

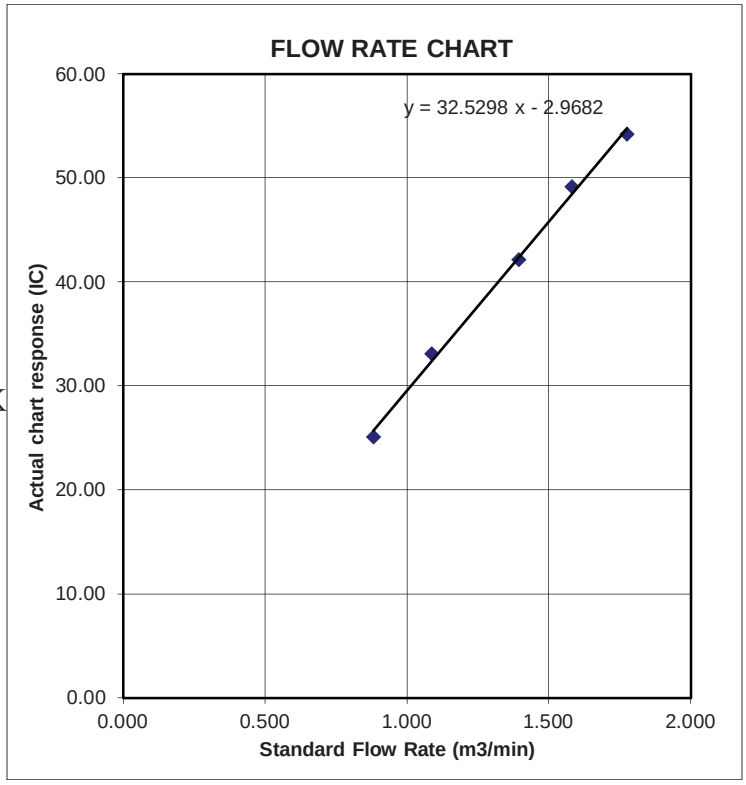
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K
Pstd = actual pressure during calibration (mm Hg

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : RE's Site Office
Location ID : AM2a

Date of Calibration: 28-Jun-16
Next Calibration Date: 28-Aug-16
Technician: K. C. Cheung

CONDITIONS

Sea Level Pressure (hPa)	1007.5	Corrected Pressure (mm Hg)	755.625
Temperature (°C)	29.1	Temperature (K)	302

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.10	6.10	12.2	1.741	55	54.10	Slope = 33.0389
13	4.90	4.90	9.8	1.562	49	48.20	Intercept = -3.4182
10	3.80	3.80	7.6	1.378	43	42.29	Corr. coeff. = 0.9998
7	2.40	2.40	4.8	1.098	33	32.46	
5	1.50	1.50	3.0	0.871	26	25.57	

Calculations :

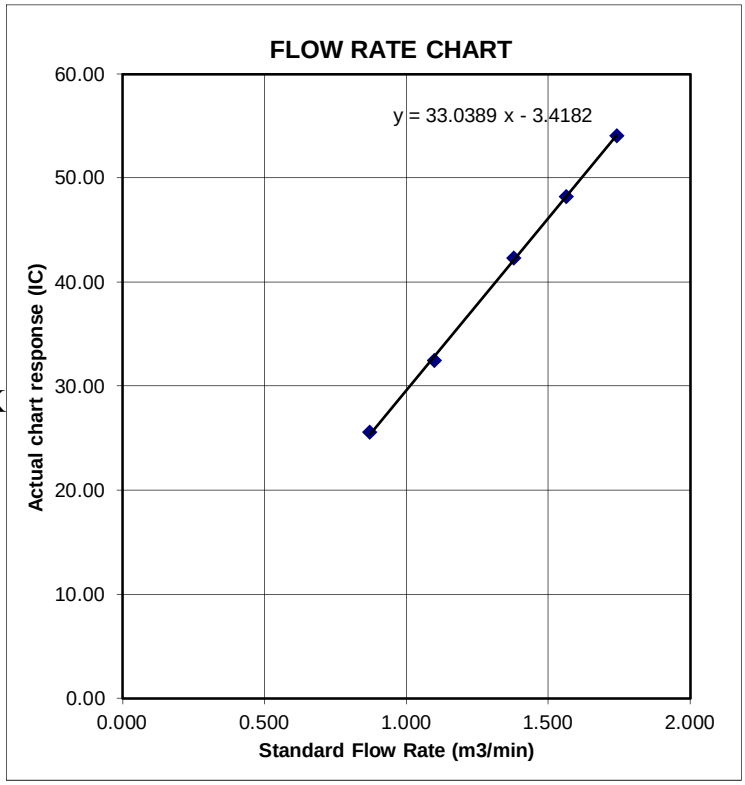
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K
Pstd = actual pressure during calibration (mm Hg

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: **HK1618617**
CLIENT	: **ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING**		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH DATE RECEIVED DATE OF ISSUE	: 1 : 2-APR-2016 : 12-MAY-2016
PROJECT	: ----	NO. OF SAMPLES CLIENT ORDER	: 1 : ----

General Comments

- **Sample(s) were received in an ambient condition.**
- **Sample(s) analysed and reported on an as received basis.**
- **Calibration was subcontracted to and analysed by Action United Enviro Services.**

Signatories

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*
Richard Fung	General Manager

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

ALS Technichem (HK) Pty Ltd
Part of the ALS Laboratory Group
1/F. Chung Shun Knitting Centre 1 - 3 Wing Yip Street Kwai Chung N.T. Hong Kong
Tel. +852 2610 1044 Fax. +852 2610 2021 www.alsglobal.com

WORK ORDER	: HK1618617
SUB-BATCH	: 1
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT	: ----

ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1618617-001	S/N: 366418	AIR	02-APR-2016	S/N: 366418

Equipment Verification Report (TSP)

Equipment Calibrated:

Type:	Laser Dust monitor
Manufacturer:	Sibata LD-3B
Serial No.	366418
Equipment Ref:	EQ108
Job Order	HK1618617

Standard Equipment:

Standard Equipment:	Higher Volume Sampler
Location & Location ID:	AUES office (calibration room)
Equipment Ref:	HVS 018
Last Calibration Date:	22 Mar 2016

Equipment Verification Results:

Calibration Date: 3 April 2016

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m^3 (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr00min	10:15 ~ 12:15	23.0	1014.6	0.056	3126	26.1
2hr00min	12:20 ~ 14:20	23.0	1014.6	0.032	1688	14.1
2hr00min	14:25 ~ 16:25	23.0	1014.6	0.039	1707	14.2

Sensitivity Adjustment Scale Setting (Before Calibration) 677 (CPM)

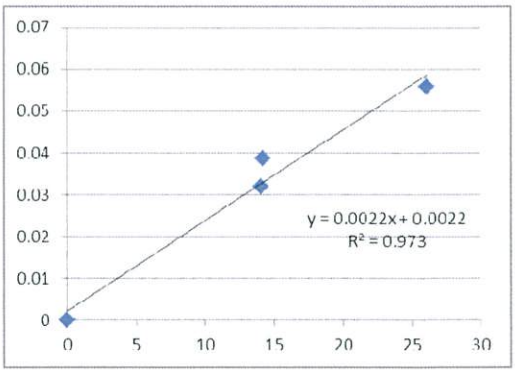
Sensitivity Adjustment Scale Setting (After Calibration) 679 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient (R) 0.9864

Date of Issue 6 April 2016



Remarks:

1. **Strong** Correlation (R>0.8)
2. Factor 0.0022 should be apply for TSP monitoring

*If R<0.5, repair or re-verification is required for the equipment

Operator : Donald Kwok Signature : Date : 6 April 2016

QC Reviewer : Ben Tam Signature : Date : 6 April 2016

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration:	22-Mar-16
Location ID :	Calibration Room	Next Calibration Date:	22-Jun-16

CONDITIONS

Sea Level Pressure (hPa)	1013.4	Corrected Pressure (mm Hg)	760.05
Temperature (°C)	16.6	Temperature (K)	290

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10265
Model->	5025A	Qstd Intercept ->	-0.00335
Calibration Date->	24-Mar-15	Expiry Date->	24-Mar-16

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	4.2	4.2	8.4	1.400	57	57.82	Slope = 31.6915
13	3.2	3.2	6.4	1.222	52	52.75	Intercept = 13.9178
10	2.4	2.4	4.8	1.059	47	47.68	Corr. coeff. = 0.9946
8	1.6	1.6	3.2	0.865	42	42.61	
5	1.1	1.1	2.2	0.717	35	35.51	

Calculations :

Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]

IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate

IC = corrected chart respones

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K

Pstd = actual pressure during calibration (mm Hg

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

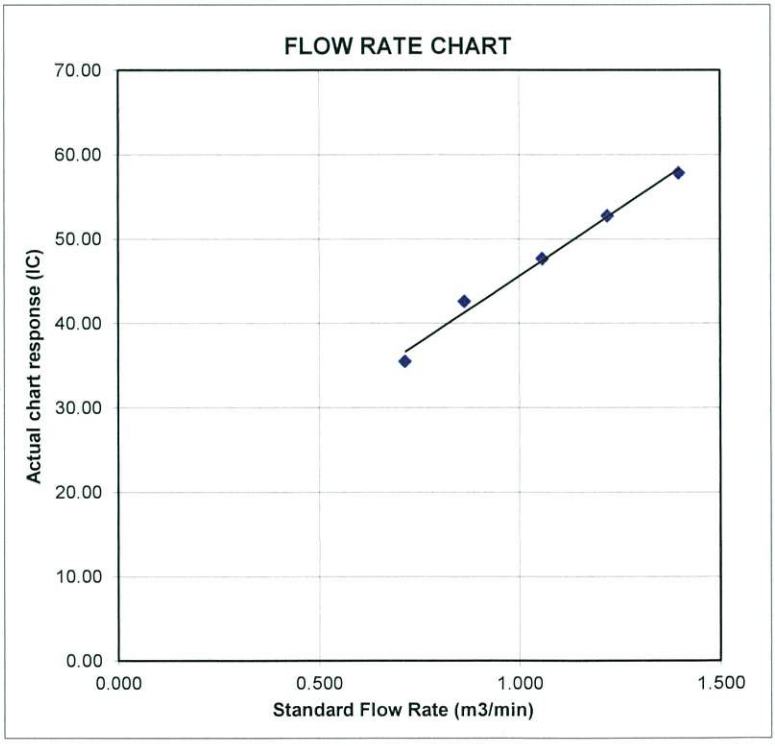
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: **HK1542737**
CLIENT	: **ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING**		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH DATE RECEIVED DATE OF ISSUE	: 1 : 18-SEP-2015 : 9-NOV-2015
PROJECT	: ----	NO. OF SAMPLES CLIENT ORDER	: 1 : ----

General Comments

- **Calibration was subcontracted to and analysed by Action United Enviro Services.**

Signatories

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*
Richard Fung	General Manager

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

ALS Technichem (HK) Pty Ltd
Part of the ALS Laboratory Group
11/F. Chung Shun Knitting Centre 1 - 3 Wing Yip Street Kwai Chung N.T. Hong Kong
Tel. +852 2610 1044 Fax. +852 2610 2021 www.alsglobal.com

WORK ORDER	: HK1542737
SUB-BATCH	: 1
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT	: ----

ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1542737-001	S/N: 23079	AIR	18-SEP-2015	S/N; 23079

Equipment Calibration Record

Equipment Calibrated:

Type:	Laser Dust monitor
Manufacturer:	TSI 8520
Serial No.	23079
Equipment Ref:	EQ064
Work Order:	HK1542737

Standard Equipment:

Standard Equipment:	Higher Volume Sampler (TSP)
Location & Location ID:	Calibration Room
Equipment Ref:	HVS 018
Last Calibration Date:	18 September 2015

Equipment Verification Results:

Calibration Date: 18 & 21 September 2015

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m^3 (Standard Equipment)	Concentration in mg/m^3 (Calibrated Equipment)	Tolerance (mg/m^3)
2hr25min	15:00 ~ 17:25	28.5	1015.0	0.048	0.052	+0.004
2hr10min	14:35 ~ 16:45	27.4	1008.5	0.040	0.046	+0.006
1hr35min	16:50 ~ 18:25	27.4	1008.5	0.042	0.046	+0.004

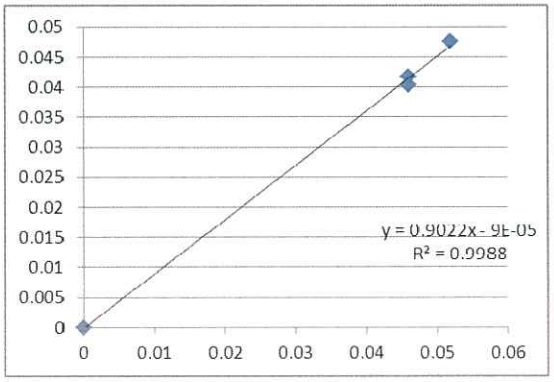
Linear Regression of Y or X

Slope (factor): 0.9022

Correlation Coefficient 0.9993

Date of Issue 25 September 2015

*Factor 0.9040 should be apply for TSP monitoring



Operator : Donald Kwok Signature : Date : 25 September 2015

QC Reviewer : Ben Tam Signature : Date : 25 September 2015

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration:	18-Sep-15
Location ID :	Calibration Room	Next Calibration Date:	18-Dec-15

CONDITIONS

Sea Level Pressure (hPa)	1015	Corrected Pressure (mm Hg)	761.25
Temperature (°C)	28.5	Temperature (K)	302

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10265
Model->	5025A	Qstd Intercept ->	-0.00335
Calibration Date->	24-Mar-15	Expiry Date->	24-Mar-16

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	4	4	8.0	1.340	55	54.72	Slope = 29.9426
13	3.1	3.1	6.2	1.180	51	50.74	Intercept = 15.3651
10	2.4	2.4	4.8	1.038	48	47.76	Corr. coeff. = 0.9947
8	1.6	1.6	3.2	0.848	41	40.79	
5	1.0	1.0	2.0	0.671	35	34.82	

Calculations :

Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]

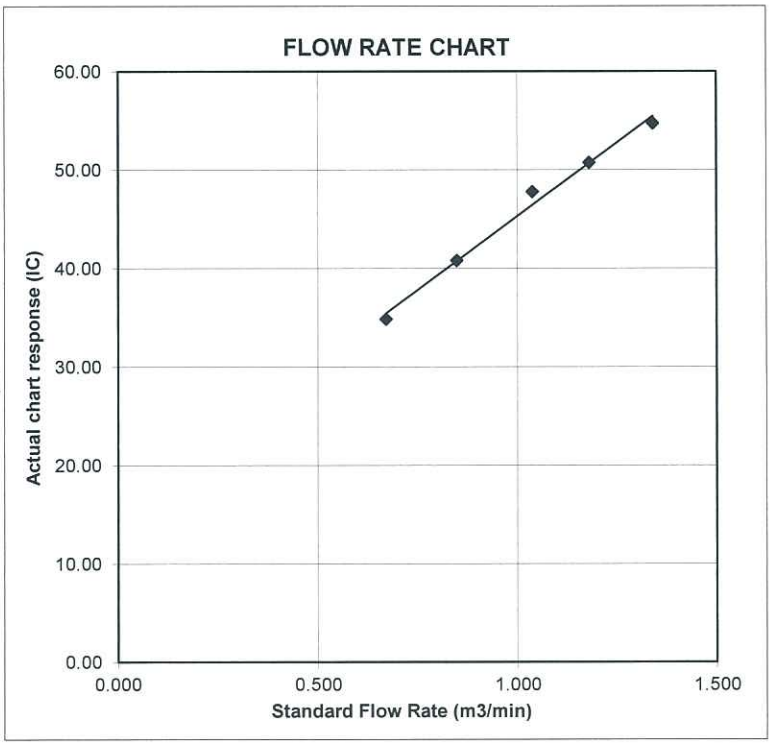
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K
Pstd = actual pressure during calibration (mm Hg

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: **HK1618642**
CLIENT	: **ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING**		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH DATE RECEIVED DATE OF ISSUE	: 1 : 2-APR-2016 : 12-MAY-2016
PROJECT	: ----	NO. OF SAMPLES CLIENT ORDER	: 1 : ----

General Comments

- **Sample(s) were received in an ambient condition.**
- **Sample(s) analysed and reported on an as received basis.**
- **Calibration was subcontracted to and analysed by Action United Enviro Services.**

Signatories

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*
Richard Fung	General Manager

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

ALS Technichem (HK) Pty Ltd
Part of the ALS Laboratory Group
11/F. Chung Shun Knitting Centre 1 - 3 Wing Yip Street Kwai Chung N.T. Hong Kong
Tel. +852 2610 1044 Fax. +852 2610 2021 www.alsglobal.com

WORK ORDER	: HK1618642
SUB-BATCH	: 1
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT	: ----

ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1618642-001	S/N: 456662	AIR	02-APR-2016	S/N: 456662

Equipment Verification Report (TSP)

Equipment Calibrated:

Type:	Laser Dust monitor
Manufacturer:	Sibata LD-3B
Serial No.	456662
Equipment Ref:	EQ118
Job Order	HK1618642

Standard Equipment:

Standard Equipment:	Higher Volume Sampler
Location & Location ID:	AUES office (calibration room)
Equipment Ref:	HVS 018
Last Calibration Date:	22 Mar 2016

Equipment Verification Results:

Calibration Date: 3 April 2016

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m^3 (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr00min	10:15 ~ 12:15	23.0	1014.6	0.056	3130	26.1
2hr00min	12:20 ~ 14:20	23.0	1014.6	0.032	1622	13.5
2hr00min	14:25 ~ 16:25	23.0	1014.6	0.039	1749	14.6

Sensitivity Adjustment Scale Setting (Before Calibration) 594 (CPM)

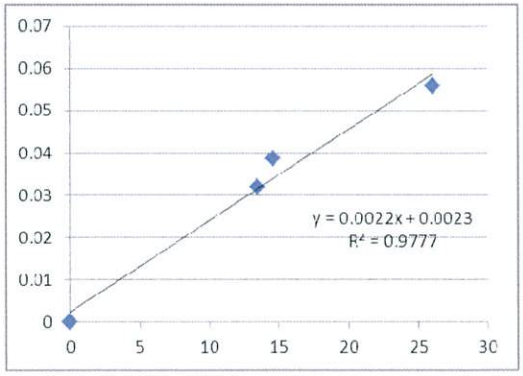
Sensitivity Adjustment Scale Setting (After Calibration) 594 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient (R) 0.9888

Date of Issue 6 April 2016



Remarks:

1. **Strong** Correlation (R>0.8)
2. Factor 0.0022 should be apply for TSP monitoring

*If R<0.5, repair or re-verification is required for the equipment

Operator : Donald Kwok Signature : Date : 6 April 2016

QC Reviewer : Ben Tam Signature : Date : 6 April 2016

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration:	22-Mar-16
Location ID :	Calibration Room	Next Calibration Date:	22-Jun-16

CONDITIONS

Sea Level Pressure (hPa)	1013.4	Corrected Pressure (mm Hg)	760.05
Temperature (°C)	16.6	Temperature (K)	290

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10265
Model->	5025A	Qstd Intercept ->	-0.00335
Calibration Date->	24-Mar-15	Expiry Date->	24-Mar-16

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	4.2	4.2	8.4	1.400	57	57.82	Slope = 31.6915
13	3.2	3.2	6.4	1.222	52	52.75	Intercept = 13.9178
10	2.4	2.4	4.8	1.059	47	47.68	Corr. coeff. = 0.9946
8	1.6	1.6	3.2	0.865	42	42.61	
5	1.1	1.1	2.2	0.717	35	35.51	

Calculations :

Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]

IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate

IC = corrected chart respones

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K

Pstd = actual pressure during calibration (mm Hg

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

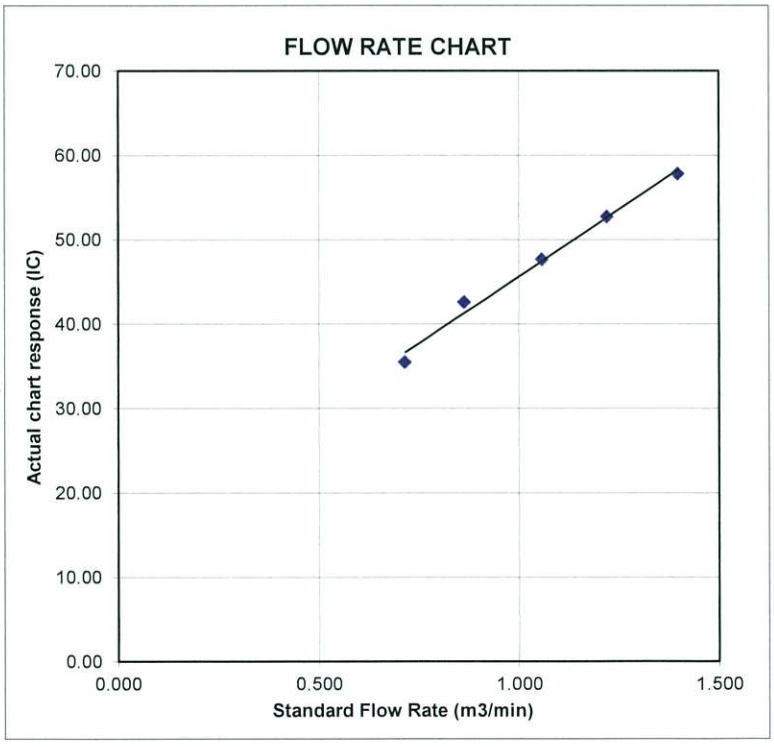
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



輝創工程有限公司
Sun Creation Engineering Limited
Calibration and Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C162439
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0843) Date of Receipt / 收件日期 : 5 May 2016

Description / 儀器名稱 : Sound Level Meter (EQ067)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-31
Serial No. / 編號 : 00410221
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C Relative Humidity / 相對濕度 : (55 ± 20)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 10 May 2016

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By 測試 : H T Wong, Technical Officer

Certified By 核證 : K C Lee, Project Engineer

Date of Issue 簽發日期 : 11 May 2016

輝創工程有限公司
Sun Creation Engineering Limited
Calibration and Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C162439
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.

2. Self-calibration was performed before the test.

3. The results presented are the mean of 3 measurements at each calibration point.

4. Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C160077
CL281	Multifunction Acoustic Calibrator	PA160023

5. Test procedure : MA101N.

6. Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 120	L_A	A	Fast	94.00	1	93.2	± 1.1

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
30 - 120	L_A	A	Fast	94.00	1	93.2 (Ref.)
				104.00		103.2
				114.00		113.3

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

6.2 Time Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 120	L_A	A	Fast	94.00	1	93.2	Ref.
			Slow			93.2	± 0.3

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 – 校正及檢測實驗所
c/o 香港新界屯門興安里一號青山灣機樓四樓
Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

Certificate of Calibration
校正證書

Certificate No. : C162439
證書編號

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 120	L_A	A	Fast	94.00	63 Hz	66.9	-26.2 ± 1.5
					125 Hz	76.9	-16.1 ± 1.5
					250 Hz	84.4	-8.6 ± 1.4
					500 Hz	89.9	-3.2 ± 1.4
					1 kHz	93.2	Ref.
					2 kHz	94.4	+1.2 ± 1.6
					4 kHz	94.3	+1.0 ± 1.6
					8 kHz	92.1	-1.1 (+2.1 ; -3.1)
					12.5 kHz	89.3	-4.3 (+3.0 ; -6.0)

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 120	L_C	C	Fast	94.00	63 Hz	92.2	-0.8 ± 1.5
					125 Hz	93.0	-0.2 ± 1.5
					250 Hz	93.1	0.0 ± 1.4
					500 Hz	93.2	0.0 ± 1.4
					1 kHz	93.2	Ref.
					2 kHz	93.1	-0.2 ± 1.6
					4 kHz	92.5	-0.8 ± 1.6
					8 kHz	90.3	-3.0 (+2.1 ; -3.1)
					12.5 kHz	87.4	-6.2 (+3.0 ; -6.0)

Remarks : - UUT Microphone Model No. : UC-53A & S/N : 319734

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value : 94 dB : 63 Hz - 125 Hz : ± 0.35 dB
250 Hz - 500 Hz : ± 0.30 dB
1 kHz : ± 0.20 dB
2 kHz - 4 kHz : ± 0.35 dB
8 kHz : ± 0.45 dB
12.5 kHz : ± 0.70 dB
104 dB : 1 kHz : ± 0.10 dB (Ref. 94 dB)
114 dB : 1 kHz : ± 0.10 dB (Ref. 94 dB)

- The uncertainties are for a confidence probability of not less than 95 %.

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

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 – 校正及檢測實驗所
c/o 香港新界屯門興安里一號青山灣機樓四樓
Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

輝創工程有限公司
Sun Creation Engineering Limited
Calibration and Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C161796
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0662) Date of Receipt / 收件日期 : 22 March 2016

Description / 儀器名稱 : Sound Level Meter (EQ015)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-52
Serial No. / 編號 : 00142581
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C Relative Humidity / 相對濕度 : (55 ± 20)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 6 April 2016

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By 測試 : H T Wong, Technical Officer

Certified By 核證 : K C Lee, Project Engineer

Date of Issue 簽發日期 : 7 April 2016

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 – 校正及檢測實驗所
c/o 香港新界屯門興安里一號青山灣機樓四樓
Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

Certificate of Calibration
校正證書

Certificate No. : C161796
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.

2. Self-calibration was performed before the test.

3. The results presented are the mean of 3 measurements at each calibration point.

4. Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C160077
CL281	Multifunction Acoustic Calibrator	PA160023

5. Test procedure : MA101N.

6. Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L_A	A	Fast	94.00	1	94.4	± 1.1

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
30 - 130	L_A	A	Fast	94.00	1	94.4 (Ref.)
				104.00		104.4
				114.00		114.4

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

6.2 Time Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L_A	A	Fast	94.00	1	94.4	Ref.
			Slow			94.4	± 0.3

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 – 校正及檢測實驗所
c/o 香港新界屯門興安里一號青山灣機樓四樓
Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

Certificate of Calibration
校正證書

Certificate No. : C161796
證書編號

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L_A	A	Fast	94.00	63 Hz	68.1	-26.2 ± 1.5
					125 Hz	78.2	-16.1 ± 1.5
					250 Hz	85.7	-8.6 ± 1.4
					500 Hz	91.1	-3.2 ± 1.4
					1 kHz	94.4	Ref.
					2 kHz	95.6	+1.2 ± 1.6
					4 kHz	95.4	+1.0 ± 1.6
					8 kHz	93.3	-1.1 (+2.1 ; -3.1)
					12.5 kHz	89.9	-4.3 (+3.0 ; -6.0)

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L_C	C	Fast	94.00	63 Hz	93.5	-0.8 ± 1.5
					125 Hz	94.2	-0.2 ± 1.5
					250 Hz	94.3	0.0 ± 1.4
					500 Hz	94.4	0.0 ± 1.4
					1 kHz	94.4	Ref.
					2 kHz	94.2	-0.2 ± 1.6
					4 kHz	93.6	-0.8 ± 1.6
					8 kHz	91.4	-3.0 (+2.1 ; -3.1)
					12.5 kHz	88.0	-6.2 (+3.0 ; -6.0)

Remarks : - UUT Microphone Model No. : UC-59 & S/N : 06015

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

94 dB :	63 Hz - 125 Hz	: ± 0.35 dB
	250 Hz - 500 Hz	: ± 0.30 dB
	1 kHz	: ± 0.20 dB
	2 kHz - 4 kHz	: ± 0.35 dB
	8 kHz	: ± 0.45 dB
	12.5 kHz	: ± 0.70 dB
104 dB :	1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB :	1 kHz	: ± 0.10 dB (Ref. 94 dB)

- The uncertainties are for a confidence probability of not less than 95 %.

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

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 – 校正及檢測實驗所
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Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

輝創工程有限公司
Sun Creation Engineering Limited
Calibration and Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C162438
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0843) Date of Receipt / 收件日期 : 5 May 2016

Description / 儀器名稱 : Acoustical Calibrator (EQ081)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 4231
Serial No. / 編號 : 2326408
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C Relative Humidity / 相對濕度 : (55 ± 20)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 10 May 2016

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By 測試 : H T Wong, Technical Officer

Certified By 核證 : K C Lee, Project Engineer

Date of Issue 簽發日期 : 11 May 2016

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 – 校正及檢測實驗所
c/o 香港新界屯門興安里一號青山灣機樓四樓
Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

Certificate of Calibration
校正證書

Certificate No. : C162438
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.

2. The results presented are the mean of 3 measurements at each calibration point.

3. Test equipment :

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C153519
CL281	Multifunction Acoustic Calibrator	PA160023
TST150A	Measuring Amplifier	C161175

4. Test procedure : MA100N.

5. Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.0	± 0.2	± 0.2
114 dB, 1 kHz	114.0		

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.000 0	1 kHz ± 0.1 %	± 0.1

Remark : The uncertainties are for a confidence probability of not less than 95 %.

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

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 – 校正及檢測實驗所
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輝創工程有限公司
Sun Creation Engineering Limited
Calibration and Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C162991
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0843)

Description / 儀器名稱 : Sound Calibrator (EQ083)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NC-74
Serial No. / 編號 : 34246492
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

Date of Receipt / 收件日期 : 24 May 2016

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C
Line Voltage / 電壓 : ---
Relative Humidity / 相對濕度 : (55 ± 20)%

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 2 June 2016

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By 測試 : H T Wong, Technical Officer

Certified By 核證 : K C Lee, Project Engineer

Date of Issue 簽發日期 : 3 June 2016

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 – 校正及檢測實驗所
c/o 香港新界屯門興安里一號青山灣機樓四樓
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Certificate of Calibration
校正證書

Certificate No. : C162991
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.

2. The results presented are the mean of 3 measurements at each calibration point.

3. Test equipment :

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C153519
CL281	Multifunction Acoustic Calibrator	PA160023
TST150A	Measuring Amplifier	C161175

4. Test procedure : MA100N.

5. Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.0	± 0.3	± 0.2

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.001	1 kHz ± 1 %	± 1

Remark : The uncertainties are for a confidence probability of not less than 95 %.

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

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Appendix H

IMPACT MONITORING SCHEDULE

Impact Monitoring Schedule for Reporting Month – June 2016

Date		Dust Monitoring		Noise Monitoring
		1-hour TSP	24-hour TSP	
Wed	1-Jun-16			
Thu	2-Jun-16			
Fri	3-Jun-16		✓	
Sat	4-Jun-16	✓		
Sun	5-Jun-16			
Mon	6-Jun-16			
Tue	7-Jun-16			
Wed	8-Jun-16		✓	
Thu	9-Jun-16			
Fri	10-Jun-16	✓		✓
Sat	11-Jun-16			
Sun	12-Jun-16			
Mon	13-Jun-16			
Tue	14-Jun-16		✓	
Wed	15-Jun-16			
Thu	16-Jun-16	✓		✓
Fri	17-Jun-16			
Sat	18-Jun-16			
Sun	19-Jun-16			
Mon	20-Jun-16			
Tue	21-Jun-16			
Wed	22-Jun-16	✓	✓	✓
Thu	23-Jun-16			
Fri	24-Jun-16			
Sat	25-Jun-16		✓	
Sun	26-Jun-16			
Mon	27-Jun-16	✓		✓
Tue	28-Jun-16			
Wed	29-Jun-16			
Thu	30-Jun-16		✓	

✓	Monitoring Day
	Sunday or Public Holiday

Monitoring Location

Air Quality	1-hour TSP	AM1 and AM2
	24-hour TSP	AM1 and AM2a
Construction Noise		NM1 and NM2

Tentative Impact Monitoring Schedule for next Reporting Period – July 2016

Date		Dust Monitoring		Noise Monitoring
		1-hour TSP	24-hour TSP	
FRI	1-Jul-16			
SAT	2-Jul-16	✓		
SUN	3-Jul-16			
MON	4-Jul-16			
TUE	5-Jul-16			
WED	6-Jul-16		✓	
THU	7-Jul-16			
FRI	8-Jul-16	✓		✓
SAT	9-Jul-16			
SUN	10-Jul-16			
MON	11-Jul-16			
TUE	12-Jul-16		✓	
WED	13-Jul-16			
THU	14-Jul-16	✓		✓
FRI	15-Jul-16			
SAT	16-Jul-16			
SUN	17-Jul-16			
MON	18-Jul-16		✓	
TUE	19-Jul-16			
WED	20-Jul-16	✓		✓
THU	21-Jul-16			
FRI	22-Jul-16			
SAT	23-Jul-16		✓	
SUN	24-Jul-16			
MON	25-Jul-16			
TUE	26-Jul-16	✓		✓
WED	27-Jul-16			
THU	28-Jul-16			
FRI	29-Jul-16		✓	
SAT	30-Jul-16			
SUN	31-Jul-16			

✓	Monitoring Day
	Sunday or Public Holiday

Monitoring Location

Air Quality	1-hour TSP	AM1 and AM2
	24-hour TSP	AM1 and AM2a
Construction Noise		NM1 and NM2

Appendix I

24-HOUR TSP AND CONSTRUCTION NOISE MONITORING DATA

24-Hr TSP Monitoring Data for AM1

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP	AVG AIR PRESS	STANDARD FLOW RATE	AIR VOLUME	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED	24-Hr TSP (μg/m³)
		INITIAL	FINAL	(min)	MIN	MAX	AVG	(℃)	(hPa)	(m³/min)	(std m³)	INITIAL	FINAL	(g)	
3-Jun-16	29556	14176.71	14200.72	1440.60	25	27	26.0	27.3	1006.9	0.72	1036	2.8171	2.8560	0.0389	38
8-Jun-16	29537	14200.72	14224.73	1440.60	23	26	24.5	27.1	1006.6	0.66	946	2.8673	2.8906	0.0233	25
14-Jun-16	29610	14224.73	14248.77	1442.40	26	28	27.0	27.9	1006.3	0.76	1096	2.8047	2.8418	0.0371	34
22-Jun-16	29644	14248.77	14272.29	1411.20	27	28	27.5	28.5	1005.8	0.78	1100	2.8248	2.8464	0.0216	20
25-Jun-16	29656	14272.29	14296.28	1439.40	25	27	26.0	28.5	1004.9	0.72	1031	2.8639	2.8930	0.0291	28
30-Jun-16	29673	14296.28	14320.28	1440.00	26	26	26.0	30	1010.3	0.73	1051	2.8311	2.8527	0.0216	21

24-Hr TSP Monitoring Data for AM2a

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP	AVG AIR PRESS	STANDARD FLOW RATE	AIR VOLUME	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED	24-Hr TSP (μg/m³)
		INITIAL	FINAL	(min)	MIN	MAX	AVG	(℃)	(hPa)	(m³/min)	(std m³)	INITIAL	FINAL	(g)	
3-Jun-16	29560	10768.36	10792.37	1440.60	34	36	35.0	27.3	1006.9	1.16	1671	2.7981	2.8474	0.0493	30
8-Jun-16	29289	10792.37	10816.38	1440.60	31	34	32.5	27.1	1006.6	1.08	1561	2.8390	2.8699	0.0309	20
14-Jun-16	29611	10816.38	10840.38	1440.00	35	38	36.5	27.9	1006.3	1.20	1734	2.8149	2.8465	0.0316	18
22-Jun-16	29643	10840.38	10864.38	1440.00	38	39	38.5	28.5	1005.8	1.26	1819	2.8055	2.8534	0.0479	26
25-Jun-16	29655	10864.38	10888.38	1440.00	34	39	36.5	28.5	1004.9	1.20	1731	2.8839	2.9174	0.0335	19
30-Jun-16	29612	10888.38	10912.38	1440.00	32	32	32.0	30	1010.3	1.06	1530	2.8194	2.8383	0.0189	12

Noise Measurement Results (dB) of NM1

Date	Start Time	1st Leq_{5min}	L10	L90	2nd Leq_{5min}	L10	L90	3rd Leq_{5min}	L10	L90	4th Leq_{5min}	L10	L90	5th Leq_{5min}	L10	L90	6th Leq_{5min}	L10	L90	Leq30min
10-Jun-16	9:58	55.4	57.7	50.9	57.4	60.3	51.6	54.1	59.4	49.6	57.1	61.0	50.4	54.1	59.3	49.9	54.2	57.9	50.5	56
16-Jun-16	9:39	56.1	58.6	51.4	54.8	57.7	50.2	54.1	57.5	50.1	54.6	57.7	50.5	54.4	57.2	51.2	54.0	56.5	49.3	55
22-Jun-16	9:50	55.0	57.9	48.1	54.0	57.8	48.6	54.0	57.1	49.3	62.4	65.3	56.4	55.8	60.8	50.6	54.7	58.6	48.7	57
27-Jun-16	9:36	55.1	57.0	49.9	54.9	57.5	49.4	57.3	60.5	50.1	54.5	57.3	50.9	54.8	58.6	50.2	56.2	58.7	51.3	56

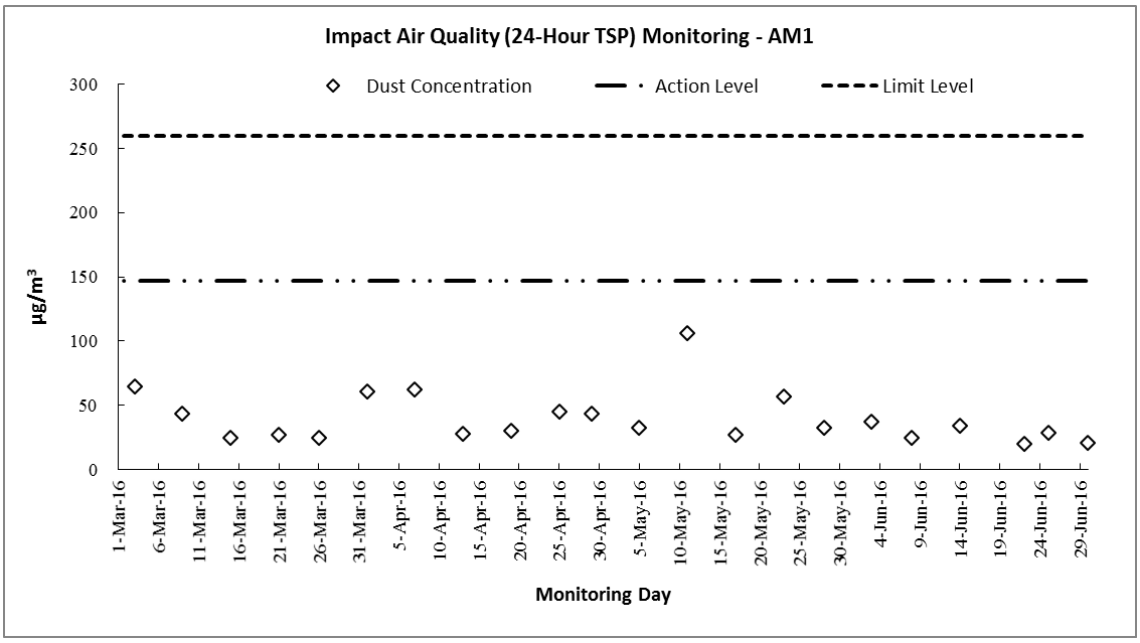
Noise Measurement Results (dB) of NM2

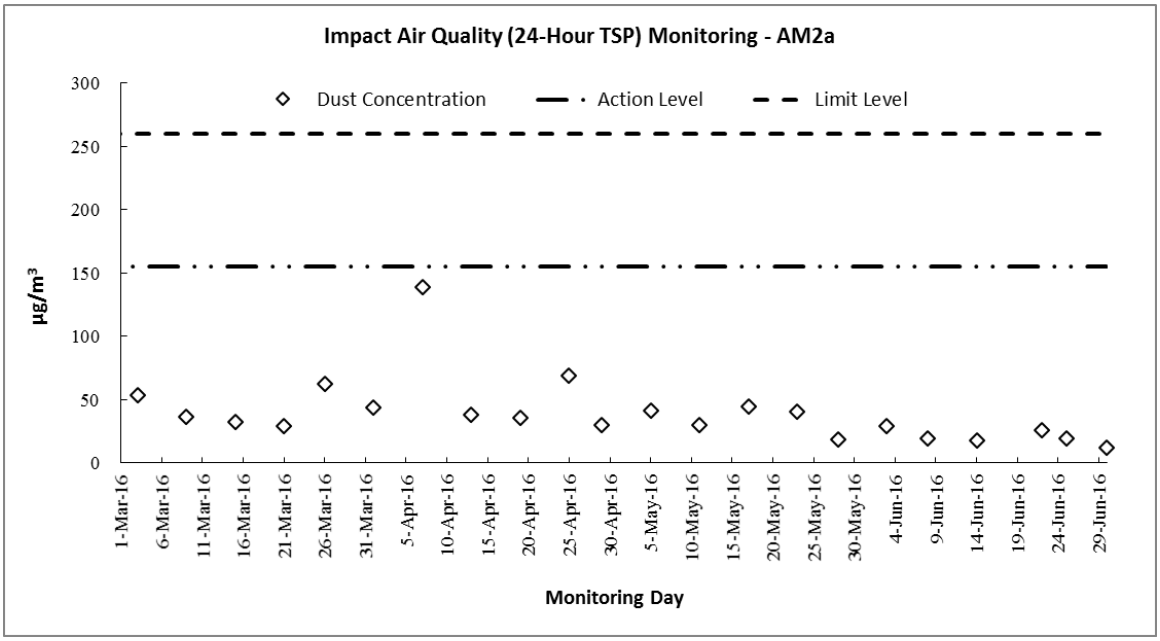
Date	Start Time	1st Leq_{5min}	L10	L90	2nd Leq_{5min}	L10	L90	3rd Leq_{5min}	L10	L90	4th Leq_{5min}	L10	L90	5th Leq_{5min}	L10	L90	6th Leq_{5min}	L10	L90	Leq30min
10-Jun-16	13:39	51.8	52.1	47.4	50.4	53.0	45.1	49.5	53.4	46.0	49.6	50.4	47.0	47.5	48.7	45.6	48.7	49.8	46.1	50
16-Jun-16	13:28	48.5	50.7	45.8	46.7	48.8	44.7	49.4	50.9	46.4	49.5	52.2	46.5	48.4	54.9	47.6	51.5	56.4	47.8	49
22-Jun-16	13:05	51.5	54.6	46.0	59.5	61.6	55.2	62.1	62.6	61.7	60.9	61.9	59.7	59.4	60.8	57.4	55.6	58.4	55.7	59
27-Jun-16	13:45	51.2	54.1	48.6	51.5	54.2	48.2	53.3	56.5	46.1	50.4	52.9	46.7	51.4	54.7	46.4	50.5	53.3	46.9	51

Appendix J

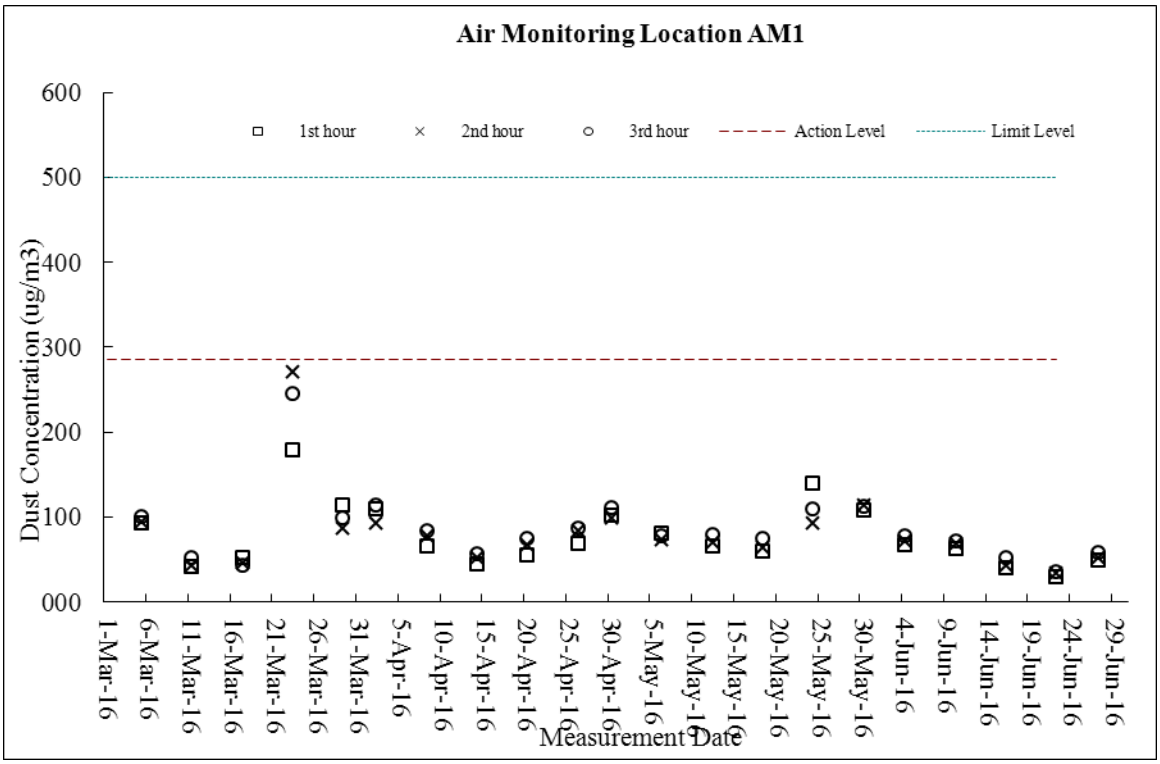
GRAPHICAL PLOTS

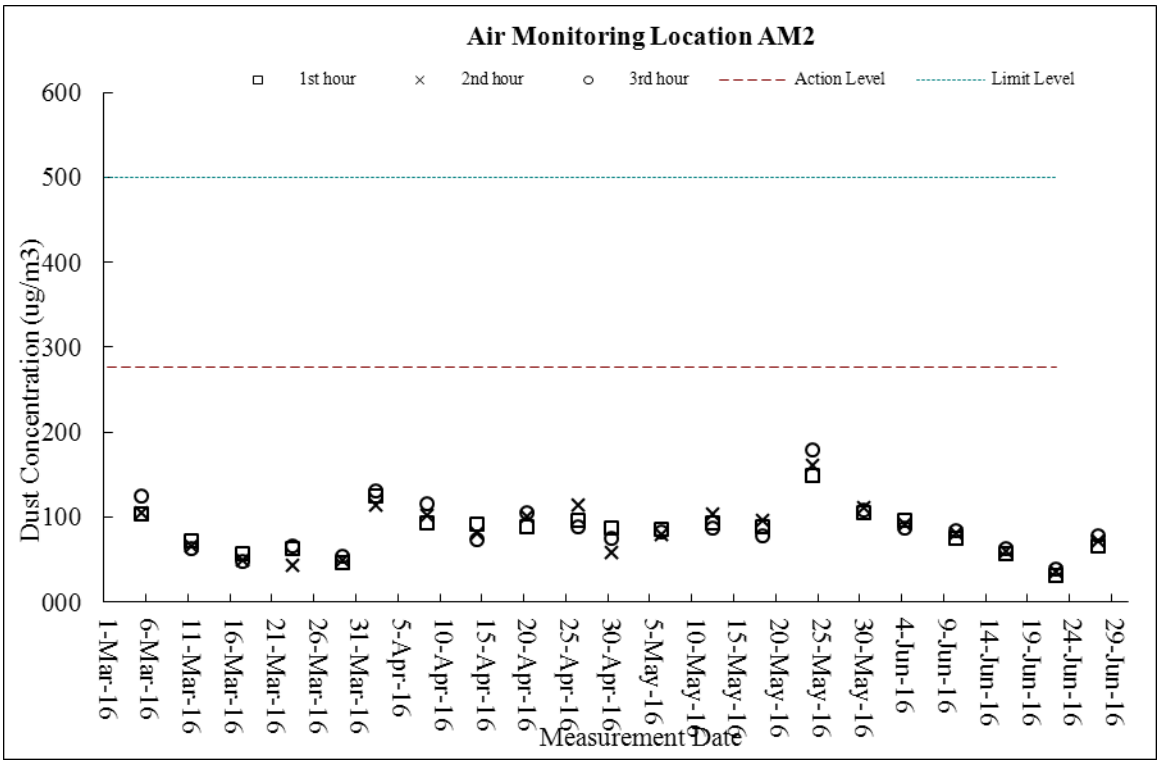
Air Quality – 24-Hour TSP



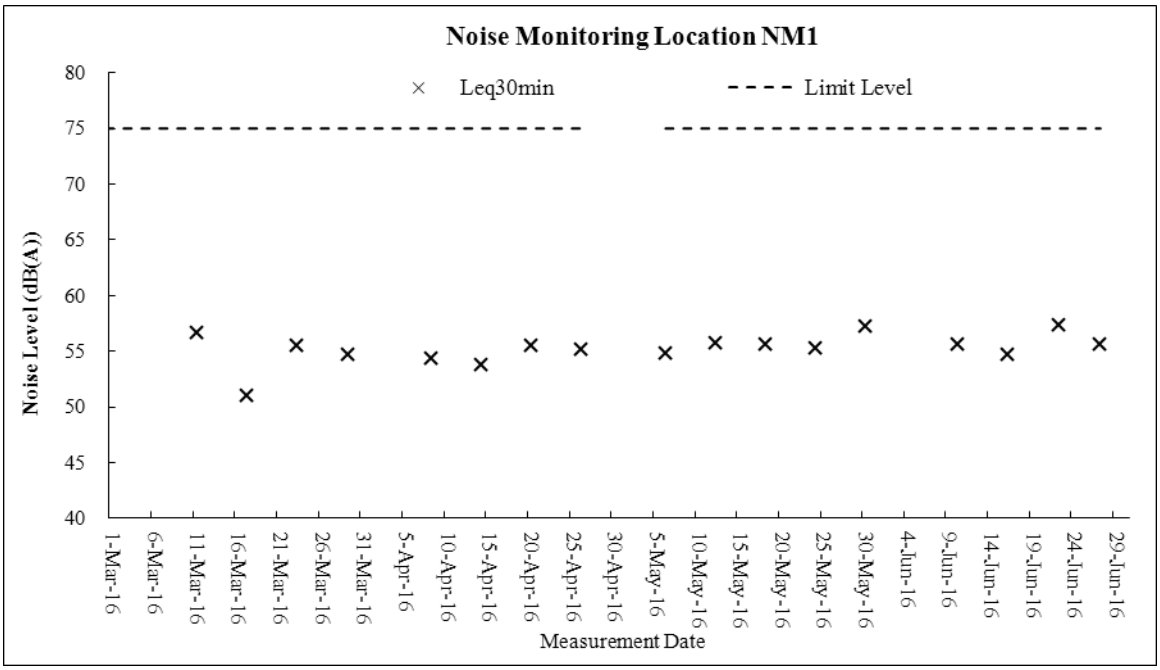


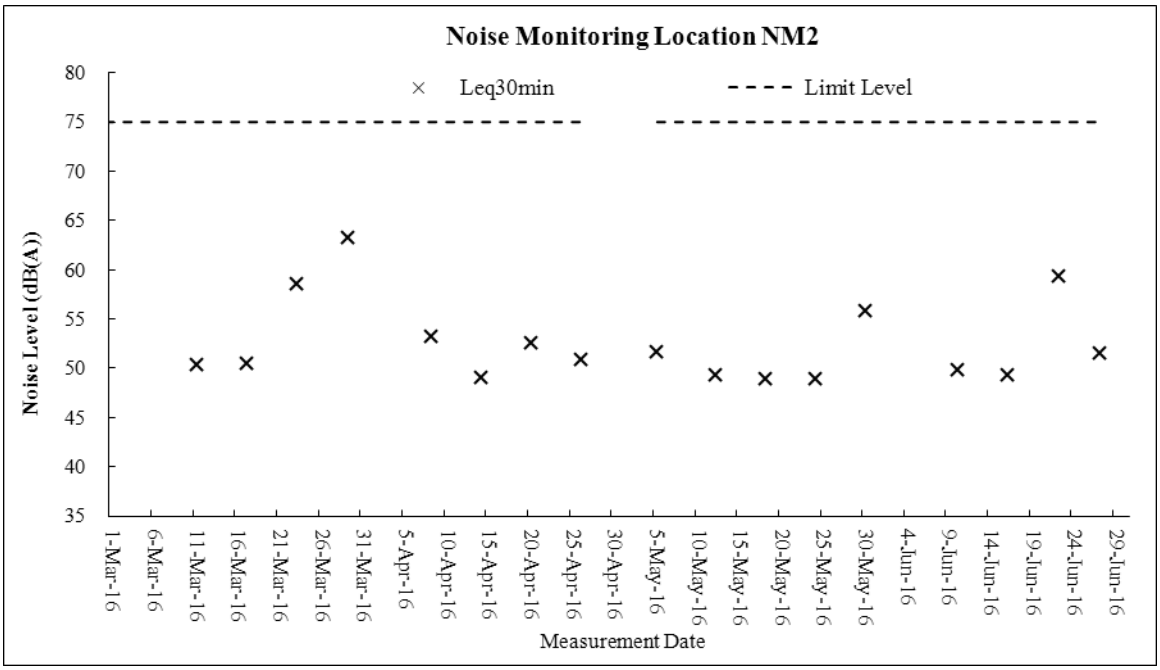
Air Quality – 1-Hour TSP





Construction Noise





Appendix K

METEOROLOGICAL DATA DURING THE REPORTING MONTH (TA KWU LING STATION)

Date		Weather	Total Rainfall (mm)	Ta Kwu Ling Station			
				Mean Air Temp. (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction
1-Jun-16	Wed	Hot with sunny periods and a few showers	0	30	7	77	S/SW
2-Jun-16	Thu	Moderate southeasterly winds	0	30.4	7.5	76.5	S/SW
3-Jun-16	Fri	Moderate south to southwesterly winds	Trace	31.6	8	77.5	S/SW
4-Jun-16	Sat	Hot with sunny periods and a few showers	12.4	29.9	8.1	78	S/SW
5-Jun-16	Sun	Moderate southeasterly winds	7.6	27.5	7.5	79.5	S/SW
6-Jun-16	Mon	Moderate south to southwesterly winds	77.6	25.9	5.5	90	E/NE
7-Jun-16	Tue	Mainly cloudy with isolated heavy showers and squally thunderstorms.	0.4	28.4	6.5	91.2	SE
8-Jun-16	Wed	Cloudy with showers and a few squally thunderstorms.	46.5	27.8	7.5	Maintenance	E/SE
9-Jun-16	Thu	Moderate south to southwesterly winds	Trace	28.5	7.8	79.5	E/NE
10-Jun-16	Fri	Hot with sunny periods and a few showers	9.1	29.1	7.2	82.5	E/NE
11-Jun-16	Sat	Moderate southeasterly winds	85.5	26	6.9	82	E/SE
12-Jun-16	Sun	Moderate south to southwesterly winds	28.2	26.6	6.5	97	E/SE
13-Jun-16	Mon	Hot with sunny periods and a few showers	0.1	29.3	6.5	Maintenance	S
14-Jun-16	Tue	Moderate southeasterly winds	Trace	29.9	9.7	Maintenance	S/SW
15-Jun-16	Wed	Moderate south to southwesterly winds	0.6	29.8	6.5	84	S/SW
16-Jun-16	Thu	Mainly cloudy with isolated heavy showers and squally thunderstorms.	2.8	28.9	6.4	84	S/SW
17-Jun-16	Fri	Cloudy with showers and a few squally thunderstorms.	2.5	29.8	6.5	79.2	S/SW
18-Jun-16	Sat	Moderate south to southwesterly winds	13.1	29.2	7.1	72	S/SW
19-Jun-16	Sun	Hot with sunny periods and a few showers	0	30.1	8.1	69	E/NE
20-Jun-16	Mon	Moderate southeasterly winds	Trace	30.1	7.2	79.2	E/NE
21-Jun-16	Tue	Moderate south to southwesterly winds	0	30.1	6.9	73.5	S/SW
22-Jun-16	Wed	Hot with sunny periods and a few showers	0	29.7	6	76	S/SW
23-Jun-16	Thu	Moderate southeasterly winds	0	29.5	4.9	74.5	S/SW
24-Jun-16	Fri	Moderate south to southwesterly winds	0	30	5.6	73.5	S/SE
25-Jun-16	Sat	Mainly cloudy with isolated heavy showers and squally thunderstorms.	0	30.5	6.3	74	E/SE
26-Jun-16	Sun	Cloudy with showers and a few squally thunderstorms.	Trace	31	7.5	72	E/SE
27-Jun-16	Mon	Moderate south to southwesterly winds	1.7	30.7	7.7	76.5	E/NE
28-Jun-16	Tue	Hot with sunny periods and a few showers	37.1	29	9.2	80.5	S/SE
29-Jun-16	Wed	Hot with sunny periods and a few showers	20.4	29.8	8.2	51	E
30-Jun-16	Thu	Hot with sunny periods and a few showers	1.8	30.1	7.5	76.2	S/SW

Appendix L

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-2015 Estimated completion Date: 19-Aug-2016 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	0.335	0.111	0.060	0.000	0.164	0.000	0.000	0.000	0.000	0.000	0.000
Feb	2.377	0.089	0.050	2.228	0.010	0.000	0.000	0.000	0.000	0.000	0.008
Mar	0.141	0.015	0.050	0.000	0.076	0.000	0.000	0.000	0.000	0.000	0.007
Apr	0.160	0.010	0.050	0.000	0.100	0.000	0.000	0.000	0.000	0.000	0.023
May	0.334	0.000	0.010	0.000	0.324	0.000	0.000	0.000	0.000	0.000	0.026
June	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**
July											
Aug											
Sep											
Oct											
Nov											
Dec											
Total	**5.863**	**0.249**	**0.520**	**2.228**	**2.866**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.076**

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 M

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	