Contractor's General Submission Form (CGS)

22.				THE RESERVE TO SHARE THE PERSON NAMED IN		
Contract No.	3/WSD/15					
Project Title:	In-situ Reprovisioning of Sha Tin Water Treatment Works (South Works) – Advance Works					
CGS No.:	3WSD15/CGS/SEQ/ALL/JV	Issue:	Α	Date:	14/03/2018	
То:	Engineer's Representativ	е	Your Ref:			
Attention:	Mr. Derek K H Ng					
From:	Ming Hing – Ming Hing Ci	vil – Vasteam Join	t Venture			
Title:	EM & A Impact Monitoring	Report (February 20	18)			
Specification:						
Purpose:	☐ For Information	☐ For Commen	t 🗆 For	Appro	val	☑ For Record
Description of Con	tents:					
We herewith submit	the EM&A Impact Monitoring	g Report (February 2	2018) for your	perusal	and rec	ord.
Attachment:	✓ Yes □ No	Number of Copies:	5 + 5 C	D		
Expected reply dat	e:					
Issued By:	(ET/ml)		rinted Name:		Mr	. Eros To
Designation:	Site Age	nt	Date:		14 Fe	bruary 2018
Received By:	(Signature & Rece		ceived Date:			
* Delete if not applic	able	4/1/2				
CC. JV Partner Office Master C	_ Copy _	(w/ encl.) (w/ encl.)				



浩科環境工業有限公司

Acumen Environmental Engineering & Technologies Co., Ltd.

香港青衣(北)担杆山路11號地段

Your ref:

Our ref: CJO-3113

By hand

Chief Engineer /Project Management Water Supplies Department 46/F., Immigration Tower 7 Gloucester Road, Wanchai (Attn: Mr. H C Wong, Heinz)

9 March, 2018

Dear Sir,

In-Situ Reprovisioning of Sha Tin Water Treatment Works – South Works Environmental Permit EP-494/2015

<u>Submission of 24th monthly EM&A Report</u>

In accordance with the Condition 3.4 of the Environmental Permit (No. EP-494/2015), we submit herewith 5 hard copies and 2 electronic copies of the 24th monthly Environmental Monitoring and Audit (EM&A) Report (Rev.0) for your processing. I certified and confirmed the submission of this monthly EM&A Report had complied with the requirements as set out in the approved Environmental Monitoring and Audit (EM&A) Manual of the EIA Report (Register No.: AEIAR-187/2015).

Yours faithfully,

Ir Dr Lam, Gabriel, C.K.

Environmental Team Leader

c.c. Independent Environmental Checker



AECOM 8/F Grand Central Plaza, Tower 2 138 Shatin Rural Committee Road Shatin, Hong Kong 香港新界沙田鄉事會路138號 新城市中央廣場第2座8樓

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Your Ref:

Our Ref:

60479142/C/fyw1803091

By Hand & By Email

Chief Engineer/Project Management Water Supplies Department 46/F., Immigration Tower 7 Gloucester Road, Wanchai

Attn: Mr. H C Wong, Heinz

9 March 2018

Dear Sir.

Contract No.3/WSD/15

In-situ reprovisioning of Sha Tin Water Treatment Works (South Works) Advance Works Submission of 24th Monthly EM&A Report for February 2018

Reference is made to Environmental Team (ET)'s 24th Monthly EM&A Report for February 2018 (Rev. 0) submitted on 9 March 2018.

In accordance with the Condition 3.4 of the Environmental Permit (No.EP-494/2015), I verified and confirmed the submission of this Monthly EM&A Monitoring Report as compiled with the requirements as set in the approved Environmental Monitoring and Audit (EM&A) Manual of the EIA Report (Register No.: AEIAR-187/2015).

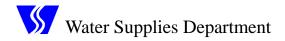
Should you have any queries, please feel free to contact the undersigned at 3922 9366.

Yours faithfully, AECOM Asia Co. Ltd.

Y W Fung

Independent Environmental Checker

c.c. Environmental Team Leader





MONTHLY ENVIRONMENTAL MONITORING AND AUDIT (EM&A) REPORT (NO. 24)

FOR

CONTRACT NO. 3/WSD/15 IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS – SOUTH WORKS

(Rev. 0)

MONTHLY ENVIRONMENTAL MONITORING AND AUDIT (EM&A) REPORT (NO. 24) -

FOR

CONTRACT NO. 3/WSD/15
IN-SITU REPROVISIONING OF SHA TIN WATER
TREATMENT WORKS – SOUTH WORKS

	Name	Signature
Prepared by	Mr. Tsui, Nelson, T. H.	M
Checked & Reviewed by	Ir Leung, Jacky, C. H.	
Approved & Certified by	Ir Dr. Lam, Gabriel, C. K. Environmental Team Leader (ETL)	Con
Verified & Confirmed by	Mr. Fung, Y. W. Independent Environmental Checker (IEC)	y

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L	l .

EXECUTIVE SUMMARY

- A.1 Pursuant to the Environmental Impact Assessment (EIA) Ordinance, the Director of Environmental Protection (DEP) granted the Environmental Permit (No. EP- 494/2015) to the Water Supplies Department (WSD) to construct and operate the designated project for "In-situ Reprovisioning of Sha Tin Water Treatment Works South Works" ("The Project").
- A.2 Under Contract No. 3/WSD/15, Ming Hing Ming Hing Civil Vasteam Joint Venture (MMVJV) is commissioned by WSD to undertake the construction of the advance works while AECOM Asia Company Limited was appointed by WSD as the Engineer. For implementation of the environmental monitoring and audit (EM&A) programme under the Contract, Acumen Environmental Engineering & Technologies Company Limited was appointed by MMVJV as the Environmental Team (ET). AECOM Asia Company Limited was also employed by the WSD as the Independent Environmental Checker (IEC).
- A.3 The construction phase of the Contract commenced on 30 October 2015 for completion by 2018. The impact monitoring of the EM&A programme, including air quality, noise, water quality monitoring as well as environmental site inspections, commenced on 17 February 2016.
 - A.4 This is the 24th monthly Environmental Monitoring and Audit Report for this Contract covering the period from 1 February 2018 to 28 February 2018 (the Reporting Period). As informed by the Contractor, major activities in the reporting period included:
 - Construction of Logistics Centre at Wall C.
 - Construction lagging wall and bore piles at Wall D and C
 - External finish work at North Work Temporary House
 - Modification of clarifier no.1
 - Modification of valve chamber and construction of flow meter house
 - Construction of CLP steel cable support between CLP substation and North Work Washwater Pump House
- A.5 Environmental monitoring activities under the EM&A program in this reporting period are summarized below

Issues	Environmental Monitoring Parameters / Inspection	Occasions
Air	1-Hour TSP	6
Noise	$L_{eq(30mins)}$ Daytime	6
Water Quality	Water Sampling	11
Inspection /	ET Regular Environmental Site Inspection	5
Audit	IEC Monthly Environmental Site Audit	1

- A.6 No exceedance of air quality, noise and water quality monitoring were recorded in this reporting period.
- A.7 No environmental complaint were received via EPD in this reporting period.
- A.8 No notification of any summons and successful prosecutions was received in this reporting period.
- A.9 No reporting change was made in this reporting period.
- A.10 There was no EPD site inspection were conducted in the reporting period.
- A.11 As informed by the Contractor, the major works for this Project in March 2018 will be:
 - Construction of Logistics Centre at Wall C.
 - Construction lagging wall and bore piles at Wall D and C
 - External finish work at North Work Temporary House
 - Modification of clarifier no.1

i

- Modification of valve chamber and construction of flow meter house
- Construction of CLP steel cable support between CLP substation and North Work Washwater Pump House
- A.12 EM&A monitoring for the 24th reporting period has been completed. The 25th monthly EM&A report will cover the period from 1 March 2018 to 31 March 2018.

I. INTRODUCTION

1.1. PROJECT BACKGROUND

- 1.1.1 Pursuant to the Environmental Impact Assessment (EIA) Ordinance, the Director of Environmental Protection (DEP) granted the Environmental Permit (No. EP- 494/2015) on 28 January 2015, subsequent to approval of the EIA Report (Register No. AEIAR-187/2015), to the Water Supplies Department (WSD) to construct and operate the designated project for "In-situ Reprovisioning of Sha Tin Water Treatment Works South Works" ("The Project").
- 1.1.2 Under Contract No. 3/WSD/15, Ming Hing Ming Hing Civil Vasteam Joint Venture (MMVJV) is commissioned by WSD to undertake the construction of the advance works while AECOM Asia Company Limited was appointed by WSD as the Engineer. For implementation of the environmental monitoring and audit (EM&A) programme under the Contract, Acumen Environmental Engineering & Technologies Company Limited was appointed by MMVJV as the Environmental Team (ET). AECOM Asia Company Limited was also employed by the WSD as the Independent Environmental Checker (IEC).
- 1.1.3 The construction phase of the Contract commenced on 30 October 2015 for completion by 2018. The general layout plan of the Contract components is presented in **Appendix A**.
- 1.1.4 ET conducted below baseline monitoring at designated locations according to the EM&A Manual.
 - Air quality and noise: from 21 December 2015 to 3 January 2016.
 - Water quality: from 15 December 2015 to 8 January 2016.
- 1.1.5 Baseline Monitoring Report was issued by the ET and verified by the IEC on 27 January 2016 and submitted to the EPD on 2 February 2016.
- 1.1.6 The impact monitoring of the EM&A programme, including air quality, noise, water quality monitoring as well as environmental site inspections, commenced on 17 February 2016.

1.2. ORGANIZATION STRUCTURE

1.2.1 The organization structure of the Contract is shown in **Appendix B**. Contact details of key personnel are summarized in below table:

Table 1-1: Key Personnel Contact for Environmental Works

Party	Position	Name	Telephone
Water Supplies	Engineer / Project	Mr. Chiu, Aletta C. M.	2829 5653
Department	Management		
AECOM	Senior Resident Engineer	Mr. Ng, Derek, K. H.	9717 1420
	(Civil)		
	Independent Environmental	Mr. Fung, Y. W.	3922 9366
	Checker		
	Deputy Independent	Ms. Lam, Lemon, M. C.	3922 9381
	Environmental Checker		
Ming Hing - Ming	Project Manager	Mr. Lam, Larry, M. W.	6478-0501
Hing Civil - Vasteam	Site Agent	Mr. To, Eros, W. H.	9223 9590
Joint Venture			
Acumen Env. Eng. &	Environmental Team	Ir Dr. Lam, Gabriel, C.	2333 6823
Tech. Co. Ltd.	Leader	K.	
	Deputy Environmental	Ir Leung, Jacky, C. H.	9060 2368
	Team Leader		
	Ecologist	Mr. Liu, Vincent, W. L.	6505 5827

1.3. SCOPE OF REPORT

- 1.3.1 This is the 24th monthly EM&A Report under the Contract No. 3/WSD/15 In-situ Reprovisioning of Sha Tin Water Treatment Works (South Works) Advance Works covering the period from 1 March 2018 to 31 March 2018 (the reporting period).
- 1.3.2 The EM&A requirements for impact monitoring are set out in the approved EM&A Manual. Environmental aspects such as the construction air quality, noise, water quality and ecology were identified as the key issues during the construction phase of the Project.

1.4. SUMMARY OF CONSTRUCTION WORKS

- 1.4.1 The construction phase of the Contract commenced on 30 October 2015. Latest construction programmes is shown in **Appendix C**.
- 1.4.2 As informed by the Contractor, details of the major works carried out in this reporting month are listed below:
 - Construction of Logistics Centre at Wall C.
 - Construction lagging wall and bore piles at Wall D and C
 - External finish work at North Work Temporary House
 - Modification of clarifier no.1
 - Modification of valve chamber and construction of flow meter house
 - Construction of CLP steel cable support between CLP substation and North Work Washwater Pump House
- 1.4.3 The locations of the construction activities are shown in **Appendix D**. The Environmental Sensitive Receivers in the vicinity of the Project are shown in **Appendix E**.

2. EM&A RESULTS

2.1. EM&A BACKGROUND

2.1.1 The EM&A programme required environmental monitoring for air quality, noise, water quality and ecology as well as environmental site inspections for air quality, noise, water quality, waste management and ecology impacts. The EM&A requirements and related findings for each component are summarized in the following sections. A summary of impact monitoring programme is presented in Table 2-1.

Table 2-1: Summary of Impact Monitoring Programme

Impact Monitoring	Sampling Parameter	Frequency
Air Quality	1-hour TSP	3 times in every 6 days when documented and valid complaint was received
Noise	$L_{\rm eq~30~min}, L_{\rm eq~5~min}, \\ L_{\rm 10} \mbox{ and } L_{\rm 90} \mbox{ as reference}.$	1 time per week:
Water Quality	Duplicate in-situ measurements: Dissolved Oxygen (DO), Turbidity and pH; HOKLAS-accredited laboratory analysis: Suspended Solids (SS).	3 days per week. The interval between 2 monitoring days will be more than 36 hours.
Ecology	-	A detailed at least 6 years post-planting monitoring and maintenance programme

Remark: Sampling Depth for Water Quality:

- (i) 3 depths: 1m below water surface, 1m above bottom and at mid-depth when the water depth exceeds 6m.
- (ii) If the water depth is between 3m and 6m, 2 depths: 1m below water surface and 1m above bottom.
- (iii) If the water depth is less than 3m, 1 sample at mid-depth is taken
- 2.1.2 A summary of the monitoring parameters is presented in Table 2-2.

Table 2-2: Summary of the monitoring parameters of EM&A Requirements

Environmental Issue	Parameter
Air Quality	1-hour TSP Monitoring by Real-Time Portable Dust Meter
Noise	• L _{eq (30min)} during normal working hours
	In-situ measurement ■ Dissolved Oxygen (mg/L);
	Dissolved Oxygen Saturation (%);Turbidity (NTU);
Water Quality	 pH value; Water depth (m); and Temperature (°C)
	Laboratory analysis ■ Suspended Solids (mg/L)

- 2.1.3 Summary of determination of Action/Limit (A/L) Levels for air quality, noise and water quality are presented in **Appendix F**.
- 2.1.4 Should non-compliance of the environmental quality criteria occurs, remedial actions will be triggered according to the Event and Action Plan enclosed in **Appendix G**.
- 2.1.5 The impact monitoring schedules are presented in **Appendix H** and the monitoring results are detailed in the following sub-sections.

2.2. AIR QUALITY MONITORING

- 2.2.1 Impact monitoring for air quality had been carried out in accordance with Sections 2.29 of the approved EM&A Manual to determine the ambient 1-hour total suspended particulates (TSP) levels at the monitoring locations. 1-hour TSP sampling should be undertaken at least 3 times in every six-days at each monitoring station when the highest dust impacts are expected. General meteorological conditions (wind speed, direction and precipitation) and notes regarding any significant adjacent dust producing sources had also been recorded throughout the impact monitoring period.
- 2.2.2 Two (2) designated monitoring stations, AM1 located at the L Louey and AM2 located at Hin Keng Estate Hin Wan House, were recommended in Section 2.18 of the approved EM&A Manual. In order to identify and seek for the access of the air monitoring locations designated in the EM&A Manual, site visit was conducted among ET, IEC and EPD.
- 2.2.3 During the site visit, all designated air monitoring locations were identified. Details of air monitoring stations are described in Table 2-3. The location plan of air quality monitoring stations is shown in **Appendix I**.

Table 2-3: Location of the Air Quality Monitoring Stations

Air Quality Monitoring Station	Air Sensitive Receiver (ASR) ID in the approved EIA Report	Dust Monitoring Station
AM1	ASR2	The L Louey (at a platform level of about 5m above road level nearby)
AM2	ASR4	Hin Keng Estate - Hin Wan House (at the roof top)

2.2.4 The monitoring equipment using for the air quality impact monitoring was proposed by ET and verified by IEC. 1-hour TSP levels had been measured with direct reading dust meter. It has been demonstrated its capability in achieving comparable results with high volume sampling method as set out in the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50). The details of equipment using for impact monitoring are listed in Table 2-4 as below.

Table 2-4: Air Quality Impact Monitoring Equipment

Equipment	Model
Portable dust meter – 1-hour TSP	TSI DustTrak Aerosol Monitor Model 8532
Portable Wind Speed Indicator	The Kestrel Pocket Weather Meter

- 2.2.5 The 1-hour TSP meter provides a real time 1-hour TSP measurement based on 90° light scattering. The 1-hour TSP monitor consists of the following:
 - A pump to draw sample aerosol through the optic chamber where TSP is measured;
 - A sheath air system to isolate the aerosol in the chamber to keep the optics clean for maximum reliability; and

- A built-in data logger compatible with based program to facilitate data collection, analysis and reporting.
- 2.2.6 The 1-hour TSP meter was 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 followed manufacturer's Operation and Service Manual. A valid calibration certificate is attached in **Appendix J**.
- 2.2.7 In this Reporting Period, a total of six (6) sampling days perform air quality monitoring at the two designated locations. The results for 1-hour TSP are summarized in Table 2-5 and Table 2-6.

Table 2-5: Summary of 1-hour TSP Monitoring Results – AM1

	•		1-hour TSP (μg/m³)			
Date	Weather	Start	End	1 st	2 nd	3 rd
		Time	Time	Measurement	Measurement	Measurement
02-02-18	Cloudy	13:04	16:04	112	127	135
07-02-18	Cloudy	9:13	12:13	131	138	152
12-02-18	Fine	9:31	12:31	130	140	127
14-02-18	Sunny	9:51	12:51	137	128	120
20-02-18	Fine	12:30	15:30	110	119	126
26-02-18	Sunny	13:25	16:25	134	120	128
	Average				128.6	
	Range				110-152	

Table 2-6: Summary of 1-hour TSP Monitoring Results – AM2

	•		1-hour TSP (μg/m³)				
Date	Weather	Start	End	1 st	2 nd	3 rd	
		Time	Time	Measurement	Measurement	Measurement	
02-02-18	Cloudy	15:18	18:18	69	71	64	
07-02-18	Cloudy	11:21	14:21	91	94	85	
12-02-18	Fine	11:47	14:47	71	88	91	
14-02-18	Sunny	12:11	15:11	90	84	81	
20-02-18	Fine	10:11	13:11	83	76	80	
26-02-18	Sunny	11:14	14:14	92	99	94	
Average				83.5			
	Range				64-99		

2.2.8 In this Reporting Month, all monitoring result were below the action level. Hence, no Action or Limit Level exceedance was triggered during this month. The impact air quality monitoring results and graphical presentation are shown in **Appendix K**.

2.3. NOISE MONITORING

- 2.3.1 Impact monitoring for noise levels had been measured in accordance with Sections 3.13 of approved EM&A Manual on normal weekdays at a frequency of once a week at logging interval of 30 minutes for daytime (between 0700 and 1900 hours of normal weekdays). The L_{eq} had been recorded at the specified intervals. The non-project related construction activity Sha Tin to Central Link (SCL) for Hin Keng to Diamond Hill Tunnel, in the vicinity of the monitoring stations during the impact monitoring had been noted and the source and location of this activity had been recorded.
- 2.3.2 According to Section 3.7 of the approved EM&A Manual, 3 noise sensitive receivers designated for the construction noise monitoring. The designated monitoring stations are identified and successfully granted by the premises. The details of noise monitoring stations are described in Table 2-7 and the location plan of noise monitoring stations is shown in **Appendix L**.

Table 2-7: Details of Noise Monitoring Stations

Noise Monitoring Station	Noise Sensitive Receiver (NSR) ID in the approved EIA Report	Identified Noise Monitoring Station
		The L Louey (South) (at a platform level of
NM1	HK2	about 5m above road level nearby
		- free field measurement)
		Hin Keng Estate –
NM2	HK5	Hin Wan House
		(at the roof level - facade measurement)
		C.U.H.K.F.A.A.
NM3	HK7	Thomas Cheung School
		(at the roof level - free field measurement)

2.3.3 The monitoring equipment using for the noise impact monitoring was proposed by ET and verified by IEC. Sound level meter in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications has been used for carrying out the noise monitoring. The sound level meter has been checked using an acoustic calibrator. The wind speed has been checked with a portable wind speed meter capable of measuring the wind speed in m/s. The details of equipment using for impact monitoring are listed in Table 2-8 as below.

Table 2-8: Noise Impact Monitoring Equipment

Noise	
Sound Level Meter	Aco 6224 Sound Level Meter
Acoustic Calibrator	Pulsar 105 Sound Calibrator
Portable Wind Speed Indicator	The Kestrel Pocket Weather Meter

- 2.3.4 All noise measurements were the meter set to FAST response and on the A-weighted equivalent continuous sound pressure level (L_{eq}).
- 2.3.5 Prior to the impact 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. Regular checking was conducted in impact monitoring period. The calibration level before and after the noise measurement is agreed to within 1.0 dB.
- 2.3.6 An acoustic calibrator and sound level meter using impact monitoring is within the valid period and were calibrated per year. A set of valid calibration certificates is attached in **Appendix M**.
- 2.3.7 Noise measurements should not be made in presence of fog, rain, wind with a steady speed exceeding 5 ms⁻¹ or wind with gusts exceeding 10 ms⁻¹. The wind speed was checked with a portable wind speed meter capable of measuring with speeds in ms⁻¹.
- 2.3.8 In this Reporting Period, a total six (6) occasions noise monitoring was undertaken in Reporting period. The noise monitoring results at the designated locations are summarized in Tables 2-9 to 2-11.

Table 2-9: Summary of Noise Monitoring Results – NM1

Date	Time	Weather	1 st Leq _{5min}	2 nd Leq _{5min}	3 rd Leq _{5min}	4 th Leq _{5min}	5 th Leq _{5min}	6 th Leq _{5min}	Leq _{30min}
02-02-18	13:50 - 14:20	Cloudy	59.3	58.6	58.4	58.1	59.3	59.6	58.9
07-02-18	10:17 - 10:47	Cloudy	58.3	58.1	59.3	58.0	58.4	59.2	58.6
12-02-18	13:28 - 13:58	Fine	56.7	57.9	58.6	58.3	59.1	58.5	58.2
14-02-18	13:07 - 13:37	Sunny	57.5	58.4	58.9	58.7	58.5	59.1	58.5
20-02-18	11:04 - 11:34	Fine	60.9	60.4	59.7	59.3	58.4	59.1	59.7
26-02-18	11:41 - 12:11	Sunny	58.4	58.9	58.7	58.0	57.8	58.3	58.4
Limit Level >75dB(A)							Average	58.8	
Limit Leve	Limit Level >/5dB(A)							Range	58.2-59.7

Table 2-10: Summary of Noise Monitoring Results – NM2

Date	Time	Weather	1 st Leq _{5min}	2 nd Leq _{5min}	3 rd Leq _{5min}	4 th Leq _{5min}	5 th Leq _{5min}	6 th Leq _{5min}	Leq _{30min}
02-02-18	14:32 - 15:02	Cloudy	59.1	58.4	58.6	59.4	59.1	58.9	58.9
07-02-18	11:13 - 11:43	Cloudy	58.0	57.6	56.9	57.1	57.4	56.7	57.3
12-02-18	14:18 - 14:48	Fine	57.2	57.4	58.3	57.9	57.6	58.5	57.8
14-02-18	14:21 - 14:51	Sunny	58.1	58.5	57.4	57.3	57.9	58.1	57.9
20-02-18	10:18 - 10:48	Fine	59.1	58.4	58.3	58.1	57.9	58.2	58.4
26-02-18	11:09 - 11:39	Sunny	57.4	57.6	57.9	57.4	58.0	58.1	57.7
I imit I ove	Limit Loyal >75dD(A)			•	•			Average	58.0
Limit Level >75dB(A)						·	·	Range	57.3-58.9

Table 2-11: Summary of Noise Monitoring Results – NM3

Data	Time	Weether	1 st	2^{nd}	3 rd	4 th	5 th	6 th	Lag
Date	Time	Weather	Leq _{5min}	Leq _{30min}					
02-02-18	15:12 - 15:42	Cloudy	60.1	58.4	58.6	59.5	59.7	59.4	59.3
07-02-18	11:58 - 12:28	Cloudy	59.6	59.9	60.4	60.1	59.4	59.7	59.9
12-02-18	15:08 - 15:38	Fine	57.9	58.1	59.4	59.3	59.1	58.5	58.8
14-02-18	15:11 - 15:41	Sunny	58.9	59.2	59.6	58.1	58.4	58.6	58.8
20-02-18	11:45 - 12:15	Fine	56.8	56.9	57.2	58.1	57.6	57.9	57.4
26-02-18	12:22 - 12:52	Sunny	54.9	54.2	54.8	55.9	55.1	56.2	55.2
Limit Level							Average	58.5	
70dB(A) dur	70dB(A) during normal teaching periods								
and 65 dB(A	and 65 dB(A) during examination periods							Range	55.2-59.9

2.3.9 As shown in the results were well below the limit level, also no complaint was received by the RE, WSD, EPD and contractor. Hence, no Action or Limit Level exceedance was triggered during this month. The impact noise quality monitoring results and graphical presentation are shown in **Appendix N**.

2.4. WATER QUALITY MONITORING

- 2.4.1 Water Impact monitoring had been taken three days per week with sampling or measurement in accordance with Sections 4.12 of the approved EM&A Manual at all designated monitoring stations in the 2 water courses. The interval between 2 sets of monitoring had been more than 36 hours. Replicate in-situ measures had been carried out in each sampling event.
- 2.4.2 Three (3) control and two (2) impact stations were recommended in the Section 4.7 of the approved EM&A Manual to carry out water quality monitoring. In order to identify and seek for the access of the water monitoring locations designated in the approved EM&A Manual, site visit was conducted among ET, IEC and Environmental Protection Department (EPD).
- 2.4.3 During the site visit, all designated monitoring locations were identified however one more impact stations (M3) along the same water course was introduced due to the concern on multiple site effect, in particular to address the potential impact to M2 from a source at upstream of the water course. Details and coordinates of the monitoring stations are described in Table 2-12 and the location plan of water quality monitoring stations is shown in **Appendix O**.

Table 2-12: Details of Water Quality Monitoring Station

Water Quality Monitoring	Description	Co-ordinates		
Station	Description	Easting	Northing	
C1		835110	824716	
C2	Control Stations	835403	824470	
C3		835642	824386	
M1	Immont	835215	824827	
M2	Impact Monitoring Stations	835536	824775	
M3	Monitoring Stations	835501	824648	

2.4.4 The water monitoring equipment and analysis using for the water quality monitoring were proposed by ET and verified by IEC. The details of equipment using for impact monitoring are listed in the Table 2-13 below:

Table 2-13: Monitoring Equipment Used in Impact Monitoring Program

Water quality	
YSI Model ProDSS Multi-para	ameter Water Quality Monitoring System
Thermometer & DO meter	The instrument is a portable and weatherproof dissolved oxygen (DO) measuring instrument complete with cable and sensor, and use a DC power source. The equipment is capable of measuring as included a DO level in the range of 0 - 20mg/L and 0 - 200% saturation; and a temperature of 0 - 45°C.
pH meter	The instrument consists of a potentiometer, a glass electrode, a reference electrode and a temperature-compensating device. It is readable to 0.1 pH in range of 0 to 14.
Turbidmeter	The instrument is a portable and weatherproof turbidity measuring instrument using a DC power source. It has a photoelectric sensor capable of measuring turbidity between 0 - 1000 NTU.
HORIBA Model U53 Multi-pa	nrameter Water Quality Meter
Thermometer & DO meter	The instrument is a portable and weatherproof dissolved oxygen (DO) measuring instrument complete with cable and sensor, and use a DC power source. The equipment is capable of measuring as included a DO level in the range of 0 - 50mg/L and 0 - 200% saturation; and a temperature of -10 - 55°C.
pH meter	The instrument consists of a potentiometer, a glass electrode, a reference electrode and a temperature-compensating device. It is readable to 0.01 pH in range of 0 to 14.
Turbidmeter	The instrument is a portable and weatherproof turbidity measuring instrument using a DC power source. It has a tungsten lamp source and 90° scattering method, capable of measuring turbidity between 0 - 1000 NTU.
Laboratory Analysis	
Suspended Solids	HOKLAS-accredited laboratory (Acumen Laboratory and Testing Limited)

Remark:

- (i) Water samples for suspended solids (SS) have been stored in high density polythene bottles with no preservative added, packed in ice (cooled to 4°C without being frozen).
- 2.4.5 Before the commencement of the sampling, general information such as the date and time of sampling as well as the personnel responsible for monitoring were recorded on the monitoring field data sheet.
- 2.4.6 Water temperature, turbidity, DO, pH and water depth were measured in-situ. Since water depths at C1, C2, M1, M2 and M3 were less than 3 m, all in-situ measurements and sampling conducted at one water depth such as mid-depth are performed. Moreover, C3 was recorded dry throughout the sampling period. Therefore, in-situ measurements and sampling could not be conducted at C3 in accordance with the water monitoring requirements in the approved EM&A Manual.
- 2.4.7 At each sampling point, (two) 2 consecutive measurements of temperature, DO, turbidity and pH were measured. The Multi-Parameter Water Quality Monitoring Probe were retrieved out of the water after the first measurement and then re-deployed for the second measurement. Where the difference in the value between the first and second readings of each set was more than 25% of the value of the first

- reading, the reading was discarded and further readings were taken. The certification of the Multi-parameter Water Quality Monitoring System is showed in **Appendix P**.
- 2.4.8 All water samples were delivered to the Acumen Laboratory and Testing Limited (HOKLAS registration no.: 241). SS testing was used HOKLAS accredited Analytical method APHA 2540 D. The certification of laboratory with HOKLAS accredited analytical tests are provided in **Appendix Q**.
- 2.4.9 In this reporting period, a total of eleven (11) sampling days perform water monitoring at the six designated locations. Monitoring results of 4 key parameters: dissolved oxygen (DO), turbidity, suspended solids and pH in this Reporting Months, are summarized in Table 2-14.

Table 2-14: Summary of Water Quality Monitoring Results

Dissolved Oxygen – Mid Depth (mg/L)	C1	C2	СЗ	M1	M2	М3
Average	9.07	9.07	N/A	9.11	9.12	9.30
Min.	8.35	8.36	N/A	8.92	8.94	9.19
Max.	9.43	9.45	N/A	9.40	9.44	9.44
Turbidity – Mid Depth (NTU)	C1	C2	C3	M1	M2	M3
Average	2.30	2.49	N/A	2.15	1.66	0.78
Min.	2.10	2.30	N/A	1.90	1.50	0.60
Max.	2.60	2.90	N/A	2.40	1.90	0.90
Suspended Solid – Mid depth (mg/L)	C1	C2	С3	M1	M2	М3
Average	3.18	3.26	N/A	2.33	6.76	<1
Min.	3.00	3.10	N/A	2.10	4.60	<1
Max.	3.50	3.60	N/A	2.80	12.30	<1
pH value (unit)	C1	C2	C3	M1	M2	M3
Average	7.80	7.82	N/A	7.79	7.78	7.78
Min.	7.64	7.65	N/A	7.62	7.65	7.67
Max	7.95	7.98	N/A	7.94	7.91	7.92

2.4.10 In this Reporting Month, all monitoring result were below or within the action level. Hence, no Action or Limit Level exceedance was triggered during this month. Detailed monitoring results including in-situ measurements, laboratory analysis data are shown in **Appendix R**.

2.5. ECOLOGY

- 2.5.1 Detailed Vegetation Survey Report and Woodland Compensation Plan submitted to EPD and approved on 17 February 2016. To ensure the planting works are properly implemented, bi-weekly monitoring is proposed throughout the planting phase. The frequency of monitoring is proposed to be bi-monthly during the first years of the planting stage, and then reduced to quarterly for the six (6) year post-planting period.
- 2.5.2 A 6 years post-planting review report will be submitted within a month after completion of the at least 6 years post-planting monitoring and maintenance.
- 2.5.3 Vegetation monitoring scheduled on 21 and 24 February 2018 during the Reporting Period. Detailed monitoring report (No. 42) is shown in **Appendix S**.
- 2.5.4 The condition of TA572 was observed in poor condition due to broken of main trunk while TA326 and TA327 were dead and in poor condition respectively. Transplanted Lamb of Tartary (*Cibotium barometz*) seems to be received too much sunlight. Leaves of them were observed yellowish in colour. Shelter (遮光網) was recommended to reduce the intensity of sunlight. Hong Kong Eagle's Claw was observed dead during inspection on 20 August 2016. New fronds of transplanted Lamb of Tartary were observed growing out. Lamb of Tartary was under recovery after transplantation. Currently, Lamb of Tartary was temporally stored on Nursery garden at Wang Toi Shan, Kam Tin. It is recommended to retain them at the nursery garden under proper maintenance during current recovery stage.
- 2.5.5 In general, all transplanted Lamb of Tartary were in fair condition while Hong Kong Eagle's Claw (Artabotrys hongkongensis) and one Incense Tree (Aquilaria sinensis) TA326 were observed dead during inspection on 20 August 2016 and on 10 August 2017 respectively.
- 2.5.6 In order to compensate for the loss of transplanted Hong Kong Eagle's Claw and Incense Tree, it is recommended to plant an individual of native climber species and 3 heavy standard native tree species at compensatory planting site. The suggested species in planting list would have certain ecological value in terms of plant ecology and the associated wildlife including birds.
- 2.5.7 After transplantation, root ball of TA572 and TA327 tree should be kept moisture especially during dry and non-raining day.

2.6. WASTE MANAGEMENT STATUS

- 2.6.1 The Contractor has submitted application form for registration as chemical waste producer under the Contract. Sufficient numbers of receptacles were available for general refuse collection and sorting. The Waste Producer Number to the Contractor is assigned in respect of the project site.
- 2.6.2 Wastes generated during this reporting period include mainly construction wastes (inert and non-inert). Waste flow table was prepared by the Contractor to record amount of waste generated and disposed (**Appendix T**).
- 2.6.3 The Contractor was advised to properly maintain on site C&D materials and waste collection, sorting and recording system, dispose of C&D materials and wastes at designated ground and maximize reuse/recycle of C&D materials and wastes.
- 2.6.4 The Contractor was also reminded to properly maintain the site tidiness and dispose of the wastes accumulated on site regularly and properly. For chemical waste containers, the Contractor was reminded to treat properly and store temporarily in designated chemical waste storage area on site in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.

2.7. DELIVERY, STORAGE AND HANDLING OF CHLORINE

2.7.1 Chlorine is delivered to Sha Tin WTW in batches of up to 6×1-tonne drums. The transport route from Sham Shui Kok dock on North Lantau is shown in **Figure 1**. The route passes along the North Lantau Expressway, around the northern edge of Tsing Yi, through Tsuen Wan and along Tai Po Road (Piper's Hill) to Sha Tin (Table 2-15).

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TO FIGURE 1: Chlorine Transport Route to Sha Tin Water Treatment Works

MA ON Figure 1: Chlorine Transport Route to Sha Tin Water Treatment Works

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MA ON Figure 1: Chlorine Transport Route to Sha Tin Water Treatment Works

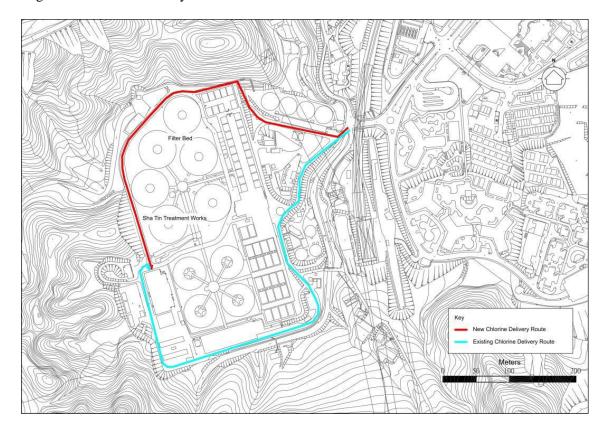
MA ON Figure 1: Chlorine Transport Route to Sha Tin Water Treatment Works

MA ON Figure 1: Chlorine Transport Route Transpor

Table 2	Table 2-15: Chlorine Truck Transport Route					
Destination		Route				
From	SSK	Sham Shui Kok Dock > Cheung Tung Road > Sunny Bay Road > N Lantau Highway				
Dock	to	> Lantau Link > NW Tsing Yi Interchange > Tsing Yi North Costal road > Tsing				
Sha	Tin	Tsuen Road > Tsuen Wan Road > Kwai Chung Road > Ching Cheung Road > Tai Po				
WTW		Road > Tai Po Road (Piper's Hill) > Tai Po Road (Sha Tin Heights) > Tai Po Road >				
		Tsing Sha Highway (Sha Tin) > Tai Po Rd (Sha Tin) > Sha Tin Rural Committee Rd				
		> Tai Chung Kiu Rd > Che Kung Miu Road > Sha Tin WTW				

- 2.7.2 Unloading takes place inside the Chlorination House, with the doors closed, in a designated truck unloading bay. The movement of drums within the storage area and 'drive-through' unloading bay is carried out using a hoist/monorail system with a purpose-built lifting beam. Prior to usage, the drums are stored on cradles within the chlorine storage area.
- 2.7.3 The on-site chlorine delivery route is shown in Figure 2.

Figure 2: Chlorine Delivery Route at Sha Tin WTW



- 2.7.4 An emergency chlorine scrubbing system is installed to remove any leaked chlorine in the chlorine handling and storage areas. The system is a packed tower utilising sodium hydroxide as the neutralising agent. The plant and equipment are installed in a separate scrubber room.
- 2.7.5 On detection of chlorine at a concentration of 3 ppm or above in the chlorine handling or storage areas, the scrubbing system will activate automatically. The air/chlorine mixture in the affected areas is drawn into the scrubber by the scrubber fan via ducting connected to the normal ventilation system. An electrically-operated isolating damper is provided in the scrubber intake which opens automatically when the scrubber fan starts up.
- 2.7.6 The scrubber system is normally set at auto standby mode and is activated if the chlorine concentration rises above 3 ppm. A continuous chlorine monitor is installed at a point downstream of

- the packed tower and upstream of the vent/recycle changeover dampers to monitor the scrubber performance; a "Chlorine concentration high" alarm will be initiated if the concentration of chlorine in the tower exhaust exceeds the preset value.
- 2.7.7 According to the Fire Services Department's fire safety requirements, an emergency repair/stoppage kit for chlorine spillage/leakage is provided and maintained in good working condition at all times for use by the trained persons and stowed adjacent to but outside the store/plant room. Regular drills are conducted to train personnel on the proper use of the breathing apparatus and protective clothing.
- 2.7.8 A Hazard Assessment of the risks associated with the storage, handling and transport of chlorine at Sha Tin WTW and the off-site transport of chlorine for the Construction and Operational Phases of the reprovisioning project has been conducted in the approved EIA Report (Register No. AEIAR-187/2015).
- 2.7.9 This In-situ Reprovisioning of Sha Tin WTW is an improvement project, following its completion the chlorine-related risks levels to the general public will be lowered due to the anticipated reduction of the chlorine storage and usage levels.
- 2.7.10 Implementation of the recommended mitigation measures would be regularly audited. No specific Environmental Monitoring would be required.

2.8. EM&A SITE INSPECTION

- 2.8.1 Site inspections were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures under the Contract. In the reporting period, five (5) site inspections were carried out on 2, 9, 12, 23 and 26 February 2018.
- 2.8.2 One joint site inspection with IEC also undertaken on 26 February 2018. Minor deficiencies were observed during weekly site inspection or joint site inspection. Key observations during the site inspections are summarized in Table 2-16.

Table 2-16: Site Observations

Date	Environmental Observations	Follow-up Status
2 February	No environmental issue was observed during the	N/A
2017	site inspection	
9 February	No environmental issue was observed during the	N/A
2017	site inspection	
12 February	No environmental issue was observed during the	N/A
2017	site inspection	
23 February 2017	Observation(s) and Recommendation(s) 1. The wastewater treatment was under maintenance at Wall C. The Contractor was advised to maintain the facility properly and ensure discharge comply with licence requirement.	The wastewater treatment was at Wall C was maintained
26 February	No environmental issue was observed during the	N/A
2017	site inspection	

2.8.3 The Contractor has rectified all of the observations identified during environmental site inspections in the reporting period.

2.9. ENVIRONMENTAL LICENSES AND PERMITS

2.9.1 The status of environmental license and permit is summarized in Table 2-17 below:

Table 2-17: Summary of Environmental License and Permit

License / Permit	License /	Date of	Date of	License /	Remark
	Permit No.	Issue	Expiry	Permit	
				Holder	
Environmental Permit	EP- 494/2015	28/01/2015	N/A	WSD	
Registration of Chemical	WPN5218-759	31/12/2015	N/A	MMVJV	
Waste Producer	-M2936-01				
Trip Ticket (Chit)	7023723	10/12/2015	N/A	MMVJV	
Account					
Waste Water Discharge	WT0023932	01/04/2016	31/03/2021	MMVJV	
License (Wall C)	-2016				
Waste Water Discharge	WT0024211	10/06/2016	30/06/2021	MMVJV	
License (Wall D)	-2016				
Construction Noise Permit	GW-RN0791-17	06/12/2017	07/06/2018	MMVJV	
Construction Noise Permit	GW-RN0052-18	09/02/2018	13/08/2018	MMVJV	

2.10. IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

- 2.10.1 In response to the site audit findings, the Contractors carried out corrective actions. A summary of the environmental mitigation measures implemented by the Contractor in this Reporting Period are summarized in Table 2-18.
- 2.10.2 The environmental mitigation measures that recommended in the Implementation Schedule for Environmental Mitigation Measures (EMIS) in the approved EM&A Manual covered the issues of dust, noise, water and waste and they are showed **Appendix U**.

Table 2-18: Environmental Mitigation Measures

Issues	Environmental Mitigation Measures
Air Quality	 Tarpaulin covering of any dusty materials on a vehicle leaving the site; Imposition of speed controls for vehicles on site haul roads; Use of regular watering to reduce dust emissions from exposed site surfaces and roads; Side enclosure and covering of any aggregate or stockpiling of dusty materials to reduce emissions; Where possible, routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs.
Noise	 Good site practices to limit noise emissions at the sources; Use of quite plant and working methods; Use of site hoarding or other mass materials as noise barrier to screen noise at ground level of NSRs; Scheduling of construction works outside school examination period in critical area.
Water	 Drainage systems were regularly and adequately maintained; Effluent discharged from the construction site should comply with standards stipulated in the TM-DSS; Open stockpiles of construction materials on sites should be covered.
General	- The site was generally kept tidy and clean.

2.10.3 The necessary mitigation measures were implemented properly for this Contract.

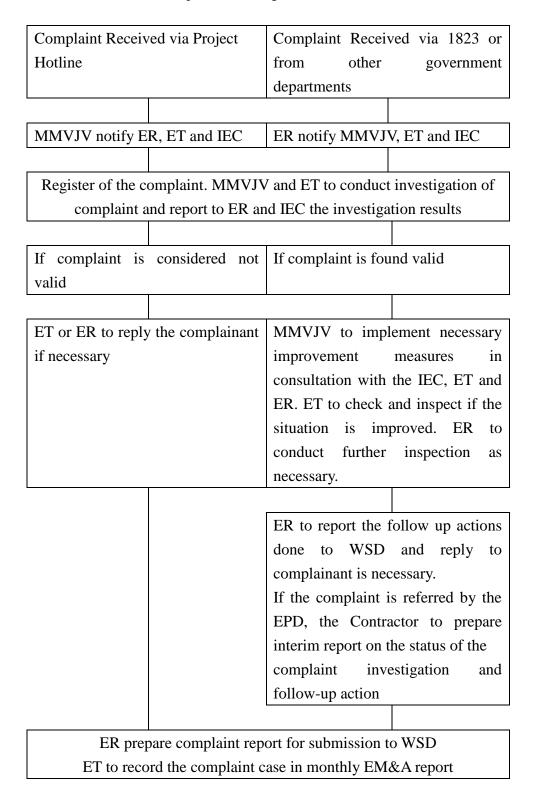
2.11. SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT

- 2.11.1 Results for 1-hour TSP, noise and water quality monitoring complied with the Action/ Limit levels in the reporting period.
- 2.11.2 Cumulative statistics on exceedances is provided in Appendix V.

2.12. SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND PROSECUTIONS

2.12.1 The Environmental Complaint Handling Procedure is shown in below table:

Table 2-19: Environmental Complaint Handling Procedure



- 2.12.2 No environmental complaint were received in the reporting period.
- 2.12.3 No notification of summons and prosecution was received in the reporting period.
- 2.12.4 Statistics on complaints, notifications of summons and successful prosecutions are summarized in **Appendix V**.

2.13. DATA MANAGEMENT AND DATA QA/QC CONTROL

- 2.13.1 The impact monitoring data were handled by ET's in-house data recording and management system.
- 2.13.2 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 computerized database properly. The laboratory results were input directly into the computerized database and checked by personnel other than those who had input the data.
- 2.13.3 For monitoring parameters that require laboratory analysis, the local laboratory had followed the QA/QC requirements as set out under the HOKLAS scheme for the relevant laboratory testing.

3. FUTURE KEY ISSUES

3.1. CONSTRUCTION PROGRAMME FOR THE COMING MONTHS

- 3.1.1 As informed by the Contractor, the major works for this Project in February 2018 to April 2018 will be:
 - Construction of Logistics Centre at Wall C.
 - Construction lagging wall and bore piles at Wall D and C
 - External finish work at North Work Temporary House
 - Modification of clarifier no.1
 - Modification of valve chamber and construction of flow meter house
 - Construction of CLP steel cable support between CLP substation and North Work Washwater Pump House

3.2. KEY ISSUES FOR COMING MONTH

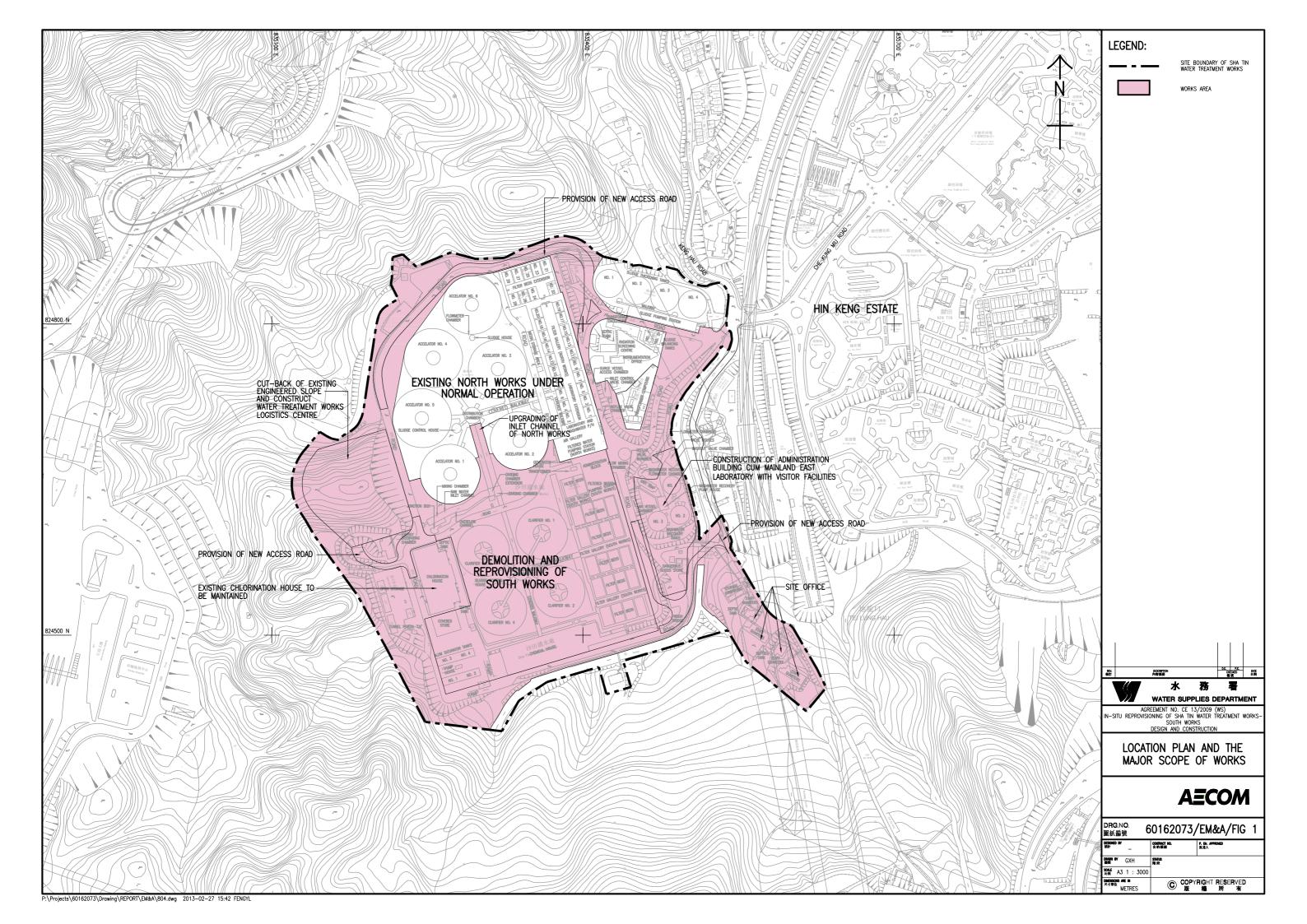
- 3.2.1 Potential environmental impacts arising from the above upcoming construction activities in March 2018 are mainly associated with dust, noise, water quality issues and waste management issues.
- 3.2.2 Particular issues to be considered in the coming month include:
 - Implementation of dust suppression measures at all times.
 - Implementation of adequate measures to prevent discharge of site effluent to the nearby water bodies
 - Desilting tanks and catch-pits should be regularly maintained.
 - Implementation of construction noise preventative control measures.
- 3.2.2 The tentative monitoring schedule for March 2018 to May 2018 can be found in **Appendix W**.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1. SUMMARY

- 4.1.1 Air quality (including 1-hour TSP), noise, water quality and ecology impact monitoring were carried out in the reporting period. All monitoring results are satisfactory and no NOEs or associated corrective action was therefore issued.
- 4.1.2 Five (5nos.) environmental site inspection were conducted during the reporting period. Joint site inspection with IEC were carried out on 26 February 2018. Minor deficiencies were observed during site inspection and were rectified within the specified deadlines. The environmental performance of the Project was therefore considered satisfactory.
- 4.1.3 To control the site performance on waste management, the contractor 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. Contractor is also reminded to implement the recommended environmental mitigation measures according to the Environmental Monitoring and Audit Manual.
- 4.1.4 No environmental complaint were received in the reporting period.
- 4.1.5 No notification of summons or prosecution was received since commencement of the Contract.
- 4.1.6 The ET will keep track on the construction works to confirm compliance of environmental requirements and the proper implementation of all necessary mitigation measures.

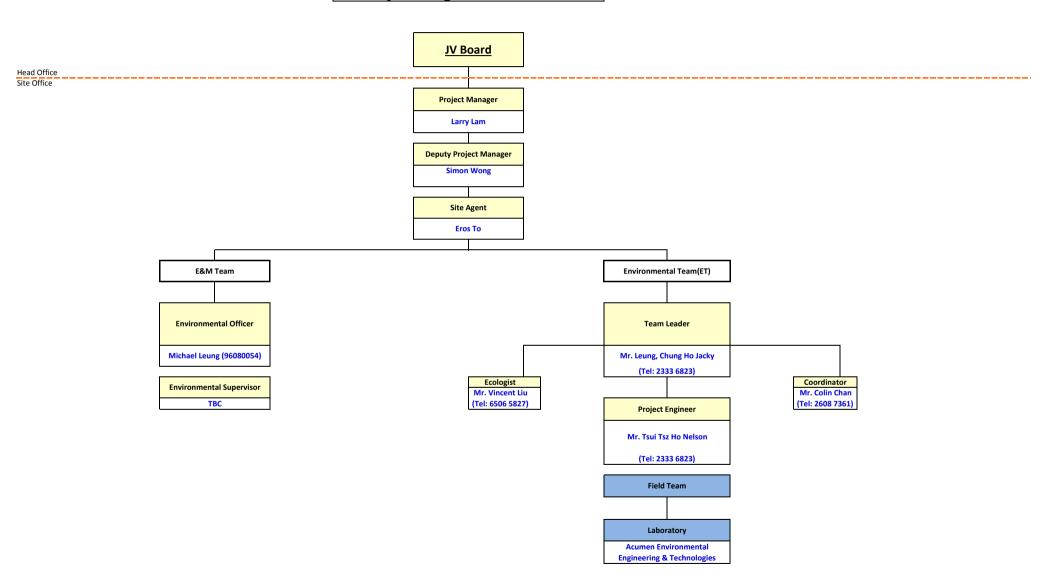
Appendix A General Layout Plan



Appendix B Project Organization

Update Date 6/11/2017

Project Organization Chart



Appendix C Latest Construction Programme

Date: 21 November 2016 Master Programme (Ver.03) Title: In-situ Reprovisioning of Sha Tin Water Treatment Works (South Works) - Advance Works 77/12 1155 day Fri 30/10/15 Thu 27/12/18 0/10) 28/11 P001 Temporary RE office 30 days Fri 30/10/15 Sat 28/11/15 4 P002 Renovation of RE office 150 days Fri 30/10/15 Sun 27/3/16 0/10 Sun 27/3/16 P003 Erection of site office 150 days Fri 30/10/15 P004 Wheels wash facilities Fri 30/10/15 Fri 26/2/16 120 days P005 Initial survey 100 days Fri 30/10/15 Sat 6/2/16 h6/2 8 P006 Fri 30/10/15 Sat 6/2/16 UU detection 100 days 9 P007 Tree and vegetation survey 78 days Fri 30/10/15 Fri 15/1/16 10 P008 Tree and vegetation survey submission to EPD 0 days Fri 15/1/16 Fri 15/1/16 **◆**15/1 11 P009 12 P010 16/1 5/2 Tree and vegetation survey consent from EPD 21 days Sat 16/1/16 Fri 5/2/16 Environmental Impact baseline monitoring Fri 30/10/15 0/10 100 days Sat 6/2/16 13 **P011** 15/1 6/2 Baseline monitoring submission 0 days Fri 15/1/16 Fri 15/1/16 14 P012 Baseline monitoring approval Sat 6/2/16 Sat 6/2/16 0 days 15 P013 Pre-condition survey 100 days Fri 30/10/15 Sat 6/2/16 16 P014 Tree transplanting works 90 days Sun 7/2/16 Fri 6/5/16 7/2 17 P015 Tree Protection 1155 days Fri 30/10/15 Thu 27/12/18 18 **D000** Contractor's Design Submission 680 days Fri 30/10/15 Fri 8/9/17 19 **D100** General 680 days Fri 30/10/15 Fri 8/9/17 V10 ♥ ₹ 8/9 20 D101 Project Design Plan Fri 30/10/15 Fri 8/9/17 680 days 21 D102 AIP-01 - Addition GI Plan 147 days Fri 6/11/15 Thu 31/3/16 22 D103 DDA-01 - Geotechnical Assessment if necessary 125 days Fri 1/4/16 Wed 3/8/16 23 D104 AIP-02 - Basis of Design 88 days Fri 6/11/15 Mon 1/2/16 24 D105 DDA-02 - Basis of Design if necessary 184 days Tue 2/2/16 Wed 3/8/16 2/2 25 D106 AIP-04 - P&ID 152 days Thu 7/1/16 Mon 6/6/16 26 D107 DDA-04-1 - P&ID 237 days Wed 6/7/16 Mon 27/2/17 27 D108 15/8 DDA-04-2 - Pumping System & Pipework Design 151 days Mon 15/8/16 Thu 12/1/17 28 D109 DDA-04-3 - Pipe Support Design 150 days Mon 13/6/16 Wed 9/11/16 9/11 29 D110 DDA-04-4 - Testing & Commissioning Thu 21/7/16 Mon 19/12/16 21/7 152 days 30 D111 AIP-05 - Intrumentation, Control and Automation (DCS / 176 days Mon 1/2/16 Mon 25/7/16 Control Philosophy) 31 **D112** 143 days DDA-05-1 - DCS (General) Mon 25/4/16 Wed 14/9/16 DDA-05-2 - DCS (Functional Design Specification) 32 D113 150 days Mon 25/4/16 Wed 21/9/16 21/9 33 D114 34 D115 DDA-05-3 - DCS (Control Loop Diagrams) 150 days Mon 25/4/16 Wed 21/9/16 21/9 AIP-06 - Communication Network 151 days Mon 22/2/16 Thu 21/7/16 35 D116 DDA-06 - Communication Network 181 days Thu 7/7/16 Tue 3/1/17 36 D117 AIP-07 - Automatic Irrigation System 163 days Thu 26/5/16 Fri 4/11/16 4/11 37 D118 21/10 DDA-07 - Automatic Irrigation System 181 days Fri 21/10/16 Wed 19/4/17 38 D119 AIP-08 - Electrical Power Supply System 166 days Thu 7/1/16 Mon 20/6/16 DDA-08-1 - Electrical Power Supply System 39 D120 151 days Mon 25/7/16 Thu 22/12/16 **22/12** 40 D121 DDA-08-2 - Earthing Design 153 days Tue 21/6/16 Sun 20/11/16 20/11 41 D122 DDA-08-3 - Fault Calculation & Protection Setting for 151 days Mon 25/7/16 Thu 22/12/16 22/12 Electrical System 42 D123 DDA-08-4 - Harmonic Analysis 151 days Mon 25/7/16 Thu 22/12/16 43 D124 DDA-08-5 - Electrical Typical Design Wed 22/6/16 Mon 21/11/16 21/11 153 days 44 D125 DDA-08-6 - Modification of Existing Administration 153 days Wed 21/9/16 Mon 20/2/17 Building 45 D126 AIP-10A - Process Piping - Civil 82 days Thu 10/12/15 Mon 29/2/16 10/12 29/2 DDA-10A - Process Piping - Civil AIP-10B - Process Piping - E&M (Pipe Trench E&M 18/5 46 D127 135 days Wed 18/5/16 Thu 29/9/16 47 D128 Thu 11/2/16 Thu 26/5/16 106 days 48 D129 DDA-10B - Process Piping - E&M (Pipe Trench E&M 91 days Tue 22/3/16 Mon 20/6/16 Design) 49 D130 AIP-19 - Sitewide E&M Design 152 days Thu 10/3/16 Mon 8/8/16 50 D131 DDA-19-1 - Sitewide E&M Design (General) (including 150 days Tue 9/8/16 Thu 5/1/17 Cable Duct Routes / Cable Routes) 51 D132 DDA-19-2 - Modification of North Works Air Gallery Mon 13/6/16 Wed 28/12/16 199 days 52 D133 DDA-19-3 - Process Piping - Modification of North Work 150 days Mon 13/6/16 Wed 9/11/16 Filter and Sludge Handling 53 **D200** 1/12 ■ WTW Logistics Centre, Alum Saturation Tank, and Hydro 322 days Tue 1/12/15 Mon 17/10/16 Turbine House 54 D201 AIP-11A - Design Concept Tue 1/12/15 Tue 15/3/16 1/12 106 days 55 D202 DDA-11A - Architectural Design Development (DAP stage 2232 days Mon 29/2/16 Mon 17/10/16 submission to ASD) 56 **D300** WTW Logistics Centre Thu 17/12/15 Mon 12/6/17 17/12 12/6 57 D301 AIP-12A - Architectural Design including GA, Interior Design and Non-Structural Element 145 days Thu 17/12/15 Mon 9/5/16 58 D302 DDA-12A - Architectural Design including GA, Interior 205 days Thu 21/4/16 Fri 11/11/16 Design and Non-Structural Element 59 D303 AIP-12B - Foundation & Structural Design Thu 17/12/15 Tue 15/3/16 17/12 90 days 29/2 60 D304 DDA-12B - Foundation & Structural Design 159 days Mon 29/2/16 Fri 5/8/16 61 D305 AIP-12C - Building Services Design 143 days Mon 22/2/16 Wed 13/7/16 DDA-12C - Building Services Design 62 D306 197 days Mon 26/9/16 Mon 10/4/17 63 D307 24/11 AIP-12D - Electrical & Mechanical Design 344 days Thu 17/12/15 Thu 24/11/16 17/12 64 D308 DDA-12D - Electrical & Mechanical Design Fri 25/11/16 25/11 200 days Mon 12/6/17 65 **D400** Alum Saturation Tanks 544 days Thu 17/12/15 Mon 12/6/17 66 D401 AIP-13A - Architectural Design including GA, Interior 145 days Thu 17/12/15 Mon 9/5/16 Design and Non-Structural Element 67 D402 DDA-13A - Architectural Design including GA, Interior 267 days Thu 21/4/16 Thu 12/1/17 Design and Non-Structural Element 68 D403 AIP-13B - Foundation & Structural Design Thu 17/12/15 Tue 15/3/16 90 days 17/12 29/21 69 D404 DDA-13B - Foundation & Structural Design 159 days Mon 29/2/16 Fri 5/8/16 AIP-13C - Building Services Design 70 D405 145 days Thu 17/12/15 Mon 9/5/16 71 D406 DDA-13C - Building Services Design 197 days Mon 26/9/16 Mon 10/4/17

Commencement Date: 30 Oct 2015 Completion Date: 3 Feb 2020 (EOT for Claim no. 009) Critical Split

Task





Manual Summary

Summary

Contract No.: 3/WSD/15
Title: In-situ Reprovisioning of Sha Tin Water Treatment Works (South Works) - Advance Works

Master Programme (Ver.03)

Master Programme (Ver.03)

72 **D407** AIP-13D - Electrical & Mechanical Design 260 days Thu 17/12/15 Thu 1/9/16 73 **D408** DDA-13D - Electrical & Mechanical Design 25/11 200 days Fri 25/11/16 Mon 12/6/17 74 D500 ₹ 31/1 Hydro Turbine House 443 days Mon 16/11/15 Tue 31/1/17 75 D501 AIP-14A - Architectural Design including GA, Interior 2/3 108 days Mon 16/11/15 Wed 2/3/16 Design and Non-Structural Element (incl. MEICA and BS 76 D502 DDA-14A - Architectural Design including GA, Interior 142 days Thu 3/3/16 Fri 22/7/16 Design and Non-Structural Element (incl. MEICA and BS design) 77 D503 AIP-14B - Foundation & Structural Design Mon 16/11/15 Thu 24/3/16 130 days 24/3 78 D504 DDA-14B - Foundation & Structural Design 123 days Fri 22/1/16 Mon 23/5/16 79 D505 AIP-14C - Building Services Design 81 days Mon 22/2/16 Thu 12/5/16 12/5 DDA-14C - Building Services Design 80 D506 Tue 17/5/16 Fri 29/7/16 17/5 74 days 81 D507 AIP-14D - Electrical & Mechanical Design (incl. Hydraulic 242 days Tue 1/12/15 Fri 29/7/16 82 **D508** DDA-14D - Electrical & Mechanical Design (incl. Hydraulic 186 days Sat 30/7/16 Tue 31/1/17 30/7 study) North Works Temporary Power House 409 days Mon 16/11/15 Wed 28/12/16 84 D601 AIP-15A - Architectural Design including GA, Interior 93 days Thu 17/12/15 Fri 18/3/16 18/3 Design and Non-Structural Element 85 D602 Fri 22/1/16 DDA-15A - Architectural Design including GA, Interior 141 days Fri 10/6/16 Design and Non-Structural Element 86 D603 AIP-15B - Foundation & Structural Design Mon 16/11/15 Thu 24/3/16 130 days 87 D604 DDA-15B - Foundation & Structural Design 22/1 109 days Fri 22/1/16 Mon 9/5/16 AIP-15C - Building Services Design 88 D605 Mon 22/2/16 74 days Thu 5/5/16 89 D606 DDA-15C - Building Services Design 88 days Fri 6/5/16 Mon 1/8/16 6/5 90 D607 AIP-15D - Electrical & Mechanical Design 221 days Tue 1/12/15 Fri 8/7/16 28/12 91 D608 DDA-15D - Electrical & Mechanical Design 153 days Fri 29/7/16 Wed 28/12/16 29/7 92 **D700** Temporary Washwater Recovery Tank Thu 11/2/16 18/8 190 days Thu 18/8/16 11/2 9 93 **D701** AIP-16A - Galvanized Steel Platforms, Walkways and 106 days h26/5 Thu 11/2/16 Thu 26/5/16 Footing Design 94 D702 DDA-16A - Galvanized Steel Platforms, Walkways and 102 days Mon 9/5/16 Thu 18/8/16 Footing Design 95 D703 AIP-16B - Lighting Design 74 days Mon 22/2/16 Thu 5/5/16 96 D704 DDA-16B - Lighting Design 16/3M 105 days Wed 16/3/16 Tue 28/6/16 97 D705 AIP-16C - Electrical & Mechanical Design 26/5 Thu 11/2/16 Thu 26/5/16 106 days 98 D706 DDA-16C - Electrical & Mechanical Design Wed 17/8/16 140 days Thu 31/3/16 99 **D800** 644 days Tue 1/12/15 Mon 4/9/17 Flowmeter House 100 D801 AIP-17A - Architectural Design including GA, Interior 29/2 91 days Tue 1/12/15 Mon 29/2/16 Design and Non-Structural Element 101 D802 DDA-17A - Architectural Design including GA, Interior Thu 11/2/16 138 days Mon 27/6/16 Design and Non-Structural Element 102 D803 AIP-17B - Foundation & Structural Design Tue 1/12/15 Mon 29/2/16 1 29/2 91 days 103 **D804** 11/2 DDA-17B - Foundation & Structural Design Thu 11/2/16 Thu 26/5/16 106 days 104 D805 AIP-17C - Electrical & Mechanical Design 259 days Mon 15/8/16 105 D806 DDA-17C - Electrical & Mechanical Design 235 days Fri 13/1/17 Mon 4/9/17 106 D807 AIP-17D - Building Services Design 75 days Thu 31/3/16 Mon 13/6/16 13/5 107 D808 DDA-17D - Building Services Designn 135 days Fri 13/5/16 Sat 24/9/16 108 **D900** 18/12 ₩ 4/9 Valve Chamber 627 days Fri 18/12/15 Mon 4/9/17 109 **D901** AIP-18A - Foundation, Civil & Structural Design 15/3 Tue 15/3/16 89 days Fri 18/12/15 110 D902 DDA-18A - Foundation, Civil & Structural Design Mon 29/2/16 Thu 30/6/16 123 days 111 D903 AIP-18B - Electrical & Mechanical Design 151 days Mon 15/8/16 Thu 12/1/17 12/1 112 **D904** DDA-18B - Electrical & Mechanical Design 235 days Fri 13/1/17 Mon 4/9/17 113 **D905** AIP-18C - Building Services Design 75 days Thu 31/3/16 Mon 13/6/16 13/5 114 D906 DDA-18C - Building Services Design 135 days Fri 13/5/16 Sat 24/9/16 ction Programme Mon 3/2/20 116 **S1000** ₹ 31/1 Section 1 825 days Fri 30/10/15 Wed 31/1/18 117 **S1001** > 30/10 Section 1 Commencement 1 day Fri 30/10/15 Fri 30/10/15 118 **S1100** North Works Temporary Power House Wed 31/1/18 31/1 Tue 1/12/15 1/12 793 days 119 **S1101** Excavation of trial pit for earthing test 25 days Wed 17/2/16 Sat 12/3/16 120 S1102 Ground Investigation Wroks 10 days Sun 13/3/16 Tue 22/3/16 13/3 22/3 23/3 21/4 121 **S1103** Additational drilling for in planting earthing log 30 days Wed 23/3/16 Thu 21/4/16 122 S1104 Excavation and installation of ELS 50 days Mon 3/10/16 Mon 21/11/16 3/10 22/11 📥 11/12 123 S1105 Installation of earth mat 20 days Tue 22/11/16 Sun 11/12/16 124 S1106 Foundation 35 days Mon 12/12/16 Sun 15/1/17 12/12 15/1 Structural for North Works Tempoary Power House 125 S1107 76 days Mon 16/1/17 Sat 1/4/17 126 **S1108** Laying of cable ducts, construction of draw pits and 76 days Mon 16/1/17 Sat 1/4/17 installation of cable trays 127 **S1109** Confirmation of cable routing with CLP and WSD 0 days Mon 3/10/16 Mon 3/10/16 **♦** 3/10 128 S1110 Design 6.6kv / 11kv working platform 120 days Mon 3/10/16 Mon 30/1/17 3/10 30/1 129 **S1111** 31/1 Construction of 6.6kv / 11kv working platform 60 days Tue 31/1/17 Fri 31/3/17 130 S1112 Sun 30/4/17 Cable tray construction 30 days Sat 1/4/17 131 **S1113** Laying 6.6kv / 11 kv cable by CLP Tue 30/5/17 Mon 1/5/17 30 days 132 S1114 Completion of concrete structure of North Works Sun 2/4/17 Sun 2/4/17 1 day Temporary Power House 133 **S1115** 3/4 3/4 11/7 Plumbing and Drainage installation 100 days Mon 3/4/17 Tue 11/7/17 134 **S1116** MVAC installation 100 days Mon 3/4/17 Tue 11/7/17 3/4 135 **S1117** Fire Services installation 100 days Mon 3/4/17 Tue 11/7/17 3/4 136 S1118 Electrical installation 100 days Mon 3/4/17 Tue 11/7/17 137 **S1119** Section 1 Site Works For E & M Works 31/1 793 days Tue 1/12/15 Wed 31/1/18 1/12 138 **S1120** North Works Temporary Power House_NWTPH 463 days Tue 7/3/17 Tue 1/12/15 139 **S1121** NWTPH- Electrical Equipment Procurement Tue 1/12/15 Mon 21/12/15 1/12 21/12 Milestone Critical Split Task Summary Manual Summary 🕶

Commencement Date: 30 Oct 2015 Completion Date: 3 Feb 2020 (EOT for Claim no. 009)





Contract No.: 3/WSD/15 Master Programme (Ver.03) Date: 21 November 2016 Title: In-situ Reprovisioning of Sha Tin Water Treatment Works (South Works) - Advance Works | 2016 | 2018 | 2018 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 2019 | 140 S1122 NWTPH- Electrical Equipment Manufacturing & 230 days Tue 1/12/15 Sun 17/7/16 141 S1123 NWTPH- Electrical Equipment Delivery 139 days Thu 20/10/16 Tue 7/3/17 20/10 142 **S1124** NWTPH Phase 1 - E & M Works 31/1 Sun 2/4/17 Wed 31/1/18 304 days 143 S1125 NWTPH- Superstructure & ABWF (up to R/F slab) - 0 days Sun 2/4/17 Sun 2/4/17 H/O by Civil Contractor 144 S1126 NWTPH- LV Supply Installation Commence at G/F 0 days Sun 2/4/17 Sun 2/4/17 NWTPH- 6.6KV/11kv Switchboard Installation at 28 days 145 S1127 Mon 3/4/17 Sun 30/4/17 1/F (incl. T & C) 146 S1128 NWTPH- Installation of 5 nos. of New Cap Bank for 14 days Mon 1/5/17 Sun 14/5/17 Pumps at 1/F 147 S1129 NWTPH- New ducts, Draw pits & Openings for 0 days Sun 14/5/17 Sun 14/5/17 6.6kV (Phase 1) Source 2 CLP Diversion - H/O by Civil Contractor 148 S1130 NWTPH- CLP Inspection of the New ducts, Draw 14 days Mon 15/5/17 Sun 28/5/17 pits & Openings for 6.6kV 149 S1131 NWTPH- Defect Rectify after CLP Inspection of the 7 days Mon 29/5/17 Sun 4/6/17 New ducts, Draw pits & Openings 150 S1132 NWTPH- Second CLP Inspection of the rectified 7 days Mon 5/6/17 Sun 11/6/17 New ducts, Draw pits & Openings 151 S1133 NWTPH- T07 New Ducts/Pits/Openings after defect 0 days Sun 11/6/17 Sun 11/6/17 rectification to CLP - H/O by Civil Contractor 152 S1134 NWTPH- CLP Mobilization for Supply 2 diversion 14 days Mon 12/6/17 Sun 25/6/17 153 **S1135** NWTPH- CLP T&C of the completed HV cables 7 days Mon 26/6/17 Sun 2/7/17 154 S1136 NWTPH- Liaison with WSD for pump no.12 new 53 days Mon 3/7/17 Thu 24/8/17 155 S1137 NWTPH- Connection of new power supply to Pump 36 days Fri 25/8/17 Fri 29/9/17 No.12 156 S1138 NWTPH- 6.6KV Switchboard T&C incl. CLP Fri 6/10/17 30/9 🕳 6/10 Sat 30/9/17 7 days 157 **S1139** NWTPH- 6.6KV Switchboard Energisation Sat 7/10/17 Sun 5/11/17 30 days 158 **S1140** NWTPH- New ducts, Draw pits & Openings for 0 days Mon 1/5/17 Mon 1/5/17 Reroute cable from 6.6 KVSB 3 to 6.6 KVSB - H/O by Civil Contractor 159 S1141 **₹**5/11 NWTPH- T06 New ducts & draw pits between 0 days Sun 5/11/17 Sun 5/11/17 Filters & Sludge treatment plant - H/O by Civil 160 S1142 NWTPH- Diversion of load from Existing LV Mon 6/11/17 Thu 4/1/18 6/11 SwitchRoom 161 S1143 NWTPH- Tx 3 relocate to STP & replace Tx 4 Tue 19/12/17 Wed 17/1/18 30 days 19/12 17/1 18/1 31/1 162 S1144 NWTPH- Reroute Tx cable from 6.6 KVSB 3 to 6.6 14 days Wed 31/1/18 Thu 18/1/18 163 **S1145** NWTPH Phase 2 - E&M Works 218 days Wed 31/5/17 Wed 3/1/18 NWTPH- CLP Mobilization for Supply 3 diversion 15 days 6/11 20/11 164 S1146 Mon 6/11/17 Mon 20/11/17 165 S1147 NWTPH-CLP T&C of the completed HV cables Tue 21/11/17 Mon 27/11/17 21/11 3 27/11 7 days 28/11 4/12 5/12 3/1 166 S1148 NWTPH-6.6KV Switchboard T&C incl. CLP Tue 28/11/17 Mon 4/12/17 7 days 167 S1149 NWTPH-6.6KV Switchboard Energisation Tue 5/12/17 Wed 3/1/18 30 days 168 S1150 NWTPH-Liaison with WSD for pump ի29**/**7 60 days Wed 31/5/17 Sat 29/7/17 No.9,10,11,13,14 for connection to new supply 169 **S1151** NWTPH-T&C incl. the remaining 5 sets of 6.6KV 138 days Sun 30/7/17 Thu 14/12/17 14/12 HV Pump NWTPH Phase 3 - E&M Works 170 **S1152** Tue 11/7/17 Thu 31/8/17 52 days 171 S1153 NWTPH-6.6KV Supply Installation Interconnection 52 days Tue 11/7/17 Thu 31/8/17 Cable Diversion 172 **S1154** NWTPH Phase 4 - E&M Works Sat 16/12/17 140 days Sun 30/7/17 16/12 1/9 15/9 173 S1155 NWTPH-CLP Mobilization for Supply 4 diversion 15 days 174 S1156 NWTPH-CLP T&C of the completed HV cables Fri 22/9/17 16/9 22/9 7 days Sat 16/9/17 23/9 29/9 175 S1157 Sat 23/9/17 NWTPH-6.6KV Switchboard T&C incl. CLP Fri 29/9/17 7 days 17/11 16/12 176 S1158 NWTPH-6.6KV Switchboard Energisation 30 days Fri 17/11/17 Sat 16/12/17 177 S1159 Relocation of existig 6.6kv capacitor banks Thu 16/11/17 110 days Sun 30/7/17 178 **S1160** NWTPH LVSB, Tx, PLC & Genset Installation at 86 days Mon 20/3/17 Tue 13/6/17 179 S1161 NWTPH-6.6KV/11KV to 380V Transformers Tx 28 days Mon 3/4/17 Sun 30/4/17 180 S1162 NWTPH-300KVA ESS. Genset 42 days Mon 20/3/17 Sun 30/4/17 181 S1163 NWTPH- PLC & Ctrl. (incl. 6.6kV switchboard to 30 days Mon 1/5/17 Tue 30/5/17 existing Admin. Building) 182 **S1164** NWTPH- Battery Room 14 days Wed 31/5/17 Tue 13/6/17 183 S1165 NWTPH- Cable Supports 14 days Mon 17/4/17 Sun 30/4/17 184 S1166 NWTPH- Cable Trays 14 days Thu 13/4/17 Wed 26/4/17 185 S1167 NWTPH- Cable Laying 14 days Sun 9/4/17 Sat 22/4/17 186 **S1168** 5/4 NWTPH- Cable Termination 14 days Wed 5/4/17 Tue 18/4/17 187 **S1169** NWTPH - T&C NWTPH - T&C 30 days Mon 1/5/17 Tue 30/5/17 1/5 188 S1170 NWTPH- Testing 30 days Mon 1/5/17 Tue 30/5/17 189 S1171 Wed 31/5/17 Wed 27/9/17 Finishing works 120 days 190 S1172 Completion of architectural finishes and relevant works 1 day Thu 28/9/17 Thu 28/9/17 28/9 (both internal and external)

Commencement Date: 30 Oct 2015 Completion Date: 3 Feb 2020 (EOT for Claim no. 009)

Hydro Turbine House

Critical Split

Site survey of existing pipeworks and cabling

Task

Data collection for HTH design by Atal

717 days

15 days

60 days

Mon 15/2/16

Mon 15/2/16

Milestone

Tue 1/3/16

Wed 31/1/18

Mon 29/2/16

Fri 29/4/16

15/2 29/2

Manual Summary 🕶

Summary

191 **S1200**

192 S1201

193 S1202





Contract No.: 3/WSD/15 Master Programme (Ver.03) Title: In-situ Reprovisioning of Sha Tin Water Treatment Works (South Works) - Advance Works 194 S1203 Construction of cable ducting for signal and power cable 61 days Tue 1/3/16 Sat 30/4/16 195 S1204 Sun 1/5/16 Fri 15/7/16 Relocation of sampling panel and cable diversion 76 days 16/7 29/ 196 S1205 Water suspension of High Island Water main pipes Sat 16/7/16 Fri 29/7/16 14 days 197 **S1206** Capping of path A Wed 20/7/16 Wed 20/7/16 0 days ELS works and demolition of EDH (incl. relocation of 198 S1207 100 days Sat 30/7/16 Sun 6/11/16 existing E & M equipment) 199 S1208 Foundation Mon 7/11/16 Thu 5/1/17 200 S1209 Superstructure for Hydro Turbine House (incl. 136 days Fri 6/1/17 Sun 21/5/17 backfilling) 201 S1210 Installation of I/O pipes outside HTH 90 days Fri 6/1/17 Wed 5/4/17 202 S1211 Completion of concrete structure of Hydro Turbine House 0 days Sun 21/5/17 Sun 21/5/17 203 S1212 Finishing works 120 days Mon 22/5/17 Mon 18/9/17 204 S1213 Completion of architectural finishes and relevant works 1 day Tue 19/9/17 Tue 19/9/17 (both internal and external) 205 S1214 Mon 18/9/17 Plumbing and Drainage installation 120 days Mon 22/5/17 206 S1215 MVAC installation 120 days Mon 22/5/17 Mon 18/9/17 207 S1216 Fire Services installation 120 days Mon 22/5/17 Mon 18/9/17 208 S1217 Electrical installation 120 days Mon 22/5/17 Mon 18/9/17 209 S1218 Water suspension of High Island Water main pipes 12 days Sun 30/7/17 Thu 10/8/17 30/7 4 10/8 210 S1219 Re-arrangement of Raw Water path B to original Path A 0 days Thu 10/8/17 Thu 10/8/17 from High Island Reservoir ▶ 19/10 211 S1220 Connecting HTH outlet pipe to original path B Thu 19/10/17 Thu 19/10/17 0 days 212 S1221 Remove capping of path A and reinstall flow meter at HF10 days Thu 19/10/17 Thu 19/10/17 213 **S1222** Hydro Turbine House - E&M Works (Section 1) Mon 15/2/16 Wed 31/1/18 15/2 5/3 214 S1223 Hydro Turbine House - E&M Equipment Procurement 20 days Mon 15/2/16 Sat 5/3/16 215 S1224 30/12 Hydro Turbine House - E&M Equipment 300 days Sun 6/3/16 Fri 30/12/16 Manufacturing & FAT 216 S1225 Hydro Turbine House - E&M Equipment Delivery 185 days Sat 31/12/16 Mon 3/7/17 217 S1226 Hydro Turbine House - E&M Equipment Delivery 230 days Sat 31/12/16 Thu 17/8/17 (Needle Valve & Turbine Generator) 218 S1227 Hydro Turbine House - H/O by Civil Contractor 0 days Sun 21/5/17 Sun 21/5/17 219 \$1228 Installation of needle valve and turbine genertor 30 days Fri 6/10/17 Sat 4/11/17 220 S1229 Hydro Turbine House - Hydropower Generation System 150 days Mon 22/5/17 Wed 18/10/17 Mechanical Installation 221 S1230 T04 - Trench/Cable ducts & Draw Pits H/O by Civil 0 days Mon 12/6/17 Mon 12/6/17 222 S1231 T05 - Trench/Cable ducts & Draw Pits H/O by Civil 0 days Mon 12/6/17 Mon 12/6/17 Contractor 223 S1232 Hydro Turbine House - Electrical & ICA Installation 81 days Fri 13/10/17 Mon 1/1/18 224 S1233 Hydro Turbine House - CLP Inspection & acceptance 90 days Fri 3/11/17 Wed 31/1/18 (Driven by Logistics house DCS) 225 S1234 Hydro Turbine House - T&C Tue 2/1/18 Wed 31/1/18 30 days 28/9 FSD inspection 226 S1235 Thu 28/9/17 Thu 28/9/17 227 S1236 Rectification of defects and issue of certificate 14 days Fri 29/9/17 Thu 12/10/17 12/10 228 **S1237** Section 1 Completion 1 day Wed 31/1/18 Wed 31/1/18 229 **S2000** Section 2 644 days Fri 30/10/15 Thu 3/8/17 230 **S2001** ≥ 30/10 Section 2 Commencement Fri 30/10/15 Fri 30/10/15 1 day 231 **S2100** Site Formation and Slope Retaining Structures for North 544 days Thu 3/8/17 Sun 7/2/16 Circular Road 232 **S2101** Site Clearance 21 days Sun 7/2/16 Sat 27/2/16 7/2 27/2 7/2 27/2 233 S2102 Temporary works removal Utilities relocation 21 days Sun 7/2/16 Sat 27/2/16 234 **S2102** 1/3 Submission of DI 1038 0 days Tue 1/3/16 Tue 1/3/16 235 S2104 27/5 Excavation for L-shape Retaining wall Fri 27/5/16 90 days Sun 28/2/16 236 S2105 Wed 13/4/16 Sun 31/7/16 13/4M Construction of L-shape Retaining wall 110 days 237 S2106 22/8 Permission of DI 1038 Mon 22/8/16 Mon 22/8/16 0 days 238 S2107 Excavation and backfilling for bore piling works area Mon 22/8/16 Tue 29/11/16 100 days 239 **S2108** Installation of temp. soil nail Mon 22/8/16 Sat 19/11/16 240 S2109 GI works for bored piles and mini piles 15 days Wed 30/11/16 Wed 14/12/16 30/11 4/12 241 S2110 242 S2111 Bored piling machine establishment Thu 15/12/16 Wed 21/12/16 15/12 21/12 Construction of bored piles (D) (H 5-10m, L 70m, Dia 118 days Thu 22/12/16 Tue 18/4/17 22/12 243 **S2112** Bored Pile test Wed 19/4/17 Tue 16/5/17 28 days 244 S2113 Excavation for mini pile area Wed 5/4/17 Tue 18/4/17 14 days 245 S2114 Mini pile load test Wed 19/4/17 Tue 16/5/17 28 days 246 S2115 Construction of mini piles 60 days Wed 3/5/17 Sat 1/7/17 247 S2116 Construction of mini piles cap and L-shape retaining wall 33 days Sun 2/7/17 Thu 3/8/17 248 S2117 Construction of retaining wall above bored pile Wed 3/5/17 Sat 1/7/17 60 days 249 S2118 Construction of R-wall above ground concurrent with 79 days Wed 17/5/17 Thu 3/8/17 backfilling works 250 **S2002** Section 2 Completion Thu 3/8/17 Thu 3/8/17 251 **S3000** Section 3 1189 days Fri 30/10/15 Wed 30/1/19 252 **S3001** Section 3 Commencement 1 day Fri 30/10/15 Fri 30/10/15 → 30/10 253 **S3003** North Circular New Road 1/11 203 days Tue 1/11/16 Mon 22/5/17 S3004 Raising the existing Flowmeter chamber Fri 30/12/16 30/12 1/11 60 days Tue 1/11/16 255 **S3005** Excavation for construction of new valve chamber Fri 30/12/16 60 days Tue 1/11/16 256 S3006 Sat 31/12/16 Tue 28/2/17 60 days 257 S3007 Construction for new road and drainage Wed 1/3/17 Sat 29/4/17 60 days

Commencement Date: 30 Oct 2015 Completion Date: 3 Feb 2020

BS works (lighting)

Construction of Wier Walls

Temporary Washwater Recovery Tank

Construction of DN900 Washwater pipes

Critical Split Task

60 days

625 days

240 days

107 days

Fri 24/3/17

Thu 11/2/16

Wed 1/6/16

Fri 1/7/16

Mon 22/5/17

Fri 27/10/17

Thu 26/1/17

Sat 15/10/16

11/2

Summary

1/7

Manual Summary 🕶

(EOT for Claim no. 009)

258 S3008

259 **S3009**

260 \$3010

261 S3011





15/10

27/10

Contract No.: 3/WSD/15 Master Programme (Ver.03) Date: 21 November 2016 Title: In-situ Reprovisioning of Sha Tin Water Treatment Works (South Works) - Advance Works Duration Sep Oct Nov Dec Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug 262 **S3012** Construction of Steel Bridge & Decking 61 days Sat 15/10/16 Wed 14/12/16 14/12 15/12 263 S3013 Completion of steel platforms and walkway installation 1 day Thu 15/12/16 Thu 15/12/16 264 \$3014 Lay 400mm & 100mm pipes 137 days Thu 1/9/16 Sun 15/1/17 15/1 265 S3015 15/10 External Process Pipe Line installation 120 days Sat 15/10/16 Sat 11/2/17 11/2 266 S3016 Fri 16/12/16 16/12 14/1 Electrical installation (Lighting) 30 days Sat 14/1/17 267 **S3017** Temporary Washwater Recovery Tank - E&M Works 625 days Fri 27/10/17 Thu 11/2/16 268 S3018 E&M equipment procurement and Completion of 124 days Wed 29/6/16 Sun 30/10/16 29/6 delivery of E&M equipment on site (Lighting) 269 S3019 Temp. WRT - Equipment Procurement 15 days Thu 11/2/16 Thu 25/2/16 11/2 25/2 270 S3020 Temp. WRT - Equipment Manufacturing & FAT 141 days Mon 14/3/16 Mon 1/8/16 271 S3021 Temp. WRT - Equipment Delivery Sat 31/12/16 31/12 Thu 18/8/16 136 days ♦ 15/12 ♦ 15/12 Temp. WRT - H/O by Civil Contractor 272 S3022 Thu 15/12/16 Thu 15/12/16 0 days 273 S3023 Temp. WRT - T01 LV/Fibre Cable draw pit & trench Thu 15/12/16 Thu 15/12/16 0 days H/O by Civil Contractor 274 S3024 Temp. WRT - E&M Installation 150 days Sun 1/1/17 Tue 30/5/17 275 S3025 15/3 Temp. WRT - Process pipelines installation Fri 16/12/16 Wed 15/3/17 16/12 90 days 276 S3026 Temp. WRT - ICA 90 days Wed 31/5/17 Mon 28/8/17 277 S3027 Temp. WRT - T&C 60 days Tue 29/8/17 Fri 27/10/17 29/8 278 **S3300** Administration Building Site Formation + Flow Meter 767 days Thu 1/9/16 Sun 7/10/18 House + Valve Chamber 279 S3301 Planning & coordination with WSD for re-arrangement of 210 days Thu 1/9/16 Wed 29/3/17 raw watermains from High Island Reservoir and construction of Flowmeter House and Valve Chamber 280 S3302 Removal of existing utitities 60 days Sat 28/10/17 Tue 26/12/17 28/10 27/12 281 S3303 Demolishing existing structure for future adminstration 80 days Wed 27/12/17 Fri 16/3/18 Building 282 S3304 17/3 Site formation (Backfilling) for future adminstration 45 days Sat 17/3/18 Mon 30/4/18 building 283 S3305 Removal of existing Flow meter and Valve Chambers Sat 21/10/17 Sat 9/12/17 50 days 21/10 9/12 10/12 284 S3306 Excavation for Flow meter house and Valve chambers Sun 10/12/17 Sun 28/1/18 50 days Construction of Flow meter house and Valve chamber 285 S3307 50 days Mon 29/1/18 Mon 19/3/18 286 S3308 Finishing Works 60 days Tue 20/3/18 Fri 18/5/18 9/4 287 **S3309** Relocating existing Flow Meter and Valve Tue 20/3/18 Mon 9/4/18 21 days 288 S3310 Plumbing and Drainage installation 60 days Tue 20/3/18 Fri 18/5/18 20/3 289 S3311 MVAC installation 60 days Tue 20/3/18 Fri 18/5/18 20/3 18/5 290 S3312 20/3 Fire Services installation 60 days Tue 20/3/18 Fri 18/5/18 18/5 291 S3313 Electrical installation Tue 20/3/18 Fri 18/5/18 18/5 60 days 292 **S3314** Valve Chamber - E&M Works 462 days Fri 2/6/17 Thu 6/9/18 293 S3315 Valve Chamber - Equipment Procurement 60 days Mon 31/7/1 294 S3316 Valve Chamber - Equipment Manufacturing & FAT Tue 1/8/17 Sat 27/1/18 180 days 295 S3317 Valve Chamber - Equipment Delivery 72 days Sun 28/1/18 Mon 9/4/18 28/1 296 S3318 Valve Chamber - H/O by Civil Contractor 0 days Mon 9/4/18 Mon 9/4/18 297 S3319 Valve Chamber - Equipment Site Works Duration* 90 days Tue 10/4/18 Sun 8/7/18 298 S3320 8/6 Valve Chamber - E&M Installation 60 days Tue 10/4/18 Fri 8/6/18 299 S3321 Valve Chamber - Modifying the actuator to suit new 30 days Mon 9/7/18 Tue 7/8/18 300 S3322 Valve Chamber - T&C Wed 8/8/18 Thu 6/9/18 8/8 6/9 301 **S3323** Flowmeter House - E&M Works 733 days Tue 4/10/16 Sat 6/10/18 4/10 ♥ 302 S3324 Flowmeter House - Equipment Procurement 60 days Tue 4/10/16 Fri 2/12/16 **■** 2/12 303 S3325 3/12 Flowmeter House - Equipment Manufacturing & FAT | 180 days Sat 3/12/16 Wed 31/5/17 304 S3326 Flowmeter House - Equipment Delivery 131 days Tue 5/9/17 Sat 13/1/18 305 S3327 Flowmeter House - H/O by Civil Contractor Mon 9/4/18 Mon 9/4/18 0 days 306 S3328 Flowmeter House - E&M Installation of new mono Sun 8/7/18 90 days Tue 10/4/18 rails & reocate flowmeter 307 S3329 Flowmeter House - Power Supply 30 days Mon 9/7/18 Tue 7/8/18 308 \$3330 Flowmeter House - T&C 60 days Wed 8/8/18 Sat 6/10/18 309 \$3331 Completion of architectural finishes and relevant works 1 day Sun 7/10/18 Sun 7/10/18 (both internal and external) 310 **S3400** Box Culvert at Tin Sum Nullah 212 days Thu 1/9/16 Fri 31/3/17 311 S3401 Excavation for temp water diversion 14 days Thu 1/9/16 Wed 14/9/16 15/9 5/10 6/10 30/10 312 S3402 Excavation for Box culvert (Section 1) Thu 15/9/16 Wed 5/10/16 21 days 313 **S3403** Construction for Box Culvert (Section 1) Thu 6/10/16 Sun 30/10/16 25 days 4/11 24/11 25/11 19/12 314 S3404 Excavation for Box culvert (Section 2) 21 days Fri 4/11/16 Thu 24/11/16 315 S3405 Construction for Box Culvert (Section 2) 25 days Fri 25/11/16 Mon 19/12/16 316 S3406 25/12 14/1 Excavation for Box culvert (Section 3) 21 days Sun 25/12/16 Sat 14/1/17 15/1 8/2 317 S3407 Construction for Box Culvert (Section 3) Sun 15/1/17 Wed 8/2/17 25 days 14/2 6/3 7/3 31/ 318 S3408 Excavation for Box culvert (Section 4) 21 days Tue 14/2/17 Mon 6/3/17 319 **S3409** 25 days Construction for Box Culvert (Section 4) Tue 7/3/17 Fri 31/3/17 388 days 320 **S3500** Storm Drain for Decking at Tin Sum Nullah Wed 9/3/16 Fri 31/3/17 321 S3501 Temporary water diversion Wed 9/3/16 Sat 12/3/16 9/3 12/3 4 days 322 S3502 13/3 16/3 Construction for Storm drain (Section 1) 4 days Sun 13/3/16 Wed 16/3/16 17/3 = 31/3 323 S3503 Installation for Storm Drain 15 days Thu 17/3/16 Thu 31/3/16 324 S3504 3/10 16/10 Temporary water diversion Mon 3/10/16 Sun 16/10/16 14 days 17/10 5/11 6/11 25/11 325 S3505 Mon 17/10/16 Excavation for Storm drain (Section 2) Sat 5/11/16 20 days 326 S3506 Installation for Storm Drain Fri 25/11/16 20 days Sun 6/11/16 327 S3507 14 days 26/11 -9/12 Temporary water diversion Sat 26/11/16 Fri 9/12/16 328 **S3508** Excavation for Storm drain (Section 3) 20 days Sat 10/12/16 Thu 29/12/16 329 S3509 Installation for Storm Drain 20 days Fri 30/12/16 Wed 18/1/17 30/12 18/1 330 S3510 19/1 1/2 Inlet, CP and bendblock construction 14 days Thu 19/1/17 Wed 1/2/17

Commencement Date: 30 Oct 2015 Completion Date: 3 Feb 2020 (EOT for Claim no. 009)

Backfilling

Modification of STWTW main entrance

Construction of temp. flow meter house

Critical Split

..... Task

28 days

30 days

30 days

Thu 2/2/17

Thu 2/3/17

Thu 2/3/17

Milestone

Wed 1/3/17

Fri 31/3/17

Fri 31/3/17

Summary

331 S3511

332 **S**3512

333 **S3513**

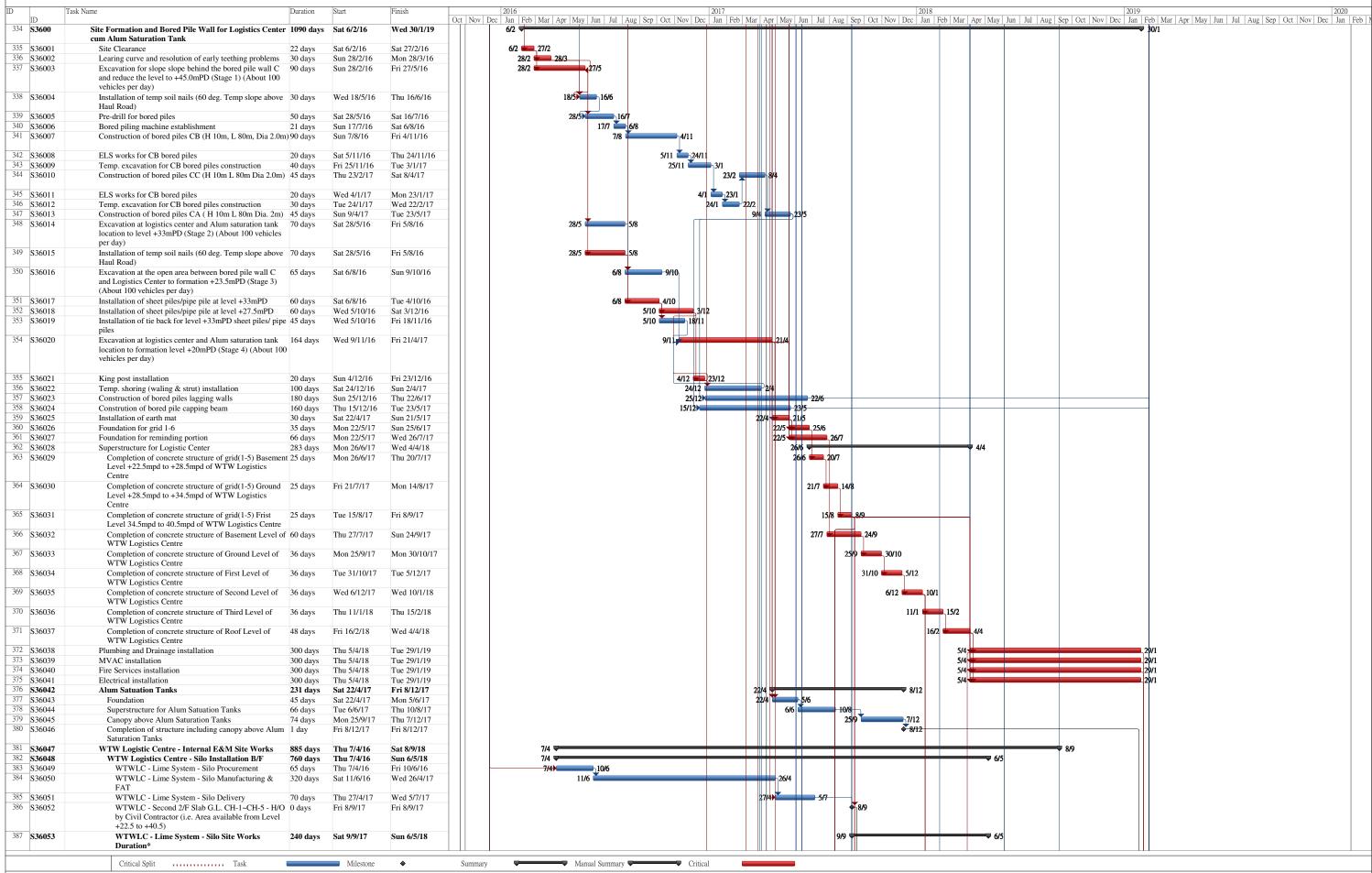




Manual Summary 🕶

Contract No.: 3/WSD/15 Master Programme (Ver.03)

Title: In-situ Reprovisioning of Sha Tin Water Treatment Works (South Works) - Advance Works



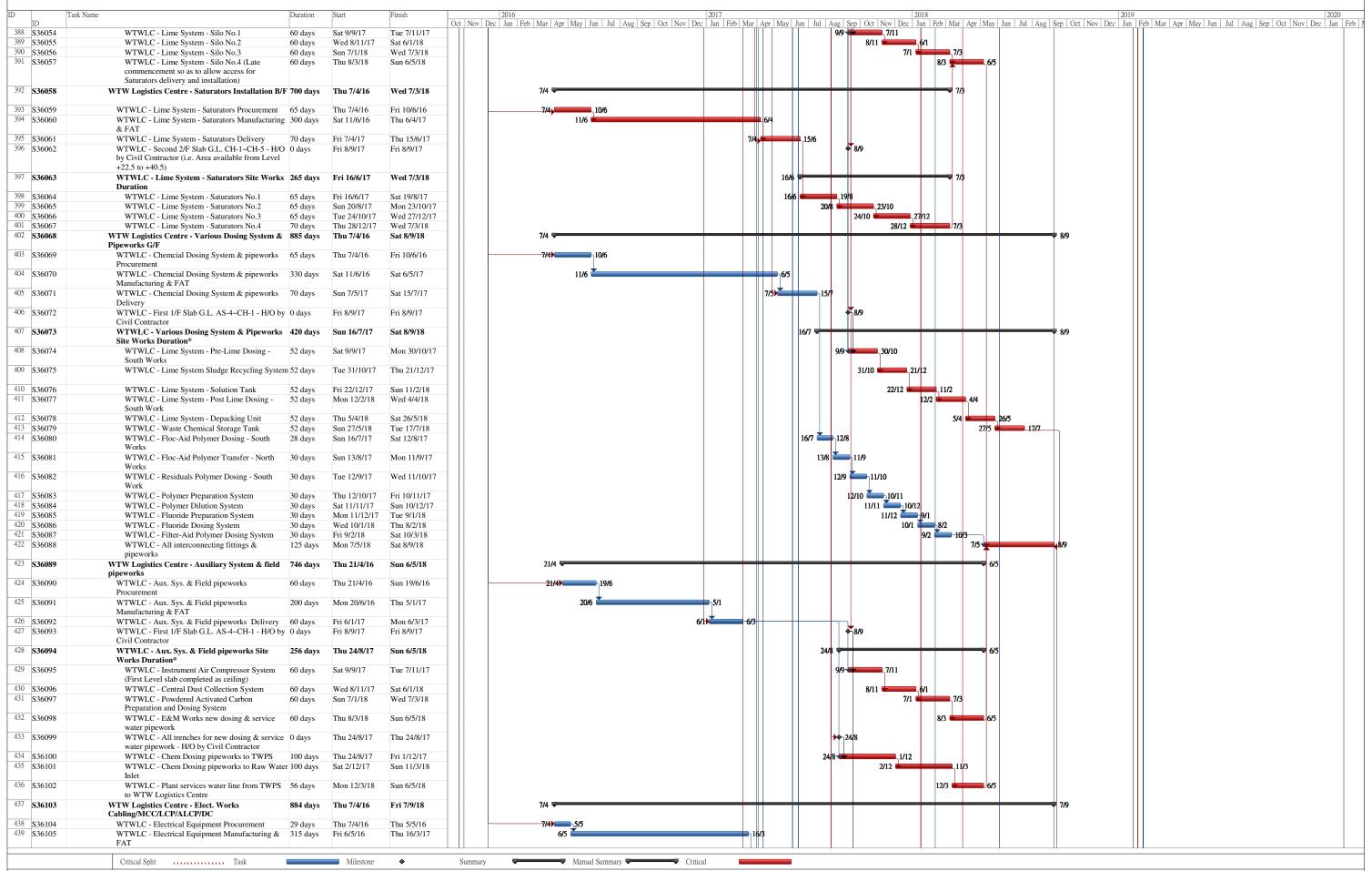
Commencement Date: 30 Oct 2015 Completion Date: 3 Feb 2020 (EOT for Claim no. 009)





Contract No.: 3/WSD/15 Master Programme (Ver.03)

Date: 21 November 2016 Title: In-situ Reprovisioning of Sha Tin Water Treatment Works (South Works) - Advance Works



Commencement Date: 30 Oct 2015 Completion Date: 3 Feb 2020 (EOT for Claim no. 009)





Contract No.: 3/WSD/15 Master Programme (Ver.03) Date: 21 November 2016 Title: In-situ Reprovisioning of Sha Tin Water Treatment Works (South Works) - Advance Works 440 S36106 WTWLC - Electrical Equipment Delivery 60 days Fri 17/3/17 Mon 15/5/17 441 S36107 WTWLC - Electrical Battery Room Installation 30 days Thu 11/1/18 Fri 9/2/18 442 S36108 WTWI C - Ty Room Installation 60 days Thu 11/1/18 Sun 11/3/18 443 S36109 WTWLC - Electrical LVSB Installation 60 days Thu 11/1/18 Sun 11/3/18 444 S36110 WTWLC - Energisation Tue 10/4/18 Mon 12/3/18 30 days 445 S36111 WTWLC - Cabling works & Termination 150 days Wed 11/4/18 Fri 7/9/18 446 S36112 WTWLC - DCS Sat 9/12/17 180 days Tue 13/6/17 447 **S36113** WTW Logistics Centre - HV Works Wed 13/9/17 13/9 164 days Mon 3/4/17 448 S36114 WTWLC/NWTPH - 11KV Supply Installation incl. 90 days Mon 3/4/17 Sat 1/7/17 1/7 HVSB at 1/F of TPH 449 S36115 WTWLC/NWTPH - CLP Mobilization for 11KV 30 days Sun 2/7/17 Mon 31/7/17 2/7 31/7 Power Source 450 S36116 WTWLC/NWTPH - CLP T&C of the completed 11 7 days Mon 7/8/17 1/8 7/8 kV HV cables 451 S36117 WTWLC/NWTPH - 11KV Switchboard T&C incl. 7 days Tue 8/8/17 Mon 14/8/17 8/8 14/8 CLP - Partial due to incompletion of WTWLC 452 S36118 WTWLC/NWTPH - 11kV Energisation Tue 15/8/17 Wed 13/9/17 15/8 30 days 453 **S36119** WTW Logistics Centre - T&C Sun 9/9/18 Tue 29/1/19 143 days 9/9 454 S36120 WTWLC - T&C Individual Test Sun 9/9/18 Mon 8/10/18 8/10 30 days 455 S36121 WTWLC - T&C Preliminary Test Tue 9/10/18 Fri 7/12/18 60 days 456 S36122 WTWLC - T&C Precommissioning Test Sat 8/12/18 Sat 22/12/18 8/12 = 22/12 15 days 457 S36123 WTWLC - T&C Commissioning Test 38 days Sun 23/12/18 Tue 29/1/19 23/12 458 **S36124** WTW Logistic Centre - External E&M Site Works 316 days Thu 24/8/17 Thu 5/7/18 459 S36125 WTWLC - T02 Trench/Civil Works - H/O by Civil 0 days Thu 24/8/17 Thu 24/8/17 Contractor 460 S36126 WTWLC - T03 Trench/Civil Works - H/O by Civil 0 days Thu 24/8/17 Thu 24/8/17 Contractor 461 S36127 WTWLC - Installation of new Process pipeline to 90 days Thu 24/8/17 Tue 21/11/17 existing dosing points 462 S36128 180 days WTWLC - PSW From Existing treated water pump Thu 24/8/17 Mon 19/2/18 24/8 463 S36129 WTWLC - Plant Service Water System Tue 20/2/18 Sat 28/4/18 68 days WTWLC - Plant Service Water High Pressure System 68 days 464 S36130 Sun 29/4/18 Thu 5/7/18 465 **S36131** Thu 1/11/18 6/12 ₩ Saturation Tanks - E&M Works 696 days Tue 6/12/16 466 S36132 6/12 30/12 Saturation Tanks - Alum System Procurement Tue 6/12/16 25 days Fri 30/12/16 467 S36133 Saturation Tanks - Alum System Manufacturing & FAT 100 days Sat 31/12/16 Sun 9/4/17 468 S36134 Saturation Tanks - Alum System Delivery Fri 19/5/17 Mon 10/4/17 40 days 469 S36135 Saturation Tanks - First 1/F Slab G.L. AS-4~CH-1 -0 days Fri 8/9/17 Fri 8/9/17 H/O by Civil Contractor 470 S36136 Saturation Tanks - Alum System Site Works Duration* 420 days Fri 8/9/17 Thu 1/11/18 471 S36137 Saturation Tanks - Alum System - Saturation Tanks 120 days Fri 5/1/18 Fri 8/9/17 Mixers & Accessories 472 S36138 Saturation Tanks - Alum System - Process pumps & 120 days Sat 5/5/18 Solution tank 473 S36139 6/5 Saturation Tanks - Alum System - Electrical & ICA 90 days Sun 6/5/18 Fri 3/8/18 Installation 474 S36140 Saturation Tanks - Alum System - Energisation Sun 2/9/18 30 days Sat 4/8/18 475 S36141 Saturation Tanks - Alum System - T&C 60 days Mon 3/9/18 Thu 1/11/18 476 S36142 EMSD inspection of lift Wed 17/10/18 Wed 17/10/18 **♦** 17/10 1 day 477 S36143 WSD inspection Mon 22/10/18 Mon 22/10/18 22/10 1 day 478 S36144 FSD inspection Thu 22/11/18 Thu 22/11/18 ♦ 22/11 1 day 479 S36145 Finishing works 240 days Mon 4/6/18 Tue 29/1/19 480 S36146 Completion of architectural finishes and relevant building 1 day Wed 30/1/19 Wed 30/1/19 works (both internal and external) 481 **S3700** Piping Works Sat 3/6/17 Tue 30/1/18 242 days 482 S3701 Excavation for piping works 145 days Wed 25/10/17 483 **S3702** Trench and steel frame construction (Completion of 20% 30 days Sat 3/6/17 Sun 2/7/17 of all civil works of Process Piping) 484 S3703 3/7 1/8 Mon 3/7/17 Trench and steel frame construction (Completion of 40% 30 days Tue 1/8/17 of all civil works of Process Piping) 485 S3704 Trench and steel frame construction (Completion of 60% 30 days Wed 2/8/17 Thu 31/8/17 of all civil works of Process Piping) 486 S3705 Trench and steel frame construction (Completion of 80% 30 days Fri 1/9/17 Sat 30/9/17 1/9 30/9 of all civil works of Process Piping) 487 **S3706** Mon 30/10/17 Trench and steel frame construction (Completion of 30 days Sun 1/10/17 1/10 100% of all civil works of Process Piping) 488 **S3707** Pipe line installation (Completion of 20% of all E&M 30 days Sat 3/6/17 Sun 2/7/17 works of Process Piping) 489 S3708 Pipe line installation (Completion of 40% of all E&M 30 days Mon 3/7/17 Tue 1/8/17 works of Process Piping) 490 S3709 Pipe line installation (Completion of 60% of all E&M 30 days Wed 2/8/17 Thu 31/8/17 works of Process Piping) 491 S3710 Pipe line installation (Completion of 80% of all E&M 30 days Fri 1/9/17 Sat 30/9/17 1/9 30/9 works of Process Piping) 492 **S3711** 1/10 29/10 Pipe line installation (Completion of 100% of all E&M 29 days Sun 1/10/17 Sun 29/10/17 works of Process Piping) 493 S3712 Fri 1/9/17 Tue 30/1/18 Pipe Line Testing 152 days 30/1 494 S3713 Completion of all site testing and operation Tue 30/1/18 1 day Tue 30/1/18

Commencement Date: 30 Oct 2015 Completion Date: 3 Feb 2020

(EOT for Claim no. 009)

Road Works

Road drainage and kerb construction

Task

Construction of road surface

Critical Split

Section 3 Completion

515 days

365 days

150 days

1 day

Mon 3/7/17

Mon 3/7/17

Tue 3/7/18

Wed 30/1/19

Milestone

Thu 29/11/18

Mon 2/7/18

Thu 29/11/18

Wed 30/1/19

495 **S3800**

496 S3801

497 S3802

498 **S3803**





₩ 29/11

2/7

Manual Summary

Contract No.: 3/WSD/15
Title: In-situ Reprovisioning of Sha Tin Water Treatment Works (South Works) - Advance Works

Master Programme (Ver.03)

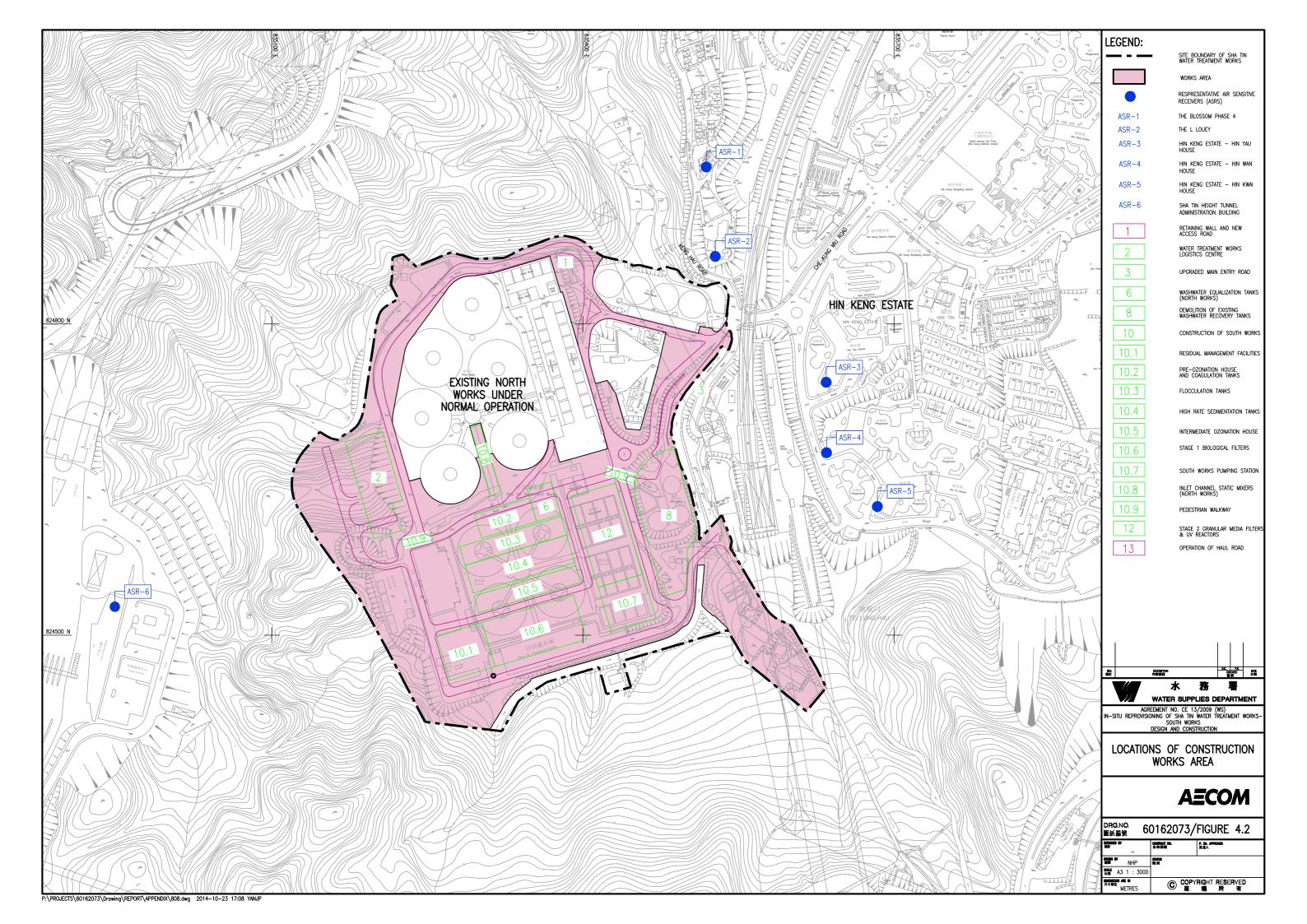
Master Programme (Ver.03)

Duration Start 499 **S4000**500 **S4001**501 **S4100**502 **S4101** Sat 31/8/19 972 days Mon 2/1/17 Mon 2/1/17 Section 4 Commencement Mon 2/1/17 **♦ 2/1** Landscaping Softworks & Establishment Works
Landscaping Soft works
Establishment works Thu 29/8/19 Wed 29/8/18 Fri 1/6/18 ₩ 29/8 455 days 90 days Fri 1/6/18 502 S4101 503 S4102 504 S4002 505 S5000 506 S5001 507 S5100 508 S5101 509 S5102 510 S5103 511 S5104 365 days Thu 30/8/18 Thu 29/8/19 29/8 Section 4 Completion Sat 31/8/19 Sat 31/8/19 **◆4**31/8 1 day Section 5 1558 days Fri 30/10/15 Mon 3/2/20 Section 5 Commencement Fri 30/10/15 Fri 30/10/15 ♦ 30/10 1 day Landscaping Softworks & Establishment Works 1390 days Fri 8/1/16 Mon 28/10/19 8/1 🕶 ₹ 28/10 8/1 27/1 Preparation of site area for planting works 20 days Fri 8/1/16 Wed 27/1/16 Transplanting works
Establishment for transplanting works Sun 14/8/16 15/8 200 days Thu 28/1/16 Mon 14/8/17 365 days Mon 15/8/16 Landscaping Soft works
Establishment works 90 days Tue 31/7/18 Sun 28/10/18 512 S5105 365 days Mon 29/10/18 Mon 28/10/19 513 **S5002** Section 5 Completion Mon 3/2/20 Mon 3/2/20 **43/2** 1 day

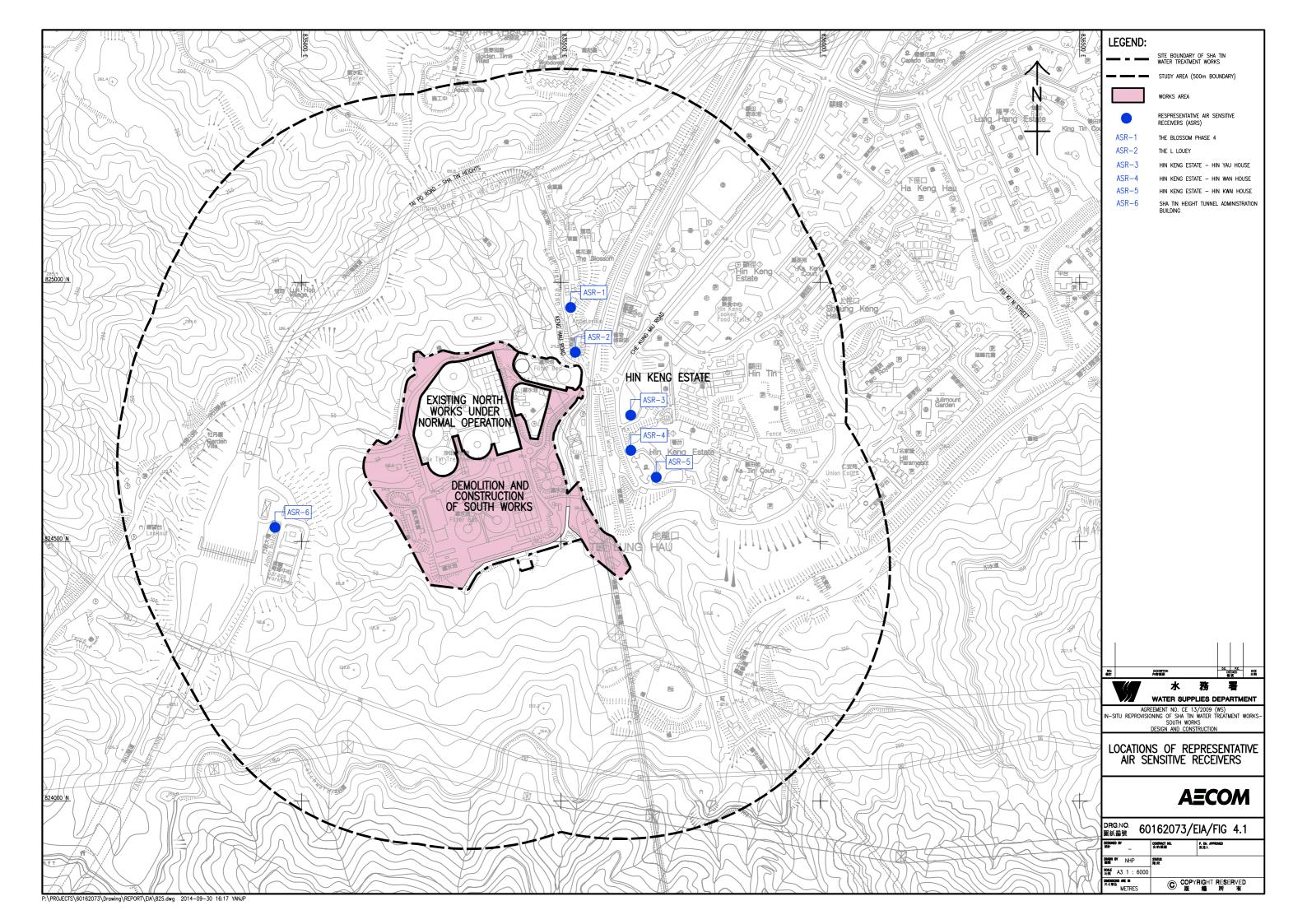


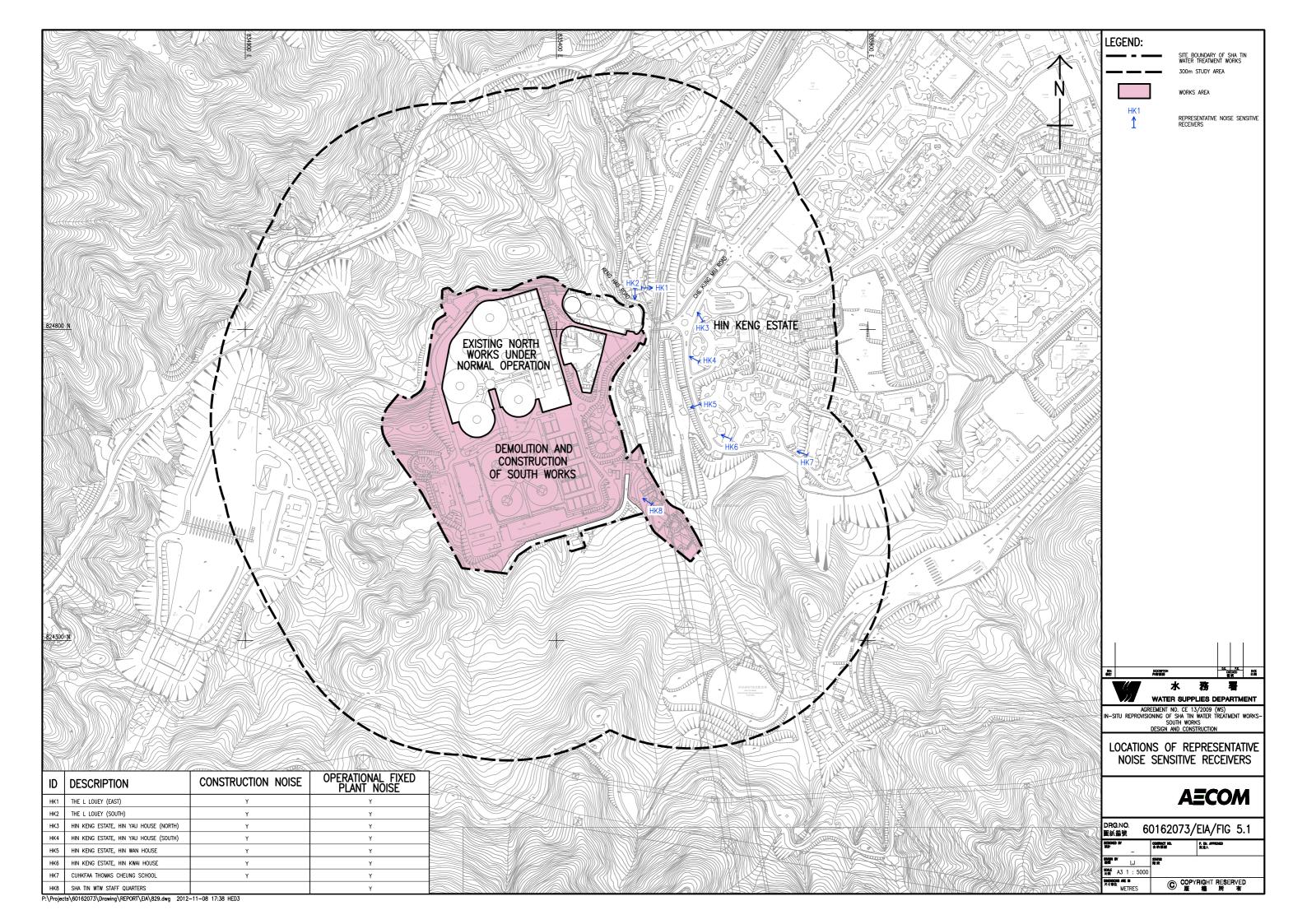


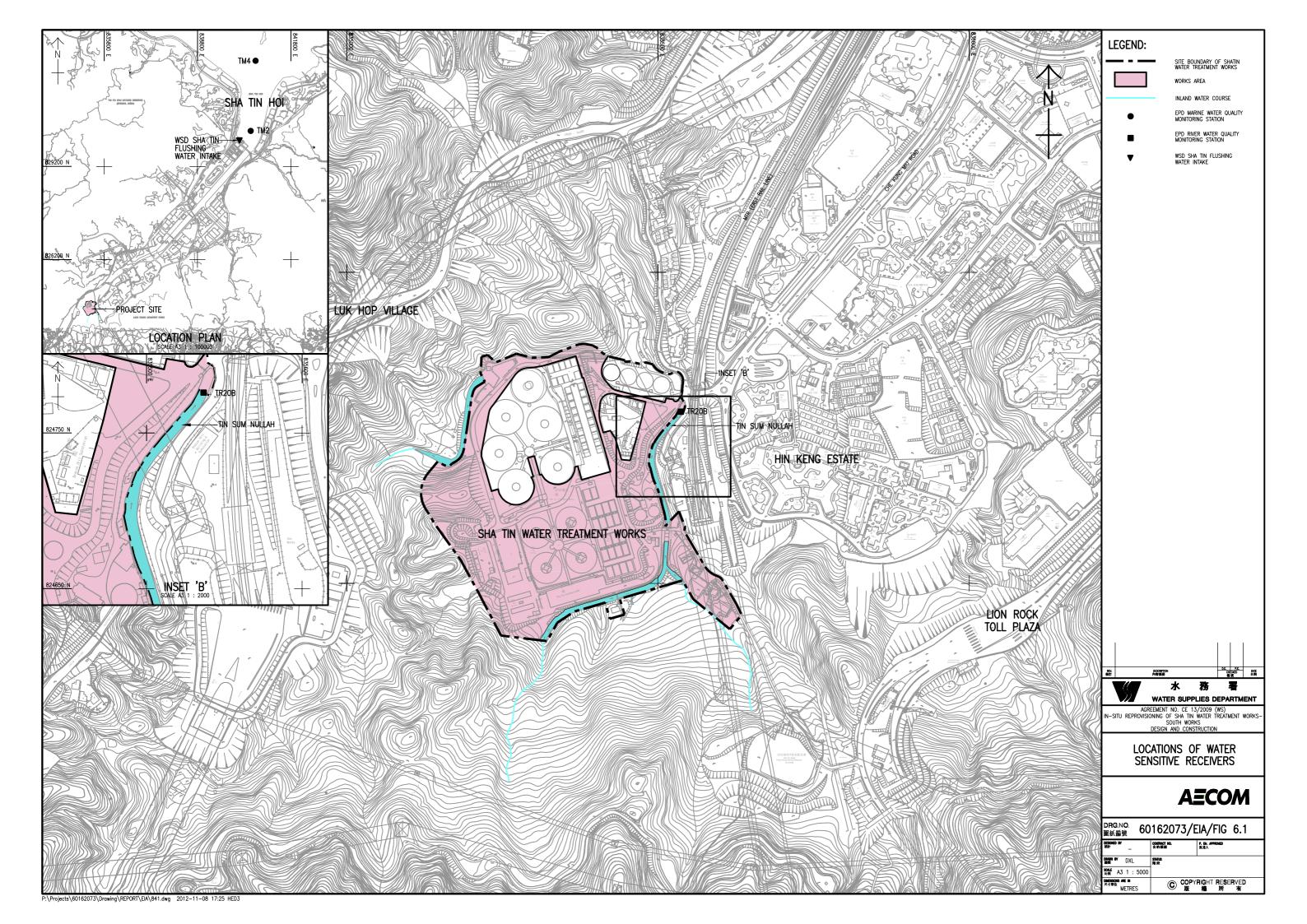
Appendix D Location of Construction Activities



Appendix E Environmental Sensitive Receivers in the Vicinity of the Project







Appendix F Summary of Action and Limit Levels

Determination of Action and Limit Levels for Air Quality

Monitoring Locations	Action Level 1-hour TSP, (µg/m³)	Limit Level 1-hour TSP, (μg/m³)
AM1	357	500
AM2	334	500

Determination of Action and Limit Levels for Noise

Monitoring	Action Level	Limit Level in dB(A)			
Location	0700-1900 hours on normal weekdays				
NM1		For domestic premises: 75 dB(A) for			
NM2	complaint is received	NM1 & NM2			
NM3		For schools: 70dB(A) during normal teaching periods and 65 dB(A) during examination periods for NM3			

Determination of Action and Limit Levels for Water Quality

Water		d Oxygen g/L)	Suspended Solids (mg/L) Turbidity (NTU) pH		Turbidity (NTU)		Н	
monitoring stations	Action	Limit	Action	Limit	Action	Limit	Action	Limit
Stations	Level	Level	Level	Level	Level	Level	Level	Level
C1	7.51	7.44	4.19	6.73	3.99	4.00	Beyond the range 6.6 to 7.9	Beyond the range 6.5 to 8.0
C2	8.10	7.98	4.33	8.16	3.13	3.28	Beyond the range 6.6 to 8.8	Beyond the range 6.5 to 8.9
C3*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
M1	8.90	8.89	3.30	3.56	4.36	4.48	Beyond the range 6.6 to 8.2	Beyond the range 6.6 to 8.3
M2	8.92	8.91	18.84	26.80	12.64	13.72	Beyond the range 6.6 to 11.0	Beyond the range 6.6 to 11.0
M3	9.16	9.15	1.00	1.00	1.10	1.18	Beyond the range 6.6 to 8.6	Beyond the range 6.6 to 8.7

Remark: For DO, action should be taken when monitoring result of either one of the surface, middle or bottom DO is lower than the proposed Action/Limit Levels.

Appendix G Event/Action Plan

Air Quality

EVENT	ACTION						
EVENI	ET	IEC	ER	CONTRACTOR			
ACTION LEVEL							
1. Exceedance for one	1. Inform the Contractor, IEC	Check monitoring data	1. Confirm receipt of	1. Identify source(s),			
sample	and ER;	submitted by the ET;	notification of exceedance	investigate the causes of			
	2. Discuss with the	2. Check Contractor's	in writing.	exceedance and propose			
	Contractor on the remedial	working method; and		remedial measures;			
	measures required;	3. Review and advise the ET		2. Implement remedial			
	3. Repeat measurement to	and ER on the effectiveness		measures; and			
	confirm findings; and	of the proposed remedial		3. Amend working methods			
	4. Increase monitoring	measures.		agreed with the ER as			
	frequency.			appropriate.			
2. Exceedance for two or	1. Inform the Contractor, IEC	Check monitoring data	1. Confirm receipt of	Identify source and			
more consecutive samples	and ER;	submitted by the ET;	notification of exceedance	investigate the causes			
	2. Discuss with the ER and	2. Check Contractor's	in writing;	of exceedance;			
	Contractor on the remedial	working method; and	2. Review and agree on the	2. Submit proposals for			
	measures required;	3. Review and advise the ET	remedial measures proposed	remedial measures to			
	3. Repeat measurements to	and ER on the effectiveness	by the Contractor; and	the ER with a copy to			
	confirm findings;	of the proposed remedial	3. Supervise implementation	ET and IEC within three			
	4. Increase monitoring	measures.	of remedial measures.	working days of notification;			
	frequency to daily;			3. Implement the agreed			
	5. If exceedance continues,			proposals; and			

	arrange meeting with the			4. Amend proposal as
	IEC, ER and Contractor; and			appropriate.
	6. If exceedance stops,			
	cease additional monitoring.			
LIMIT LEVEL				
Event	ET	IEC	ER	CONTRACTOR
1. Exceedance for one	1. Inform the Contractor,	Check monitoring data	1. Confirm receipt of	1. Identify source(s) and
sample	IEC, EPD and ER;	submitted by the ET;	notification of exceedance	investigate the causes
	2. Repeat measurement to	2. Check the Contractor's	in writing;	of exceedance;
	confirm findings;	working method;	2. Review and agree on the	2. Take immediate action to
	3. Increase monitoring	3. Discuss with the ET, ER	remedial measures proposed	avoid further exceedance;
	frequency to daily; and	and Contractor on possible	by the Contractor; and	3. Submit proposals for
	4. Discuss with the ER, IEC	remedial measures; and	3. Supervise implementation	remedial measures to ER
	and contractor on the	4. Review and advise the ER	of remedial measures.	with a copy to ET and IEC
	remedial measures and	and ET on the effectiveness		within three working days of
	assess the effectiveness.	of Contractor's remedial		notification;
		measures.		4. Implement the agreed
				proposals; and
				5. Amend proposal if
				appropriate.

	ET	IEC	ER	CONTRACTOR
2. Exceedance for two or	1. Notify Contractor, IEC, EPD	1. Check monitoring data	1. Confirm receipt of	1. Identify source(s) and
more consecutive samples	and ER;	submitted by the ET;	notification of exceedance	investigate the causes of
	2. Repeat measurement to	2. Check the Contractor's	in writing;	exceedance;
	confirm findings;	working method;	2. In consultation with the ET	2. Take immediate action
	3. Increase monitoring	3. Discuss with ET, ER, and	and IEC, agree with the	to avoid further exceedance;
	frequency to daily;	Contractor on the potential	Contractor on the remedial	3. Submit proposals for
	4. Carry out analysis of the	remedial measures; and	measures to be	remedial measures to the ER
	Contractor's working procedures	4. Review and advise the ER	implemented;	with a copy to the IEC and
	with the ER to determine	and ET on the effectiveness	3. Supervise the	ET within three working days
	possible mitigation to be	of Contractor's remedial	implementation of remedial	of notification;
	implemented;	measures.	measures; and	4. Implement the agreed
	5. Arrange meeting with the IEC		4. If exceedance continues,	proposals;
	and ER to discuss the remedial		consider what portion of the	5. Revise and resubmit
	measures to be taken;		work is responsible and	proposals if problem still not
	6. Review the effectiveness of		instruct the Contractor to	under control; and
	the Contractor's remedial		stop that portion of work	6. Stop the relevant portion
	measures and keep IEC, EPD		until the exceedance is	of works as determined by
	and ER informed of the results;		abated.	the ER until the exceedance
	and			is abated.
	7. If exceedance stops, cease			
	additional monitoring.			

Noise

EVENT	ACTION							
EVENT	ET	IEC	ER	CONTRACTOR				
ACTION LEVEL	1. Notify the Contractor, IEC	Review the investigation	1. Confirm receipt of	Investigate the complaint				
	and ER;	results submitted by the	notification of complaint in	and propose remedial				
	2. Discuss with the ER and	Contractor; and	writing;	measures;				
	Contractor on the remedial	2. Review and advise the ET	2. Review and agree on the	2. Report the results of				
	measures required; and	and ER on the effectiveness	remedial measures proposed	investigation to the IEC, ET				
	3. Increase monitoring	of the remedial measures	by the Contractor; and	and ER;				
	frequency to check mitigation	proposed by the Contractor.	3. Supervise implementation	3. Submit noise mitigation				
	effectiveness.		of remedial measures.	proposals to the ER with				
				copy to the IEC and ET				
				within three working days of				
				notification; and				
				4. Implement noise mitigation				
				proposals.				
LIMIT LEVEL	1. Notify the Contractor, IEC,	Check monitoring data	1. Confirm receipt of	Identify source and				
	EPD and ER;	submitted by the ET;	notification of failure in	investigate the causes of				
	2. Repeat measurement to	2. Check the Contractor's	writing;	exceedance;				
	confirm findings;	working method;	2. In consultation with the ET	2. Take immediate action to				
	3. Increase monitoring	3. Discuss with the ER, ET	and IEC, agree with the	avoid further exceedance;				
	frequency;	and Contractor on the	Contractor on the remedial	3. Submit proposals for				
	4. Carry out analysis of	potential remedial measures;	measures to be	remedial measures to the ER				

Contractor's working	and	implemented;	with copy to the IEC and ET
procedures to determine	4. Review and advise the ET	3. Supervise the	within three working days of
possible mitigation to be	and ER on the effectiveness	implementation of remedial	notification;
implemented;	of the remedial measures	measures; and	4. Implement the agreed
5. Arrange meeting with the	proposed by the Contractor.	4. If exceedance continues,	proposals;
IEC and ER to discuss the		consider what portion of the	5. Revise and resubmit
remedial measures to be		work is responsible and	proposals if problem still not
taken;		instruct the Contractor to	under control; and
6. Review the effectiveness		stop that portion of work until	6. Stop the relevant portion
of Contractor's remedial		the exceedance is abated.	of works as determined by
measures and keep IEC,			the ER until the exceedance
EPD and ER informed of the			is abated.
results; and			
7. If exceedance stops,			
cease			

Water Quality

FVFNT	ACTION						
EVENT	ET Leader	IEC	ER	CONTRACTOR			
Action level being exceeded	Repeat in situ	Discuss with ET and	Discuss with IEC on the	Inform the ER and			
by one sampling day	measurement to	Contractor on the	proposed mitigation	confirm notification of			
	confirm findings;	mitigation measures;	measures;	the non-compliance in			
	Identify reasons for	Review proposals on	Make agreement on the	writing;			
	non-compliance and	mitigation measures	mitigation measures to	Rectify unacceptable			
	source(s) of impact;	submitted by	be implemented.	practice;			
	Inform IEC and	Contractor and advise	Assess the	Check all plant and			
	Contractor;	the ER accordingly;	effectiveness of the	equipment;			
	Check monitoring data,	Assess the	implemented mitigation	 Consider changes of 			
	all plant, equipment	effectiveness of the	measures.	working methods;			
	and Contractor's	Implemented mitigation		Discuss with ET and			
	working methods;	measures.		IEC and propose			
	Discuss mitigation			mitigation measures to			
	measures with IEC and			IEC and ER;			
	Contractor;			Implement the agreed			
	Repeat measurement			mitigation measures.			
	on next day of						
	exceedance.						

	ET Leader	IEC	ER	CONTRACTOR
Action level being exceeded	Repeat in situ	Discuss with ET and	Discuss with IEC on the	Inform the ER and
by more than one	measurement to	Contractor on the	proposed mitigation	confirm notification of
consecutive sampling day	confirm findings;	mitigation measures;	measures;	the non-compliance in
	 Identify reasons for 	Review proposals on	Make agreement on the	writing;
	non-compliance and	mitigation measures	mitigation measures to	Rectify unacceptable
	source(s) of impact;	submitted by	be implemented;	practice;
	● Inform IEC and	Contractor and advise	Assess the	Check all plant and
	Contractor;	the ER accordingly;	effectiveness of the	equipment;
	Check monitoring data,	Assess the	implemented mitigation	Consider changes of
	all plant, equipment	effectiveness of the	measures.	working methods;
	and Contractor's	implemented mitigation		Discuss with ET and
	working methods;	measures.		IEC and propose
	Discuss mitigation			mitigation measures to
	measures with IEC and			IEC and ER within
	Contractor;			three working days;
	Ensure mitigation			Implement the agreed
	measures are			mitigation measures.
	implemented;			
	Prepare to increase the			
	monitoring frequency to			
	daily;			

	•	Repeat measurement						
		on next day of						
		exceedance.						
		ET Leader		IEC		ER		CONTRACTOR
Limit level being	•	Repeat in situ	•	Discuss with ET and	•	Discuss with IEC, ET	•	Inform the ER and
exceeded by one		measurement to		Contractor on the		and Contractor on the		confirm notification of
sampling day		confirm findings;		mitigation measures;		proposed mitigation		the non-compliance in
	•	Identify reasons for	•	Review proposals on		measures;		writing;
		non-compliance and		mitigation measures	•	Request Contractor to	•	Rectify unacceptable
		source(s) of impact;		submitted by		critically review the		practice;
	•	Inform IEC Contractor		Contractor and advise		working methods;	•	Check all plant and
		and EPD;		the ER accordingly;	•	Make agreement on the		equipment;
	•	Check monitoring data,	•	Assess the		mitigation measures to	•	Consider changes of
		all plant, equipment		effectiveness of the		be implemented;		working methods;
		and Contractor's		implemented mitigation	•	Assess the	•	Discuss with ET, IEC
		working methods;		measures.		effectiveness of the		and ER and propose
	•	Discuss mitigation				implemented mitigation		mitigation measures to
		measures with IEC, ER				measures.		IEC and ER within
		and Contractor;						three working days;
	•	Ensure mitigation					•	Implement the agreed
		measures are						mitigation measures.
		implemented;						

	Increase the monitoring frequency to daily until no exceedance of Limit level.			
	ET Leader	IEC	ER	CONTRACTOR
Limit level being	Repeat in situ	Discuss with ET and	 Discuss with IEC, ET 	 Inform the ER and
exceeded by more	measurement to	Contractor on the	and Contractor on the	confirm notification of
than one	confirm findings;	mitigation measures;	proposed mitigation	the non-compliance in
consecutive	 Identify reasons for 	Review proposals on	measures;	writing;
sampling day	non-compliance and	mitigation measures	Request Contractor to	Rectify unacceptable
	source(s) of impact;	submitted by	critically review the	practice;
	Inform IEC Contractor	Contractor and advise	working methods;	Check all plant and
	and EPD;	the ER accordingly;	Make agreement on the	equipment;
	Check monitoring data,	Assess the	mitigation measures to	Consider changes of
	all plant, equipment	effectiveness of the	be implemented;	working methods;
	and Contractor's	implemented mitigation	Assess the	Discuss with ET, IEC
	working methods;	measures.	effectiveness of the	and ER and propose
	Discuss mitigation		implemented mitigation	mitigation measures to
	measures with IEC, ER		measures;	IEC and ER within
	and Contractor;		Consider and instruct, if	three working days;
	Ensure mitigation		necessary, the	Implement the agreed
	measures are		Contractor to slow	mitigation measures;

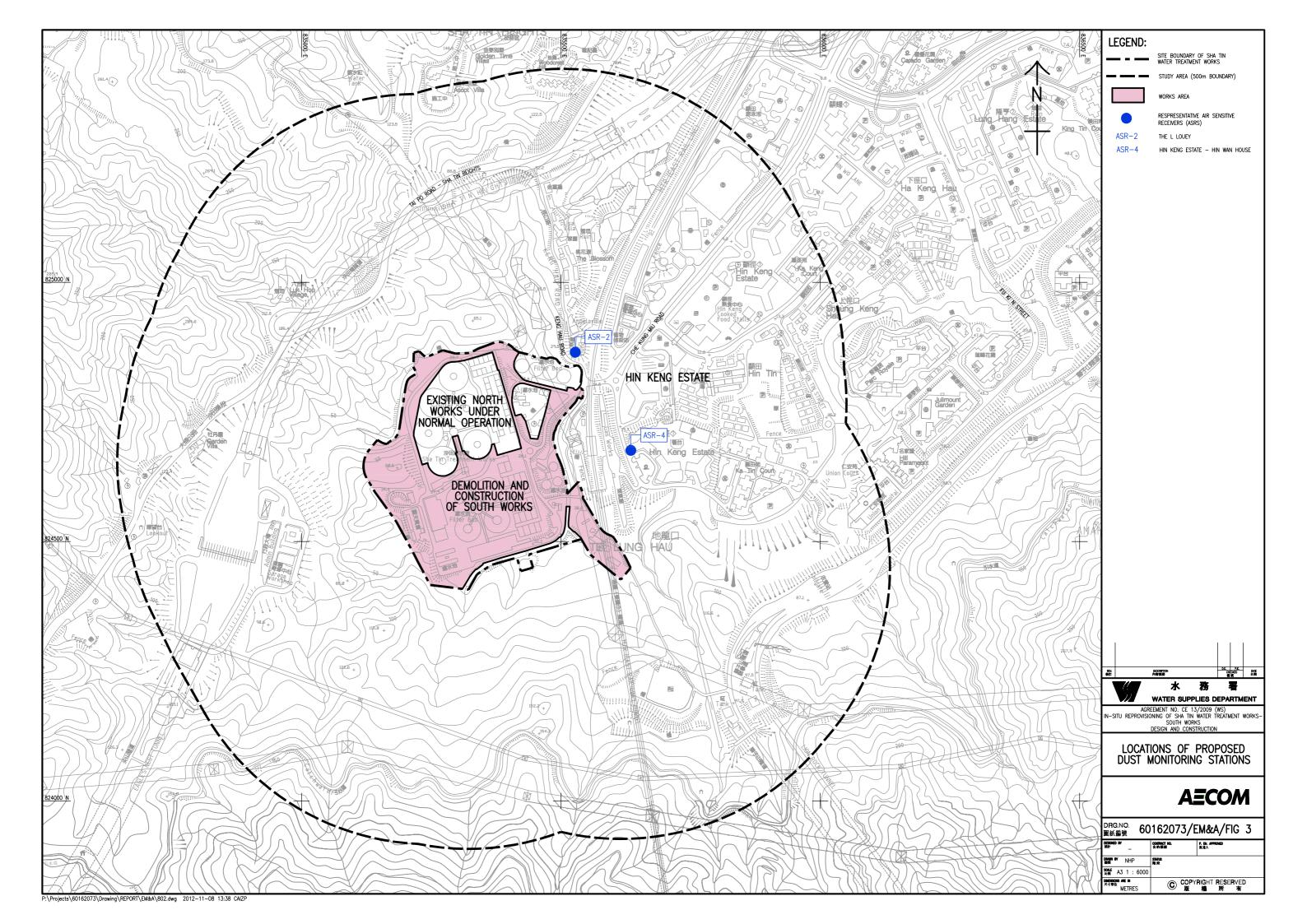
implemented; Increase	down or to stop all or	As directed by the ER,
the monitoring	part of the construction	to slow down or to stop
frequency to daily until	activities until no	all or part of the
no exceedance of Limit	exceedance of Limit	construction activities.
level for two	level.	
consecutive days.		

Appendix H Impact Monitoring Schedules

Impact Monitoring Schedule for STWTW

Impact Monitoring Schedule for STWTW								
Feb-18								
Sun	Mon	Tue	Wed		Fri	Sat		
				1	2	3		
			Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2			
					& NM3			
4	5	6	7	8	9	10		
	Impact		Impact		Impact			
	Water Quality monitoring for C1, C2, C3, M1, M2 & M3		Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3		Water Quality monitoring for C1, C2, C3, M1, M2 & M3			
11	12	13	14	15	16	17		
	Impact Water Quality monitoring for C1,		Impact Water Quality monitoring for C1,					
18	19	20	21	22	23	24		
		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3		
25	26	27	28					
	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	*Remark: No construction works will be pe	erformed on public holiday 16/2 to 19/2			

Appendix I Location Plan of Air Quality Monitoring Station



Appendix J Calibration Certificates (Air Monitoring)



CERTIFICATE OF CALIBRATION AND TESTING

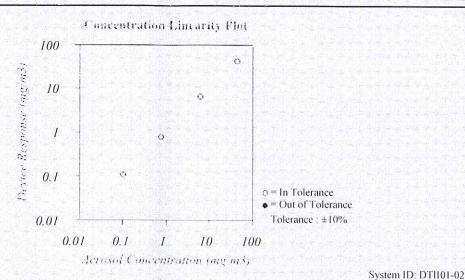
TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

Environment Conditions		
Temperature	74.9 (23.8)	°F (°C)
Relative Humidity	46	%RH
Barometric Pressure	29.08 (984.8)	inHg (hPa)

Model	8532
Serial Number	8532114409

 ☑ As Left
 ☑ In Tolerance

 ☐ As Found
 ☑ Out of Tolerance



FLOW AND PRESSURE VERIFICATION SYSTEM DTH01-02							
Parameter	Standard	Measured	Allowable Range	Parameter	Standard	Measured	Allowable Range
Flow Ipm	3.0	3.1	2.85 ~ 3.15	Pressure kPa	98.5	98.5	93.57 ~ 103.42

TSI Incorporated does hereby certify that all materials, components, and workmanship used in the manufacture of this equipment are in strict accordance with the applicable specifications agreed upon by TSI and the customer and with all published specifications. All performance and acceptance tests required under this contract were successfully conducted according to required specifications. There is no NIST standard for optical mass measurements. Calibration of this instrument performed by TSI has been done using emery oil and has been nominally adjusted to respirable mass per standard ISO 12103-1, A1 test dust (Arizona dust). Our calibration ratio is greater than 1.2:1

Measurement Variable	System ID	Last Cal.	Cal. Due	Measurement Variable	System ID	Last Cal.	Cal. Due
Temp/Humidity	E005409	04-26-16	10-26-17	Temp/Humidity	E005410	04-26-16	10-26-17
DC Voltage	E003314	05-03-17	05-31-18	DC Voltage	E003315	05-03-17	05-31-18
Photometer	E003319	01-16-17	07-31-17	Microbalance	M001324	11-02-16	11-30-18
1 um PSL	679755	n/a	n/a	3 um PSL	180387	n/a	n/a
10 um PSL = _ = = =	167947	n/a	n/a	Pressure -	E003511	10-11-16	10-11-17
Flowmeter	E002471	04 20 17	04.30.18		THE OWNER WATER		

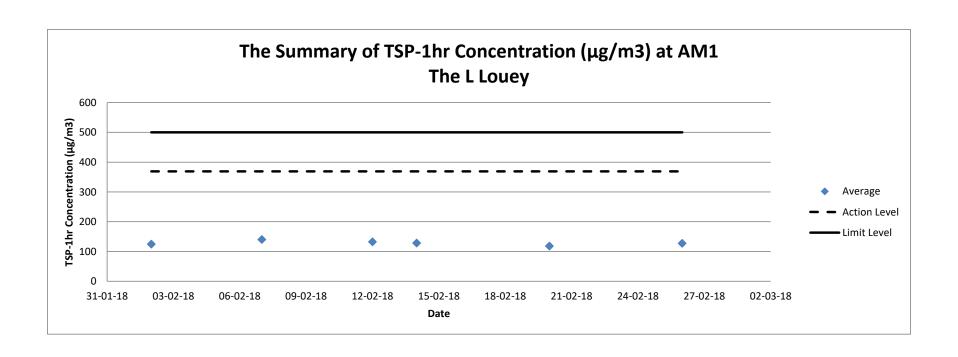
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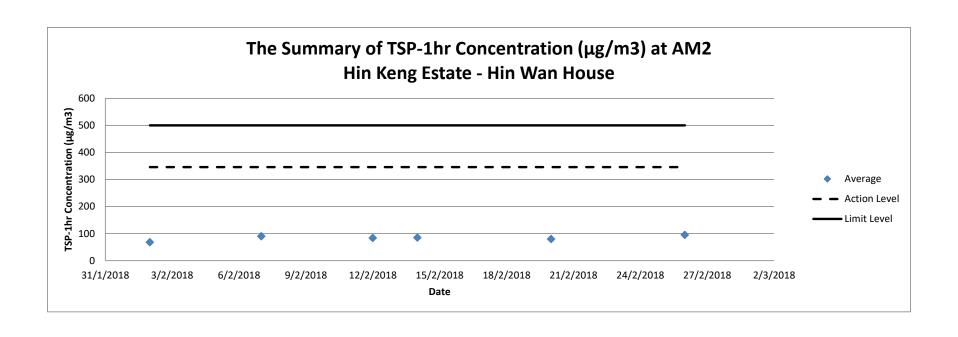
July 24, 2017

Date

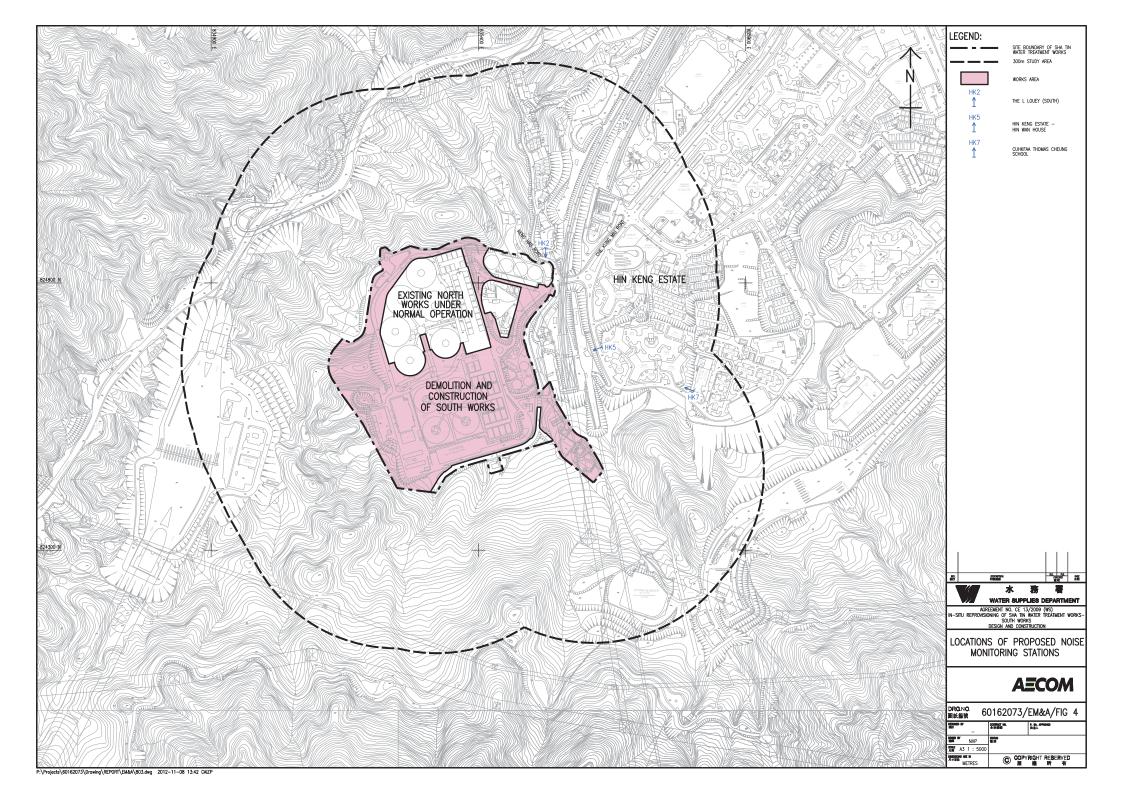
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Appendix K Impact Air Quality Monitoring Results and Graphical Presentation





Appendix L Location Plan of Noise Monitoring Station



Appendix M Calibration Certificates (Noise)

積分形精密騒音計 Intergrating Precision Sound Level Meter TYPE 6224

検査成績書 INSPECTION CERTIFICATE

本体製造番号

Serial No. of body:

171157

マイクロホン製造番号

Serial No. of Microphone:

67492

Ver: 1.6E-09-11

年月日:

平成29年8月1日

Date:

August 1, 2017

承認	点検	担当
Approved	Passed	Inspected
anagatu	1. Matumoto	K. Naheta

株式会社 アコー ACO CO., LTD.

1. 検査年月日 Inspection Date

平成29年8月1日

August 1, 2017

2. 検査条件 Inspection Condition

1) 温度 Temperature 26 ℃

2) 湿度

Humidity

: 58 %

3) 気圧

Barometric pressure : 982 hPa

3. 検査項目及び結果 Inspection Results

1) RANGE 切換誤差検査 The RANGE Shifting Error

RANGE: 20-100dB、70dB入力基準±0.5dB以下

Within ±0.5dB of the value at 70dB input, Range 20-100dB.

RANGE	入力レベル	周波数	Frequency (H		
(dB)	Input level (dB)	31.5	1000	8000	
40-130	100	0.0	0.0	0.1	
30-120	90	0.0	-0.1	0.0	
20-110	80.	0.1	0.0	0.1	
20-100	70	0.0	0.0	0.0	
20-90	60	0.1	-0.1	0.0	
20-80	50	0.1	-0.1	-0.1	
判定	Passed	Pass			

2) 安定性特性検査 Stability Caracteristic

RANGE: 20-100dB、1分後基準±0.5dB以下

Within ±0.5dB of the value one minute later, Range 20-100dB.

		10分後
		ten minutes later
誤差	Error (dB)	0.0
判定	Passed	Pass

3) 目盛誤差特性検査 The Scale Error

RANGE: 20-110dB、65dB入力基準

Error of the value at 65dB input, Range 20-110dB.

入力	規格	周波数	I Fred	quency			
Input	Standard	11-11-20	(Hz)	a coaro,			
(dB)	(dB)	31.5	1000	8000			
110	±0.7	0.0	0.0	0.0			
105	±0.7	-0.2	-0.1	0.0			
100	±0.7	0.0	0.0	-0.1			
95	±0.7	-0.1	0.0	0.0			
90	±0.7	0.2	0.1	0.1			
85	±0.7	0.1	0.1	0.0			
80	±0.7	0.1	0.0	0.0			
75	±0.7	0.1	0.0	0.0			
70	±0.7	0.0	-0.1	-0.1			
65		0,0	0.0	0.0			
60	±0.7	-0.2	0.0	0.0			
55	±0.7	-0.3	-0.1	-0.1			
50	±0.7	-0.1	0.0	0.0			
45	±0.7	-0.2	0.1	0.1			
40	±0.7	-0.2	-0.1	0.0			
35	±0.7	0.0	-0.1	0.1			
30	±0.7	-0.2	-0.1	-0.1			
25	±0.7	0.1	0.0	0.0			
判定	Passed	Pass					

4) 動特性検査 Dynamic Characteristic

RANGE: 20-100dB、1kHz、100dB入力基準

When 100dB input, Range 20-100dB at 1kHz.

	規格	測定				
	Standard(dB)	Measured Value(dB)				
FAST	$^{-1.0}_{-1.0}^{+0.5}$ (dB)	-1.0				
SLOW	-4.0 ±1.0 (dB)	-4.0				
判定	Passed	Pass				

5) 周波数特性検査 Frequency Response

RANGE: 20-100dB、95dB入力基準(マイクを含む)

When 95dB input, including Microphone value, Range 20-100dB.

	56 m ¥	,	A特性	<u> </u>	,	C特性	TOOLD.	FLAT(Z)特性			
周波数	許容差	規格	レスポンス	偏差	規格	レスポンス	偏差	規格	レスポンス	偏差	
Frequency	Tolerance	Standard	Response	Deviation	Standard	Response	Deviation	Standard	Response	Deviation	
(Hz)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	
20	±3.0	-50.5	-49.0	1.5	-6.2	-5.1	1.1	0.0	-0.9	-0.9	
40	±1.5	-34.6	-34.0	0.6	-2.0	-1.7	0.3	0.0	-0.1	-0.1	
100	±1.0	-19.1	-18.8	0.3	-0.3	-0.2	0.1	0.0	0.1	0.1	
250	±1.0	-8.6	-8.3	0.3	0.0	0.1	0.1	0.0	0.1	0.1	
500	±1.0	-3.2	-3.0	0.2	0.0	0.0	0.0	0.0	0.1	0.1	
1000	±1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	
2000	±1.0	1.2	1.1	-0.1	-0.2	-0.3	-0.1	0.0	0.0	0.0	
4000	±1.0	1.0	0.5	-0.5	-0.8	-1.1	-0.3	0.0	-0.1	-0.1	
5000	±1.5	0.5	-0.1	-0.6	-1.3	-1.9	-0.6	0.0	-0.4	-0.4	
6300	+1.5 -2.0	-0.1	-0.6	-0.5	-2.0	-2.3	-0.3	0.0	-0.2	-0.2	
8000	+1.5 -3.0	-1.1	-1.7	-0.6	-3.0	-3.5	-0.5	0.0	-0.3	-0.3	
10000	+1.5 -4.0	-2.5	-3.2	-0.7	-4.4	-5.1	-0.7	0.0	-0.9	-0.9	
12500	-	-4.3	-4.0	0.3	-6.2	-5.7	0.5	0.0	-0.4	-0.4	
16000	+3.0 -6.0							0.0	-2.7	-2.7	
20000								0.0	-2.2	-2.2	
判定	Passed					Pass					

6) 実効値指示誤差検査 Effective Value Error

RANGE: 20-100dB、波高率3のバースト信号に対して1.0dB以内

Within 1.0dB on the Burst signal of the peak factor 3, Ragne 20-100dB.

周波数 Frequency 2kHz、繰り返し周波数 Repeat fequency 40Hz

実効値指示誤差	判定
Effective value Error (dB)	Passed
0.3	Pass

7) 自己雑音特性検査 Self-noise

RANGE: 20-80dB (マイクを含む)

RANGE: 20-80dB (Including Microphone value)

RANGE: 20-80dB (Including Microphone value)	A特性	C特性	FLAT(Z)特性	
規格 Standard	18以下	29以下	32以下	
(dB)	Below 18	Below 29	Below 32	
自己雑音 Self-noise(dB)	17.1	23.8	29.7	
判定 Passed	Pass			



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.: C172190

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號: IC17-0865)

Date of Receipt / 收件日期: 18 April 2017

Description / 儀器名稱

Acoustic Calibrator

Manufacturer / 製造商 Model No. / 型號

Pulsar 105

Serial No. / 編號

70396

Supplied By / 委託者

Acumen Environmental Engineering and Technologies Co., Ltd.

Lot 11, Tam Kon Shan Road, North Tsing Yi, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 :

 $(23 \pm 2)^{\circ}$ C

Relative Humidity / 相對濕度 :

 $(55 \pm 20)\%$

Line Voltage / 電壓 :

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期

25 April 2017

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

Date of Issue 簽發日期

26 April 2017

Project Engineer

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗所書面批准。



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.: C172190

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 TST150A

CL130 CL281 Description

Measuring Amplifier Universal Counter

Multifunction Acoustic Calibrator

Certificate No.

C161175 C163709

PA160023

Test procedure: MA100N. 4.

5. Results:

Sound I aval Accuracy 5.1

ound Dever Meeting			
UUT	Measured Value	IEC60942:2003	Uncertainty of Measured Value
Nominal Value	(dB)	Class 1 Spec.	(dB)
94 dB, 1 kHz	93.9	± 0.4 dB	± 0.2

Mfr's Spec.: IEC60942:2003 Class 1

Frequency Accuracy

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

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

Note:

Only the original copy or the laboratory's certified true copy is valid.

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.

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗所書面批准。





This instrument was produced under rigorous factory production control and documented standard procedures. It was individually visually inspected, leak tested and function tested for display, backlight, button and software performance. The accuracy of each of its primary measurements was individually calibrated and/or tested against standards traceable to the National Institute of Standards and Technology ("NIST") or calibrated intermediary standards. This instrument is certified to have performed at the time of manufacture in compliance with the following specifications as they apply to this meter's specific model, measurements and features.

Methods Used in Calibration and Testing

Wind Speed:

The Kestrel Pocket Weather Meter impeller installed in this unit was individually tested in a subsonic wind tunnel operating at approximately 300 fpm (1.5 m/s) and 1200 fpm (6.1 m/s) monitored by a Gill Instruments Model 1350 ultrasonic time-of-flight anemometer. The Standard's maximum combined uncertainty is +/-1.04% within the airspeed range 706.6 to 3923.9 fpm (3.59 to 19.93 m/s), and +/-1.66% within the airspeed range 166.6 to 706.6 fpm (0.85 to 3.59 m/s).

Temperature:

Temperature response is verified in comparison with a Eutechnics 4600 Precision Thermometer or a standard Kestrel 4000 Weather and Environmental Meter calibrated weekly against the Eutechnics 4600. The Eutechnics 4600 is calibrated annually and is traceable to NIST with a system accuracy of +/- 0.05 °C.

Direction / Heading

The sensitivity of the magnetic directional sensor is verfied at the component level by applying a magnetic field to the sensor and measuring the signal output at 4 points, as well as after assembly by orienting the unit to the cardinal directions and measuring the magnetic field output. In both cases the compass output must be accurate to within +/- 5 degrees.

Relative Humidity:

Relative humidity receives a two-point calibration in humidity and temperature controlled chambers at 75.3% RH and 32.8% RH at 25° C. The calibration tanks are monitored with an Edgetech Model 2002 DewPrime II Standard Chilled Mirror Hygrometer. Following calibration, performance is further verified at an RH of approximately 43.2% against the Edgetech Hygrometer. The Edgetech Hygrometer is calibrated annually and is traceable to NIST with a maximum relative expanded uncertainty of +/- 0.2% RH.

Barometric Pressure:

Pressure response is verified against a Mensor Series 6000 Digital Barometer or a standard Kestrel 4000 Weather and Environmental Meter calibrated weekly against the Mensor Barometer. The Mensor Barometer is calibrated annually and is traceable to NIST with a maximum relative expanded uncertainty of +/- 0.02% F.S.

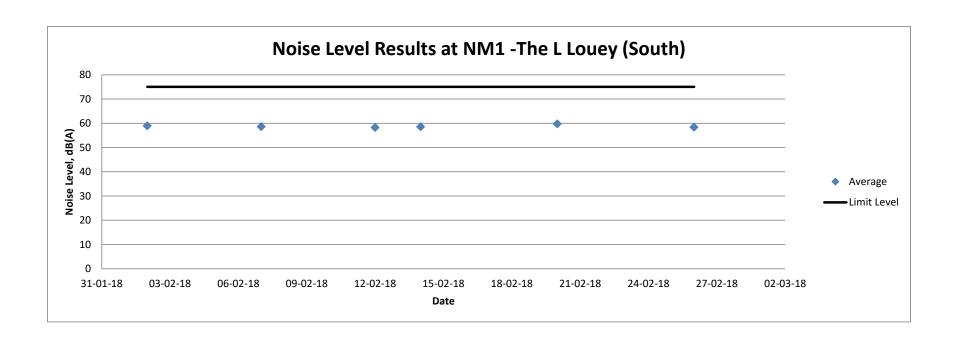
Approved By:

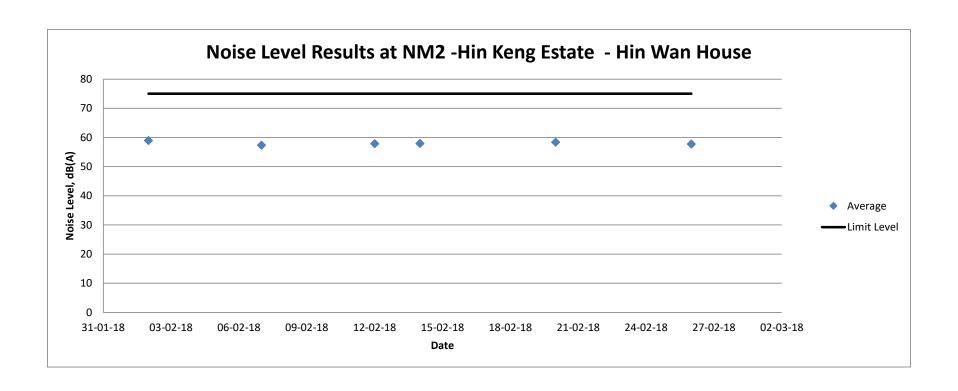
Michael Naughton, Engineering Manager

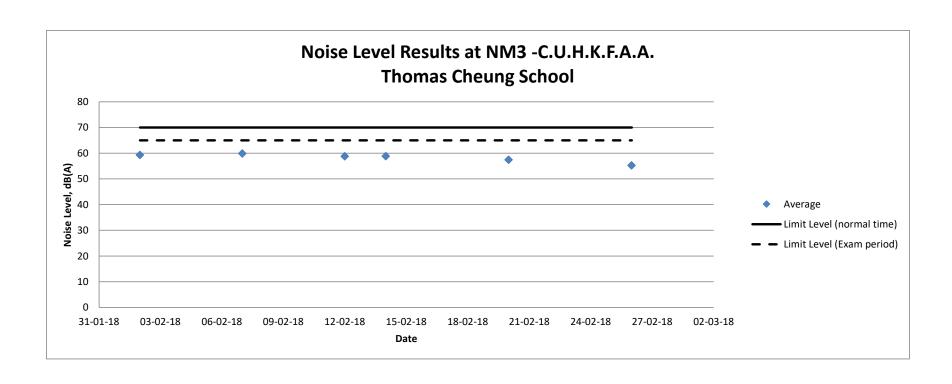
SENSOR	1000	2000	2500	3000	3500	3500	4000	4200	4250	4300	4400	4500	4500	ACCURACY (+/-)*	SENSO	SPECIFICATION RANGE	OPERATIONAL RANGE	NOTES
Wind Speed Air Flow	•	•	•	•	•	•	•	•	•	•	•	•	HOR	Larger of 3% of reading, least significant digit or 20 ft/min	0.1 m/s 1 ft/min 0.1 km/h 0.1 mph 0.1 knots 1 B	0.6 to 40.0 m/s 118 to 7,874 ft/min 2.2 to 144.0 km/h 1.3 to 89.5 mph 1.2 to 77.8 knots 0 to 12 B	0.6 to 60.0 m/s 118 to 11,811 ft/min 2.2 to 216.0 km/h 1.3 to 134.2 mph 1.2 to 116.6 km/ts 0 to 12.8	Inch/25 mm diameter impeller with precision axis and low-friction Zystell bearings. Startup is stated as lower limit, readings may be taken down to 0.4 mis [78 ftmm] [1.5 kmh] [9 mph], after impeller startup, Off-asis accuracy -1% @ 5° off-axis; 2% @ 10° -35% @ 15° -Cashrid erf. 1 1% darb 10 hous use at 10 MB/17 mis. Repicement repoler (NR PH-2005) field installs without took (US Plainet C, 783 755). Whird speed calibration and testing about to be down thratige) on mapple in Coated at the bottom took (US Plainet C, 783 755). Whird speed calibration and testing about to be down thratige) on mapple in Coated at the bottom tack of the Coated at the bottom took (US Plainet C, 783 755). Whird speed calibration and testing about the down thratige on mapple in Coated at the bottom.
Ambient Temperature					٠	•					•		•	0.9*F 0.5*C	0.1 *F 0.1 *C	-20.0 to 158.0 °F -29.0 to 70.0 °C	14.0.0 to 131.0 'F -10.0 to 55.0 °C	Hermitically-sealed, practision thermition mounted externally and thermally isolated. US Pair 5.358.645 for rapid response. Aufflow of 2.2 mpc/1 mis or greater provides fastest response fastest response fastest response fastest response fastes from the provided of the p
Globe Temperature - Tg											•			*F 1.4 *C	0.1 °F 0.1 °C	-20.0 to 140.0 °F -29.0 to 60.0 °C	14.0 to 131.0 °F -10.0 to 55.0 °C	Temperature inside 1in 25 mm black powder coated copper globe converted to Tg equivalen standard 6 in 150 mm globe. Closest equivalence obtained with airflow greater than 2.2 mph m/s.
Relative Humidity											•			3.0 %RH	0.1 %RH	5 to 95% non-condensing	0 to 100%	Polymer capacitive humidity sensor mounted in thin-walled chamber external to case for rap accurate response (US Patent 6,257,074). To achieve stated accuracy, unit must be primit qualibate to external temperature when exposed to large, rapid temperature changes and out of direct suright. Calibration drift +7-2% over 24 months. Htm.Pdf sensor may be recall at factory or in fedular days fester thinding. Calibration first. Htm.Pdf D002.
Pressure			٠	23.5			•		٠				•	inHg 1.0 hPalmbar 0.01 PSI	0.01 inHg 0.1 hPa mbar 0.01 PSI	8.86 to 32.49 inHg 300.0 to 1100.0 hPajmbar 4.35 to 15.95 PSI and 32.0 to 185.0 °F 0.0 to 85.0 °C	0.30 to 48.87 inHg 10.0 to 1654.7 hPalmbar 0.14 to 24.00 PSI and 14.0 to 131.0 "F -10.0 to 55.0 "C	Monofilhic silicon piezoresistive pressure sensor with second-order temperature correction. Pressure sensor may be reclaimbed of factory in field. Adjustate interiore attitude as display of station pressure or transmitic pressure connected to MSL. Kestelle 4200 displays station pressure or a dedicated screen. Relatele 2500 and 3500 displays station pressure or an edicated screen. Relatele 2500 and 3500 displays continuously update three-hour later matter pressure the related to relating station. Post displays pressure trend through graphing function. POI display on Kestel 4000 berlies only.
Compass												•		5*	1* 1/16th Cardinal Scale	0 to 360°	0 to 360°	2-axis sold-state magnetoresistive sensor mounted perpendicular to unit plane. Accuracy of sensor dependent upon units vertical position. Self-calibration routine eliminates magnetic el from batterios e unit and must be run after verey full power-down (battery removal or chair Readout indicates direction to which the back of the unit is pointed when held in a vertical orientation. Declinations/variation adjustable for Tixe North readout.
														CALCUL	ATED ME	ASUREMENTS		
MEASUREMENT	1000	2000	2500	3000	3500	3500 DT	4000	4200	4250	4300	4400	4500	4500 HOR	ACCURACY (+/-)*	RESOLUTION	SPECIFICATION RANGE	SENSORS EMPLOYED	NOTES
Air Density	i jen	191		W	133	17	194	•	•		43	3	3,51	0.0002 lb/ft ³ 0.0033 kg/m ³	0.001 lbs/ft ³ 0.001 kg/m ³	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	Mass of air per unit volume
Air Flow								•	-					6.71%	1 cfm 1 m²/hr 1 m²/m 0.1m²/s 1 L/s	Refer to Ranges for Sensors Employed	Air Flow User Input (Duct Shape & Size)	Volume of air flowing through an opening. Automatically calculated from Air Velocity measure and user-specified duct shape (circle or rectangle) and dimensions (units: in, ft, cm or m). Maximum duct dimension input: 258.0 in 21.5 ft 955.3 cm 6.55 m.
Altitude														typical: 23.6 ft 7.2 m max: 48.2 ft	1 ft 1 m	typical: 750 to 1100 mBar max: 300 to 750 mBar	Pressure User Input (Reference Pressure)	Height above Mean Sea Level ("MSL"). Temperature compensated pressure (barometric) altimeter requires accurate reference barometric pressure to produce maximum absolute accuracy. Both accuracy specs corresponds to a reference pressure anywhere from 850 to mBar.
Barometric Pressure					•	٠	٠				•			14.7 m 0.07 inHg 2.4 hPa mbar 0.03 PSI	0.01 inHg 0.1 hPa mbar 0.01 PSI	Refer to Ranges for Sensors Employed	Pressure User Input (Reference Altitude)	Air pressure that would be present in identical conditions at MSL. Station pressure compens for local elevation provided by reference altitude. Requires accurate reference altitude to proximum absolute accuracy.
Crosswind & Headwind/Tailwind														7.1%	1 mph 1 ft/min 0.1 km/h 0.1 m/s 0.1 knots	Refer to Ranges for Sensors Employed	Wind Speed Compass	Effective wind relative to a target or travel direction. Auto-switching headwindfallwind indical
Delta T														3.2 °F 1.8 °C	0.1 °F 0.1 °C	Refer to Ranges for Sensors Employed	Temperature Relative Humidity	Difference between dry bulb temperature and wet bulb temperature. When spraying, indicat evaporation rate and droplet lifetime. Safe range for pesticide spraying is 4 to 16 °F / 2 to 9
Density Altitude	JA L				1000									226 ft	1 ft	Refer to Ranges for	Pressure Temperature Relative Humidity	Local air density converted to equivalent elevation above sea level in a uniform layer consis
Denaity Autitude						101								69 m	1 m	Sensors Employed 15 to 95 % RH	Pressure	the International Standard Atmosphere. Temperature that a volume of air must be cooled to at constant pressure for the water vaporate to the cooled to a constant pressure for the water vaporate to the cooled to a constant pressure for the water vaporate to the cooled to a constant pressure for the water vaporate to the cooled to a constant pressure for the water vaporate to the cooled to a constant pressure for the water vaporate to the cooled to a constant pressure for the water vaporate to the cooled to a constant pressure for the water vaporate to the cooled to a constant pressure for the water vaporate to the cooled to a constant pressure for the water vaporate to the cooled to a constant pressure for the water vaporate to the cooled to a constant pressure for the water vaporate to the cooled to a constant pressure for the water vaporate to the cooled to a constant pressure for the water vaporate to the cooled to a constant pressure for the water vaporate to the cooled to a constant pressure for the water vaporate to the cooled to a constant pressure for the water vaporate to the cooled to a constant pressure for the water vaporate to the cooled to a constant pressure for the water vaporate to the cooled to a constant pressure for the cooled to a constant press
Dewpoint				•	•	•	•		•	•	•	•	•	1.9 °C	0.1 °C	Refer to Range for Temperature Sensor	Temperature Relative Humidity	present to condense into dewand form on a solid surface. Can also be considered to be the water-to-air saturation temperature.
Evaporation Rate														0.01 lib/ft²/hr 0.06 kg/m2/hr	0.01 b/ft²/hr 0.01 kg/m²/hr	Refer to Ranges for Sensors Employed	Wind Speed Temperature Relative Humidity Pressure User Input (Concrete Temperature)	The rate at which moisture is lost from the surface of curing concrete. Requires user measurement and entry of concrete temperature obtained with an accurate IR or grobe thermoreter (F or TC, not include). Readings should be taken 20 inches above pour surface with the thermistor shaded, and averaged for 6-10 seconds using built-in averaging function.
Heat Index	7.1	10	•	•	٠	23.54	٠	•	•	•	•	٠		7.1 °F 4.0 °C	0.1 °F 0.1 °C	Refer to Ranges for Sensors Employed	Temperature Relative Humidity	Perceived temperature resulting from the combined effect of temperature and relative humic Calculated based on NWS Heat Index (HI) tables. Measurement range limited by extent of published tables.
Moisture Content Humidity Ratio ("Grains")									•					.3 gpp .04 g/kg	0.1 gpp 0.01 g/kg	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	Mass of water vapor in a mass of air.
Relative Air Density					247	127	1			100				0.3%	0.1%	Refer to Ranges for Sensors Employed	Temperature Relative Humidity	The ratio, expressed as a percentage, of measured air density to the air density of a standa atmosphere as defined by the ICAO.
hermal Work Limit (TWL)						La P	13.	100	L gr		•			10.9 W/m²	0.1 W/m²	Refer to Ranges for Sensors Employed	Pressure Wind Speed Temperature Globe Temperature Relative Humidity Pressure	armospere as connect or excession of the Control of the Control of the Conditions and coloring factors. Based off of estimated metabolic cutput of typical human. O screen zone varings.
Outdoor Wet Bulb Globe Temperature (WBGT)								198	1,11					1.3 °F 0.7 °C	0.1 °F 0.1 °C	Refer to Ranges for Sensors Employed	Wind Speed Temperature Globe Temperature Relative Humidity	Measure of human heat stress defined as the combination of effects due to radiation, convi and conduction. Outdoor WBGT is calculated from a veighted sum of natural web bull. Or the globe temperature (Tg), and dry bulb temperature (Td). User setable on-screen varning zo
Wet Bulb Temperature - aturally Aspirated (Tnwb)			1812			TERMINAL PROPERTY.	re-	a is	3 19	eşkili Dişkili	•	10 145	201	1.4 °F 0.8 °C	0.1 *F 0.1 *C	Refer to Ranges for Sensors Employed	Pressure Wind Speed Temperature Globe Temperature Relative Humidity	Similar to psychrometric werl-bubl temperature (see below). However, Trivib only undergoes convection from the arrisent air velocity. Trivib is a measure of the evaporative cooling that will allow. This is accounted for by combrining the effects of, mainly, relative humidity and windspeed.
Wet Bulb Temperature - Psychrometric		7.00	S 140	18.20										3.2 °F 1.8 °C	0.1 °F 0.1 °C	Refer to Ranges for Sensors Employed	Pressure Temperature Relative Humidity	Temperature indicated by a sling psychrometer. Due to nature of the psychrometric ratio for water-air system, this approximates the thermodynamic web-bulb temperature. The thermody web-bulb temperature is the temperature approach of air would have if cooled adiabatically to
Wind Chill	LW.	•	•						· h					1.6 °F 0.9 °C	0.1 °F 0.1 °C	Refer to Ranges for Sensors Employed	Pressure Wind Speed Temperature	saturation temperature via water evaporating into it. Perceived temperature resulting from combined effect of wind speed and temperature. Calcibased on the NWS Wind Chill Temperature (WCT) Index, revised 2001, with wind speed all by a factor of 1.5 to wide devalvant results to wind speed measured at 10 m above cround.
C. 1 of 5U.			O.Y	1631	133	901	1653	2423	MA			90		RESERVATION OF	The least			Measurement range limited by extent of published tables.
													2006	Reflective 3 1/2 digit LC	D. Digit height 0:38 in	CIFICATIONS 19 mm. Aviation green electro	luminescent backlight. Manual activation	on with auto-off.
Display & Backlight			•			•	•				•	•		Multifunction, multi-digit	monochrome dot-matri	x display. Choice of aviation	green or visible red (NV models only) of	uminescent backlight. Manual activation with auto-off. electroluminescent backlight. Automatic or manual activation.
Response Time & Display Update		•	•				•	•	•	•	•	•	•	equilibrate to a large cha	ange in the measureme	event environment. Display update ant environment. Display update t and Average Wind measure	tes every 1 second.	nd all measurements which include RH in their calculation may require as long as 1 minute to f
Max/Avg Wind							•	•		•	•	٠						with all other wind-related functions: air velocity, crosswind, headwind/tailwind, wind chill, WBC
ata Storage & Graphical Display, Min/Max/Avg History									3200 points					Minimum, maximum, ave	erage and logged histo re interval settable from	ry stored and displayed for ew n 2 seconds to 12 hours, oven	ery measured value. Large capacity di write on or off. Logs even when displa	ata logger with graphical display. Manual and auto data storage. Min/Max/Avg history may be re y off except for 2 and 5 second intervals (code version 4.18 and later). Data capacity shown.
ta Upload & Bluetooth® Data Connect Option										•	•	•		Bluetooth Data Trans	fer Option: Adjustable		io range from up to 30 ft 9 meters. Inc	fividual unit ID and 4-digit PIN code preprogrammed for easy identification and data security w
Clock / Calendar	•	٠	•	•	•									Requires optional PC in	terface (USB or RS-23	rial Port Protocol for data trans 32) or Bluetooth data transfer 32) or Bluetooth data transfer	option and provided software.	
Auto Shutdown	٠	٠	•	•	•	•								Requires optional PC in	terface (USB or RS-23	 32) or Bluetooth data transfer 32) or Bluetooth data transfer 32) or Bluetooth data transfer 	option and provided software.	
Languages Certifications	•			•		•							•	English, French, Germa	n, Italian, Spanish.		ble standards (written certificate of tes	ts available at additional charge).
Origin Battery Life	•	•	:	:			•		٠	•	•	•	•	Designed and manufact CR2032, one, included.	ured in the USA from I Average life, 300 hour	JS and imported components. s. Battery life reduced by back	Complies with Regional Value Content klight use in 2000 to 3500 models.	t and Tariff Code Transformation requirements for NAFTA Preference Criterion B.
Shock Resistance	•					•	•				•	:		Standard Models: AA MIL-STD-810g, Transit	A Alkaline, two, include Shock, Method 516.5	d. Average life, 400 hours of u	use, reduced by backlight or Bluetooth t may damage replaceable impeller.	radio transmission use.
Sealing	•					•	•		•		•	•		Waterproof (IP67 and N 14° F to 131° F -10 °C	EMA-6). to 55 °C Measureme	nts may be taken beyond the li	imits of the operational temperature ra	nge of the display and batteries by maintaining the unit within the operational range and expos
Operational Temperature			575	CONTRACTOR OF STREET			J. S. S.	200			THE R		1	to the more extreme env	ironment for the minim	num time necessary to take rea	ading.	
Operational Temperature Limits Storage Temperature		•		•							•			-22.0 °F to 140.0 °F -3	0.0 °C to 60.0 °C	102 g (including slip-on cover)		

^{*} NOTE: Accuracy calculated as uncertainty of the measurement derived from statistical analysis considering the comined effects from primary sensor specifications, circuit conversions, and all other sources of error using a coverage factor of k=2, or two standard deviations (2\(\mathbb{Z}\)).

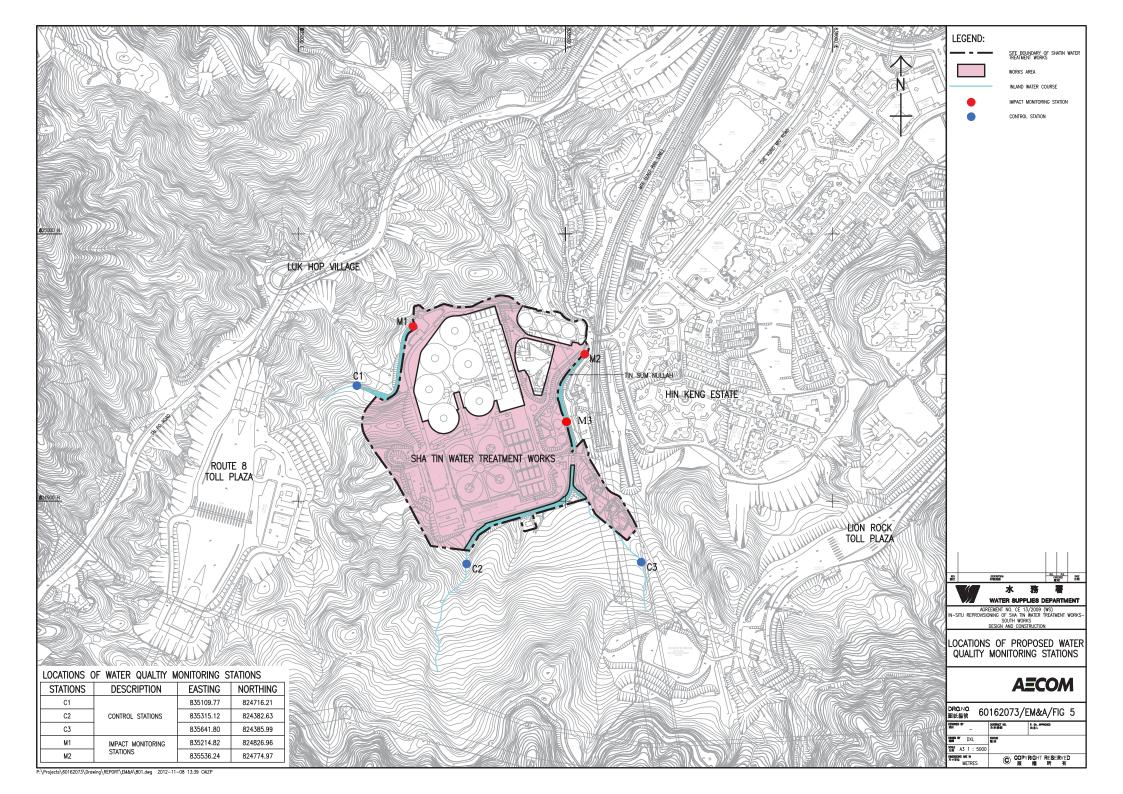
Appendix N Impact Noise Monitoring Results and Graphical Presentation







Appendix O Location Plan of Water Quality Monitoring Station



Appendix P Calibration Certificate (Water Quality)



ALS Technichem (HK) Pty Ltd

11/F, Chung Shun Knitting Centre 1-3 Wing Yip Street, Kwai Chung N.T., Hong Kong

T: +852 2610 1044 | F: +852 2610 2021

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT: MR KENNY LOK WORK ORDER: HK1815729

CLIENT: ACUMEN ENVIRONMENTAL ENG & TECH CO LTD SUB-BATCH: 0

ADDRESS: LOT 11, TAM KON SHAN ROAD, LABORATORY: HONG KONG

TSING YI,

DATE RECEIVED: 06-Feb-2018

N.T. HONG KONG

N.T., HONG KONG. DATE OF ISSUE: 15-Feb-2018

COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.

The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.

The "Next Calibration Date" is recommended according to best practice principals as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test: Dissolved Oxygen, pH, Salinity, Turbidity, Redox Potential and Temperature

Equipment Type: Multifunctional Meter

Brand Name: YSI
Model No.: ProDSS
Serial No.: 15M101091

Equipment No.: --

Date of Calibration: 06 February, 2018

NOTES

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

> Mr Chan Siu Ming, Vice Manager - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1815729

Sub-Batch: 0

Date of Issue: 15-Feb-2018

Client:

ACUMEN ENVIRONMENTAL ENG & TECH CO LTD

Equipment Type: Multifunctional Meter

Brand Name: YSI Model No.: ProDSS Serial No.: 15M101091

Equipment No.:

Date of Calibration: 06 February, 2018 Date of next Calibration: 06 May, 2018

Parameters:

Dissolved Oxygen Method Ref: APHA (21st edition), 45000: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)		
9.38	9.48	+0.10		
5.70	5.74	+0.04		
2.89	2.95	+0.06		
	Tolerance Limit (mg/L)	±0.20		

pH Value Method Ref: APHA 21st Ed. 4500H:B

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)				
4.0	4.01	+0.01				
7.0	7.00	+0.00				
10.0	10.02	+0.02				
	Tolerance Limit (pH unit)	±0.20				

Salinity Method Ref: APHA (21st edition), 2520B

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)				
О	0.00					
10	9.44	-5.6				
20	19.30	-3.5				
30	32.63	+8.8				
	Tolerance Limit (%)	±10.0				

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

> Mr Chan Siu Ming, Vik Manager - Inorganics



REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1815729

Sub-Batch: 0

Date of Issue: 15-Feb-2018

Client: ACUMEN ENVIRONMENTAL ENG & TECH CO LTD

Equipment Type: Multifunctional Meter

Brand Name: YSI
Model No.: ProDSS
Serial No.: 15M101091

Equipment No.: --

Date of Calibration: 06 February, 2018 Date of next Calibration: 06 May, 2018

Parameters:

Temperature Method Ref: Section 6 of International Accreditation New Zealand Technical

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

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)				
10.5	11.6	+1.1				
21.0	20.1	-0.9				
40.0	39.6	-0.4				
	Tolerance Limit (°C)	±2.0				

Turbidity Method Ref: APHA (21st edition), 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)				
О	0.5					
4	4.1	+2.5 +2.0				
40	40.8					
80	80.3	+0.4				
400	390.2	-2.5				
800	811.7	+1.5				
	Tolerance Limit (%)	±10.0				

Redox Potential Method Ref: APHA (21st edition), 2580B

Method Ref: Orion Research Instruction Manual and the Laboratory Manual

the Environmental of Water, Wastewater and Soil (2nd edition), Rump & Krist (1992)

_	tile Ellin ellinerital el materi	masternater and sen (End saither	1), (1011) 6 11 101 (1772)				
	Expected Reading (mV)	ected Reading (mV) Displayed Reading (mV)					
ĺ							
	Solution A (~234mV)	172.3					
	Solution B (~300mV)	248.0	+76				
		Tolerance Limit (mV)	>66				

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

Mr Chan Siu Ming, Viet Manager - Inorganics



ALS Technichem (HK) Pty Ltd

11/F, Chung Shun Knitting Centre 1-3 Wing Yip Street, Kwai Chung N.T., Hong Kong

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:

MR NELSON TSUI

CLIENT:

ACUMEN ENVIRONMENTAL ENG & TECH CO LTD

ADDRESS:

LOT 11, TAM KON SHAN ROAD,

TSING YI.

N.T., HONG KONG.

WORK ORDER: HK1774082

LABORATORY: DATE RECEIVED:

SUB-BATCH:

HONG KONG

DATE OF ISSUE:

03- Nov- 2017 10- Nov- 2017

COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.

The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.

The "Next Calibration Date" is recommended according to best practice principals as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test:

Dissolved Oxygen, pH, Salinity, Turbidity, Redox Potential and Temperature

Equipment Type:

Multifunctional Meter

Brand Name:

HORIBA U-53

Model No.:

Multiparameter Water

Serial No.:

BGYP9CKD

Equipment No.:

Date of Calibration: 07 November, 2017

NOTES

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

> Mr Chan Siu Ming, Manager - Inorganics

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Page 1 of 3

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order:

HK1774082

Sub-Batch:

0

Date of Issue:

10- Nov- 2017

Client:

ACUMEN ENVIRONMENTAL ENG & TECH CO LTD

Equipment Type:

Multifunctional Meter

Brand Name:

HORIBA U- 53

Model No.:

Multiparameter Water

Serial No.:

BGYP9CKD

Equipment No.:

- -

Date of Calibration:

07 November, 2017

Date of next Calibration:

07 February, 2018

Parameters:

Dissolved Oxygen

Method Ref: APHA (21st edition), 45000: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)		
4.09	3.98	- 0.11		
6.45	6.33	- 0.12		
8.12	8.04	- 0.08		
	Tolerance Limit (mg/L)	±0.20		

pH Value

Method Ref: APHA 21st Ed. 4500H:B

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)				
		n				
4.0	4.12	+0.12				
7.0	7.08	+0.08				
10.0	9.94	- 0.06				
	Tolerance Limit (pH unit)	±0.20				

Salinity

Method Ref: APHA (21st edition), 2520B

	,						
Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)					
0	0.0	:= =:					
10	10.1	+1.0					
20	20.0	+0.0					
30	31.3	+4.3					
	Tolerance Limit (%)	±10.0					

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

Mr Chan Siu Ming, Vice Manager - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order:

HK1774082

Sub-Batch:

0

Date of Issue:

10- Nov- 2017

Client:

ACUMEN ENVIRONMENTAL ENG & TECH CO LTD

Equipment Type:

Multifunctional Meter

Brand Name:

HORIBA U-53

Model No.:

Multiparameter Water

Serial No.:

BGYP9CKD

Equipment No.:

- -

Date of Calibration:

07 November, 2017

Date of next Calibration:

07 February, 2018

Parameters:

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical

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

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)				
10.0	9.12	- 0.9				
23.0	23.07	+0.1				
36.0	35.73	- 0.3				
	Tolerance Limit (°C)	± 2.0				

Turbidity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)				
0	0.00	C#3#				
4	4.32	+8.0				
40	37.7	- 5.7				
80	86.0	+ 7.5				
400	396	- 1.0				
800	839	+4.9				
	Tolerance Limit (%)	±10.0				

Redox Potential

Method Ref: APHA (21st edition), 2580B

Method Ref: Orion Research Instruction Manual and the Laboratory Manual

the Environmental of Water, Wastewater and Soil (2nd edition), Rump & Krist (1992)

Expected Reading (mV)	Displayed Reading (mV)	Difference of A and B (mV
Solution A (~234mV) Solution B (~300mV)	158 235	+ 77
	Tolerance Limit (mV)	> 66

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

Mr Chan Siu Ming, Viko

Manager - Inorganics

Appendix Q The Certification of Laboratory with HOKLAS accredited Analytical Tests



Hong Kong Accreditation Service 香港認可處

Certificate of Accreditation

認可證書

This is to certify that 特此證明

ACUMEN LABORATORY AND TESTING LIMITED

浩科檢測中心有限公司

Lot 12, Tam Kon Shan Road, North Tsing Yi, New Territories, Hong Kong 香港新界青衣北担杆山路12路段

has been accepted by the HKAS Executive, on the recommendation of the Accreditation Advisory Board, as a 在認可諮詢委員會的建議下獲香港認可處執行機關接受為

HOKLAS Accredited Laboratory 「香港實驗所認可計劃」認可實驗所

This laboratory meets the requirements of ISO/IEC 17025:2005 and it has been accredited for performing specific tests or calibrations as listed in the scope of accreditation within the test category of

Environmental Testing

此實驗所符合ISO/IEC 17025:2005所訂的要求 並獲認可進行載於認可範圍內下述測試類別中的指定測試或校正工作

環境測試

This accreditation to ISC/IEC 17025:2005 demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (see joint IAF-ILAC-ISO Communiqué). 此項 ISC/IEC 17025:2005 的部可資格證明此實驗所是明存機能完整時內所領的技術能力並實施一套實驗所質量管理體系(見圖際認可論壇、國際實驗所認可合作組織及圖際標準化組織的聯合公報)。

The common seal of the Hong Kong Accreditation Service is affixed hereto by the authority of the HKAS Executive 現經香港認可處執行機關授權在此蓋上香港認可處的印章

WONG Wang-wan, Executive Administrator

報行幹事 黄宏華 Issue Date: 16 July 2014 簽發日期: 二零一四年七月十六日

Registration Number: HOKLAS 241

Date of First Registration: 16 July 2014 首次註冊日期:二零一四年七月十六日

This certificate is issued subject to the terms and conditions laid down by HKAS 本證書按照香港認可處訂立的條款及條件發出

L 001195

Appendix R Impact Water Quality Monitoring Results

Date	Time	Weather	Location	Co-ord	dinates	Water Depth	Sample Depth	Te	mp.	DO	con.	DO Sat	uration	Turl	bidity	pl	ł	SS
				East	North	m	m	0	C	mį	g/L	9	%	N	TU	un	it	mg/L
	11:00	Cloudy	C1	835110	824716	0.04	0.02	17.4	17.3	9.06	9.04	94.6	94.4	2.5	2.6	7.71	7.72	3.5
	11:24	Cloudy	C2	835403	824470	0.02	0.01	17.5	17.4	9.05	9.07	94.5	94.7	2.8	2.9	7.73	7.74	3.6
02-02-18	N/A	N/A	C3	835642	824386	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
02-02-10	10:38	Cloudy	M1	835215	824827	0.8	0.4	17.1	17.2	9.04	9.02	94.4	94.2	2.3	2.4	7.70	7.71	2.8
	10:00	Cloudy	M2	835536	824775	0.05	0.025	17.2	17.3	9.01	9.03	94.1	94.3	1.6	1.7	7.65	7.66	12.3
	10:15	Cloudy	M3	835501	824648	0.02	0.01	17.3	17.3	9.19	9.21	95.9	96.1	0.7	0.8	7.67	7.68	<1
		Cloudy	C1	835110	824716	0.04	0.02	16.4	16.5	9.40	9.42	96.1	96.3	2.5	2.6	7.74	7.75	3.3
	11:54	Cloudy	C2	835403	824470	0.02	0.01	16.5	16.5	9.39	9.41	96.0	96.2	2.7	2.6	7.76	7.77	3.4
05-02-18	N/A	N/A	C3	835642	824386	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
03 02 10	11:01	Cloudy	M1	835215	824827	0.8	0.4	16.5	16.5	9.33	9.35	95.4	95.6	2.2	2.3	7.72	7.73	2.5
	10:09	Cloudy	M2	835536	824775	0.05	0.025	16.4	16.3	9.32	9.30	95.3	95.1	1.5	1.6	7.80	7.79	9.6
	10:24	Cloudy	M3	835501	824648	0.02	0.01	16.4	16.4	9.34	9.36	95.5	95.7	0.8	0.9	7.78	7.79	<1
		Cloudy	C1	835110	824716	0.04	0.02	16.3		9.39	9.41	96.0	96.2	2.2		7.64	7.65	3.2
		Cloudy	C2	835403	824470	0.02	0.01	16.2		9.37	9.39	95.8	96.0	2.4	2.4	7.65	7.66	3.3
07-02-18		N/A	C3	835642		· · · · ·	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	· ·	N/A	N/A
0, 02 10	11:18	Cloudy	M1	835215	824827	0.8	0.4	16.4	16.5	9.40	9.38	96.1	95.9	2.1	2.2	7.62	7.63	2.3
		Cloudy	M2	835536	824775	0.05	0.025	16.1	16.2	9.44	9.42	96.5	96.3	1.6		7.69	7.70	8.9
	10:36	Cloudy	M3	835501	824648	0.02	0.01	16.2	16.2	9.42	9.44	96.3	96.5	0.7	0.8	7.67	7.68	<1
		Cloudy	C1	835110	824716	0.04	0.02	16.2	1	9.41	9.43	96.2	96.4	2.2		7.77	7.78	3.0
		Cloudy	C2	835403	824470	0.02	0.01	16.1	16.2	9.43	9.45	96.4	96.6	2.4	2.5	7.76	7.77	3.1
09-02-18	N/A	N/A	C3	835642			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-	N/A	N/A
		Cloudy	M1	835215	824827	0.8	0.4	16.4	16.3	9.38	9.40	95.9	96.1	2.1	2.2	7.74	7.75	2.1
		Cloudy	M2	835536	824775	0.05	0.025	16.5		9.35	9.37	95.6	95.8	1.5	1.6	7.70	7.71	4.6
	10:02	Cloudy	M3	835501	824648	0.02	0.01	16.5	16.6	9.38	9.40	95.9	96.1	0.8	0.7	7.71	7.72	<1
	10:30	Fine	C1	835110	824716	0.04	0.02	10.0	16.8	9.07	9.05	94.7	94.5	2.3	2.4	7.78	7.79	3.2
	11:02		C2	835403	824470	0.04	0.02	16.8 17.0	1	9.03	9.05	94.7	94.5	2.3	2.4	7.78	7.79	3.2
	-	N/A	C3	835642			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		7.81 N/A	N/A
12-02-18	10:09	•	M1	835215	824827	0.8	0.4		-	9.10	9.11	95.0	95.1	2.3	1N/A 2.2	7.77	7.78	2.3
	9:30		M2	835536	824775	0.05	0.025	17.1	-	9.09	9.11	94.9	95.1	1.6		7.77	7.76	5.2
	9:44		M3	835501	824648	0.02	0.023	17.1	l	9.22	9.24	96.2	96.4	0.7	0.8	7.76	7.77	<1
	5.44	THIC	IVIS	333301	324040	0.02	0.01	17.2	17.2	3.22	5.24	30.2	50.4	0.7	0.8	7.70	7.77	<u> </u>
	11:21	Sunny	C1	835110	824716	0.04	0.02	17.1	17.1	8.96	8.94	93.5	93.3	2.1	2.2	7.83	7.84	3.1
	11:49		C2	835403	824470	0.02	0.01	17.2	-	8.95	8.97	93.4	93.6	2.4		7.85	7.86	3.2
	N/A	N/A	C3	835642			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A
14-02-18		Sunny	M1	835215	824827	0.8	0.4	17.1	17.0	8.98	9.00	93.8	94.0	2.1	2.2	7.84	7.85	2.2
		Sunny	M2	835536	824775	0.05	0.025	17.3		9.03	9.01	94.3	94.1	1.7	1.8	7.81	7.82	5.6
	10:08		M3	835501	824648	0.02	0.01	17.3		9.22	9.24	96.2	96.4	0.8	0.9	7.82	7.83	<1
				·														
	11:20	Fine	C1	835110	824716	0.04	0.02	17.1	17.1	9.01	9.03	94.1	94.3	2.1	2.2	7.77	7.78	3.1
	12:01	Fine	C2	835403	824470	0.02	0.01	17.1	17.2	9.04	9.02	94.4	94.2	2.3	2.4	7.79	7.78	3.1
20 02 10	N/A	N/A	С3	835642	824386	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
20-02-18	10:54	Fine	M1	835215	824827	0.8	0.4	17.2	17.2	9.00	9.02	94.0	94.2	2.0	2.1	7.74	7.75	2.1
	9:55	Fine	M2	835536	824775	0.05	0.025	17.4	17.3	8.94	8.96	93.1	92.9	1.9	1.8	7.78	7.79	5.0
		Fine				0.02												<1

22-02-18	12:39	Cloudy	C1	835110	824716	0.04	0.02	17.1	17.2	8.94	8.95	93.3	93.4	2.2	2.3	7.94	7.95	3.1
	13:02	Cloudy	C2	835403	824470	0.02	0.01	17.2	17.3	8.97	8.99	93.6	93.8	2.3	2.4	7.97	7.98	3.2
	N/A	N/A	C3	835642	824386	N/A N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	12:02	Cloudy	M1	835215	824827	0.8	0.4	17.0	17.1	8.93	8.92	93.2	93.1	1.9	2.0	7.93	7.94	2.1
	11:01	Cloudy	M2	835536	824775	0.05	0.025	17.3	17.3	9.08	9.06	93.7	93.5	1.6	1.7	7.90	7.91	5.2
	11:11	Cloudy	M3	835501	824648	0.02	0.01	17.2	17.3	9.27	9.29	96.6	96.8	0.7	0.8	7.91	7.92	<1
24-02-18	12:22	Sunny	C1	835110	824716	0.04	0.02	17.1	17.1	9.09	9.11	94.9	95.1	2.1	2.2	7.94	7.95	3.2
	13:04	Sunny	C2	835403	824470	0.02	0.01	17.2	17.3	9.05	9.07	94.5	94.7	2.4	2.5	7.96	7.97	3.3
	N/A	N/A	C3	835642	824386	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	11:40	Sunny	M1	835215	824827	0.8	0.4	17.2	17.1	9.06	9.07	94.6	94.7	2.0	2.1	7.93	7.94	2.3
	10:28	Sunny	M2	835536	824775	0.05	0.025	17.5	17.6	9.01	9.03	94.1	94.3	1.8	1.7	7.90	7.91	6.3
	10:34	Sunny	M3	835501	824648	0.02	0.01	17.6	17.5	9.22	9.24	96.2	96.4	0.8	0.9	7.91	7.92	<1
	11:49	Sunny	C1	835110	824716	0.04	0.02	17.2	17.1	9.02	9.04	94.2	94.4	2.4	2.5	7.84	7.85	3.1
	12:18	Sunny	C2	835403	824470	0.02	0.01	17.3	17.2	9.00	9.02	94.0	94.2	2.6	2.7	7.88	7.87	3.2
26-02-18	N/A	N/A	C3	835642	824386	N/A N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
20-02-10	11:19	Sunny	M1	835215	824827	0.8	0.4	17.1	17.2	8.99	9.01	93.9	94.1	2.2	2.3	7.83	7.84	2.4
	10:04	Sunny	M2	835536	824775	0.05	0.025	17.4	17.4	8.98	8.96	93.8	93.6	1.6	1.7	7.80	7.79	5.4
	10:14	Sunny	M3	835501	824648	0.02	0.01	17.5	17.4	9.26	9.24	96.3	96.1	0.7	0.8	7.81	7.82	<1
28-02-18	12:18	Sunny	C1	835110	824716	0.04	0.02	20.1	20.2	8.35	8.37	92.7	92.9	2.2	2.3	7.80	7.81	3.2
	12:54	Sunny	C2	835403	824470	0.02	0.01	20.1	20.1	8.36	8.38	92.8	93.0	2.3	2.4	7.83	7.84	3.3
	N/A	N/A	C3	835642	824386	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	11:50	Sunny	M1	835215	824827	0.8	0.4	20.1	20.2	8.99	9.01	94.1	94.4	2.1	2.0	7.78	7.79	2.5
	11:01	Sunny	M2	835536	824775	0.05	0.025	20.4	20.3	9.03	9.01	94.6	94.4	1.5	1.6	7.74	7.75	6.3
	11:10	Sunny	M3	835501	824648	0.02	0.01	20.4	20.4	9.44	9.42	99.7	99.5	0.6	0.7	7.72	7.73	<1

Acumen Laboratory and Testing Limited

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Test Report

Page 1 of 2

Report Number

: Q180003aR180103

Job Number

: R180103

Issue Date

: 04/03/2018

Name of Applicant

: Acumen Environmental Engineering and Technologies Co., Ltd.

Address of Applicant

: No. 12, Tam Kon Shan Road, Tsing Yi (North), N.T.

Project Name

: CJO-3113-323

Sample Description

: SS test

Laboratory ID

: R180103/1-5

Date of Sampling

: 02/02/2018

Date Received

: 02/02/2018

Test Period

: 02/02/2018- 03/02/2018

Test Required

: 1. Suspended Solids (SS)

Method Used

: 1. QPL-15e, APHA 22ed 2540 D

Test Result

: Refer to the results on page 2.

For and on behalf of

Acumen Laboratory and Testing Limited

Authorized Signature:

Hui Wai Fung, Huntington

Laboratory Manager

Chemical Division

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Test Report

Page 2 of 2

Report Number

: Q180003aR180103

Job Number

: R180103

Issue Date

: 04/03/2018

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L		
R180103/1	02/02/2018	C1	3.5		
R180103/2	02/02/2018	C2	3.6		
R180103/3	02/02/2018	M1	2.8		
R180103/4	02/02/2018	M2	12.3		
R180103/5	02/02/2018	МЗ	<1		

Note:

- 1. mg/L indicates milligram per liter
- 2. mg O₂/ L indicates milligram oxygen per liter
- 3. < indicates less than.
 4. > indicates more than.
- 5. NA indicates Not Applicable.

End of Report

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Acumen Laboratory and Testing Limited

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Test Report

Page 1 of 2

Report Number

: Q180003aR180104

Job Number

: R180104

Issue Date

: 04/03/2018

Name of Applicant

: Acumen Environmental Engineering and Technologies Co., Ltd.

Address of Applicant

: No. 12, Tam Kon Shan Road, Tsing Yi (North), N.T.

Project Name

: CJO-3113-324

Sample Description

: SS test

Laboratory ID

: R180104/1-5

Date of Sampling

: 05/02/2018

Date Received

: 05/02/2018

Test Period

: 05/02/2018- 06/02/2018

Test Required

: 1. Suspended Solids (SS)

Method Used

: 1, QPL-15e, APHA 22ed 2540 D

Test Result

: Refer to the results on page 2.

For and on behalf of

Acumen Laboratory and Testing Limited

Authorized Signature:

Hui Wai Fung, Huntington

Laboratory Manager

Chemical Division

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Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Page 2 of 2

Report Number

: Q180003aR180104

Job Number

: R180104

Issue Date

: 04/03/2018

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L		
R180104/1	05/02/2018	C1	3.3		
R180104/2	05/02/2018	C2	3.4		
R180104/3	05/02/2018	М1	2.5		
R180104/4	05/02/2018	M2	9.6		
R180104/5	05/02/2018	М3	<1		

Note:

- 1. mg/L indicates milligram per liter
- 2. mg O₂/ L indicates milligram oxygen per liter
- 3. < indicates less than.
- 4. > indicates more than.
- 5. NA indicates Not Applicable.

End of Report

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Test Report

Page 1 of 2

Report Number

: Q180003aR180105

Job Number

: R180105

Issue Date

: 04/03/2018

Name of Applicant

: Acumen Environmental Engineering and Technologies Co., Ltd.

Address of Applicant

: No. 12, Tam Kon Shan Road, Tsing Yi (North), N.T.

Project Name

: CJO-3113-325

Sample Description

: SS test

Laboratory ID

: R180105/1-5

Date of Sampling

: 07/02/2018

Date Received

: 07/02/2018

Test Period

: 07/02/2018- 08/02/2018

Test Required

: 1. Suspended Solids (SS)

Method Used

: 1. QPL-15e, APHA 22ed 2540 D

Test Result

: Refer to the results on page 2.

For and on behalf of

Acumen Laboratory and Testing Limited

Authorized Signature:

Hui Wai Fung, Huntington

Laboratory Manager

Chemical Division

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Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Page 2 of 2

Report Number

: Q180003aR180105

Job Number

: R180105

Issue Date

: 04/03/2018

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R180105/1	07/02/2018	Ċ1	3.2
R180105/2	07/02/2018	C2	3.3
R180105/3	07/02/2018	M1	2.3
R180105/4	07/02/2018	M2	8.9
R180105/5	07/02/2018	М3	<1

Note:

- 1. mg/L indicates milligram per liter
- 2. mg O₂/ L indicates milligram oxygen per liter
- 3. < indicates less than.
- indicates more than.
- 5. NA indicates Not Applicable.

End of Report

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Test Report

Page 1 of 2

Report Number: Q180003aR180106

Job Number : R180106

Issue Date : 04/03/2018

Name of Applicant : Acumen Environmental Engineering and Technologies Co., Ltd.

Address of Applicant : No. 12, Tam Kon Shan Road, Tsing Yi (North), N.T.

Project Name : CJO-3113-326

Sample Description : SS test

Laboratory ID : R180106/1-5

Date of Sampling : 09/02/2018

Date Received : 09/02/2018

Test Period : 09/02/2018-- 10/02/2018

Test Required : 1. Suspended Solids (SS)

Method Used : 1. QPL-15e, APHA 22ed 2540 D

Test Result : Refer to the results on page 2.

For and on behalf of

Acumen Laboratory and Testing Limited

Authorized Signature:

Hui Wai Fung, Huntington

Laboratory Manager

Chemical Division

Acumen Laboratory and Testing Limited Lot 12, Tam Kon Shan Road, Tsing Yi (N), Hong Kong

Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Page 2 of 2

Report Number

: Q180003aR180106

Job Number

: R180106

Issue Date

: 04/03/2018

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R180106/1	09/02/2018	C 1	3.0
R180106/2	09/02/2018	C2	3.1
R180106/3	09/02/2018	M1	2.1
R180106/4	09/02/2018	M2	4.6
R180106/5	09/02/2018	М3	<1

Note:

- 1. mg/L indicates milligram per liter
- 2. mg O₂/ L indicates milligram oxygen per liter
- 3. < indicates less than.
- 4. > indicates more than.
- 5. NA indicates Not Applicable.

End of Report

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Test Report

Page 1 of 2

Report Number

: Q180003aR180107

Job Number

: R180107

Issue Date

: 04/03/2018

Name of Applicant

: Acumen Environmental Engineering and Technologies Co., Ltd.

Address of Applicant

: No. 12, Tam Kon Shan Road, Tsing Yi (North), N.T.

Project Name

: CJO-3113-327

Sample Description

: SS test

Laboratory ID

: R180107/1-5

Date of Sampling

: 13/02/2018

Date Received

: 13/02/2018

Test Period

: 13/02/2018- 14/02/2018

Test Required

: 1. Suspended Solids (SS)

Method Used

: 1, QPL-15e, APHA 22ed 2540 D

Test Result

: Refer to the results on page 2.

For and on behalf of

Acumen Laboratory and Testing Limited

Authorized Signature:

Hui Wai Fung, Huntington

Laboratory Manager

Chemical Division

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Test Report

Page 2 of 2

Report Number

: Q180003aR180107

Job Number

: R180107

Issue Date

: 04/03/2018

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R180107/1	13/02/2018	C1	3.2
R180107/2	13/02/2018	C2	3.2
R180107/3	13/02/2018	M1	2.3
R180107/4	13/02/2018	M2	5.2
R180107/5	13/02/2018	МЗ	<1

Note:

- 1. mg/L indicates milligram per liter
- 2. mg O₂/ L indicates milligram oxygen per liter
- 3. < indicates less than.
- 4. > indicates more than.
- 5. NA indicates Not Applicable.

End of Report

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Test Report

Page 1 of 2

Report Number

: Q180003aR180108

Job Number

: R180108

Issue Date

: 04/03/2018

Name of Applicant

: Acumen Environmental Engineering and Technologies Co., Ltd.

Address of Applicant

: No. 12, Tam Kon Shan Road, Tsing Yi (North), N.T.

Project Name

: CJO-3113-328

Sample Description

: SS test

Laboratory ID

: R180108/1-5

Date of Sampling

: 15/02/2018

Date Received

: 15/02/2018

Test Period

: 15/02/2018- 16/02/2018

Test Required

: 1. Suspended Solids (SS)

Method Used

: 1. QPL-15e, APHA 22ed 2540 D

Test Result

: Refer to the results on page 2.

For and on behalf of

Acumen Laboratory and Testing Limited

Authorized Signature:

Hui Wai Fung, Huntington

Laboratory Manager

Chemical Division

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Test Report

Page 2 of 2

Report Number

: Q180003aR180108

Job Number

: R180108

Issue Date

: 04/03/2018

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R180108/1	15/02/2018	C1	3.1
R180108/2	15/02/2018	C2	3.2
R180108/3	15/02/2018	M1	2.2
R180108/4	15/02/2018	M2	5.6
R180108/5	15/02/2018	M3	<1

Note:

- 1. mg/L indicates milligram per liter
- 2. mg O₂/ L indicates milligram oxygen per liter
- 3. < indicates less than.
- 4. > indicates more than.
- 5. NA indicates Not Applicable.

End of Report

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Test Report

Page 1 of 2

Report Number

: Q180003aR180109

Job Number

: R180109

Issue Date

: 04/03/2018

Name of Applicant

: Acumen Environmental Engineering and Technologies Co., Ltd.

Address of Applicant

: No. 12, Tam Kon Shan Road, Tsing Yi (North), N.T.

Project Name

: CJO-3113-329

Sample Description

: SS test

Laboratory ID

: R180109/1-5

Date of Sampling

: 20/02/2018

Date Received

: 20/02/2018

Test Period

: 20/02/2018-21/02/2018

Test Required

: 1. Suspended Solids (SS)

Method Used

: 1. QPL-15e, APHA 22ed 2540 D

Test Result

: Refer to the results on page 2.

For and on behalf of

Acumen Laboratory and Testing Limited

Authorized Signature:

Hui Wai Fung, Huntington

Laboratory Manager

Chemical Division

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Test Report

Page 2 of 2

Report Number

: Q180003aR180109

Job Number

: R180109

Issue Date

: 04/03/2018

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R180109/1	20/02/2018	C1	3.1
R180109/2	20/02/2018	C2	3.1
R180109/3	20/02/2018	M1	2.1
R180109/4	20/02/2018	. M2	5.0
R180109/5	20/02/2018	МЗ	<1
Note: 1 mg/l indicate			

Note:

- mg/L indicates milligram per liter
 mg O₂/ L indicates milligram oxygen per liter
- 3. < indicates less than.
- indicates more than.
- 5. NA indicates Not Applicable.

End of Report***

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Test Report

Page 1 of 2

Report Number

: Q180003aR180110

Job Number

: R180110

Issue Date

: 04/03/2018

Name of Applicant

: Acumen Environmental Engineering and Technologies Co., Ltd.

Address of Applicant

: No. 12, Tam Kon Shan Road, Tsing Yi (North), N.T.

Project Name

: CJO-3113-330

Sample Description

: SS test

Laboratory ID

: R180110/1-5

Date of Sampling

: 22/02/2018

Date Received

: 22/02/2018

Test Period

: 22/02/2018-23/02/2018

Test Required

: 1. Suspended Solids (SS)

Method Used

: 1. QPL-15e, APHA 22ed 2540 D

Test Result

: Refer to the results on page 2.

For and on behalf of

Acumen Laboratory and Testing Limited

Authorized Signature:

Hui Wai Fung, Huntington

Laboratory Manager

Chemical Division

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Test Report

Page 2 of 2

Report Number

: Q180003aR180110

Job Number

: R180110

Issue Date

: 04/03/2018

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R180110/1	22/02/2018	C1	3.1
R180110/2	22/02/2018	C2	3.2
R180110/3	22/02/2018	M1	2.1
R180110/4	22/02/2018	M2	5.2
R180110/5	22/02/2018	мз	<1
Note: 1 mg/l india.			

Note:

- 1. mg/L indicates milligram per liter 2. mg O₂/ L indicates milligram oxygen per liter
- < indicates less than. indicates more than.
- 5. NA indicates Not Applicable.

End of Report

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Test Report

Page 1 of 2

Report Number

: Q180003aR180111

Job Number

: R180111

Issue Date

: 04/03/2018

Name of Applicant

: Acumen Environmental Engineering and Technologies Co., Ltd.

Address of Applicant

: No. 12, Tam Kon Shan Road, Tsing Yi (North), N.T.

Project Name

: CJO-3113-331

Sample Description

: SS test

Laboratory ID

: R180111/1-5

Date of Sampling

: 24/02/2018

Date Received

: 24/02/2018

Test Period

: 24/02/2018- 25/02/2018

Test Required

: 1. Suspended Solids (SS)

Method Used

: 1. QPL-15e, APHA 22ed 2540 D

Test Result

: Refer to the results on page 2.

For and on behalf of

Acumen Laboratory and Testing Limited

Authorized Signature:

Hui Wai Fung, Huhtington

Laboratory Manager

Chemical Division

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Test Report

Page 2 of 2

Report Number

: Q180003aR180111

Job Number

: R180111

Issue Date

: 04/03/2018

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R180111/1	24/02/2018	C1	3.2
R180111/2	24/02/2018	C2	3.3
R180111/3	24/02/2018	M1	2.3
R180111/4	24/02/2018	M2	6.3
R180111/5	24/02/2018	M3	
Note: 1. mg/L indicates	Milligram per liter		<1

- mg/L indicates milligram per liter
 mg O₂/ L indicates milligram oxygen per liter
 indicates less than.
- 4. > indicates more than.
- 5. NA indicates Not Applicable.

End of Report

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Test Report

Page 1 of 2

Report Number

: Q180003aR180112

Job Number

: R180112

Issue Date

: 04/03/2018

Name of Applicant

: Acumen Environmental Engineering and Technologies Co., Ltd.

Address of Applicant

: No. 12, Tam Kon Shan Road, Tsing Yi (North), N.T.

Project Name

: CJO-3113-332

Sample Description

: SS test

Laboratory ID

: R180112/1-5

Date of Sampling

: 26/02/2018

Date Received

: 26/02/2018

Test Period

: 26/02/2018- 27/02/2018

Test Required

: 1. Suspended Solids (SS)

Method Used

: 1. QPL-15e, APHA 22ed 2540 D

Test Result

: Refer to the results on page 2.

For and on behalf of

Acumen Laboratory and Testing Limited

Authorized Signature:

Hui Wai Fung, Huhtington

Laboratory Manager

Chemical Division

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Test Report

Page 2 of 2

Report Number

: Q180003aR180112

Job Number

: R180112

Issue Date

: 04/03/2018

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R180112/1	26/02/2018	C1	3.1
R180112/2	26/02/2018	C2	3.2
R180112/3	26/02/2018	M1	2.4
R180112/4	26/02/2018	M2	5.4
R180112/5	26/02/2018	МЗ	<1

Note:

- 1. mg/L indicates milligram per liter
- 2. mg O₂/ L indicates milligram oxygen per liter
- 3. < indicates less than.
- 4. > indicates more than.
- 5. NA indicates Not Applicable.

End of Report

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Test Report

Page 1 of 2

Report Number : Q180003aR180119

Job Number : R180119

Issue Date : 04/03/2018

Name of Applicant : Acumen Environmental Engineering and Technologies Co., Ltd.

Address of Applicant : No. 12, Tam Kon Shan Road, Tsing Yi (North), N.T.

Project Name : CJO-3113-333

Sample Description : SS test

Laboratory ID : R180119/1-5

Date of Sampling : 28/02/2018 Date Received : 28/02/2018

Test Period : 28/02/2018 – 01/03/2018

Test Required : 1. Suspended Solids (SS)

Method Used : 1. QPL-15e, APHA 22ed 2540 D

Test Result : Refer to the results on page 2.

For and on behalf of

Acumen Laboratory and Testing Limited

Authorized Signature:

Hui Wai Fung, Huntington

Laboratory Manager

Chemical Division

Lot 12, Tam Kon Shan Road, Tsing Yi (N), Hong Kong Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Page 2 of 2

Report Number

: Q180003aR180119

Job Number

: R180119

Issue Date

: 04/03/2018

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R180119/1	28/02/2018	C1	3.2
R180119/2	28/02/2018	C2	3.3
R180119/3	28/02/2018	M1	2.5
R180119/4	28/02/2018	M2	6.3
R180119/5	28/02/2018	М3	<1

Note:

- 1. mg/L indicates milligram per liter
 2. mg O₂/ L indicates milligram oxygen per liter
- 3. < indicates less than.
- 4. > indicates more than.
- 5. NA indicates Not Applicable.

End of Report

Appendix S Impact Monitoring report for Ecology

Project no.: CJO-3113

Post-Transplantation Monitoring Report

for Agreement No. CE 13/2009 (WS)

IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS – SOUTH WORKS

Report No.42

February 2018

TABLE OF CONTENTS

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2.	DESCRIPTION OF TREE MONITORING SITE	3
3.	MONITORING METHODOLOGY	3
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APPENDICES

APPENDIX I- Photos

APPENDIX II- Table for condition of transplanted plant

1. INTRODUCTION

- 1.1 Pursuant to the Environmental Impact Assessment (EIA) Ordinance, the Director of Environmental Protection (DEP) granted the Environmental Permit (No. EP- 494/2015) to the Water Supplies Department (WSD) to construct and operate the designated project for "In-situ Reprovisioning of Sha Tin Water Treatment Works South Works" ("The Project").
- 1.2 Upon the requirement of the Environmental Permit, a detailed vegetation report presenting the baseline vegetation condition for flora species with conservation interest, transplanting and monitoring programme for the Project has been prepared and approved by DEP in February 2016.
- 1.3 There were 4 flora species of conservation importance were recorded in the woodland habitat within project site including Ailanthus (*Ailanthus fordii*), Incense Tree (*Aquilaria sinensis*), Lamb of Tartary (*Cibotium barometz*) and Hong Kong Eagle's Claw (*Artabotrys hongkongensis*). In total, 2 nos. of Incense Tree (*Aquilaria sinensis*), 1 no. of Ailanthus (*Ailanthus fordii*) trees, 5 colonies of Lamb of Tartary (*Cibotium barometz*) and 1 no. Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) was recommended to be transplanted in the approved detailed vegetation survey report.
- 1.4 Detailed vegetation report was planned that Incense Tree (*Aquilaria sinensis*) and Ailanthus (*Ailanthus fordii*) trees will be transplanted within existing Sha Tin Water Treatment Works (STWTW). All other shrubs including Lamb of Tartary (*Cibotium barometz*) and Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) will be transplanted to the hillside slope at Sha Tin South Fresh Water Service Reservoir (STSFWSR).
- 1.2 Upon the requirement of the Environmental Permit, a qualified Ecologist was commissioned to prepare a post-transplantation monitoring report to present the status (health condition and survival rate) of transplanted vegetation and submitted to the DEP.
- 1.3 Monitoring of transplanted flora was conducted after the transplantation. The monitoring will be conducted at twice per month during the first year and once per month during the course of planting works. The parameters to be monitoring will include the health condition and survival rate of the transplanted flora. Any observations and recommendations will be reported in monthly EM&A reports.
- 1.3 This is no. 42 Tree Report presents data collected on 21 and 24 February 2018. It contains the following information:
 - Introduction (Section 1)
 - Description Of Tree Monitoring Area (Section 2)
 - Monitoring Methodology (Section 3)
 - Result (Section 4)

- Summary
- Photos (Appendix I)
- Summary table (Appendix II)
- Typhoon information (Appendix III)

2. DESCRIPTION OF TREE MONITORING SITE

- 2.1 Incense Tree (*Aquilaria sinensis*) and Ailanthus (*Ailanthus fordii*) trees was transplanted within existing Sha Tin Water Treatment Works (STWTW) where is the extended compensatory plantation area. The area was flat and without covering with concrete.
- 2.2 Lamb of Tartary (*Cibotium barometz*) and Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) will be transplanted to the Sha Tin South Fresh Water Service Reservoir (STSFWSR) where is currently covered with concrete. Plough is required before planting on to this area.
- 2.3 The planting site at Sha Tin South Fresh Water Service Reservoir (STSFWSR) was still under preparation. Transplanted Lamb of Tartary (*Cibotium barometz*) and Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) was temporally stored at nursery garden at Wang Toi Shan, Kam Tin. Once the planting site at Sha Tin South Fresh Water Service Reservoir (STSFWSR) was prepared and temporally stored transplanted vegetation were in fair condition, all transplanted Lamb of Tartary (*Cibotium barometz*) and Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) will be planted at the planting site.

3. MONITORING METHODOLOGY

- 3.1 Site inspection will be carried out by walking through the transplanting area. Health condition and survival rate will be observed during inspection.
- 3.4 Health condition of all transplanted vegetation including trees/Shrubs surveyed was evaluated according to the following criteria:
 - Transplanted vegetation with good health are classified as **good**;
 - Transplanted vegetation with few or no visible defects or health problems are classified as being **fair**;
 - Transplanted vegetation was badly damaged or clearly suffering from decay die back or the effects of very heavy vine growth are classified as **poor**.
- 3.5 Survival rate for each of transplanted vegetation species will be calculated based on site observation.

4. RESULT

- 4.1 Monitoring inspections were conducted on 21 and 24 February 2018. TA572, TA326 and TA327 tree was transplanted to tree compensation area within the Sha Tin Water Treatment Works (STWTW) in 20 June 2016.
- 4.2 The condition of TA572 was observed in poor condition due to the damage of two main trunks while TA326 and TA327 were in dead and poor condition respectively. Transplanted Lamb of Tartary (*Cibotium barometz*) seems to be received too much sunlight. Leaves of them were observed yellowish in colour. On the other hand, young foliage was growing out to replace the old one.
- 4.3 Since Sha Tin South Fresh Water Service Reservoir (STSFWSR) was still under preparation, Lamb of Tartary was still temporally stored on Nursery garden at Wang Toi Shan, Kam Tin.
- 4.4 In general, all transplanted Lamb of Tartary (*Cibotium barometz*) were in fair condition while Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) was observed dead during inspection on 20 August 2016. The survival rate for Lamb of Tartary (*Cibotium barometz*) and Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) was 96%. The Summary table for health condition and survival rate was shown in Appendix II.
- 4.4.1 All transplanted Lamb of Tartary (*Cibotium barometz*) were under recovery stage. It is recommended to retain them at the nursery garden under proper maintenance during current recovery stage. Once their condition has recovered to acceptable level, they can be moved to the transplantation site at Sha Tin South Fresh Water Service Reservoir (STSFWSR) when the site is ready.
- 4.5 After transplantation, root ball of TA572 and TA327 tree should be kept moisture especially during non-raining day.

5. MITIGATION MEASURE

Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) was observed dead during inspection on 20 August 2016. In order to compensate for the loss of transplanted Hong Kong Eagle's Claw which is in climber growing form, it is recommended to plant an individual of native climber species at compensatory planting site (Sha Tin South Fresh Water Service Reservoir (STSFWSR)) together with compensatory tree planting. Recommended list of species are given in the table 1 below. It is suggested that about 1 species of climber to be selected from the following list according to availability of the nursery source. The recommended plant species have been recorded from adjacent secondary woodland in an approved EIA Report (AEIAR-187/2015). These species would have certain ecological value in terms of plant ecology and the associated wildlife including birds.

Table 1. Table for Recommended climber species list to be planted

Native Tree Species			
Common Name	Latin Name	Chinese name	Growing form
Climbing Bauhinia	Bauhinia glauca	粉葉羊蹄甲	Climber
Spiny-fruited Vine	Byttneria aspera	刺果藤	Climber
Cassytha	Cassytha filiformis	無根藤	Climber
Bentham,s Rose-wood	Dalbergia benthamii	兩廣黃檀	Climber
Desmos	Desmos chinensis	假鷹爪	Climber
Glaucescent Diploclisia	Diploclisia glaucescens	蒼白秤鈎風	Climber
Luofushan Joint-fir	Gnetum luofuense	羅浮買麻藤	Climber
Australian Cow-plant	Gymnema sylvestre	匙羹藤	Climber
Shining Hypserpa	Hypserpa nitida	夜花藤	Climber
Large-floweredHoneysuckle	Lonicera macrantha	大花忍冬	Climber
Splash-of-white	Mussaenda pubescen	玉葉金花	Climber
Rusty-haired Raspberry	Rubus reflexus	鏽毛莓	Climber
Sandpaper Vine	Tetracera asiatica	錫葉藤	Climber
Hong Kong Eagle's Claw	Artabotrys hongkongensis	鷹爪花	Climber

- 5.2 For yellowish color for the leave of transplanted Lamb of Tartary (*Cibotium barometz*), it is recommended to provide shelter (such as 遮光網) for them to reduce the intensity of sunlight.
- Incense Tree (Aquilaria sinensis) was observed dead during inspection on 10 August 2017. Dead Incense Tree (TA326) is in tree growing form with 346cm (DBH). In according to the Tree Preservation, Development Bureau Technical Circular (Works) No. 7/2015, the compensatory planting will try to achieve the compensatory planting ratio of 1:1 in terms of aggregated DBH.
- 5.4 In total, 3 individual of native tree species with heavy standard size will be planted with 2.5-3 metres (centre to centre) spacing at compensatory planting site. Recommended list of species are given in the table 2 below. It is suggested that at least 1 tree species to be selected from the following list according to availability of the nursery source. The recommended plant species have been recorded from adjacent secondary woodland in an approved EIA Report (AEIAR-187/2015). These species would have certain ecological value in terms of plant ecology and the associated wildlife including birds. Dead Incense Tree (TA326) is recommended to be removed in order to prevent tree failure.

Table 2. Table for Recommended tree species list to be planted

	<u>-</u>		
Native Tree Species			
Common Name	Latin Name	Chinese name	Growing form
Ivy Tree	Schefflera heptaphylla	鴨腳木	Tree
Levine's Syzygium	Syzygium levinei	山蒲桃	Tree

Chekiang Machilus	Machilus chekiangensis	浙江潤楠	Tree
Aporusa	Aporusa dioica	銀柴	Tree
Mountain Tallow Tree	Sapium discolor	山烏桕	Tree
Fragrant Litsea	Litsea cubeba	山蒼樹	Tree
Chinese Apea Ear-ring	Archidendron lucidum	亮葉猴耳環	Tree
Chinese Hackberry	Celtis sinensis	朴樹	Tree
Turn-in-the-wind	Mallotus paniculatus	白楸	Tree
Acronychia	Acronychia pedunculata	降真香	Tree

6. SUMMARY

- The condition of TA572 was observed in poor condition due to broken of main trunk while TA326 and TA327 were dead and in poor condition respectively. Transplanted Lamb of Tartary (*Cibotium barometz*) seems to be received too much sunlight. Leaves of them were observed yellowish in colour. Shelter (遮光網) was recommended to reduce the intensity of sunlight. Hong Kong Eagle's Claw was observed dead during inspection on 20 August 2016. New fronds of transplanted Lamb of Tartary were observed growing out. Lamb of Tartary was under recovery after transplantation. Currently, Lamb of Tartary was temporally stored on Nursery garden at Wang Toi Shan, Kam Tin. It is recommended to retain them at the nursery garden under proper maintenance during current recovery stage.
- 6.2 In general, all transplanted Lamb of Tartary were in fair condition while Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) and one Incense Tree (*Aquilaria sinensis*) TA326 were observed dead during inspection on 20 August 2016 and on 10 August 2017 respectively.
- 6.3 In order to compensate for the loss of transplanted Hong Kong Eagle's Claw and Incense Tree, it is recommended to plant an individual of native climber species and 3 heavy standard native tree species at compensatory planting site. The suggested species in planting list would have certain ecological value in terms of plant ecology and the associated wildlife including birds.
- 6.4 After transplantation, root ball of TA572 and TA327 tree should be kept moisture especially during dry and non-raining day.

APPENDIX I Photo



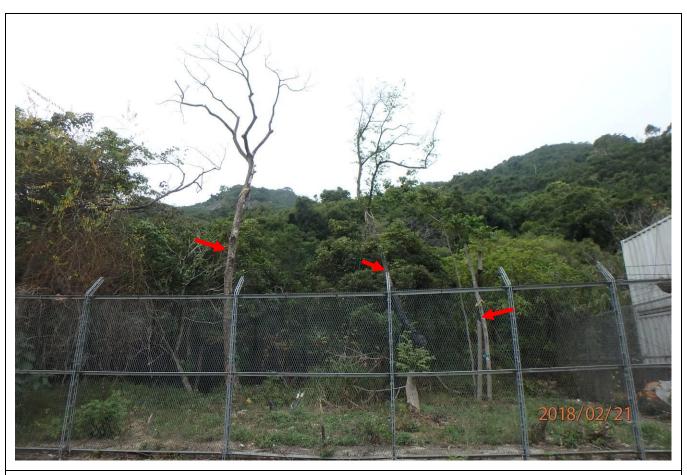


Photo 7. Incense Tree after transplantation (*Aquilaria sinensis*) – TA326 (left, dead) and TA327 (middle), (*Ailanthus fordii*) – TA572 (right)



Photo 8. Weak crown with dead twigs observed in of TA327.



Photo 9. Old wound found at trunk base of TA327.



Photo 10. Cracks and wounds observed in one of the trunks of TA572.



Photo 11. Weak crown and broken trunks of TA572.

IN-SITU REPROVISIONING OF SH	A TIN WATER TREATMENT WORKS -	– SOUTH WORKS–Post-Transplantatio	n Monitoring Report

APPENDIX II

Table for condition of transplanted plant

Shrubs of Lamb of Tartary and Hong Kong Eagle's Claw

No.	Species	Condition	Alive/Dead	Remark
1	Cibotium barometz	Fair	Alive	Under recovering
2	Cibotium barometz	Fair	Alive	Under recovering
3	Cibotium barometz	Fair	Alive	Under recovering
4	Cibotium barometz	Fair	Alive	Under recovering
5	Cibotium barometz	Fair	Alive	Under recovering
6	Cibotium barometz	Fair	Alive	Under recovering
7	Cibotium barometz	Fair	Alive	Under recovering
8	Cibotium barometz	Fair	Alive	Under recovering
9	Cibotium barometz	Fair	Alive	Under recovering
10	Cibotium barometz	Fair	Alive	Under recovering
11	Cibotium barometz	Fair	Alive	Under recovering
12	Cibotium barometz	Fair	Alive	Under recovering
13	Cibotium barometz	Fair	Alive	Under recovering
14	Cibotium barometz	Fair	Alive	Under recovering
15	Cibotium barometz	Fair	Alive	Under recovering
16	Cibotium barometz	Fair	Alive	Under recovering
17	Cibotium barometz	Fair	Alive	Under recovering
18	Cibotium barometz	Fair	Alive	Under recovering
19	Cibotium barometz	Fair	Alive	Under recovering
20	Cibotium barometz	Fair	Alive	Under recovering
21	Cibotium barometz	Fair	Alive	Under recovering
22	Cibotium barometz	Fair	Alive	Under recovering
23	Cibotium barometz	Fair	Alive	Under recovering
24	Cibotium barometz	Fair	Alive	Under recovering
25	Cibotium barometz	Fair	Alive	Under recovering
26	Cibotium barometz	Fair	Alive	Under recovering
27	Cibotium barometz	Fair	Alive	Under recovering
28	Artabotrys hongkongensis		Dead	
		Survival rate (%)	96%	

Trees of Ailanthus and Incense Tree

No.	Species	Condition	Alive/Dead	Remark
TA572	Ailanthus fordii	Poor	Alive	Two main trunk was
				broken during typhoon
				on 23 August 2017
TA327	Aquilaria sinensis	Poor	Alive	Tree crown of TA327
				was thinner after
				transplantation. Water
				sprouts and cracks on
				tree bark observed.
TA326	Aquilaria sinensis	Dead	Dead	
		Survival rate (%)	67%	

Appendix T Monthly Summary of Waste Flow Table

Project no.: CJO-3113

Water Supplies Department Monthly Summary Waste Flow Table

for Contract with Environmental Management Plan under ETWB TCW No. 19/2005 and its Interim Guidance Note Reporting Year: 2018

Contract No.	3/WSD/15
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(To be submitted to C&D MM Coordinator of Respective Division/Region via Engineer's Representative before 15th of the following month)

	Actual Quantities of Inert C&D Materials Generated / Imported (in '000 m ³)					Actual Quantities of Other C&D Materials / Wastes Generated					
Month			Metal Paper/ Cardboard Packaging		Chemical Waste	Others (e.g. General Refuse etc.)					
	[a+b+c+d)	(a)	(b)	(c)	(d)		(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m ³)
January	0.403	0.000	0.000	0.000	0.403	0.000	0.000	0.000	0.000	0.000	0.019
February	0.517	0.000	0.000	0.000	0.517	0.000	0.000	0.000	0.000 0.000		0.008
March											
April											
May											
June											
Half-year total	0.920	0.000	0.000	0.000	0.920	0.000	0.000	0.000	0.000	0.000	0.027
July											
August											
September											
October											
November											
December											
Yearly Total	0.920	0.000	0.000	0.000	0.920	0.000	0.000	0.000	0.000	0.000	0.027

Appendix U Implementation Schedule of Environmental Mitigation Measures (EMIS)

Project no.: CJO-3113

Environmental Mitigation and Enhancement Measure Implementation Schedule at Construction Stage

EIA Ref.	Recommended Mitigation Measures	Location of the Measures	Implementation	Relevant Legislation and Guidelines	Implementation Phase			Status
			Agent		D	С	0	
Air Quality					1			
4.7.1	Use of regular watering to reduce dust emissions from exposed site surfaces and unpaved roads, particularly during dry weather.	All works areas	Contractor	Air Pollution Control		V		Υ
4.7.1	Side enclosure and covering of any aggregate or stockpiling of dusty material to reduce emissions. Where this is not practicable owing to frequent usage, watering shall be applied to aggregate fines.	All works areas	Contractor	Ordinance and Air Pollution Control (Construction		V		Υ
4.7.1	Tarpaulin covering of all dusty vehicle loads transported to, from and between site locations.	All works areas	Contractor	Dust) Regulation		√		Υ
4.7.1	Establishment and use of vehicle wheel and body washing facilities at the exit points of the site.	All works areas	Contractor	EM&A Manual		1		Υ
4.7.1	Imposition of speed controls for vehicles on site haul roads.	All works areas	Contractor			V		Υ
4.7.1	Implement EM&A program to monitor the construction process in order to enforce controls and modify method of work if dusty conditions arise.	All works areas / Monitoring points	Contractor			V		Υ
Noise		P =	l.	I.	1	1		
5.6.4	Implement good site practices to reduce noise level	All works areas	Contractor	Noise Control Ordinance		1		Υ
5.6.5	Adoption of Quiet PME	All works areas	Contractor			1		N/A
5.6.6	Use of Movable Noise Barrier	All works areas	Contractor			1		N/A
5.8	Noise monitoring	Monitoring points	Contractor			√		Υ
Water Quality								
6.8.1	Surface run-off from construction sites should be discharged into storm drains via adequately designed sand/silt removal facilities such as sand	All works areas	Contractor	ProPECC PN 1/94 Construction		1		Υ

the deposited silt and grit should be removed regularly, at the onset of and after each rainstorm to prevent local flooding. Temporary exposed slope surfaces should be covered and temporary access roads should be protected by crushed stone or gravel, as excavation proceeds. Intercepting channels should be provided to prevent storm run-off from washing across exposed soil surfaces. 8.8.4 Earthworks final surfaces should be well compacted and the subsequent permanent work or surface protection should be carried out immediately after the final surfaces are formed to prevent erosion caused by rainstorms. Appropriate drainage like intercepting channels should be provided where necessary. 8.8.5 Rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities. 9 All works areas Contractor All works areas Contractor All works areas Contractor acquately and acquately provided and plant should be adopted to remove rubbish and litter from spreading from the site area. All works areas Contractor All works areas Contractor All works areas Contractor			1	1			1	- 1
Silt removal facilities, channels and manholes should be maintained and the deposited silt and grit should be removed regularly, at the onset of and after each rainstorm to prevent local flooding. S.8.3 Temporary exposed slope surfaces should be covered and temporary access roads should be protected by crushed stone or gravel, as excavation proceeds. Intercepting channels should be provided to prevent storm run-off from washing across exposed soil surfaces. S.8.4 Earthworks final surfaces should be well compacted and the subsequent partner work or surface protection should be carried out immediately after the final surfaces are formed to prevent erosion caused by rainstorms. Appropriate drainage like intercepting channels should be provided where necessary. S.8.5 Rainwater pumped out from trenches or foundation excavations should be provided where necessary. S.8.6 Open stockpiles of construction materials (e.g. aggregates, sand and fill material) on sites should be covered with tarpaulin or similar fabric during rainstorms. S.8.7 Manholes (including newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system. S.8.8 Good site practices should be adopted to remove rubbish and litter from construction materials or debris from getting into the drainage system. S.8.9 All vehicles and plant should be cleaned before they leave a construction site to minimize the deposition of earth, mud, debris on roads. A wheel washing bay should be provided at every site exit if practicable and wash-water should have sand and silt settled out or removed before discharging into storm drains. S.8.10 Before commencing any demolition works, all drainage connections. All works areas Contractor		sand bag barriers should be provided on site to properly direct stormwater to such silt removal facilities. Perimeter channels at site boundaries should be provided where necessary to intercept storm run-off from outside the site so that it will not wash across the site. Catchpits and perimeter channels should be constructed in advance of			TM-DSS Water Pollution Control			
Temporary exposed slope surfaces should be covered and temporary access roads should be protected by crushed stone or gravel, as excavation proceeds. Intercepting channels should be provided to prevent storm run-off from washing across exposed soil surfaces. Earthworks final surfaces should be well compacted and the subsequent permanent work or surface protection should be carried out immediately after the final surfaces are formed to prevent erosion caused by rainstorms. Appropriate drainage like intercepting channels should be provided where necessary. S.8.5 Rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities. S.8.6 Open stockpiles of construction materials (e.g. aggregates, sand and fill during rainstorms. Manholes (including newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system. S.8.8 Good site practices should be adopted to remove rubbish and litter from construction sites so as to prevent the rubbish and litter from site to minimize the deposition of earth, mud, debris on roads. A wheel washing bay should be provided at every site exit if practicable and wash-water should have sand and silt settled out or removed before discharging into storm drains. All works areas Contractor	6.8.2	Silt removal facilities, channels and manholes should be maintained and the deposited silt and grit should be removed regularly, at the onset of	All works areas	Contractor		√		Υ
permanent work or surface protection should be carried out immediately after the final surfaces are formed to prevent erosion caused by rainstorms. Appropriate drainage like intercepting channels should be provided where necessary. 8.8.5 Rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities. 8.8.6 Open stockpiles of construction materials (e.g. aggregates, sand and fill material) on sites should be covered with tarpaulin or similar fabric during rainstorms. 8.8.7 Manholes (including newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system. 8.8.8 Good site practices should be adopted to remove rubbish and litter from construction sites so as to prevent the rubbish and litter from spreading from the site area. 8.8.9 All vehicles and plant should be cleaned before they leave a construction site to minimize the deposition of earth, mud, debris on roads. A wheel washing bay should be provided at every site exit if practicable and wash-water should have sand and silt settled out or removed before discharging into storm drains. 8.8.10 Before commencing any demolition works, all drainage connections All works areas Contractor	6.8.3	Temporary exposed slope surfaces should be covered and temporary access roads should be protected by crushed stone or gravel, as excavation proceeds. Intercepting channels should be provided to	All works area	Contractor		√		Υ
Rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities. Open stockpiles of construction materials (e.g. aggregates, sand and fill material) on sites should be covered with tarpaulin or similar fabric during rainstorms. All works areas Contractor	6.8.4	permanent work or surface protection should be carried out immediately after the final surfaces are formed to prevent erosion caused by rainstorms. Appropriate drainage like intercepting channels should be	All works areas	Contractor		V		N/A
material) on sites should be covered with tarpaulin or similar fabric during rainstorms. 5.8.7 Manholes (including newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system. 6.8.8 Good site practices should be adopted to remove rubbish and litter from construction sites so as to prevent the rubbish and litter from spreading from the site area. 6.8.9 All vehicles and plant should be cleaned before they leave a construction site to minimize the deposition of earth, mud, debris on roads. A wheel washing bay should be provided at every site exit if practicable and wash-water should have sand and silt settled out or removed before discharging into storm drains. 6.8.10 Before commencing any demolition works, all drainage connections All works areas Contractor	6.8.5	Rainwater pumped out from trenches or foundation excavations should	All works areas	Contractor		√		Υ
adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system. 5.8.8 Good site practices should be adopted to remove rubbish and litter from construction sites so as to prevent the rubbish and litter from spreading from the site area. 6.8.9 All vehicles and plant should be cleaned before they leave a construction site to minimize the deposition of earth, mud, debris on roads. A wheel washing bay should be provided at every site exit if practicable and wash-water should have sand and silt settled out or removed before discharging into storm drains. 6.8.10 Before commencing any demolition works, all drainage connections All works areas Contractor	6.8.6	material) on sites should be covered with tarpaulin or similar fabric	All works areas	Contractor		V		Υ
construction sites so as to prevent the rubbish and litter from spreading from the site area. 5.8.9 All vehicles and plant should be cleaned before they leave a construction site to minimize the deposition of earth, mud, debris on roads. A wheel washing bay should be provided at every site exit if practicable and wash-water should have sand and silt settled out or removed before discharging into storm drains. 5.8.10 Before commencing any demolition works, all drainage connections All works areas Contractor	6.8.7	adequately covered and temporarily sealed so as to prevent silt,	All works areas	Contractor		√		Υ
site to minimize the deposition of earth, mud, debris on roads. A wheel washing bay should be provided at every site exit if practicable and wash-water should have sand and silt settled out or removed before discharging into storm drains. 5.8.10 Before commencing any demolition works, all drainage connections All works areas Contractor	6.8.8	construction sites so as to prevent the rubbish and litter from spreading	All works areas	Contractor		√		Υ
5.8.10 Before commencing any demolition works, all drainage connections All works areas Contractor	6.8.9	site to minimize the deposition of earth, mud, debris on roads. A wheel washing bay should be provided at every site exit if practicable and wash-water should have sand and silt settled out or removed before	All works areas	Contractor		V		Υ
	6.8.10		All works areas	Contractor		√		N/A

	drains.					
6.8.11	Wastewater generated from building construction activities including concreting, plastering, internal decoration, cleaning of works and similar activities should not be discharged into the stormwater drainage system. If the wastewater is to be tankered off site for disposal into foul sewers, it should undergo the removal of settleable solids in a silt removal facility, and pH adjustment as necessary.	All works areas	Contractor		√	Υ
5.8.12	Acidic wastewater generated from acid cleaning, etching, pickling and similar activities should be neutralized to within the pH range of 6 to 10. The neutralized wastewater should be tankered off site for disposal into foul sewers or treated to a standard acceptable to storm drains and the receiving waters.	All works areas	Contractor		√	N/
6.8.13	All surface run-off must proper collected and discharge at designated location. The discharge quality must meet the requirements specified in the discharge license.	All works areas	Contractor		√	Υ
6.8.15	Contractor must register as a chemical waste producer if chemical wastes would be produced from the construction activities. The Waste Disposal Ordinance (Cap 354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation should be observed and complied with for control of chemical wastes.	All works areas	Contractor		V	Υ
6.8.16	Maintenance of vehicles and equipment involving activities with potential for leakage and spillage should only be undertaken within the areas appropriately equipped to control these discharges	All works areas	Contractor		√	Υ
6.8.17	Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance.	All works areas	Contractor		√	Υ
6.8.18	Sewage generated from the workforce should be properly treated by interim treatment facilities, such as chemical toilets which are properly maintained with the employment of licensed collectors for the collection and disposal on a regular basis.	All works areas	Contractor		V	Y
6.8.19	Adopt relevant measures stated in ETWB TC (Works) No. 5/2005 "Protection of Natural Streams/rivers from Adverse Impacts arising from Construction Works" to minimize the potential water quality impacts from the construction works near any water courses.	All works areas	Contractor		√	Y
6.10	Water quality monitoring	Monitoring points	Contractor		√	Υ

7.6.1	Appropriate waste handling, transportation and disposal methods for all waste arisings generated during the construction works for the Project should be implemented to ensure that construction wastes do not enter the nearby streams or drainage channel.	All works areas	Contractor	Waste Disposal Ordinance DEVB TCW No.	√	Υ
7.6.2	Implementation of good site practices for waste management	All works areas	Contractor	6/2010,	√	Υ
7.6.3	Implementation of trip ticket system to control waste disposal	All works areas	Contractor	ETWB TCW No.	√	Υ
7.6.4	Implementation of good site practices to reduce waste generations	All works areas	Contractor	19/2005 Land	√	Υ
7.6.5	Re-use of excavated C&D materials on site as far as practical. A suitable area should be designated within the site for temporary stockpiling of C&D material and to facilitate the sorting process.	All works areas	Contractor	(Miscellaneous Provisions) Ordinance	√	Υ
7.6.8	General refuse should be stored in enclosed bins or compaction units separate from C&D material. A reputable waste collector should be employed by the contractor to remove general refuse from the site, separately from C&D material.	All works areas	Contractor	Code of Practice on the Packaging, Labelling and	√	Υ
7.6.9	All storage of asbestos waste should be carried out properly in a secure place isolated from other substances so as to prevent any possible release of asbestos fibres into the atmosphere and contamination of other substances. The storage area should bear warning panels to alert people of the presence of asbestos waste.	All works areas	Contractor	Storage of Chemical Wastes	V	N/A
7.6.10	A licensed asbestos waste collector will be appointed to collect the asbestos waste and deliver to the designated landfill for disposal. Application should be submitted to EPD.	All works areas	Contractor		√	N/A
7.6.11	If chemical wastes were to be produced at the construction site, the Contractor would be required to register with the EPD as a Chemical Waste Producer, and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the waste, such as explosive, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc. The Contractor shall use a licensed collector to transport the chemical wastes. The licensed collector shall deliver the waste to the Chemical Waste Treatment Centre at Tsing Yi, or other licenced facility, in accordance with	All works areas	Contractor		V	Y

	the Waste Disposal (Chemical Waste) (General) Regulation.					
Ecology	1		I			
8.8.1	Ecological impacts on important habitats and the associated wildfile caused by the proposed development should be mitigated and compensation approaches to the maximum practical extent	All works areas in particular important	The Engineer/ Contractor	EIAO-TM EM&A Manual	V	Υ
8.8.2	Reduce the amount of vegetation removal required and thereby minimize the footprint of the slope at the woodland habitat	habitats All works areas	The Engineer/ Contractor		√	Υ
8.8.3	Conduct detailed vegetation survey and implement suggested measures for species of conservation importance.		The Engineer/ Contractor		√	Υ
8.8.4	The affected Incense Tree and Ailanthus as mentioned in the detailed vegetation survey report within the works area will be transplanted		The Engineer/ Contractor		V	Υ
8.8.5	To avoid impacts on Short-nosed Fruit Bat, the tree with records of an active roost and trees showing evidence of roosting activity should be retained where possible. Where Chinese Fan-palm (Livistona chinensis) removal is required, these should be checked by suitably qualified ecologist with over 7 years relevant experience for roosting bats prior to their removal. If roosting bats are observed, a strategy for passive removal will be agreed with the AFCD and implemented. This could include undertaking the works just after the bats have left the roost (i.e. dusk).		The Engineer/ Contractor		√	N/A
8.8.6	The inclusion of Chinese Fan-palm of similar size as the affected plant within the areas of compensatory planting or other suitable areas is recommended to replace affected specimens, and compensate for the impact to roosting opportunities for this bat species		The Engineer/ Contractor		√	N/A
8.8.7	Implement good site measures to minimize the disturbance impacts to terrestrial habitat and associated wildlife arising from the land-based construction activities.		The Engineer/ Contractor		V	Υ
8.8.8	To minimize the contamination of wastewater discharge, accidental chemical spillage and construction site run-off to the receiving water bodies, mitigation measures such as diverting the site runoff to silt trap facilities before discharging into storm drain, proper waste and dumping management and standard good site practice for land-based construction.		The Engineer/ Contractor		V	Υ
8.8.9-8.8.11	Implement woodland compensation		The Engineer/ Contractor		V	N/A

Landscape and 9.8.1	Existing tress to be retained on site shall be carefully protected during	All works areas	Contractor	DEVB TCW No.		
7.0.1	construction. Trees unavoidably affected by the works shall be transplanted as far as possible.	All Works areas	Contractor	10/2013	$\sqrt{}$	Y
	Compensatory Planting shall be provided in accordance with DEVB TCW No. 10/2013 – Tree Preservation.	All works areas	Contractor	EIAO TM	V	Υ
	Control of night-time lighting glare.	All works areas	Contractor		V	Υ
	Erection of decorative screen hoarding compatible with the surrounding setting.	All works areas	Contractor		V	Y
	Management of facilities on work sites which give control on the height and disposition/arrangement of all facilities on the works site to minimize visual impact to adjacent VSRs.	All works areas	Contractor		√	Υ
Cultural Herita	nge					
10.6.2	Vibration monitoring at Ex KCR Beacon Hill Tunnel during piling works of Administration Building	Work site	The Engineer /Contractor		V	N/A
Land Contamii	nation	1	1	1	· · · · · · · · · · · · · · · · · · ·	.
11.7	Identify contamination and implement appropriate remedial measures on site. Provide relevant submission and obtain approval from EPD if necessary.	All works areas	Contractor	Guidance Note for Contaminated Land Assessment and Remediation Guidance Manual for Use of Risk based	V	N/A
				Remediation Goals for Contaminated Land Management (Guidance Manual)		
Hazard to Life		T	T			T-
Table 12.22	Ensure speed limit enforcement is specified in the contractor's Method Statement to limit the speed of construction vehicles on site	All works areas	The Engineer	EIAO-TM	$\sqrt{}$	Y
	Develop an audit procedure to ensure enforcement of speed limits and to ensure adequate site access control	All works areas	The Engineer		V	Υ
	Ensure construction method statement is endorsed by the Engineer (AECOM)	All works areas	The Engineer		√	Υ

	New access	Contractor/		V	Υ
,	road area	The Engineer			
0 , 1 , 1 , 0	All works areas	Contractor/		1	Υ
drills) cover the reprovisioning activities		The Engineer		•	'
Safety training to be provided to construction workers and WSD/Engineer	All works area	Contractor/		1	V
staff regarding evacuation procedures		The Engineer		1	Υ
Ensure communication protocol is in place between construction and	All works areas	Contractor/			
operation staff with regard to the change of chlorine delivery route and		The Engineer			N/A
the switchover from the existing to new chlorinated water piping;					
	All works areas	Contractor/		,	
movements during chlorine delivery		The Engineer		√	Υ
Provide a crash barrier between the construction site and the north side	Chlorination	Contractor			
	House area	3 0		√	Υ
	Chlorination	Contractor			
		Contractor		1	Υ
any damage of the Chlorination House	House area			\ \ \	ĭ
· -	Chlorination	Contractor	_		
	House area	Contractor		1	Υ
Chlorination House	riouse area			'	Į.
	Chlorination	Contractor			
=	House area	Contractor		√	Υ
·		MCD	<u> </u>		
	Chlorinated	WSD			
, , ,	water piping				N/A
for chlorine gas vapours being released if the concentration is too high					
and there is spillage during switchover Develop an operating procedure for performing the chlorinated water	All works areas	Contractor/			
switchover from the existing piping to new piping.	All WUIKS aleds	The Engineer /		1	N/A
switchover from the existing piping to new piping.		WSD		'	IN/A
Ensure the location/height of the lifting equipment is such there is no	Chlorination	Contractor/	_		
	House area	The Engineer		1	Υ
swinging or dropped load.	riouse area	THE LIIGHTEET		'	
	Existing E&M	Contractor/	 		
	Workshop	The Engineer			
	and	c ziigiiicci		1	N/A
	Chlorination			'	, , ,
	House				
		<u> </u>			 1

	areas			
Stop any construction activities which may lead to vibrations and potential slope/boulder disturbance during the chlorine deliveries	All works areas	Contractor	√	+
Installation of Chlorine gas monitors with audible alarms in the relevant reprovisioning works area	Reprovisioning works areas	Contractor/ The Engineer	V	
Provision of an accompanying vehicle for the chlorine truck on the WTW site and ensuring that during the chlorine drums delivery construction works are stopped and the construction workers moved away from Chlorination House	All works areas	Contractor	1	
Establish a liaison between the contractor and HKCG and develop a chlorine/town gas emergency plan to ensure gas safety during the Construction Phase	Beacon Hill North Gas Offtake Station and Gas Pipelines in Old Beacon Hill Tunnel	The Engineer / Contractor / HKCG	√	
Temporary suspend chlorine delivery during the short period of construction of the concerned section of elevated walkway to avoid mobile crane impact on the chlorine truck		The Engineer / Contractor	√	
Provide clear road signs for site vehicles	Chlorine delivery route and reprovisioning works access roads	The Engineer / Contractor	1	
Large equipment/plant movement should be controlled by 'Permit-to-move' system	All works areas	The Engineer / Contractor / WSD	V	
Define restricted zone for the equipment (i.e. keep the equipment from the Chlorination House at a safe distance). The extent of the restricted zone would be determined by the size of the equipment	Chlorination House area	The Engineer / Contractor	√	
Locate the construction site office at or near property boundary away from the Chlorination House as far as possible	Construction Office area	The Engineer / Contractor	V	
Entry of non-authorized personnel to the construction site to be prohibited	All works areas	Contractor	V	

12.15.4, 12.18.1, 12.22.9	GPS fleet management system with driver training to help enforce truck speeds	Chlorine delivery trucks, fleet management centre	WSD / Chlorine Supply Contractor	EIAO-TM	V	k.i.v.
	Improved clamps with independent checks to prevent load shedding	Chlorine			√	F
	Installation of fire screen and larger fire extinguishers to prevent engine and wheel fires from spreading to the cargo area	delivery trucks			V	F
	Adoption of the chlorine delivery route from Sham Shui Kok Dock to Sha Tin WTW				1	F
	Provision of emergency repair kit				V	F
12.34.3 Table 12.37	Ban the use of retreaded tyres and perform regular visual checks on the tyres.				$\sqrt{}$	F
& 12.38	A vehicle accompanying chlorine truck along critical road sections in Sha Tin. The truck should be equipped with emergency kit, fire extinguisher, radio set for communication. The accompanying vehicle will be ahead of the chlorine truck after the vehicles entering the water treatment works site – An accompanying vehicle may provide rapid response to an incident but any action would be limited to containing a small leak. Limit fuel tanks capacity at the beginning of the Project (Item 2.3 of Table				V	F
	12.37 – advance measure).				$\sqrt{}$	F
	Review the practicality of reducing combustible materials or use of fire retardant materials in the cab. (Item 2.3 of Table 12.37 – further measure)				V	k.i.v.
	Annual periodic radiography or ultrasonic test inspections of the chlorine drums should be considered for implementation as soon as feasible (Item 3.8 of Table 12.37).	Chlorine drums			V	k.i.v.
	Implement side, front and rear crash guards with high energy absorption in coordination and accordance with the relevant authorities.	Chlorine delivery trucks			√	k.i.v.
	Implement a sturdy steel frame to minimize the potential for chlorine release due to truck rollover				V	k.i.v.
12.34.4	WSD will continue to keep under review the latest development of use of alternative disinfectants in water supply industry to aim at minimising on-site chlorine storage.4	Chlorine delivery Route	WSD		V	k.i.v.

Training should be provided for the use of the GPS fleet management and improved safe driving.	√	k.i.
Ensured that independent checks are performed to ensure proper chlorine drum latching and clamping.	√	F
Chlorine truck drivers or driver attendants should be further trained to check and detect potential chlorine leaks during transport. This should include the timely application of the emergency kit.	√	k.i
Training should be provided to driver and driver attendant for the emergency use of the new 2 × 9L AFFF extinguishers.	√	F
Induction training for new drivers and driver attendant should include familiarisation with the route, familiarisation with chlorine risks, defensive driving, application of emergency kits, use of fire extinguishers and emergency response	√	k.i
Provision of a fire screen between the cab and cargo as well as fire retardant materials for the wheel arches on the chlorine truck should be planned and provided	√	F
To keep under review alternate chlorine receiving dock in Sha Tin/Tai Po area for chlorine delivery to STWTW.	√	k.

Legend

- D Design Phase
- C Construction Phase
- O Operation Phase
- Y Compliance of Mitigation Measures
- N/A Not Applicable in Reporting Period
- k.i.v Keep In View
- F Completed

Appendix V Cumulative Statistics on Exceedances, Complaints, Notifications of Summons and Successful Prosecutions

Project no.: CJO-3113

Statistical Summary of Exceedances (Air Quality)

				Ai	r Quality	,				
Location	A	ction Lev	el		I	imit Leve	el		Total	
AM1		0				0			0	
AM2		0				0			0	
Noise										
Location	A	ction Lev	el		I	imit Levo	el		Total	
NM1		0				0			0	
NM2		0			0				0	
NM3		0		0				0		
				Wa	ter Qualit	y				
Location		Action Level				Limit	Level		Total	
Location	DO	Turbidity	SS	pН	DO	Turbidity	SS	pН	Total	
C1	0	0	0	0	0	0	0	0	0	
C2	0	0	0	0	0	0	0	0	0	
C3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	
M1	0	0	0	0	0	0	0	0	0	
M2	0	0	0	0	0	0	0	0	0	
M3	0	0	0	0	0	0	0	0	0	

Statistical Summary of Environmental Complaints

Reporting	En	Environmental Complaint Statistics									
Period	Frequency	Cumulative	Complaint Nature								
1 Feb - 28 Feb	0	3	Water Quality								

Statistical Summary of Environmental Summons

Reporting	Er	Environmental Summons Statistics							
Period	Frequency	Cumulative	Details						
1 Feb -	0	0	N/A						
28 Feb	ů –	,	1 1/11						

Statistical Summary of Environmental Prosecution

Reporting	Environmental Prosecution Statistics					
Period	Frequency	Cumulative	Details			
1 Feb - 28 Feb	0	0	N/A			

Project no.: CJO-3113

Appendix W

Project no.: CJO-3113

Tentative schedule for environmental monitoring

Impact Monitoring Schedule for STWTW

Impact Monitoring Schedule for STWTW							
Mar-18							
Sun	Mon	Tue	Wed	Thur	Fri	Sat	
				1	2	3	
					Impact		
					P		
					Water Quality monitoring for C1, C2,		
					C3, M1, M2 & M3		
					Air monitoring for AM1 & AM2		
					Noise monitoring for NM1, NM2 &		
					NM3		
		_	_	_	-		
4	5	6	7	8	9	10	
	Impact		Impact		Impact		
	Water Quality monitoring for C1, C2,		Water Quality monitoring for C1, C2,		Water Quality monitoring for C1, C2,		
	C3, M1, M2 & M3		C3, M1, M2 & M3		C3, M1, M2 & M3		
			Air monitoring for AM1 & AM2				
			Noise monitoring for NM1, NM2 &				
			NM3				
11	12	13	14	15	16	17	
	Impact		Impact		Impact		
	impact		pubc		pace		
	Water Quality monitoring for C1, C2,		Water Quality monitoring for C1, C2,		Water Quality monitoring for C1, C2,		
	C3, M1, M2 & M3		C3, M1, M2 & M3		C3, M1, M2 & M3		
	Air monitoring for AM1 & AM2		,		Air monitoring for AM1 & AM2		
	Noise monitoring for NM1, NM2 &				Noise monitoring for NM1, NM2 &		
	NM3				NM3		
	5						
						-	
18	19	20	21	22	23	24	
	Impact		Impact		Impact		
	Water Quality monitoring for C1, C2,		Water Orallity or enthants for Co. Co.		Water Overliber and the death of		
	C3, M1, M2 & M3		Water Quality monitoring for C1, C2,		Water Quality monitoring for C1, C2,		
	C3, IVI1, IVI2 & IVI3		C3, M1, M2 & M3		C3, M1, M2 & M3		
			Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 &				
			Noise monitoring for NM1, NM2 & NM3				
			INIVIS				
25	26	27	28	29	30	31	
	Impact		Impact				
	Water Quality monitoring for C1, C2,		Water Quality monitoring for C1, C2,				
	C3, M1, M2 & M3		C3, M1, M2 & M3				
	Air monitoring for AM1 & AM2		Air monitoring for AM1 & AM2				
	Noise monitoring for NM1, NM2 &		Noise monitoring for NM1, NM2 &				
	NM3		NM3				
		1					

^{*}Remark: No construction works will be performed on public holiday 30/3 and 31/3

Impact Monitoring Schedule for STWTW

Impact Monitoring Schedule for STWTW							
Apr-18							
Sun	Mon		Wed	Thur	Fri	Sat	
1	2	3	4	5	6	7	
		Impact			Impact		
		Water Quality monitoring for C1, C2,			Water Quality monitoring for C1, C2,		
		C3, M1, M2 & M3			C3, M1, M2 & M3		
		Air monitoring for AM1 & AM2					
		Noise monitoring for NM1, NM2 &					
		NM3					
8	9	10	11	12	13	14	
	lucius et		Impact			2-7	
	Impact		impact		Impact		
	Water Quality monitoring for C1, C2,		Water Quality monitoring for C1, C2,		Water Quality monitoring for C1, C2,		
	C3, M1, M2 & M3		C3, M1, M2 & M3		C3, M1, M2 & M3		
	Air monitoring for AM1 & AM2		C3, 1V11, 1V12 & 1V13		Air monitoring for AM1 & AM2		
	Noise monitoring for NM1, NM2 &				Noise monitoring for NM1, NM2 &		
	NM3				NM3		
					INIVIS		
15	16	17	18	19	20	21	
	Impact		Impact		Impact		
	Water Quality monitoring for C1, C2,		Water Quality monitoring for C1, C2, C3, M1, M2 & M3		Water Quality monitoring for C1, C2,		
	C3, M1, M2 & M3				C3, M1, M2 & M3		
			Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 &				
			NM3				
			INIVIS				
22		24		26	27	28	
	Impact		Impact		Impact		
	W				W		
	Water Quality monitoring for C1, C2,		Water Quality monitoring for C1, C2,		Water Quality monitoring for C1, C2,		
	C3, M1, M2 & M3		C3, M1, M2 & M3		C3, M1, M2 & M3		
	Air monitoring for AM1 & AM2				Air monitoring for AM1 & AM2		
	Noise monitoring for NM1, NM2 &				Noise monitoring for NM1, NM2 &		
	NM3				NM3		
29	30						
	Impact						
	Water Quality monitoring for C1, C2,						
	C3, M1, M2 & M3						
		*Pemark: No construction works will be sorte	rmed on public holiday 2/4 and 5/4				
*Remark: No construction works will be performed on public holiday 2/4 and 5/4							

Impact Monitoring Schedule for STWTW

Impact Monitoring Schedule for STWTW							
May-18							
Sun	Mon	Tue	Wed	Thur	Fri	Sat	
			2	3		5	
6	7 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3 9 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	10	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 In Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	12	
	Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3		C2, C3, M1, M2 & M3		Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3		
13	14	15	16	17	18	19	
	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3		Impact Water Quality monitoring for C1,		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3		
20	21	22	23	24	25	26	
	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3		
27	28	29	30	31			
	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3				