

Contractor's General Submission Form (CGS)
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Contract No.	3/WSD/15					
Project Title:	In-situ Reprovision (South Works) – Ad		er Treatment Wo	rks		
CGS No.:	3WSD15/CGS/SEQ/	ALL/JV0336A	Issue:	Α	Date:	10/07/2017
То:	Engineer's Represe	ntative	Your Ref:			
Attention:	Mr. Derek K H Ng					
From:	Ming Hing – Ming H	ing Civil – Vasteam	n Joint Venture			
Title:	EM & A Impact Monitoring Report (June)					
Specification:						
Purpose:	For Information	on 🗌 For Cor	mment 🗌 F	or Appr	oval	For Record
Description of Con	tents:					
We herewith submit	the EM&A Impact Mo	nitoring Report (Jun	e 2017) for your p	erusal a	nd record	I.
Attachment:	✓ Yes	Number of No Copies:	f 5+5 C	D		
Expected reply dat	e: 24 July 2017					
Issued By:	(ET	/LP/lp)	Printed Name		Mr	. Eros To
Designation:	Site	Agent	Date		10	July 2017
Received By:	(Signature &	Received Chop)	Received Date	::		
* Delete if not application	able					
CC. JV Partner Office Master C	- opy -	(w/ encl (w/ encl				



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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. Aletta CHIU)

10 July, 2017

Dear Sir,

In-Situ Reprovisioning of Sha Tin Water Treatment Works – South Works Environmental Permit EP-494/2015 Submission of 16th monthly EM&A Report

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 16th 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

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Your Ref: 60479142/C/fyw1707101

By Hand & By Email

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

Attn: Mr. Aletta CHIU

10 July 2017

Dear Sir,

Contract No.3/WSD/15 In-situ reprovisioning of Sha Tin Water Treatment Works (South Works) Advance Works Submission of 16th Monthly EM&A Report for June 2017

Reference is made to Environmental Team (ET)'s 16th Monthly EM&A Report for June 2017 (Rev. 0) submitted on 8 July 2017.

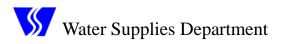
In accordance with the Condition 3.4 of the Environmental Permit (No.EP-494/2015), I verified and confirmed the submission of this Monthly EM&A Monitoring Report as compiled with the requirements as set in the approved Environmental Monitoring and Audit (EM&A) Manual of the EIA Report (Register No.: 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. 16)

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. 16) -

FOR

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

	Name	Signature
Prepared by	Mr. Lok, Kenny, K. M.	A
Checked & Reviewed by	Ir Leung, Jacky, C. H.	
Approved & Certified by	Ir Dr. Lam, Gabriel, C. K. Environmental Team Leader (ETL)	Com
Verified & Confirmed by	Mr. Fung, Y. W. Independent Environmental Checker (IEC)	4

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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 16th monthly Environmental Monitoring and Audit Report for this Contract covering the period from 1 June 2017 to 30 June 2017 (the Reporting Period). As informed by the Contractor, major activities in the reporting period included:
 - Site clearance and site formation works at Logistics Centre area.
 - Construction minipile for Wall D and bored pile at Wall C.
 - Modification of clarifier no.1
 - Construction works for North Works Temporary Power House
 - Reinstatment works between Tin Sum Nullah and box culvert
- 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	13
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 July 2017 will be:
 - Site clearance and site formation works at Logistics Centre area for Wall C.
 - Construction of mini pile for Wall D and bored pile at Wall C.
 - Construction for North Works Temporary Power House
 - Modification of clarifier no.1
 - Modification of valve chamber and construction of flow meter house

Acumen Environmental Engineering & Technologies Company Limited

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A.12 EM&A monitoring for the 16th reporting period has been completed. The 17th monthly EM&A report will cover the period from 1 July 2017 to 31 July 2017.

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1. 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.

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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:

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	К.	
	Deputy Environmental	Ir Leung, Jacky, C. H.	9060 2368
	Team Leader		
	Ecologist	Mr. Liu, Vincent, W. L.	6505 5827

Table 1-1: Key Personnel Contact for Environmental Works

1.3. SCOPE OF REPORT

- 1.3.1 This is the 16th 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 June 2017 to 30 June 2017 (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:
 - Site clearance and site formation works at Logistics Centre area.
 - Construction minipile for Wall D and bored pile at Wall C
 - Modification of clarifier no.1
 - Construction works for North Works Temporary Power House
 - Reinstatment works between Tin Sum Nullah and box culvert
- 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.

Impact Monitoring	Sampling Parameter	Frequency
Air Quality	1-hour TSP	3 times in every 6 days when documented and valid complaint was received
Noise	$L_{eq 30 min}$, $L_{eq 5 min}$, L_{10} and L_{90} as reference.	 1 time per week: ◆ L_{eq 30 min} for normal weekdays from 0700 - 1900;
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

Table 2-1: Summary of Impact Monitoring 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 (\mathfrak{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**.

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)

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

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.

				1-hour TSP	$(\mu g/m^3)$	
Date	Weather	Start	End	1 st	2 nd	3 rd
		Time	Time	Measurement	Measurement	Measurement
5/6/2017	Sunny	10:00	13:00	241	255	218
9/6/2017	Cloudy	10:03	13:03	212	189	207
14/6/2017	Cloudy	14:57	17:57	187	192	222
19/6/2017	Cloudy	10:01	13:01	233	227	215
23/6/2017	Cloudy	10:02	13:02	208	209	198
28/6/2017	Sunny	15:00	18:00	212	222	229
Average				215.3		
Range				187-255		

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

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

		1-hour TSP (μg/m ³)				
Date	Weather	Start Time	End Time	1 st Measurement	2 nd Measurement	3 rd Measurement
5/6/2017	Sunny	14:43	17:43	144	150	133
9/6/2017	Cloudy	15:33	18:33	97	128	121
14/6/2017	Cloudy	10:00	13:00	111	137	135
19/6/2017	Cloudy	14:34	17:34	108	110	121
23/6/2017	Cloudy	14:23	17:23	92	111	133
28/6/2017	Sunny	9:57	12:57	140	135	127
	Average				124.1	
Range				92-150		

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**.

Noise Monitoring Station	Noise Sensitive Receiver (NSR) ID in the approved EIA Report	Identified Noise Monitoring Station	
		The L Louey (South)	
NM1	HK2	(at a platform level of	
	11112	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)	

Table 2-7: Details of Noise Monitoring Stations

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	Pulsar 43 Sound level meter
Acoustic Calibrator	Sound Calibrator Rion NC-74
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.

Date	Weather	Start Time	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}
5/6/2017	Sunny	14:05-14:35	70.6	71.7	72.8	72.9	71.5	73.0	72.2
9/6/2017	Cloudy	09:37-10:07	70.7	71.5	71.3	72.4	71.2	70.7	71.3
14/6/2017	Cloudy	9:59-10:29	68.9	69.5	69.2	69.1	70.6	69.5	69.5
19/6/2017	Cloudy	10:00-10:30	70.6	71.3	69.8	72.3	71.7	72.0	71.4
23/6/2017	Cloudy	14:33-15:03	71.5	72.0	70.4	70.7	71.1	70.0	71.0
28/6/2017	Sunny	10:12-10:42	68.8	69.7	70.1	71.3	72.0	71.0	70.6
Limit Level	Limit Level >75dB(A)					•	•	Average Range	71.1 69.5-72.2

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

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

Date	Weather	Start Time	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}
5/6/2017	Sunny	14:57-15:27	60.7	61.0	61.1	60.5	61.2	60.2	60.8
9/6/2017	Cloudy	10:46-11:16	60.3	61.2	60.0	60.4	59.7	59.8	60.3
14/6/2017	Cloudy	11:00-11:30	59.1	58.1	59.7	58.5	60.4	60.7	59.5
19/6/2017	Cloudy	10:49-11:19	61.1	61.0	62.7	61.3	60.5	61.1	61.3
23/6/2017	Cloudy	15:08-15:38	59.7	59.5	59.8	58.5	60.0	60.3	59.7
28/6/2017	Sunny	10:55-11:25	59.7	59.5	61.1	59.7	61.3	60.5	60.4
Limit Level >75dB(A)					•		•	Average	60.4
Limit Level	>/5 ub (Ај						Range	59.5-61.3

Date	Weather	Start Time	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}
5/6/2017	Sunny	15:45-16:15	53.9	52.8	52.5	53.3	54.7	54.0	53.6
9/6/2017	Cloudy	11:36-12:06	55.7	55.4	53.2	54.6	55.0	54.2	54.8
14/6/2017	Cloudy	11:43-12:13	54.5	54.7	55.1	55.4	54.9	54.7	54.9
19/6/2017	Cloudy	11:49-12:19	52.7	53.4	53.0	54.1	53.9	55.0	53.8
23/6/2017	Cloudy	16:35-17:05	54.2	53.9	54.2	53.9	52.5	53.1	53.7
28/6/2017	Sunny	11:37-12:37	52.6	54.1	54.9	53.4	54.9	55.3	54.3
7040(4)	Limit Level							Average	54.2
	70dB(A) during normal teaching periods and 65 dB(A) during examination periods							Range	53.6-54.9

Table 2-11: Summary	of Noise	Monitoring	Results – NM3
ruolo 2 11. Summury	01 1 10150	monitoring	itebuite itilis

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**.

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

Table 2-12: Details of Water Quality Monitoring Station

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:

Water quality						
YSI Model ProDSS Multi-parameter 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.					
Laboratory Analysis						
Suspended Solids	HOKLAS-accredited laboratory (Acumen Laboratory and Testing Limited)					

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

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 thirteen (13) 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.

Dissolved Oxygen – Mid Depth (mg/L)	C1	C2	C3	M1	M2	M3
Average	8.13	8.75	N/A	9.09	9.14	9.27
Min.	7.82	8.29	N/A	8.95	8.95	9.19
Max.	8.64	9.12	N/A	9.20	9.33	9.34
Turbidity – Mid Depth (NTU)	C1	C2	C3	M1	M2	M3
Average	3.03	2.38	N/A	3.38	6.40	0.69
Min.	1.60	0.80	N/A	1.70	2.90	0.40
Max.	3.70	3.00	N/A	4.20	9.30	0.90
Suspended Solid – Mid depth (mg/L)	C1	C2	C3	M1	M2	M3
Average	3.81	3.95	N/A	3.05	11.42	<1
Min.	3.60	3.70	N/A	2.90	10.30	<1
Max.	3.90	4.10	N/A	3.20	13.00	<1
pH value (unit)	C1	C2	C3	M1	M2	M3
Average	7.65	8.52	N/A	7.84	9.05	8.11
Min.	7.33	8.26	N/A	7.61	8.59	7.67
Max.	7.88	8.70	N/A	8.10	9.51	8.52

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 A bi-weekly monitoring scheduled on 5 and 22 June 2017 during the Reporting Period. Detailed monitoring report (No. 33 and No. 34) are shown in **Appendix S**.
- 2.5.4 Ailanthus (Ailanthus fordii) and Incense Tree (Aquilaria sinensis) was transplanted to new location within STWTW. The condition of TA572 was observed in fair condition while TA326 and TA327 were in very poor and poor condition respectively. No new leave was observed generated during this growing season and tree bark was seen peel off from tree trunk at TA326. Water sprouts and Flowering were observed on TA327. Contractor was advised to apply the growing hormone again helping TA326 and TA327 to regenerate their roots. 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

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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 were 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) was observed dead during inspection on 20 August 2016 and the survival rate was 96%.
- 2.5.6 In order to compensate for the lost of transplanted Hong Kong Eagle's Claw, 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. 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, TA326 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).



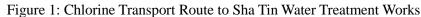
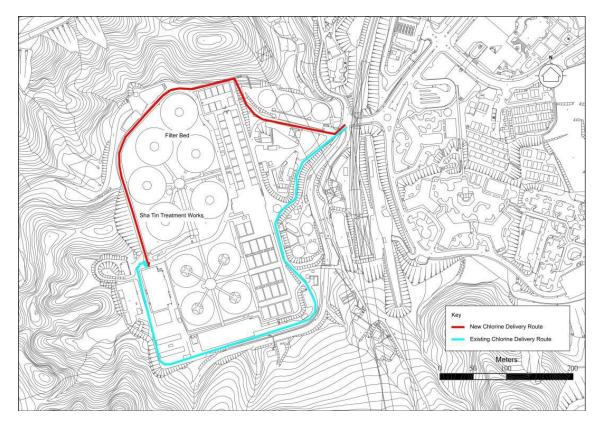


	Table 2-15: Chlorine Truck Transport Route						
Destination		Route					
20000000							
From	SSK	Sham Shui Kok Dock > Cheung Tung Road > Sunny Bay Road > N Lantau Highway					
Dock	to	> Lantau Link > NW Tsing Yi Interchange > Tsing Yi North Costal road > Tsing					
Sha	Tin	Tsuen Road > Tsuen Wan Road > 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 6, 15, 16, 22 & 30 June 2017.
- 2.8.2 One joint site inspection with IEC also undertaken on 16 June 2017. Minor deficiencies were observed during weekly site inspection or joint site inspection. Key observations during the site inspections are summarized in Table 2-16.

Date	Environmental Observations	Follow-up Status
6 June 2017	No environmental issue was observed during the site	N/A
0 June 2017	inspection	
15 June 2017	No environmental issue was observed during the site	N/A
15 Julie 2017	inspection	
	Observation(s) and Recommendation(s)	
	Chemical containers were observed without drip tray at bar	All chemical
	bending yard next to welfare facility. The Contractor was	containers were
	advised to provide secondary containment to chemical	provided with
	containers.	secondary
16 June 2017		containment.
10 June 2017		
	The Contractor was reminded to cover stockpiles of fill	Stockpiles of fill
	material with impervious sheeting at wall D.	material was covered
		with impervious
		sheeting at wall D.
	Transplanted tree (TA326) seemed to be in poor condition.	Contractor would
		undertake inspection
22 June 2017		more frequently to
		monitor tree
		condition.
30 June 2017	No environmental issue was observed during the site	N/A
50 June 2017	inspection	

Table 2-16: Site Observations

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:

License / Permit	License / Permit No.	Date of Issue	Date of Expiry	License / Permit Holder	Remark	
Environmental Permit	EP- 494/2015	28/1/2015	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	1/4/2016	31/3/2021	MMVJV		
License (Wall C)	-2016					
Waste Water Discharge	WT0024211	10/6/2016	30/6/2021	MMVJV		
License (Wall D)	-2016					
Construction Noise Permit	GW-RN0906-16	6/12/2016	7/6/2017	MMVJV		
	GW-RN0027-17	13/01/2017	12/7/2017	MMVJV		

Table 2-17: Summary of Environmental License and Permit

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**.

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.
	- Good site practices to limit noise emissions at the sources;

 Table 2-18: Environmental Mitigation Measures

Noise	-	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.
	-	Drainage systems were regularly and adequately maintained;
Water	-	Effluent discharged from the construction site should comply with

Open stockpiles of construction materials on sites should be covered.

standards stipulated in the TM-DSS;

The site was generally kept tidy and clean.

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General

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

Complaint Received via Project	Complaint Received via 1823 or								
Hotline	from other government								
	departments								
MMVJV notify ER, ET and IEC	ER notify MMVJV, ET and IEC								
Register of the complaint. MMVJV	V and ET to conduct investigation of								
complaint and report to ER an	nd IEC the investigation results								
If complaint is considered not	If complaint is found valid								
valid									
ET or ER to reply the complainant	MMVJV to implement necessary								
if necessary	improvement measures in								
	consultation with the IEC, ET and								
	ER. ET to check and inspect if the								
	situation is improved. ER to								
	conduct further inspection as								
	necessary.								
	ER to report the follow up actions								
	done to WSD and reply to								
	complainant is necessary.								
	If the complaint is referred by the								
	EPD, the Contractor to prepare								
	interim report on the status of the								
	complaint investigation and								
	follow-up action								
ER prepare complaint rep	ort for submission to WSD								
	ase in monthly EM&A report								

- 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 July 2017 to September 2017 will be:
 - Site clearance and site formation works at Logistics Centre area for Wall C.
 - Construction of mini pile for Wall D and bored pile at Wall C.
 - Construction for North Works Temporary Power House
 - Modification of clarifier no.1
 - Modification of valve chamber and construction of flow meter house

3.2. KEY ISSUES FOR COMING MONTH

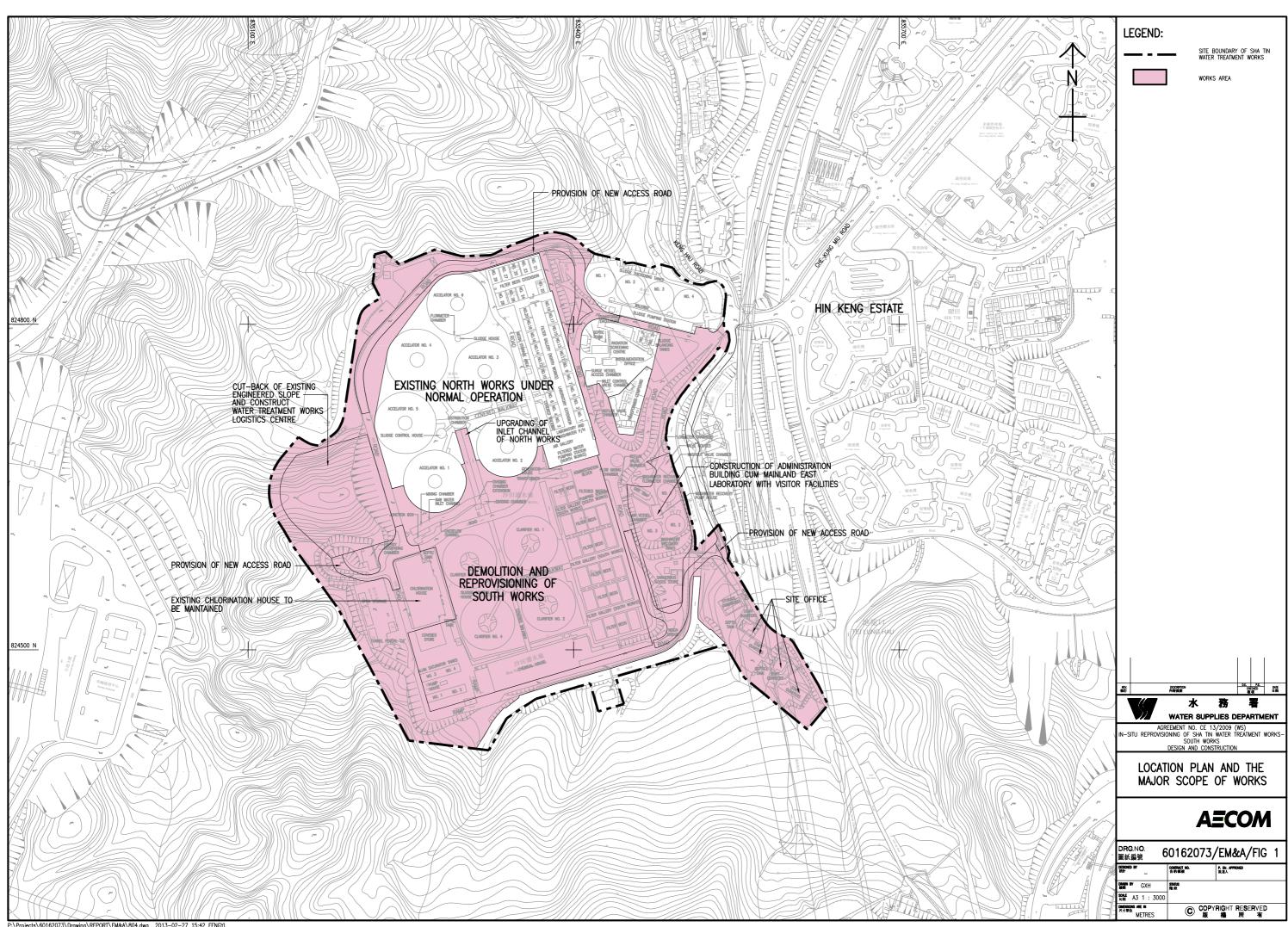
- 3.2.1 Potential environmental impacts arising from the above upcoming construction activities in June 2017 are mainly associated with dust, noise, water quality issues and waste management issues.
- 3.2.2 Particular issues to be considered in the coming month include:
 - Implementation of dust suppression 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 July 2017 to September 2017 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 Four (4 nos.) environmental site inspection were conducted during the reporting period. Joint site inspection with IEC were carried out on 16 June 2017. 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.

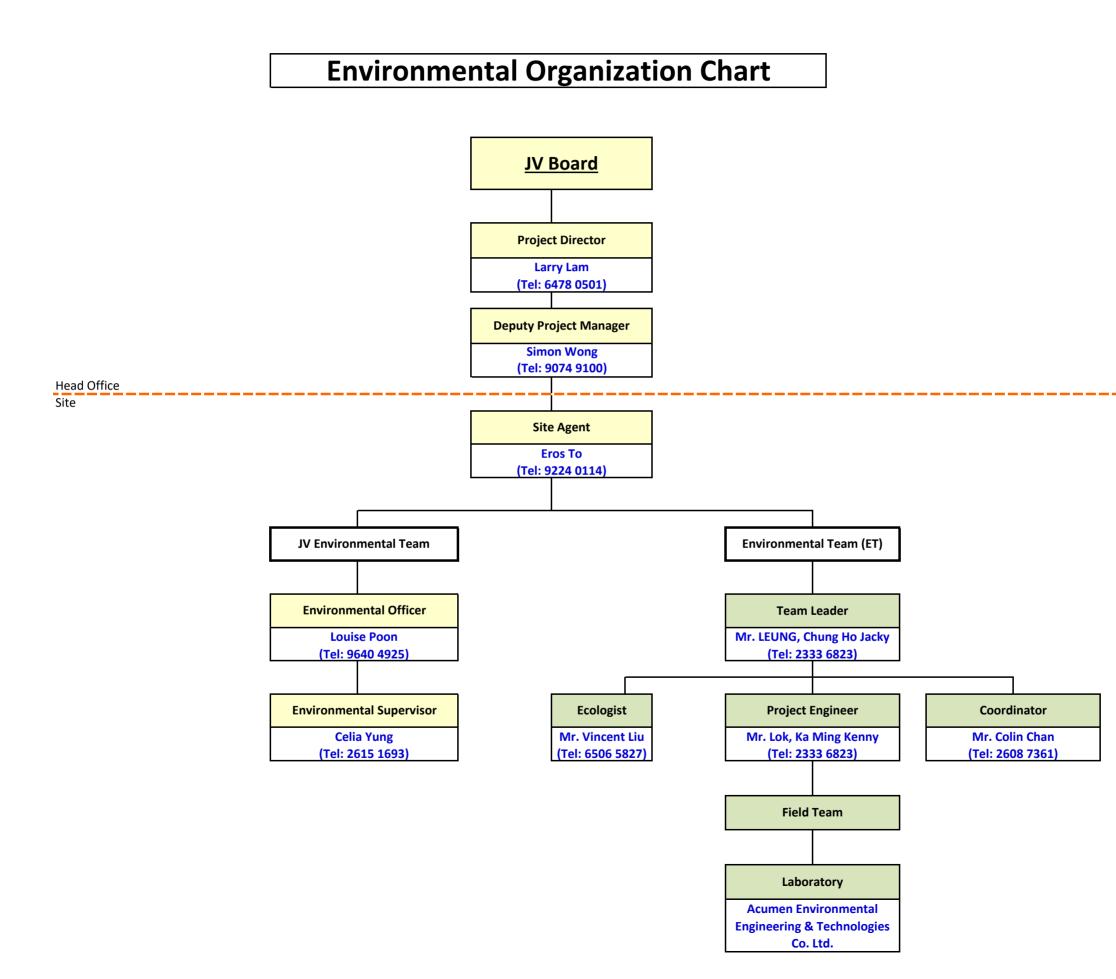
Appendix A General Layout Plan



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Appendix B Project Organization

Contract No. 3/WSD/15 In-Situ Reprovisioning of Sha Tin Water Treatment Works (South Works) - Advance Works Ming Hing - Ming Hing Civil - Vasteam Joint Venture



Update Date: 1/2/2017

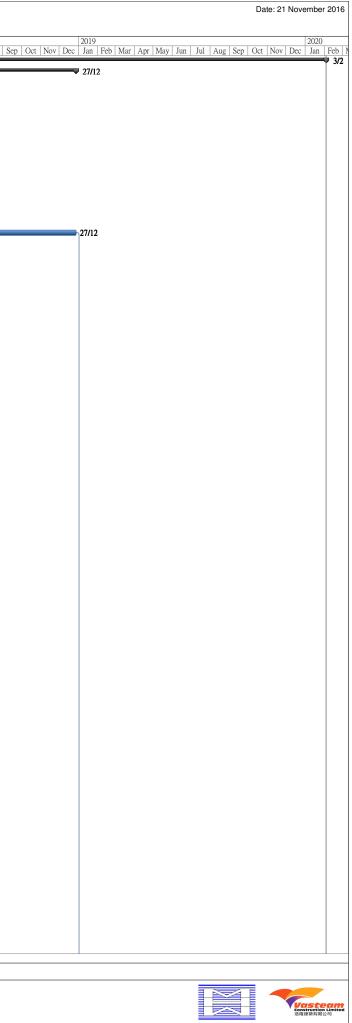
Appendix C Latest Construction Programme

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

Master Programme (Ver.03)

ID	Task Name	Duration	Start	Finish	2016 2017 2018 Oct Nov Dec Jan Feb Mar Apr May Jun Jun
P000	3/WSD/15 Master Programme Preliminaries Works		Fri 30/10/15	Mon 3/2/20 Thu 27/12/18	
P000 P001		30 days	Fri 30/10/15 Fri 30/10/15	Sat 28/11/15	0/10
P002	Renovation of RE office	150 days	Fri 30/10/15	Sun 27/3/16	0/10/
P003	Erection of site office	150 days	Fri 30/10/15	Sun 27/3/16	0/10
P004	Wheels wash facilities	120 days	Fri 30/10/15	Fri 26/2/16	0/10)26/2
P005 P006	Initial survey	100 days	Fri 30/10/15	Sat 6/2/16	0/10) 0/10) 0/10)
P006 P007	UU detection Tree and vegetation survey	100 days 78 days	Fri 30/10/15 Fri 30/10/15	Sat 6/2/16 Fri 15/1/16	0/10/ 0/10
P008		0 days	Fri 15/1/16	Fri 15/1/16	\bullet 15/1
P009	· ·	21 days	Sat 16/1/16	Fri 5/2/16	16/1 == 5/2
P010	Environmental Impact baseline monitoring	100 days	Fri 30/10/15	Sat 6/2/16	0/10 6/2
P011		0 days	Fri 15/1/16	Fri 15/1/16	
P012		0 days	Sat 6/2/16	Sat 6/2/16	6/2
P013	Pre-condition survey	100 days	Fri 30/10/15	Sat 6/2/16	0/10) 6/2
P014 P015	Tree transplanting works Tree Protection	90 days	Sun 7/2/16 Fri 30/10/15	Fri 6/5/16 Thu 27/12/18	9/10 0/10 0/10 0/10 0/10 0/10 0/10 0/10
D000	Contractor's Design Submission	680 days	Fri 30/10/15	Fri 8/9/17	
D100	General	680 days	Fri 30/10/15	Fri 8/9/17	V10 P
D101	Project Design Plan	680 days	Fri 30/10/15	Fri 8/9/17	8/10 × 8/9
D102	AIP-01 - Addition GI Plan	147 days	Fri 6/11/15	Thu 31/3/16	6/1
D103	DDA-01 - Geotechnical Assessment if necessary	125 days	Fri 1/4/16	Wed 3/8/16	1/4 -3/8
D104		88 days	Fri 6/11/15	Mon 1/2/16	
D105	DDA-02 - Basis of Design if necessary	184 days	Tue 2/2/16	Wed 3/8/16	2/2 3/8
D106 D107	AIP-04 - P&ID DDA-04-1 - P&ID	152 days 237 days	Thu 7/1/16 Wed 6/7/16	Mon 6/6/16 Mon 27/2/17	
D107 D108	DDA-04-1 - P&D DDA-04-2 - Pumping System & Pipework Design	151 days	Mon 15/8/16	Thu 12/1/17	
D108	DDA-04-2 - Pipe Support Design	151 days	Mon 13/6/16	Wed 9/11/16	
D110	DDA-04-4 - Testing & Commissioning	150 days 152 days	Thu 21/7/16	Mon 19/12/16	21/7
D111	AIP-05 - Intrumentation, Control and Automation (DCS / Control Philosophy)	176 days	Mon 1/2/16	Mon 25/7/16	
D112	DDA-05-1 - DCS (General)	143 days	Mon 25/4/16	Wed 14/9/16	
D113	DDA-05-2 - DCS (Functional Design Specification)	150 days	Mon 25/4/16	Wed 21/9/16	
D114 D115	DDA-05-3 - DCS (Control Loop Diagrams) AIP-06 - Communication Network	150 days 151 days	Mon 25/4/16 Mon 22/2/16	Wed 21/9/16 Thu 21/7/16	25/4>21/9
D115 D116	DDA-06 - Communication Network	181 days	Thu 7/7/16	Tue 3/1/17	
D110 D117	AIP-07 - Automatic Irrigation System	161 days	Thu 26/5/16	Fri 4/11/16	
D118	DDA-07 - Automatic Irrigation System	181 days	Fri 21/10/16	Wed 19/4/17	21/10
D119	AIP-08 - Electrical Power Supply System	166 days	Thu 7/1/16	Mon 20/6/16	
D120	DDA-08-1 - Electrical Power Supply System	151 days	Mon 25/7/16	Thu 22/12/16	25/722/12
D121	DDA-08-2 - Earthing Design	153 days	Tue 21/6/16	Sun 20/11/16	21/6
D122	DDA-08-3 - Fault Calculation & Protection Setting for Electrical System	151 days	Mon 25/7/16	Thu 22/12/16	25/7 22/12
D123	DDA-08-4 - Harmonic Analysis	151 days	Mon 25/7/16	Thu 22/12/16	25/7 22/12
D123	DDA-08-4 - Hamonic Analysis DDA-08-5 - Electrical Typical Design	151 days 153 days	Wed 22/6/16	Mon 21/11/16	
D125	DDA-08-6 - Modification of Existing Administration	153 days	Wed 21/9/16	Mon 20/2/17	21/2 21/2 20/2
	Building				
D126	AIP-10A - Process Piping - Civil	82 days	Thu 10/12/15	Mon 29/2/16	10/12
D127	DDA-10A - Process Piping - Civil	135 days	Wed 18/5/16	Thu 29/9/16	18/5 29/9
D128	AIP-10B - Process Piping - E&M (Pipe Trench E&M Design)	106 days	Thu 11/2/16	Thu 26/5/16	11/2
D129		91 days	Tue 22/3/16	Mon 20/6/16	22/3
012)	Design)	JI duys	100 22/3/10	101011 20/0/10	
D130	AIP-19 - Sitewide E&M Design	152 days	Thu 10/3/16	Mon 8/8/16	8/8
D131	DDA-19-1 - Sitewide E&M Design (General) (including	150 days	Tue 9/8/16	Thu 5/1/17	9/8
	Cable Duct Routes / Cable Routes)				
D132	DDA-19-2 - Modification of North Works Air Gallery	199 days	Mon 13/6/16	Wed 28/12/16	
D133		150 days	Mon 13/6/16	Wed 9/11/16	9/11
D200	Filter and Sludge Handling WTW Logistics Centre, Alum Saturation Tank, and Hydro	222 dove	Tue 1/12/15	Mon 17/10/16	1/12
D200	Turbine House	322 uays	Tue 1/12/15	WIOII 17/10/10	
D201	AIP-11A - Design Concept	106 days	Tue 1/12/15	Tue 15/3/16	1/12) 29/2) 17/10
D202	DDA-11A - Architectural Design Development (DAP stage 2		Mon 29/2/16	Mon 17/10/16	23/22
	submission to ASD)				
D300	WTW Logistics Centre	544 days	Thu 17/12/15	Mon 12/6/17	17/12 12/6
D301	AIP-12A - Architectural Design including GA, Interior	145 days	Thu 17/12/15	Mon 9/5/16	17/12
D302	Design and Non-Structural Element DDA-12A - Architectural Design including GA, Interior	205 dor-	Thu 21/4/16	Eri 11/11/16	
1502	DDA-12A - Architectural Design including GA, Interior Design and Non-Structural Element	205 days	111u 21/4/10	Fri 11/11/16	
D303		90 days	Thu 17/12/15	Tue 15/3/16	17/12
D304	DDA-12B - Foundation & Structural Design	159 days	Mon 29/2/16	Fri 5/8/16	29/2
D305	AIP-12C - Building Services Design	143 days	Mon 22/2/16	Wed 13/7/16	
D306	DDA-12C - Building Services Design	197 days	Mon 26/9/16	Mon 10/4/17	26/9 10/4
D307	AIP-12D - Electrical & Mechanical Design	344 days	Thu 17/12/15	Thu 24/11/16	24/11
D308	DDA-12D - Electrical & Mechanical Design	200 days	Fri 25/11/16	Mon 12/6/17	
D400 D401	Alum Saturation Tanks AIP-13A - Architectural Design including GA, Interior	544 days 145 days	Thu 17/12/15 Thu 17/12/15	Mon 12/6/17 Mon 9/5/16	17/12 12/6
10401	Design and Non-Structural Element	145 uays	111u 1//12/13	101 9/3/10	
D402	•	267 days	Thu 21/4/16	Thu 12/1/17	
	Design and Non-Structural Element		21, 1,10		
D403	AIP-13B - Foundation & Structural Design	90 days	Thu 17/12/15	Tue 15/3/16	17/12
D404	DDA-13B - Foundation & Structural Design	159 days	Mon 29/2/16	Fri 5/8/16	29/2
D405		145 days	Thu 17/12/15	Mon 9/5/16	17/12
D406	DDA-13C - Building Services Design	197 days	Mon 26/9/16	Mon 10/4/17	26/9
			3.00	•	
	Critical Split Task		Milestone	•	Summary Manual Summary Critical

(EOT for Claim no. 009)



Ta	ask Name	Duration	Start	Finish	Oct Nov	Dec Jan	Feb Mar Apr May Jun J	ul Aug Sen	Oct Nov De	2017 ec Jan Feb Mar	Apr Ma	y Jun Jul Ang Ser	Oct Nov Dec	2018 Jan Feb Mar	Apr Mav	Jun Jul Aug Sen Oct Nov	2019 Dec Jan Feb M	Mar Apr May Jun Jul Aug Sep Oct Nov I
	AIP-13D - Electrical & Mechanical Design	260 days	Thu 17/12/15	Thu 1/9/16		/12	100 Mai Api May Juli J	1/9						Juli 100 Mu	npr Muy			nu ripi wuy sur sur rug bep oet rov r
	DDA-13D - Electrical & Mechanical Design	200 days	Fri 25/11/16	Mon 12/6/17					25/11			12/6						
	Hydro Turbine House		Mon 16/11/15		16/11 🛡					■ 31/1								
	AIP-14A - Architectural Design including GA, Interior Design and Non-Structural Element (incl. MEICA and BS	108 days	Mon 16/11/15	Wed 2/3/16	16 /11)		2/3											
	design)																	
2		142 days	Thu 3/3/16	Fri 22/7/16			3/3 🎽	₽ -22 <mark>/</mark> 7										
	Design and Non-Structural Element (incl. MEICA and BS																	
,	design)	120.1	M. 16/11/15	TL 04/0/16	1.0.1		04/2											
3	AIP-14B - Foundation & Structural Design DDA-14B - Foundation & Structural Design	130 days 123 days	Mon 16/11/15 Fri 22/1/16	Mon 23/5/16	16/11	22/1	24/3											
5	AIP-14C - Building Services Design	81 days	Mon 22/2/16	Thu 12/5/16			2/2											
6	DDA-14C - Building Services Design	74 days	Tue 17/5/16	Fri 29/7/16			17/5	29/7										
7	AIP-14D - Electrical & Mechanical Design (incl. Hydraulic		Tue 1/12/15	Fri 29/7/16	1/12			29/7										
	study)																	
8	DDA-14D - Electrical & Mechanical Design (incl. Hydrauli	c 186 days	Sat 30/7/16	Tue 31/1/17			30/	7		31/1								
0	study) North Works Temporary Power House	409 days	Mon 16/11/15	Wed 28/12/16	16/11 🖛					28/12								
1	AIP-15A - Architectural Design including GA, Interior	93 days	Thu 17/12/15	Fri 18/3/16	10 11 17	/12	18/3			¥ 20/12								
	Design and Non-Structural Element	55 days	1110 1 112, 10	111 10/0/10			10/3											
)2	DDA-15A - Architectural Design including GA, Interior	141 days	Fri 22/1/16	Fri 10/6/16		22/	10/6		ı									
	Design and Non-Structural Element																	
)3)4	AIP-15B - Foundation & Structural Design	130 days	Mon 16/11/15	Thu 24/3/16	16/11>	22/1	24/3											
)4)5	DDA-15B - Foundation & Structural Design AIP-15C - Building Services Design	109 days 74 days	Fri 22/1/16 Mon 22/2/16	Mon 9/5/16 Thu 5/5/16			2/2]									
6	DDA-15C - Building Services Design	74 days 88 days	Fri 6/5/16	Mon 1/8/16			6/5		L									
7	AIP-15D - Electrical & Mechanical Design	221 days	Tue 1/12/15	Fri 8/7/16	1/12			8/7										
8	DDA-15D - Electrical & Mechanical Design	153 days	Fri 29/7/16	Wed 28/12/16				n e		28/12								
)0	Temporary Washwater Recovery Tank	190 days	Thu 11/2/16	Thu 18/8/16		11/		18/8										
01	AIP-16A - Galvanized Steel Platforms, Walkways and	106 days	Thu 11/2/16	Thu 26/5/16		11	2) 26/5											
02	Footing Design DDA-16A - Galvanized Steel Platforms, Walkways and	102 days	Mon 9/5/16	Thu 18/8/16			0/6	18/8	Ц									
2	DDA-16A - Galvanized Steel Platforms, Walkways and Footing Design	102 days	101011 9/3/10	1110 10/0/10			76/6	16/8										
)3	AIP-16B - Lighting Design	74 days	Mon 22/2/16	Thu 5/5/16			2/2											
04	DDA-16B - Lighting Design	105 days	Wed 16/3/16	Tue 28/6/16			16/3	\$/6										
)5	AIP-16C - Electrical & Mechanical Design	106 days	Thu 11/2/16	Thu 26/5/16		11	2)26/5											
)6	DDA-16C - Electrical & Mechanical Design	140 days	Thu 31/3/16	Wed 17/8/16			31/3	17/8										
)0)1	Flowmeter House		Tue 1/12/15	Mon 4/9/17	1/12							4	/9					
)1	AIP-17A - Architectural Design including GA, Interior Design and Non-Structural Element	91 days	Tue 1/12/15	Mon 29/2/16	1/12		29/2											
02	DDA-17A - Architectural Design including GA, Interior	138 days	Thu 11/2/16	Mon 27/6/16		11	2) 27	7/6										
	Design and Non-Structural Element																	
03	AIP-17B - Foundation & Structural Design	91 days	Tue 1/12/15	Mon 29/2/16	1/12		29/2 2)26/5											
04	DDA-17B - Foundation & Structural Design	106 days	Thu 11/2/16	Thu 26/5/16		11	2) 26/5											
05	AIP-17C - Electrical & Mechanical Design	259 days	Tue 1/12/15	Mon 15/8/16	1/12			15/8										
806 807	DDA-17C - Electrical & Mechanical Design	235 days 75 days	Fri 13/1/17 Thu 31/3/16	Mon 4/9/17 Mon 13/6/16			31/3		1	13/1		4/	,					
308	AIP-17D - Building Services Design DDA-17D - Building Services Designn	135 days	Fri 13/5/16	Sat 24/9/16			12/6		94/9									
00	Valve Chamber	627 days	Fri 18/12/15	Mon 4/9/17	18	12						4	/9					
01	AIP-18A - Foundation, Civil & Structural Design	89 days	Fri 18/12/15	Tue 15/3/16	1	/12	15/3											
02	DDA-18A - Foundation, Civil & Structural Design	123 days	Mon 29/2/16	Thu 30/6/16			29/2	0/6										
03 04	AIP-18B - Electrical & Mechanical Design	151 days	Mon 15/8/16	Thu 12/1/17				15/8		12/1			`					
04	DDA-18B - Electrical & Mechanical Design AIP-18C - Building Services Design	235 days 75 days	Fri 13/1/17 Thu 31/3/16	Mon 4/9/17 Mon 13/6/16			31/3			13/1		4/	,					
06	DDA-18C - Building Services Design	135 days	Fri 13/5/16	Sat 24/9/16			13/5		24/9									
00	Section Programme		Fri 30/10/15	Mon 3/2/20	/10 🕶													
00	Section 1		Fri 30/10/15	Wed 31/1/18	v10									31/1				
01	Section 1 Commencement	1 day	Fri 30/10/15	Fri 30/10/15	G 40 30	10												
00 01	North Works Temporary Power House Excavation of trial pit for earthing test	793 days 25 days	Tue 1/12/15 Wed 17/2/16	Wed 31/1/18 Sat 12/3/16	1/12		12/3							31/1				
01	Ground Investigation Wroks	25 days 10 days	Sun 13/3/16	Tue 22/3/16		$ ^{-\top}$	13/3 22/3											
02	Additational drilling for in planting earthing log	30 days	Wed 23/3/16	Thu 21/4/16			23/3 21/4		11									
04	Excavation and installation of ELS	50 days	Mon 3/10/16	Mon 21/11/16				3/10-	21/1	փ								
05	Installation of earth mat	20 days	Tue 22/11/16	Sun 11/12/16					22/11 📥									
06	Foundation	35 days	Mon 12/12/16	Sun 15/1/17					12/12 🖷	15/1								
07 08	Structural for North Works Tempoary Power House	76 days	Mon 16/1/17	Sat 1/4/17							1/4							
00	Laying of cable ducts, construction of draw pits and installation of cable trays	76 days	Mon 16/1/17	Sat 1/4/17						10/1	1/4							
09	Confirmation of cable routing with CLP and WSD	0 days	Mon 3/10/16	Mon 3/10/16					♣ 3/10									
10	Design 6.6kv / 11kv working platform	120 days	Mon 3/10/16	Mon 30/1/17				3/10		30/1								
11	Construction of 6.6kv / 11kv working platform	60 days	Tue 31/1/17	Fri 31/3/17						31/1	.31/3							
12	Cable tray construction	30 days	Sat 1/4/17	Sun 30/4/17						1/4	30							
13	Laying 6.6kv / 11 kv cable by CLP	30 days	Mon 1/5/17	Tue 30/5/17								30/5						
14	Completion of concrete structure of North Works Temporary Power House	1 day	Sun 2/4/17	Sun 2/4/17														
15	Plumbing and Drainage installation	100 days	Mon 3/4/17	Tue 11/7/17						3/4		11/7						
16	MVAC installation	100 days	Mon 3/4/17	Tue 11/7/17						214		11/7						
17	Fire Services installation	100 days	Mon 3/4/17	Tue 11/7/17						3//		11/7						
18	Electrical installation	100 days	Mon 3/4/17	Tue 11/7/17						3/4		11/7						
119	Section 1 Site Works For E & M Works		Tue 1/12/15	Wed 31/1/18	1/12									31/1				
120	North Works Temporary Power House_NWTPH	463 days	Tue 1/12/15	Tue 7/3/17	1/12						1							
21	NWTPH- Electrical Equipment Procurement	21 days	Tue 1/12/15	Mon 21/12/15	1/12	21/12												
	Critical Split Task		Milestone	♦	Summ	ary	Manual Summ	nary 🛡	Criti	cal								
nent Date:	30 Oct 2015								Page 2									
									1 450 -									
Date: 3 Fe	20/20/20/20/20/20/20/20/20/20/20/20/20/2																	

Contract No : 3/WSD/15

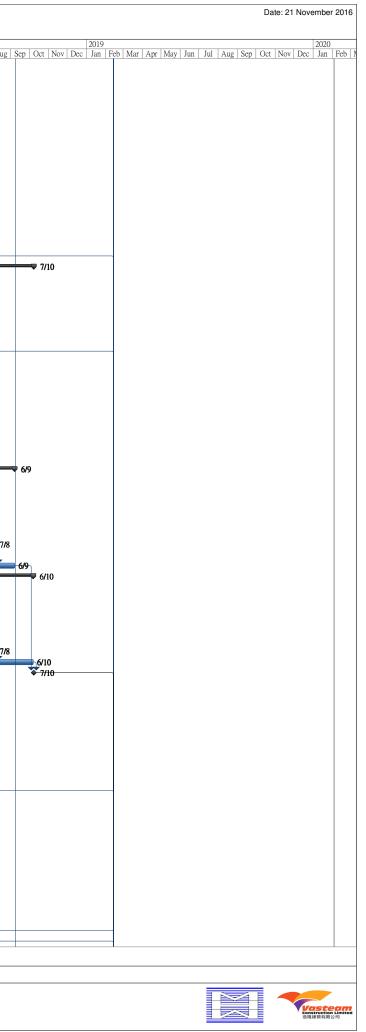
Master Programme (Ver 03)

		Task Name	Duration	Start	Finish	2016 2017 2018 2019	Jun Jul Aug Cor Oct M
	22		230 days	Tue 1/12/15			Jun Jui Aug Sep Oct Nov
	23		139 days	Thu 20/10/16	Tue 7/3/17		
	124					2/4	
3 3 <td>125</td> <td></td> <td>0 days</td> <td>Sun 2/4/17</td> <td></td> <td></td> <td></td>	125		0 days	Sun 2/4/17			
	1106		0.1	0 0///17	0.04417		
	1126	NWTPH-LV Supply Installation Commence at G/F	0 days	Sun 2/4/17	Sun 2/4/17		
	\$1127	NWTPH- 6.6KV/11kv Switchboard Installation at	28 days	Mon 3/4/17	Sun 30/4/17	3/4 🗯 30/4	
30 OPERATE Activity Suppression, Note on the Sole in LUSCI in LUS	S1128		· 14 days	Mon 1/5/17	Sun 14/5/17		
	G 4 4 6 G		0.1		0		
	S1129		0 days	Sun 14/5/17	Sun 14/5/17		
11 met of there yes in the second of the							
	S1130		14 days	Mon 15/5/17	Sun 28/5/17		
				24 20/5/18	0.000		
S 1 https://www.scoredit interfactory	S1131		7 days	Mon 29/5/17	Sun 4/6/17	29/5 🕊 4/6	
	S1132		7 days	Mon 5/6/17	Sun 11/6/17	56 = 146	
	01102		, aujo	11011 0707 17	5 uli 11, 6, 17		
	S1133		0 days	Sun 11/6/17	Sun 11/6/17	₩ ¹ ±1/6	
		rectification to CLP - H/O by Civil Contractor					
	S1134	NWTPH- CLP Mobilization for Supply 2 diversion	14 dave	Mon 12/6/17	Sun 25/6/17		
9 VPTTPL Lube v: 10 kp > 40 kp >			1 . augo		201011		
	S1135						
2 SVTPS Guardian Gar opera unplue Name No. 20017 No.20017 No.20017 </td <td>S1136</td> <td></td> <td>53 days</td> <td>Mon 3/7/17</td> <td>Thu 24/8/17</td> <td></td> <td></td>	S1136		53 days	Mon 3/7/17	Thu 24/8/17		
N-0.2 N-0.2 <td< td=""><td>S1137</td><td></td><td>36 dave</td><td>Fri 25/8/17</td><td>Fri 29/9/17</td><td></td><td></td></td<>	S1137		36 dave	Fri 25/8/17	Fri 29/9/17		
20 NUTHE LAW, Subjective Law	51157		Jouays	111 23/0/17	111 471 71 1 1		
63 SWTH: No-since Deep in A Space Construction No. 107 74 SWTH: Second and the deep in the Ward of the State Deep in the Ward of the Ward of the State Deep in the Ward of the State Deep in the Ward of the War	S1138	NWTPH- 6.6KV Switchboard T&C incl. CLP	7 days				
Rume_outle_family Ru	S1139	•					
- W Coll Constant - W Coll Constant - W Coll Constant - W Coll Constant - W Coll Constant - W Coll Constant - W Coll Constant <	S1140			Mon 1/5/17	Mon 1/5/17		
1 0.5 NPTH 10 NP reduce the direct in the Proceed in the maximum							
File. A Subjectionate data State (State (S1141		0 days	Sun 5/11/17	Sun 5/11/17	5/11	
2 SWTPR Documentation for Privacy 11 with 12 min of Vision 12		Filters & Sludge treatment plant - H/O by Civil					
 	01140		60.1		TI 4/1/10		
44 NVPTH: 1. Altroactic WTM angles TF 4. Will you	S1142		60 days	Mon 6/11/1/	1 hu 4/1/18	0/11 - 4/1	
4 NVTPL NVT	S1143		30 days	Tue 19/12/17	Wed 17/1/18		
46 NVTTPI Free-1-EAN Works 216 day Wai 10/07 70 NVTTPI CDP 41, and 100 mm monosity 3 devices 100 mm m	S1144	NWTPH- Reroute Tx cable from 6.6 KVSB 3 to 6.6					
4 NVTP14-02 Maintaine for single 7 and 10 more marks 15 more mark	G 4 4 4 5						
21 NYTTH: Car Data of decouptions if Y regions 2 day 2 day<	S1145 S1146						
46 NVTPH-64X V Sockbord Total 2017 Total 2017 90 NVTPH-64X V Sockbord Sockay Total 2017 Vol 2017 90 NVTPH-64X V Sockbord Sockay Total 2017 Vol 2017 90 NVTPH-64X V Sockbord Sockay Total 2017 Vol 2017 91 NVTPH-64X V Sockbord Sockay Total 2017 No 2017 92 NVTPH-64X V Sockbord Sockay Total 2017 Total 2017 93 NVTPH-64X V Sockbord Sockay Total 2017 Total 2017 93 NVTPH-64X V Sockbord Sockay Total 2017 Total 2017 93 NVTPH-64X V Sockbord Sockay Total 2017 Total 2017 94 NVTPH-64X V Sockbord Sockay Total 2017 Total 2017 95 NVTPH-64X V Sockbord Sockay Total 2017 Total 2017 95 NVTPH-64X V Sockbord Sockay Total 2017 Sockay Total 2017 96 NVTPH-64X V Sockbord Sockay Total 2017 Sockay Total 2017 97 NVTPH-64X V Sockbord Sockay Total 2017 Sockay Total 2017 97 NVTPH-64X V Sockbord Sockay Total 2017 Sockay Total 2017 Sockay Total 2016	51140	Nw IPH-CLP Mobilization for Supply 5 diversion	15 days	MOI 0/11/1/	N10f1 20/11/17	0/11 - 20/11	
49 NVTTHE GAS Switchboard Engring in the 5/12/17 We 1/11/15 Sub 2/12/17 We 1/11/15 51 NVTTHE GAS Short back and	S1147	NWTPH-CLP T&C of the completed HV cables	7 days	Tue 21/11/17	Mon 27/11/17		
90 NVTP14:Low rule with Part functions with W3D for pump for Part function in the support of the support the support of the support support the support of the support of the support of	S1148						
No.9.0.0.1.1.1.1.0 for connections is we apply Intel V1/17 Intel V1/17 S1 NVTPTP1 Second State	S1149	•					
51 NVTPH-TAC (sol, the remaining 5 ares of 6.6 × 19.4 up, 50.7 if 10.4 (21.27) 33 NVTPH-TAC (sol, the remaining 5 ares of 6.6 × 19.4 up, 50.7 if 10.4 (21.27) 34 NVTPH-TAC (sol, the remaining 5 are of 6.6 × 19.4 up, 50.7 if 10.4 (21.27) 35 NVTPH-TAC (sol, the remaining 5 are of 6.6 × 19.4 up, 50.7 if 10.4 (21.27) 36 NVTPH-TAC (sol, the remaining 5 are of 6.6 × 19.4 up, 50.7 if 10.4 (21.27) 37 NVTPH-CAC (sol, the remaining 5 are of 6.6 × 19.4 up, 10.7 if 11.2 (21.27) 36 NVTPH-CAC (sol, the remaining 5 are of 6.6 × 19.4 up, 10.7 if 11.2 (21.27) 37 NVTPH-CAC (sol, the remaining 5 are of 6.6 × 19.4 up, 10.7 if 11.2 (21.27) 38 NVTPH-CAC (sol, the remaining 5 are of 6.6 × 19.4 up, 10.7 if 11.2 (21.27) 39 NVTPH-CAC (sol, the remaining 5 are of 6.6 × 19.4 up, 10.4 up, 10.7 if 11.2 (21.27) 30 NVTPH-CAC (sol, the remaining 6 are of 6.6 × 19.4 up, 10.4	S1150		ou days	wed 51/5/17	Sat 29/1/17		
25 NVTIPI Fue-3 - L6AI Works S2 days The 11/17 The 31/817 21 NVTIPI Fue-3 - L6AI Works S2 days The 11/17 The 31/817 23 NVTIPI Fue-46X Supplies Mailainin for complexity S4 days Sex 50/17 S4 is 16/217 25 NVTIPI Cub-45/12/2014 S4 days Sex 50/17 S4 is 16/217 25 NVTIPI Cub-45/12/2014 S4 days Sex 50/17 S4 is 16/217 26 NVTIPI Cub-45/12/2014 The 35/817 F0 32/817 27 NVTIPI-60X Subthowal T6C is 16/07 The 35/817 F0 32/817 28 NVTIPI-60X Subthowal T6C is 16/07 The 35/817 F0 32/817 29 Relation or Cobie 6/6 var opacity tabus 10/49 Sau 30/17 F0 3/817 20 NVTIPI-60X Subthowal T6C is 10/107 The 35/817 Sau 30/17 Sau 30/17 20 NVTIPI-60X Subthowal T6C is 10/107 The 35/817 Sau 30/17 Sau 30/17 20 NVTIPI-60X Subthowal T6C is 10/107 Sau 30/17 Sau 30/17 Sau 30/17 21 NVTIPI-60X Subthowal T6C is 10/107 Sau 30/17 Sau 30/17 Sau 30/17 20 NVTIP	S1151		138 days	Sun 30/7/17	Thu 14/12/17	30/7	
31 NW TYH 64.0V Supply installation intercomments 10 are 11/07.1 The 11/07.1 <td></td> <td>*</td> <td></td> <td></td> <td></td> <td></td> <td></td>		*					
Calls Diversion Construction	S1152						
54 NVTTH 1998 4 - EAN Work Works 54 above So an 1977 5 - 11977 So at 16712 178 55 NVTTH-1297 K2 of the complexited IV tables 7.days So 11977 To 12977 56 NVTTH-1297 K2 of the complexited IV tables 7.days So 11977 To 12977 57 NVTTH-1600 V Switchmail Energination 10 days So 11977 To 12977 58 NVTTH-1600 V Switchmail Energination 10 days So 11977 To 12977 59 NVTTH-1600 V Switchmail Energination 10 days So 11977 To 12977 50 NVTTH-1600 V Switchmail Energination 10 days So 11977 To 12977 50 NVTTH-1600 V Switchmail Energination 90 days No 30417 To 15417 60 NVTTH-1600 V Switchmail Energination 90 days No 30417 To 15417 61 NVTTH-1600 V Switchmail Energination 90 days No 30417 To 15417 62 NVTTH-1600 V Switchmail Energination 90 days No 30417 To 20517 63 NVTTH-1000 V Switchmail Energination 90 days No 15717 Su 30417 64 NVTTH-1000 V Switchmail Energination <td>S1153</td> <td></td> <td>52 days</td> <td>Tue 11///1/</td> <td>1 hu 31/8/17</td> <td></td> <td></td>	S1153		52 days	Tue 11///1/	1 hu 31/8/17		
55 NVTPH-C1P Mobilization for Supply 4 diversion 15 days Pri 15/017 56 NVTPH-C1P XC office completed IV calles 7 days Sai 16/017 Fri 22/017 57 NVTPH-C1P XC office completed IV calles 7 days Sai 23/017 Fri 22/017 57 NVTPH-C1P XC office completed IV calles 7 days Sai 23/017 Fri 22/017 58 NVTPH-C1P XC office complete halts 10 days Smi 30/017 The 20017 59 NVTPH-C2 XC fineLic Address thestallation at 8 days Mai 30/017 The 30/017 The 30/017 50 NVTPH-SiteXVIIK Vo 38/0V Transformers TX 28 days Mai 30/017 The 30/017 50 NVTPH-SiteXVIIK Vo 38/0V Transformers TX 28 days Mai 30/017 The 30/017 51 NVTPH-SiteXVIIK Vo 38/0V Transformers TX 28 days Mai 30/017 The 30/017 52 NVTPH-SiteXVIIK Vo 38/0V Transformers TX 28 days Mai 30/017 The 30/017 53 NVTPH-Calle Signers 14 days Smi 30/017 The 30/017 The 30/017 54 NVTPH-Calle Signers 14 days Smi 30/017 The 30/017 The 30/017 The 30/017	S1154		140 davs	Sun 30/7/17	Sat 16/12/17	3077 - 16/12	
71 NVTFH-646X V switchbaud TacC incl. CLP 7 days Sat 230/17 Fit 200/17 58 NVTFH-646X V switchbaud TacC incl. CLP 7 days Sat 16/12/17 Fit 16/11/7 59 Relocation of existig 6.8X* expacing banks 110 days Sat 16/12/17 Fit 16/11/7 59 Relocation of existig 6.8X* expacing banks 110 days Sat 16/12/17 Fit 16/11/7 61 NVTFH LVSR, T.PL CK Censet Hendlandon 48 20 days Mon 20/31/7 Sat 30/31/7 Tue 13/01/7 62 NVTFH-50KV LSS. Censet 42 days Mon 20/31/7 Tue 30/31/7 Tue 30/31/7 63 existing Admin. Building 4d days Mon 17/417 San 30/417 Tue 30/417 64 NVTFH-50KV LSS. Censet 42 days Mon 20/317 Tue 30/317 Tue 30/317 65 NVTFH-64bc Laying 14 days Mol 17/417 San 30/417 Tue 30/417 66 NVTFH-64bc Laying 14 days Mol 15/17 Tue 30/417 San 30/417 67 NVTFH-64bc Laying 14 days Mol 15/17 Tue 30/417 San 30/417 68 NVTFH-64bc Laying 10 days Mol 15/17	S1155						
71 NVTFH-646X V switchbaud TacC incl. CLP 7 days Sat 230/17 Fit 200/17 58 NVTFH-646X V switchbaud TacC incl. CLP 7 days Sat 16/12/17 Fit 16/11/7 59 Relocation of existig 6.8X* expacing banks 110 days Sat 16/12/17 Fit 16/11/7 59 Relocation of existig 6.8X* expacing banks 110 days Sat 16/12/17 Fit 16/11/7 61 NVTFH LVSR, T.PL CK Censet Hendlandon 48 20 days Mon 20/31/7 Sat 30/31/7 Tue 13/01/7 62 NVTFH-50KV LSS. Censet 42 days Mon 20/31/7 Tue 30/31/7 Tue 30/31/7 63 existing Admin. Building 4d days Mon 17/417 San 30/417 Tue 30/417 64 NVTFH-50KV LSS. Censet 42 days Mon 20/317 Tue 30/317 Tue 30/317 65 NVTFH-64bc Laying 14 days Mol 17/417 San 30/417 Tue 30/417 66 NVTFH-64bc Laying 14 days Mol 15/17 Tue 30/417 San 30/417 67 NVTFH-64bc Laying 14 days Mol 15/17 Tue 30/417 San 30/417 68 NVTFH-64bc Laying 10 days Mol 15/17	01156		7.1	0	E : 22/0/17		
88 NWTPH-66KV Switchboard blacrejaation 30 days Fi 1/711/17 Sui 10/21/7 99 Relocation of existing 6.40x exaction blas 66 days Mon 20X17 The 16/11/7 61 NWTPH-66KV/11KV to 380V Transformers Tx 28 days Mon 30/417 The 15/617 62 NWTPH-66KV/11KV to 380V Transformers Tx 28 days Mon 30/417 The 15/617 63 SWTPH-VEX & Ch. (mcl. 66/4 Switchbard to 30/4000 40 days Mon 20X17 The 15/617 64 NWTPH-66KV/11KV to 380V Transformers Tx 28 days Mon 30/417 The 15/617 65 NWTPH-106K Scott 40 days Mon 20X17 The 15/617 66 NWTPH-66KV/11KV to 380V The 36/177 The 36/177 66 NWTPH-62Me Trays 14 days Sup 30/177 The 30/517 66 NWTPH-62Me Trays 14 days Sup 30/177 Sup 30/517 67 NWTPH-62Me Trays 14 days Sup 30/177 Sup 30/517 68 NWTPH-62Me Trays 10 days Mon 15/177 The 30/517 70 NWTPH-62Me Trays 10 days Mon 15/216 Wed 31/178 71	S1156 S1157						
99 Relocation of existing 6.6% capacitor banks 110 days Sun 30/71/7 The 16/11/7 60 C/F Sun 30/71/7 The 16/11/7 The 16/11/7 61 WTPH-LSRN, FL/C & Genestication and Sun 30/7 Sun 30/71/7 The 13/6/1 62 NWTPH-306KV1 KV to 380V Transformers TA 28 days Mon 20/317 Sun 30/417 63 NWTPH-90C, Cut (incl. 6.6K vswitchbaardu 30 days Mon 15/17 The 30/517 64 NWTPH-160K Supports 14 days Mon 11/17 The 30/317 65 NWTPH-2able Trays 14 days Mon 11/17 Sun 30/417 66 NWTPH-2able Trays 14 days Mon 11/17 Sun 30/417 7 NWTPH-2able Trays 14 days Mon 11/17 Sun 30/417 66 NWTPH-2able Trays 14 days Mon 11/17 Sun 30/417 70 NWTPH-2able Trays 14 days Mon 11/17 Sun 30/417 71 Finishing works 10 days Mon 15/216 Wed 20/417 70 NWTPH-2able Trays 10 days Mon 15/216 Wed 30/216 71 Finishing works 10 days	S1157 S1158						
00 NYTPH LSB, Tx, PLC & Genest Installation at 86 days Mon 20/3/17 The 13/0/17 61 NUTPH.6K/V11KV to 380V Transformers Tz 28 days Mon 3/4/17 Sum 30/4/17 62 NWTPH.6K/V11KV to 380V Transformers Tz 28 days Mon 20/3/17 Sum 30/4/17 62 NWTPH.1CA Ch (nic. 6.6K) witchboard to 3) days Mon 20/3/17 Two 30/3/17 Two 30/3/17 63 SWTTPH.PLC & Ch (nic. 6.6K) witchboard to 3) days Mon 3/3/17 Two 13/3/17 Two 13/3/17 64 NWTPH H-10K Two 30/3/17 Two 13/3/17 Two 13/3/17 Two 13/3/17 65 NWTPH Cable Trays 14 days Mon 3/4/17 Sum 30/4/17 Sum 30/4/17 66 NWTPH Cable Trays 14 days Mon 13/17 Two 13/3/17 Wot 3/3/17 67 NWTPH -11K Sum 30/4/17 Sum 30/4/17 Sum 30/4/17 Sum 30/4/17 68 NWTPH -12K Sum 30/4/17 Sum 30/4/17 Sum 30/4/17 Sum 30/4/17 70 NWTPH -14K Sum 30/4/17 Sum 30/4/17 Sum 30/4/17 Sum 30/4/17 71 Finishing works 120 days Mon 13/17 Two 20/17/17 Sum 3	\$1159	Relocation of existig 6.6kv capacitor banks	110 days			30/7	
61 NWTPH-6.6KV/11KV to 380V Transformers Tx 28 days Mon 3/4/17 Sun 30/4/17 62 NWTPH-50K VA ESS. Geneet 42 days Mon 20/4/17 Tue 30/17 63 NVTPH-50K VA ESS. Geneet 42 days Mon 20/4/17 Tue 30/17 64 NVTPH-50K VA ESS. Geneet 14 days Mon 15/4/17 Tue 30/17 65 NVTPH-120k Supports 14 days Mon 15/4/17 Tue 30/17 66 NVTPH-120k Trays 14 days Mon 15/4/17 Tue 30/17 67 NVTPH-120k Trays 14 days Mon 15/4/17 Tue 30/17 66 NVTPH-120k Trays 14 days Mon 15/4/17 Tue 30/17 70 NVTPH-140k Trays 14 days Mon 15/17 Tue 30/17 70 NVTPH-140k Termination 14 days Mon 15/17 Tue 20/17 71 Finishing more training 14 days Mon 15/17 Tue 20/17 71 Finishing more training 14 days Mon 15/17 Tue 20/17 72 Completion of architectural finishes and relevant works 12 days Mon 15/17 Tue 20/17 72 Completion of architectu	S1160	NWTPH LVSB, Tx, PLC & Genset Installation at				20/3 🖛 🕂 13/6	
62 NWTPH-30KVA ESS. Genset 42 days Mon 20/3/17 Sun 30/4/17 63 NWTPH-CR CWT, (ncl. 6.6 KV switchboard to susting Admin. Building) 14 days Mon 1/5/17 Tue 30/5/17 64 NWTPH-Cable Trays 14 days Mon 1/5/17 Tue 13/6/17 65 NWTPH-Cable Supports 14 days Mon 1/5/17 Tue 13/6/17 66 NWTPH-Cable Trays 14 days Mon 1/5/17 Tue 13/6/17 66 NWTPH-Cable Trays 14 days Mon 1/5/17 Tue 13/6/17 66 NWTPH-Cable Trays 14 days Mon 1/5/17 Tue 13/6/17 66 NWTPH-Cable Trays 14 days Mon 1/5/17 Tue 13/6/17 70 NWTPH-TaC 30 days Mon 1/5/17 Tue 30/5/17 70 NWTPH-TaC 30 days Mon 1/5/17 Tue 30/5/17 71 Finishing works 120 days Mon 15/2/16 Wed 31/1/18 71 Finishing admin de external 10 days Mon 15/2/16 Wed 31/1/18 72 Completion of architectural finishes and relevant works 1ay 1ay 23/2 23/2 72 Jata	S1161		28 days	Mon 2/4/17	Sup 30/4/17		
63 NVTPH-PLC & Ct. (incl. 6.6K vswitchboard to 90 days Mon 1/5/17 Tu 20/5/17 64 NVTPH-Battery Room 14 days Wed 3/15/17 Tu 20/5/17 Wed 3/15/17 Tu 20/5/17 64 NVTPH-Cable Supports 14 days Mon 17/4/17 Sun 30/4/17 Sun 30/4/17 65 NVTPH-Cable Supports 14 days Mon 17/4/17 Sun 30/4/17 Sun 20/5/17 66 NVTPH-Cable Trays 14 days Sun 9/4/17 Sut 20/4/17 Sun 20/4/17 67 NVTPH-Cable Trays 14 days Sun 9/4/17 Sut 20/4/17 Sun 20/4/17 68 NVTPH-Cable Termination 14 days Sun 9/4/17 Tu 20/5/17 Tu 20/5/17 69 NVTPH-Tacc 30 days Mon 1/5/17 Tu 20/5/17 Tu 20/5/17 Tu 20/5/17 70 NVTPH-Cable Termination 14 days Sun 9/5/17 Tu 20/5/17 Tu 20/5/17 71 Finishig works 120 days Mon 15/2/16 Wed 31/5/17 Tu 20/5/17 72 Completion of architectural finishes and relevant was 140 Yes 20/2 Yes 20/2 Yes 20/2 71 Gristal Split	31101	INWIPH-0.0KV/IIKV to 380V Transformers Tx	∠o days	Mon 3/4/1/	5uii 50/4/1/		
63 NVTPH-PLC & Ct. (incl. 6.6K vswitchboard to 90 days Mon 1/5/17 Tu 20/5/17 64 NVTPH-Battery Room 14 days Wed 3/15/17 Tu 20/5/17 Wed 3/15/17 Tu 20/5/17 64 NVTPH-Cable Supports 14 days Mon 17/4/17 Sun 30/4/17 Sun 30/4/17 65 NVTPH-Cable Supports 14 days Mon 17/4/17 Sun 30/4/17 Sun 20/5/17 66 NVTPH-Cable Trays 14 days Sun 9/4/17 Sut 20/4/17 Sun 20/4/17 67 NVTPH-Cable Trays 14 days Sun 9/4/17 Sut 20/4/17 Sun 20/4/17 68 NVTPH-Cable Termination 14 days Sun 9/4/17 Tu 20/5/17 Tu 20/5/17 69 NVTPH-Tacc 30 days Mon 1/5/17 Tu 20/5/17 Tu 20/5/17 Tu 20/5/17 70 NVTPH-Cable Termination 14 days Sun 9/5/17 Tu 20/5/17 Tu 20/5/17 71 Finishig works 120 days Mon 15/2/16 Wed 31/5/17 Tu 20/5/17 72 Completion of architectural finishes and relevant was 140 Yes 20/2 Yes 20/2 Yes 20/2 71 Gristal Split	S1162	NWTPH-300KVA ESS. Genset	42 days	Mon 20/3/17	Sun 30/4/17	20/3≻→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→→	
64 NWTPH-Battery Room 14 days Wed 31/5/17 Tue 13/6/17 65 NWTPH-Cable Supports 14 days Mon 17/4/17 Tue 13/6/17 66 NWTPH-Cable Trays 14 days Tue 13/4/17 Wed 36/4/17 66 NWTPH-Cable Trays 14 days Sun 9/4/17 Sun 20/4/17 67 NWTPH-Cable Trays 14 days Wed 36/4/17 Tue 13/6/17 68 NWTPH-Cable Trays 14 days Wed 31/5/17 Tue 20/5/17 69 NWTPH-T&Cable Trays Mon 15/5/17 Tue 20/5/17 Tue 20/5/17 70 NWTPH-T&Cable Trainsing works 120 days Mon 15/5/17 Tue 20/5/17 71 Finishing works 120 days Mon 15/2/16 Wed 31/1/18 157 Completion of architectural finishes and relevant works 1days Mon 25/2/16 Mon 25/2/16 10 Site survey of existing pipeworks and cabling 15 days Mon 15/2/16 Mon 25/2/16 Mon 25/2/16 102 Data collection for HTH design by Attal 60 days Tue 12/3/16 Fri 29/4/16 15 20/2 20/2 102 Chtical Split Milestone	S1163	NWTPH- PLC & Ctrl. (incl. 6.6kV switchboard to					
65 NWTPH-Cable Supports 14 days Mon 17/4/17 Sun 30/4/17 66 NWTPH-Cable Trays 14 days Sun 9/4/17 Sun 20/4/17 67 NWTPH-Cable Trays 14 days Sun 9/4/17 Sun 20/4/17 68 NWTPH-Cable Trays 14 days Sun 9/4/17 Sun 20/4/17 68 NWTPH-Cable Trays 14 days Sun 9/4/17 Tue 18/4/17 68 NWTPH-Cable Trays 14 days Wed 5/4/17 Tue 18/4/17 69 NWTPH-Tack ONTPH-Tack 30 days Mon 15/17 Tue 30/5/17 70 NWTPH-Testing 30 days Mon 15/17 Tue 30/5/17 70 NWTPH-Testing 30 days Mon 15/17 Tue 30/5/17 71 Finishing works 12 days Wed 31/1/18 Hou 28/9/17 Thu 28/9/17 72 Completion of architectural finishes and relevant works 1 day Thu 28/9/17 Thu 28/9/17 Thu 28/9/17 70 Site survey of existing pipeworks and cabling 15 days Mon 15/2/16 Mon 29/2/16 15/2 29/2 21/16 21/16 70 Datacollection for HTH design by Atal	01164		14.3	W-101/5/17	Tue 12/6/17		
66 NWTPH- Cable Trays 14 days Thu 13/117 Wed 26/4/17 67 NWTPH- Cable Laying 14 days Sun 9/4/17 Sat 22/4/17 68 NWTPH- Cable Termination 14 days Wed 5/4/17 Tue 18/4/17 69 NWTPH- Cable Termination 14 days Wed 5/4/17 Tue 18/4/17 60 NWTPH- T&C CWTPH - T&C 30 days Mon 1/5/17 Tue 30/5/17 70 NWTPH- Testing 30 days Mon 1/5/17 Wed 31/5/17 71 Finishing works 120 days Wed 31/5/17 Wed 25/4/17 72 Completion of architectural finishes and relevant works 1 day Thu 28/9/17 Thu 28/9/17 72 Completion of architectural finishes and relevant works 1 days Mon 15/2/16 Wed 31/5/18 00 Hydro Turbine House 717 days Mon 15/2/16 Wed 32/1/18 152 29/2 13 13 28/9 31/1 01 Site survey of existing pipworks and cabling 15 days Mon 15/2/16 Mon 29/2/16 162 Jata collection for HTH design by Atal O days Milestone Summary Critical <	S1164 S1165						
67 NWTPH-Cable Laying 14 days Sun 9/4/17 Sta 22/4/17 68 NWTPH-Cable Termination 14 days Wed 5/4/17 Tue 18/4/17 69 NWTPH-T&C NUPH - T&C NUPH	S1165 S1166						
69 NWTPH - T&C 30 days Mon 1/5/17 Tue 30/5/17 Tue	S1167	NWTPH- Cable Laying	14 days	Sun 9/4/17	Sat 22/4/17		
71 Finishing works 120 days Wed 31/5/17 Wed 27/9/17 72 Completion of architectural finishes and relevant works 1 day Thu 28/9/17 Thu 28/9/17 00 Hydro Turbine House 717 days Mon 15/2/16 Wed 31/1/18 01 Site survey of existing pipeworks and cabling 15 days Mon 15/2/16 02 Data collection for HTH design by Atal 60 days Tue 1/3/16 Fri z9/4/16 Fri 29/4/16	S1168						
71 Finishing works 120 days Wed 31/5/17 Wed 27/9/17 72 Completion of architectural finishes and relevant works 1 day Thu 28/9/17 Thu 28/9/17 00 Hydro Turbine House 717 days Mon 15/2/16 Wed 31/1/18 01 Site survey of existing pipeworks and cabling 15 days Mon 15/2/16 02 Data collection for HTH design by Atal 60 days Tue 1/3/16 Fri z9/4/16 Fri 29/4/16	1169 1170						
72 Completion of architectural finishes and relevant works 1 day Thu 28/9/17 Thu 28/9/17 Thu 28/9/17 00 Hydro Turbine House 717 days Mon 15/2/16 Wed 31/1/18 01 Site survey of existing pipeworks and cabling 15 days Mon 15/2/16 Mon 29/2/16 02 Data collection for HTH design by Atal 60 days Tue 1/3/16 Fri 29/4/16 Critical Split Critical Split Critical Split Milestone Milestone Summary Manual Summary Critical	S1170 S1171						
(both internal and external) 00 Hydro Turbine House 717 days Mon 15/2/16 Won 29/2/16 15/2 15/2 15/2 2 Data collection for HTH design by Atal 60 days True 1/3/16 Fri 29/4/16	S1172	Completion of architectural finishes and relevant work					
01 Site survey of existing pipeworks and cabling 15 days Mon 15/2/16 Mon 29/2/16 02 Data collection for HTH design by Atal 60 days Tue 1/3/16 Fri 29/4/16 Critical Split		(both internal and external)					
02 Data collection for HTH design by Atal 60 days Tue 1/3/16 Fri 29/4/16 1/3 29/4 1 Critical Split Critical Split Task Milestone Milestone Manual Summary Critical	S1200						
Critical Split	S1201 S1202						
	51202	Data concentration for fifth uesign by Atal	oo days	100 1/3/10	111 27/4/10		
		Critical Solit T1-		Milastor -	A		
				ivitiestone	•		

ID I	Task Name	Duration	Start	Finish		2016	2017 2018 2019
1203	Construction of cable ducting for signal and power cable	61 davs	Tue 1/3/16	Sat 30/4/16	Oct Nov	Dec Jan	Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov
		•					
1204 1205		76 days	Sun 1/5/16	Fri 15/7/16			
1205		14 days 0 days	Sat 16/7/16 Wed 20/7/16	Fri 29/7/16 Wed 20/7/16			10// ₩ 20// →> 20//
1200		100 days	Sat 30/7/16	Sun 6/11/16			
1207	existing E & M equipment)	100 aujo	541 507 1710	5411 0/11/10			
1208	C 1 1 1	60 days	Mon 7/11/16	Thu 5/1/17			
1209		136 days	Fri 6/1/17	Sun 21/5/17			
1010	backfilling)						
1210 1211		90 days	Fri 6/1/17	Wed 5/4/17			
1211	Completion of concrete structure of Hydro Turbine House	0 days	Sun 21/5/17	Sun 21/5/17			
1212	Finishing works	120 days	Mon 22/5/17	Mon 18/9/17			
51213	Completion of architectural finishes and relevant works		Tue 19/9/17	Tue 19/9/17			
	(both internal and external)	•					
1214		120 days	Mon 22/5/17	Mon 18/9/17			
1215		120 days	Mon 22/5/17	Mon 18/9/17			
S1216 S1217		120 days	Mon 22/5/17	Mon 18/9/17			
1217		120 days 12 days	Mon 22/5/17 Sun 30/7/17	Mon 18/9/17 Thu 10/8/17			
1218	Re-arrangement of Raw Water path B to original Path A		Thu 10/8/17	Thu 10/8/17 Thu 10/8/17			
121)	from High Island Reservoir	o days	1110 10/0/17	110 10/0/17			
51220		0 days	Thu 19/10/17	Thu 19/10/17			19/10
51221	Remove capping of path A and reinstall flow meter at HF1		Thu 19/10/17	Thu 19/10/17			19/10
1222		717 days	Mon 15/2/16	Wed 31/1/18		15/	
51223	Hydro Turbine House - E&M Equipment Procurement		Mon 15/2/16	Sat 5/3/16		15	
\$1224	Hydro Turbine House - E&M Equipment Manufacturing & FAT	300 days	Sun 6/3/16	Fri 30/12/16			
\$1225	e	185 days	Sat 31/12/16	Mon 3/7/17			31/12
S1225		230 days	Sat 31/12/16	Thu 17/8/17			31/12+ 3/7 31/12+ 3/7
/1220	(Needle Valve & Turbine Generator)	200 aujo	540 5 17 12/10	1110 1770/17			
S1227	Hydro Turbine House - H/O by Civil Contractor	0 days	Sun 21/5/17	Sun 21/5/17			
S1228		30 days	Fri 6/10/17	Sat 4/11/17			
\$1229	Hydro Turbine House - Hydropower Generation System	150 days	Mon 22/5/17	Wed 18/10/17			
	Mechanical Installation						
\$1230	T04 - Trench/Cable ducts & Draw Pits H/O by Civil	0 days	Mon 12/6/17	Mon 12/6/17			
51231	Contractor T05 - Trench/Cable ducts & Draw Pits H/O by Civil	0 dave	Mon 12/6/17	Mon 12/6/17			
51251	Contractor	0 days	NIOII 12/0/17	WOII 12/0/17			
S1232	Hydro Turbine House - Electrical & ICA Installation	81 days	Fri 13/10/17	Mon 1/1/18			
S1233	Hydro Turbine House - CLP Inspection & acceptance		Fri 3/11/17	Wed 31/1/18			3/1 3/1 3/1
	(Driven by Logistics house DCS)						
S1234	Hydro Turbine House - T&C	30 days	Tue 2/1/18	Wed 31/1/18			
S1235	•	0 days	Thu 28/9/17	Thu 28/9/17			\$28/9
S1236		14 days	Fri 29/9/17	Thu 12/10/17			21/9 📥 12/10
S1237 S2000		1 day 644 davs	Wed 31/1/18 Fri 30/10/15	Wed 31/1/18 Thu 3/8/17	V10 🕶		→ → → → → → → → → → → → → → → → → → →
S2000		1 day		Fri 30/10/15	₩10 ◆ 30/	10	
S2100	Site Formation and Slope Retaining Structures for North			Thu 3/8/17		7/2	3/8
	Circular Road						
S2101		21 days	Sun 7/2/16	Sat 27/2/16		71.	
S2102 S2103		21 days	Sun 7/2/16	Sat 27/2/16		7/.	
S2103 S2104		0 days	Tue 1/3/16	Tue 1/3/16			
S2104 S2105		90 days 110 days	Sun 28/2/16 Wed 13/4/16	Fri 27/5/16 Sun 31/7/16			
S2106		0 days	Mon 22/8/16	Mon 22/8/16			
S2107		100 days	Mon 22/8/16	Tue 29/11/16			
\$2108		90 days	Mon 22/8/16	Sat 19/11/16			
S2109	GI works for bored piles and mini piles	15 days	Wed 30/11/16	Wed 14/12/16			30/11 4/12
S2110		7 days	Thu 15/12/16	Wed 21/12/16			
\$2111		118 days	Thu 22/12/16	Tue 18/4/17			
52112	1.5m) Bored Pile test	28 days	Wed 19/4/17	Tue 16/5/17			
S2112 S2113		28 days 14 days	Wed 19/4/17 Wed 5/4/17	Tue 18/4/17			
	*	28 days	Wed 19/4/17	Tue 16/5/17			
S2114	Construction of mini piles	60 days	Wed 3/5/17	Sat 1/7/17			
S2115	Construction of mini piles cap and L-shape retaining wall		Sun 2/7/17	Thu 3/8/17			
S2115							
S2115 S2116		.	Wed 3/5/17	Sat 1/7/17			
S2115 S2116 S2117	Construction of retaining wall above bored pile	60 days					
S2114 S2115 S2116 S2117 S2118	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with	60 days 79 days	Wed 17/5/17	Thu 3/8/17	1 1 1		
S2115 S2116 S2117	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works	79 days	Wed 17/5/17				
\$2115 \$2116 \$2117 \$2118 \$2002 \$3000	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works Section 2 Completion	79 days 1 day	Wed 17/5/17 Thu 3/8/17	Thu 3/8/17	v10 🕶		→ → → → → → → → → → → → → → → → → → →
32115 32116 32117 32118 32002 33000 33001	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works Section 2 Completion Section 3 Section 3 Commencement	79 days 1 day 1189 days 1 day	Wed 17/5/17 Thu 3/8/17 Fri 30/10/15 Fri 30/10/15	Thu 3/8/17 Wed 30/1/19 Fri 30/10/15	V10 ♥ ┌♥ 30/	10	30/1
2115 2116 2117 2118 2002 3000 3001 3003	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works Section 2 Completion Section 3 Section 3 Commencement North Circular New Road	79 days 1 day 1189 days 1 day 203 days	Wed 17/5/17 Thu 3/8/17 Fri 30/10/15 Fri 30/10/15 Tue 1/11/16	Thu 3/8/17 Wed 30/1/19 Fri 30/10/15 Mon 22/5/17	V10 ♥ ● 30/	10	
32115 32116 32117 32118 32002 33000 33001 33003 33004	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works Section 2 Completion Section 3 Section 3 Commencement North Circular New Road Raising the existing Flowmeter chamber	79 days 1 day 1189 days 1 day 203 days 60 days	Wed 17/5/17 Thu 3/8/17 Fri 30/10/15 Fri 30/10/15 Tue 1/11/16 Tue 1/11/16	Thu 3/8/17 Wed 30/1/19 Fri 30/10/15 Mon 22/5/17 Fri 30/12/16	V10 - 30/	10	1/11 1/11 1/11 1/11 1/11 1/11
32115 32116 32117 32117 32118 32002 33000 33001 33003 33004 33005	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works Section 2 Completion Section 3 Section 3 Commencement North Circular New Road Raising the existing Flowmeter chamber Excavation for construction of new valve chamber	79 days 1 day 1189 days 1 day 203 days 60 days 60 days	Wed 17/5/17 Thu 3/8/17 Fri 30/10/15 Fri 30/10/15 Tue 1/11/16 Tue 1/11/16 Tue 1/11/16	Thu 3/8/17 Wed 30/1/19 Fri 30/10/15 Mon 22/5/17 Fri 30/12/16 Fri 30/12/16)/10 ← 30/	10	1/11 1/11 30/12 30/12 30/12
32115 32116 32117 32118 32002 33000 33001 33003 33004 33005 33006	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works Section 2 Completion Section 3 Section 3 Commencement North Circular New Road Raising the existing Flowmeter chamber Excavation for construction of new valve chamber Construction of new valve chamber	79 days 1 day 1189 days 1 day 203 days 60 days 60 days 60 days 60 days	Wed 17/5/17 Thu 3/8/17 Fri 30/10/15 Tri 30/10/15 Tue 1/11/16 Tue 1/11/16 Tue 1/11/16 Sat 31/12/16	Thu 3/8/17 Wed 30/1/19 Fri 30/10/15 Mon 22/5/17 Fri 30/12/16 Fri 30/12/16 Tue 28/2/17	V10 ♥ ←● 30/	10	1/11 30/12 1/11 30/12 30/12 30/12 31/12 28/2
32115 32117 32117 32118 32002 33000 33001 33003 33004 33005 33006 33007	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works Section 2 Completion Section 3 Section 3 Commencement North Circular New Road Raising the existing Flowmeter chamber Excavation for construction of new valve chamber Construction of new valve chamber Construction for new road and drainage	79 days 1 day 1189 days 1 day 203 days 60 days 60 days 60 days 60 days 60 days	Wed 17/5/17 Thu 3/8/17 Fri 30/10/15 Tue 1/11/16 Tue 1/11/16 Sat 31/12/16 Wed 1/3/17	Thu 3/8/17 Wed 30/1/19 Fri 30/10/15 Mon 22/5/17 Fri 30/12/16 Fri 30/12/16 Tue 28/2/17 Sat 29/4/17)/10 ♥ ←● 30/	10	1/11 30/12 1/11 30/12 30/12 30/12 31/12 28/2
32115 32116 32117 32118 32002 33000 33001 33003 33004 33005 33006 33007 33008	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works Section 2 Completion Section 3 Section 3 Commencement North Circular New Road Raising the existing Flowmeter chamber Excavation for construction of new valve chamber Construction of new valve chamber Construction for new road and drainage BS works (lighting)	79 days 1 day 1189 days 1 day 203 days 60 days 60 days 60 days 60 days 60 days 60 days 60 days	Wed 17/5/17 Thu 3/8/17 Fri 30/10/15 Tue 1/11/16 Tue 1/11/16 Tue 1/11/16 Sat 31/12/16 Wed 1/3/17 Fri 24/3/17	Thu 3/8/17 Wed 30/1/19 Fri 30/10/15 Mon 22/5/17 Fri 30/12/16 Fri 30/12/16 Tue 28/2/17 Sat 29/4/17 Mon 22/5/17)/10 - 30/		1/11 30/12 30/12 30/12 31/12 22/5
2115 2116 2117 2118 32002 33000 33001 33003 33004 33005 33006 33007	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works Section 2 Completion Section 3 Section 3 Commencement North Circular New Road Raising the existing Flowmeter chamber Excavation for construction of new valve chamber Construction of new valve chamber Construction of new road and drainage BS works (lighting) Temporary Washwater Recovery Tank	79 days 1 day 1189 days 1 day 203 days 60 days 60 days 60 days 60 days 60 days	Wed 17/5/17 Thu 3/8/17 Fri 30/10/15 Tue 1/11/16 Tue 1/11/16 Sat 31/12/16 Wed 1/3/17	Thu 3/8/17 Wed 30/1/19 Fri 30/10/15 Mon 22/5/17 Fri 30/12/16 Fri 30/12/16 Tue 28/2/17 Sat 29/4/17	V10 - 30/	10	1/11 30/12 1/11 30/12 1/11 30/12 31/12 28/2 1/2 29/4 2/3 22/5
2115 2116 2117 2118 2002 3000 3001 3003 3004 3005 3006 3007 3008 3008 3009	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works Section 2 Completion Section 3 Section 3 Commencement North Circular New Road Raising the existing Flowmeter chamber Excavation for construction of new valve chamber Construction of new valve chamber Construction of new road and drainage BS works (lighting) Temporary Washwater Recovery Tank Construction of DN900 Washwater pipes	79 days 1 day 1189 days 1 day 203 days 60 d	Wed 17/5/17 Thu 3/8/17 Fri 30/10/15 Tue 1/11/16 Tue 1/11/16 Tue 1/11/16 Sat 31/12/16 Wed 1/3/17 Fri 24/3/17 Thu 11/2/16	Thu 3/8/17 Wed 30/1/19 Fri 30/10/15 Mon 22/5/17 Fri 30/12/16 Fri 30/12/16 Tue 28/2/17 Sat 29/4/17 Mon 22/5/17 Fri 27/10/17	y10 ♥ 30/		30/1 1/11 30/12 30/12 31/12 31/12 24/3 22/5 22/5 22/5 22/5 21/1 24/3 22/5 21/1 24/3 22/5 27/10
2115 2116 2117 2118 2002 3000 3001 3003 3004 3005 3006 3006 3007 3008 3009 3010	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works Section 2 Completion Section 3 Section 3 Commencement North Circular New Road Raising the existing Flowmeter chamber Excavation for construction of new valve chamber Construction of new valve chamber Construction of new valve chamber Construction for new road and drainage BS works (lighting) Temporary Washwater Recovery Tank Construction of DN900 Washwater pipes Construction of Wier Walls	79 days 1 day 1189 days 1 day 203 days 60 days 60 days 60 days 60 days 60 days 625 days 240 days 107 days	Wed 17/5/17 Thu 3/8/17 Fri 30/10/15 Tue 1/11/16 Tue 1/11/16 Tue 1/11/16 Tue 1/11/16 Sat 31/12/16 Wed 1/3/17 Thu 11/2/16 Wed 1/6/16 Fri 1/7/16	Thu 3/8/17 Wed 30/1/19 Fri 30/10/15 Mon 22/5/17 Fri 30/12/16 Fri 30/12/16 Tue 28/2/17 Sat 29/4/17 Mon 22/5/17 Fri 27/10/17 Thu 26/1/17 Sat 15/10/16	-* 30/	11/2	1/11 30/12 1/11 30/12 31/12 30/12 24/3> 22/5 1/6 26/1 1/7 15/10
2115 2116 2117 2118 2002 3000 3003 3004 3005 3006 3007 3008 3009 3011	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works Section 2 Completion Section 3 Section 3 Commencement North Circular New Road Raising the existing Flowmeter chamber Excavation for construction of new valve chamber Construction of new valve chamber Construction of new road and drainage BS works (lighting) Temporary Washwater Recovery Tank Construction of DN900 Washwater pipes Construction of Wier Walls Critical Split Task	79 days 1 day 1189 days 1 day 203 days 60 days 60 days 60 days 60 days 60 days 625 days 240 days 107 days	Wed 17/5/17 Thu 3/8/17 Fri 30/10/15 Tue 1/11/16 Tue 1/11/16 Tue 1/11/16 Sat 31/12/16 Wed 1/3/17 Thu 11/2/16 Wed 1/6/16	Thu 3/8/17 Wed 30/1/19 Fri 30/10/15 Mon 22/5/17 Fri 30/12/16 Fri 30/12/16 Tue 28/2/17 Sat 29/4/17 Mon 22/5/17 Fri 27/10/17 Thu 26/1/17	V10 30/	11/2	1/11 30/12 30/12 30/12 30/12 30/12 30/12 30/12 30/12 30/12 1/11 31/12 1/11 31/12 24/3> 29/4 24/3> 22/5 1/6 26/1 1/7/1 15/10 1/7/1 15/10
1115 1116 1117 1118 0002 0000 0003 004 005 006 007 008 009 010 011	Construction of retaining wall above bored pile Construction of R-wall above ground concurrent with backfilling works Section 2 Completion Section 3 Section 3 Commencement North Circular New Road Raising the existing Flowmeter chamber Excavation for construction of new valve chamber Construction of new valve chamber Construction of new valve chamber Construction of new road and drainage BS works (lighting) Temporary Washwater Recovery Tank Construction of DN900 Washwater pipes Construction of Wier Walls Critical Split Task	79 days 1 day 1189 days 1 day 203 days 60 days 60 days 60 days 60 days 60 days 625 days 240 days 107 days	Wed 17/5/17 Thu 3/8/17 Fri 30/10/15 Tue 1/11/16 Tue 1/11/16 Tue 1/11/16 Tue 1/11/16 Sat 31/12/16 Wed 1/3/17 Thu 11/2/16 Wed 1/6/16 Fri 1/7/16	Thu 3/8/17 Wed 30/1/19 Fri 30/10/15 Mon 22/5/17 Fri 30/12/16 Fri 30/12/16 Tue 28/2/17 Sat 29/4/17 Mon 22/5/17 Fri 27/10/17 Thu 26/1/17 Sat 15/10/16	-* 30/	11/2	1/11 30/12 1/11 30/12 31/12 30/12 24/3> 22/5 1/6 26/1 1/7 15/10

ID	'ask Name	Duration	Start	Finish		2016				2017			1			20			
262 \$3012	Construction of Steel Bridge & Decking	61 days	Sat 15/10/16	Wed 14/12/16	Oct Nov 1	Dec Jan	Feb Mar Apr	May Jun Jul A	ug Sep Oct No 15/10	ov Dec Jan Fe	b Mar Aj	pr May	/ Jun .	ul Aug	Sep Oct N	Nov Dec Ja	n Feb Mar	Apr May	Jun Jul Au
263 S3012	Completion of steel platforms and walkway installation	1 day	Thu 15/12/16	Thu 15/12/16	-				15/10	15/12									
53 S3013	Lay 400mm & 100mm pipes	137 days	Thu 1/9/16	Sun 15/1/17	-				1/0	15/1									
65 S3015	External Process Pipe Line installation	120 days	Sat 15/10/16	Sat 11/2/17	-				15/10		11/2								
266 S3016	Electrical installation (Lighting)	30 days	Fri 16/12/16	Sat 14/1/17	-					6/12 14/1	11/2								
267 S3017	Temporary Washwater Recovery Tank - E&M Works		Thu 11/2/16	Fri 27/10/17	-	11/2	~			141	_					27/10			
268 S3018	E&M equipment procurement and Completion of	124 days	Wed 29/6/16	Sun 30/10/16	-			29/6		v 10									
0 02010	delivery of E&M equipment on site (Lighting)	16.1	TI 11/0/17	TIL 05/0/16	_														
269 S3019 270 S3020	Temp. WRT - Equipment Procurement	15 days	Thu 11/2/16	Thu 25/2/16	-	11/2	25/2												
	Temp. WRT - Equipment Manufacturing & FAT	141 days	Mon 14/3/16	Mon 1/8/16	-		14/3	18/8	78										
271 S3021 272 S3022	Temp. WRT - Equipment Delivery	136 days	Thu 18/8/16	Sat 31/12/16 Thu 15/12/16	-			18/8		31/12									
272 \$3022 273 \$3023	Temp. WRT - H/O by Civil Contractor Temp. WRT - T01 LV/Fibre Cable draw pit & trench	0 days	Thu 15/12/16	Thu 15/12/16	-					◆15/12									
215 55025	H/O by Civil Contractor	0 days	Thu 15/12/16	1 nu 13/12/10						1.3/12									
274 \$3024	Temp. WRT - E&M Installation	150 days	Sun 1/1/17	Tue 30/5/17	-					1/1			30/5						
275 S 3025	Temp. WRT - Process pipelines installation	90 days	Fri 16/12/16	Wed 15/3/17	-				1	6/12	15/3		5015						
276 S3026	Temp. WRT - ICA	90 days	Wed 31/5/17	Mon 28/8/17	-				1	0/12		31/5		,	18/8				
277 S3027	Temp. WRT - T&C	60 days	Tue 29/8/17	Fri 27/10/17	-							1 343		29/8	H.	7/10			
278 S3300	Administration Building Site Formation + Flow Meter	767 days	Thu 1/9/16	Sun 7/10/18				1	/9										
	House + Valve Chamber	ror duys	1110 1/ // 10	5uii //10/10				1	,, ,										
279 \$3301	Planning & coordination with WSD for re-arrangement or raw watermains from High Island Reservoir and	f 210 days	Thu 1/9/16	Wed 29/3/17					1/9			VB							
280 63202	construction of Flowmeter House and Valve Chamber	(0.1	0.100/00/27	T		1												1	
280 S3302	Removal of existing utilities	60 days	Sat 28/10/17	Tue 26/12/17		1									28/10 🎬	26/	12	din .	
281 S3303	Demolishing existing structure for future adminstration Building	80 days	Wed 27/12/17	Fri 16/3/18		1										27/12 🎽		ur p	
282 S3304	Site formation (Backfilling) for future adminstration building	45 days	Sat 17/3/18	Mon 30/4/18													17/3	30/4	
283 \$3305	Removal of existing Flow meter and Valve Chambers	50 days	Sat 21/10/17	Sat 9/12/17		1									21/10	9/12		1	
284 S3306	Excavation for Flow meter house and Valve chambers	50 days	Sun 10/12/17	Sun 28/1/18	1											10/12	28/1		
285 S 3307	Construction of Flow meter house and Valve chambers	50 days	Mon 29/1/18	Mon 19/3/18	1										1	29/		9/3	
286 \$3308	Finishing Works	60 days	Tue 20/3/18	Fri 18/5/18	1										1		20/3	1	1 8/5
287 \$3309	Relocating existing Flow Meter and Valve	21 days	Tue 20/3/18	Mon 9/4/18	-												20/3	9/4	
288 \$3310	Plumbing and Drainage installation	60 days	Tue 20/3/18	Fri 18/5/18													20/3	1	i 8/5
289 \$3311	MVAC installation	60 days	Tue 20/3/18	Fri 18/5/18													20/3	-14	i 8/5
290 \$3312	Fire Services installation	60 days	Tue 20/3/18	Fri 18/5/18													20/3	1	i 8/5
291 \$3313	Electrical installation	60 days	Tue 20/3/18	Fri 18/5/18	_												20/3 🎽	1	1 8/5
292 S3314	Valve Chamber - E&M Works	462 days	Fri 2/6/17	Thu 6/9/18	_							2/6	ф					11	
293 S3315	Valve Chamber - Equipment Procurement	60 days	Fri 2/6/17	Mon 31/7/17	_							2/		31/7					
294 S3316	Valve Chamber - Equipment Manufacturing & FAT	180 days	Tue 1/8/17	Sat 27/1/18	_									1/8 📥			27/1		
295 S3317	Valve Chamber - Equipment Delivery	72 days	Sun 28/1/18	Mon 9/4/18	_											28/		9/4	
296 S3318 297 S3319	Valve Chamber - H/O by Civil Contractor	0 days	Mon 9/4/18	Mon 9/4/18	-												10/	● <u></u>	07
297 \$3319 298 \$3320	Valve Chamber - Equipment Site Works Duration*	90 days	Tue 10/4/18	Sun 8/7/18	-												10/		8/7
299 S 3321	Valve Chamber - E&M Installation Valve Chamber - Modifying the actuator to suit new level	60 days 30 days	Tue 10/4/18 Mon 9/7/18	Fri 8/6/18 Tue 7/8/18	-												10/	*	9/7 7/
300 \$3322	Valve Chamber - T&C	30 days	Wed 8/8/18	Thu 6/9/18	1										1			11	8/8
301 S3323	Flowmeter House - E&M Works	733 days	Tue 4/10/16	Sat 6/10/18]				4/10 🛡		╺┥╸╢┼				<u> </u>		_		++
302 \$3324	Flowmeter House - Equipment Procurement	60 days	Tue 4/10/16	Fri 2/12/16					4/10	2/12									
303 \$3325			Sat 3/12/16	Wed 31/5/17					3/	12			31/5		L				
304 S3326	Flowmeter House - Equipment Delivery	131 days	Tue 5/9/17	Sat 13/1/18										5/9	<u> </u>		13/1	ti↓	
305 S3327	Flowmeter House - H/O by Civil Contractor	0 days	Mon 9/4/18	Mon 9/4/18														9/4	
306 S3328	Flowmeter House - E&M Installation of new mono rails & reocate flowmeter	90 days	Tue 10/4/18	Sun 8/7/18													10/	4	8/7
307 S3329	Flowmeter House - Power Supply	30 days	Mon 9/7/18	Tue 7/8/18	-														9/7 7/
308 S3330 309 S3331	Flowmeter House - T&C Completion of architectural finishes and relevant works	60 days	Wed 8/8/18	Sat 6/10/18														1	8/8 🎽
55551	(both internal and external)	1 day	Sun 7/10/18	Sun 7/10/18															
310 S3400	Box Culvert at Tin Sum Nullah	212 days	Thu 1/9/16	Fri 31/3/17				1	/9 🖵			1/3						1	
311 S3401	Excavation for temp water diversion	14 days	Thu 1/9/16	Wed 14/9/16	1 H		+		1/9▶ 14/9		∥[
312 S3402	Excavation for Box culvert (Section 1)	21 days	Thu 15/9/16	Wed 5/10/16		1			15/9 🏊_5/10									1	
313 S3403	Construction for Box Culvert (Section 1)	25 days	Thu 6/10/16	Sun 30/10/16		1			6/10 230									1	
314 S 3404	Excavation for Box culvert (Section 2)	21 days	Fri 4/11/16	Thu 24/11/16		1			4/11	24/11								1	
315 S3405	Construction for Box Culvert (Section 2)	25 days	Fri 25/11/16	Mon 19/12/16		1				19/12								1	
316 S3406	Excavation for Box culvert (Section 3)	21 days	Sun 25/12/16	Sat 14/1/17	- 11	1				25/12 14/1								1	
317 S3407	Construction for Box Culvert (Section 3)	25 days	Sun 15/1/17	Wed 8/2/17		1				15/1 200	\$/2							1	
318 S3408	Excavation for Box culvert (Section 4)	21 days	Tue 14/2/17	Mon 6/3/17		1				14/2	6/3 /3 31							1	
319 \$3409 320 \$3500	Construction for Box Culvert (Section 4)	25 days	Tue 7/3/17	Fri 31/3/17		1	9/3			7	13 3	13							
321 S3500	Storm Drain for Decking at Tin Sum Nullah Temporary water diversion	388 days	Wed 9/3/16 Wed 9/3/16	Fri 31/3/17 Sat 12/3/16			9/3 9/3 12/3					4/2						1	
322 S 3502	Construction for Storm drain (Section 1)	4 days 4 days	Sun 13/3/16	Wed 16/3/16			13/3 16/3											1	
323 S 3503	Installation for Storm Drain	15 days	Thu 17/3/16	Thu 31/3/16	1	1												1	
324 S 3504	Temporary water diversion	14 days	Mon 3/10/16	Sun 16/10/16	1	1			3/10 16/10)								1	
325 \$3505	Excavation for Storm drain (Section 2)	20 days	Mon 17/10/16	Sat 5/11/16	1	1			17/10 🍆 5	/11								1	
326 S 3506	Installation for Storm Drain	20 days	Sun 6/11/16	Fri 25/11/16	1	1			6/11 🎽	▶25/11								1	
327 S3507	Temporary water diversion	14 days	Sat 26/11/16	Fri 9/12/16		1			26/11	. ≦ _9 / 12								1	
328 S3508	Excavation for Storm drain (Section 3)	20 days	Sat 10/12/16	Thu 29/12/16		1			10	/12 📥 29/12								1	
329 \$3509	Installation for Storm Drain	20 days	Fri 30/12/16	Wed 18/1/17		1				30/12 🍋 18/1								1	
330 S 3510	Inlet, CP and bendblock construction	14 days	Thu 19/1/17	Wed 1/2/17		1				19/1 🏊 1/								1	
331 S3511	Backfilling	28 days	Thu 2/2/17	Wed 1/3/17		1				2/2 🎽								1	
332 S3512	Modification of STWTW main entrance	30 days	Thu 2/3/17	Fri 31/3/17	- 11					2/.					<u> </u>			1	1
333 S3513	Construction of temp. flow meter house	30 days	Thu 2/3/17	Fri 31/3/17						2/	3 💶 31	13			±				<u> </u>
i																			
	Critical Split		Milestone	•	Summary			Manual Summary	~	Critical									

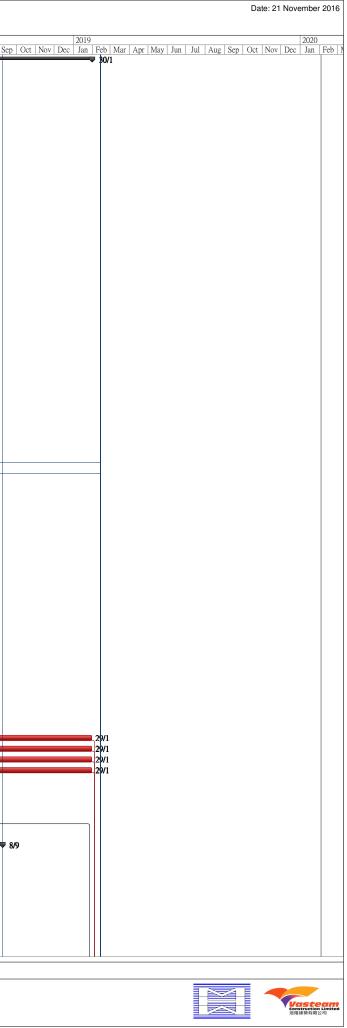
Completion Date: 3 Feb 2020 (EOT for Claim no. 009)



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

ID	'ask Name	Duration	Start	Finish	Oct Nov Dec Jan Feb May Jun Jul Aug Sep Oct Nov Dec Jan Feb May Jun Jul Aug Sep Oct Nov Dec Jan Feb May Jun Jun
S3600	Site Formation and Bored Pile Wall for Logistics Center cum Alum Saturation Tank	1090 days	Sat 6/2/16	Wed 30/1/19	6/2
S36001	Site Clearance	22 days	Sat 6/2/16	Sat 27/2/16	6/2 - 27/2
36002		30 days	Sun 28/2/16	Mon 28/3/16	28/2 - 28/3
S36003	Excavation for slope slope behind the bored pile wall C and reduce the level to +45.0mPD (Stage 1) (About 100	90 days	Sun 28/2/16	Fri 27/5/16	28/2 - 27/5
26004	vehicles per day)	20.1			
36004	Installation of temp soil nails (60 deg. Temp slope above Haul Road)	30 days	Wed 18/5/16	Thu 16/6/16	18/5
\$36005	Pre-drill for bored piles	50 days	Sat 28/5/16	Sat 16/7/16	28/5
36006 36007	Bored piling machine establishment Construction of bored piles CB (H 10m, L 80m, Dia 2.0m	21 days	Sun 17/7/16 Sun 7/8/16	Sat 6/8/16 Fri 4/11/16	
0007	Construction of boled piles CB (H Tolli, E solii, Dia 2.011) 90 uays	Sull //6/10	FII 4/11/10	
36008	ELS works for CB bored piles	20 days	Sat 5/11/16	Thu 24/11/16	5/11 22/11 25/11
36009 36010	Temp. excavation for CB bored piles construction Construction of bored piles CC (H 10m L 80m Dia 2.0m)	40 days	Fri 25/11/16 Thu 23/2/17	Tue 3/1/17 Sat 8/4/17	25/11 23/2 23/2
50010	Construction of boled pries CC (H Tom E som Dia 2.0m)	45 days	111u 2 <i>5</i> /2/17	Sat 6/4/17	
36011	ELS works for CB bored piles	20 days	Wed 4/1/17	Mon 23/1/17	4/1 23/1
S36012 S36013	Temp. excavation for CB bored piles construction	30 days	Tue 24/1/17	Wed 22/2/17	24/1 22/2 9/4 23/5
36013 36014	Construction of bored piles CA (H 10m L 80m Dia. 2m) Excavation at logistics center and Alum saturation tank	45 days 70 days	Sun 9/4/17 Sat 28/5/16	Tue 23/5/17 Fri 5/8/16	28/5 5/8 723/5
	location to level +33mPD (Stage 2) (About 100 vehicles	10 days	Sut 2013/10	111 5/0/10	
36015	per day) Installation of temp soil nails (60 deg. Temp slope above	70 dava	Sat 28/5/16	Fri 5/8/16	28/5 - 5/8
-30013	Installation of temp soil nails (60 deg. Temp slope above Haul Road)	/0 days	Sat 28/5/16	FTI 5/8/16	
36016	Excavation at the open area between bored pile wall C	65 days	Sat 6/8/16	Sun 9/10/16	6/8 9/10
	and Logistics Center to formation +23.5mPD (Stage 3)				
6017	(About 100 vehicles per day) Installation of sheet piles/pipe pile at level +33mPD	60 days	Sat 6/8/16	Tue 4/10/16	6/8 - 4/10
6018	Installation of sheet piles/pipe pile at level +27.5mPD	60 days	Wed 5/10/16	Sat 3/12/16	5/10 - 3/12
86019	Installation of tie back for level +33mPD sheet piles/ pipe		Wed 5/10/16	Fri 18/11/16	5/10 18/11
6020	piles	164 days	Wad 0/11/17	Emi 01/4/17	9/11
020	location to formation level +20mPD (Stage 4) (About 100		Wed 9/11/16	Fri 21/4/17	9/1
	vehicles per day)				
21	King post installation	20 days	Sun 4/12/16	Fri 23/12/16	4/12 - 23/12
5022	Temp. shoring (waling & strut) installation	100 days	Sat 24/12/16	Sun 2/4/17	24/12
6023	Construction of bored piles lagging walls	180 days	Sun 25/12/16	Thu 22/6/17	25/12
5024	Constrution of bored pile capping beam	160 days	Thu 15/12/16	Tue 23/5/17	15/12
5025 5026	Installation of earth mat Foundation for grid 1-6	30 days 35 days	Sat 22/4/17 Mon 22/5/17	Sun 21/5/17 Sun 25/6/17	22/4 22/5 22/5 25/6
6026	Foundation for grid 1-6 Foundation for reminding portion	66 days	Mon 22/5/17 Mon 22/5/17	Wed 26/7/17	22/5 22/5 25/6
36028	Superstructure for Logistic Center	283 days	Mon 26/6/17	Wed 4/4/18	26/6 4/4
6029	Completion of concrete structure of grid(1-5) Basemen Level +22.5mpd to +28.5mpd of WTW Logistics Centre	t 25 days	Mon 26/6/17	Thu 20/7/17	26/6 💳 20/7
)	Completion of concrete structure of grid(1-5) Ground Level +28.5mpd to +34.5mpd of WTW Logistics	25 days	Fri 21/7/17	Mon 14/8/17	21/7 🖛 14/8
1	Centre Completion of concrete structure of grid(1-5) Frist Level 34.5mpd to 40.5mpd of WTW Logistics Centre	25 days	Tue 15/8/17	Fri 8/9/17	15/8 - 8/9
032	Completion of concrete structure of Basement Level of	60 days	Thu 27/7/17	Sun 24/9/17	21/7 - 24/9
5033	WTW Logistics Centre Completion of concrete structure of Ground Level of	36 days	Mon 25/9/17	Mon 30/10/17	25/9 - 30/10
	WTW Logistics Centre				
36034	Completion of concrete structure of First Level of WTW Logistics Centre	36 days	Tue 31/10/17	Tue 5/12/17	31/10 5/12
5035	Completion of concrete structure of Second Level of	36 days	Wed 6/12/17	Wed 10/1/18	6/12 - 10/1
036	WTW Logistics Centre Completion of concrete structure of Third Level of	36 days	Thu 11/1/18	Thu 15/2/18	
	WTW Logistics Centre				
6037	Completion of concrete structure of Roof Level of WTW Logistics Centre	48 days	Fri 16/2/18	Wed 4/4/18	16/2
6038	Plumbing and Drainage installation	300 days	Thu 5/4/18	Tue 29/1/19	5/4
36039	MVAC installation	300 days	Thu 5/4/18	Tue 29/1/19	5/4
36040	Fire Services installation	300 days	Thu 5/4/18	Tue 29/1/19	
36041	Electrical installation	300 days	Thu 5/4/18	Tue 29/1/19	
36042 36043	Alum Satuation Tanks	231 days	Sat 22/4/17	Fri 8/12/17	22/4
3604 <i>3</i> 36044	Foundation Superstructure for Alum Satuation Tanks	45 days 66 days	Sat 22/4/17 Tue 6/6/17	Mon 5/6/17 Thu 10/8/17	
36045	Canopy above Alum Saturation Tanks	74 days	Mon 25/9/17	Thu 7/12/17	25/9 7/12
36046	Completion of structure including canopy above Alum Saturation Tanks	1 day	Fri 8/12/17	Fri 8/12/17	₹ 8/12
36047 36048	WTW Logistic Centre - Internal E&M Site Works WTW Logistics Centre - Silo Installation B/F	885 days 760 days	Thu 7/4/16 Thu 7/4/16	Sat 8/9/18 Sun 6/5/18	
36048	WTWLC - Lime System - Silo Procurement	65 days	Thu 7/4/16	Fri 10/6/16	
36050	WTWLC - Lime System - Silo Manufacturing & FAT	320 days	Sat 11/6/16	Wed 26/4/17	11/6 26/4
36051	WTWLC - Lime System - Silo Delivery	70 days	Thu 27/4/17	Wed 5/7/17	27//4
\$36052	WTWLC - Second 2/F Slab G.L. CH-1~CH-5 - H/O by Civil Contractor (i.e. Area available from Level +22.5 to +40.5)		Fri 8/9/17	Fri 8/9/17	₹8/9
6053	+22.5 to +40.5) WTWLC - Lime System - Silo Site Works Duration*	240 days	Sat 9/9/17	Sun 6/5/18	9/9
	Critical Split Task		Milactore		Summary Manual Summary Critical
	Critical Split Task	the second se	Milestone	•	

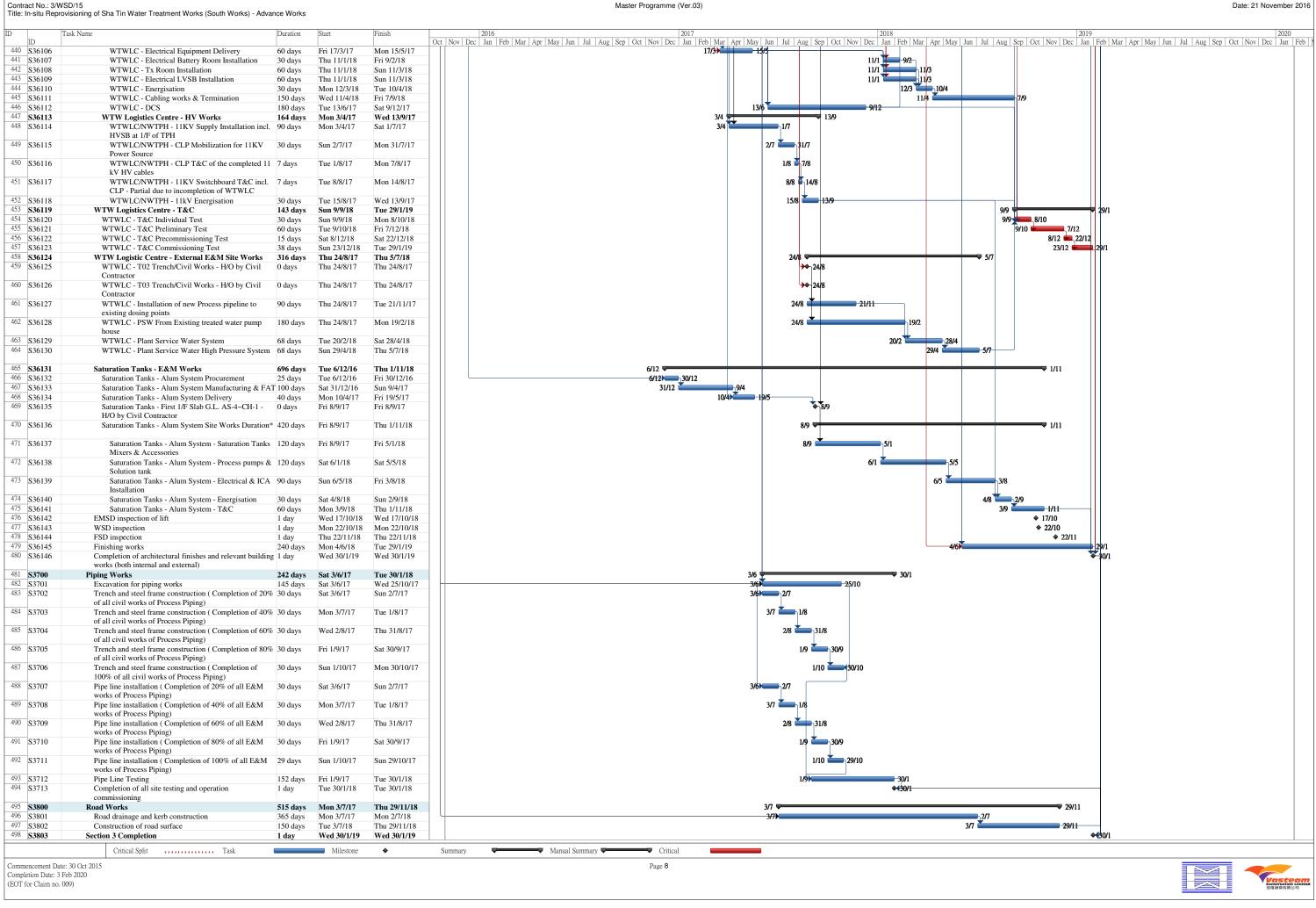
Completion Date: 3 Feb 2020 (EOT for Claim no. 009)



	sioning of Sha Tin Water Treatment Works (South Works) - Advance Works	1			
Tasl	k Name Duration	Start	Finish		2019 Jan Fah Mar Azz May Jun Jul Aug San Oat Nav Dea
6054	WTWLC - Lime System - Silo No.1 60 days	Sat 9/9/17	Tue 7/11/17	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Jan Peo Mai Api May Jun Jun Aug Sep Oct Nov Dec
055	WTWLC - Lime System - Silo No.2 60 days	Wed 8/11/17	Sat 6/1/18	8/11	
056	WTWLC - Lime System - Silo No.3 60 days	Sun 7/1/18	Wed 7/3/18		
057	WTWLC - Lime System - Silo No.4 (Late 60 days commencement so as to allow access for	Thu 8/3/18	Sun 6/5/18	8/3 🛫 🔤 6/5	
	Saturators delivery and installation)				
058	WTW Logistics Centre - Saturators Installation B/F 700 days	Thu 7/4/16	Wed 7/3/18	7/4 💭 7/3	
5059	WTWLC - Lime System - Saturators Procurement 65 days	Thu 7/4/16	Fri 10/6/16		
6060	WTWLC - Lime System - Saturators Manufacturing 300 days & FAT	Sat 11/6/16	Thu 6/4/17		
5061	WTWLC - Lime System - Saturators Delivery 70 days	Fri 7/4/17	Thu 15/6/17	7/4	
5062	WTWLC - Second 2/F Slab G.L. CH-1~CH-5 - H/O 0 days	Fri 8/9/17	Fri 8/9/17	1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/	
	by Civil Contractor (i.e. Area available from Level				
	+22.5 to +40.5)				
6063	WTWLC - Lime System - Saturators Site Works 265 days	Fri 16/6/17	Wed 7/3/18	16/6	
6064	Duration WTWLC - Lime System - Saturators No.1 65 days	Fri 16/6/17	Sat 19/8/17	16/6	
6065	WTWLC - Lime System - Saturators No.1 65 days	Sun 20/8/17	Mon 23/10/17	20/5	
6066	WTWLC - Lime System - Saturators No.3 65 days	Tue 24/10/17	Wed 27/12/17	24/10 -27/12	
5067	WTWLC - Lime System - Saturators No.4 70 days	Thu 28/12/17	Wed 7/3/18	28/12 28/12	
6068	WTW Logistics Centre - Various Dosing System & 885 days	5 Thu 7/4/16	Sat 8/9/18		
6069	Pipeworks G/F WTWLC - Chemcial Dosing System & pipeworks 65 days	Thu 7/4/16	Fri 10/6/16		
	Procurement	110 //4/10	111 10/0/10		
5070	WTWLC - Chemcial Dosing System & pipeworks 330 days	Sat 11/6/16	Sat 6/5/17		
	Manufacturing & FAT				
6071	WTWLC - Chemcial Dosing System & pipeworks 70 days	Sun 7/5/17	Sat 15/7/17	7/5	
6072	Delivery WTWLC - First 1/F Slab G.L. AS-4~CH-1 - H/O by 0 days	Fri 8/9/17	Fri 8/9/17		
	Civil Contractor				
6073	WTWLC - Various Dosing System & Pipeworks 420 days	Sun 16/7/17	Sat 8/9/18	16/7 🗸 👘 👘 👘 👘 👘 👘	
(074	Site Works Duration*	0.0047	N 20/10/17		
6074	WTWLC - Lime System - Pre-Lime Dosing - 52 days South Works	Sat 9/9/17	Mon 30/10/17	9/9	
6075	WTWLC - Lime System Sludge Recycling System 52 days	Tue 31/10/17	Thu 21/12/17	31/10 21/12	
6076	WTWLC - Lime System - Solution Tank 52 days		Sun 11/2/18		
6077	WTWLC - Lime System - Post Lime Dosing - 52 days South Work	Mon 12/2/18	Wed 4/4/18	12/2 - 4/4	
6078	WTWLC - Lime System - Depacking Unit 52 days	Thu 5/4/18	Sat 26/5/18	5/4 26/5	
6079	WTWLC - Waste Chemical Storage Tank 52 days		Tue 17/7/18	27/5 - 17/7	
6080	WTWLC - Floc-Aid Polymer Dosing - South 28 days	Sun 16/7/17	Sat 12/8/17		
(001	Works	0 10/0/17	11/0/17	138 -119	
6081	WTWLC - Floc-Aid Polymer Transfer - North 30 days Works	Sun 13/8/17	Mon 11/9/17	13/8 11/9	
6082	WTWLC - Residuals Polymer Dosing - South 30 days	Tue 12/9/17	Wed 11/10/17	12/9 - 11/10	
	Work				
6083 6084	WTWLC - Polymer Preparation System 30 days	Thu 12/10/17			
6084 6085	WTWLC - Polymer Dilution System 30 days WTWLC - Fluoride Preparation System 30 days		Sun 10/12/17 Tue 9/1/18		
6086	WTWLC - Fluoride Dosing System 30 days	Wed 10/1/18	Thu 8/2/18	10/1 🏣 8/2	
6087	WTWLC - Filter-Aid Polymer Dosing System 30 days	Fri 9/2/18	Sat 10/3/18	9/2 - 10/3	
6088	WTWLC - All interconnecting fittings & 125 days	Mon 7/5/18	Sat 8/9/18		
6089	pipeworks WTW Logistics Centre - Auxiliary System & field 746 days	Thu: 01/4/16	Sum 6/5/19	21/4	
0089	pipeworks	Thu 21/4/16	Sun 6/5/18		
5090	WTWLC - Aux. Sys. & Field pipeworks 60 days Procurement	Thu 21/4/16	Sun 19/6/16	21/4	
6091	WTWLC - Aux. Sys. & Field pipeworks 200 days	Mon 20/6/16	Thu 5/1/17	20/6	
	Manufacturing & FAT				
5092	WTWLC - Aux. Sys. & Field pipeworks Delivery 60 days	Fri 6/1/17	Mon 6/3/17	6/1+ 6/3	
5093	WTWLC - First 1/F Slab G.L. AS-4~CH-1 - H/O by 0 days Civil Contractor	Fri 8/9/17	Fri 8/9/17	₩ ⁵ 8/9	
5094	WTWLC - Aux. Sys. & Field pipeworks Site 256 days	Thu 24/8/17	Sun 6/5/18	24/\$ + 6/5	
	Works Duration*				
6095	WTWLC - Instrument Air Compressor System 60 days (First Lavel slab completed as cailing)	Sat 9/9/17	Tue 7/11/17	9/9 - 7/11	
5096	(First Level slab completed as ceiling) WTWLC - Central Dust Collection System 60 days	Wed 8/11/17	Sat 6/1/18	8/11	
6097	WTWLC - Central Dust Conection System 60 days WTWLC - Powdered Activated Carbon 60 days	Sun 7/1/18	Wed 7/3/18		
	Preparation and Dosing System				
6098	WTWLC - E&M Works new dosing & service 60 days	Thu 8/3/18	Sun 6/5/18	8/3 - 6/5	
6099	water pipework WTWLC - All trenches for new dosing & service 0 days	Thu 24/8/17	Thu 24/8/17		
	water pipework - H/O by Civil Contractor	1110 24/0/17	1110 24/0/17		
5100	WTWLC - Chem Dosing pipeworks to TWPS 100 days		Fri 1/12/17	24/8 1/12	
5101	WTWLC - Chem Dosing pipeworks to Raw Water 100 days	Sat 2/12/17	Sun 11/3/18		
6102	Inlet WTWLC - Plant services water line from TWPS 56 days	Mon 12/3/18	Sun 6/5/18	12/3	
0102	to WTW Logistics Centre 56 days	wion 12/3/18	Suii 0/3/18		
6103	WTW Logistics Centre - Elect. Works 884 days	Thu 7/4/16	Fri 7/9/18	7/4 🖵 🛶 7/9	
(10)	Cabling/MCC/LCP/ALCP/DC				
6104 6105	WTWLC - Electrical Equipment Procurement 29 days WTWLC - Electrical Equipment Manufacturing & 315 days		Thu 5/5/16 Thu 16/3/17	7/4 5/5	
	FAT 515 days		10/0/17		
		Milestone	•	Summary Manual Summary Critical	
	Critical Split Task	WINCStolle			
ent Date: 2	0 Oct 2015	Willestolle	•	Page 7	

Contract No.: 3/WSD/15

Master Programme (Ver.03)



	tract No.: 3 : In-situ Re	/WSD/15 provisioning of Sha Tin Water Treatment Works (South Works)	Advance Works				Master Programme (Ver.03)
		· · · · · · · · · · · · · · · · · · ·		10			
D	ID	Task Name	Duration	Start	Finish	Oct	2016 2018 ct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug
499	S4000	Section 4	972 days	Mon 2/1/17	Sat 31/8/19		
500	S4001	Section 4 Commencement	1 day	Mon 2/1/17	Mon 2/1/17		♦ 2/1
501	S4100	Landscaping Softworks & Establishment Works	455 days	Fri 1/6/18	Thu 29/8/19		1/6 👱
	S4101	Landscaping Soft works	90 days	Fri 1/6/18	Wed 29/8/18		1/6
503	S4102	Establishment works	365 days	Thu 30/8/18	Thu 29/8/19		30/8
504	S4002	Section 4 Completion	1 day	Sat 31/8/19	Sat 31/8/19		
505	S5000	Section 5	1558 days	Fri 30/10/15	Mon 3/2/20	3/2	2 //
506	S5001	Section 5 Commencement	1 day	Fri 30/10/15	Fri 30/10/15		♦ 30/10
	S5100	Landscaping Softworks & Establishment Works	1390 days	Fri 8/1/16	Mon 28/10/19		8/1 🗸
508	S5101	Preparation of site area for planting works	20 days	Fri 8/1/16	Wed 27/1/16		8/127/1
509) S5102	Transplanting works	200 days	Thu 28/1/16	Sun 14/8/16		28/1
	S5103	Establishment for transplanting works	365 days	Mon 15/8/16	Mon 14/8/17		15/8
	S5104	Landscaping Soft works	90 days	Tue 31/7/18	Sun 28/10/18		31/7
512	S5105	Establishment works	365 days	Mon 29/10/18	Mon 28/10/19		
513	S5002	Section 5 Completion	1 day	Mon 3/2/20	Mon 3/2/20		

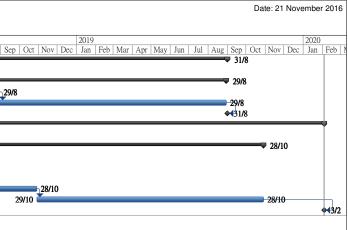
Critical Split	Tas	sk
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Milestone 🔶

Summary

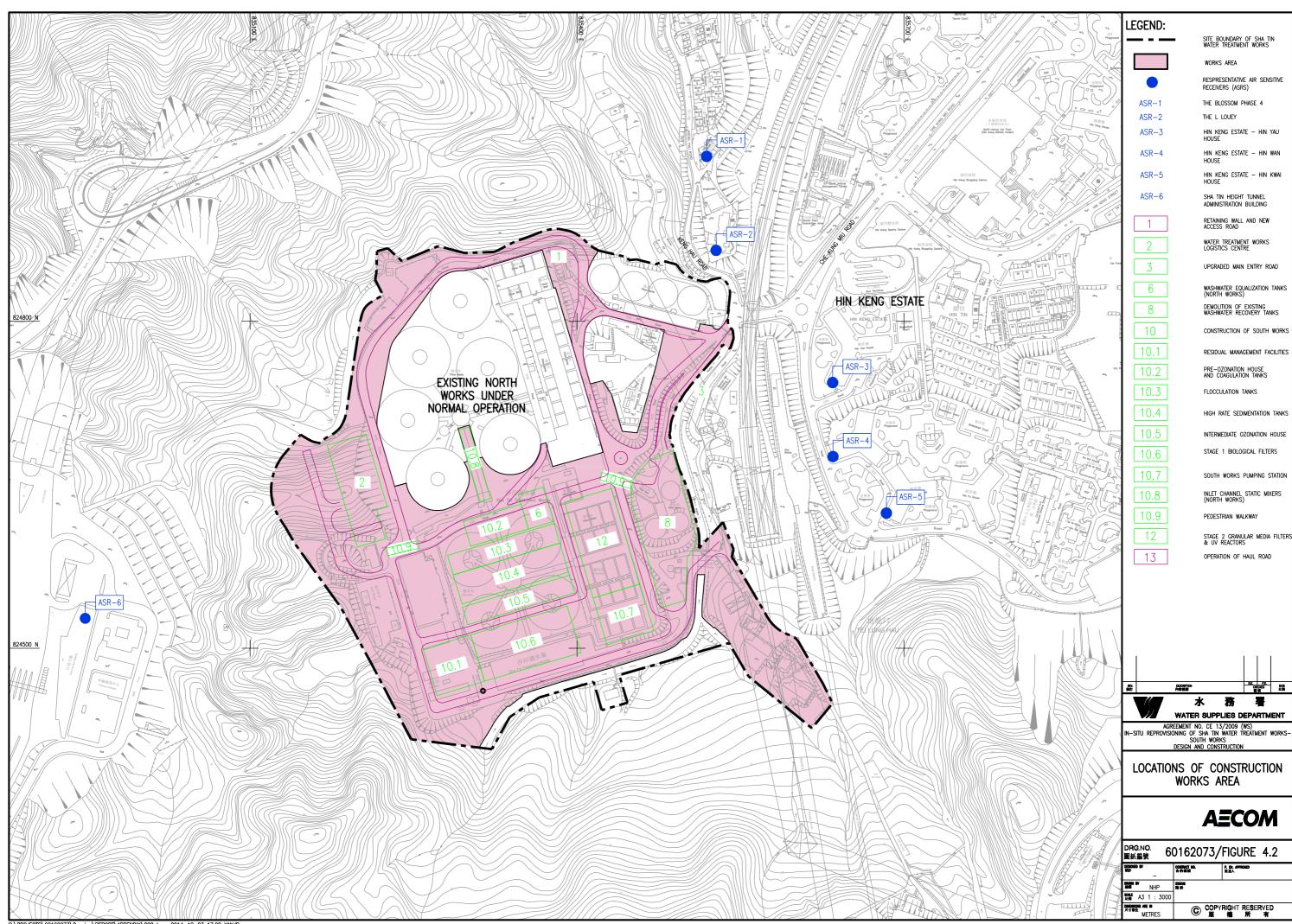
Manual Summary 🛡

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





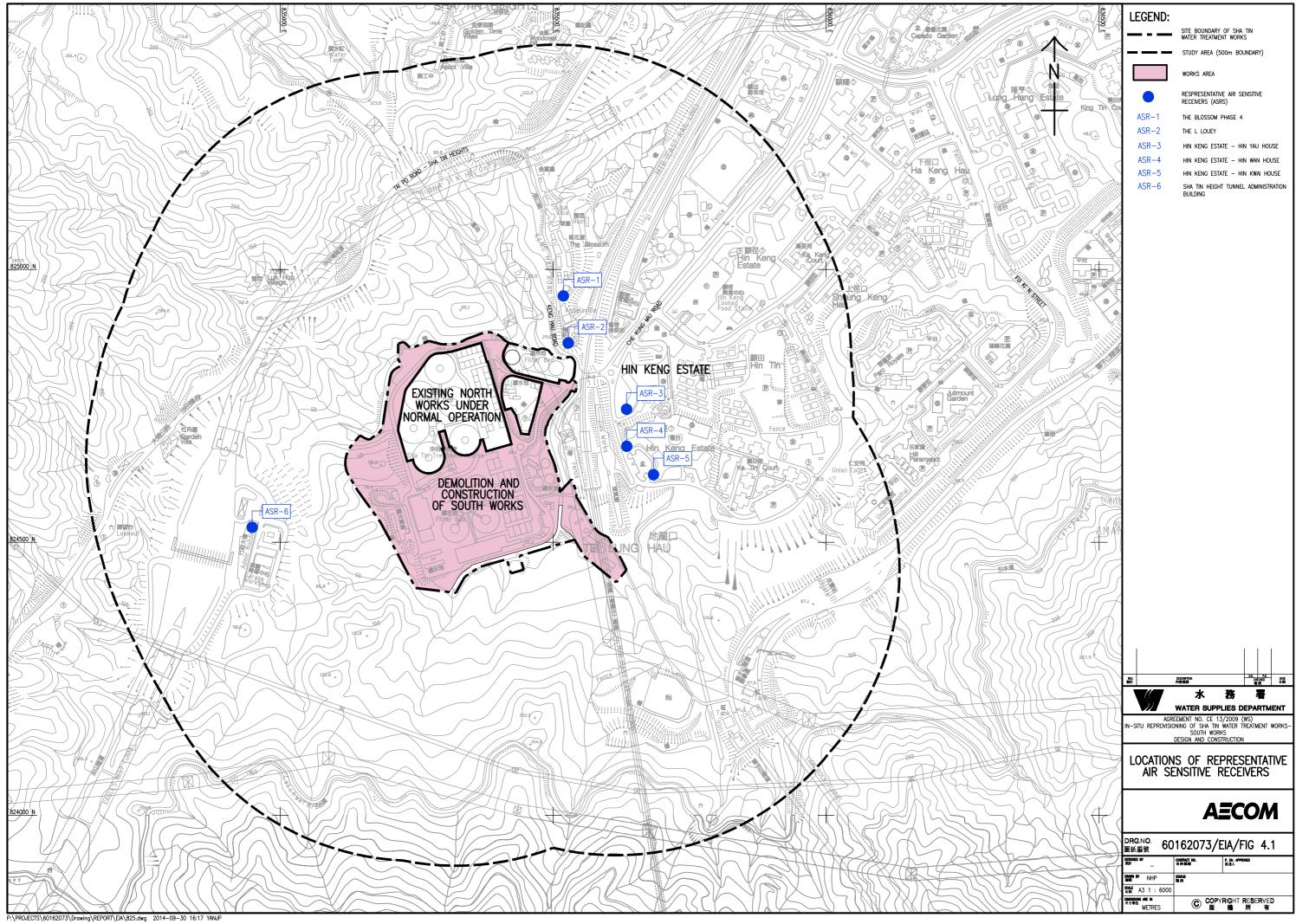
Appendix D Location of Construction Activities

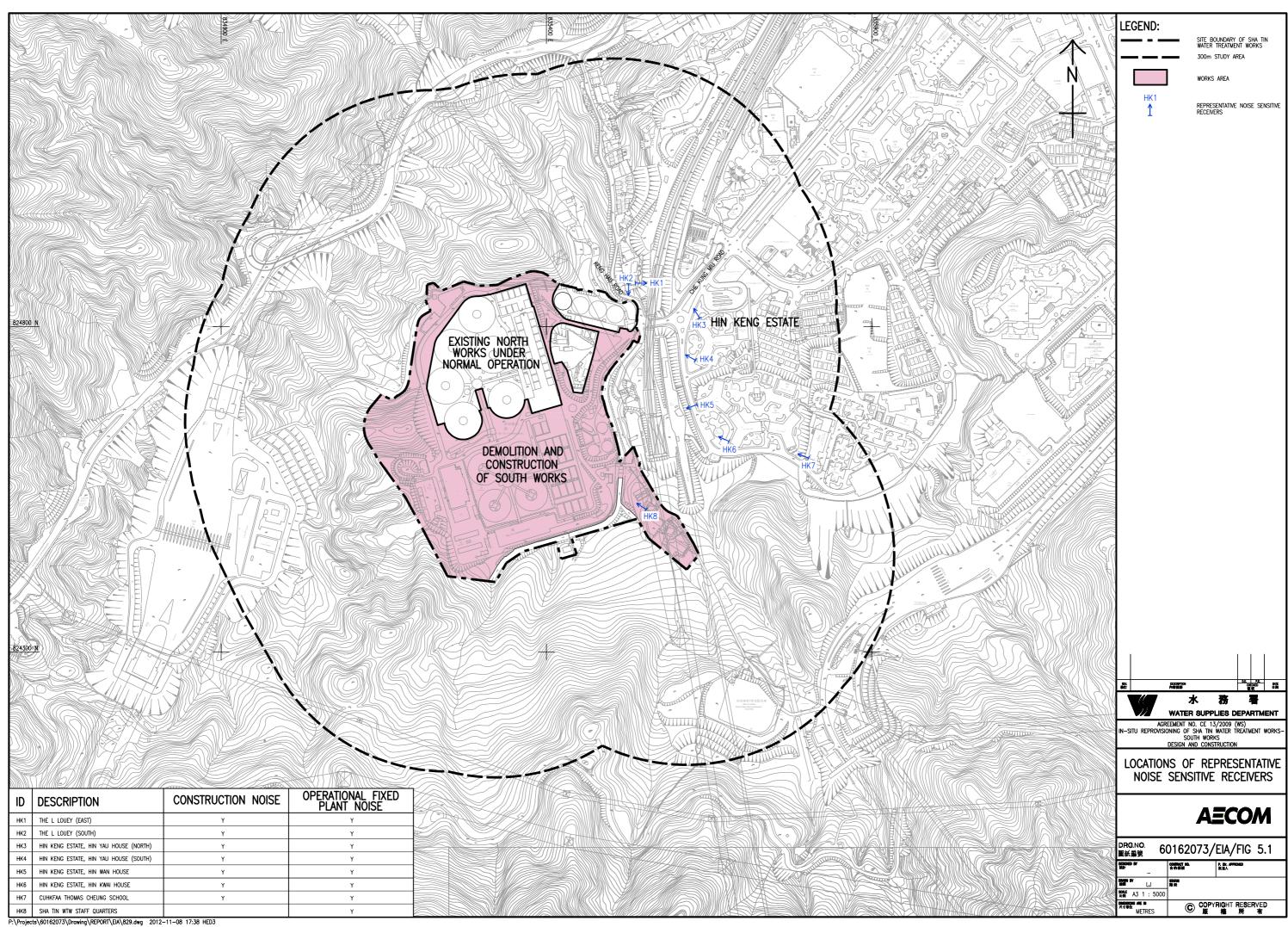


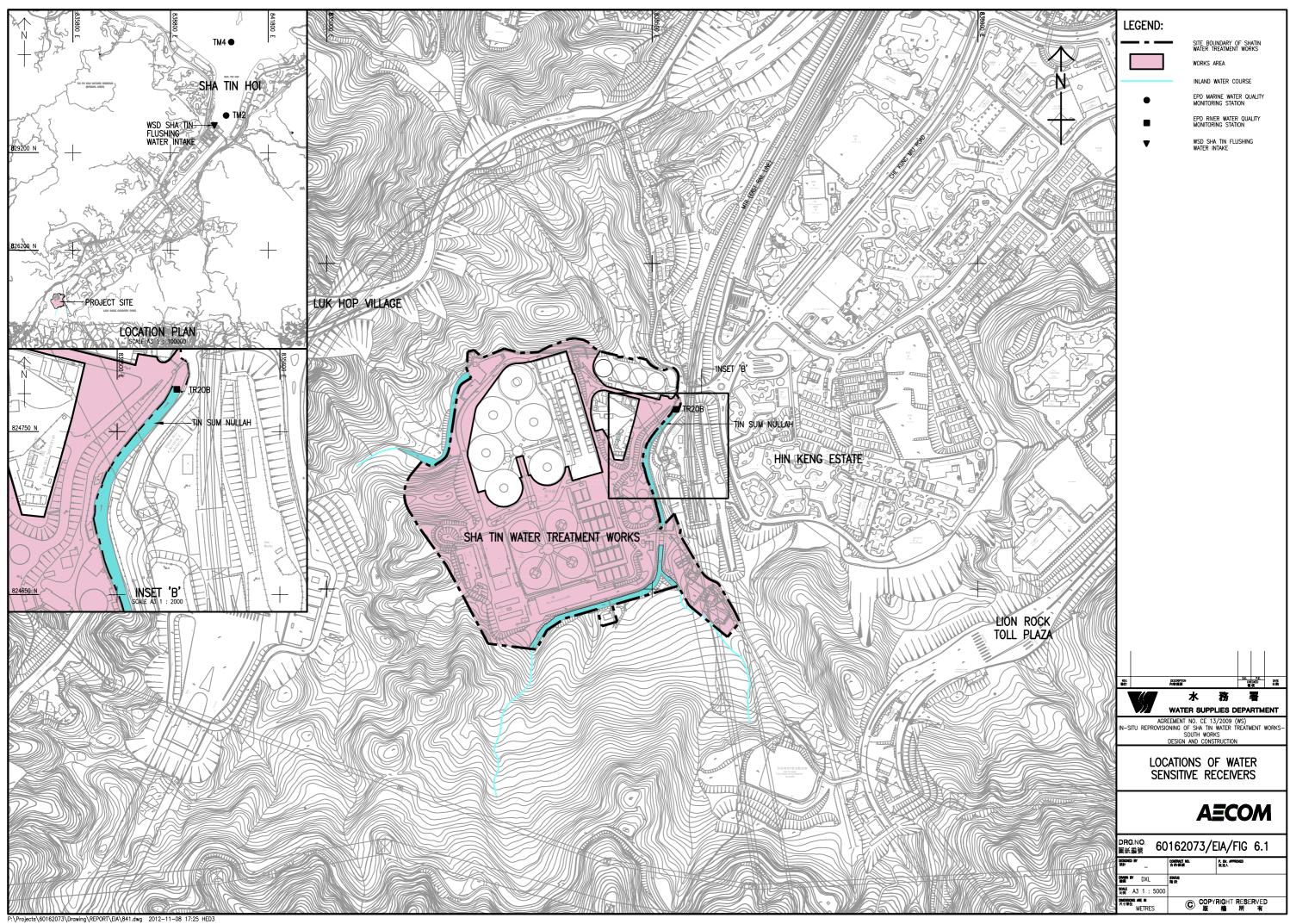
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DRG.NO. 60 圖紙編號 60	0162073/	FIGURE 4.2
DESIGNED BY 1821- —	confinct HD. 合約網號	P. Dr. APPROVED 批准人
NHP	SNUS 階段	
SOLE A3 1 : 3000		
Demensions Are In R寸單位 METRES	C COPY	RIGHT RESERVED 權所有

Appendix E Environmental Sensitive Receivers in the Vicinity of the Project







Appendix F Summary of Action and Limit Levels

Monitoring Locations	Action Level 1-hour TSP, (μg/m³)	Limit Level 1-hour TSP, (µg/m ³)
AM1	357	500
AM2	334	500

Determination of Action and Limit Levels for Air Quality

Determination of Action and Limit Levels for Noise

Monitoring	Action Level	Limit Level in dB(A)
Location	0700-1900 hc	ours on normal weekdays
NM1		For domestic premises: 75 dB(A) for
NM2	When one documented	NM1 & NM2
NM3	complaint is received	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)	Suspendee (mg/		Turbidity	v (NTU)	рН		
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	8.90 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

		ACT	ΓΙΟΝ		
EVENT	ET	IEC	ER	CONTRACTOR	
ACTION LEVEL					
1. Exceedance for one	1. Inform the Contractor, IEC	1. 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	1. Check monitoring data	1. Confirm receipt of	1. 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,	1. 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

		ACTION									
EVENT	ET	IEC	ER	CONTRACTOR							
ACTION LEVEL	1. Notify the Contractor, IEC	1. Review the investigation	1. Confirm receipt of	1. 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,	1. Check monitoring data	1. Confirm receipt of	1. 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

		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;

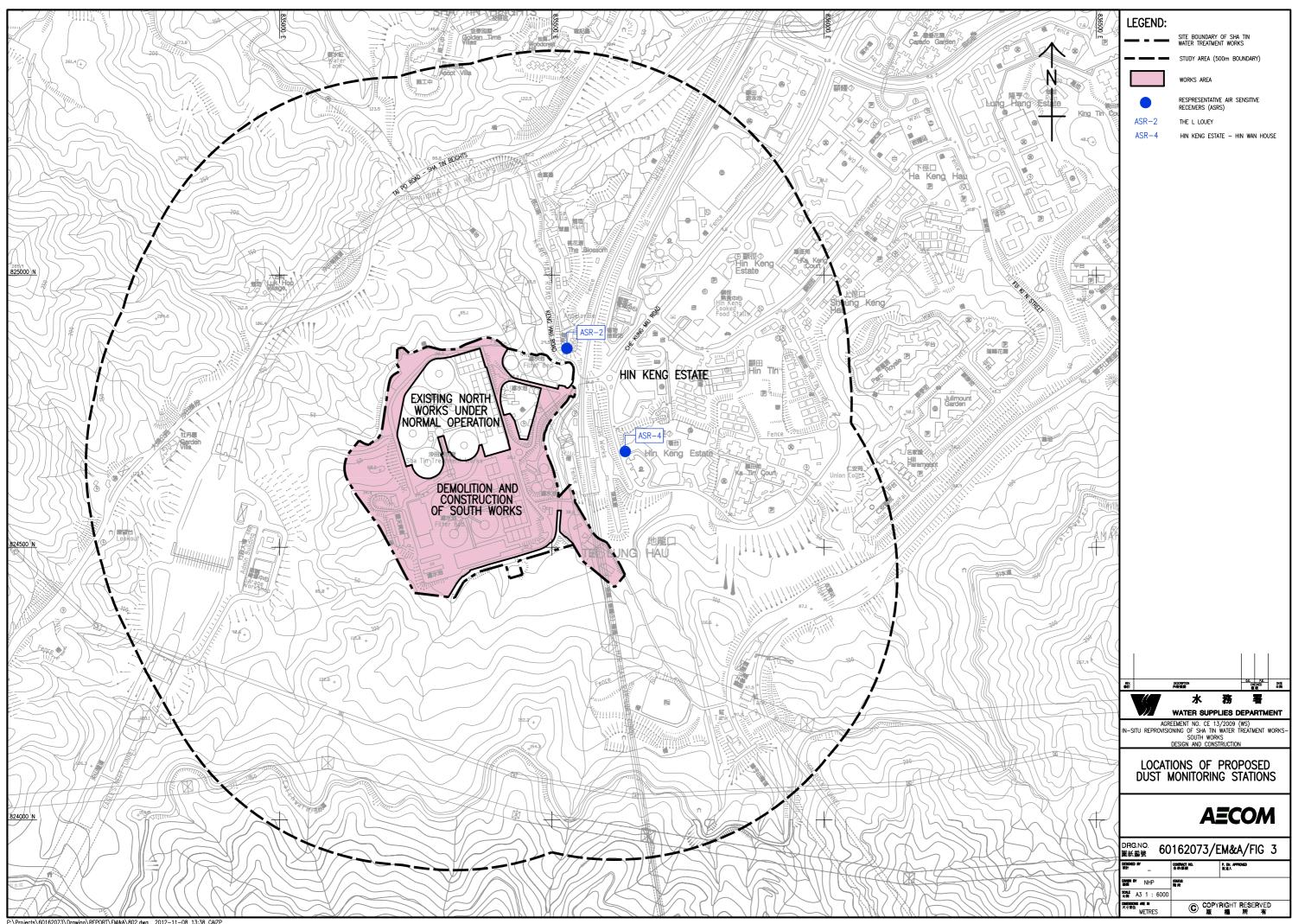
implemented; Increase	down or to stop all or	• As directed by the ER,
the monitoring	part of the construction	to slow down or to stop
frequency to daily until	activities until no	all or part of the
no exceedance of Limit	exceedance of Limit	construction activities.
level for two	level.	
consecutive days.		

Appendix H Impact Monitoring Schedules

Impact Monitoring Schedule for STWTW

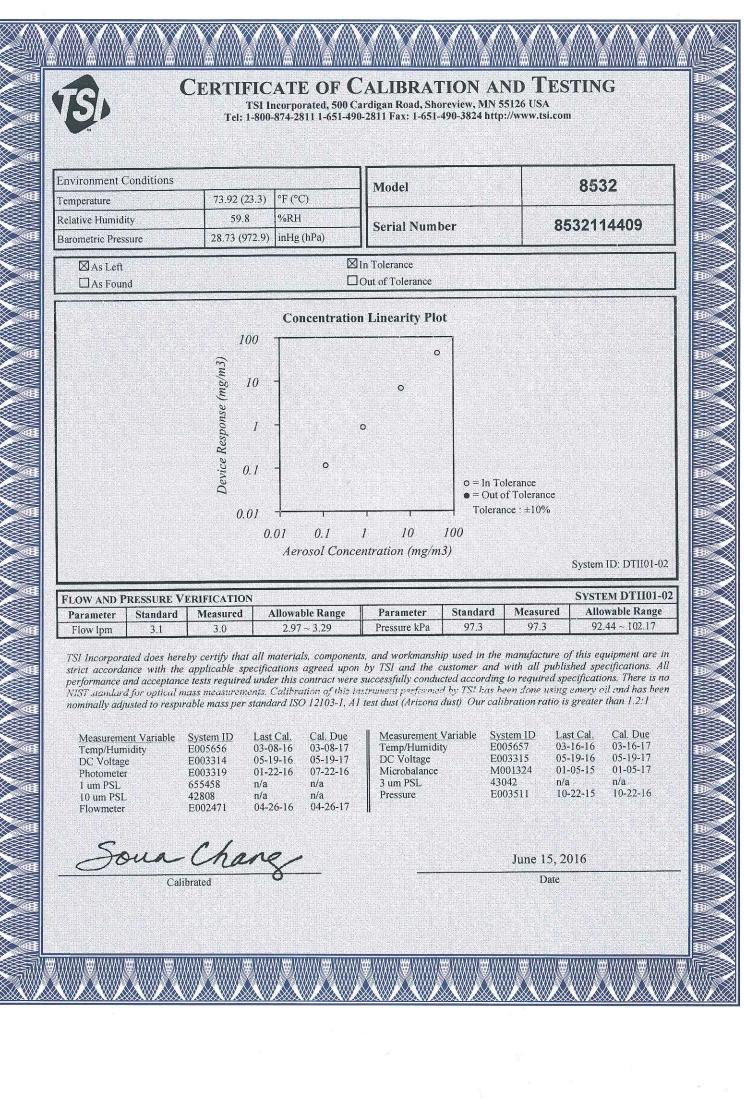
Impact Monitoring Schedule for STWTW											
			Jun-17								
Sun	Mon	Tue	Wed	Thur		Sat					
				1	2	3					
					Impact						
					inpuer						
					Water Quality monitoring for C1,						
					C2, C3, M1, M2 & M3						
						10					
4	5	6	7	8	9	10					
	Impact		Impact		Impact						
	Water Quality monitoring for C1,		Water Quality monitoring for C1,		Water Quality monitoring for C1,						
	C2, C3, M1, M2 & M3		C2, C3, M1, M2 & M3		C2, 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						
11	12	13	14	15	16	17					
	Impact		Impact		Impact						
	puot				Provide State						
	Water Quality monitoring for C1,		Water Quality monitoring for C1,		Water Quality monitoring for C1,						
	C2, C3, M1, M2 & M3		C2, C3, M1, M2 & M3		C2, C3, M1, M2 & M3						
	,,,		Air monitoring for AM1 & AM2								
			Noise monitoring for NM1, NM2								
			& NM3								
18	19	20	21	22	23	24					
	Impact		Impact		Impact						
	poor		inipact		input						
	Water Quality monitoring for C1,		Water Quality monitoring for C1,		Water Quality monitoring for C1,						
	C2, C3, M1, M2 & M3		C2, C3, M1, M2 & M3		C2, 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						
	& WWS				& NWIS						
25	26	27	28	29	30						
23		21		23							
	Impact		Impact		Impact						
					Water Overlite and the Constant						
	Water Quality monitoring for C1,		Water Quality monitoring for C1,		Water Quality monitoring for C1,						
	C2, C3, M1, M2 & M3		C2, C3, M1, M2 & M3		C2, C3, M1, M2 & M3						
			Air monitoring for AM1 & AM2								
			Noise monitoring for NM1, NM2								
			& NM3								

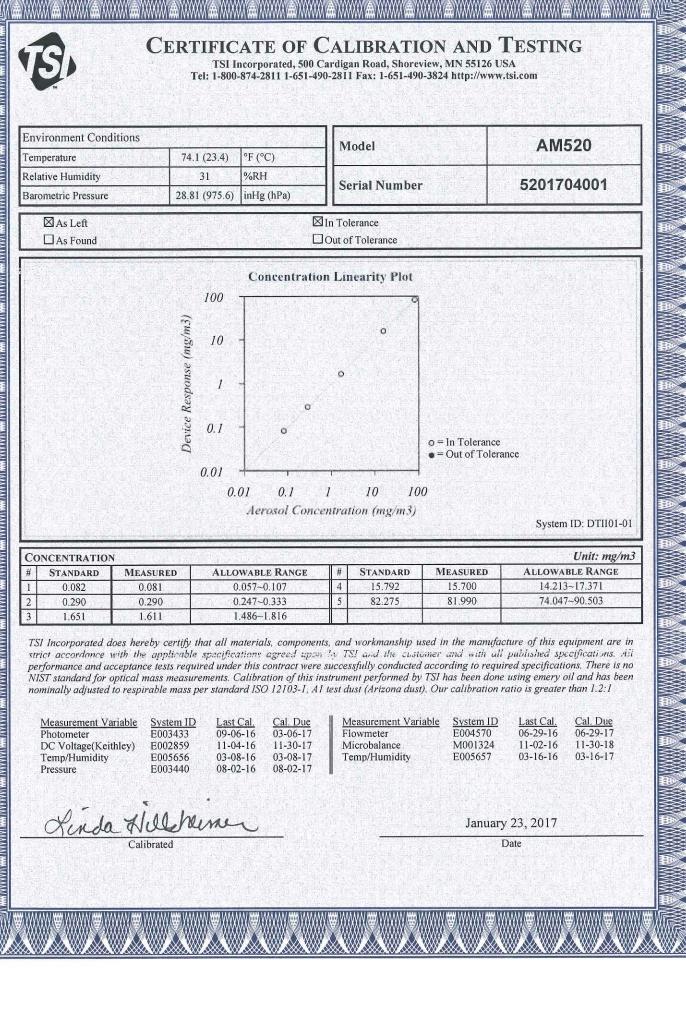
Appendix I Location Plan of Air Quality Monitoring Station



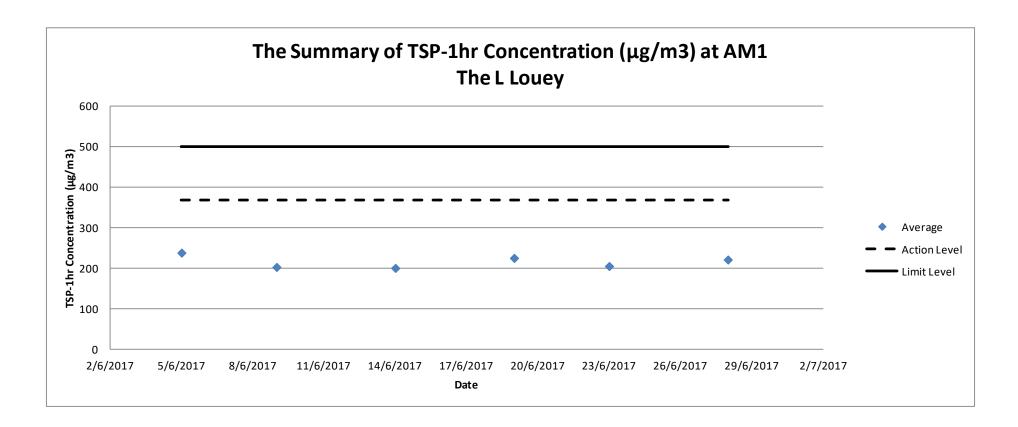
P:\Projects\60162073\Drawing\REPORT\EM&A\802.dwg 2012-11-08 13:38 CAIZP

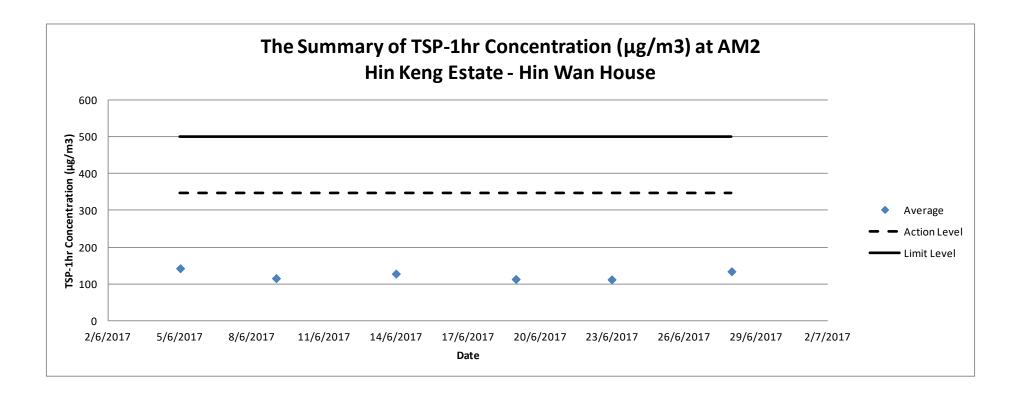
Appendix J Calibration Certificates (Air Monitoring)





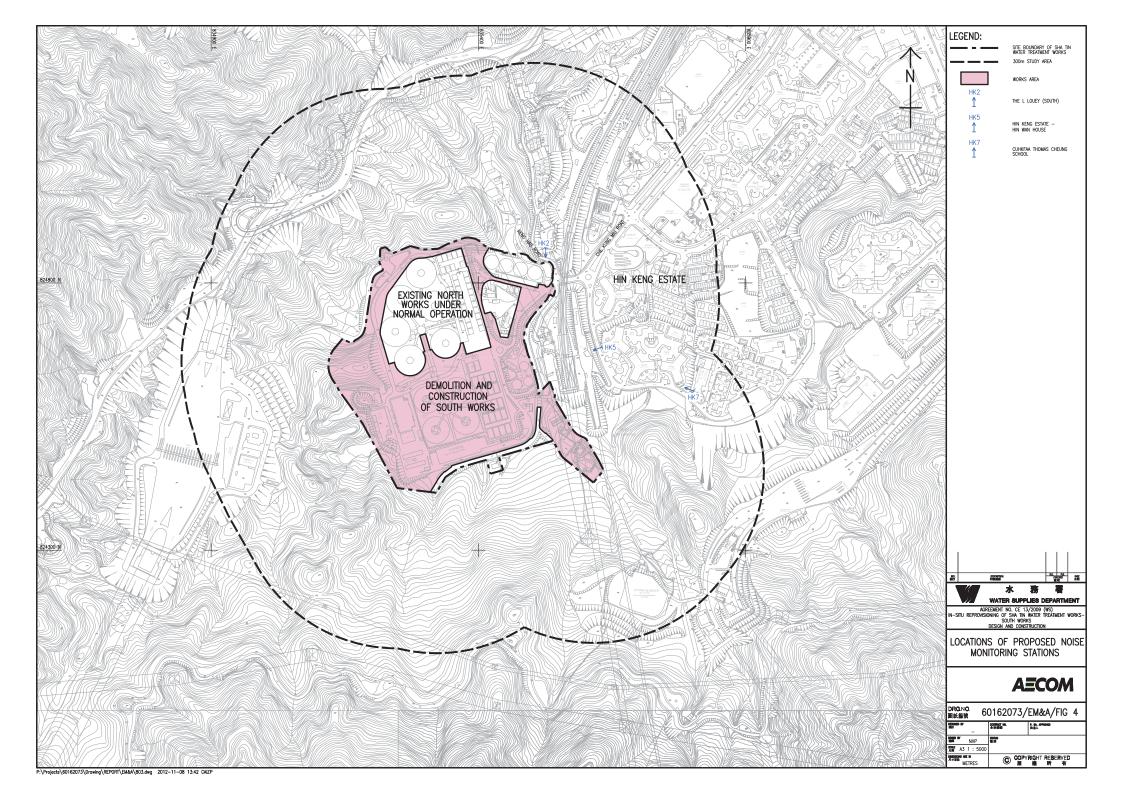
Appendix K Impact Air Quality Monitoring Results and Graphical Presentation





Appendix L

Location Plan of Noise Monitoring Station



Appendix M Calibration Certificates (Noise)





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

The enclosed Kestrel Weather and Environmental Meter was manufactured by Nielsen-Kellerman Co. at its facilities located at 21 Creek Circle, Boothwyn, PA 19061 USA.

															SENSO	RS		
SENSOR	1000	2000	2500	3000	3500	3500	4000	4200	4250	4300	4400	4500	4500	ACCURACY (+/-)*	RESOLUTION	SPECIFICATION RANGE	OPERATIONAL RANGE	NOTES
Wind Speed Air Flow	•	•	•	•	•	•	•	•	•	•	•	•	•	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 kmots 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 kmots 0 to 12 B	1 inch/25 mm diameter impeler with precision axie and low-friction Zytel8 bearings. Startup s statud as sover imit, readings may be taken down to 04 mm (7 Britmin 11 Shrmh 1 Bryth). Effort impeler statud as 04 mm (2 Britmin 11 Shrmh 1 Bryth). Effort and the regimeter statud of the down to 04 mm (2 Britmin 11 Shrmh 1 Bryth). Effort and the regimeter statud are been down to 04 mm (2 Britmin 11 Shrmh 1 Bryth). The reading statud are shown to 04 mm (2 Britmin 11 Shrmh 1 Bryth). The reading statud are shown to 04 mm (2 Britmin 11 Shrmh 1 Bryth). The reading statud are been down to 04 mm (2 Britmin 15 7 Shrmh 25 7 Shrmh 1 Bryth).
Ambient Temperature	V	•	•	•	•	•	•	•	•	•	•	•	•	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	Hermelically-seaked, precision thermitor mounted externally and thermally licelated (US Paik 5.936.645) for rapidr response. Altificion (2.2 mpc) if mis or greater provide fatteet response exaction of molecular offset. C alternal on threadgible. Thermater may also be used to may be used to make the second second and the second
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 equivalent 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 rapic accurate response (US Plante 6.257 2074). To achieve stated accuracy, unit mat be permit equilibrate to activate la Imprature wall en exposed to large, rapid temperature damps and b out of direct sunight. California of the -2% over 24 months. Humidity sensor may be recall at factory or in fault using Kastel Humiding California for (MR PH-0602).
Pressure	1	-01	•	14	•	•	•		•	•		•	•	0.03 inHg 1.0 hPaImbar 0.01 PSI	0.01 inHg 0.1 hPajmbar 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 in Hg 10.0 to 1654.7 h Palmbar 0.14 to 24.00 PSI and 14.0 to 131.0 °F -10.0 to 55.0 °C	Monothics sillion piecewsitely pressure sensor with second-order temperature controllon- Pressure sensor may be nearbitrated at tochyo in field, adjustable inference attubus also display of tation pressure on anometric pressure connected to MSL. Kestini 4.200 display attation pressure on addicated screen. Restriet 2.200 and 3500 display continuously update three-hour barometric pressure trend indicator: main graphy, ning, steady, falling, falling na kestitel 4.000 series displays on sexite tend frough graphing function. PSI display on Kestrie 4.000 series displays on sexite trend frough graphing function. PSI display on Kestrie
Compass		153						1919 1-1-1-1				•	•	5*	1* 1/16th Cardinal Scale	0 to 360*	0 to 360°	400 series only. 2-axis sole-state magnetoresistive sensor mounted perpendicular to unit plane. Accuracy of sensor dependent upon unit's vertical populion. Self-aultication routine eliminates imagnetic en from bittimis or unit anomato te un after every full power-down (bittimy removal or change increation). Declaracionariation advatable for Time North read-ut.
						18								CALCUL		SUREMENTS		
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	1	-	1		123	Y	1	•	•		13	31	3.23	0.0002 lb/tt 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 m ³ /hr 1 m ³ /m 0.1m ³ /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 655.3 cm 6.35 m.
Altitude			•		•	•	•	•	•	•	•	•	•	typical: 23.6 ft 7.2 m max: 48.2 ft 14.7 m	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			•		•	•	•	•	•	•	•	•	•	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 compensation local elevation provided by reference abitude. Requires accurate reference abitude to pro maximum absolute accuracy.
Crosswind & Headwind/Tailwind											rin		•	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 headwindtailwind indicate
Delta T	18		an		an	•							ins	3.2 *F 1.8 *C	0.1 *F 0.1 *C	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	Difference between dry bulb temperature and wet bulb temperature. When spraying, indicate evaporation rate and droplet lifetime. Safe range for pesticide spraying is 4 to 16 $^{\circ}$ / 2 to 9 $^{\circ}$
Density Altitude							•	•	•	•	•	•	•	226 ft 69 m	1 ft 1 m	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	Local air density converted to equivalent elevation above sea level in a uniform layer consisti the International Standard Atmosphere.
Dewpoint				•	•	•	•	•	•		•	•	•	3.4 *F 1.9 *C	0.1 *F 0.1 *C	15 to 95 % RH Refer to Range for Temperature Sensor	Temperature Relative Humidity	Temperature that a volume of air must be cooled to at constant pressure for the water vapor present to condense into dew and form on a solid surface. Can also be considered to be the water-to-air saturation temperature.
Evaporation Rate										•				0.01 lb/ft ² /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 moleture is lost from the surface of curing concrete. Requires user measurement and entry of concrete temperature obtained with an accurate IR or probe thermometer ("F or "C, not included). Readings should be taken 20 inches above pour surfac with the thermiser braked, and averaged for 5-10 seconds using built-in waveraging function.
Heat Index		121	•	1.	•	1231	•	•	•	•	•	•	•	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 humidit Calculated based on NVNS 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									•					0.3%	0.1%	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	The ratio, expressed as a percentage, of measured air density to the air density of a standard atmosphere as defined by the ICAO.
Thermal Work Limit (TWL)														10.9 W/m ²	0.1 W/m ²	Refer to Ranges for Sensors Employed	Wind Speed Temperature Giobe Temperature Relative Humidity Pressure	Estimated safe maximum continuously sustainable human metabolic rate (Wim2) for the conditions and clothing factors. Based off of estimated metabolic output of typical human. On screen zone warnings.
Outdoor Wet Bulb Globe Temperature (WBGT)											•			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 Pressure	Measure of human heat stress defined as the combination of effects due to radiation, convec and conduction. Outdoor WBGT is calculated from a weighted sum of natural wet bub (Triwb) globe temperature (Tg), and dry bub temperature (Td). User settable on-screen warning zone
Wet Bulb Temperature - aturally Aspirated (Tnwb)					23	112	18	3. "F) 11		•	101		1.4 *F 0.8 *C	0.1 *F 0.1 *C	Refer to Ranges for Sensors Employed	Wind Speed Temperature Globe Temperature Relative Humidity Pressure	Similar to psychrometric web-bub temperature (see below). However, Trub only undergoes for convection from the ambient air velocity. Trub is a measure of the evaporative cooling that th will allow. This is accounted for by combining the effects of, mainly, relative humidity and windspeed.
Wet Bulb Temperature - Psychrometric					•	•	•		•	•	•	•	•	3.2 °F 1.8 °C	0.1 *F 0.1 *C	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	Temperature indicated by a sling psychrometer. Due to nature of the psychrometric ratio for water-air system, this approximates the thermodynamic wei-bub temperature. The thermodyn wei-bub temperature is the temperature a parcel of air would have if cooled adiabatically to saturation temperature via water evaporating into it.
Wind Chill		•			•		•	•		•	•	•	•	1.6 *F 0.9 *C	0.1 *F 0.1 *C	Refer to Ranges for Sensors Employed	Wind Speed Temperature	Perceived temperature resulting from combined effect of wind speed and temperature. Calcul based on the NWS Wind Chill Temperature (WCT) Index, revised 2001, with wind speed adju by a factor of 1.5 to yield equivalent results to wind speed measured at 10 m above ground. Measurement range limited by extern of published tables.
													115-5			CIFICATIONS		
Display & Backlight		•	•								AND CONTRACTOR	CONT.		Reflective 5 digit LCD. D	Digit height 0.36 in / 9 r	nm. Choice of aviation green of	iuminescent backlight. Manual activation or visible red (NV models only) electrol	uminescent backlight. Manual activation with auto-off.
Response Time & Display Update	•	•	•	•	•	•	•	•	•	•	•	•		All measurements except equilibrate to a large cha	ot those based on relations in the measurements of		ly within 1 second. Relative humidity a tes every 1 second.	viectroluminescent backlight. Automatic or manual activation. nd all measurements which include RH in their calculation may require as long as 1 minute to ful
Max/Avg Wind			-				•	•	•	•	•	•	•					with all other wind-related functions: air velocity, crosswind, headwind/tailwind, wind chill, WBGT
Data Storage & Graphical Display, Min/Max/Avg History										• 3600 points			• 2500	Minimum, maximum, ave				ta logger with graphical display. Mariual and auto data storage. Min/Max/Avg history may be res y off except for 2 and 5 second intervals (code version 4.18 and later). Data capacity shown.
ata Upload & Bluetooth® Data Connect Option								•	•	•	•	•		Bluetooth Data Trans pairing and transmitting.	fer Option: Adjustabl Employs Bluetooth Se	32) or Bluetooth data transfer e power consumption and radi rial Port Protocol for data tran 32) or Bluetooth data transfer	io range from up to 30 ft 9 meters. In smission.	sividual unit ID and 4-digit PIN code preprogrammed for easy identification and data security whe
Clock / Calendar					•		•	•			•	•		Requires optional PC int	erface (USB or RS-23	 or Bluetooth data transfer or Bluetooth data transfer or Bluetooth data transfer 	option and provided software.	Western refer to the transfer of
Auto Shutdown Languages							•	•	*	*	•	•		Requires optional PC int English, French, German	erface (USB or RS-23 n, Italian, Spanish.	32) or Bluetooth data transfer	option and provided software.	
Certifications Origin	•	*	*	*	*	•	*	•	•		•	•		CE certified, RoHS and Designed and manufact	WEEE compliant. Inde ured in the USA from U	JS and imported components.		ts available at additional charge). t and Tariff Code Transformation requirements for NAFTA Preference Criterion B.
Battery Life	•	•	•	•	•	•	•				•	•		Standard Models: AA	A Alkaline, two, include	d. Average life, 400 hours of u	klight use in 2000 to 3500 models. use, reduced by backlight or Bluetooth	radio transmission use.
Shock Resistance Sealing	•	•	•	•	•	•	•	•	•	•	•	•		Waterproof (IP67 and N	EMA-6).		t may damage replaceable impeller.	nge of the display and batteries by maintaining the unit within the operational range and exposin
Operational Temperature Limits Storage Temperature	*	•	•	•	*	*	*	*	*	•	•	*		14" F to 131" F -10 "C to the more extreme env -22.0 "F to 140.0 "F -3	ironment for the minim	nts may be taken beyond the li num time necessary to take rea	ading.	nge or one weavery and batteries by maintaining, the unit within the operational range and exposin
atorage remperature		•	•				-		-		-	-		4.8 x 1.9 x 1.1 in / 12.2 >	4.8 x 2.8 cm, 3.6 oz /	102 g (including slip-on cover)).	
Size & Weight														5.0 x 1.8 x 1.1 in / 12.7 x	45x28 m 20	102 g		

Please note, these specifications are valid for all Kestrel 4400 products and all other Kestrel 4000 series with a serial number higher than 659340. If your product has a lower serial number, please reference the previous version of the specifications.



Certificate of Calibration 校正證書

Certificate No. : C166584 證書編號

Manufacturer / 製造商 Model No. / 型號	 (Job No. / 序引編號: IC16-26) Sound Level Meter Pulsar 43 PN1374 Acumen Environmental Engineer Lot 11, Tam Kon Shan Road, No 	ring and Technologies Co., Ltd.				
	則試條件 (23 ± 2)℃ 	Relative Humidity / 相對濕度 : (55 ± 20)%				
TEST SPECIFICATIONS / 測試規範 Calibration check						

DATE OF TEST / 測試日期 : 25 November 2016

TEST RESULTS / 測試結果

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

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany

•

- Fluke Everett Service Center, USA

Tested By 測試

1
hannt
VV

H T Wong Technical Officer

K C Lee Project Engineer

Certified By 核證

Date of Issue 簽發日期 :

25 November 2016

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。

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

Page 1 of 4



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. : C166584 證書編號

- 1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- 2. Self-calibration using laboratory acoustic calibrator was performed before test from 6.1.1.2 to 6.3.2.
- 3. The results presented are the mean of 3 measurements at each calibration point.
- 4. Test equipment :

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

- 5. Test procedure : MA101N.
- 6. Results :
- 6.1 Sound Pressure Level
- 6.1.1 Reference Sound Pressure Level

6.1.1.1 Before Self-calibration

UUT S	Setting	Applied	UUT	
Frequency	Time	Level	Freq.	Reading
Weighting	Weighting	(dB)	(kHz)	(dB)
LA	F	94.00	1	93.9

6.1.1.2 After Self-calibration

UUT S	Setting	Applie	d Value	UUT	IEC 61672 Class 1
Frequency	Time	Level	Freq.	Reading	Spec.
Weighting	Weighting	(dB)	(kHz)	(dB)	(dB)
LA	F	94.00	1	93.7	± 1.1

6.1.2 Linearity

UUT Setting		Applied	l Value	UUT	
Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	Reading (dB)	
LA	F	94.00	1	93.7 (Ref.)	
		104.00		103.7	
		114.00	1	113.7	

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

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。

Sun Creation Engineering Limited - Calibration & Testing Laboratory

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 – 校正及檢測實驗所 c/o 香港新界屯門與安里一號青山灣機樓四樓

Tel/電話: 2927 2606

Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

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



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. : C166584 證書編號

6.2 Time Weighting

UUT	Setting	Applie	d Value	UUT	IEC 61672 Class 1	
Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	Reading (dB)	Spec. (dB)	
LA	F	94.00	1	93.7	Ref.	
	S			93.7	± 0.3	

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT	Setting	Appli	ed Value	UUT	IEC 61672 Class 1	
Frequency Weighting	Time Weighting	Level (dB)	Freq.	Reading (dB)	Spec. (dB)	
LA	F	94.00	63 Hz	67.5	-26.2 ± 1.5	
			125 Hz	77.5	-16.1 ± 1.5	
			250 Hz	85.0	-8.6 ± 1.4	
			500 Hz	90.4	-3.2 ± 1.4	
			1 kHz	93.7	Ref.	
			2 kHz	94.9	$+1.2 \pm 1.6$ +1.0 ± 1.6	
			4 kHz	94.7		
			8 kHz	92.9	-1.1 (+2.1 ; -3.1)	
			12.5 kHz	89.4	-4.3 (+3.0 ; -6.0)	

6.3.2 C-Weighting

UUT	Setting	Appli	ed Value	UUT	IEC 61672 Class 1
Frequency	Time	11.2 · · · · · · · · · · · · · · · · · · ·		Reading	Spec.
Weighting	Weighting	(dB)	(0.11	(dB)	(dB)
LC	F	94.00	63 Hz	92.9	-0.8 ± 1.5
			125 Hz	93.5	-0.2 ± 1.5
			250 Hz		0.0 ± 1.4
			500 Hz		0.0 ± 1.4
			1 kHz	93.7	Ref.
			2 kHz	93.5	-0.2 ± 1.6
			4 kHz	93.0	-0.8 ± 1.6
			8 kHz	91.0	-3.0 (+2.1 ; -3.1)
			12.5 kHz	87.5	-6.2 (+3.0 ; -6.0)

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。

Sun Creation Engineering Limited - Calibration & Testing Laboratory

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 – 校正及檢測實驗所 c/o 香港新界屯門與安里一號青山灣機樓四樓

Fax/傳真: 2744 8986 Tel/電話: 2927 2606



Certificate of Calibration 校正證書

Certificate No. : C166584 證書編號

Remarks : - UUT Microphone Model No. : PM1 & S/N : 011060C

- Mfr's Spec. : IEC 61672 Class 1

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

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

Note :

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.

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。

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.



Certificate of Calibration 校正證書					
Certificate No. PA160094 證書編號	Page 1 of 7 pages 如此2010 051 第 頁 (共 頁) (共 頁)				
Customer / 客戶	Acumen Environmental Engineering & Technologies Co. Ltd. Lot 11, Tam Kon Shan Road, Tsing Yi (N), Hong Kong				
Equipment / 儀器					
Description / 名稱	Sound Calibrator				
Make / 製造商	RION				
Model / 型號	NC-74				
Serial No. / 序號	34615222				
Date of Receipt / 收件日期	21 July 2016				
Test Environment / 測試環境					
Temperature / 溫度	(23 ± 1) °C				
Relative Humidity / 相對濕度	(45 ± 8) %				
Air Pressure / 氣壓	(99.5 to 99.6) kPa				
Date of Test / 測試日期	22 July 2016				

Test Specifications / 測試規格

To calibrate the sound pressure level, frequency and total distortion of the sound calibrator at 94 dB in accordance with the International Standard IEC 60942 : 2003 Annex B.

Test Results / 測試結果

The results are detailed in the continuation pages.

Approved Signatory 批簽	Lam Hoi Shan Shendle Ler	Date: 日期	27 July 2016	
--------------------------	-----------------------------	-------------	--------------	--

Hong Kong Accreditation Service (HKAS) has accredited this laboratory (Reg. No. HOKLAS 051) under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific calibration activities as listed in the HOKLAS directory of accredited laboratories. The results shown in this certificate are metrologically traceable to the International System of Units (S.I.) or recognised measurement standards. 香港認可處已根據香港實驗所認可計劃,認可本實驗所 (Reg. No. HOKLAS 051)進行 (認可實驗所所名冊) 內戴列的指定活動。本證書所載結果可溯源至國際單位制或公認

的計量標準。 The conversible of this sortificate is owned by the Covernment of the Hong Yong Special Administrative Pagion — This sortificate shall only be coverduced in full

The copyright of this certificate is owned by the Government of the Hong Kong Special Administrative Region. This certificate shall only be reproduced in full unless prior written approval is obtained from the Head of the Standards and Calibration Laboratory, the Government of the Hong Kong Special Administrative Region.

香港特別行政區政府擁有本證書的版權,除非事前獲得香港特別行政區政府標準及校正實驗所主管的書面批准,否則在複印本證書時必須整份進行。

 Main Laboratory
 :
 36/F, Immigration Tower, 7 Gloucester Road, Wan Chai, Hong Kong.

 Branch Laboratory:
 :
 604, Public Works Central Laboratory Building, 2B Cheung Yip Street, Kowloon Bay, Kowloon.

 總所:
 :
 香港灣仔告土打道 7 號入境事務大樓 36 樓
 電話:
 2829 4830

 分所:
 九龍九龍灣祥業街 2 號 B 工務中央試驗所大樓地下 04 室
 電話:
 2798 7347

 $\frac{\text{Tel: } 2829 \; 4830}{\text{Tel: } 2798 \; 7347} \\ M \; 0 \; 1 \; 0 \; 6 \; 3 \; 8 \\ \end{array}$



Certificate of Calibration (Continuation Page) 校正證書 (續頁)

Certificate No. PA160094 證書編號 Page2of7pages第頁(共頁)

- 1. The test equipment was allowed to stabilise in the laboratory environment at 23 °C and 45 % RH for over 24 hours before the test.
- 2. The power supply to the instrument under test was two 1.5 V batteries.
- 3. Procedures from IEC 60942 : 2003 Annex B were used to perform the calibration, which included the following tests :
 - (1) <u>Sound pressure level</u>

Performance tests were carried out in accordance with Section B.3.4 of IEC 60942 : 2003. The sound pressure level generated by the RION NC-74 was measured by a laboratory B&K 4180 standard microphone. Measurement results are presented in Table 1.

(2) <u>Frequency</u>*

Relevant tests were carried out in accordance with Section B.3.5 of IEC 60942 : 2003. The frequency of the acoustic signal was measured by a frequency counter. Measurement results are presented in Table 2.

(3) <u>Total distortion</u>*

Relevant tests were carried out in accordance with Section B.3.6 of IEC 60942 : 2003. The distortion of the acoustic signal was measured by a distortion meter. Measurement results are presented in Table 3.

Note*: Item is not included in the CIPM Classification of Services in Acoustics Ultrasound and Vibration, Version 2.0, and is not supported by CIPM MRA.

Calibrated by :

Y.C. Kwan

Checked by : H.S. Lam

Date : 26 July 2016



Certificate of Calibration (Continuation Page) 校正證書 (續頁)

Certificate No. PA160094 證書編號
 Page
 3
 of
 7
 pages

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- 4. No adjustment was made to the instrument under test.
- 5. The Sound Calibrator has been shown to conform to the class 1 requirements for periodic testing, described in Annex B of IEC 60942 : 2003 for the sound pressure level, frequency and total distortion stated, for the environmental conditions under which the tests were performed. However, as public evidence was not available, from a testing organization responsible for pattern approval, to demonstrate that the model of sound calibrator conformed to the requirements for pattern evaluation described in Annex A of IEC 60942 : 2003, no general statement or conclusion can be made about conformance of the sound calibrator to the requirements of IEC 60942 : 2003.
- 6. The measurement uncertainty evaluation has been carried out in accordance with principles in the Evaluation of Measurement Data – Guide to the Expression of Uncertainty in Measurement, JCGM 100:2008. The expanded measurement uncertainty U, with its coverage factor k, corresponds to a 95 % probability that the value of the measurand Y lies within the interval y-U to y+U. The combined standard measurement uncertainty u_c can be calculated as $u_c = U/k$ and its degrees of freedom v_{eff} is given by the *t*-distribution with the respective k value.

Calibrated by :

Y.Ć. Kwan

Checked by : H.S. Lam

Date : 26 July 2016



Certificate of Calibration (Continuation Page) 校正證書 (續頁)

Certificate No. PA160094 證書編號

Page	4	of	7	pages
第	頁		(共	頁)

- 7. The values given in this Certificate of Calibration only relate to the values measured at the time of the test and any measurement uncertainties quoted will not include allowances for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, or the capability of any other laboratory to repeat the measurement.
- 8. This certificate is consistent with the capabilities that are included in Appendix C of the MRA drawn up by the CIPM. Under the MRA, all participating institutes recognise the validity of each other's calibration and measurement certificates for the quantities, ranges and measurement uncertainties specified in Appendix C (for details see <u>http://www.bipm.org</u>).

CIPM : International Committee for Weights and Measures MRA : Mutual Recognition Arrangement

Calibrated by :

Y.C. Kwan

Checked by : U

Date : 26 July 2016



Certificate of Calibration (Continuation Page) 校正證書 (續頁)

Certificate No. PA160094 證書編號

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Table 1

Sound Pressure Level Test Results

RION NC-74 Sound Pressure Level Setting	Measured Sound Pressure Level ⁽¹⁾			
	Value y	Measurement Expanded Measurement Uncertainty U	Uncertainty Coverage Factor k	
94 dB	94.08 dB	0.06 dB	2.0	

Note (1): Measurement results at measurement conditions were corrected to the following reference conditions :

Temperature :	23 °C
Humidity :	50 % RH
Pressure :	101.325 kPa

Calibrated by :

Y.C. Kwan

Checked by :

H.S. Lam

Date : 26 July 2016



Certificate of Calibration (Continuation Page) 校正證書 (續頁)

Certificate No. PA160094 證書編號

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第	頁		(共	頁)

Table 2

Frequency Test Results⁽¹⁾

	Measured Frequency			
RION NC-74 Sound Pressure Level Setting	Value y	Measurement Expanded Measurement Uncertainty U	Uncertainty Coverage Factor <i>k</i>	
94 dB	1 001.662 Hz	0.010 Hz	2.0	

Note (1): Items not supported by CIPM MRA.

Calibrated by :

Y.C. Kwan

Checked by :

H.S. Lam

Date : 26 July 2016



Certificate of Calibration (Continuation Page) 校正證書 (續頁)

Certificate No. PA160094 證書編號

Page 7 of 7 pages第 頁 (共 頁)

Table 3

Total Distortion Test Results⁽¹⁾

	Measured Total Distortion		
RION NC-74 Sound Pressure Level Setting	Value y	Measurement Expanded Measurement Uncertainty U	Uncertainty Coverage Factor <i>k</i>
94 dB	1.3 %	0.5 %	2.0

Note (1): Items not supported by CIPM MRA.

- END -

Calibrated by :

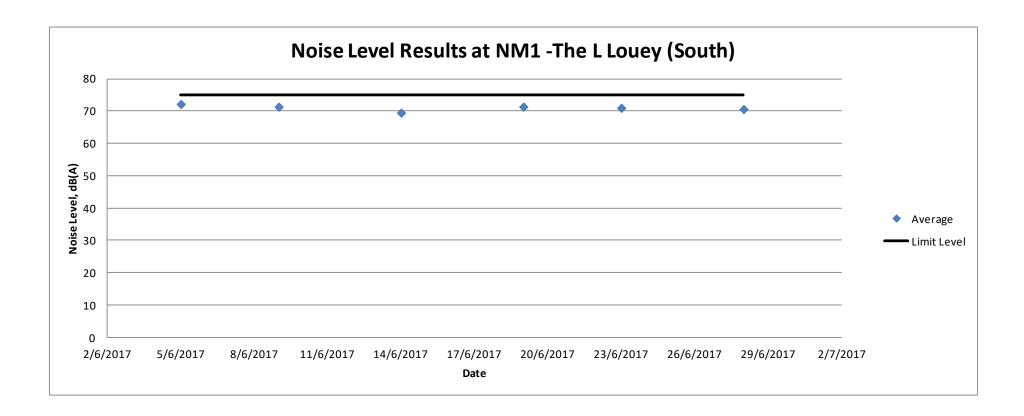
Y.C. Kwan

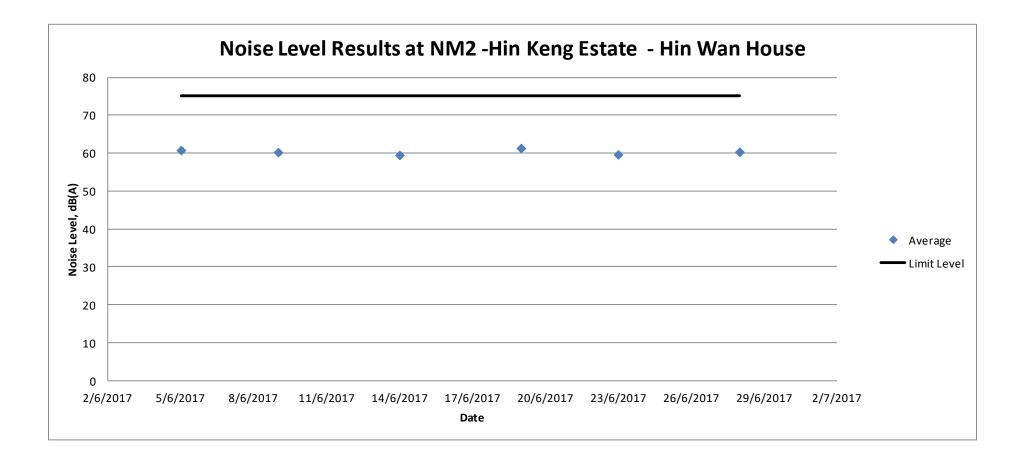
Checked by :

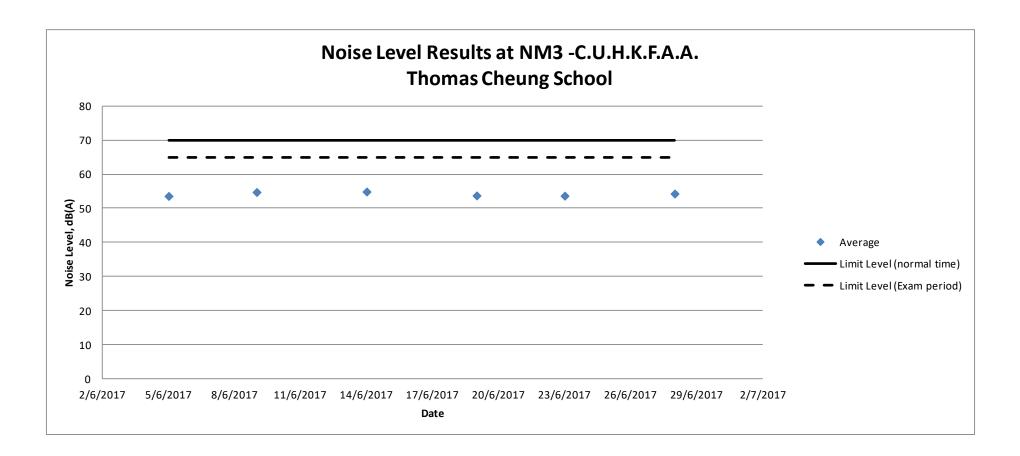
H.S. Lam

Date : 26 July 2016

Appendix N Impact Noise Monitoring Results and Graphical Presentation

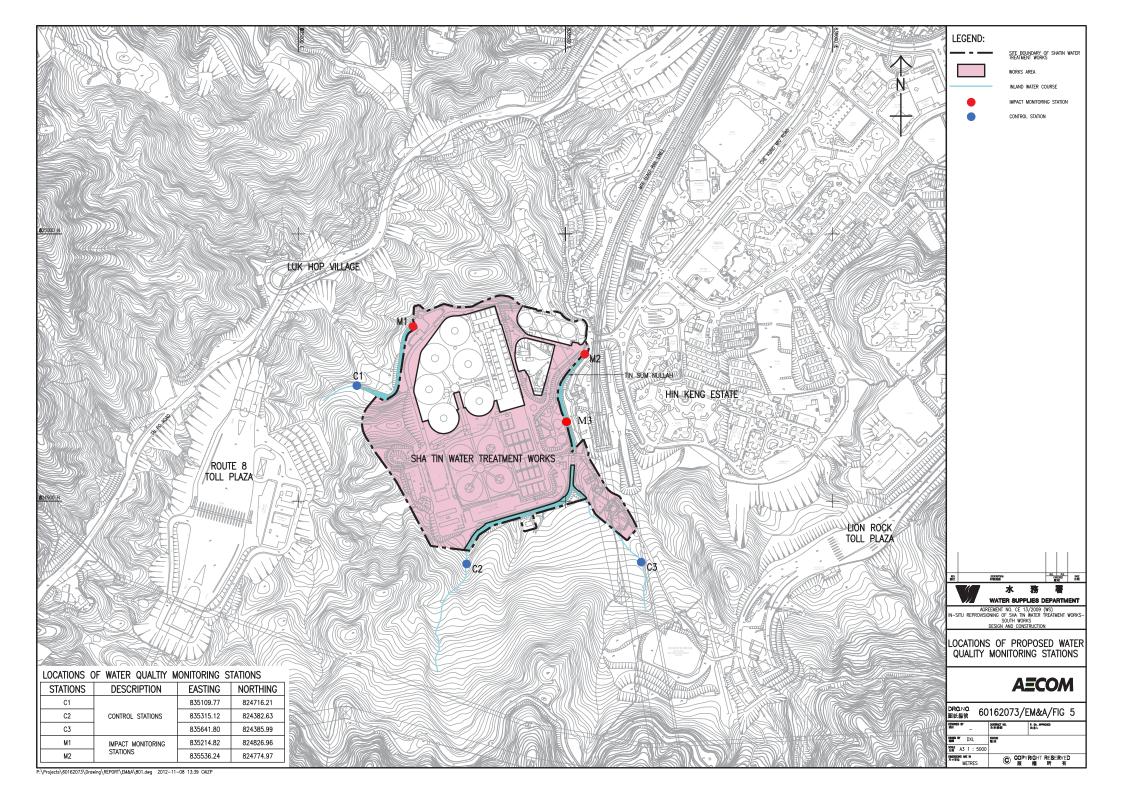






Appendix O Location Plan of Water Quality Monitoring Station

Project no.: CJO-3113



Appendix P Calibration Certificate (Water Quality)

Acumen Laboratory and Testing Ltd. Lot 12, Tam Kon Shan Road, Tsing Yi (N), Hong Kong Tel: (852) 2333 6823 Fax: (852) 2333 1316

Page 1 of 2

Test Report

Completion Date : 20/5/2017

Client Information

Company/ Organization	: Acumen Environmental Engineering and Technologies
	Co. Ltd.
Address	: No. 12, Tam Kon Shan Road, Tsing Yi (North), N.T.
Project Name	: CJO-3113-214-01
Sample Description	: Certificate of Reference Check

Test Information

Laboratory ID	: R170261/6
Item	: YSI ProDSS Multi-parameter Water Quality Monitoring System
Serial No.	: 16A101332
Receive Date	: 19/5/2017
Test Period	: 20/5/2017-20/5/2017
Test Result	: The results are presented on page 2

Authorized Signature:

Hui Wai Fung, Huntington Laboratory Manager Chemical Division

Acumen Laboratory and Testing Ltd. Lot 12, Tam Kon Shan Road, Tsing Yi (N), Hong Kong Tel: (852) 2333 6823 Fax: (852) 2333 1316

Page 2 of 2

Test Report

: CJO-3113

Test Result:

pН	Reference Reading	Recorded Reading
	4.00	4.04
	7.00	6.95
	10.00	10.04
	Allowing Deviation	±0.2 unit

Temperature	Reference Reading	Recorded Reading
	8.0°C	8.4°C
	25.0°C	25.8°C
	42.0°C	41.5°C
	Allowing Deviation	±2.0°C

Testing Method:
In-house method

Testing Method:

APHA 4500-H*B

Turbidity	Reference Reading	Recorded Reading
	0.0NTU	0.0NTU
	4.0NTU	4.1NTU
	40.0NTU	40.3NTU
	80.0NTU	79.5NTU
	400.0NTU	398.2NTU
	800.0NTU	801.8NTU
	Allowing Deviation	±10%

Testing Method:
APHA 2130B

Dissolved	Reference Reading	Recorded Reading
Oxygen	3.30mg/L	3.25mg/L
	5.90mg/L	5.81mg/L
	8.20mg/L	8.13mg/L
	Allowing Deviation	±0.2mg/L

Testing Method: APHA 4500-OC & G

-----End of Report-----

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 ISO/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). 此页 ISO/IEC 17025:2005 的認可資格證明此實驗所認可合作組織及國際標準化組織的聯合公報)。 實施一套實驗所質量管理體系(見國際認可論壇、國際實驗所認可合作組織及國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

CAON

WONG Wang-wan, Executive Administrator 執行幹事 黃宏華 Issue Date:16 July 2014 簽發日期:二零一四年七月十六日

Registration Number : HOKLAS 241 註冊號碼:

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



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

∟001195

Appendix R Impact Water Quality Monitoring Results

Date	Time	Weather	Location	Co-or	dinates	Water Depth	Sample Depth	Те	mp.	DO	con.	DO Sat	turation	Τι	urbidity	/	ŗ	Н	SS
				East	North	m	m	C	C	m	g/L	Ģ	%		NTU		u	nit	mg/L
	9:17	Sunny	C1	835110	824716	0.04	0.02	22.1	22.2	7.82	7.82	98.7	98.8	3	.3	3.3	7.87	7.88	3.9
ļ	9:28	Sunny	C2	835403	824470	0.02	0.01	22.7	22.7	8.29	8.29	99.1	99.1	2.	.3	2.3	8.60	8.60	3.7
2/6/2017	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	1	N/A	N/A	N/A
2/0/2017	9:49	Sunny	M1	835215	824827	0.8	0.4	23.0	23.0	9.11	9.12	96.2	96.3	3	5.7	3.6	7.80	7.81	3.0
	10:15	Sunny	M2	835536	824775	0.05	0.025	23.2	23.1	9.07	9.07	97.3	97.3	8	3.7	8.7	9.51	9.51	10.3
	10:21	Sunny	M3	835501	824648	0.02	0.01	22.8	22.7	9.34	9.33	97.9	98.1	0).8	0.8	7.98	7.98	<1
		Sunny	C1	835110	824716	0.04	0.02	22.1	22.1	8.64	8.64	96.9	96.9	3.		3.5	7.52	7.51	3.6
	14:57	Sunny	C2	835403	824470	0.02	0.01	24.0	24.1	8.87	8.87	98	98.1		2.6	2.6	8.70	8.70	4.0
5/6/2017	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
5/0/2017		Sunny	M1	835215	824827	0.8	0.4	23.9	23.9	8.99	9.00	98.7	98.8		.8	3.7	7.92	7.90	3.0
		Sunny	M2	835536	824775	0.05	0.025	21.6	21.6	9.33	9.33	97.6	97.5		0.3	9.3	8.98	8.98	11.3
	15:40	Sunny	M3	835501	824648	0.02	0.01	21.7	21.7	9.26	9.26	99	99.2	0).7	0.8	7.97	7.97	<1
		Cloudy	C1	835110	824716	0.04	0.02	23.3	23.3	8.33	8.33	97.3	97.3		.6	3.7	7.63	7.63	3.7
		Cloudy	C2	835403	824470	0.02	0.01	22.7	22.7	9.03	9.03	98.6	98.4		2.9	2.9	8.51	8.51	3.9
7/6/2017	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
		Cloudy	M1	835215	824827	0.8	0.4	21.9	21.9	9.13	9.13	98.8	98.7	4.		4.1	8.00	8.01	3.0
		Cloudy	M2	835536	824775	0.05	0.025	22.6	22.6	8.98	8.98	97.4	97.4		.4	5.3	9.04	9.03	11.0
	10:08	Cloudy	M3	835501	824648	0.02	0.01	22.9	23.0	9.24	9.25	99.8	99.7	0).5	0.6	8.00	7.98	<1
	0.10	d 1 1	G1	005110	00.471.6	0.04	0.00	22.0	22.0	0.10	0.10	00.0	00.1	2	0	2.0			2.0
		Cloudy	C1	835110	824716	0.04	0.02	22.8	22.9	8.10	8.10	98.9	99.1	2.		2.9	7.74	7.75	3.9
		Cloudy	C2	835403	824470	0.02	0.01	23.6	23.6	9.12	9.12	96.4	96.4		2.2	2.1	8.57	8.57	3.8
9/6/2017	N/A	N/A Classic	C3	835642 835215	824386	N/A	N/A	N/A 21.9	N/A 21.0	N/A	N/A	N/A 07.7	N/A 07.7	N/A	N/A		N/A 0.10	N/A	N/A
		Cloudy Cloudy	M1 M2	835536	824827 824775	0.8	0.4	21.8	21.9 21.8	9.02 8.95	9.00 8.95	97.7 97.2	97.7 97.2	6.	.1	4.2	8.10 9.12	8.08 9.10	3.1 11.1
		Cloudy	M3	835501	824648	0.03	0.023	22.5	21.8	9.19	9.19	97.2	97.2		.2	0.2	7.67	7.68	<1
	10.10	Cloudy	IVIJ	855501	024040	0.02	0.01	22.3	22.3	7.17	9.19	77.2	77.2	U	1.0	0.7	7.07	7.08	
· · · · · ·	8.30	Cloudy	C1	835110	824716	0.04	0.02	23.1	23.1	8.05	8.05	98.6	98.5	2	2.7	2.7	7.60	7.62	3.6
 		Cloudy	C2	835403	824470	0.02	0.02	22.8	22.8	8.87	8.87	99.6	99.6		2.7	2.8	8.60	8.60	4.0
	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
12/6/2017		Cloudy	M1	835215	824827	0.8	0.4	21.7	21.6	9.20	9.20	95.9	96.0		.9	3.8	7.87	7.89	3.0
 	9:57	Cloudy	M2	835536	824775	0.05	0.025	23.7	23.6	9.21	9.20	96.7	96.5		5.4	3.4	8.91	8.91	11.0
	-	Cloudy	M3	835501	824648	0.02	0.01	21.9	22.0	9.27	9.20	96.4	96.5).7	0.6	8.23	8.23	<1
	9:04	Cloudy	C1	835110	824716	0.04	0.02	21.7	21.8	7.87	7.87	98.7	98.8	3.	.3	3.3	7.71	7.70	3.8
	9:17	Cloudy	C2	835403	824470	0.02	0.01	20.9	21.0	8.59	8.59	100.4	100.5		2.6	2.7	8.68	8.70	4.1
14/6/2017	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	1	N/A	N/A	N/A
14/0/2017	9:50	Cloudy	M1	835215	824827	0.8	0.4	21.2	21.3	8.95	8.95	96.5	96.5	2	2.5	2.5	7.65	7.64	2.9
	10:16	Cloudy	M2	835536	824775	0.05	0.025	21.7	21.8	9.21	9.21	98.9	98.9	3.	.7	3.8	9.08	9.08	11.4
	10:37	Cloudy	M3	835501	824648	0.02	0.01	23.0	23.1	9.30	9.31	98	98.0	0).9	0.8	8.10	8.10	<1
		Cloudy	C1	835110	824716	0.04	0.02	22.7	22.8	8.11	8.12	97.1	97.1		.6	1.6	7.68	7.68	3.9
	15:40	Cloudy	C2	835403	824470	0.02	0.01	24.0	24.0	8.60	8.61	99.9	100.1	1.		1.3	8.52	8.51	4.0
16/6/2017	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
2010/2011		Cloudy	M1	835215	824827	0.8	0.4	21.6	21.7	9.14	9.15	100.9	100.9	1.		1.8	7.79	7.78	3.2
	16:17	Cloudy	M2	835536	824775	0.05	0.025	22.0	22.0	9.21	9.23	98	98.0	9	0.1	9	9.50	9.50	12.1
' i		Cloudy	M3	835501	824648	0.02	0.01	22.8	22.7	9.26	9.27	98.6	98.6).4	0.5	7.75	7.76	<1

	10:01	Cloudy	C1	835110	824716	0.04	0.02	22.5	22.4	7.87	7.87	100.5	100.5	3	2.9	7.59	7.59	3.8
		Cloudy	C2	835403	824470	0.04	0.02	23.4	23.4	8.66	8.66	97.7	97.9	0.8			8.52	4.0
	N/A	N/A	C3	835642	824386		N/A	N/A		N/A	N/A	N/A	N/A	0.0 N/A	N/A	N/A	N/A	N/A
19/6/2017	10:59	Cloudy	M1	835215	824827	0.8	0.4	21.9	22.0	8.99	8.99	98.2	98.2	3.5			7.62	3.0
	11:23	Cloudy	M2	835536	824775	0.05	0.025	23.0	22.9	9.04	9.05	99.1	99.2	8.7			8.69	10.9
	11:32	Cloudy	M3	835501	824648	0.02	0.01	23.4	23.3	9.30	9.30	98.5	98.4	0.7			7.98	<1
																_		
	16:01	Cloudy	C1	835110	824716	0.04	0.02	22.2	22.2	7.93	7.93	98.4	98.5	2.4			7.33	3.9
	16:29	Cloudy	C2	835403	824470	0.02	0.01	22.5	22.6	8.98	9.00	100.4	100.4	2.9	-	8.50	8.50	4.1
21/6/2017	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
21/0/2017	16:57	Cloudy	M1	835215	824827	0.8	0.4	22.8	22.8	9.17	9.17	99.9	99.8	4	4	7.67	7.67	3.1
		Cloudy	M2	835536	824775	0.05	0.025	21.3	21.3	9.24	9.24	98.4	98.5	6.2		8.59	8.60	11.3
	17:20	Cloudy	M3	835501	824648	0.02	0.01	20.9	21.0	9.24	9.26	97.6	97.6	0.7	0.7	8.21	8.21	<1
	15.00	Cloudy	C1	835110	824716	0.04	0.02	22.4	22.4	8.18	8.17	99.3	99.3	2.7	2.8	7.49	7.49	3.9
		Cloudy	C1 C2	835403	824470	0.04	0.02	22.4	22.4	9.07	9.06	97.6	99.5	2.7			8.33	4.0
	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
23/6/2017			M1	835215	824827	0.8	0.4	21.5	21.4	9.18	9.18	98.4	98.4	3.8			8.00	3.2
	16:17	Cloudy	M2	835536	824775	0.05	0.025	22.0	22.1	9.07	9.08	99.5	99.5	7.7			8.80	12.7
	16:21	Cloudy	M3	835501	824648	0.02	0.01	21.7	21.7	9.23	9.23	99.7	99.5	0.8	0.8		8.18	<1
		Sunny	C1	835110	824716	0.04	0.02	21.9	21.8	8.26	8.26	100.3	100.2	3.6			7.59	3.7
	15:30	Sunny	C2	835403	824470	0.02	0.01	21.7	21.7	8.53	8.53	99.2	99.2	2.5			8.26	4.1
26/6/2017	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
20/0/2017		Sunny	M1	835215	824827	0.8	0.4	20.9	20.9	8.99	9.01	98.9	99.0	2.9			7.67	3.0
		Sunny	M2	835536	824775	0.05	0.025	21.3	21.3	9.26	9.25	97.9	97.9	8	-	9.00	9.00	10.6
	16:37	Sunny	M3	835501	824648	0.02	0.01	22.8	22.9	9.27	9.27	96.3	96.3	0.9	0.8	8.33	8.33	<1
	14.00	Sunny	C1	835110	824716	0.04	0.02	22.0	22.1	8.30	8.28	95.7	95.7	3.5	3.4	7.87	7.87	3.6
		Sunny	C1 C2	835403	824470	0.04	0.02	22.0	22.1	8.67	8.67	95.7	93.7	2.3			8.43	4.0
	N/A	N/A	C3	835642	824386		0.01 N/A	N/A		N/A	N/A)0.0 N/A	N/A	N/A	N/A	N/A	N/A	4.0 N/A
28/6/2017		Sunny	M1	835215	824827	0.8	0.4	20.8	20.8	9.06	9.07	97.3	97.3	2.9			7.81	3.1
	15:01	Sunny	M2	835536	824775	0.05	0.025	23.2	23.2	9.25	9.27	101.4	101.4	2.9			9.13	12.8
		Sunny	M3	835501	824648	0.02	0.01	21.8	21.8	9.25	9.25	99.5	99.7	0.5			8.45	<1
		· · · · ·							_									
	15:13	Sunny	C1	835110	824716	0.04	0.02	21.5	21.4	8.22	8.21	96.1	96.1	3.3	3.2	7.79	7.78	3.9
	15:33	Sunny	C2	835403	824470	0.02	0.01	21.9	22.0	8.49	8.48	97.3	97.3	2.9	3.0	8.50	8.48	4.0
30/6/2017	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
	15:56	Sunny	M1	835215	824827	0.8	0.4	20.7	20.7	9.18	9.20	96.8	97.0	3.1	3	8.04	8.04	3.0
20/0/2017	15.50																	
20/0/2017	16:14	Sunny Sunny	M2 M3	835536 835501	824775 824648	0.05	0.025	20.6	20.7	8.97 9.31	8.97 9.33	97.6 99.1	97.7 98.9	3.9 0.6			9.26 8.52	13.0 <1

Acumen Laboratory and Testing Limited

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Test Report

Page 1 of 2

Report Number	: Q170003aR170320
Job Number	: R170320
Issue Date	: 06/07/2017
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-3113-220
Sample Description	: SS test
Laboratory ID	: R170320/1-5
Date of Sampling Date Received Test Period	: 02/06/2017 : 02/06/2017 : 02/06/2017 03/06/2017
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:	in the second se

Hui Wai Fung, Huntington Laboratory Manager Chemical Division

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Test Report

Page 2 of 2

Report Number	: Q170003aR170320				
Job Number	: R170320				
Issue Date	: 06/07/2017				

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R170320/1	02/06/2017	C1	3.9
R170320/2	02/06/2017	C2	3.7
R170320/3	02/06/2017	M1	3.0
R170320/4	02/06/2017	M2	10.3
R170320/5	02/06/2017	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	: Q170003aR170321
Job Number	: R170321
Issue Date	: 06/07/2017
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-3113-221
Sample Description	: SS test
Laboratory ID	: R170321/1-5
Date of Sampling	: 05/06/2017
Date Received Test Period	: 05/06/2017 : 05/06/2017–06/06/2017
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. QPL-15e, APHA 22ed 2540 D
Test Result	: Refer to the results on page 2.
root noodic	
	For and on behalf of

Acumen Laboratory and Testing Limited

Authorized Signature:

iA.

Hui Wai Fung, Huntington Laboratory Manager Chemical Division

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Test Report

Page 2 of 2

Report Number	: Q170003aR170321
Job Number	: R170321
Issue Date	: 06/07/2017

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R170321/1	05/06/2017	C1	3.6
R170321/2	05/06/2017	C2	4.0
R170321/3	05/06/2017	M1	3.0
R170321/4	05/06/2017	M2	11.3
R170321/5	05/06/2017	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	: Q170003aR170322
Job Number	: R170322
Issue Date	: 06/07/2017
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-3113-222
Sample Description	: SS test
Laboratory ID	: R170322/1-5
Date of Sampling	: 07/06/2017
Date Received	: 07/06/2017
Test Period	: 07/06/2017–08/06/2017
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:

Donort Number

1A.

Hui Wai Fung, Huntington Laboratory Manager Chemical Division

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Test Report

Page 2 of 2

Report Number	: Q170003aR170322
Job Number	: R170322
Issue Date	: 06/07/2017

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R170322/1	07/06/2017	C1	3.7
R170322/2	07/06/2017	C2	3.9
R170322/3	07/06/2017	M1	3.0
R170322/4	07/06/2017	M2	11.0
R170322/5	07/06/2017	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.

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Test Report

Page 1 of 2

Report Number	: Q170003aR170323
Job Number Issue Date	: R170323 : 06/07/2017
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-3113-223
Sample Description	: SS test
Laboratory ID	: R170323/1-5
Date of Sampling Date Received Test Period	: 09/06/2017 : 09/06/2017 : 09/06/2017—10/06/2017
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	: Q170003aR170323
Job Number	: R170323
Issue Date	: 06/07/2017

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R170323/1	09/06/2017	C1	3.9
R170323/2	09/06/2017	C2	3.8
R170323/3	09/06/2017	M1	3.1
R170323/4	09/06/2017	M2	11.1
R170323/5	09/06/2017	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.

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Test Report

Page 1 of 2

Report Number	: Q170003aR170324
Job Number	: R170324
Issue Date	: 06/07/2017
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-3113-224
Sample Description	: SS test
Laboratory ID	: R170324/1-5
Date of Sampling	: 12/06/2017
Date Received	: 12/06/2017
Test Period	: 12/06/2017–13/06/2017
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	: Q170003aR170324
Job Number	: R170324
Issue Date	: 06/07/2017

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R170324/1	12/06/2017	C1	3.6
R170324/2	12/06/2017	C2	4.0
R170324/3	12/06/2017	M1	3.0
R170324/4	12/06/2017	M2	11.0
R170324/5	12/06/2017	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	: Q170003aR170325
Job Number	: R170325
Issue Date	: 06/07/2017
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-3113-225
Sample Description	: SS test
Laboratory ID	: R170325/1-5
Date of Sampling	: 14/06/2017
Date Received	: 14/06/2017
Test Period	: 14/06/2017–15/06/2017
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	: Q170003aR170325
Job Number	: R170325
Issue Date	: 06/07/2017

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R170325/1	14/06/2017	C1	3.8
R170325/2	14/06/2017	C2	4.1
R170325/3	14/06/2017	M1	2.9
R170325/4	14/06/2017	M2	11.4
R170325/5	14/06/2017	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	: Q170003aR170326
Job Number	: R170326
Issue Date	: 06/07/2017
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-3113-226
Sample Description	: SS test
Laboratory ID	: R170326/1-5
Date of Sampling	: 16/06/2017
Date Received	: 16/06/2017
Test Period	: 16/06/2017–17/06/2017
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:

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Test Report

Page 2 of 2

Report Number	: Q170003aR170326
Job Number	: R170326
Issue Date	: 06/07/2017

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R170326/1	16/06/2017	C1	3.9
R170326/2	16/06/2017	C2	4.0
R170326/3	16/06/2017	M1	3.2
R170326/4	16/06/2017	M2	12.1
R170326/5	16/06/2017	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	: Q170003aR170328
Job Number	: R170328
Issue Date	: 06/07/2017
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-3113-227
Sample Description	: SS test
Laboratory ID	: R170328/1-5
Date of Sampling	: 19/06/2017
Date Received	: 19/06/2017
Test Period	: 19/06/2017–20/06/2017
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	: Q170003aR170328
Job Number	: R170328
Issue Date	: 06/07/2017

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R170328/1	19/06/2017	C1	3.8
R170328/2	19/06/2017	C2	4.0
R170328/3	19/06/2017	M1	3.0
R170328/4	19/06/2017	M2	10.9
R170328/5	19/06/2017	МЗ	<1

Note:

1. mg/L indicates milligram per liter

2. mg O_2/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	: Q170003aR170329
Job Number Issue Date	: R170329 : 06/07/2017
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-3113-228
Sample Description	: SS test
Laboratory ID	: R170329/1-5
Date of Sampling Date Received Test Period	: 21/06/2017 : 21/06/2017 : 21/06/2017–22/06/2017
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	: Q170003aR170329
Job Number	: R170329
Issue Date	: 06/07/2017

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R170329/1	21/06/2017	C1	3.9
R170329/2	21/06/2017	C2	4.1
R170329/3	21/06/2017	M1	3.1
R170329/4	21/06/2017	M2	11.3
R170329/5	21/06/2017	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	: Q170003aR170330
Job Number	: R170330
Issue Date	: 06/07/2017
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-3113-229
Sample Description	: SS test
Laboratory ID	: R170330/1-5
Date of Sampling	: 23/06/2017
Date Received	: 23/06/2017
Test Period	: 23/06/2017–24/06/2017
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, Huňtington Laboratory Manager Chemical Division

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Test Report

Page 2 of 2

Report Number	: Q170003aR170330
Job Number	: R170330
Issue Date	: 06/07/2017

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R170330/1	23/06/2017	C1	3.9
R170330/2	23/06/2017	C2	4.0
R170330/3	23/06/2017	M1	3.2
R170330/4	23/06/2017	M2	12.7
R170330/5	23/06/2017	M3	<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	: Q170003aR170331
Job Number Issue Date	: R170331 : 06/07/2017
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-3113-230
Sample Description	: SS test
Laboratory ID	: R170331/1-5
Date of Sampling Date Received Test Period	: 26/06/2017 : 26/06/2017 : 26/06/2017–27/06/2017
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	: Q170003aR170331
Job Number	: R170331
Issue Date	: 06/07/2017

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R170331/1	26/06/2017	C1	3.7
R170331/2	26/06/2017	C2	4.1
R170331/3	26/06/2017	M1	3.0
R170331/4	26/06/2017	M2	10.6
R170331/5	26/06/2017	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	: Q170003aR170332
Job Number	: R170332
Issue Date	: 06/07/2017
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-3113-231
Sample Description	: SS test
Laboratory ID	: R170332/1-5
Date of Sampling	: 28/06/2017
Date Received	: 28/06/2017
Test Period	: 28/06/2017–29/06/2017
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	: Q170003aR170332
Job Number	: R170332
Issue Date	: 06/07/2017

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R170332/1	28/06/2017	C1	3.6
R170332/2	28/06/2017	C2	4.0
R170332/3	28/06/2017	М1	3.1
R170332/4	28/06/2017	M2	12.8
R170332/5	28/06/2017	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	: Q170003aR170333
Job Number	: R170333
Issue Date	: 06/07/2017
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-3113-232
Sample Description	: SS test
Laboratory ID	: R170333/1-5
Date of Sampling	: 30/06/2017
Date Received	: 30/06/2017
Test Period	: 30/06/2017–30/06/2017
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:

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Test Report

Page 2 of 2

Report Number	: Q170003aR170333
Job Number	: R170333
Issue Date	: 06/07/2017

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R170333/1	30/06/2017	C1	3.9
R170333/2	30/06/2017	C2	4.0
R170333/3	30/06/2017	M1	3.0
R170333/4	30/06/2017	M2	13.0
R170333/5	30/06/2017	МЗ	<1

Note:

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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Appendix S

Impact Monitoring report for Ecology

Post-Transplantation Monitoring Report

for Agreement No. CE 13/2009 (WS)

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

Report No.33

05 June 2017

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1.	INTRODUCTION	2
2.	DESCRIPTION OF TREE MONITORING SITE	3
3.	MONITORING METHODOLOGY	3
4.	RESULT	3
5	SUMMARY	4

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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. 33 Tree Report presents data collected in 05 June 2017. 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)

2. DESCRIPTION OF TREE MONITORING SITE

- 2.1 Incense Tree (*Aquilaria sinensis*) and Ailanthus (*Ailanthus fordii*) trees will be 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*) will be 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 were 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 inspection was conducted on 05 June 2017. TA572, TA326 and TA327 tree was transplanted to tree compensation area within the Sha Tin Water Treatment Works (STWTW) in 20 June 2016. The condition of TA572 was observed in fair condition while TA326 and TA327 were in poor condition. Water sprouts and Flowering were observed on TA327. Transplanted Lamb of Tartary (*Cibotium barometz*) seems to be received too much sunlight. Leaves of them were observed yellowish in colour.
- 4.2 Since Sha Tin South Fresh Water Service Reservoir (STSFWSR) was still under preparation, Lamb of Tartary and Hong Kong Eagle's Claw was still temporally stored on Nursery garden at Wang Toi Shan, Kam Tin.
- 4.3 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 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) in order to increase their transplantation survival rate.
- 4.5 After transplantation, root ball of TA572, TA326 and TA327 tree should be kept moisture especially during non-raining day.

5. MITIGATION MEASURE

5.1 Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) was observed dead during inspection on 20 August 2016. In order to compensate for the lost 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 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.

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

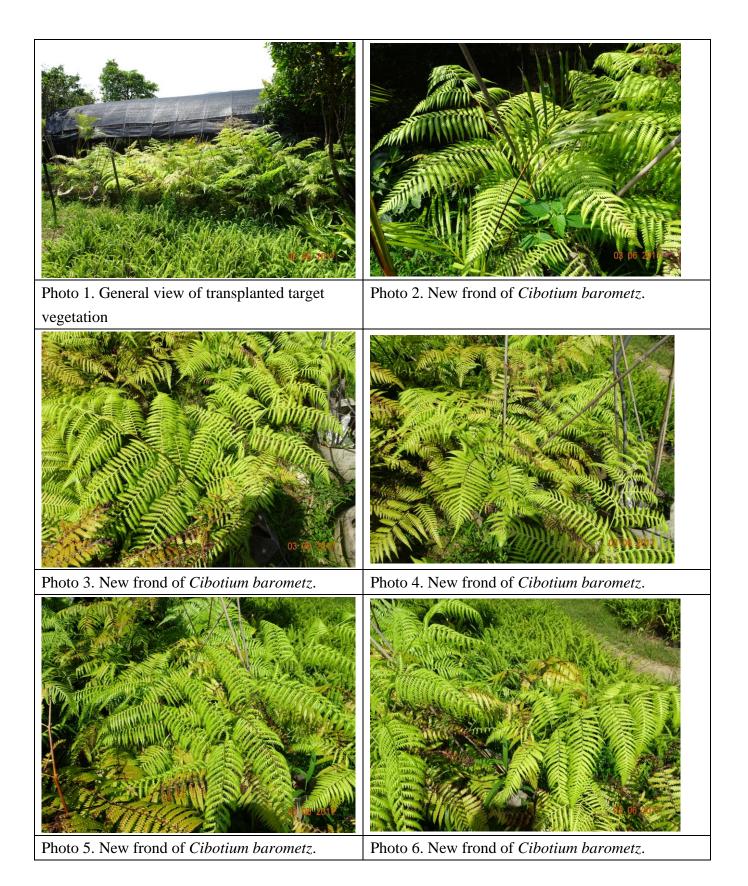
Table for Recommended species list to be planted

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.

6. SUMMARY

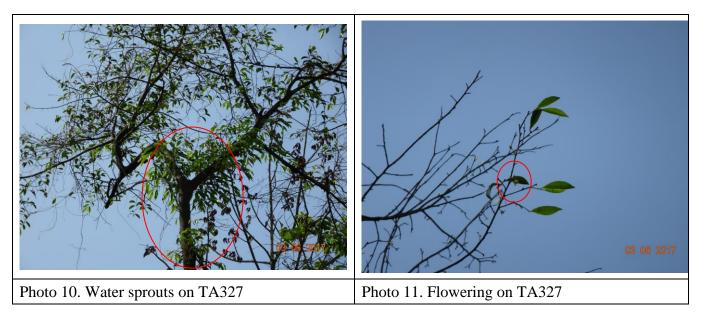
- 6.1 Ailanthus (Ailanthus fordii) and Incense Tree (Aquilaria sinensis) was transplanted to new location within STWTW. The condition of TA572 was observed in fair condition while TA326 and TA327 were in poor condition. Water sprouts and Flowering were observed on TA327. Transplanted Lamb of Tartary (*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 were 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*) was observed dead during inspection on 20 August 2016 and the survival rate was 96%.
- 6.3 In order to compensate for the lost of transplanted Hong Kong Eagle's Claw, 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. 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, TA326 and TA327 tree should be kept moisture especially during dry and non-raining day.

APPENDIX I Photo





(Ailanthus fordii) - TA572 (right)



APPENDIX II Table for condition of transplanted plant

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%	

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

No.	Species	Condition	Alive/Dead	Remark
TA572	Ailanthus fordii	Poor to Fair	Alive	
TA327	Aquilaria sinensis	Poor	Alive	Tree crown of TA327
				was thinner after
				transplantation. Water
				sprouts and Flowering
				were observed.
TA326	Aquilaria sinensis	Poor	Alive	Tree crown of TA326
				was thinner after
				transplantation.
		Survival rate (%)	100%	

Trees of Ailanthus and Incense Tree

Post-Transplantation Monitoring Report

for Agreement No. CE 13/2009 (WS)

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

Report No.34

22 June 2017

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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. 34 Tree Report presents data collected in 22 June 2017. 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)

2. DESCRIPTION OF TREE MONITORING SITE

- 2.1 Incense Tree (*Aquilaria sinensis*) and Ailanthus (*Ailanthus fordii*) trees will be 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*) will be 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 were 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 inspection was conducted on 22 June 2017. TA572, TA326 and TA327 tree was transplanted to tree compensation area within the Sha Tin Water Treatment Works (STWTW) in 20 June 2016. The condition of TA572 was observed in fair condition while TA326 and TA327 were in very poor and poor condition respectively. No new leave was observed generated during this growing season and tree bark was seen peel off from tree trunk at TA326. Water sprouts and Flowering were observed on TA327. Transplanted Lamb of Tartary (*Cibotium barometz*) seems to be received too much sunlight. Leaves of them were observed yellowish in colour.
- 4.2 Since Sha Tin South Fresh Water Service Reservoir (STSFWSR) was still under preparation, Lamb of Tartary and Hong Kong Eagle's Claw was still temporally stored on Nursery garden at Wang Toi Shan, Kam Tin.
- 4.3 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 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) in order to increase their transplantation survival rate.
- 4.5 After transplantation, root ball of TA572, TA326 and TA327 tree should be kept moisture especially during non-raining day.

5. MITIGATION MEASURE

5.1 Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) was observed dead during inspection on 20 August 2016. In order to compensate for the lost 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 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.

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

Table for Recommended species list to be planted

- 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.
- 5.3 For poor condition of TA326 and TA327, Contractor was advised to apply the growing hormone again helping TA326 and TA327 to regenerate their roots.

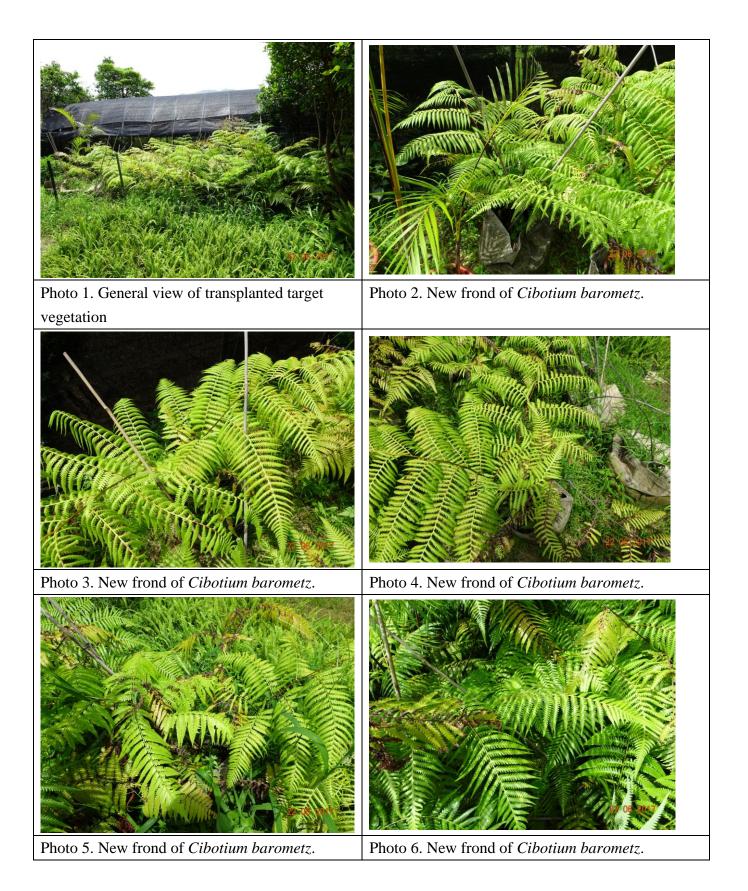
6. SUMMARY

6.1 Ailanthus (Ailanthus fordii) and Incense Tree (Aquilaria sinensis) was transplanted to new location within STWTW. The condition of TA572 was observed in fair condition while TA326 and TA327 were in very poor and poor condition respectively. No new leave was observed generated during this growing season and tree bark was seen peel off from tree trunk at TA326. Water sprouts and Flowering were observed on TA327. Contractor was advised to apply the growing hormone again helping TA326 and TA327 to regenerate their roots. 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 were temporally stored on

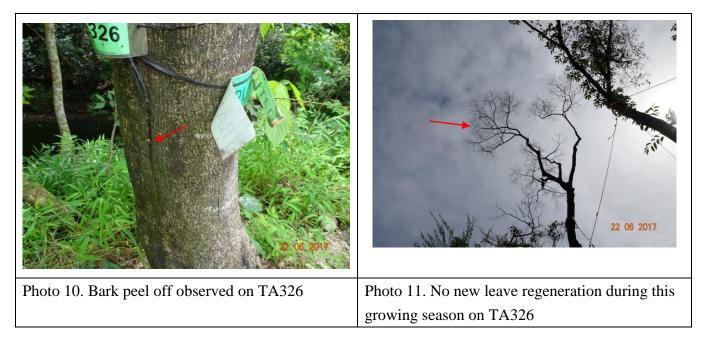
Nursery garden at Wang Toi Shan, Kam Tin. It is recommended to retain them at the nursery garden under proper maintenance during current recovery stage.

- 6.2 In general, all transplanted Lamb of Tartary were in fair condition while Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) was observed dead during inspection on 20 August 2016 and the survival rate was 96%.
- 6.3 In order to compensate for the lost of transplanted Hong Kong Eagle's Claw, 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. 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, TA326 and TA327 tree should be kept moisture especially during dry and non-raining day.

APPENDIX I Photo







APPENDIX II Table for condition of transplanted plant

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%	

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

	These of Analitius and incense Tree								
No.	Species	Condition	Alive/Dead	Remark					
TA572	Ailanthus fordii	Poor to Fair	Alive						
TA327	Aquilaria sinensis	Poor	Alive	Tree crown of TA327					
				was thinner after					
				transplantation. Water					
				sprouts and Flowering					
				were observed.					
TA326	Aquilaria sinensis	Very Poor	Alive	Tree crown of TA326					
				was thinner after					
				transplantation. No new					
				leave was observed					
				generated during this					
				growing season and tree					
				bark was seen peel off					
				from tree trunk at TA326					
		Survival rate (%)	100%						

Trees of Ailanthus and Incense Tree

Appendix T Monthly Summary of Waste Flow Table

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: 2017 Contract No. 3/WSD/15

(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	Total Quantities Generated	Broken Concrete (including rock for recycling into aggregates)	Reused in the Contract	Reused in Other Projects	Disposed as Public Fill	Imported C&D Material	Metal	Paper/ Cardboard Packaging	Plastic (bottles/containers, plastic sheets/ foams from package material)	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	3.377	0.000	0.050	2.990	0.336	0.000	4.086	0.001	0.003	0.000	0.018
February	5.074	0.000	0.080	4.190	0.803	0.000	0.000	0.000	0.000	0.000	0.007
March	7.363	0.000	0.006	6.562	0.796	0.000	4.545	0.075	0.002	0.000	0.014
April	0.496	0.000	0.026	0.240	0.231	0.000	4.145	0.065	0.015	0.000	0.005
May	5.457	0.000	0.023	0.042	5.392	0.000	0.000	0.000	0.000	0.433	0.014
June	1.771	0.000	0.014	0.354	1.403	0.000	0.008	0.050	0.007	0.000	0.004
Half-year total	23.538	0.000	0.199	14.378	8.961	0.000	12.784	0.191	0.027	0.433	0.061
July	0.000										
August	0.000										
September	0.000										
October	0.000										
November	0.000										
December	0.000										
Yearly Total	23.538	0.000	0.199	14.378	8.961	0.000	12.784	0.191	0.027	0.433	0.061

*174 m3 was reused in GE/96/10 and 180 m3 was reused by Tailor Recycled Aggregates (HK) Ltd.

Appendix U Implementation Schedule of Environmental Mitigation Measures (EMIS)

Environmental Mitigation and Enhancement Measure Implementation Schedule at Construction Stage

EIA Ref.	Recommended Mitigation Measures	Location of the	Implementation	Relevant Legislation	Implementation Phase			Status
		Measures	Agent	and Guidelines	D	с	0	
Air Quality								
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		\checkmark		Y
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		\checkmark		Y
4.7.1	Tarpaulin covering of all dusty vehicle loads transported to, from and between site locations.	All works areas	Contractor	Dust) Regulation		\checkmark		Y
4.7.1	Establishment and use of vehicle wheel and body washing facilities at the exit points of the site.	All works areas	Contractor	EIVIQA Manual		\checkmark		Y
4.7.1	Imposition of speed controls for vehicles on site haul roads.	All works areas	Contractor	-		\checkmark		Y
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					Y
Noise					1		I	
5.6.4	Implement good site practices to reduce noise level	All works areas	Contractor	Noise Control Ordinance		\checkmark		Y
5.6.5	Adoption of Quiet PME	All works areas	Contractor			\checkmark		N/A
5.6.6	Use of Movable Noise Barrier	All works areas	Contractor	-		\checkmark		N/A
5.8	Noise monitoring	Monitoring points	Contractor			\checkmark		Y
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		\checkmark		Y

	traps, silt traps and sedimentation basins. Channels or earth bunds or			Site Drainage		
	sand bag barriers should be provided on site to properly direct					
	stormwater to such silt removal facilities. Perimeter channels at site			TM-DSS		
	boundaries should be provided where necessary to intercept storm					
	run-off from outside the site so that it will not wash across the site.			Water Pollution		
	Catchpits and perimeter channels should be constructed in advance of			Control		
	site formation works and earthworks.			Ordinance		
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 and after each rainstorm to prevent local flooding.	All works areas	Contractor		\checkmark	Y
6.8.3	Temporary exposed slope surfaces should be covered and temporary	All works area	Contractor	_		
0.8.5	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.	All WORKS area	Contractor		\checkmark	Y
6.8.4	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.	All works areas	Contractor		\checkmark	N/A
6.8.5	Rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities.	All works areas	Contractor	-	\checkmark	Y
6.8.6	Open stockpiles of construction materials (e.g. aggregates, sand and fill material) on sites should be covered with tarpaulin or similar fabric during rainstorms.	All works areas	Contractor		\checkmark	Y
6.8.7	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.	All works areas	Contractor	-	\checkmark	Y
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.	All works areas	Contractor		\checkmark	Y
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.	All works areas	Contractor			Y
6.8.10	Before commencing any demolition works, all drainage connections should be sealed to prevent building debris, soil, sand etc. from entering	All works areas	Contractor		\checkmark	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
6.8.12	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
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
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
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
6.8.17	Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance.	All works areas	Contractor
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
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
6.10	Water quality monitoring	Monitoring points	Contractor

7.6.1	Appropriate waste handling, transportation and disposal methods for all	All works areas	Contractor	Waste Disposal		
	waste arisings generated during the construction works for the Project			Ordinance	\checkmark	Y
	should be implemented to ensure that construction wastes do not enter					
	the nearby streams or drainage channel.			DEVB TCW No.		
7.6.2	Implementation of good site practices for waste management	All works areas	Contractor	6/2010,	\checkmark	Y
7.6.3	Implementation of trip ticket system to control waste disposal	All works areas	Contractor	ETWB TCW No. 19/2005	\checkmark	Y
7.6.4	Implementation of good site practices to reduce waste generations	All works areas	Contractor	Land	\checkmark	Y
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	All works areas	Contractor	(Miscellaneous Provisions)	\checkmark	Y
7.0	C&D material and to facilitate the sorting process.			Ordinance		
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	\checkmark	Y
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	N	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		\checkmark	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		\checkmark	Y

	the Waste Disposal (Chemical Waste) (General) Regulation.					
Ecology		•	·		· · · ·	
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	\checkmark	Y
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		\checkmark	Y
8.8.3	Conduct detailed vegetation survey and implement suggested measures for species of conservation importance.		The Engineer/ Contractor	-	\checkmark	Y
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	-	\checkmark	Y
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		\checkmark	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		√	Y
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		~	Y
8.8.9-8.8.11	Implement woodland compensation		The Engineer/ Contractor		\checkmark	N/A

Landscape ar	nd Visual					
9.8.1	Existing tress to be retained on site shall be carefully protected during construction. Trees unavoidably affected by the works shall be transplanted as far as possible.	All works areas	Contractor	DEVB TCW No. 10/2013	\checkmark	Y
	Compensatory Planting shall be provided in accordance with DEVB TCW No. 10/2013 – Tree Preservation.	All works areas	Contractor	EIAO TM	\checkmark	Y
	Control of night-time lighting glare.	All works areas	Contractor		\checkmark	Y
	Erection of decorative screen hoarding compatible with the surrounding setting.	All works areas	Contractor		√	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		\checkmark	Y
Cultural Heri	tage					
10.6.2	Vibration monitoring at Ex KCR Beacon Hill Tunnel during piling works of Administration Building	Work site	The Engineer /Contractor		\checkmark	N/A
Land Contam	nination		4		I I	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 Remediation Goals for Contaminated Land Management (Guidance Manual)	\checkmark	N/A
Hazard to Life						
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	\checkmark	Υ
	Develop an audit procedure to ensure enforcement of speed limits and to ensure adequate site access control	All works areas	The Engineer		\checkmark	Y
	Ensure construction method statement is endorsed by the Engineer (AECOM)	All works areas	The Engineer	1	\checkmark	Y

		1	 	
Ensure designated manoeuvring area for the new access road construction is away from the Chlorination House	New access road area	Contractor/ The Engineer	\checkmark	Y
Ensure that the emergency response plan and procedures (including drills) cover the reprovisioning activities	All works areas	Contractor/ The Engineer	\checkmark	Y
Safety training to be provided to construction workers and WSD/Engineer staff regarding evacuation procedures	All works area	Contractor/ The Engineer	\checkmark	Y
Ensure communication protocol is in place between construction and operation staff with regard to the change of chlorine delivery route and the switchover from the existing to new chlorinated water piping;	All works areas	Contractor/ The Engineer	\checkmark	N/A
Ensure temporary suspension of crane operation and construction truck movements during chlorine delivery	All works areas	Contractor/ The Engineer	\checkmark	Y
Provide a crash barrier between the construction site and the north side of the Chlorination House.	Chlorination House area	Contractor	\checkmark	Y
Conduct vibration monitoring at the Chlorination House during piling activities to ensure vibration levels are acceptable and will not lead to any damage of the Chlorination House	Chlorination House area	Contractor	√	Y
Civil engineering calculation to be performed to confirm differential settlement from excavation work is within acceptable limits for the Chlorination House	Chlorination House area	Contractor	\checkmark	Y
Provide settlement monitoring for the Chlorination House to ensure no subsidence occurs from nearby excavation works.	Chlorination House area	Contractor	\checkmark	Y
Confirm the chlorine concentration for the chlorinated water before the switchover from the existing to new piping. This is to avoid the potential for chlorine gas vapours being released if the concentration is too high and there is spillage during switchover	Chlorinated water piping	WSD	\checkmark	N/A
Develop an operating procedure for performing the chlorinated water switchover from the existing piping to new piping.	All works areas	Contractor/ The Engineer / WSD	\checkmark	N/A
Ensure the location/height of the lifting equipment is such there is no impact on Chlorination House/chlorine delivery route in case of falling, swinging or dropped load.	Chlorination House area	Contractor/ The Engineer	\checkmark	Y
Implement the controlled demolition of the existing E&M workshop to ensure that any steel structural elements can only fall away from the Chlorination House	Existing E&M Workshop and Chlorination House	Contractor/ The Engineer	\checkmark	N/A

	areas				
Stop any construction activities which may lead to vibrations and potential slope/boulder disturbance during the chlorine deliveries	All works areas	Contractor		\checkmark	
Installation of Chlorine gas monitors with audible alarms in the relevant	Reprovisioning	Contractor/		.1	
reprovisioning works area	works areas	The Engineer		\checkmark	
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			
· · · · · · · · · · · · · · · · · · ·	Beacon Hill	The Engineer /			
	North Gas	Contractor /			
	Offtake Station and Gas	HKCG			
	Pipelines in Old			N	
	Beacon Hill				
	Tunnel				
Temporary suspend chlorine delivery during the short period of		The Engineer /			
construction of the concerned section of elevated walkway to avoid		Contractor		\checkmark	
mobile crane impact on the chlorine truck					
	Chlorine	The Engineer /			
	delivery route and	Contractor			
	reprovisioning			\checkmark	
	works access				
	roads				
Large equipment/plant movement should be controlled by	All works areas	The Engineer /			
'Permit-to-move' system		Contractor /		\checkmark	
		WSD			
	Chlorination	The Engineer /		.1	
zone would be determined by the size of the equipment	House area	Contractor		\checkmark	
	Construction	The Engineer /		\checkmark	
· ·	Office area	Contractor		`	
Entry of non-authorized personnel to the construction site to be prohibited	All works areas	Contractor		\checkmark	

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	\checkmark	k.i.v.
	Improved clamps with independent checks to prevent load shedding	Chlorine			\checkmark	F
	Installation of fire screen and larger fire extinguishers to prevent engine and wheel fires from spreading to the cargo area	delivery trucks			\checkmark	F
	Adoption of the chlorine delivery route from Sham Shui Kok Dock to Sha Tin WTW					F
	Provision of emergency repair kit					F
12.34.3 Table 12.37	Ban the use of retreaded tyres and perform regular visual checks on the tyres.				\checkmark	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.				\checkmark	F
	Limit fuel tanks capacity at the beginning of the Project (Item 2.3 of Table 12.37 – advance measure).				\checkmark	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)				~	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			\checkmark	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			\checkmark	k.i.v.
	Implement a sturdy steel frame to minimize the potential for chlorine release due to truck rollover				\checkmark	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		\checkmark	k.i.v.

	Training should be provided for the use of the GPS fleet management and improved safe driving.	\checkmark	k.i.v.
	Ensured that independent checks are performed to ensure proper chlorine drum latching and clamping.	\checkmark	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.	\checkmark	k.i.v.
	Training should be provided to driver and driver attendant for the emergency use of the new 2 × 9L AFFF extinguishers.	\checkmark	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	\checkmark	k.i.v.
	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	\checkmark	F
	To keep under review alternate chlorine receiving dock in Sha Tin/Tai Po area for chlorine delivery to STWTW.	\sim	k.i.v.
<u>Legend</u>			
D – Design I			
C – Constru	ction Phase		
0 – Operati	on Phase		
Y - Complia	nce of Mitigation Measures		
N/A – Not A	Applicable in Reporting Period		
k.i.v – Keep	In View		
nine neep			

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

				Ai	r Quality	7				
Location	A	ction Lev	el		Ι	Total				
AM1		0				0			0	
AM2		0				0			0	
Noise										
Location	A	ction Lev	el		Ι	Limit Leve	el		Total	
NM1		0				0			0	
NM2		0				0			0	
NM3		0				0			0	
				Wa	ter Qualit	У				
Location		Action	Level			Limit	Level	-	Total	
Location	DO	Turbidity	SS	рН	DO	Turbidity	SS	pH	Iotai	
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 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 Exceedances (Air Quality)

Statistical Summary of Environmental Complaints

Reporting	Environmental Complaint Statistics							
Period	Frequency	Cumulative	Complaint Nature					
1 Jun - 30 Jun	0	3	Water Quality					

Statistical Summary of Environmental Summons

Reporting	Environmental Summons Statistics							
Period	Frequency	Cumulative	Details					
1 Jun - 30 Jun	0	0	N/A					

Statistical Summary of Environmental Prosecution

Reporting	Environmental Prosecution Statistics							
Period	Frequency	Cumulative	Details					
1 Jun - 30 Jun	0	0	N/A					

Appendix W

Tentative schedule for environmental monitoring

Impact Monitoring Schedule for STWTW Jul-17									
Sun	Mon	Tue		Thur	Fri	Sat			
Sun						1			
						-			
2	3	4	5	6	7	8			
	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				
9	10	11	12	13	14	15			
	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		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3				
16	17	18	19	20	21	22			
	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				
23	24	25	26	27	28	29			
	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		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3				
30	31								
	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2								

Impact Monitoring Schedule for STWTW

Impact Monitoring Schedule for STWTW									
	Aug-17								
Sun	Mon	Tue	Wed	Thur	Fri	Sat			
		1	2	3	4	5			
			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				
6	7	8	9	10	11	12			
	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		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3				
13	14	15	16	17	18	19			
	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				
20	21	22	23	24	25	26			
	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		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3				
27	28	29	30	31					
	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				

Impact Monitoring Schedule for STWTW

Impact Monitoring Schedule for STWTW										
	Sep-17									
Sun	Mon	Тие	Wed	Thur	Fri	Sat				
					1	2				
					Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3					
-										
3	4	5	6	7	8	9				
	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		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3					
10	11	12	13	14	15	16				
	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					
17	18	19	20	21	22	23				
	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		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3					
24	25	26	27	28	29	30				
	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					