浩科環境工業有限公司
Acumen Environmental Engineering & Technologies Co., Ltd.
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Our Ref.: CJO-3113

11 February 2021

The EIA Ordinance Register Office,
Environmental Protection Department,
27th floor, Southorn Centre,
130 Hennessy Road,
Wanchai, Hong Kong

CONTRACT NO. 1/WSD/19

IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS (SOUTH WORKS) – WATER TREATMENT WORKS AND ANCILLARY FACILITIES
Environmental Permit EP-494/2015

We are enclosing the following information for your kind considerations of our application:

(a) Three hard copies,
(b) Two copies of the 59th monthly Environmental Monitoring and Audit (EM&A) Report (Rev.0). (Register No.: AEIAR-187/2015)

Please feel free to contact us should you need further information.

Yours sincerely,
Acumen Environmental Engineering and Technologies Co. Ltd.

Mr. Vega Wong
2877 3122

c.c. Water Supplies Department

浩科環境工業有限公司
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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. H C Wong, Heinz)

11 February, 2021

Dear Sir,

In-Situ Reprovisioning of Sha Tin Water Treatment Works (South Works) – Water Treatment Works and Ancillary Facilities
Environmental Permit EP-494/2015
Submission of 59th monthly EM&A Report

In accordance with the Condition 3.4 of the Environmental Permit (No. EP-494/2015), we submit herewith 3 hard copies and 2 electronic copies of the 59th 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 Leung, Jacky, C. H.
Environmental Team Leader

c.c. Independent Environmental Checker

AECOM
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Your Ref:
Our Ref: 60479142/C/fyw2102111

By Hand & By Email

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

Attn: Mr. Edmund Huen

11 Feburary 2021

Dear Sir,

Contract No.3/WSD/15
In-situ reprovisioning of Sha Tin Water Treatment Works (South Works) – Water Treatment Works and Ancillary Facilities
Submission of 59th Monthly EM&A Report for January 2021

Reference is made to Environmental Team (ET)'s 59th Monthly EM&A Report for January 2021 (Rev. 0) submitted on 11 February 2021.

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. 59)

FOR

CONTRACT NO. 1/WSD/19
IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS (SOUTH WORKS) – Water Treatment Works and Ancillary Facilities

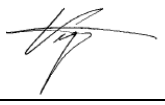
(Rev. 0)

MONTHLY ENVIRONMENTAL MONITORING AND AUDIT (EM&A) REPORT (NO. 59)

FOR

CONTRACT NO. 1/WSD/19

IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS (SOUTH WORKS) – WATER TREATMENT WORKS AND ANCILLARY FACILITIES

	Name	Signature
Prepared by	Mr. Chong, Terence, K. K.	
Reviewed by	Mr. Wong, Vega, T. L.	
Approved & Certified by	Ir Leung, Jacky, C. H. Environmental Team Leader (ETL)	
Verified & Confirmed by	Mr. Fung, Y. W. Independent Environmental Checker (IEC)	

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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. 1/WSD/19, ATAL - Chun Wo - Ming Hing Joint Venture (ACMJV) 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 ACMJV 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 Contract No. 3/WSD/15 commenced on 30 October 2015 for completion by 31 December 2020. The construction phase of Contract No. 1/WSD/19 commenced on 01 January 2021. 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 59th monthly Environmental Monitoring and Audit Report for Contract No. 1/WSD/19 covering the period from 1 to 31 January 2021 (the Reporting Period). As informed by the Contractor, major activities in the reporting period included:

- M1-M5 Water Main Diversion
- Diversion of Existing CLP Cable in Administration building
- Construction of Temporary DG store
- Isolation of Clarifier-RC Wall Construction
- Washwater Equalization Tank (WET)-unforeseen underground utilities clarification
- Cofferdam of WET- installation of pipe pile & grouting
- DN1200 drainage work in Administration Building-Excavation & drainage pile laying

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	21
Noise	$L_{eq(30mins)}$ Daytime	7
Water Quality	Water Sampling	13
Inspection / Audit	ET Regular Environmental Site Inspection	4
	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 conducted in the reporting period.

A.11 As informed by the Contractor, the major works for Contract No. 1/WSD/19 between February to April 2021 will be:

- M1-M5 Water Main Diversion
- Diversion of Existing CLP Cable in Administration building

- Construction of Temporary DG store
- Isolation of Clarifier-RC Wall Construction
- Washwater Equalization Tank (WET)-unforeseen underground utilities clarification
- Cofferdam of WET- installation of pipe pile & grouting
- DN1200 drainage work in Administration Building-Excavation & drainage pile laying
- Asbestos sampling and testing

A.12 EM&A monitoring for the 59th reporting period for Contract No. 1/WSD/19 has been completed. The 60th monthly EM&A report will cover the period from 1 to 28 February 2021.

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. 1/WSD/19, ATAL - Chun Wo - Ming Hing Joint Venture (ACMJV) 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 ACMJV 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 Contract No. 3/WSD/15 commenced on 30 October 2015 for completion by 31 December 2020. The construction phase of Contract No. 1/WSD/19 commenced on 01 January 2021. The general layout plan of the Contract components is presented in **Appendix A**.

1.1.4 ET conducted below baseline monitoring at designated locations according to the EM&A Manual.
- Air quality and noise: from 21 December 2015 to 3 January 2016.
- Water quality: from 15 December 2015 to 8 January 2016.

1.1.5 Baseline Monitoring Report was issued by the ET and verified by the IEC on 27 January 2016 and submitted to the EPD on 2 February 2016.

1.1.6 The impact monitoring of the EM&A programme, including air quality, noise, water quality monitoring as well as environmental site inspections, commenced on 17 February 2016.

1.2. ORGANIZATION STRUCTURE

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

Table 1-1: Key Personnel Contact for Environmental Works

Party	Position	Name	Telephone
Water Supplies Department	Engineer / Project Management	Mr. Ng, Horace, C. K.	2829 5693
AECOM	Senior Resident Engineer (Civil)	Mr. Ng, Derek, K. H.	9717 1420
	Independent Environmental Checker	Mr. Fung, Y. W.	3922 9366
	Deputy Independent Environmental Checker	Ms. Lam, Lemon, M. C.	3922 9381
ATAL-CW-MH Joint Venture	Project Manager	Mr. Tam, Wilson, Y. C.	9031 5600
	Site Agent	Ms. Cheung, S. Y.	6323 4716
Acumen Env. Eng. & Tech. Co. Ltd.	Project Director	Ir Dr. Lam, Gabriel, C. K.	2333 6823
	Environmental Team Leader	Ir Leung, Jacky, C. H.	9060 2368
	Ecologist	Mr. Wan, Jay, P. H.	2333 6823

1.3. SCOPE OF REPORT

1.3.1 This is the 59th monthly EM&A Report under the Contract No. 1/WSD/19 In-situ Reprovisioning of Sha Tin Water Treatment Works (South Works) – Water Treatment Works and Ancillary Facilities covering the period from 1 to 31 January 2021 (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, the major works for Contract No. 1/WSD/19 between February to April 2021 will be:

- M1-M5 Water Main Diversion
- Diversion of Existing CLP Cable in Administration building
- Construction of Temporary DG store
- Isolation of Clarifier-RC Wall Construction
- Washwater Equalization Tank (WET)-unforeseen underground utilities clarification
- Cofferdam of WET- installation of pipe pile & grouting
- DN1200 drainage work in Administration Building-Excavation & drainage pile laying
- Asbestos sampling and testing

1.4.3 The locations of the construction activities are shown in **Appendix D**. The Environmental Sensitive Receivers in the vicinity of the Project are shown in **Appendix E.**

2. EM&A RESULTS

2.1. EM&A BACKGROUND

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

Table 2-1: Summary of Impact Monitoring Programme

Impact Monitoring	Sampling Parameter	Frequency
Air Quality	1-hour TSP	3 times in every 6 days when documented and valid complaint was received
Noise	$L_{eq\ 30\ min}$, $L_{eq\ 5\ min}$, 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

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
Water Quality	In-situ measurement ● Dissolved Oxygen (mg/L); ● Dissolved Oxygen Saturation (%); ● Turbidity (NTU); ● pH value; ● Water depth (m); and ● Temperature (ºC)
	Laboratory analysis ● Suspended Solids (mg/L)

2.1.3 Summary of determination of Action/Limit (A/L) Levels for air quality, noise and water quality are presented in **Appendix F**.

2.1.4 Should non-compliance of the environmental quality criteria occurs, remedial actions will be triggered according to the Event and Action Plan enclosed in **Appendix G**.

2.1.5 The impact monitoring schedules are presented in **Appendix H** and the monitoring results are detailed in the following sub-sections.

2.2. AIR QUALITY MONITORING

2.2.1 Impact monitoring for air quality had been carried out in accordance with Sections 2.29 of the approved EM&A Manual to determine the ambient 1-hour total suspended particulates (TSP) levels at the monitoring locations. 1-hour TSP sampling should be undertaken at least 3 times in every six-days at each monitoring station when the highest dust impacts are expected. General meteorological conditions (wind speed, direction and precipitation) and notes regarding any significant adjacent dust producing sources had also been recorded throughout the impact monitoring period.

2.2.2 Two (2) designated monitoring stations, AM1 located at the L Louey and AM2 located at Hin Keng Estate - Hin Wan House, were recommended in Section 2.18 of the approved EM&A Manual. In order to identify and seek for the access of the air monitoring locations designated in the EM&A Manual, site visit was conducted among ET, IEC and EPD.

2.2.3 During the site visit, all designated air monitoring locations were identified. Details of air monitoring stations are described in Table 2-3. The location plan of air quality monitoring stations is shown in **Appendix I**.

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

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

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

Table 2-4: Air Quality Impact Monitoring Equipment

Equipment	Model
Portable dust meter – 1-hour TSP	TSI Model 8532
Portable dust meter – 1-hour TSP	Nephelometer (CASC) Type PC-3A (E)
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^{o} 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 seven (7) sampling days perform air quality monitoring at the two designated locations. The results for 1-hour TSP are summarized in Table 2-5 and Table 2-6.

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

Date	**Weather**	**1-hour TSP (μg/m³)**				
		Start Time	**End Time**	**1st Measurement**	**2nd Measurement**	**3rd Measurement**
2/1/2021	Fine	15:22	18:22	204	211	196
6/1/2021	Cloudy	09:30	12:30	116	105	98
11/1/2021	Sunny	09:00	12:00	85	70	92
15/1/2021	Sunny	09:02	12:02	91	85	81
20/1/2021	Fine	09:17	12:17	118	119	105
25/1/2021	Cloudy	13:26	16:26	76	83	89
29/1/2021	Cloudy	13:15	16:15	110	120	106
Average				112.4		
Range				70 – 211		

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

Date	**Weather**	**1-hour TSP (μg/m³)**				
		Start Time	**End Time**	**1st Measurement**	**2nd Measurement**	**3rd Measurement**
2/1/2021	Fine	15:28	18:28	224	231	207
6/1/2021	Cloudy	09:36	12:36	103	100	106
11/1/2021	Sunny	09:39	12:39	95	100	109
15/1/2021	Sunny	09:42	12:42	108	112	104
20/1/2021	Fine	09:58	12:58	103	99	108
25/1/2021	Cloudy	14:18	17:18	86	97	96
29/1/2021	Cloudy	14:01	17:01	113	121	105
Average				120.3		
Range				86 – 231		

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

2.3. NOISE MONITORING

2.3.1 Impact monitoring for noise levels had been measured in accordance with Sections 3.13 of approved EM&A Manual on normal weekdays at a frequency of once a week at logging interval of 30 minutes for daytime (between 0700 and 1900 hours of normal weekdays). The L_{eq} had been recorded at the specified intervals. The non-project related construction activity – Sha Tin to Central Link (SCL) for Hin Keng to Diamond Hill Tunnel, in the vicinity of the monitoring stations during the impact monitoring had been noted and the source and location of this activity had been recorded.

2.3.2 According to Section 3.7 of the approved EM&A Manual, 3 noise sensitive receivers designated for the construction noise monitoring. The designated monitoring stations are identified and successfully granted by the premises. The details of noise monitoring stations are described in Table 2-7 and the location plan of noise monitoring stations is shown in **Appendix L**.

Table 2-7: Details of Noise Monitoring Stations

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

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

Table 2-8: Noise Impact Monitoring Equipment

Noise	
Sound Level Meter	NTi Audio XL2
Acoustic Calibrator	Pulsar 105
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 seven (7) occasions noise monitoring was undertaken in Reporting period. The noise monitoring results at the designated locations are summarized in Tables 2-9 to 2-11.

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

Date	**Time**	**Weather**	**1st Leq_{5min}**	**2nd Leq_{5min}**	**3rd Leq_{5min}**	**4th Leq_{5min}**	**5th Leq_{5min}**	**6th Leq_{5min}**	**Leq_{30min}**
2/1/2021	16:44 - 17:14	Fine	65.4	64.1	62.6	63.2	65.0	66.2	64.6
6/1/2021	10:52 - 11:22	Cloudy	63.8	63.8	65.4	64.0	63.2	65.4	64.3
11/1/2021	09:00 - 09:30	Sunny	59.0	60.4	60.7	61.5	58.4	59.9	60.1
15/1/2021	09:03 - 09:33	Sunny	60.1	60.4	61.2	58.5	60.4	59.9	60.2
20/1/2021	09:17 - 09:47	Fine	60.5	59.4	60.2	60.8	61.5	62.3	60.9
25/1/2021	13:30 - 14:00	Cloudy	61.5	59.5	60.3	60.4	61.0	61.4	60.7
29/1/2021	13:21 - 13:51	Cloudy	62.3	61.0	61.0	59.8	61.1	61.2	61.1
Limit Level >75dB(A)								**Average**	62.1
								Range	60.1 – 64.6

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

Date	**Time**	**Weather**	**1st Leq_{5min}**	**2nd Leq_{5min}**	**3rd Leq_{5min}**	**4th Leq_{5min}**	**5th Leq_{5min}**	**6th Leq_{5min}**	**Leq_{30min}**
2/1/2021	15:28 - 15:58	Fine	61.5	63.2	62.1	63.2	64.1	62.0	62.8
6/1/2021	09:36 - 10:06	Cloudy	63.2	62.1	61.4	62.4	63.0	61.9	62.4
11/1/2021	09:38 - 10:08	Sunny	57.4	59.7	60.2	59.5	59.8	60.1	59.5
15/1/2021	09:40 - 10:10	Sunny	57.9	58.7	55.6	59.8	58.1	60.3	58.6
20/1/2021	09:59 - 10:29	Fine	61.2	60.5	59.9	60.4	61.2	60.1	60.6
25/1/2021	14:18 - 14:48	Cloudy	60.4	59.7	58.0	58.4	59.7	59.9	59.4
29/1/2021	14:00 - 14:30	Cloudy	60.2	60.9	61.3	59.9	59.8	60.2	60.4
Limit Level >75dB(A)								**Average**	60.8
								Range	58.6 – 62.8

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

Date	Time	Weather	1st Leq_{5min}	2nd Leq_{5min}	3rd Leq_{5min}	4th Leq_{5min}	5th Leq_{5min}	6th Leq_{5min}	Leq_{30min}
2/1/2021	16:02 - 16:32	Fine	59.9	61.1	60.0	61.2	60.7	61.1	60.7
6/1/2021	10:10 - 10:40	Cloudy	61.0	60.6	62.2	60.9	61.6	62.2	61.5
11/1/2021	10:15 - 10:45	Sunny	56.3	57.2	59.6	60.3	61.2	59.0	59.2
15/1/2021	10:19 - 10:49	Sunny	56.3	59.6	56.7	59.4	60.7	58.6	58.8
20/1/2021	10:39 - 11:09	Fine	58.4	62.3	60.3	60.1	59.8	57.4	60.0
25/1/2021	14:59 - 15:29	Cloudy	61.6	62.7	61.4	61.8	60.4	60.8	61.5
29/1/2021	14:45 - 15:15	Cloudy	58.7	61.8	61.3	62.5	62.6	56.9	61.1
Limit Level 70dB(A) during normal teaching periods ~~or 65dB(A) during examination periods~~								**Average**	60.5
								Range	58.8 – 61.5

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

2.4. WATER QUALITY MONITORING

2.4.1 Water Impact monitoring had been taken three days per week with sampling or measurement in accordance with Sections 4.12 of the approved EM&A Manual at all designated monitoring stations in the 2 water courses. The interval between 2 sets of monitoring had been more than 36 hours. Replicate in-situ measures had been carried out in each sampling event.

2.4.2 Three (3) control and two (2) impact stations were recommended in the Section 4.7 of the approved EM&A Manual to carry out water quality monitoring. In order to identify and seek for the access of the water monitoring locations designated in the approved EM&A Manual, site visit was conducted among ET, IEC and Environmental Protection Department (EPD).

2.4.3 During the site visit, all designated monitoring locations were identified however one more impact stations (M3) along the same water course was introduced due to the concern on multiple site effect, in particular to address the potential impact to M2 from a source at upstream of the water course. Details and coordinates of the monitoring stations are described in Table 2-12 and the location plan of water quality monitoring stations is shown in **Appendix O**.

Table 2-12: Details of Water Quality Monitoring Station

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

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

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

Water quality	
Horiba Multi Water Quality Checker U-53	
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)

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.

Table 2-14: Summary of Water Quality Monitoring Results

Dissolved Oxygen – Mid Depth (mg/L)	**C1**	**C2**	**C3**	**M1**	**M2**	**M3**
Average	8.58	8.68	N/A	9.20	9.18	9.45
Min.	8.36	8.34	N/A	9.02	9.01	9.27
Max.	8.87	8.85	N/A	9.35	9.40	9.65
Turbidity – Mid Depth (NTU)	**C1**	**C2**	**C3**	**M1**	**M2**	**M3**
Average	2.55	2.60	N/A	2.05	1.78	0.60
Min.	2.30	2.30	N/A	1.80	1.40	0.30
Max.	2.70	2.80	N/A	2.30	2.10	0.90
Suspended Solid – Mid depth (mg/L)	**C1**	**C2**	**C3**	**M1**	**M2**	**M3**
Average	3.66	3.48	N/A	3.08	3.21	<1
Min.	3.00	3.00	N/A	2.90	1.30	<1
Max.	4.10	4.20	N/A	3.20	5.20	<1
pH value (unit)	**C1**	**C2**	**C3**	**M1**	**M2**	**M3**
Average	7.56	7.55	N/A	7.77	7.73	7.66
Min.	7.27	7.24	N/A	7.59	7.62	7.51
Max	7.74	7.89	N/A	7.87	7.82	7.80

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 Monitoring inspections were conducted on 22 and 28 January 2021

2.5.4 Three trees TA572, TA326 and TA327 were transplanted to tree compensation area within the Sha Tin Water Treatment Works (STWTW) in 20 June 2016.

2.5.5 The condition of TA572 was observed in poor condition due to the damage of two main trunks. TA327 was also in poor condition. The already dead tree TA326 collapsed due to big hit by the Signal No.10 typhoon Mangkhut on 16 September 2018. Tree guying cables have been installed to provide external support to the remaining two transplanted trees. Transplanted Lamb of Tartary (Cibotium barometz) seems to be received too much sunlight. Leaves of them were observed yellowish in colour. On the other hand, young foliage was growing out to replace the old one.

2.5.6 Since Sha Tin South Fresh Water Service Reservoir (STSFWSR) was still under preparation, Lamb of Tartary was still temporally stored in a nursery garden at Wang Toi Shan, Kam Tin.

2.5.7 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.

2.5.8 All transplanted Lamb of Tartary (Cibotium barometz) have been severely damaged by Typhon Wipha on 30-31 July 2019; the next few monitoring will be critical to assess their survival and recovery progress.

2.5.9 It is recommended to retain transplanted Lamb of Tartary (Cibotium barometz) at the nursery garden under proper maintenance during current recovery stage. Once their condition has recovered to acceptable level, they can be moved to the transplantation site at Sha Tin South Fresh Water Service Reservoir (STSFWSR) when the site is ready.

2.5.10 After transplantation, root ball of TA572 and TA327 tree should be kept moisture especially during 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).

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

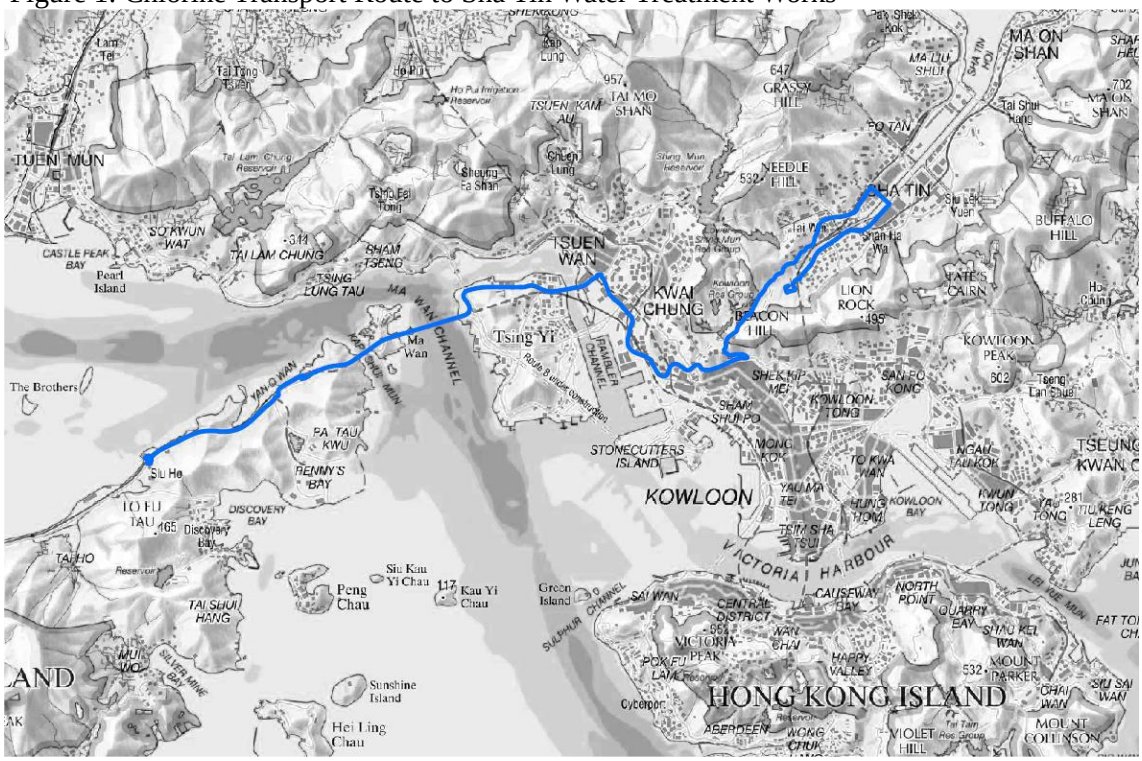


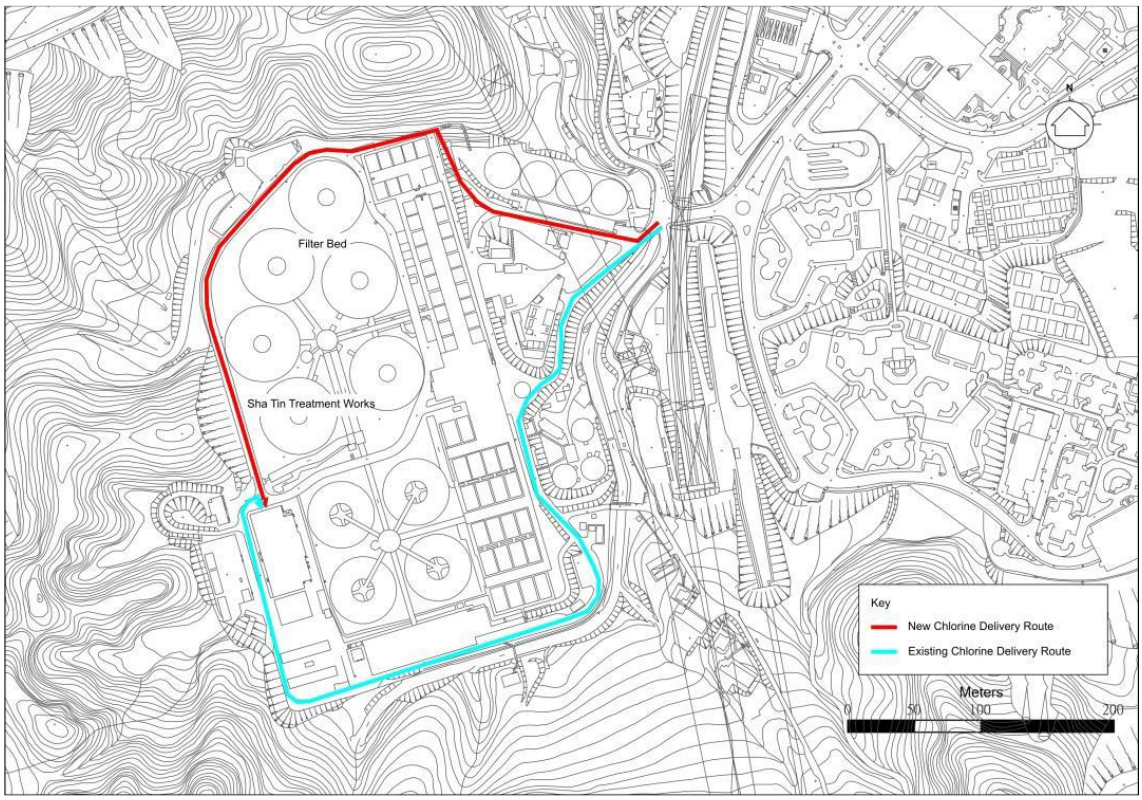
Table 2-15: Chlorine Truck Transport Route

Destination	Route
From SSK Dock to Sha Tin WTW	Sham Shui Kok Dock > Cheung Tung Road > Sunny Bay Road > N Lantau Highway > Lantau Link > NW Tsing Yi Interchange > Tsing Yi North Costal road > Tsing Tsuen Road > Tsuen Wan Road > Kwai Chung Road > Ching Cheung Road > Tai Po 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, four (4) site inspections were carried out on 7, 14, 20 and 27 January 2021.

2.8.2 One joint site inspection with IEC also undertaken on 14 January 2021. Minor deficiencies were observed during weekly site inspection or joint site inspection. Key observations during the site inspections are summarized in Table 2-16.

Table 2-16: Site Observations

Date	Environmental Observations	Follow-up Status
7 January 2021	Unnecessary water retained on the electric generator near the site office of contractor, water horse of Shut Down Area and WET area. The contractor was reminded to clear the retained water.	Retained water was cleared
14 January 2021	The label of NRMM in the M123 was not renewed. The contractor was reminded to change the label with correct color.	Label was renewed to correct color
20 January 2021	Dusty materials in WBT was not covered properly. The contractor was reminded to remove the dusty material.	Dusty material was removed
27 January 2021	Sediment was found in a session of U-channel near Administration Building. The contractor was reminded to clear the sediment.	Sediment was removed

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

2.9. ENVIRONMENTAL LICENSES AND PERMITS

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

Table 2-17: Summary of Environmental License and Permit

License / Permit	License / Permit No.	Date of Issue	Date of Expiry	License / Permit Holder	Remark
Environmental Permit	EP- 494/2015	28/01/2015	N/A	WSD	
Registration of Chemical Waste Producer	WPN5296-759-A3012-01	28/09/2020	N/A	ACMJV	
Trip Ticket (Chit) Account	7038091	26/8/2020	N/A	ACMJV	
Waste Water Discharge License (Wall C)	WT0023932 -2016	01/04/2016	31/03/2021	ACMJV	
Waste Water Discharge License (Wall D)	WT0024211 -2016	10/06/2016	30/06/2021	ACMJV	
Construction Noise Permit	GW-RN0786-20	06/11/2020	08/02/2021	ACMJV	

2.10. IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

2.10.1 In response to the site audit findings, the Contractors carried out corrective actions. A summary of the environmental mitigation measures implemented by the Contractor in this Reporting Period are summarized in Table 2-18.

2.10.2 The environmental mitigation measures that recommended in the Implementation Schedule for Environmental Mitigation Measures (EMIS) in the approved EM&A Manual covered the issues of dust, noise, water and waste and they are showed **Appendix U**.

Table 2-18: Environmental Mitigation Measures

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

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

2.11. SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT

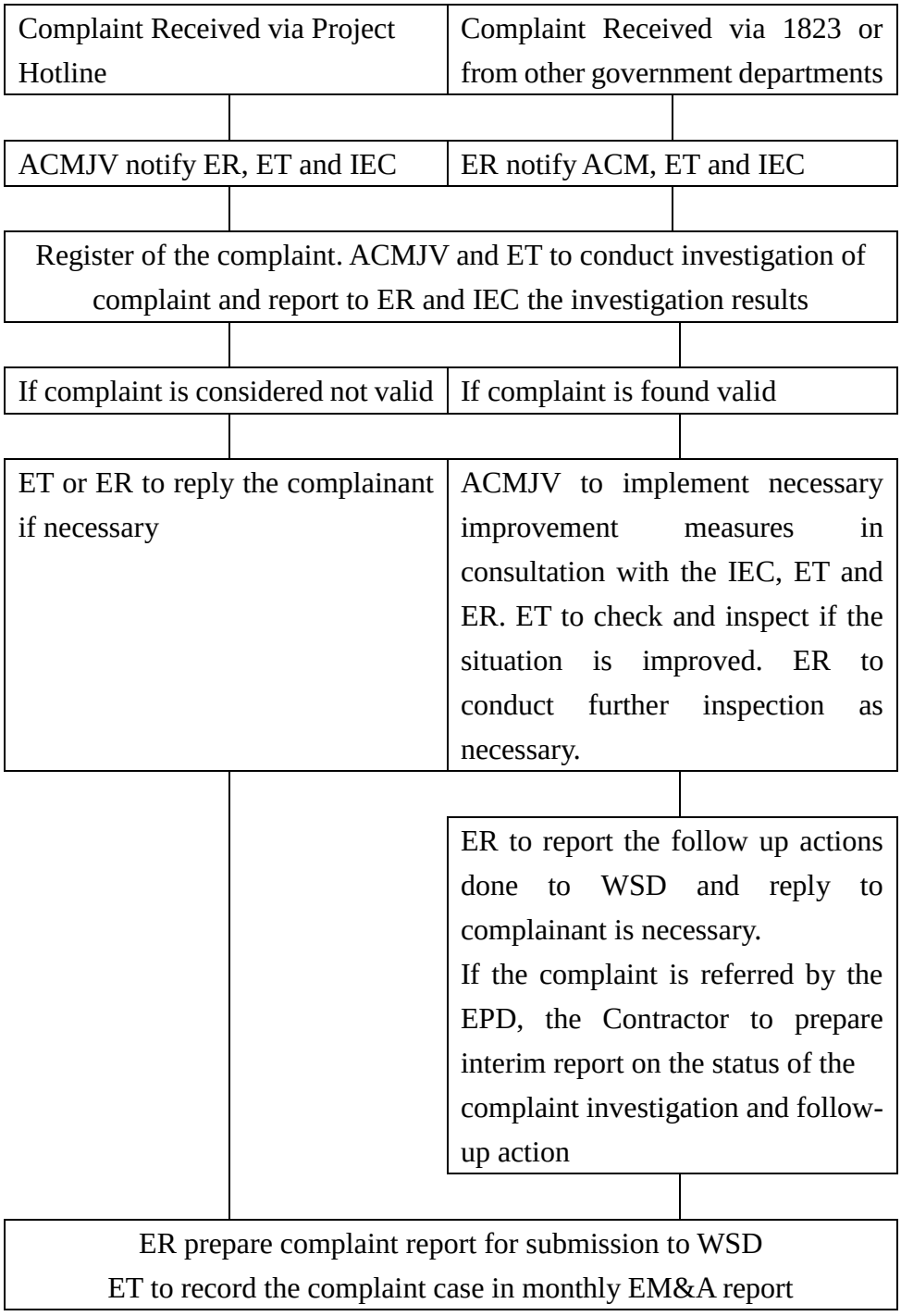
2.11.1 Results for 1-hour TSP, noise and water quality monitoring complied with the Action/ Limit levels in the reporting period.

2.11.2 Cumulative statistics on exceedances is provided in **Appendix V**.

2.12. SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND PROSECUTIONS

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

Table 2-19: Environmental Complaint Handling Procedure



2.12.2 No environmental complaint were received in the reporting period.

2.12.3 No notification of summons and prosecution was received in the reporting period.

2.12.4 No visit from EPD in the reporting period.

2.12.5 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 Contract No. 1/WSD/19 between February to April 2021 will be:

- M1-M5 Water Main Diversion
- Diversion of Existing CLP Cable in Administration building
- Construction of Temporary DG store
- Isolation of Clarifier-RC Wall Construction
- Washwater Equalization Tank (WET)-unforeseen underground utilities clarification
- Cofferdam of WET- installation of pipe pile & grouting
- DN1200 drainage work in Administration Building-Excavation & drainage pile laying
- Arbestos sampling and testing

3.2. KEY ISSUES FOR COMING MONTH

3.2.1 Potential environmental impacts arising from the above upcoming construction activities in February 2021 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:

- M1-M5 Water Main Diversion
- Diversion of Existing CLP Cable in Administration building
- Construction of Temporary DG store
- Isolation of Clarifier-RC Wall Construction
- Washwater Equalization Tank (WET)-unforeseen underground utilities clarification
- Cofferdam of WET- installation of pipe pile & grouting
- DN1200 drainage work in Administration Building-Excavation & drainage pile laying

3.2.2 The tentative monitoring schedule for February 2021 to April 2021 can be found in **Appendix W**.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1. SUMMARY

4.1.1 Air quality (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 14 January 2021. 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 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

835100 E

835400 E

835700 E

824800 N

824500 N

PROVISION OF NEW ACCESS ROAD

KENG HAU ROAD

CHE KUNG MIU ROAD

HIN KENG ESTATE

CUT-BACK OF EXISTING ENGINEERED SLOPE AND CONSTRUCT WATER TREATMENT WORKS LOGISTICS CENTRE

EXISTING NORTH WORKS UNDER NORMAL OPERATION

UPGRADING OF INLET CHANNEL OF NORTH WORKS

CONSTRUCTION OF ADMINISTRATION BUILDING CUM MAINLAND EAST LABORATORY WITH VISITOR FACILITIES

PROVISION OF NEW ACCESS ROAD

PROVISION OF NEW ACCESS ROAD

DEMOLITION AND REPROVISIONING OF SOUTH WORKS

EXISTING CHLORINATION HOUSE TO BE MAINTAINED

SITE OFFICE

TEI LUNG HAU

LEGEND:

SITE BOUNDARY OF SHA TIN WATER TREATMENT WORKS

WORKS AREA

N

REV. 修訂	DESCRIPTION 內容摘要	D.E.	P.E. CHECKED 核准	DATE 日期

水 務 署
WATER SUPPLIES DEPARTMENT

AGREEMENT NO. CE 13/2009 (WS)
IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS-SOUTH WORKS
DESIGN AND CONSTRUCTION

LOCATION PLAN AND THE MAJOR SCOPE OF WORKS

AECOM

DRG.NO. 圖紙編號 60162073/EM&A/FIG 1

DESIGNED BY 設計	–	CONTRACT NO. 合約編號	P. Dy. APPROVED 批准人
DRAWN BY 繪圖	GXH	STATUS 階段	
SCALE 比例	A3 1 : 3000		
DIMENSIONS ARE IN 尺寸單位	METRES	© COPYRIGHT RESERVED 版 權 所 有	

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Appendix B
Project Organization

Contract No. 1/WSD/19

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

- **Water Treatment Works and Ancillary Facilities**

Environmental Organizational Chart

Date: 31 Jan 2021

Project Manager
WSD

Project Manager's
Delegate Representative

Construction Manager
Mr. Wilson Tam
Mobile: 9031 5600

Site Agent
Ms. S Y Cheung
Mobile: 6323 4716

Deputy Site Agent
Mr. Yau Ming Hong
Mobile: 6973 0138

Environmental Manager
Mr. Clarence Yeung
Mobile: 6140 1886

Environmental Team Leader
Mr. Jacky CH Leung
Mobile: 9060 2368

Works Manager (E&M)
Mr. Alfred Wong
Mobile:6277 6095

Works Manager
(Civil & Structural)
TBC

Works Manager
(Geotechnical)
Mr. Gordon Li
Mobile: 6016 6130

Environmental Officer
Ms. Fanny Law
Mobile: 6184 4650

Senior Environmental Consultant
Mr. Vega Wong
Mobile: 6113 2368

Project Manager
Mr. Terence Ho
Mobile: 6277 6092

Sub-Agent
Mr. Dick Chang Mobile: 6020 7722
Mr. Roger Chang 9015 9059
Mr. Wong Yat Hong 9640 8057

Environmental Consultant
Mr. Terence Chong
Mobile: 9143 5086

Qualified Ecologist
Mr. Pak-Ho Wan, Jay
Mobile: 2333 6823

Senior Engineer
Mr. Matt Chan Mobile: 6482 3510
Mr Wilson Luk 6271 1428

Site Engineer
Mr. Victor Choy Mobile:9651 1371
Mr. Curtis Lam 6777 4936
Ms Sophia So 9040 4078

Graduated Engineer
Ms Karman Lo Mobile: 5488 7539
Mr. Ryan Tam 6628 4802
Mr. Andy To 6354 3628

G. Foreman
Mr. Calvin Ho Mobile: 5565 2513

G. Foreman
Mr. Chan Ka Leung 9319 7706

Senior Forman
Mr. Chiu Wai Man
Mobile: 9780 8168

Foreman
Mr. So Wing Hang
Mobile:5399 4662

Technical Apprentice
Mr. Lee Chi Shing Mobile: 6859 2631
Mr. Poon Kai Leung Mobile: 6540 3322

Environmental Supervisor
Roger Chang
Mobile : 9015 9059

Sub-Con. Rep's.

Dickie's	Shing Kee	Mly	Harvest
Mr. Chan Lok Fung	Mr. Lam Shing Kee	Mr. Joseph Ng	Mr. Chan Chi Kuen
Mobile: 9081 3715	Mobile:9050 4651/ 6052 3565	Mobile: 6851 8202	Mobile: 6851 8202

Authorization

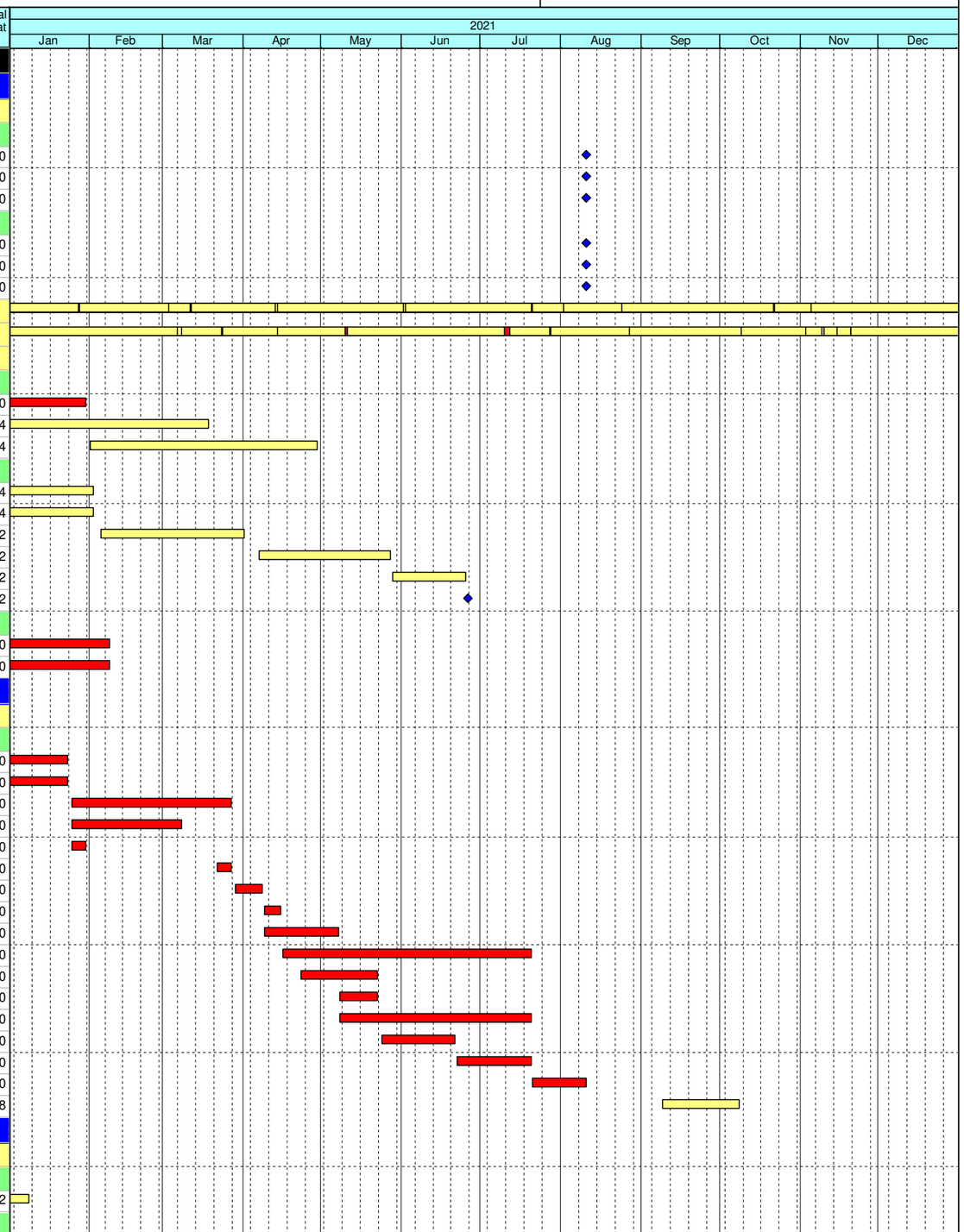
Communication Line

Appendix C
Latest Construction Programme

Data Date: 31-Dec-20

Contract No. 1/WSD/19
In-Situ Reprovisioning of Sha Tin Water Treatment Works (South Works) - Water Treatment Works

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
Contract No. 1/WSD/19 - Monthly Update (Dec-20) - Detail Works Programme Rev.1_DT					
Preliminaries					
Contractal Date					
Sectional Completion Date - Contract					
C-Sec1	Section 1 - relocate DG Stores, Site formation for new Administration Building - (365 Days after Project Start)	0		10-Aug-21*	0
C-KD	Key Date - diversion of Pipelines M1, M2, M3, M4 and M5 - (365 Days after Project Start)	0		10-Aug-21*	0
C-Sec3	Section 3 - Landscape Softworks within Portion D - (365 Days after Project Start)	0		10-Aug-21*	0
Sectional Completion Date - Planned					
KD	Key Date - diversion of Pipelines M1, M2, M3, M4 and M5	0		10-Aug-21*	0
Sec1	Section 1 - relocate DG Stores, Site formation for new Administration Building	0		10-Aug-21*	0
Sec3	Section 3 - Landscape Softworks within Portion D	0		10-Aug-21*	0
Design Submission					
Major Plant and Equipment - Submission, Procurement, Fabrication and Factory Test					
Pre-construction Works					
Initial Set Up & Survey					
78	Ground Investigation Work & Geotechnical Assessment	60	19-Nov-20 A	30-Jan-21	0
1188	Hoarding Erection (whole site area)	60	31-Dec-20	18-Mar-21	24
1198	Stage 1 Fencing for DN1200 pipe laying and ADB Site Formation works (include Type 2 Fence to SMH37	66	01-Feb-21	29-Apr-21	24
UU Diversion - DN200 and DN300 Plant Service Watermain Diversion					
85	Procurement & Delivery of Temp. Pipework	48	22-Oct-20 A	02-Feb-21	14
84	Method Statement (Incl. Risk & Safety requirement) for Existing DN200 & DN300 Watermains diversion	48	22-Oct-20 A	02-Feb-21	14
86_01	Excavation for temp pipework	42	05-Feb-21	01-Apr-21	12
86_02	Install temp. pipework for diversion	42	07-Apr-21	27-May-21	12
87	Hydraulic Tests for the Temp. Pipework for Diversion and swapping	24	28-May-21	25-Jun-21	12
88	Diversion completed and Operational	0	26-Jun-21		12
UU Diversion - Existing Chlorine Pipe / MEP utilities (WET Area)					
1224	Diversion of MEP Utilities (WET Area)	33	31-Dec-20	08-Feb-21	0
90	Diversion and Reprovision of Existing Chlorine Pipe	33	31-Dec-20	08-Feb-21	0
Key Date - Diversion of Pipelines M1, M2, M3, M4 and M5					
Decommission Existing South Works Pumping Station					
M1, M2, M3, M4 and M5 Diversion					
100_01	Stage 1 - Excavation for existing M2 & M3 (Include demolition of canopy)	49	25-Nov-20 A	23-Jan-21	0
102_01	Stage 1 - Installation DN1200 and DN1400 pipiline at M5 and valve chamber No.2	49	25-Nov-20 A	23-Jan-21	0
100_11	Stage 2ii - Remove M3 pump pipe & existing utilities / Install temp. surge vessel for M3 / Remove Pump 4,5,6	48	25-Jan-21	27-Mar-21	0
100_17	Stage 1 - Suspend & Remove Pump 7 & 8	31	25-Jan-21	08-Mar-21	0
100_03	Stage 2i - Cap off existing M3 / Connect V01 & V02 to M5 & V02 to M3	6	25-Jan-21	30-Jan-21	0
102_03	Stage 2iii - Connection M3 of surge vessel and installation of reserve tee on M3	6	22-Mar-21	27-Mar-21	0
099_11	Stage 3i - Cap off existing M4	6	29-Mar-21	08-Apr-21	0
100_09	Stage 4 - Cap off existing M2	6	09-Apr-21	15-Apr-21	0
100_13	Stage 4 - Remove M2 pump pipe / Remove Pump 1,2,3	24	09-Apr-21	07-May-21	0
099_05	Stage 3ii - Remove M4 & M5 existing pipes / Install M4 & M5 from V02 to V01	78	16-Apr-21	20-Jul-21	0
098_01	Stage 6 - Valve (V908) (MBV) replacement and test for Lion Rock Service Reservoir	24	23-Apr-21	22-May-21	0
100_15	Stage 4 - Construct temp. serge vessel for M2 and connect to M2 / Installation of reserve tee on M2	12	08-May-21	22-May-21	0
102_09	Installation of twin DN1200 watermain and valve chamber No.1 (include installing DN1200 blank flange)	60	08-May-21	20-Jul-21	0
101_01	Demolish existing South Works Pump Hall	24	24-May-21	21-Jun-21	0
101_03	Demolish part of existing Main Pump Sump	24	22-Jun-21	20-Jul-21	0
101_05	Demolish remainig of existing Main Pump Sump	18	21-Jul-21	10-Aug-21	0
098_02	Stage 6 - Valve (V909) (MBV) replacement and test for Lion Rock Service Reservoir	24	09-Sep-21	08-Oct-21	418
Section 1 - Relocation of DG Stores, Site formation for new Administration Building					
Statuory Submissions					
Temp DG - FSD Submission prior to Fire Services Installation					
1170	Temp. DG Store - FSD - Submission of FSI/314 with VAC Layout Plan	7	31-Dec-20	08-Jan-21	32
Temp DG - FSD Submission prior to DG Installation					



Current Milestone
Remaining Work
Level of Effort
Actual Work
Critical Remaining Work

1 Year Rolling Programme

Project ID: 1WSD19 - U003-3
Baseline:
Layout: Update Three Month Rolling

Date	Revision	Checked	Approved
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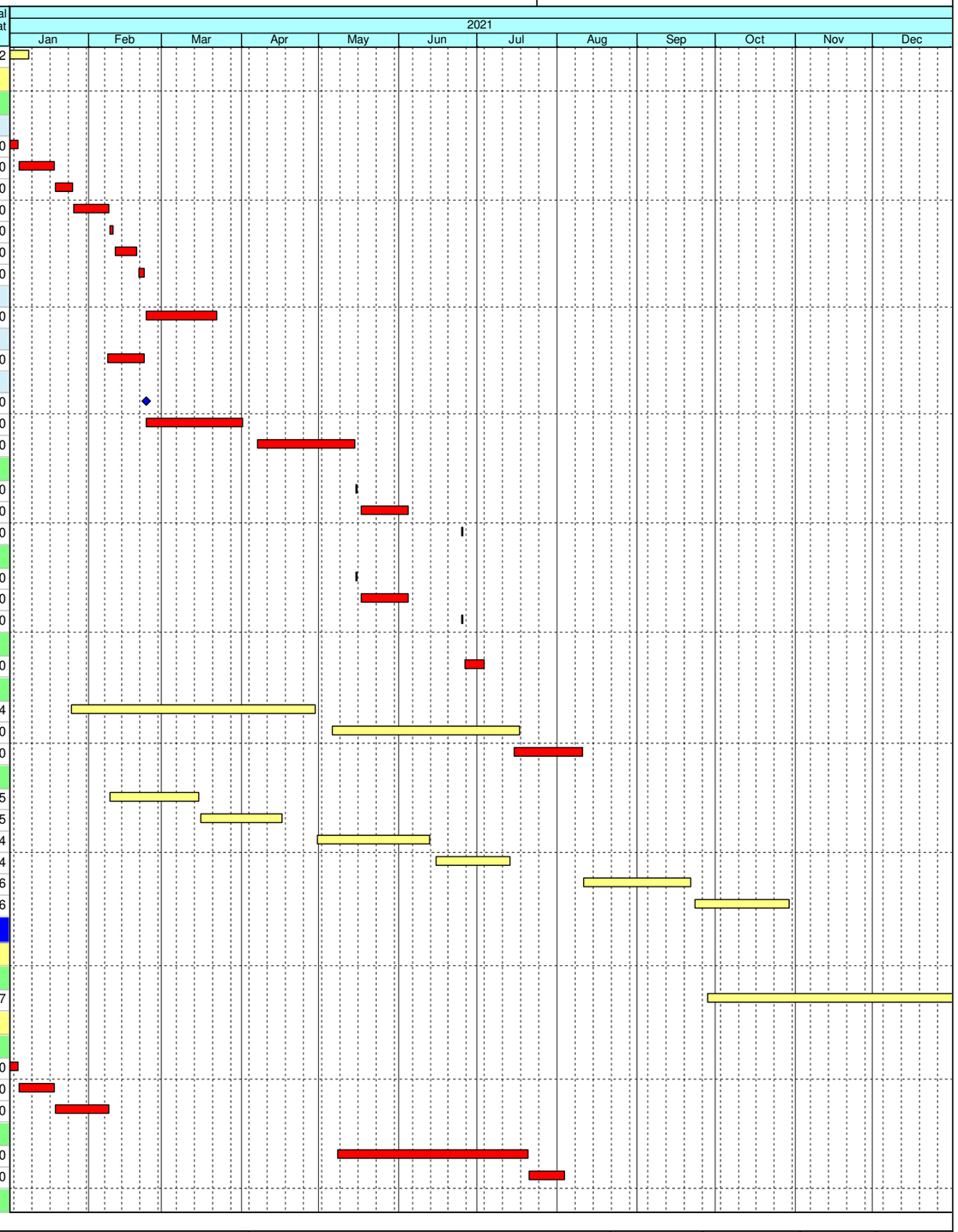
Data Date: 31-Dec-20

Contract No. 1/WSD/19
In-Situ Reprovisioning of Sha Tin Water Treatment Works (South Works) - Water Treatment Works

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
54_03	Temp. DG Store - FSD - Submission for DG Installation	7	31-Dec-20	08-Jan-21	32
Sec 1.1 - Relocation of DG Stores					
Construction of New Temp. DG Store					
Structure Construction					
107_09	Temp. DG Stores - Blinding and Earth mat installation	4	19-Dec-20 A	04-Jan-21	0
107_11	Temp. DG Stores - G/F slab upto +27.8mPD	12	05-Jan-21	18-Jan-21	0
107_13	Temp. DG Stores - Scaffolding erection	6	19-Jan-21	25-Jan-21	0
107_15	Temp. DG Stores - Construct walls and slab up to R/F	12	26-Jan-21	08-Feb-21	0
107_17	Temp. DG Stores - Laying of Waterproofing	2	09-Feb-21	10-Feb-21	0
107_19	Temp. DG Stores - Leakage test	2	11-Feb-21	19-Feb-21	0
107_21	Temp. DG Stores - Dismantle Scaffolding	2	20-Feb-21	22-Feb-21	0
ABWF & E&M Works					
109	Temp. DG Stores - ABWF works	24	23-Feb-21	22-Mar-21	0
Temp DG - Material Inspection and Testing on Delivery to SIte					
TDG.0630	SWPS - Delivery for Installation - Other Plants and Materials for BS Works (EM 4)	7	08-Feb-21	22-Feb-21	0
Temp DG - E&M Works					
TDG.108	Temp. DG Stores - Handover for E&M Installation	0	23-Feb-21		0
TDG.110_01	Temp. DG Stores - BS Electrical Installation	33	23-Feb-21	01-Apr-21	0
TDG.110_03	Temp. DG Stores - FS Installation	32	07-Apr-21	14-May-21	0
DG Inspection					
A20640	Temp. DG Stores - Report to FSD for DG Inspection	1	15-May-21	15-May-21	0
A20650	Temp. DG Stores - DG Inspection	16	17-May-21	04-Jun-21	0
A20660	Temp. DG Stores - Issuance of DG License by FSD	1	25-Jun-21	25-Jun-21	0
FSI Inspection					
1130	Temp. DG Stores - Submit FSI/314 and FSI/501	1	15-May-21	15-May-21	0
1150	Temp. DG Stores - Fire Service Inspection	16	17-May-21	04-Jun-21	0
1160	Temp. DG Stores - Issue Fire Cert 172	1	25-Jun-21	25-Jun-21	0
Relocate the DG Store					
114	Relocate DG store material to new temp. DG store	6	26-Jun-21	03-Jul-21	0
Site formation for new Administration Building					
1182	CLP / HKT / Other utilities diversion for Administration Building area site formation	72	25-Jan-21	29-Apr-21	24
118	Site Formation for future Administration Buillding Area (Except existing DG Stores area)	60	06-May-21	17-Jul-21	20
103	Remaining site formation at future Administration Buillding Area (Existing DG Stores area)	23	15-Jul-21	10-Aug-21	0
DN1200 Drainage					
117_23	Drainage Works near Administration Building (DN1200) - Excavation for 1st Section (Outfall headwall to SMH40)	24	09-Feb-21	15-Mar-21	35
117_25	Drainage Works near Administration Building (DN1200) - 1st Section drainage pipe laying (Outfall headwall to SMH40)	24	16-Mar-21	16-Apr-21	35
117_01	Drainage Works near Administration Building (DN1200) - Excavation for 2nd Section (SMH40 to SMH39)	36	30-Apr-21	12-Jun-21	24
117_05	Drainage Works near Administration Building (DN1200) - 2nd Section drainage pipe laying (SMH40 to SMH39)	24	15-Jun-21	13-Jul-21	24
117_07	Drainage Works near Administration Building (DN1200) - Excavation for 3rd Section (SMH39 to SMH37)	36	11-Aug-21	21-Sep-21	136
117_09	Drainage Works near Administration Building (DN1200) - 3rd Section drainage pipe laying (SMH39 to SMH37)	30	23-Sep-21	29-Oct-21	136
Section 2 - Const new plant in Portion A&B, E&M in portion H, Pipeline diversion M1 to M5					
Statuory Submissions					
Building 1 - 4 - FSD Submission prior to Fire Services Installation					
SUB.1020	FSD - Submission of FSI/314 with VAC Layout Plan	90	28-Sep-21	15-Jan-22	217
Pipe Pile Wall Construction					
ELS Design					
192	pipe pile wall - Prepare design & drawing	12	19-Nov-20 A	04-Jan-21	0
193	pipe pile wall - Submit to RE for comment	12	05-Jan-21	18-Jan-21	0
194	pipe pile wall - Revise, Resubmit & approval	18	19-Jan-21	08-Feb-21	0
Cofferdam (Stage 2 Filters)					
196	Cofferdam (Stage 2 Filters) - Install pipe pile & Grouting	60	08-May-21	20-Jul-21	0
197	Cofferdam (Stage 2 Filters) - Sensitive Pumping Test	12	21-Jul-21	03-Aug-21	0
Cofferdam (South Work Pumping Station) & Cofferdam for Delivery Main					



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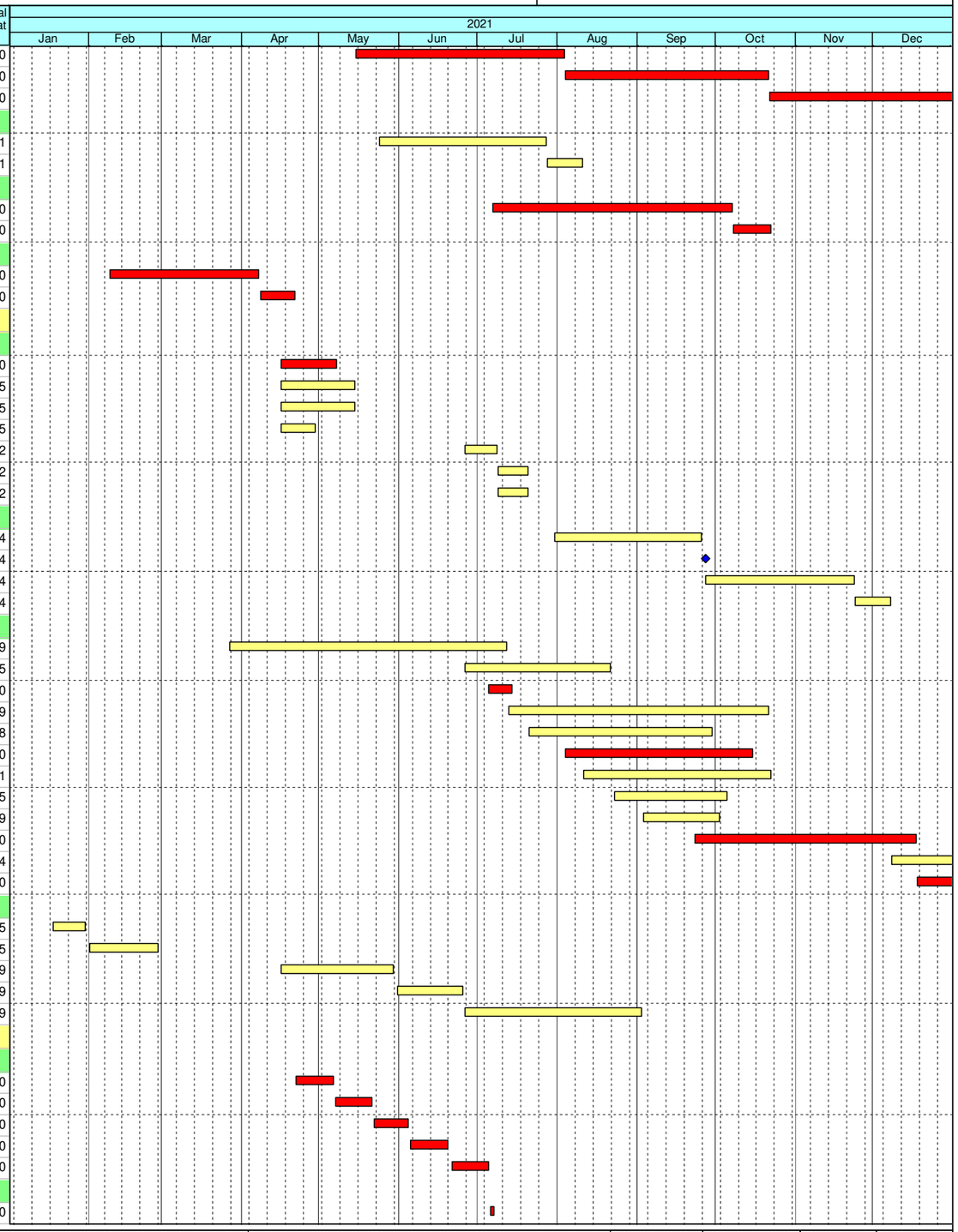
Contract No. 1/WSD/19
In-Situ Reprovisioning of Sha Tin Water Treatment Works (South Works) - Water Treatment Works

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
199_01	Cofferdam (South Work Pumping Station) - Install pipe pile & Grouting - 1/3 Portion	66	15-May-21	03-Aug-21	0
199_03	Cofferdam (South Work Pumping Station) - Install pipe pile & Grouting - 2/3 Portion	65	04-Aug-21	21-Oct-21	0
199_05	Cofferdam (South Work Pumping Station) - Install pipe pile & Grouting - 3/3 Portion	65	22-Oct-21	08-Jan-22	0
Cofferdam (Stage 1 Filters)					
202	Cofferdam (Stage 1 Filters) - Install pipe pile & Grouting	54	24-May-21	27-Jul-21	1
203	Cofferdam (Stage 1 Filters) - Sensitive Pumping Test	12	28-Jul-21	10-Aug-21	1
Cofferdam (Flocculation and Sedimentation Tanks , Ozone Building, Residual Management Facilities)					
205	Cofferdam (Flocculation & Sedimenatation Tanks,Ozone Bldg, Residual Manag. Facilities) - Install pipe pile & Grouting	78	07-Jul-21	07-Oct-21	0
206	Cofferdam (Flocculation & Sedimenatation Tanks,Ozone Bldg, Residual Management Facilities) - Sensitive Pumping Test	12	08-Oct-21	22-Oct-21	0
Cofferdam (Washwater Equalization Tanks)					
208	Cofferdam (Washwater Equalization Tanks) - Install pipe pile & Grouting	40	09-Feb-21	07-Apr-21	0
209	Cofferdam (Washwater Equalization Tanks) - Sensitive Pumping Test	12	08-Apr-21	21-Apr-21	0
Decommissioning, Shut Down & Relocation of Works					
Shut Down of South Works					
220	Disconnect Filtered Water Tank	18	16-Apr-21	07-May-21	0
221	Disconnect SW air receiver from Air Compressor at NW Pumping Station	24	16-Apr-21	14-May-21	85
222	Abandon Washwater Pump inside SW Pumping Station	24	16-Apr-21	14-May-21	85
223	Relocate Air Compressors at SW Filter Gallery for NW Surge Vessels	12	16-Apr-21	29-Apr-21	85
216	Remove Existing Dosing Pipes from Chemical House	10	26-Jun-21	08-Jul-21	12
217	Disconnect SW Raw Water Channel at Raw Water Dividing Chamber	10	09-Jul-21	20-Jul-21	12
218	Disconnect Sludge Pipe at existing Sludge Collect Chamber	10	09-Jul-21	20-Jul-21	12
Relocation of Existing Emergency Power Generator for Chlorination House					
227	Construct New Steel Shed for Emergency Power Generator	48	31-Jul-21	25-Sep-21	614
228	Handover Steel Shed for E&M Installation	0	27-Sep-21		614
229	Installation of Building Services and Electrical Works	48	27-Sep-21	23-Nov-21	614
230	Relocation of the Existing Genset to Chlorine Building & Resume operation	12	24-Nov-21	07-Dec-21	614
Demolition of Major Existing Facilities					
224_01	Washwater Equalization Tank-Pipe Laying for Washwater Pipes - 1/2 Portion	84	27-Mar-21	12-Jul-21	49
233	Demolition of Existing Alum Saturation Tanks	48	26-Jun-21	21-Aug-21	15
116	Demolition of the Exiting DG Store	9	05-Jul-21	14-Jul-21	0
224_03	Washwater Equalization Tank-Pipe Laying for Washwater Pipes - 2/2 Portion	84	13-Jul-21	21-Oct-21	49
237	Demolition of Existing Clarifiers	60	21-Jul-21	29-Sep-21	18
236	Demolition of Existing Filter Beds	60	04-Aug-21	15-Oct-21	0
235	Demolition of Existing Chemical House	60	11-Aug-21	22-Oct-21	1
234	Demolition of Existing M&E Workshop	36	23-Aug-21	05-Oct-21	15
240	Demolition of Existing Raw Water Channel	24	03-Sep-21	02-Oct-21	29
810	Decommissioning of M&E utilities for demolition of Existing Temp. Washwater Recovery Tanks	72	23-Sep-21	17-Dec-21	0
664	Demolition of Existing Emergency Generator for Chlorine House	24	08-Dec-21	07-Jan-22	614
232	Demolition of Existing Temp. Washwater Recovery Tanks	20	18-Dec-21	13-Jan-22	0
Isolation of Clarifiers					
730_01	Stage 2 - Construction of RC walls for Settled Water Isolation (Wall 1 & 2)	12	18-Jan-21	30-Jan-21	65
730_03	Stage 2 - Construction of RC walls for Settled Water Isolation (Wall 3 & 4)	18	01-Feb-21	27-Feb-21	65
730_05	Stage 2 - Construction of RC walls for Settled Water Isolation (Wall 5 to 9)	36	16-Apr-21	29-May-21	29
732	Stage 3 - Disconnect SW & NW settled water channel / raw water channel	22	31-May-21	25-Jun-21	29
740	Isolate Clarifiers No.2, No.3 and No.4	58	26-Jun-21	02-Sep-21	29
Washwater Equalization Tanks					
Excavation & ELS					
252	Washwater Equilization Tank - Excav & const Retaining Wall at existing treated water wet wells	12	22-Apr-21	06-May-21	0
253_01	Washwater Equilization Tank - Excav & Install ELS & Plate Loading Test - S1	12	07-May-21	21-May-21	0
253_03	Washwater Equilization Tank - Excav & Install ELS & Plate Loading Test - S2	12	22-May-21	04-Jun-21	0
253_05	Washwater Equilization Tank - Excav & Install ELS & Plate Loading Test - S3	12	05-Jun-21	19-Jun-21	0
253_07	Washwater Equilization Tank - Excav & Install ELS & Plate Loading Test - S4	12	21-Jun-21	05-Jul-21	0
Substructure					
254	Washwater Equilization Tank - Earth mat Installation (if any) & blinding	2	06-Jul-21	07-Jul-21	0



Current Milestone
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1 Year Rolling Programme

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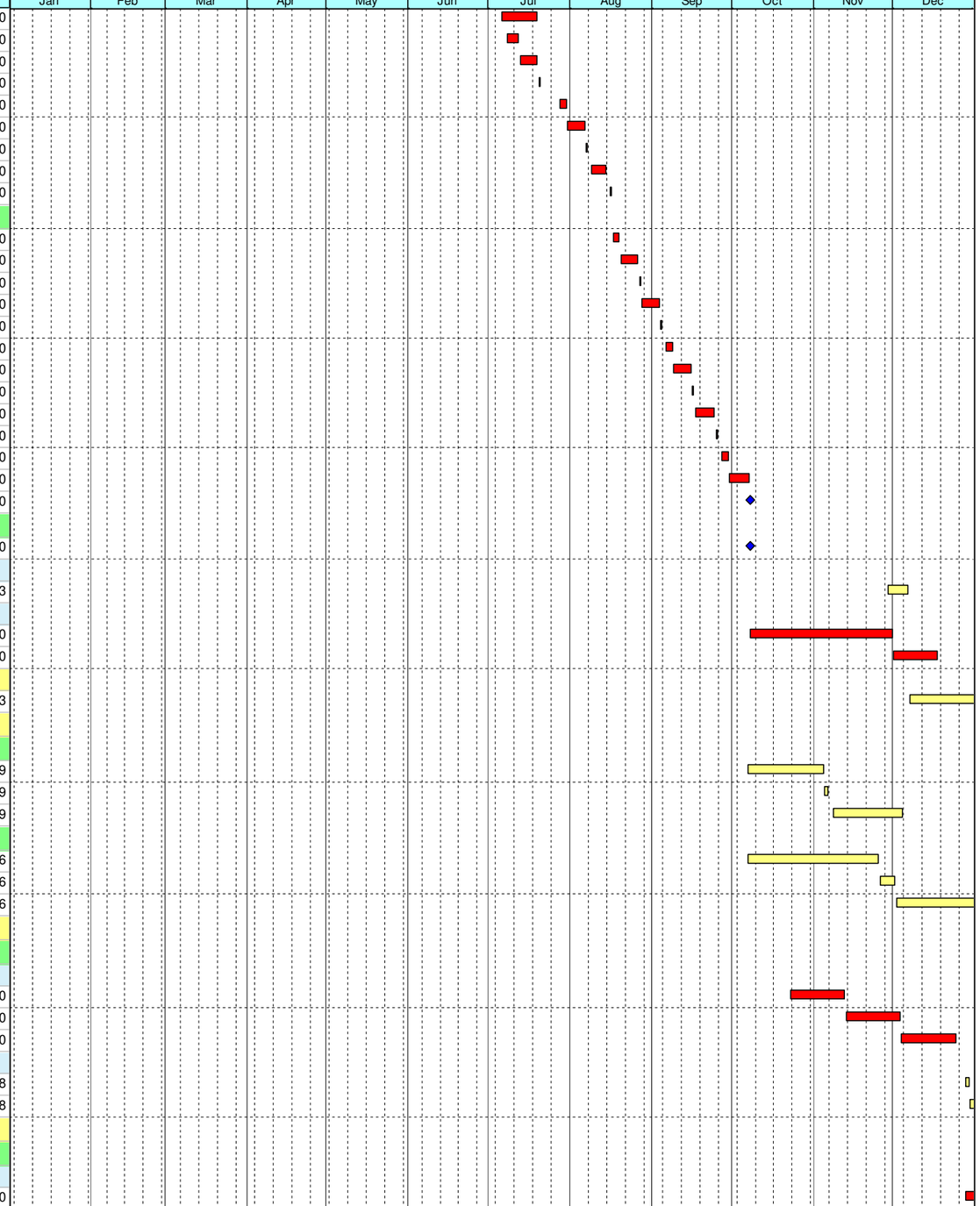
Contract No. 1/WSD/19
In-Situ Reprovisioning of Sha Tin Water Treatment Works (South Works) - Water Treatment Works

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
257	Washwater Equilization Tank - Underground pipework	12	06-Jul-21	19-Jul-21	0
255_01	Washwater Equilization Tank - Backfilling to formation level	4	08-Jul-21	12-Jul-21	0
255_03	Washwater Equilization Tank - Formwork and rebar fixing for Basement floor slab	6	13-Jul-21	19-Jul-21	0
255_05	Washwater Equilization Tank - Concreting for Basement floor slab (+16.8mPD)	1	20-Jul-21	20-Jul-21	0
255_07	Washwater Equilization Tank - Scaffolding erection +16.8mPD to +24mPD	3	28-Jul-21	30-Jul-21	0
255_09	Washwater Equilization Tank- Formwork and rebar fixing for walls +16.8mPD to +24mPD	6	31-Jul-21	06-Aug-21	0
255_11	Washwater Equilization Tank - Concreting for walls (up to +24mPD)	1	07-Aug-21	07-Aug-21	0
255_13	Washwater Equilization Tank - Formwork and rebar fixing for floor slab (+24mPD)	6	09-Aug-21	14-Aug-21	0
255_15	Washwater Equilization Tank - Concreting for floor slab (+24mPD)	1	16-Aug-21	16-Aug-21	0
Superstructure					
255_17	Washwater Equilization Tank - Scaffolding erection +24mPD to +27.4mPD	3	17-Aug-21	19-Aug-21	0
255_19	Washwater Equilization Tank - Formwork and rebar fixing for walls +24mPD to +27.4mPD	6	20-Aug-21	26-Aug-21	0
255_21	Washwater Equilization Tank - Concreting for walls (up to +27.4mPD)	1	27-Aug-21	27-Aug-21	0
255_23	Washwater Equilization Tank - Formwork and rebar fixing for floor slab (+27.4mPD)	6	28-Aug-21	03-Sep-21	0
255_25	Washwater Equilization Tank - Concreting for floor slab (+27.4mPD)	1	04-Sep-21	04-Sep-21	0
255_35	Washwater Equilization Tank - Scaffolding erection +27.4mPD to +31mPD (Roof)	3	06-Sep-21	08-Sep-21	0
255_45	Washwater Equilization Tank - Formwork and rebar fixing for walls +27.4mPD to +31mPD (Roof)	6	09-Sep-21	15-Sep-21	0
255_55	Washwater Equilization Tank - Concreting for walls (up to +31mPD) (Roof)	1	16-Sep-21	16-Sep-21	0
255_65	Washwater Equilization Tank - Formwork and rebar fixing for Roof slab (+31mPD)	6	17-Sep-21	24-Sep-21	0
255_75	Washwater Equilization Tank - Concreting for Roof slab (+31mPD)	1	25-Sep-21	25-Sep-21	0
718	Washwater Equilization Tank - Apply waterproofing	3	27-Sep-21	29-Sep-21	0
256	Washwater Equilization Tank - Water Test	6	30-Sep-21	07-Oct-21	0
258	Washwater Equilization Tank - Completion of Civil Structure for E&M Installation	0	08-Oct-21		0
Washwater Equalization Tanks - M&E Works					
WET.1010	Washwater Equilization Tank - Handover of Washwater Equalization Tanks for E&M works	0	08-Oct-21		0
Washwater Equalization Tanks - Delivery to Installation Area					
WET.1050	Washwater Equilization Tank - Delivery for Installation - LALG	7	29-Nov-21	06-Dec-21	173
Washwater Equalization Tanks - Installation					
WET.1000	Washwater Equilization Tank - Temporary Installation for Flow Diversion	45	08-Oct-21	30-Nov-21	0
WET.1090	Washwater Equilization Tank - Ready for Temporary Operation	15	01-Dec-21	17-Dec-21	0
Washwater Equalization Tanks - Installation - Mechanical					
WET.1100	Washwater Equilization Tank - Installation of LALG	80	07-Dec-21	19-Mar-22	173
Inlet Works and New Sampling Room					
New Sampling Room					
1226	New Sampling Room - Construct new temporary New Sampling Room	24	07-Oct-21	04-Nov-21	59
1228	New Sampling Room - Migrate existing equipment from the existing new sampling room to new temporary one	2	05-Nov-21	06-Nov-21	59
1230	New Sampling Room - Modify the structure of the existing sampling room	24	08-Nov-21	04-Dec-21	59
Inlet Works - Structure					
272	Inlet Works - Open cut excavation	42	07-Oct-21	25-Nov-21	26
273	Inlet Works - Installation of underground earthing system or earth mat (if necessary)	5	26-Nov-21	01-Dec-21	26
274	Inlet Works - Foundation (with 6 nos. mini pile avg. length=13m including empty boring)	36	02-Dec-21	15-Jan-22	26
Flocculation and Sedimentation Tanks					
Western Half of Flocculation & Sedimentation Tank Structure					
Flocculation & Sedimentation Tank (Western Half) - Excavation and ELS					
285_01	Flocc & Sed Tanks (Western Half) - Excav & Install ELS & Plate Loading Test - S1	18	23-Oct-21	12-Nov-21	0
285_03	Flocc & Sed Tanks (Western Half) - Excav & Install ELS & Plate Loading Test - S2	18	13-Nov-21	03-Dec-21	0
285_05	Flocc & Sed Tanks (Western Half) - Excav & Install ELS & Plate Loading Test - S3	18	04-Dec-21	24-Dec-21	0
Flocculation & Sedimentation Tank (Western Half) - Substructure					
286	Flocc & Sed Tanks (Western Half) - Installation of underground earthing system or earth mat	2	28-Dec-21	29-Dec-21	8
287_01	Flocc & Sed Tanks (Western Half) - Backfilling to formation level	12	30-Dec-21	13-Jan-22	8
Ozone Building					
Ozone Building - Structure					
Ozone Building - Excavation and ELS					
328_01	Ozone Building - Excav & Install ELS & Plate Loading Test - S1	18	28-Dec-21	18-Jan-22	0



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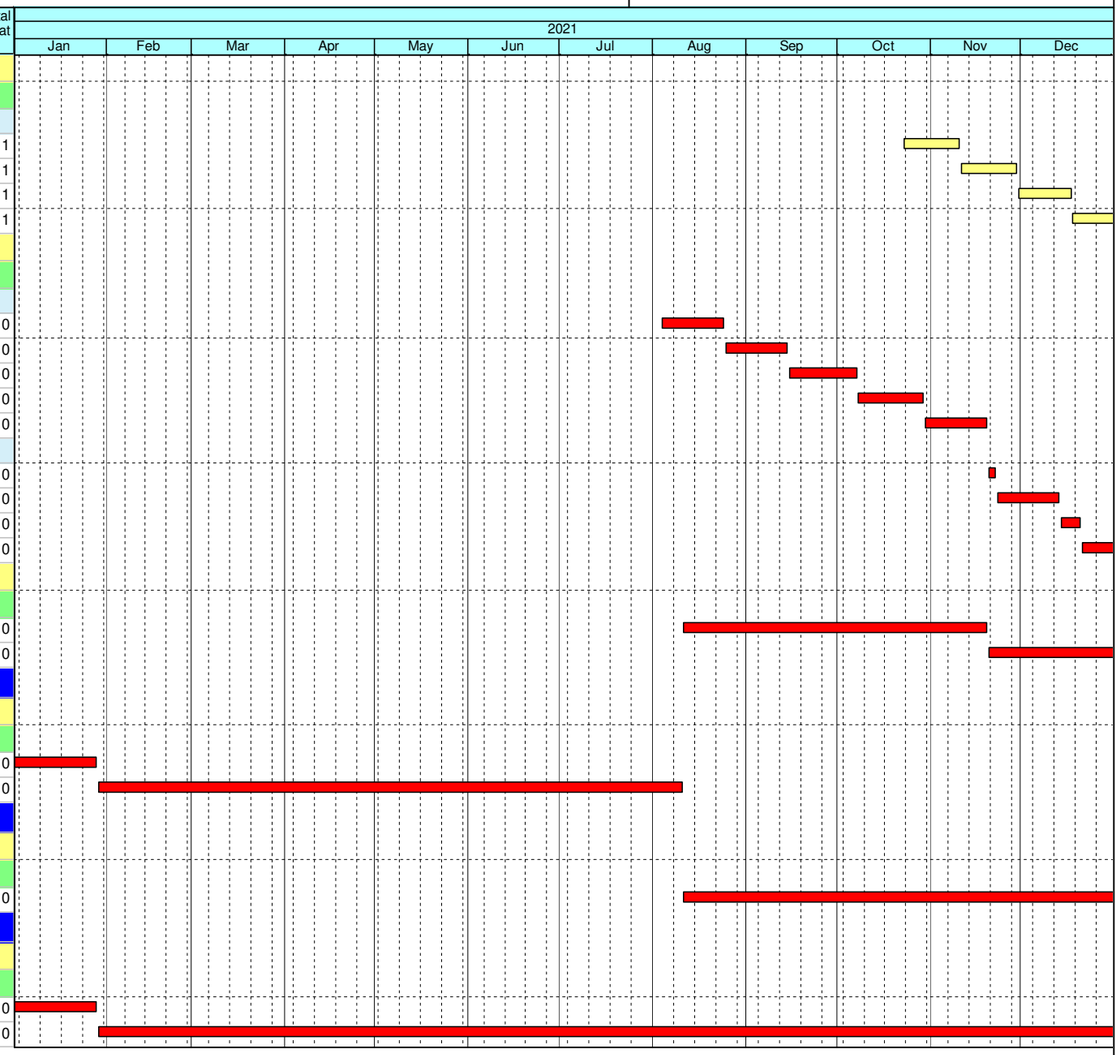
Contract No. 1/WSD/19
In-Situ Reprovisioning of Sha Tin Water Treatment Works (South Works) - Water Treatment Works

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
Stage 1 Filters					
1st Half of Stage 1 Filters Structure (Northern Half)					
Stage 1 Filters (1st Half - Northern Half) - Escavation and ELS					
357_01	Stage 1 Filter (1st Half - Northern) - Excav & Install ELS & Plate Loading Test - S1	16	23-Oct-21	10-Nov-21	1
357_03	Stage 1 Filter (1st Half - Northern) - Excav & Install ELS & Plate Loading Test - S2	16	11-Nov-21	29-Nov-21	1
357_05	Stage 1 Filter (1st Half - Northern) - Excav & Install ELS & Plate Loading Test - S3	16	30-Nov-21	17-Dec-21	1
357_07	Stage 1 Filter (1st Half - Northern) - Excav & Install ELS & Plate Loading Test - S4	16	18-Dec-21	08-Jan-22	1
Stage 2 Filters					
Stage 2 Filters - Filters Structure 1st Half (Western Half)					
Stage 2 Filters (1st Half - Western Half) - Escavation and ELS					
426_01	Stage 2 Filter (1st Half - Western) - Excav & Install ELS & Plate Loading Test - S1	18	04-Aug-21	24-Aug-21	0
426_03	Stage 2 Filter (1st Half - Western) - Excav & Install ELS & Plate Loading Test - S2	18	25-Aug-21	14-Sep-21	0
426_05	Stage 2 Filter (1st Half - Western) - Excav & Install ELS & Plate Loading Test - S3	18	15-Sep-21	07-Oct-21	0
426_07	Stage 2 Filter (1st Half - Western) - Excav & Install ELS & Plate Loading Test - S4	18	08-Oct-21	29-Oct-21	0
426_09	Stage 2 Filter (1st Half - Western) - Excav & Install ELS & Plate Loading Test - S5	18	30-Oct-21	19-Nov-21	0
Stage 2 Filters (1st Half - Western Half) - Substructure					
427	Stage 2 Filter (1st Half - Western) - Install underground earthing system or earth mat (if any)	2	20-Nov-21	22-Nov-21	0
428	Stage 2 Filter (1st Half - Western) - Tower Crane Constrction	18	23-Nov-21	13-Dec-21	0
429_01	Stage 2 Filter (1st Half - Western) - Backfilling to formation level	6	14-Dec-21	20-Dec-21	0
429_03	Stage 2 Filter (1st Half - Western) - Formwork and rebar fixing for Basement floor slab	12	21-Dec-21	06-Jan-22	0
Geotechnical Works					
Retaining Wall A, E, G & Soldier Pipe Wall B, F					
570_01	L-Shape Retaining Wall A (Type RW1 and RW2) - 1st Section	84	11-Aug-21	19-Nov-21	0
570_03	L-Shape Retaining Wall A (Type RW1 and RW2) - 2nd Section	84	20-Nov-21	08-Mar-22	0
Section 3 - Landscaping Softworks within Portion D					
Landscaping Softworks					
Portion D					
651_01	Subletting for Landscaping Works	90	10-Aug-20 A	28-Jan-21	0
651	Portion D - Landscaping Works	194	29-Jan-21	10-Aug-21	0
Section 3A - Establishment Works within Portion D					
Landscaping Establishment					
Portion D					
655	Portion D - Establishment Works	365	11-Aug-21	10-Aug-22	0
Section 5 - Post-planting Monitoring and Maintenance Works within Portion A, D and G					
Post-planting Monitoring and Maintenance Works					
Portion A, D and G					
669_01	Subletting for Post-planting Monitoring and Maintenance Works within Portion A, D and G	90	10-Aug-20 A	28-Jan-21	0
669	Post-planting Monitoring and Maintenance Works within Portion A, D and G	1929	29-Jan-21	11-May-26	0



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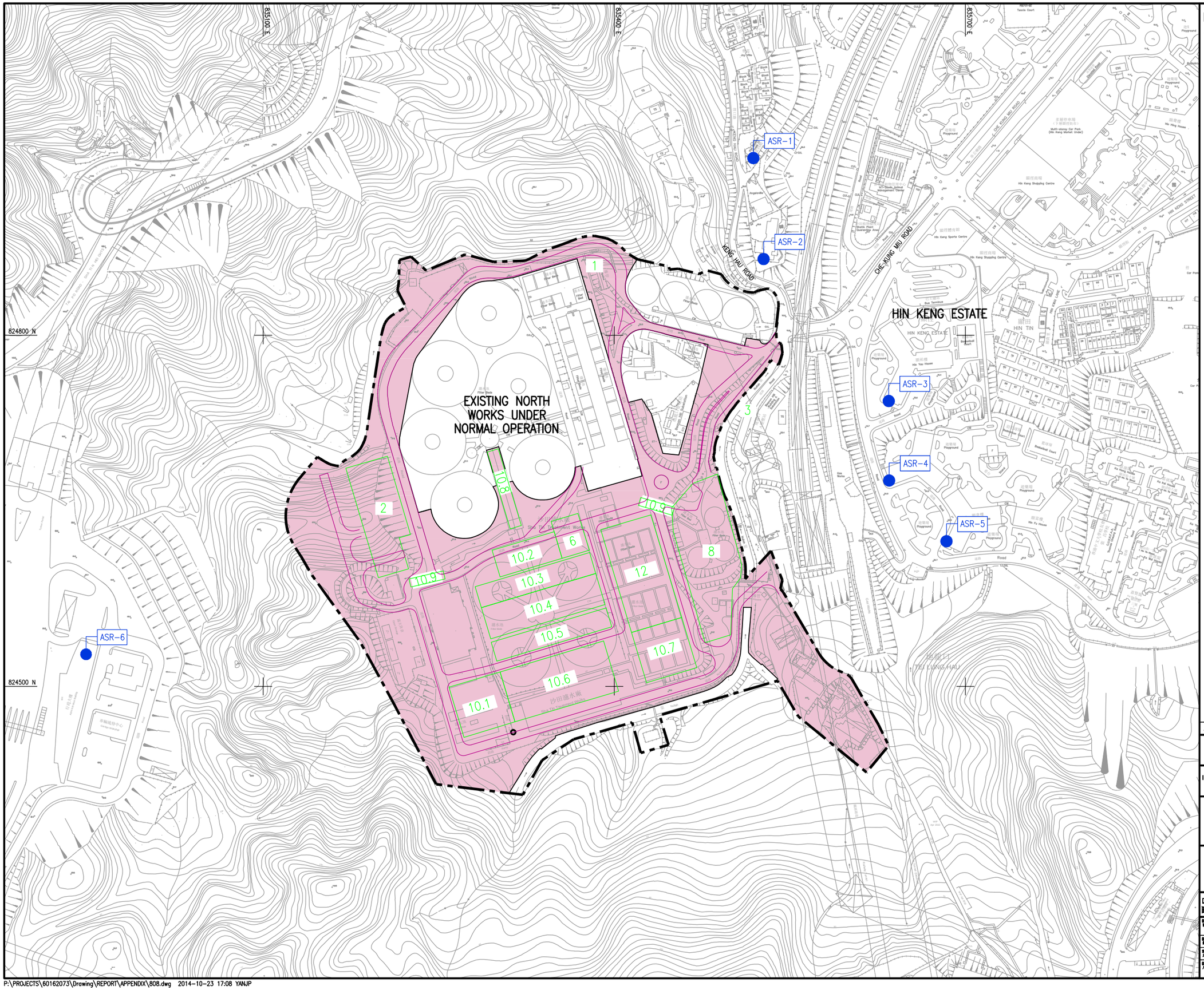
Appendix D
Location of Construction Activities



LEGEND:

	SITE BOUNDARY OF SHA TIN WATER TREATMENT WORKS
	WORKS AREA
	RESPRESENTATIVE AIR SENSITIVE RECEIVERS (ASRS)
ASR-1	THE BLOSSOM PHASE 4
ASR-2	THE L LOUEY
ASR-3	HIN KENG ESTATE – HIN YAU HOUSE
ASR-4	HIN KENG ESTATE – HIN WAN HOUSE
ASR-5	HIN KENG ESTATE – HIN KWAI HOUSE
ASR-6	SHA TIN HEIGHT TUNNEL ADMINISTRATION BUILDING
1	RETAINING WALL AND NEW ACCESS ROAD
2	WATER TREATMENT WORKS LOGISTICS CENTRE
3	UPGRADED MAIN ENTRY ROAD
6	WASHWATER EQUALIZATION TANKS (NORTH WORKS)
8	DEMOLITION OF EXISTING WASHWATER RECOVERY TANKS
10	CONSTRUCTION OF SOUTH WORKS
10.1	RESIDUAL MANAGEMENT FACILITIES
10.2	PRE-OZONATION HOUSE AND COAGULATION TANKS
10.3	FLOCCULATION TANKS
10.4	HIGH RATE SEDIMENTATION TANKS
10.5	INTERMEDIATE OZONATION HOUSE
10.6	STAGE 1 BIOLOGICAL FILTERS
10.7	SOUTH WORKS PUMPING STATION
10.8	INLET CHANNEL STATIC MIXERS (NORTH WORKS)
10.9	PEDESTRIAN WALKWAY
12	STAGE 2 GRANULAR MEDIA FILTERS & UV REACTORS
13	OPERATION OF HAUL ROAD

REV. 修訂 | DESCRIPTION 內容修訂 | BY 由 | CHKD'D 核准 | DATE 日期

水 務 署
WATER SUPPLIES DEPARTMENT

AGREEMENT NO. CE 13/2009 (WS)
IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS-SOUTH WORKS
DESIGN AND CONSTRUCTION

LOCATIONS OF CONSTRUCTION WORKS AREA

AECOM

DRG.NO. 圖紙編號 60162073/FIGURE 4.2

DESIGNED BY 設計 –	CONTRACT NO. 合約編號	P. CK. APPROVED 批准人
DRAWN BY 繪圖 NHP	STATUS 階段	
SCALE 比例 A3 1 : 3000		
DIMENSIONS ARE IN 尺寸單位 METRES	© COPYRIGHT RESERVED 版 權 所 有	

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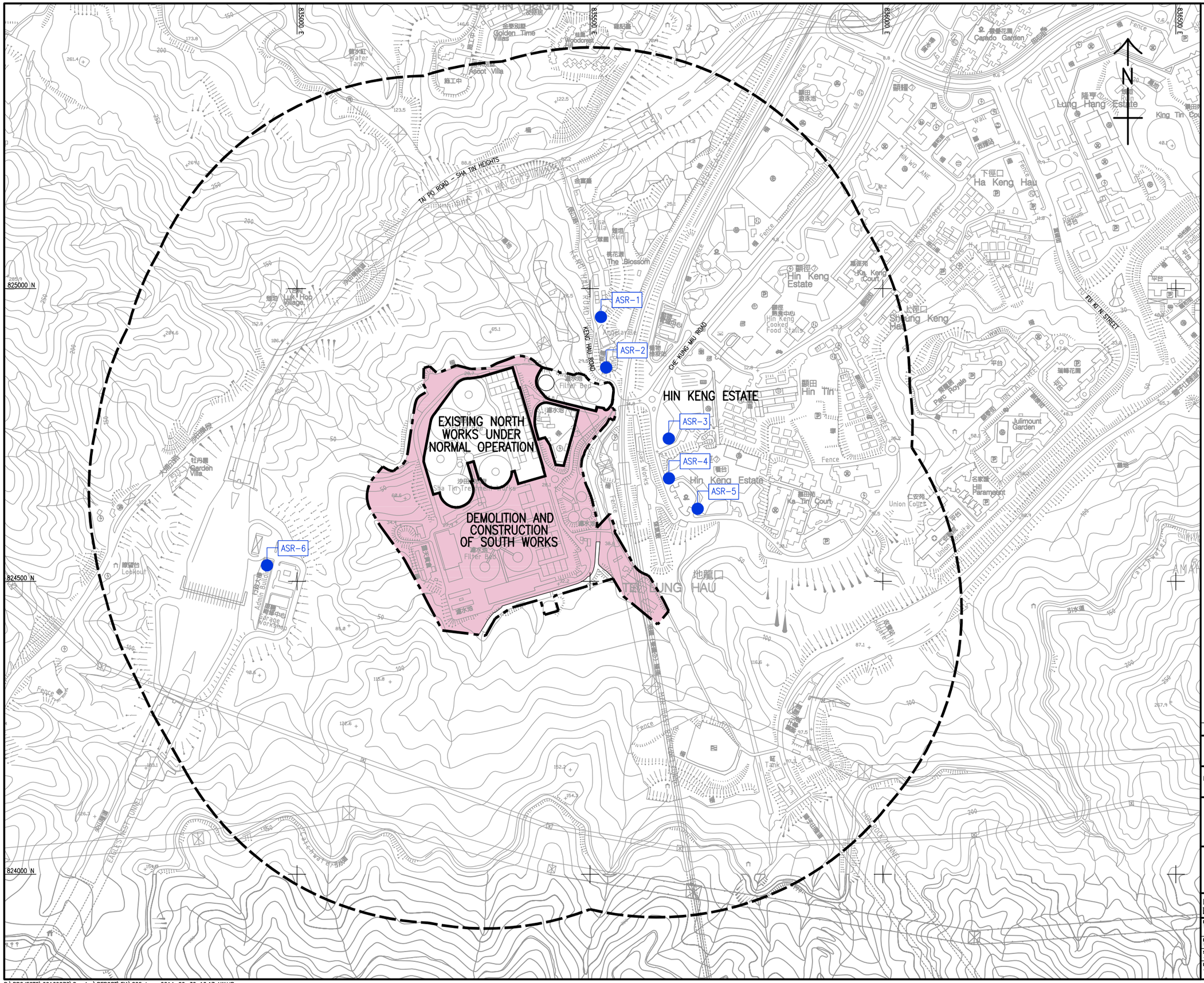
Appendix E
Environmental Sensitive Receivers in the Vicinity of the Project



LEGEND:

- SITE BOUNDARY OF SHA TIN WATER TREATMENT WORKS
- STUDY AREA (500m BOUNDARY)
- WORKS AREA
- RESPRESENTATIVE AIR SENSITIVE RECEIVERS (ASRS)

ASR-1	THE BLOSSOM PHASE 4
ASR-2	THE L LOUEY
ASR-3	HIN KENG ESTATE – HIN YAU HOUSE
ASR-4	HIN KENG ESTATE – HIN WAN HOUSE
ASR-5	HIN KENG ESTATE – HIN KWAI HOUSE
ASR-6	SHA TIN HEIGHT TUNNEL ADMINISTRATION BUILDING

REV. 版次	DESCRIPTION 內容摘要	BY 由	CHECKED 核准	DATE 日期

水 務 署
WATER SUPPLIES DEPARTMENT

AGREEMENT NO. CE 13/2009 (WS)
IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS-SOUTH WORKS
DESIGN AND CONSTRUCTION

LOCATIONS OF REPRESENTATIVE AIR SENSITIVE RECEIVERS

AECOM

DRG.NO. 圖紙編號 60162073/EIA/FIG 4.1

DESIGNED BY 設計	–	CONTRACT NO. 合約編號
DRAWN BY 繪圖	NHP	STATUS 階段
SCALE 比例	A3 1 : 6000	
DIMENSIONS ARE IN 尺寸單位	METRES	

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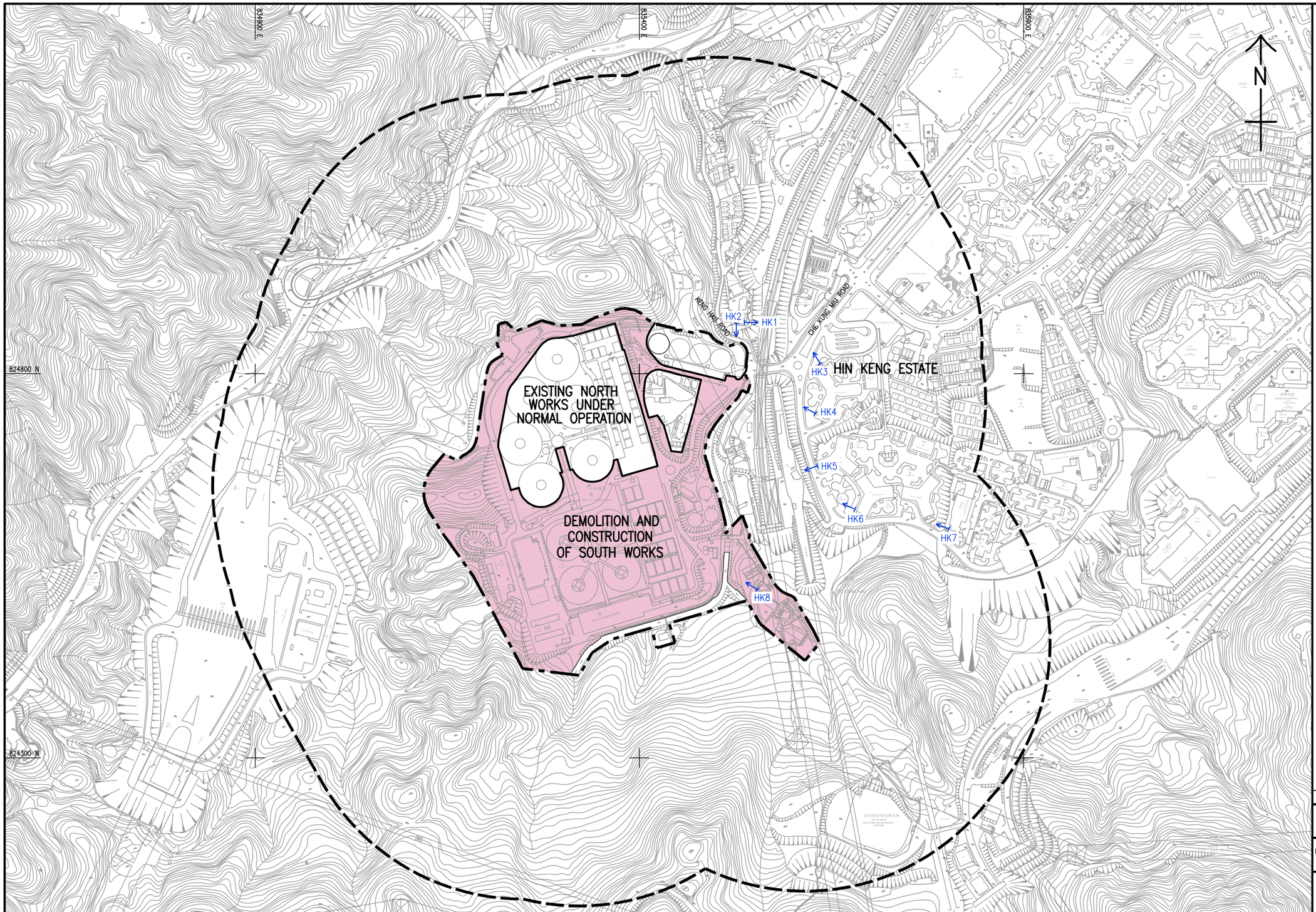

LEGEND:

- SITE BOUNDARY OF SHA TIN WATER TREATMENT WORKS
- 300m STUDY AREA
- WORKS AREA
- HK1 — REPRESENTATIVE NOISE SENSITIVE RECEIVERS

ID	DESCRIPTION	CONSTRUCTION NOISE	OPERATIONAL FIXED PLANT NOISE
HK1	THE L LOUEY (EAST)	Y	Y
HK2	THE L LOUEY (SOUTH)	Y	Y
HK3	HIN KENG ESTATE, HIN YAU HOUSE (NORTH)	Y	Y
HK4	HIN KENG ESTATE, HIN YAU HOUSE (SOUTH)	Y	Y
HK5	HIN KENG ESTATE, HIN WAN HOUSE	Y	Y
HK6	HIN KENG ESTATE, HIN KWAI HOUSE	Y	Y
HK7	CUHKFAA THOMAS CHEUNG SCHOOL	Y	Y
HK8	SHA TIN WTW STAFF QUARTERS		Y

REV. 修訂 | DESCRIPTION 內容修訂 | BY 由 | CHECKED 核准 | DATE 日期

水 務 署
WATER SUPPLIES DEPARTMENT

AGREEMENT NO. CE 13/2009 (WS)
IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS-SOUTH WORKS
DESIGN AND CONSTRUCTION

LOCATIONS OF REPRESENTATIVE NOISE SENSITIVE RECEIVERS

AECOM

DRG.NO. 圖紙編號 60162073/EIA/FIG 5.1

DESIGNED BY 設計 –
CONTRACT NO. 合約編號
P. DIR. APPROVED 批准人
DRAWN BY 繪圖 LJ
STATUS 種類
SCALE 比例 A3 1 : 5000
DIMENSIONS ARE IN 尺寸單位 METRES

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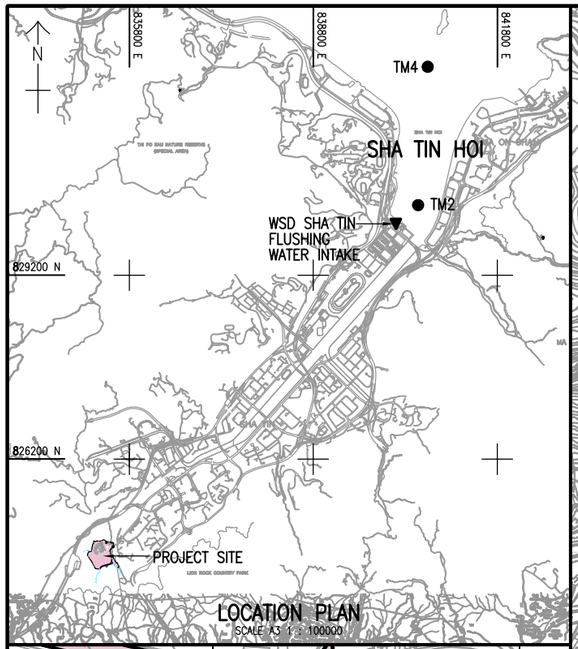
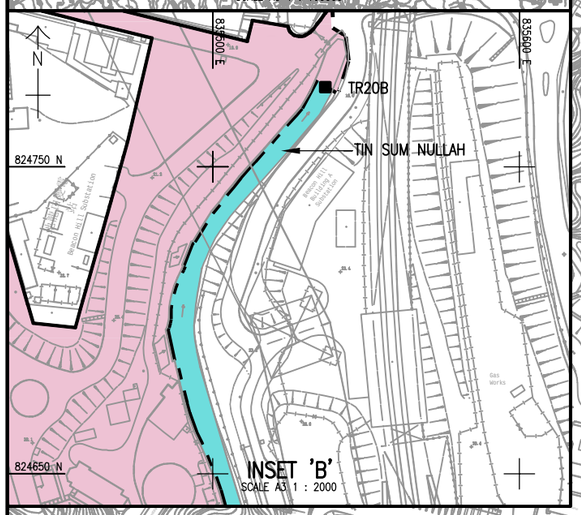
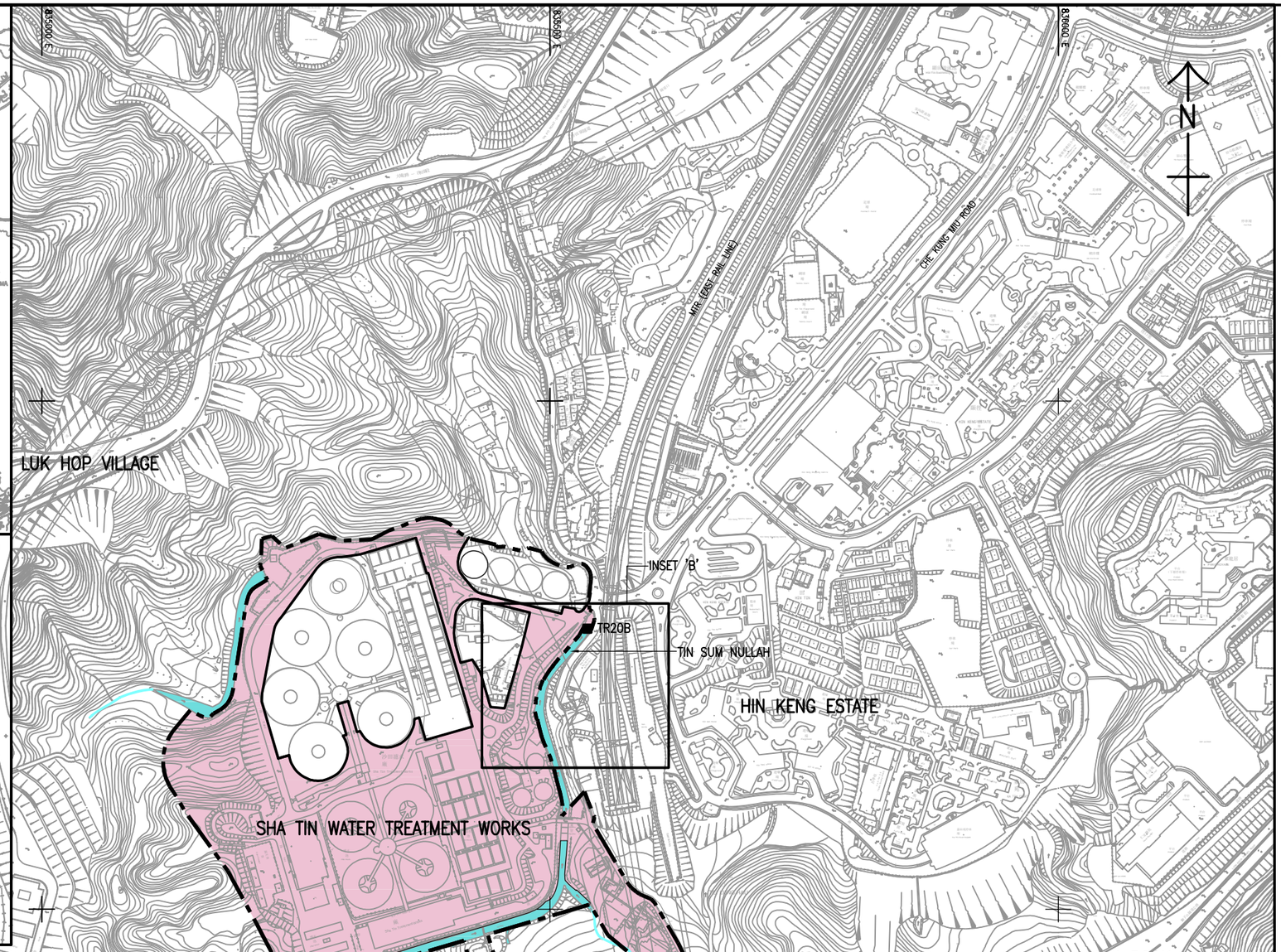


LOCATION PLAN
SCALE A3 1 : 100000



INSET 'B'
SCALE A3 1 : 2000



LEGEND:

- SITE BOUNDARY OF SHATIN WATER TREATMENT WORKS
- WORKS AREA
- INLAND WATER COURSE
- EPD MARINE WATER QUALITY MONITORING STATION
- EPD RIVER WATER QUALITY MONITORING STATION
- WSD SHA TIN FLUSHING WATER INTAKE

REV. 修訂	DESCRIPTION 內容摘要	DR.	CHECKED 核准	DATE 日期

水 務 署
WATER SUPPLIES DEPARTMENT

AGREEMENT NO. CE 13/2009 (WS)
IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS-SOUTH WORKS
DESIGN AND CONSTRUCTION

LOCATIONS OF WATER SENSITIVE RECEIVERS

AECOM

DRG.NO. 圖紙編號 60162073/EIA/FIG 6.1

DESIGNED BY 設計 –	CONTRACT NO. 合約編號	P. Dr. APPROVED 批准人
DRAWN BY 繪圖 DXL	STATUS 階段	
SCALE 比例 A3 1 : 5000		
DIMENSIONS ARE IN 尺寸單位 METRES		

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Appendix F
Summary of Action and Limit Levels

Determination of Action and Limit Levels for Air Quality

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

Determination of Action and Limit Levels for Noise

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

Determination of Action and Limit Levels for Water Quality

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

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

Appendix G
Event/Action Plan

Air Quality

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

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

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

Noise

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

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

Water Quality

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

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

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

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

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

Appendix H
Impact Monitoring Schedules

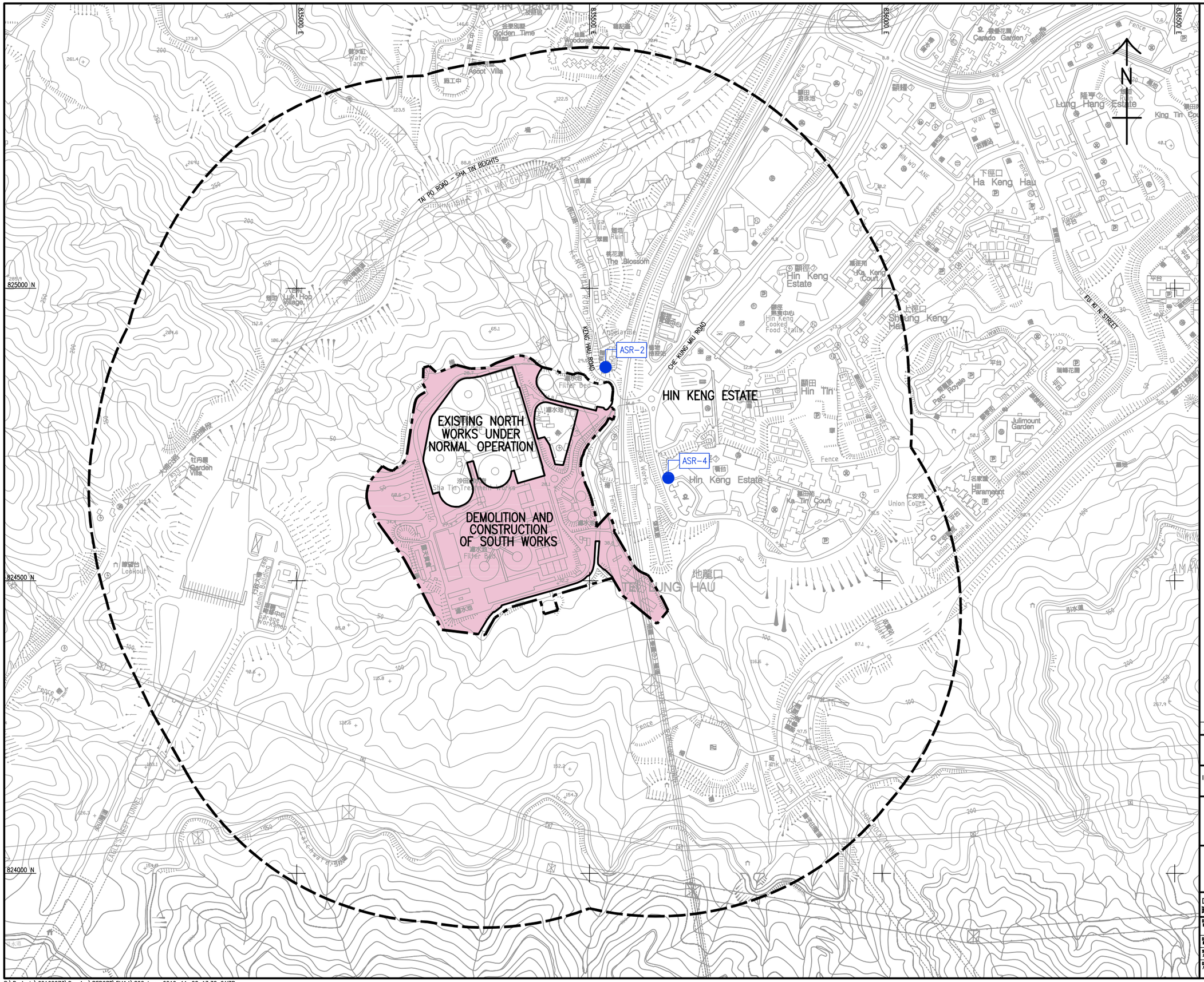
Impact Monitoring Schedule for STWTW

Jan 21						
Sun	Mon	Tue	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 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	5	6 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	7	8 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	9
10	11 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	12	13 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	14	15 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	16
17	18 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	19	20 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	21	22 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	23
24	25 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	26	27 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	28	29 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	30
31						

Tentative Impact Monitoring Schedule for STWTW

Feb 21						
Sun	Mon	Tue	Wed	Thur	Fri	Sat
	1 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	2	3 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	4	5 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 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	9	10 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	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	17	18 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	19	20 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3
21	22 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	23	24 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	25	26 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	27
28						

Appendix I
Location Plan of Air Quality Monitoring Station



LEGEND:

- SITE BOUNDARY OF SHA TIN WATER TREATMENT WORKS
- STUDY AREA (500m BOUNDARY)
- WORKS AREA
- RESPRESENTATIVE AIR SENSITIVE RECEIVERS (ASRS)
- ASR-2 THE L LOUEY
- ASR-4 HIN KENG ESTATE – HIN WAN HOUSE

REV. 修訂	DESCRIPTION 內容摘要	BY 由	CHECKED 核查	DATE 日期

水 務 署
WATER SUPPLIES DEPARTMENT

AGREEMENT NO. CE 13/2009 (WS)
IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS-SOUTH WORKS
DESIGN AND CONSTRUCTION

LOCATIONS OF PROPOSED DUST MONITORING STATIONS

AECOM

DRG.NO. 圖紙編號 60162073/EM&A/FIG 3

DESIGNED BY 設計 –	CONTRACT NO. 合約編號	P. Dir. APPROVED 批准人
DRAWN BY 繪圖 NHP	STATUS 階段	
SCALE 比例 A3 1 : 6000		
DIMENSIONS ARE IN 尺寸單位 METRES		

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Appendix J
Calibration Certificates
(Air Monitoring)

北京航天计量测试技术研究所
中国航天 CASC Beijing Aerospace Institute for Metrology and Measurement Technology

证书编号：HD1e-2021-01-2867823
CERTIFICATE №:

校准证书

CALIBRATION CERTIFICATE

委托方 CLIENT

名 称：浩科環境工業有限公司
NAME: Acumen Environmental Engineering and Technologies Company Limited
地 址：香港青衣(北)担杆山路 12 號地段
ADDRESS: Lot 12, Tam Kon Shan Road, North Tsing Yi, Hong Kong

计量器具 MEASURING INSTRUMENTS

名 称：TSP 全尘浓度检测仪
NAME:
型号：PC-3A（E）
TYPE:
制造者：青岛精诚仪器仪表有限公司
MANUFACTURER:
编号：JC-2001141
№:

校准人：沈北砚 核验人：孙景波 签发人：杨广强
OPERATOR: INSPECTOR: APPROVED SIGNATORY:

发证机构(专用章)
ISSUED BY(STAMP)

接收日期：RECEIVED DATE:	2021	年 YEAR	01	月 MONTH	14	日 DAY
校准日期：CAL. DATE:	2021	年 YEAR	01	月 MONTH	14	日 DAY
建议下次校准日期：NEXT TIME TO CALIBRAT:	2022	年 YEAR	01	月 MONTH	13	日 DAY

本结果仅对所校准样品有效，证书未经本实验室批准，不得部分复印。
These results apply only to the calibrated sample, this certificate can't be partly copied without authorization.

地址：中国北京市丰台区东高地南大红门路 1 号
通讯：北京 9200 信箱 24 分箱 邮政编码：100076
电话：86-10-68383637，86-10-68383657
传真：86-10-88522409
网址：http://www.102.com.cn

Address:No.1 South Dahongmen Road ,Beijing ,China.
P.O.Box: 9200-24,Beijing ,China. Zip:100076
Tel.:86-10-68383637，86-10-68383657
Fax:86-10-88522409
E-mail:jiliang102@163.com

证书编号：HD1e-2021-01-2867823
CERTIFICATE №:

本实验室是法定计量检定机构（包括被授权的计量检定机构）
This body is an institute of legal verification (including authorized body)
授权单位：国家国防科技工业局
Authorized by: State Administration of Science Technology and Industry for National Defence
授权证书号：国防军工-JLJG-1-003
Authorization certificate № 国防军工-JLJG-1-003
本实验室的质量管理体系符合 ISO/IEC17025 标准的要求，并经中国合格评定国家认可委员会认可，认可证书号：CNAS L0283
This body is a CNAS accredited laboratory with a qualified quality management system in compliance with the ISO/IEC17025 standard, Accreditation certificate № CNAS L0283
本实验室通过国家认证认可监督管理委员会的资质认定，认定证书编号：170020180155
This body is accredited by Certification and Accreditation administration of the People's Republic of China , Accreditation Certificate №170020180155
测量溯源性的说明：国家计量基准
A statement of Measurement traceability: National Metrology Standards

校准所使用的计量标准及主要测量设备
STANDARD AND EQUIPMENT USED IN THE CALIBRATION

名称/编号 NAME/NO.	测量范围 MEASURING RANGE	扩展不确定度/准确度等级/最大允许误差 EXPANDED UNCERTAINTY /ACCURACY CLASS /MAX.PERMISSIBLE ERROR	证书编号 CERTIFICATE NO.	证书有效期至 DUE DATE
低浓度粉尘发生装置	（0~10）mg/m³	5.0%	2020D11-09-012990	2021-09-03

校准所依据的技术文件（编号、名称）
BASIS OF CALIBRATION (CODE、NAME)
JJG 846-2015 粉尘浓度测量仪

校准的环境条件、地点，限制使用条件和测量范围
ENVIROMENTAL CONDITION IN THE CALIBRATION, LOCATION, LIMITED USING CONDITION AND MEASURING RANGE

温度 Temperature: 20.2 ℃
湿度 Moisture: 53 %RH
地点 Location：北京市丰台区南大红门路一号
限制使用条件和测量范围 **Limited using condition and measuring range:**

证书编号：HD1e-2021-01-2867823
CERTIFICATE №:

校准结果

RESULTS OF CALIBRATION

外观及标志	名牌内容及标识	完整
	粉尘仪表面及采样头	无缺陷
示值误差	±20%	5.5%
示值重复性	±10%	2.9%
绝缘强度	应能承受 1500V、50Hz 的电压，泄露电流不大于 5mA，持续时间 1min，无飞弧和击穿现象	符合要求

说明 1. 本次校准测量结果的扩展不确定度：U_{rel}=5.2% ； (k=2)。

2. 经校准，所校项目符合检定规程技术要求。

以下空白

Blank Below

CERTIFICATE OF CALIBRATION AND TESTING

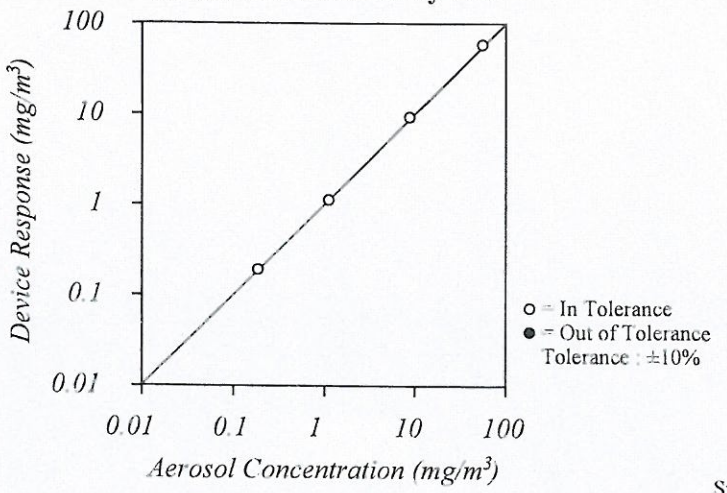
TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA
Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

Environment Conditions		
Temperature	73.34 (23.0)	°F (°C)
Relative Humidity	40.5	%RH
Barometric Pressure	29.00 (982.1)	inHg (hPa)

Model	**8532**
Serial Number	**8532114409**

☒ As Left ☐ As Found ☒ In Tolerance ☐ Out of Tolerance

Concentration Linearity Plot



System ID: DTII01-02

FLOW AND PRESSURE VERIFICATION

SYSTEM DTII01-02

Parameter	Standard	Measured	Allowable Range	Parameter	Standard	Measured	Allowable Range
Flow lpm	3.00	3.08	2.88 ~ 3.12	Pressure kPa	98.2	98.2	93.32 ~ 103.14
Full Flow lpm	N/A	5.21	>3.80				

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

Measurement Variable	System ID	Last Cal.	Cal. Due
DC Voltage	E003314	01-15-20	01-31-21
Microbalance	M001324	10-03-18	10-31-20
3 um PSL	221853	n/a	n/a
Pressure	E003511	10-04-19	10-31-20
DC Voltage	E003315	01-15-20	01-31-21

Measurement Variable	System ID	Last Cal.	Cal. Due
Photometer	E005612	02-25-20	08-31-20
1 um PSL	698880	n/a	n/a
10 um PSL	212455	n/a	n/a
Flowmeter	E005140	01-09-20	01-31-21

Maynhia Vang

Calibrated

August 11, 2020

Date

TSI P/N 2300157

CERTIFICATE OF CALIBRATION AND TESTING

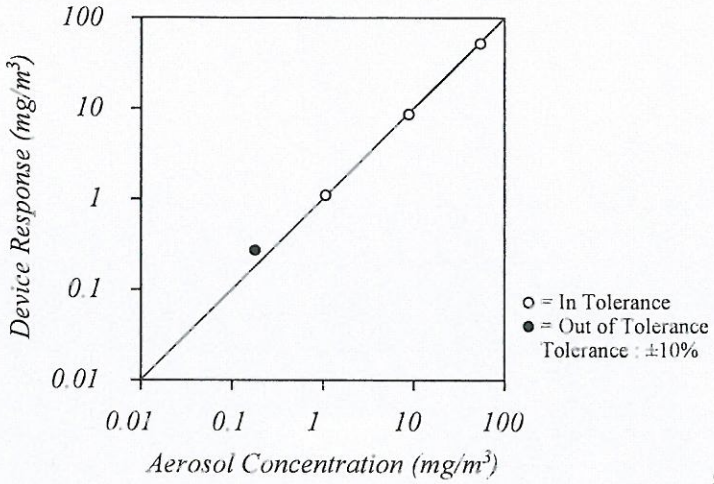
TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA
Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

Environment Conditions		
Temperature	73.8 (23.2)	°F (°C)
Relative Humidity	43	%RH
Barometric Pressure	29.02 (982.7)	inHg (hPa)

Model	**8532**
Serial Number	**8532114409**

☐ As Left ☐ In Tolerance
☒ As Found ☒ Out of Tolerance

Concentration Linearity Plot



System ID: DTII01-02

FLOW AND PRESSURE VERIFICATION — **SYSTEM DTII01-02**

Parameter	Standard	Measured	Allowable Range	Parameter	Standard	Measured	Allowable Range
Flow lpm	3.00	3.12	2.85 ~ 3.15	Pressure kPa	98.2	98.3	93.34 ~ 103.16
Full Flow lpm	N/A	5.19	>3.80				

Pump run time: 2764 Hours, Pump voltage: 571 Bits

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

Measurement Variable	System ID	Last Cal.	Cal. Due
DC Voltage	E003314	01-15-20	01-31-21
Microbalance	M001324	10-03-18	10-31-20
3 um PSL	221853	n/a	n/a
Pressure	E003511	10-04-19	10-31-20
DC Voltage	E003315	01-15-20	01-31-21

Measurement Variable	System ID	Last Cal.	Cal. Due
Photometer	E005612	02-25-20	08-31-20
1 um PSL	698880	n/a	n/a
10 um PSL	212455	n/a	n/a
Flowmeter	E005140	01-09-20	01-31-21

Maynhia Vang

Verified

August 11, 2020

Date

TSI P/N 2300157

Kestrel®
Weather & Environmental Meters
by NK

Certificate of Conformity

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.

SENSORS

SENSOR	1000	2000	2500	3000	3500	3500 DT	4000	4200	4250	4300	4400	4500	4500 HOR	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 mph 0.1 knots 1 B	0.6 to 40.0 m/s 118 to 7,874 ft/min 2.2 to 144.0 km/h 1.3 to 89.5 mph 1.2 to 77.8 knots 0 to 12 B	0.6 to 60.0 m/s 118 to 11,811 ft/min 2.2 to 216.0 km/h 1.3 to 134.2 mph 1.2 to 116.6 knots 0 to 12 B	1 inch|25 mm diameter impeller with precision axle and low-friction Zytel® bearings. Startup speed stated as lower limit, readings may be taken down to 0.4 m/s | 79 ft/min | 1.5 km/h | .9 mph | .8 kt after impeller startup. Off-axis accuracy -1% @ 5° off-axis; -2% @ 10°; -3% @ 15°. Calibration drift < 1% after 100 hours use at 16 MPH | 7 m/s. Replacement impeller (NK PN-0801) field installs without tools. (US Patent 5,783,753). Wind speed calibration and testing should be done with triangle on impeller located at the top front face of the Kestrel.
Ambient Temperature		•	•	•	•	•	•	•	•	•	•	•	•	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 to 131.0 °F -10.0 to 55.0 °C	Hermetically-sealed, precision thermistor mounted externally and thermally isolated (US Patent 5,939,645) for rapid response. Airflow of 2.2 mph|1 m/s or greater provides fastest response and reduction of insolation effect. Calibration drift negligible. Thermistor may also be used to measure temperature of water or snow by submerging thermistor portion into material -- remove impeller prior to taking submerged measurements and ensure humidity sensor membrane is free of liquid water prior to taking humidity based measurements after submersion.
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 for standard 6 in|150 mm globe. Closest equivalence obtained with airflow greater than 2.2 mph|1 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 rapid, accurate response (US Patent 6,257,074). To achieve stated accuracy, unit must be permitted to equilibrate to external temperature when exposed to large, rapid temperature changes and be kept out of direct sunlight. Calibration drift +/- 2% over 24 months. Humidity sensor may be recalibrated at factory or in field using Kestrel Humidity Calibration Kit (NK PN-0802).
Pressure				•			•	•	•	•	•	•	•	inHg 0.03 1.0 hPa|mbar 0.01 PSI	0.01 inHg 0.1 hPa|mbar 0.01 PSI	8.86 to 32.49 inHg 300.0 to 1100.0 hPa|mbar 4.35 to 15.95 PSI *and* 32.0 to 185.0 °F 0.0 to 85.0 °C	0.30 to 48.87 inHg 10.0 to 1654.7 hPa|mbar 0.14 to 24.00 PSI *and* 14.0 to 131.0 °F -10.0 to 55.0 °C	Monolithic silicon piezoresistive pressure sensor with second-order temperature correction. Pressure sensor may be recalibrated at factory or in field. Adjustable reference altitude allows display of station pressure or barometric pressure corrected to MSL. Kestrel 4200 displays station pressure on a dedicated screen. Kestrel 2500 and 3500 display continuously updating three-hour barometric pressure trend indicator: rising rapidly, rising, steady, falling, falling rapidly. Kestrel 4000 series displays pressure trend through graphing function. PSI display on Kestrel 4000 series only.
Compass												•	•	5°	1° 1/16th Cardinal Scale	0 to 360°	0 to 360°	2-axis solid-state magnetoresistive sensor mounted perpendicular to unit plane. Accuracy of sensor dependent upon unit's vertical position. Self-calibration routine eliminates magnetic error from batteries or unit and must be run after every full power-down (battery removal or change). Readout indicates direction to which the back of the unit is pointed when held in a vertical orientation. Declination/variation adjustable for True North readout.

CALCULATED MEASUREMENTS

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								•	•					0.0002 lb/ft³ 0.0033 kg/m³	0.001 lbs/ft³ 0.001 kg/m³	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	Mass of air per unit volume
Air Flow								•						6.71%	1 cfm 1 m³/hr 1 m³/m 0.1m³/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 measurement 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 | 6.55 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 1100 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 compensated for local elevation provided by reference altitude. Requires accurate reference altitude to produce maximum absolute accuracy.
Crosswind & Headwind/Tailwind												•	•	7.1%	1 mph 1 ft/min 0.1 km/h 0.1 m/s 0.1 knots	Refer to Ranges for Sensors Employed	Wind Speed Compass	Effective wind relative to a target or travel direction. Auto-switching headwind/tailwind indication.
Delta T						•								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, indicates evaporation rate and droplet lifetime. Safe range for pesticide spraying is 4 to 16 °F / 2 to 9 °C.
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 consisting of 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/ft²/hr 0.06 kg/m2/hr	0.01 lb/ft²/hr 0.01 kg/m²/hr	Refer to Ranges for Sensors Employed	Wind Speed Temperature Relative Humidity Pressure User Input (Concrete Temperature)	The rate at which moisture is lost from the surface of curing concrete. Requires user measurement and entry of concrete temperature obtained with an accurate IR or probe thermometer (°F or °C, not included). Readings should be taken 20 inches above pour surface with the thermistor shaded, and averaged for 6-10 seconds using built-in averaging function.
Heat Index			•	•	•		•	•	•	•	•	•	•	7.1 °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 humidity. Calculated based on NWS Heat Index (HI) tables. Measurement range limited by extent of published tables.
Moisture Content | Humidity Ratio ("Grains")								•	•					3 gpp .04 g/kg	0.1 gpp 0.01 g/kg	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	Mass of water vapor in a mass of air.
Relative Air Density									•					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/m²	0.1 W/m²	Refer to Ranges for Sensors Employed	Wind Speed Temperature Globe Temperature Relative Humidity Pressure	Estimated safe maximum continuously sustainable human metabolic rate (W/m2) 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, convection, and conduction. Outdoor WBGT is calculated from a weighted sum of natural wet bulb (Tnwb), globe temperature (Tg), and dry bulb temperature (Td). User settable on-screen warning zones.
Wet Bulb Temperature - Naturally Aspirated (Tnwb)											•			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 wet-bulb temperature (see below). However, Tnwb only undergoes forced convection from the ambient air velocity. Tnwb is a measure of the evaporative cooling that the air 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 a water-air system, this approximates the thermodynamic wet-bulb temperature. The thermodynamic wet-bulb 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. Calculated based on the NWS Wind Chill Temperature (WCT) Index, revised 2001, with wind speed adjusted by a factor of 1.5 to yield equivalent results to wind speed measured at 10 m above ground. Measurement range limited by extent of published tables.

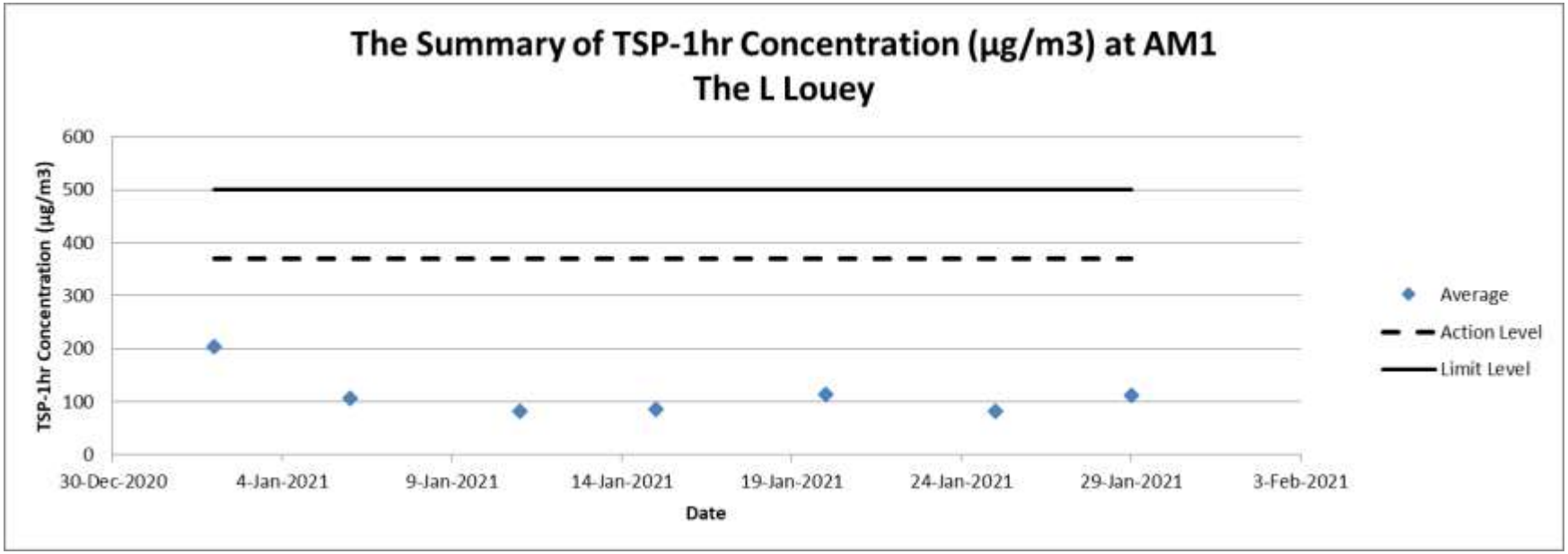
ADDITIONAL SPECIFICATIONS

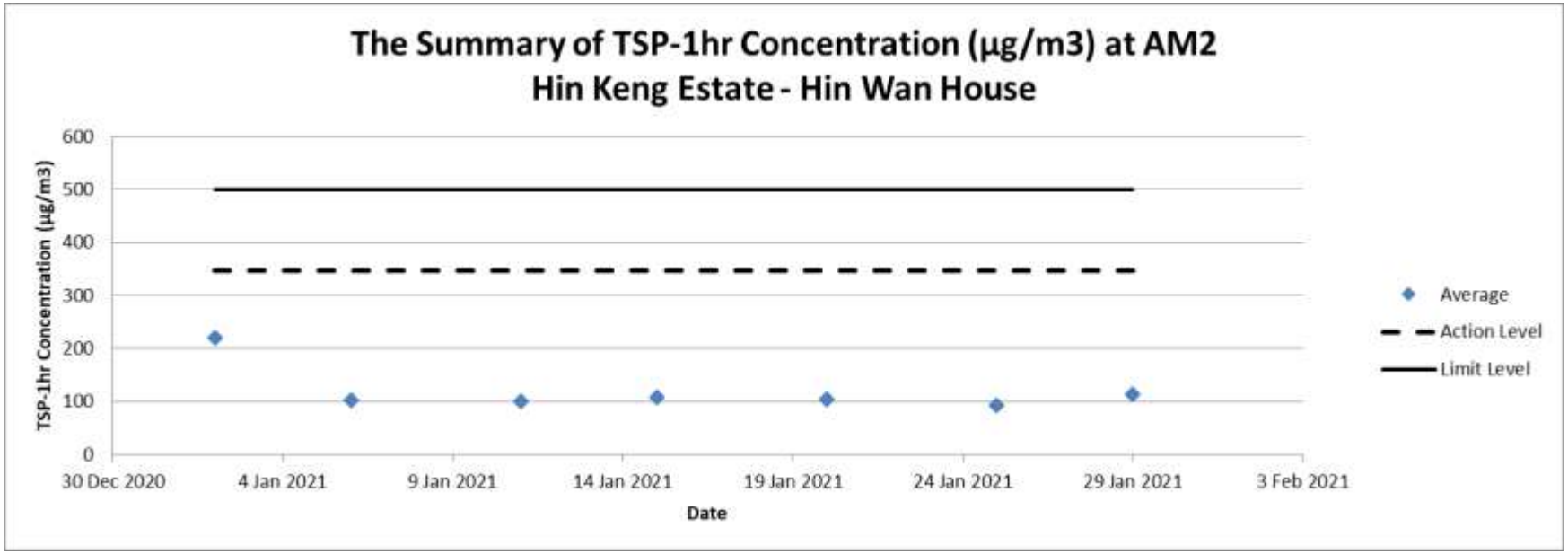
Display & Backlight	•	•		•										Reflective 3 1/2 digit LCD. Digit height 0.55 in / 9 mm. Aviation green electroluminescent backlight. Manual activation with auto-off.
			•		•	•								Reflective 5 digit LCD. Digit height 0.36 in / 9 mm. Choice of aviation green or visible red (NV models only) electroluminescent backlight. Manual activation with auto-off.
Response Time & Display Update							•	•	•	•	•	•	•	Multifunction, multi-digit monochrome dot-matrix display. Choice of aviation green or visible red (NV models only) electroluminescent backlight. Automatic or manual activation.
	•	•	•	•	•	•	•	•	•	•	•	•	•	All measurements except those based on relative humidity respond accurately within 1 second. Relative humidity and all measurements which include RH in their calculation may require as long as 1 minute to fully equilibrate to a large change in the measurement environment. Display updates every 1 second.
	•	•	•	•	•	•								One-button clear and restart of Max Wind Gust and Average Wind measurement.
Max/Avg Wind							•	•	•	•	•	•	•	Max and average wind calculation may be started and stopped independently of data logging of other values, along with all other wind-related functions: air velocity, crosswind, headwind/tailwind, wind chill, WBGT, TWL, evaporation rate.
Data Storage & Graphical Display, Min/Max/Avg History							4000 points	3200 points	3200 points	3600 points	2300 points	2900 points	2500 points	Minimum, maximum, average and logged history stored and displayed for every measured value. Large capacity data logger with graphical display. Manual and auto data storage. Min/Max/Avg history may be reset independently. Auto-store interval settable from 2 seconds to 12 hours, overwrite on or off. Logs even when display off except for 2 and 5 second intervals (code version 4.18 and later). Data capacity shown.
Data Upload & Bluetooth® Data Connect Option							•	•	•	•	•	•	•	Requires optional PC interface (USB or RS-232) or Bluetooth data transfer option and provided software. **Bluetooth Data Transfer Option:** Adjustable power consumption and radio range from up to 30 ft | 9 meters. Individual unit ID and 4-digit PIN code preprogrammed for easy identification and data security when pairing and transmitting. Employs Bluetooth Serial Port Protocol for data transmission.
Clock / Calendar	•	•	•	•	•	•								Requires optional PC interface (USB or RS-232) or Bluetooth data transfer option and provided software.
							•	•	•	•	•	•	•	Requires optional PC interface (USB or RS-232) or Bluetooth data transfer option and provided software.
Auto Shutdown	•	•	•	•	•	•								Requires optional PC interface (USB or RS-232) or Bluetooth data transfer option and provided software.
							•	•	•	•	•	•	•	Requires optional PC interface (USB or RS-232) or Bluetooth data transfer option and provided software.
Languages							•	•	•	•	•	•	•	English, French, German, Italian, Spanish.
Certifications	•	•	•	•	•	•	•	•	•	•	•	•	•	CE certified, RoHS and WEEE compliant. Individually tested to NIST-traceable standards (written certificate of tests available at additional charge).
Origin	•	•	•	•	•	•	•	•	•	•	•	•	•	Designed and manufactured in the USA from US and imported components. Complies with Regional Value Content and Tariff Code Transformation requirements for NAFTA Preference Criterion B.
Battery Life	•	•	•	•	•	•								CR2032, one, included. Average life, 300 hours. Battery life reduced by backlight use in 2000 to 3500 models.
							•	•	•	•	•	•	•	**Standard Models:** AAA Alkaline, two, included. Average life, 400 hours of use, reduced by backlight or Bluetooth radio transmission use.
Shock Resistance	•	•	•	•	•	•	•	•	•	•	•	•	•	MIL-STD-810g, Transit Shock, Method 516.5 Procedure IV; unit only; impact may damage replaceable impeller.
Sealing	•	•	•	•	•	•	•	•	•	•	•	•	•	Waterproof (IP67 and NEMA-6).
Operational Temperature Limits	•	•	•	•	•	•	•	•	•	•	•	•	•	14° F to 131° F | -10 °C to 55 °C. Measurements may be taken beyond the limits of the operational temperature range of the display and batteries by maintaining the unit within the operational range and exposing it to the more extreme environment for the minimum time necessary to take reading.
Storage Temperature	•	•	•	•	•	•	•	•	•	•	•	•	•	-22.0 °F to 140.0 °F | -30.0 °C to 60.0 °C
Size & Weight	•	•	•	•	•	•								4.8 x 1.9 x 1.1 in / 12.2 x 4.8 x 2.8 cm, 3.6 oz / 102 g (including slip-on cover).
							•	•	•	•		•	•	5.0 x 1.8 x 1.1 in / 12.7 x 4.5 x 2.8 cm, 3.6 oz / 102 g.
											•			6.5 x 2.3 x 1.1 in / 16.5 x 5.9 x 2.8 cm, 4.4 oz / 125 g.

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

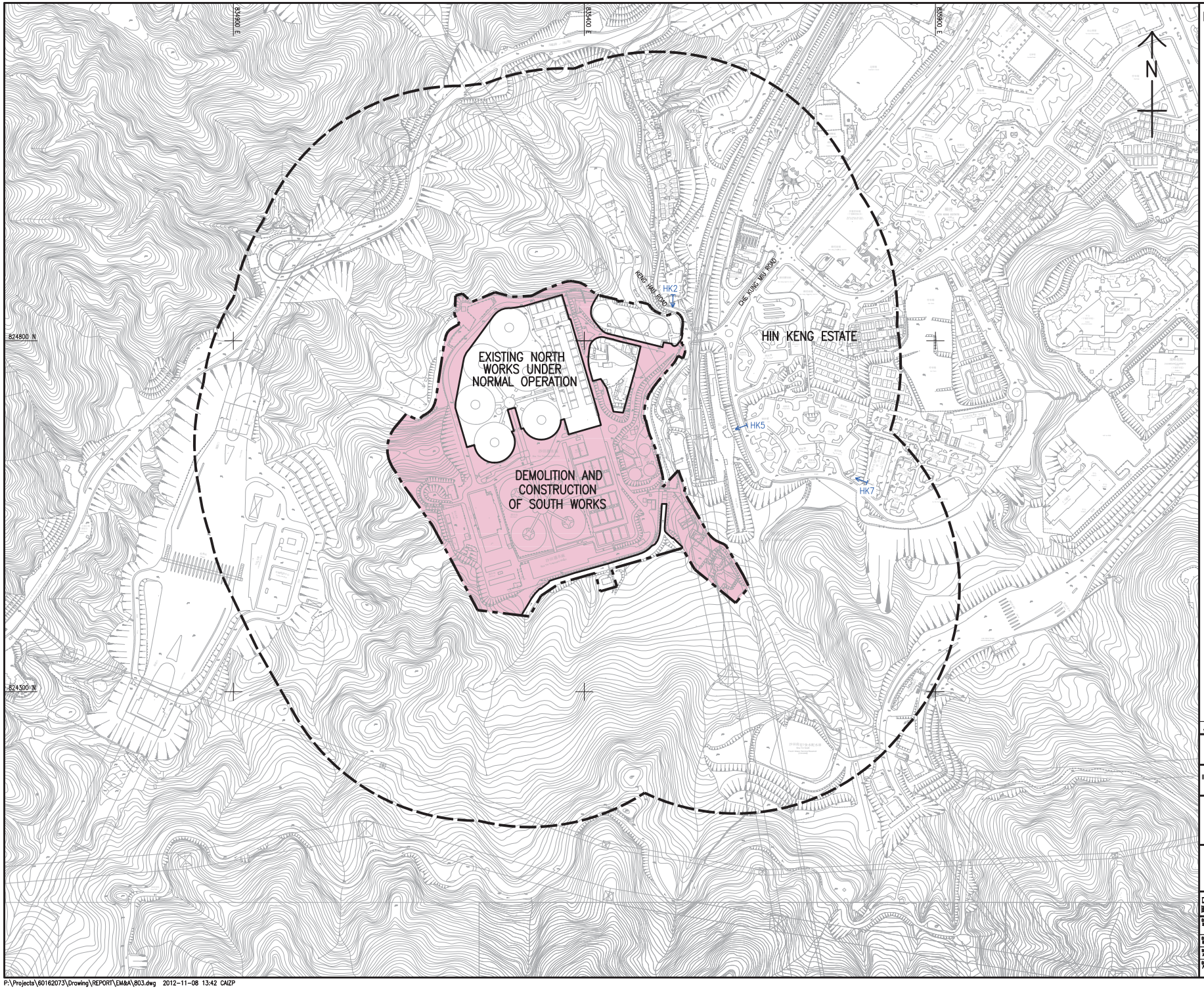
Please note, these specifications are valid for all Kestrel 4400 products and all other Kestrel 4000 series with a serial number higher than 659340. If your product has a lower serial number, please reference the previous version of the specifications.

Appendix K
Impact Air Quality Monitoring Results and Graphical Presentation


The Summary of TSP-1hr Concentration (µg/m3) at AM1
The L Louey
TSP-1hr Concentration (µg/m3)
600
500
400
300
200
100
0
30-Dec-2020
4-Jan-2021
9-Jan-2021
14-Jan-2021
19-Jan-2021
24-Jan-2021
29-Jan-2021
3-Feb-2021
Date
Average
Action Level
Limit Level


The Summary of TSP-1hr Concentration (µg/m3) at AM2
Hin Keng Estate - Hin Wan House
TSP-1hr Concentration (µg/m3)
600
500
400
300
200
100
0
30 Dec 2020
4 Jan 2021
9 Jan 2021
14 Jan 2021
19 Jan 2021
24 Jan 2021
29 Jan 2021
3 Feb 2021
Date
Average
Action Level
Limit Level

Appendix L
Location Plan of Noise Monitoring Station



LEGEND:

- SITE BOUNDARY OF SHA TIN WATER TREATMENT WORKS
- 300m STUDY AREA
- WORKS AREA
- HK2 — THE L LOUEY (SOUTH)
- HK5 — HIN KENG ESTATE – HIN WAN HOUSE
- HK7 — CUHKFAA THOMAS CHEUNG SCHOOL

REV. 修訂	DESCRIPTION 內容摘要	BY 由	CHECKED 核對	DATE 日期

水務署
WATER SUPPLIES DEPARTMENT

AGREEMENT NO. CE 13/2009 (WS)
IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS – SOUTH WORKS
DESIGN AND CONSTRUCTION

LOCATIONS OF PROPOSED NOISE MONITORING STATIONS

AECOM

DRG. NO. 圖表編號: 60162073/EM&A/FIG 4

DESIGNED BY 設計	CONTRACT NO. 合約編號	P. IN. APPROVED 批准人
DRAWN BY 繪圖 NHP	STATUS 狀況	
SCALE 比例 A3 1 : 5000		
DIMENSIONS ARE IN 尺寸單位 METRES	© COPYRIGHT RESERVED 版權所有	

P:\Projects\60162073\Drawing\REPORT\EM&A\803.dwg 2012-11-08 13:42 CAIZP

Appendix M
Calibration Certificates (Noise)

Kestrel®
Weather & Environmental Meters
by NK

Certificate of Conformity

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.

SENSORS

SENSOR	1000	2000	2500	3000	3500	3500 DT	4000	4200	4250	4300	4400	4500	4500 HOR	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 mph 0.1 knots 1 B	0.6 to 40.0 m/s 118 to 7,874 ft/min 2.2 to 144.0 km/h 1.3 to 89.5 mph 1.2 to 77.8 knots 0 to 12 B	0.6 to 60.0 m/s 118 to 11,811 ft/min 2.2 to 216.0 km/h 1.3 to 134.2 mph 1.2 to 116.6 knots 0 to 12 B	1 inch|25 mm diameter impeller with precision axle and low-friction Zytel® bearings. Startup speed stated as lower limit, readings may be taken down to 0.4 m/s | 79 ft/min | 1.5 km/h | .9 mph | .8 kt after impeller startup. Off-axis accuracy -1% @ 5° off-axis; -2% @ 10°; -3% @ 15°. Calibration drift < 1% after 100 hours use at 16 MPH | 7 m/s. Replacement impeller (NK PN-0801) field installs without tools. (US Patent 5,783,753). Wind speed calibration and testing should be done with triangle on impeller located at the top front face of the Kestrel.
Ambient Temperature		•	•	•	•	•	•	•	•	•	•	•	•	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 to 131.0 °F -10.0 to 55.0 °C	Hermetically-sealed, precision thermistor mounted externally and thermally isolated (US Patent 5,939,645) for rapid response. Airflow of 2.2 mph|1 m/s or greater provides fastest response and reduction of insolation effect. Calibration drift negligible. Thermistor may also be used to measure temperature of water or snow by submerging thermistor portion into material -- remove impeller prior to taking submerged measurements and ensure humidity sensor membrane is free of liquid water prior to taking humidity based measurements after submersion.
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 for standard 6 in|150 mm globe. Closest equivalence obtained with airflow greater than 2.2 mph|1 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 rapid, accurate response (US Patent 6,257,074). To achieve stated accuracy, unit must be permitted to equilibrate to external temperature when exposed to large, rapid temperature changes and be kept out of direct sunlight. Calibration drift +/- 2% over 24 months. Humidity sensor may be recalibrated at factory or in field using Kestrel Humidity Calibration Kit (NK PN-0802).
Pressure				•			•	•	•	•	•	•	•	inHg 0.03 1.0 hPa|mbar 0.01 PSI	0.01 inHg 0.1 hPa|mbar 0.01 PSI	8.86 to 32.49 inHg 300.0 to 1100.0 hPa|mbar 4.35 to 15.95 PSI *and* 32.0 to 185.0 °F 0.0 to 85.0 °C	0.30 to 48.87 inHg 10.0 to 1654.7 hPa|mbar 0.14 to 24.00 PSI *and* 14.0 to 131.0 °F -10.0 to 55.0 °C	Monolithic silicon piezoresistive pressure sensor with second-order temperature correction. Pressure sensor may be recalibrated at factory or in field. Adjustable reference altitude allows display of station pressure or barometric pressure corrected to MSL. Kestrel 4200 displays station pressure on a dedicated screen. Kestrel 2500 and 3500 display continuously updating three-hour barometric pressure trend indicator: rising rapidly, rising, steady, falling, falling rapidly. Kestrel 4000 series displays pressure trend through graphing function. PSI display on Kestrel 4000 series only.
Compass												•	•	5°	1° 1/16th Cardinal Scale	0 to 360°	0 to 360°	2-axis solid-state magnetoresistive sensor mounted perpendicular to unit plane. Accuracy of sensor dependent upon unit's vertical position. Self-calibration routine eliminates magnetic error from batteries or unit and must be run after every full power-down (battery removal or change). Readout indicates direction to which the back of the unit is pointed when held in a vertical orientation. Declination/variation adjustable for True North readout.

CALCULATED MEASUREMENTS

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								•	•					0.0002 lb/ft³ 0.0033 kg/m³	0.001 lbs/ft³ 0.001 kg/m³	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	Mass of air per unit volume
Air Flow								•						6.71%	1 cfm 1 m³/hr 1 m³/m 0.1m³/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 measurement 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 | 6.55 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 1100 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 compensated for local elevation provided by reference altitude. Requires accurate reference altitude to produce maximum absolute accuracy.
Crosswind & Headwind/Tailwind												•	•	7.1%	1 mph 1 ft/min 0.1 km/h 0.1 m/s 0.1 knots	Refer to Ranges for Sensors Employed	Wind Speed Compass	Effective wind relative to a target or travel direction. Auto-switching headwind/tailwind indication.
Delta T						•								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, indicates evaporation rate and droplet lifetime. Safe range for pesticide spraying is 4 to 16 °F / 2 to 9 °C.
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 consisting of 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/ft²/hr 0.06 kg/m2/hr	0.01 lb/ft²/hr 0.01 kg/m²/hr	Refer to Ranges for Sensors Employed	Wind Speed Temperature Relative Humidity Pressure User Input (Concrete Temperature)	The rate at which moisture is lost from the surface of curing concrete. Requires user measurement and entry of concrete temperature obtained with an accurate IR or probe thermometer (°F or °C, not included). Readings should be taken 20 inches above pour surface with the thermistor shaded, and averaged for 6-10 seconds using built-in averaging function.
Heat Index			•	•	•		•	•	•	•	•	•	•	7.1 °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 humidity. Calculated based on NWS Heat Index (HI) tables. Measurement range limited by extent of published tables.
Moisture Content | Humidity Ratio ("Grains")								•	•					3 gpp .04 g/kg	0.1 gpp 0.01 g/kg	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	Mass of water vapor in a mass of air.
Relative Air Density									•					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/m²	0.1 W/m²	Refer to Ranges for Sensors Employed	Wind Speed Temperature Globe Temperature Relative Humidity Pressure	Estimated safe maximum continuously sustainable human metabolic rate (W/m2) 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, convection, and conduction. Outdoor WBGT is calculated from a weighted sum of natural wet bulb (Tnwb), globe temperature (Tg), and dry bulb temperature (Td). User settable on-screen warning zones.
Wet Bulb Temperature - Naturally Aspirated (Tnwb)											•			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 wet-bulb temperature (see below). However, Tnwb only undergoes forced convection from the ambient air velocity. Tnwb is a measure of the evaporative cooling that the air 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 a water-air system, this approximates the thermodynamic wet-bulb temperature. The thermodynamic wet-bulb 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. Calculated based on the NWS Wind Chill Temperature (WCT) Index, revised 2001, with wind speed adjusted by a factor of 1.5 to yield equivalent results to wind speed measured at 10 m above ground. Measurement range limited by extent of published tables.

ADDITIONAL SPECIFICATIONS

Display & Backlight	•	•		•										Reflective 3 1/2 digit LCD. Digit height 0.55 in / 9 mm. Aviation green electroluminescent backlight. Manual activation with auto-off.
			•		•	•								Reflective 5 digit LCD. Digit height 0.36 in / 9 mm. Choice of aviation green or visible red (NV models only) electroluminescent backlight. Manual activation with auto-off.
Response Time & Display Update							•	•	•	•	•	•	•	Multifunction, multi-digit monochrome dot-matrix display. Choice of aviation green or visible red (NV models only) electroluminescent backlight. Automatic or manual activation.
	•	•	•	•	•	•	•	•	•	•	•	•	•	All measurements except those based on relative humidity respond accurately within 1 second. Relative humidity and all measurements which include RH in their calculation may require as long as 1 minute to fully equilibrate to a large change in the measurement environment. Display updates every 1 second.
	•	•	•	•	•	•								One-button clear and restart of Max Wind Gust and Average Wind measurement.
Max/Avg Wind							•	•	•	•	•	•	•	Max and average wind calculation may be started and stopped independently of data logging of other values, along with all other wind-related functions: air velocity, crosswind, headwind/tailwind, wind chill, WBGT, TWL, evaporation rate.
Data Storage & Graphical Display, Min/Max/Avg History							4000 points	3200 points	3200 points	3600 points	2300 points	2900 points	2500 points	Minimum, maximum, average and logged history stored and displayed for every measured value. Large capacity data logger with graphical display. Manual and auto data storage. Min/Max/Avg history may be reset independently. Auto-store interval settable from 2 seconds to 12 hours, overwrite on or off. Logs even when display off except for 2 and 5 second intervals (code version 4.18 and later). Data capacity shown.
Data Upload & Bluetooth® Data Connect Option							•	•	•	•	•	•	•	Requires optional PC interface (USB or RS-232) or Bluetooth data transfer option and provided software. **Bluetooth Data Transfer Option:** Adjustable power consumption and radio range from up to 30 ft | 9 meters. Individual unit ID and 4-digit PIN code preprogrammed for easy identification and data security when pairing and transmitting. Employs Bluetooth Serial Port Protocol for data transmission.
Clock / Calendar	•	•	•	•	•	•								Requires optional PC interface (USB or RS-232) or Bluetooth data transfer option and provided software.
							•	•	•	•	•	•	•	Requires optional PC interface (USB or RS-232) or Bluetooth data transfer option and provided software.
Auto Shutdown	•	•	•	•	•	•								Requires optional PC interface (USB or RS-232) or Bluetooth data transfer option and provided software.
							•	•	•	•	•	•	•	Requires optional PC interface (USB or RS-232) or Bluetooth data transfer option and provided software.
Languages							•	•	•	•	•	•	•	English, French, German, Italian, Spanish.
Certifications	•	•	•	•	•	•	•	•	•	•	•	•	•	CE certified, RoHS and WEEE compliant. Individually tested to NIST-traceable standards (written certificate of tests available at additional charge).
Origin	•	•	•	•	•	•	•	•	•	•	•	•	•	Designed and manufactured in the USA from US and imported components. Complies with Regional Value Content and Tariff Code Transformation requirements for NAFTA Preference Criterion B.
Battery Life	•	•	•	•	•	•								CR2032, one, included. Average life, 300 hours. Battery life reduced by backlight use in 2000 to 3500 models.
							•	•	•	•	•	•	•	**Standard Models:** AAA Alkaline, two, included. Average life, 400 hours of use, reduced by backlight or Bluetooth radio transmission use.
Shock Resistance	•	•	•	•	•	•	•	•	•	•	•	•	•	MIL-STD-810g, Transit Shock, Method 516.5 Procedure IV; unit only; impact may damage replaceable impeller.
Sealing	•	•	•	•	•	•	•	•	•	•	•	•	•	Waterproof (IP67 and NEMA-6).
Operational Temperature Limits	•	•	•	•	•	•	•	•	•	•	•	•	•	14° F to 131° F | -10 °C to 55 °C. Measurements may be taken beyond the limits of the operational temperature range of the display and batteries by maintaining the unit within the operational range and exposing it to the more extreme environment for the minimum time necessary to take reading.
Storage Temperature	•	•	•	•	•	•	•	•	•	•	•	•	•	-22.0 °F to 140.0 °F | -30.0 °C to 60.0 °C
Size & Weight	•	•	•	•	•	•								4.8 x 1.9 x 1.1 in / 12.2 x 4.8 x 2.8 cm, 3.6 oz / 102 g (including slip-on cover).
							•	•	•	•		•	•	5.0 x 1.8 x 1.1 in / 12.7 x 4.5 x 2.8 cm, 3.6 oz / 102 g.
											•			6.5 x 2.3 x 1.1 in / 16.5 x 5.9 x 2.8 cm, 4.4 oz / 125 g.

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

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

for

Description:	***Sound Level Meter***
Manufacturer:	***NTi Audio***
Type No.:	***XL2 (Serial No.: A2A-09696-E0)***
Microphone:	***ACO 7052 (Serial No.: 60997)***
Preamplifier:	***MA220 (Serial No.: 5287)***

Submitted by:

Customer:	*Acumen Environmental Engineering and Technologies Co. Ltd.*
Address:	*No.12, Tam Kon Shan Road, Tsing Yi Island, Hong Kong*

Upon receipt for calibration, the instrument was found to be:

☑ **Within**
☐ **Outside**

the allowable tolerance.

The test equipment used for calibration are traceable to National Standards via:
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory

Date of receipt: 28 February 2020

Date of calibration: 2 March 2020

Calibrated by: _____
Calibration Technician

Certified by: _____
Mr. Ng Yan Wa
Laboratory Manager

Date of issue: 2 March 2020

Certificate No.: APJ19-168-CC001

Room 422,Leader Industrial Centre,57-59 Au Pui Wan Street ,Fo Tan, Shatin,N.T.,Hong Kong
Tel: (852) 2668 3423 Fax:(852) 2668 6946
Homepage: http://www.aa-lab.com E-mail : inquiry@aa-lab.com

1. *Calibration Precaution:*

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 24 hours, and switched on to warm up for over 10 minutes before the commencement of the test.

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

2. *Calibration Conditions:*

Air Temperature:	23.7 °C
Air Pressure:	1008 hPa
Relative Humidity:	54.5 %

3. *Calibration Equipment:*

	Type	Serial No.	Calibration Report Number	Traceable to
Multifunction Calibrator	B&K 4226	2288467	AV180064	HOKLAS

4. *Calibration Results*

Sound Pressure Level

Reference Sound Pressure Level

Setting of Unit-under-test (UUT)			Applied value		UUT Reading, dB	IEC 61672 Class 1 Specification, dB
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz		
30-130	dBA SPL	Fast	94	1000	94.0	±0.4

Linearity

Setting of Unit-under-test (UUT)			Applied value		UUT Reading, dB	IEC 61672 Class 1 Specification, dB
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz		
30-130	dBA SPL	Fast	94	1000	94.0	Ref
			104		104.0	±0.3
			114		114.0	±0.3

Time Weighting

Setting of Unit-under-test (UUT)			Applied value		UUT Reading, dB	IEC 61672 Class 1 Specification, dB
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz		
30-130	dBA SPL	Fast	94	1000	94.0	Ref
		Slow			94.0	±0.3

Room 422,Leader Industrial Centre,57-59 Au Pui Wan Street ,Fo Tan, Shatin,N.T.,Hong Kong
Tel: (852) 2668 3423 Fax:(852) 2668 6946
Homepage: http://www.aa-lab.com E-mail : inquiry@aa-lab.com

Frequency Response

Linear Response

Setting of Unit-under-test (UUT)			Applied value		UUT Reading, dB	IEC 61672 Class 1 Specification, dB
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz		
30-130	dB SPL	Fast	94	31.5	94.0	±2.0
				63	94.1	±1.5
				125	94.2	±1.5
				250	94.1	±1.4
				500	94.1	±1.4
				1000	94.0	Ref
				2000	93.8	±1.6
				4000	93.3	±1.6
				8000	92.9	+2.1; -3.1

A-weighting

Setting of Unit-under-test (UUT)			Applied value		UUT Reading, dB	IEC 61672 Class 1 Specification, dB
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz		
30-130	dBA SPL	Fast	94	31.5	55.6	-39.4 ±2.0
				63	67.9	-26.2 ±1.5
				125	78.0	-16.1 ±1.5
				250	85.4	-8.6 ±1.4
				500	90.8	-3.2 ±1.4
				1000	94.0	Ref
				2000	95.0	+1.2 ±1.6
				4000	94.3	+1.0 ±1.6
				8000	91.8	-1.1 +2.1; -3.1

C-weighting

Setting of Unit-under-test (UUT)			Applied value		UUT Reading, dB	IEC 61672 Class 1 Specification, dB
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz		
30-130	dBC SPL	Fast	94	31.5	91.0	-3.0 ±2.0
				63	93.2	-0.8 ±1.5
				125	94.0	-0.2 ±1.5
				250	94.1	-0.0 ±1.4
				500	94.1	-0.0 ±1.4
				1000	94.0	Ref
				2000	93.6	-0.2 ±1.6
				4000	92.5	-0.8 ±1.6
				8000	89.9	-3.0 +2.1; -3.1

Room 422,Leader Industrial Centre,57-59 Au Pui Wan Street ,Fo Tan, Shatin,N.T.,Hong Kong
Tel: (852) 2668 3423 Fax:(852) 2668 6946
Homepage: http://www.aa-lab.com E-mail : inquiry@aa-lab.com

5. *Calibration Results Applied*

The results apply to the particular unit-under-test only. All calibration points are within manufacture's specification as IEC 61672 Class 1.

Uncertainties of Applied Value:

94 dB	31.5 Hz	± 0.10
	63 Hz	± 0.10
	125 Hz	± 0.10
	250 Hz	± 0.05
	500 Hz	± 0.10
	1000 Hz	± 0.05
	2000 Hz	± 0.05
	4000 Hz	± 0.05
	8000 Hz	± 0.10
104 dB	1000 Hz	± 0.05
114 dB	1000 Hz	± 0.05

The uncertainties are evaluated for a 95% confidence level.

Note:
The values given in this certification only related to the values measured at the time of the calibration and any uncertainties quoted will not allow for the equipment long-term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the calibration. (A+A)*L shall not be liable for any loss or damage resulting from the use of the equipment.

Room 422,Leader Industrial Centre,57-59 Au Pui Wan Street ,Fo Tan, Shatin,N.T.,Hong Kong
Tel: (852) 2668 3423 Fax:(852) 2668 6946
Homepage: http://www.aa-lab.com E-mail : inquiry@aa-lab.com

綜合試驗有限公司
SOILS & MATERIALS ENGINEERING CO., LTD.
香港新界葵涌永基路22-24號椰林閣集團大廈全幢
The Whole Block of YLK Group Building, Nos. 22-24 Wing Kei Road, Kwai Chung, New Territories, Hong Kong.
Tel: (852) 2873 6860 Fax: (852) 2555 7533 E-mail: smec@cigismec.com Website: www.cigismec.com

HOKLAS 028 CAL

CERTIFICATE OF CALIBRATION

Certificate No.: 20CA0803 01 **Page:** 1 **of** 2

Item tested

Description: Acoustical Calibrator (Class 1)
Manufacturer: Pulsar Instruments Ltd.
Type/Model No.: 105
Serial/Equipment No.: 63705
Adaptors used: -

Item submitted by

Curstomer: Acuity Sustainability Consulting Limited.
Address of Customer: -
Request No.: -
Date of receipt: 03-Aug-2020

Date of test: 06-Aug-2020

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2341427	11-May-2021	SCL
Preamplifier	B&K 2673	2743150	03-Jun-2021	CEPREI
Measuring amplifier	B&K 2610	2346941	03-Jun-2021	CEPREI
Signal generator	DS 360	33873	19-May-2021	CEPREI
Digital multi-meter	34401A	US36087050	19-May-2021	CEPREI
Audio analyzer	8903B	GB41300350	18-May-2021	CEPREI
Universal counter	53132A	MY40003662	18-May-2021	CEPREI

Ambient conditions

Temperature: 22 ± 1 °C
Relative humidity: 55 ± 10 %
Air pressure: 1005 ± 5 hPa

Test specifications

1, The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B and the lab calibration procedure SMTP004-CA-156.
2, The calibrator was tested with its axis vertical facing downwards at the specific frequency using insert voltage technique.
3, The results are rounded to the nearest 0.01 dB and 0.1 Hz and have not been corrected for variations from a reference pressure of 1013.25 hectoPascals as the maker's information indicates that the instrument is insensitive to pressure changes.

Test results

This is to certify that the sound calibrator conforms to the requirements of annex B of IEC 60942: 1997 for the conditions under which the test was performed. This does not imply that the sound calibrator meets IEC 60942 under any other conditions.

Details of the performed measurements are presented on **page 2** of this certificate.

Approved Signatory: Feng Junqi **Date:** 07-Aug-2020 **Company Chop:** SOILS & MATERIALS ENGINEERING COMPANY LTD. 綜合試驗有限公司

Comments: The results reported in this certificate refer to the conditon of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.

綜合試驗有限公司
SOILS & MATERIALS ENGINEERING CO., LTD.
香港新界葵涌永基路22-24號椰林閣集團大廈全幢
The Whole Block of YLK Group Building, Nos. 22-24 Wing Kei Road, Kwai Chung, New Territories, Hong Kong.
Tel: (852) 2873 6860 Fax: (852) 2555 7533 E-mail: smec@cigismec.com Website: www.cigismec.com

HOKLAS 028
CAL

CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 20CA0803 01 **Page:** 2 **of** 2

1, Measured Sound Pressure Level

The output Sound Pressure Level in the calibrator head was measured at the setting and frequency shown using a calibrated laboratory standard microphone and insert voltage technique. The results are given in below with the estimated uncertainties.

(Output level in dB re 20 μPa)

Frequency Shown Hz	Output Sound Pressure Level Setting dB	Measured Output Sound Pressure Level dB	Estimated Expanded Uncertainty dB
1000	94.00	93.78	0.10

2, Sound Pressure Level Stability - Short Term Fluctuations

The Short Term Fluctuations was determined by measuring the maximum and minimum of the fast weighted DC output of the B&K 2610 measuring amplifier over a 20 second time interval as required in the standard. The Short Term Fluctuation was found to be:

At 1000 Hz **STF = 0.027 dB**

Estimated expanded uncertainty 0.005 dB

3, Actual Output Frequency

The determination of actual output frequency was made using a B&K 4180 microphone together with a B&K 2673 preamplifier connected to a B&K 2610 measuring amplifier. The AC output of the B&K 2610 was taken to an universal counter which was used to determine the frequency averaged over 20 second of operation as required by the standard. The actual output frequency at 1 KHz was:

At 1000 Hz **Actual Frequency = 1000.3 Hz**

Estimated expanded uncertainty 0.1 Hz Coverage factor k = 2.2

4, Total Noise and Distortion

For the Total Noise and Distortion measurement, the unfiltered AC output of the B&K 2610 measuring amplifier was connected to an Agilent Type 8903 B distortion analyser. The TND result at 1 KHz was:

At 1000 Hz **TND = 0.6 %**

Estimated expanded uncertainty 0.7 %

The expanded uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95%. A coverage factor of 2 is assumed unless explicitly stated.

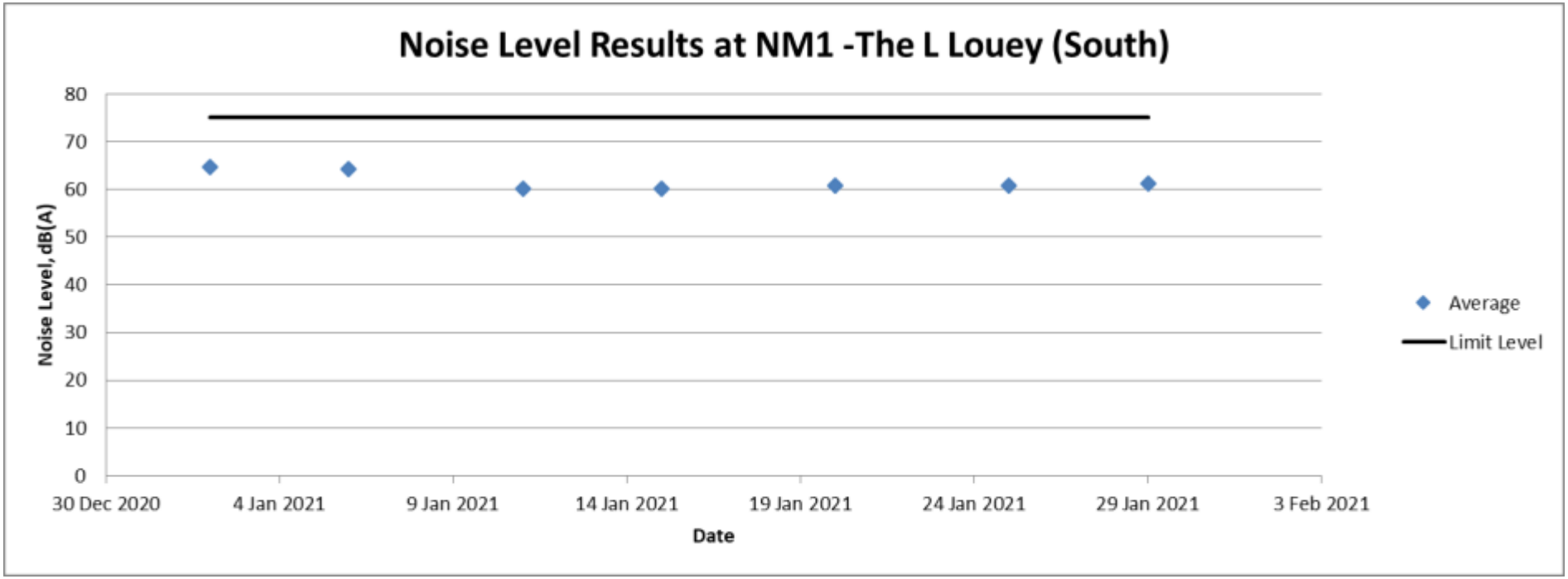
- End -

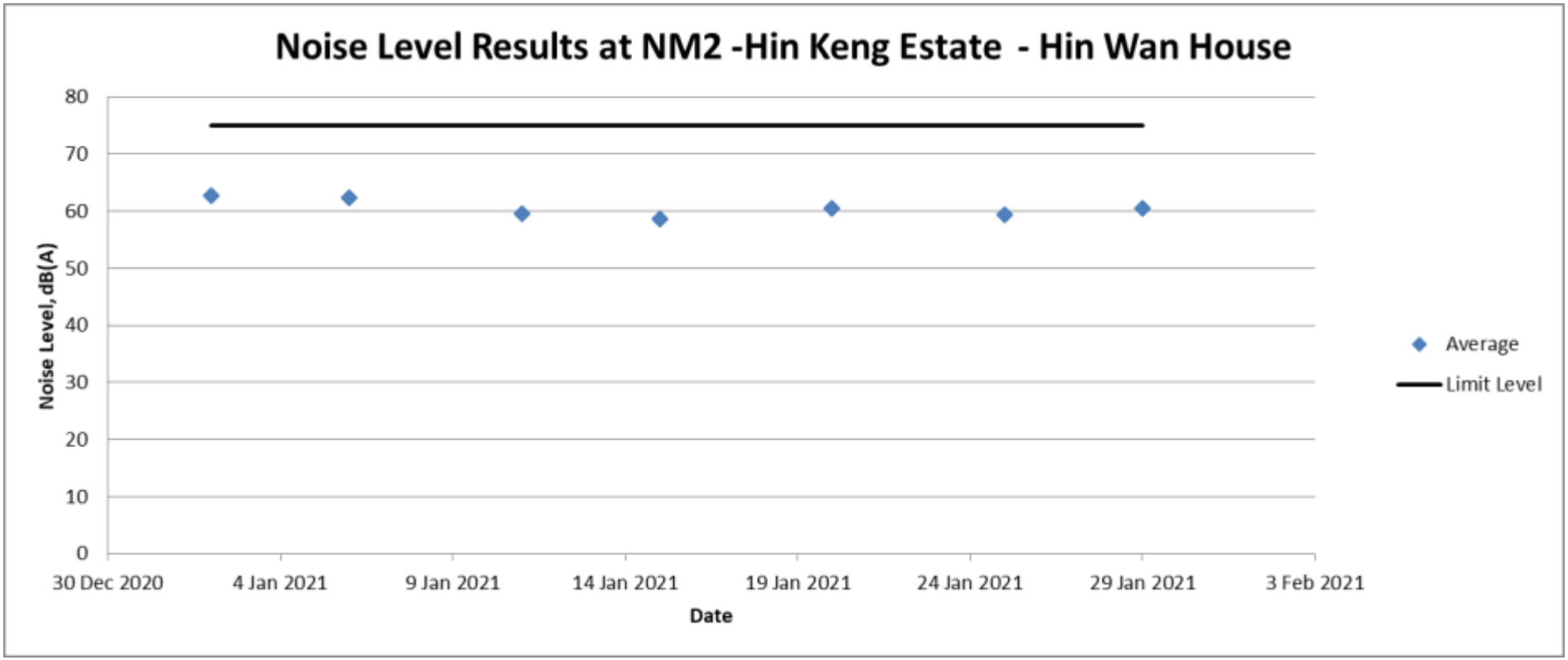
Calibrated by: Fung Chi Yip **Date:** 06-Aug-2020

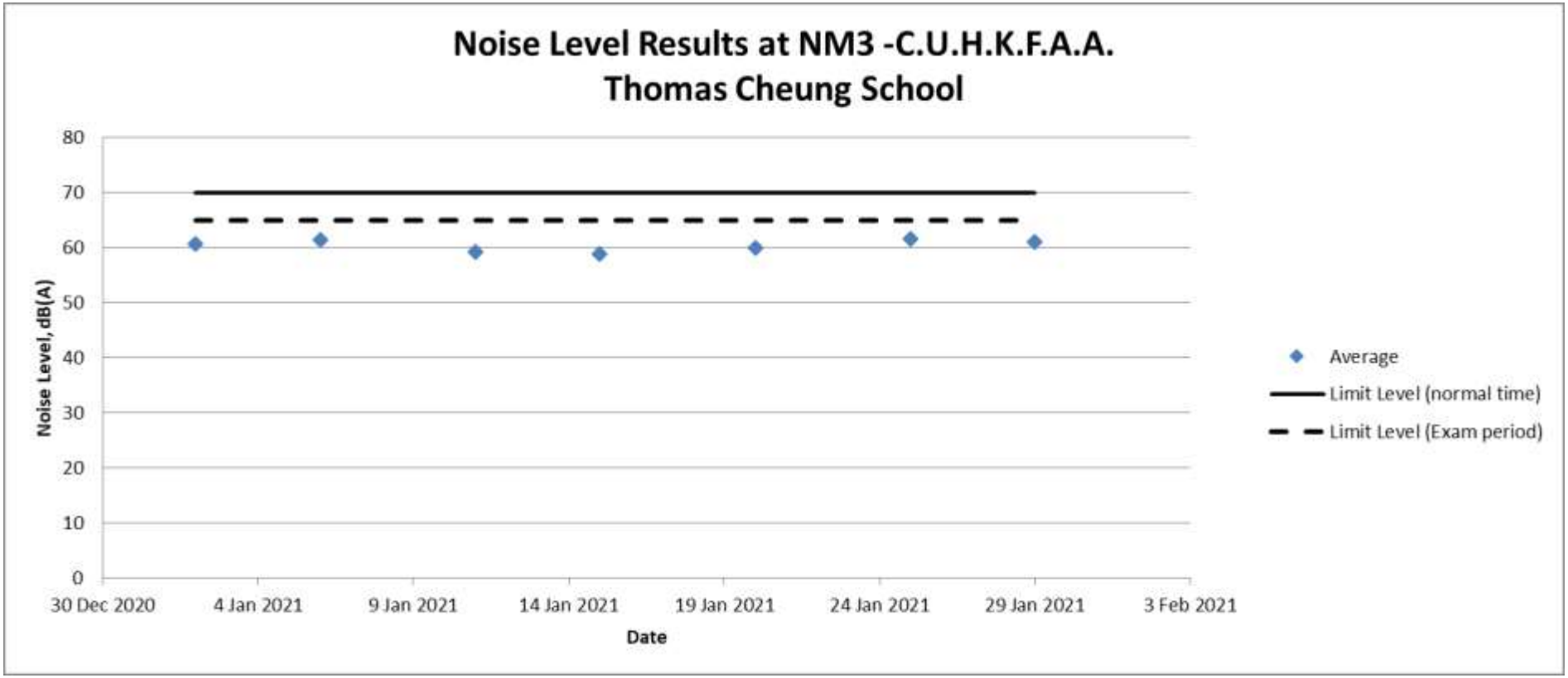
Checked by: Feng Junqi **Date:** 07-Aug-2020

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

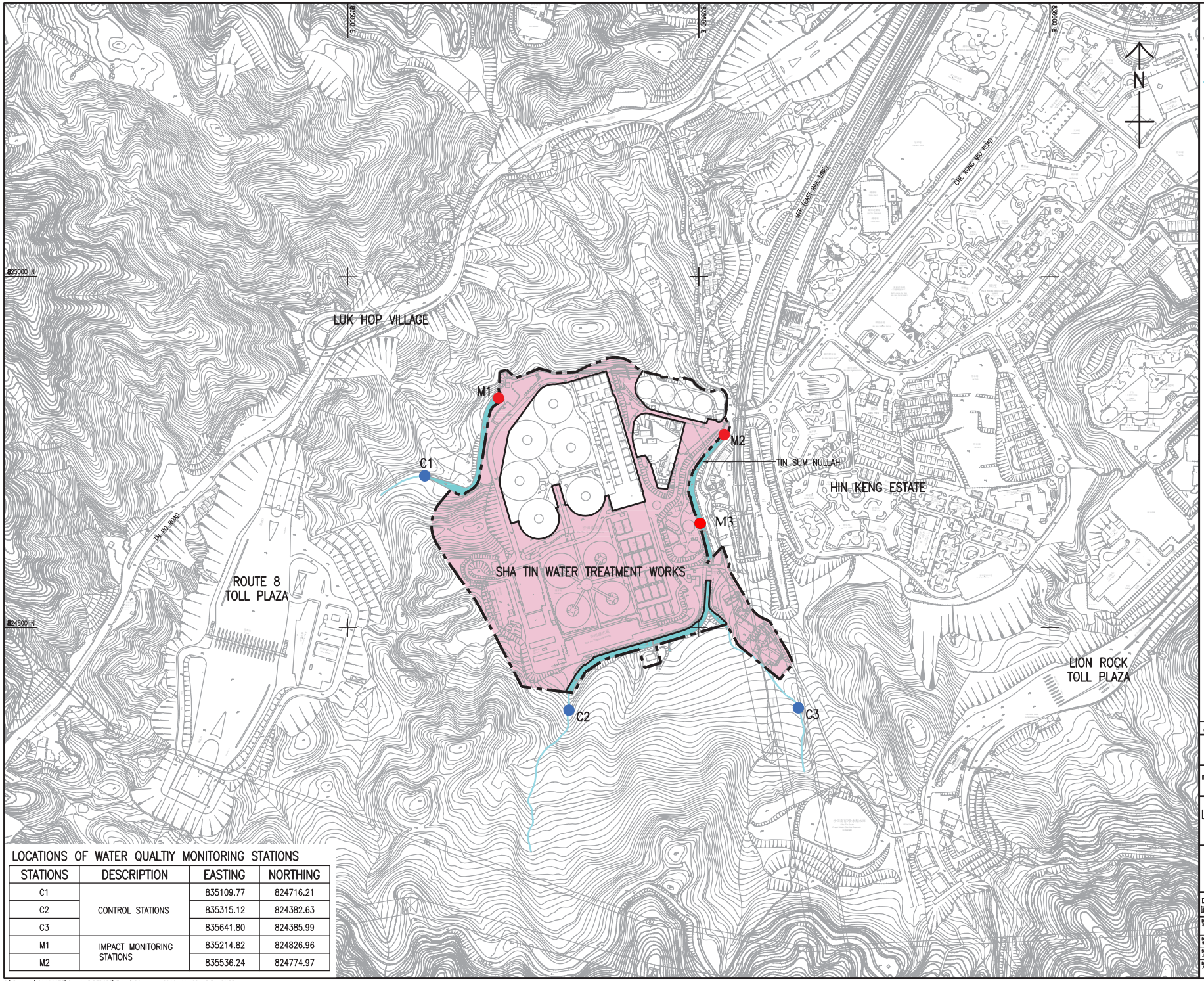
Appendix N
Impact Noise Monitoring Results and Graphical Presentation


Noise Level Results at NM1 -The L Louey (South)
Noise Level, dB(A)
80
70
60
50
40
30
20
10
0
30 Dec 2020
4 Jan 2021
9 Jan 2021
14 Jan 2021
19 Jan 2021
24 Jan 2021
29 Jan 2021
3 Feb 2021
Date
Average
Limit Level


Noise Level Results at NM2 -Hin Keng Estate - Hin Wan House
80
70
60
50
40
30
20
10
0
Noise Level, dB(A)
30 Dec 2020
4 Jan 2021
9 Jan 2021
14 Jan 2021
19 Jan 2021
24 Jan 2021
29 Jan 2021
3 Feb 2021
Date
Average
Limit Level


Noise Level Results at NM3 -C.U.H.K.F.A.A.
Thomas Cheung School
Noise Level, dB(A)
80
70
60
50
40
30
20
10
0
30 Dec 2020
4 Jan 2021
9 Jan 2021
14 Jan 2021
19 Jan 2021
24 Jan 2021
29 Jan 2021
3 Feb 2021
Date
Average
Limit Level (normal time)
Limit Level (Exam period)

Appendix O
Location Plan of Water Quality Monitoring Station



LEGEND:

- SITE BOUNDARY OF SHATIN WATER TREATMENT WORKS
- WORKS AREA
- INLAND WATER COURSE
- IMPACT MONITORING STATION
- CONTROL STATION

LOCATIONS OF WATER QUALTIY MONITORING STATIONS

STATIONS	DESCRIPTION	EASTING	NORTHING
C1	CONTROL STATIONS	835109.77	824716.21
C2		835315.12	824382.63
C3		835641.80	824385.99
M1	IMPACT MONITORING STATIONS	835214.82	824826.96
M2		835536.24	824774.97

水務署
WATER SUPPLIES DEPARTMENT

AGREEMENT NO. CE 13/2009 (WS)
IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS-SOUTH WORKS
DESIGN AND CONSTRUCTION

LOCATIONS OF PROPOSED WATER QUALITY MONITORING STATIONS

AECOM

DRG.NO. 60162073/EM&A/FIG 5

DESIGNED BY: _
DRAWN BY: DXL
SCALE: A3 1 : 5000
DIMENSIONS ARE IN: METRES

P:\Projects\60162073\Drawing\REPORT\EM&A\801.dwg 2012-11-08 13:39 CAIZP

Appendix P
Calibration Certificate (Water Quality)

專業化驗有限公司
QUALITY PRO TEST-CONSULT LIMITED
Unit 10, 14/F, Wah Wai Centre, 38-40 Au Pui Wan St., Fotan, Hong Kong
Email: info@qualityprotest.com; Website: www.qualityprotest.com
Tel: (852) 3956 8717; Fax: (852) 3956 3928

REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION

Report No. : AJ110022
Date of Issue : 11 November 2020

PART A – CUSTOMER INFORMATION

Acuity Sustainability Consulting Limited
Unit C, 11/F, Ford Glory Plaza
37-39 Wing Hong Street
Cheung Sha Wan, Kowloon, Hong Kong
Attn: Mr. Nelson TSUI

PART B – DESCRIPTION

Name of Equipment	:	Multi Water Quality Checker U-53
Manufacturer	:	Horiba
Serial Number	:	UHB5F2BB
Date of Received	:	Nov 04, 2020
Date of Calibration	:	Nov 11, 2020
Date of Next Calibration[a]	:	Feb 10, 2021

PART C – REFERENCE METHODS/ DOCUMENTS FOR THE CALIBRATION

Parameter	Reference Method
pH at 25°C	APHA 21e 4500-H^+ B
Dissolved Oxygen	APHA 21e 4500-O G
Salinity	APHA 21e 2520 B
Turbidity	APHA 21e 2130 B
Temperature	Section 6 of international Accreditation New Zealand Technical Guide no. 3 Second edition March 2008: Working Thermometer Calibration Procedure.
Oxidation-Reduction Potential	APHA 22e 2580 B

PART D – CALIBRATION RESULTS[b,c]

(1) pH at 25°C

Target (pH unit)	Displayed Reading[d] (pH Unit)	Tolerance[e](pH Unit)	Results
4.00	4.10	0.10	Satisfactory
7.42	7.46	0.04	Satisfactory
10.01	10.02	0.01	Satisfactory

Tolerance of pH should be less than ±0.20 (pH unit)

(2) Temperature

Reading of Ref. thermometer (°C)	Displayed Reading (°C)	Tolerance (°C)	Results
12	12.38	0.38	Satisfactory
25	25.01	0.01	Satisfactory
35	35.75	0.75	Satisfactory

Tolerance limit of temperature should be less than ±2.0 (°C)

~ CONTINUED ON NEXT PAGE ~

Remark(s): -

[a] *The "Date of Next Calibration" is recommended according to best practice principals as practiced by QPT or quoted form relevant international standards.*
[b] *The results relate only to the calibrated equipment as received*
[c] *The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.*
[d] *"Displayed Reading" denotes the figure shown on item under calibration/ checking regardless of equipment precision or significant figures.*
[e] *The "Tolerance Limit" mentioned is the acceptance criteria applicable for similar equipment used by Quality Pro Test-Consult Ltd. or quoted form relevant international standards.*

LEE Chun-ning, Desmond
Senior Chemist

專業化驗有限公司
QUALITY PRO TEST-CONSULT LIMITED
Unit 10, 14/F, Wah Wai Centre, 38-40 Au Pui Wan St., Fotan, Hong Kong
Email: info@qualityprotest.com; Website: www.qualityprotest.com
Tel: (852) 3956 8717; Fax: (852) 3956 3928

REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION

Report No. : AJ110022
Date of Issue : 11 November 2020

PART D – CALIBRATION RESULTS (Cont'd)

(3) Dissolved Oxygen

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)	Results
0.07	0.00	-0.07	Satisfactory
4.60	4.27	-0.33	Satisfactory
6.32	6.11	-0.21	Satisfactory
7.98	8.00	0.02	Satisfactory

Tolerance limit of dissolved oxygen should be less than ±0.50 (mg/L)

(4) Salinity

Expected Reading (g/L)	Displayed Reading (g/L)	Tolerance (%)	Results
10	9.88	-1.20	Satisfactory
20	19.60	-2.00	Satisfactory
30	28.55	-4.83	Satisfactory

Tolerance limit of salinity should be less than ±10.0 (%)

(5) Turbidity

Expected Reading (NTU)	Displayed Reading[f] (NTU)	Tolerance[g] (%)	Results
0	0.46	--	Satisfactory
10	10.01	0.1	Satisfactory
20	20.11	0.5	Satisfactory
100	96.80	-3.2	Satisfactory
800	797.00	-0.4	Satisfactory

Tolerance limit of turbidity should be less than ±10.0 (%)

(6) Oxidation-Reduction Potential

Expected Reading (mV)	Displayed Reading (mV)	Tolerance (mV)[g]	Results
222	225	3	Satisfactory

Tolerance limit of Oxidation-Reduction Potential should be less than ±10 (mV)

~ END OF REPORT ~

Remark(s): -

[f] *"Displayed Reading" presents the figures shown on item under calibration/ checking regardless of equipment precision or significant figures.*

[g] *The "Tolerance Limit" mentioned is the acceptance criteria applicable for similar equipment used by Quality Pro Test-Consult Ltd. or quoted form relevant international standards.*

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).
此項 ISO/IEC 17025:2005 的認可資格證明此實驗所具備指定範疇內所須的技術能力並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

WONG Wang-wah, 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：

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

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

L 001195

Appendix R
Impact Water Quality Monitoring Results

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

Test Report

Report Number	: Q210003aR210164
Job Number	: R210164
Issue Date	: 03/02/2021
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-3113-802
Sample Description	: pH Value, TSS and COD tests
Laboratory ID	: R210164/1
Date of Sampling	: 14/01/2021
Date Received	: 14/01/2021
Test Period	: 14/01/2021 – 15/01/2021
Test Required	: 1. pH Value; 2. Total Suspended Solids (TSS); 3. Chemical Oxygen Demand (COD)
Method Used	: 1. QPL-15d, APHA 22ed 4500-H^+ B 2. QPL-15e, APHA 22ed 2540 D 3. QPL-15f, APHA 22ed 5220 B
Test Result	: Refer to the results on page 2.

For and on behalf of

Acumen Laboratory and Testing Limited

Authorized Signature: _____

Hui Wai Fung, Huntington

Laboratory Manager

Chemical Division

Acumen Laboratory and Testing Limited

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

Test Report

Report Number : Q210003aR210164

Job Number : R210164

Issue Date : 03/02/2021

Test Result:

Lab ID	Date of Sampling	Client Sample ID	pH Value at (measured temperature °C)	Total Suspended Solids (TSS), mg/L	Chemical Oxygen Demand (COD), mg O_2/L
R210164/1	14/01/2021	Hing Keng, Wall C	7.8(23)	<2.5	<50

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

Date	Time	Weather	Location	Co-ordinates		Water Depth	Sample Depth	Temp.		DO con.		DO Saturation		Turbidity		pH		SS
				East	North	m	m	°C		mg/L		%		NTU		unit		mg/L
2 Jan 2021	13:33	Sunny	C1	835110	824716	0.04	0.02	18.8	18.8	8.62	8.61	94.1	94.1	2.6	2.6	7.72	7.72	3.5
	13:45	Sunny	C2	835403	824470	0.02	0.01	19.1	19.1	8.71	8.71	94.9	94.8	2.7	2.7	7.66	7.67	3.4
	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
	13:22	Sunny	M1	835215	824827	0.8	0.4	19.5	19.4	9.21	9.20	99.8	99.8	2.0	2.0	7.83	7.84	3.0
	13:00	Sunny	M2	835536	824775	0.05	0.025	18.9	18.8	9.04	9.03	98.2	98.2	1.6	1.5	7.76	7.75	4.0
	13:15	Sunny	M3	835501	824648	0.02	0.01	19.4	19.4	9.35	9.34	101.5	101.4	0.9	0.9	7.63	7.63	<1
4 Jan 2021	13:25	Sunny	C1	835110	824716	0.04	0.02	19.2	17.3	8.87	8.87	97.7	97.7	2.4	2.3	7.63	7.63	3.7
	13:36	Sunny	C2	835403	824470	0.02	0.01	16.9	16.9	8.71	8.71	96.3	96.3	2.6	2.6	7.30	7.30	3.6
	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
	13:18	Sunny	M1	835215	824827	0.8	0.4	17.5	17.5	9.27	9.28	101.7	101.8	2.0	2.0	7.74	7.74	3.1
	12:51	Sunny	M2	835536	824775	0.05	0.025	17.6	17.5	9.40	9.40	103.0	102.9	1.6	1.5	7.69	7.70	4.1
	13:08	Sunny	M3	835501	824648	0.02	0.01	17.5	17.5	9.39	9.40	103.0	102.9	0.8	0.7	7.75	7.75	<1
6 Jan 2021	9:50	Cloudy	C1	835110	824716	0.04	0.02	19.6	19.5	8.81	8.80	95.6	95.5	2.7	2.7	7.56	7.57	3.6
	10:09	Cloudy	C2	835403	824470	0.02	0.01	20.1	20.0	8.85	8.84	95.9	95.9	2.7	2.6	7.55	7.56	3.5
	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
	9:43	Cloudy	M1	835215	824827	0.8	0.4	19.8	19.9	9.20	9.19	99.6	99.6	2.3	2.2	7.74	7.74	3.0
	9:21	Cloudy	M2	835536	824775	0.05	0.025	20.1	20.2	9.16	9.16	99.1	99.1	1.9	1.8	7.77	7.77	3.6
	9:32	Cloudy	M3	835501	824648	0.02	0.01	19.6	19.7	9.30	9.31	100.8	100.7	0.5	0.6	7.75	7.76	<1
8 Jan 2021	10:49	Sunny	C1	835110	824716	0.04	0.02	20.2	20.1	8.52	8.51	92.4	92.4	2.6	2.6	7.62	7.63	4.0
	11:00	Sunny	C2	835403	824470	0.02	0.01	20.1	20.1	8.76	8.77	95.0	95.0	2.5	2.6	7.26	7.27	3.8
	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
	10:38	Sunny	M1	835215	824827	0.8	0.4	19.7	19.8	9.25	9.24	99.9	100.0	2.1	2.0	7.65	7.65	3.1
	10:18	Sunny	M2	835536	824775	0.05	0.025	19.8	19.8	9.30	9.31	100.3	100.4	1.4	1.5	7.70	7.69	4.0
	10:29	Sunny	M3	835501	824648	0.02	0.01	19.6	19.7	9.57	9.57	102.1	102.2	0.5	0.6	7.51	7.52	<1
11 Jan 2021	9:46	Sunny	C1	835110	824716	0.04	0.02	18.2	18.1	8.41	8.41	92.4	92.5	2.6	2.5	7.33	7.32	3.2
	9:55	Sunny	C2	835403	824470	0.02	0.01	18.7	18.6	8.69	8.70	95.0	95.1	2.8	2.7	7.88	7.89	3.0
	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
	9:32	Sunny	M1	835215	824827	0.8	0.4	18.3	18.2	9.03	9.02	98.7	98.6	2.3	2.2	7.69	7.70	3.0
	9:09	Sunny	M2	835536	824775	0.05	0.025	18.1	18.1	9.16	9.16	100.1	100.1	1.9	2.0	7.62	7.62	2.5
	9:20	Sunny	M3	835501	824648	0.02	0.01	18.2	18.3	9.35	9.36	102.1	102.1	0.7	0.8	7.59	7.59	<1
13 Jan 2021	10:36	Cloudy	C1	835110	824716	0.04	0.02	19.3	19.2	8.50	8.50	92.7	92.7	2.4	2.3	7.56	7.55	3.5
	10:49	Cloudy	C2	835403	824470	0.02	0.01	19.4	19.3	8.83	8.83	96.0	96.1	2.7	2.7	7.81	7.82	3.1
	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
	10:21	Cloudy	M1	835215	824827	0.8	0.4	19.4	19.4	9.19	9.19	99.8	99.7	2.0	1.9	7.80	7.80	3.2
	10:00	Cloudy	M2	835536	824775	0.05	0.025	18.9	18.8	9.18	9.17	99.8	99.8	1.7	1.8	7.70	7.70	3.5
	10:12	Cloudy	M3	835501	824648	0.02	0.01	19.0	19.1	9.29	9.30	100.9	101.0	0.7	0.7	7.64	7.64	<1

15 Jan 2021	14:11	Sunny	C1	835110	824716	0.04	0.02	19.7	19.8	8.74	8.75	94.9	95.0	2.5	2.4	7.41	7.40	3.6
	14:25	Sunny	C2	835403	824470	0.02	0.01	20.4	20.5	8.34	8.35	90.4	90.5	2.4	2.5	7.87	7.87	3.4
	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
	13:52	Sunny	M1	835215	824827	0.8	0.4	20.1	20.0	9.19	9.20	99.3	99.5	1.9	1.8	7.76	7.77	3.0
	13:33	Sunny	M2	835536	824775	0.05	0.025	20.3	20.3	9.01	9.02	97.4	97.5	1.9	1.9	7.79	7.80	3.7
	13:46	Sunny	M3	835501	824648	0.02	0.01	20.0	20.1	9.55	9.54	103.0	103.1	0.6	0.7	7.54	7.55	<1
18 Jan 2021	11:59	Cloudy	C1	835110	824716	0.04	0.02	19.6	19.7	8.70	8.70	94.5	94.6	2.5	2.5	7.65	7.65	4.0
	12:16	Cloudy	C2	835403	824470	0.02	0.01	19.4	19.3	8.78	8.78	95.5	95.5	2.7	2.6	7.75	7.76	3.9
	N/A	N/A	C3	835642	824386	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	11:42	Cloudy	M1	835215	824827	0.8	0.4	19.8	19.8	9.15	9.14	99.1	99.0	1.9	1.9	7.82	7.83	2.9
	11:21	Cloudy	M2	835536	824775	0.05	0.025	19.8	19.7	9.14	9.14	99.0	99.0	1.8	1.8	7.81	7.82	1.3
	11:33	Cloudy	M3	835501	824648	0.02	0.01	19.2	19.2	9.38	9.39	101.8	101.8	0.4	0.4	7.76	7.75	<1
20 Jan 2021	12:59	Cloudy	C1	835110	824716	0.04	0.02	18.8	18.9	8.72	8.73	95.2	95.2	2.6	2.6	7.28	7.27	3.3
	13:12	Cloudy	C2	835403	824470	0.02	0.01	18.6	18.7	8.84	8.84	96.5	96.4	2.7	2.8	7.38	7.39	3.0
	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
	12:43	Cloudy	M1	835215	824827	0.8	0.4	19.1	19.0	9.21	9.21	100.1	100.1	2.2	2.2	7.82	7.83	3.2
	12:19	Cloudy	M2	835536	824775	0.05	0.025	18.9	18.9	9.06	9.07	98.7	98.7	1.6	1.6	7.76	7.75	4.2
	12:31	Cloudy	M3	835501	824648	0.02	0.01	18.9	19.0	9.65	9.65	104.7	104.6	0.3	0.3	7.63	7.62	<1
22 Jan 2021	16:33	Sunny	C1	835110	824716	0.04	0.02	18.4	18.5	8.37	8.38	91.8	91.8	2.7	2.6	7.64	7.64	4.1
	16:42	Sunny	C2	835403	824470	0.02	0.01	18.9	18.9	8.71	8.70	95.1	94.9	2.3	2.3	7.39	7.41	3.5
	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
	16:25	Sunny	M1	835215	824827	0.8	0.4	18.4	18.5	9.21	9.22	100.4	100.5	2.0	2.0	7.87	7.87	3.0
	16:00	Sunny	M2	835536	824775	0.05	0.025	18.8	18.7	9.14	9.13	99.5	99.5	1.9	2.0	7.76	7.76	1.6
	16:15	Sunny	M3	835501	824648	0.02	0.01	18.9	19.0	9.61	9.61	104.2	104.3	0.5	0.5	7.59	7.60	<1
25 Jan 2021	13:55	Sunny	C1	835110	824716	0.04	0.02	20.2	20.1	8.55	8.56	92.8	92.9	2.6	2.6	7.48	7.48	4.0
	14:16	Sunny	C2	835403	824470	0.02	0.01	20.3	20.3	8.34	8.34	90.5	90.6	2.7	2.7	7.24	7.25	3.6
	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
	13:42	Sunny	M1	835215	824827	0.8	0.4	20.4	20.4	9.21	9.20	99.4	99.4	2.0	1.9	7.78	7.77	3.2
	13:18	Sunny	M2	835536	824775	0.05	0.025	19.7	19.8	9.39	9.39	101.6	101.6	1.9	1.9	7.67	7.68	2.6
	13:26	Sunny	M3	835501	824648	0.02	0.01	20.0	19.9	9.28	9.27	100.3	100.3	0.7	0.6	7.70	7.70	<1
27 Jan 2021	14:49	Cloudy	C1	835110	824716	0.04	0.02	19.1	19.2	8.37	8.36	91.4	91.3	2.6	2.7	7.74	7.74	3.0
	14:59	Cloudy	C2	835403	824470	0.02	0.01	18.9	19.0	8.76	8.75	95.5	95.3	2.6	2.7	7.65	7.64	3.3
	N/A	N/A	C3	835642	824386	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	14:36	Cloudy	M1	835215	824827	0.8	0.4	19.4	19.4	9.17	9.18	99.5	99.6	2.2	2.3	7.87	7.87	3.2
	14:18	Cloudy	M2	835536	824775	0.05	0.025	19.2	19.2	9.09	9.09	98.8	98.8	2.0	2.1	7.72	7.70	1.4
	14:25	Cloudy	M3	835501	824648	0.02	0.01	18.8	18.9	9.63	9.63	104.5	104.5	0.8	0.7	7.80	7.80	<1
29 Jan 2021	13:50	Fine	C1	835110	824716	0.04	0.02	18.7	18.7	8.40	8.40	91.9	92.0	2.6	2.6	7.65	7.64	4.1
	14:02	Fine	C2	835403	824470	0.02	0.01	18.6	18.5	8.47	8.48	92.7	92.8	2.4	2.3	7.31	7.30	4.2
	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
	13:41	Fine	M1	835215	824827	0.8	0.4	18.6	18.5	9.35	9.35	101.8	101.8	2.1	2.0	7.61	7.59	3.1
	13:21	Fine	M2	835536	824775	0.05	0.025	18.8	18.7	9.31	9.30	101.3	101.2	1.9	1.9	7.77	7.79	5.2
	13:33	Fine	M3	835501	824648	0.02	0.01	19.2	19.2	9.55	9.55	103.5	103.5	0.4	0.4	7.69	7.69	<1

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

Report Number	: Q210003aR210151
Job Number	: R210151
Issue Date	: 03/02/2021
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-3113-789
Sample Description	: SS test
Laboratory ID	: R210151/1-5
Date of Sampling	: 02/01/2021
Date Received	: 02/01/2021
Test Period	: 02/01/2021 – 03/01/2021
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. QPL-15e, APHA 22ed 2540 D
Test Result	: Refer to the results on page 2.

For and on behalf of
Acumen Laboratory and Testing Limited

Authorized Signature: _____

Hui Wai Fung, Huntington
Laboratory Manager
Chemical Division

Acumen Laboratory and Testing Limited

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

Test Report

Report Number : Q210003aR210151

Job Number : R210151

Issue Date : 03/02/2021

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R210151/1	02/01/2021	C1	3.5
R210151/2	02/01/2021	C2	3.4
R210151/3	02/01/2021	M1	3.0
R210151/4	02/01/2021	M2	4.0
R210151/5	02/01/2021	M3	<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

Acumen Laboratory and Testing Limited
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Test Report

Report Number	: Q210003aR210152
Job Number	: R210152
Issue Date	: 03/02/2021
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-3113-790
Sample Description	: SS test
Laboratory ID	: R210152/1-5
Date of Sampling	: 04/01/2021
Date Received	: 04/01/2021
Test Period	: 04/01/2021 – 05/01/2021
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. QPL-15e, APHA 22ed 2540 D
Test Result	: Refer to the results on page 2.

For and on behalf of
Acumen Laboratory and Testing Limited

Authorized Signature: _____

Hui Wai Fung, Huntington
Laboratory Manager
Chemical Division

Acumen Laboratory and Testing Limited
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Test Report

Report Number : Q210003aR210152

Job Number : R210152

Issue Date : 03/02/2021

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R210152/1	04/01/2021	C1	3.7
R210152/2	04/01/2021	C2	3.6
R210152/3	04/01/2021	M1	3.1
R210152/4	04/01/2021	M2	4.1
R210152/5	04/01/2021	M3	<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

Acumen Laboratory and Testing Limited
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Test Report

Report Number	: Q210003aR210153
Job Number	: R210153
Issue Date	: 03/02/2021
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-3113-791
Sample Description	: SS test
Laboratory ID	: R210153/1-5
Date of Sampling	: 06/01/2021
Date Received	: 06/01/2021
Test Period	: 06/01/2021 – 07/01/2021
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. QPL-15e, APHA 22ed 2540 D
Test Result	: Refer to the results on page 2.

For and on behalf of
Acumen Laboratory and Testing Limited

Authorized Signature: _____

Hui Wai Fung, Huntington
Laboratory Manager
Chemical Division

Acumen Laboratory and Testing Limited

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Test Report

Report Number : Q210003aR210153

Job Number : R210153

Issue Date : 03/02/2021

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R210153/1	06/01/2021	C1	3.6
R210153/2	06/01/2021	C2	3.5
R210153/3	06/01/2021	M1	3.0
R210153/4	06/01/2021	M2	3.6
R210153/5	06/01/2021	M3	<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

Acumen Laboratory and Testing Limited
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Test Report

Report Number	: Q210003aR210154
Job Number	: R210154
Issue Date	: 03/02/2021
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-3113-792
Sample Description	: SS test
Laboratory ID	: R210154/1-5
Date of Sampling	: 08/01/2021
Date Received	: 08/01/2021
Test Period	: 08/01/2021 – 09/01/2021
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. QPL-15e, APHA 22ed 2540 D
Test Result	: Refer to the results on page 2.

For and on behalf of
Acumen Laboratory and Testing Limited

Authorized Signature: _____

Hui Wai Fung, Huntington
Laboratory Manager
Chemical Division

Acumen Laboratory and Testing Limited

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Test Report

Report Number : Q210003aR210154

Job Number : R210154

Issue Date : 03/02/2021

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R210154/1	08/01/2021	C1	4.0
R210154/2	08/01/2021	C2	3.8
R210154/3	08/01/2021	M1	3.1
R210154/4	08/01/2021	M2	4.0
R210154/5	08/01/2021	M3	<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

Report Number	: Q210003aR210155
Job Number	: R210155
Issue Date	: 03/02/2021
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-3113-793
Sample Description	: SS test
Laboratory ID	: R210155/1-5
Date of Sampling	: 11/01/2021
Date Received	: 11/01/2021
Test Period	: 11/01/2021 – 12/01/2021
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. QPL-15e, APHA 22ed 2540 D
Test Result	: Refer to the results on page 2.

For and on behalf of
Acumen Laboratory and Testing Limited

Authorized Signature: _____

Hui Wai Fung, Huntington
Laboratory Manager
Chemical Division

Acumen Laboratory and Testing Limited

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Test Report

Report Number : Q210003aR210155

Job Number : R210155

Issue Date : 03/02/2021

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R210155/1	11/01/2021	C1	3.2
R210155/2	11/01/2021	C2	3.0
R210155/3	11/01/2021	M1	3.0
R210155/4	11/01/2021	M2	2.5
R210155/5	11/01/2021	M3	<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

Acumen Laboratory and Testing Limited
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Test Report

Report Number	: Q210003aR210156
Job Number	: R210156
Issue Date	: 03/02/2021
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-3113-794
Sample Description	: SS test
Laboratory ID	: R210156/1-5
Date of Sampling	: 13/01/2021
Date Received	: 13/01/2021
Test Period	: 13/01/2021 – 14/01/2021
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. QPL-15e, APHA 22ed 2540 D
Test Result	: Refer to the results on page 2.

For and on behalf of
Acumen Laboratory and Testing Limited

Authorized Signature: _____

Hui Wai Fung, Huntington
Laboratory Manager
Chemical Division

Acumen Laboratory and Testing Limited

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

Test Report

Report Number : Q210003aR210156

Job Number : R210156

Issue Date : 03/02/2021

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R210156/1	13/01/2021	C1	3.5
R210156/2	13/01/2021	C2	3.1
R210156/3	13/01/2021	M1	3.2
R210156/4	13/01/2021	M2	3.5
R210156/5	13/01/2021	M3	<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

Acumen Laboratory and Testing Limited
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Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Report Number	: Q210003aR210157
Job Number	: R210157
Issue Date	: 03/02/2021
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-3113-795
Sample Description	: SS test
Laboratory ID	: R210157/1-5
Date of Sampling	: 15/01/2021
Date Received	: 15/01/2021
Test Period	: 15/01/2021 – 16/01/2021
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. QPL-15e, APHA 22ed 2540 D
Test Result	: Refer to the results on page 2.

For and on behalf of
Acumen Laboratory and Testing Limited

Authorized Signature: _____

Hui Wai Fung, Huntington
Laboratory Manager
Chemical Division

Acumen Laboratory and Testing Limited

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

Test Report

Report Number : Q210003aR210157

Job Number : R210157

Issue Date : 03/02/2021

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R210157/1	15/01/2021	C1	3.6
R210157/2	15/01/2021	C2	3.4
R210157/3	15/01/2021	M1	3.0
R210157/4	15/01/2021	M2	3.7
R210157/5	15/01/2021	M3	<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

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

Test Report

Report Number	: Q210003aR210158
Job Number	: R210158
Issue Date	: 03/02/2021
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-3113-796
Sample Description	: SS test
Laboratory ID	: R210158/1-5
Date of Sampling	: 18/01/2021
Date Received	: 18/01/2021
Test Period	: 18/01/2021 – 19/01/2021
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

Report Number : Q210003aR210158

Job Number : R210158

Issue Date : 03/02/2021

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R210158/1	18/01/2021	C1	4.0
R210158/2	18/01/2021	C2	3.9
R210158/3	18/01/2021	M1	2.9
R210158/4	18/01/2021	M2	1.3
R210158/5	18/01/2021	M3	<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

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

Test Report

Report Number	: Q210003aR210159
Job Number	: R210159
Issue Date	: 03/02/2021
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-3113-797
Sample Description	: SS test
Laboratory ID	: R210159/1-5
Date of Sampling	: 20/01/2021
Date Received	: 20/01/2021
Test Period	: 20/01/2021 – 21/01/2021
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. QPL-15e, APHA 22ed 2540 D
Test Result	: Refer to the results on page 2.

For and on behalf of
Acumen Laboratory and Testing Limited

Authorized Signature: _____

Hui Wai Fung, Huntington
Laboratory Manager
Chemical Division

Acumen Laboratory and Testing Limited

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

Test Report

Report Number : Q210003aR210159

Job Number : R210159

Issue Date : 03/02/2021

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R210159/1	20/01/2021	C1	3.3
R210159/2	20/01/2021	C2	3.0
R210159/3	20/01/2021	M1	3.2
R210159/4	20/01/2021	M2	4.2
R210159/5	20/01/2021	M3	<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

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

Report Number	: Q210003aR210160
Job Number	: R210160
Issue Date	: 03/02/2021
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-3113-798
Sample Description	: SS test
Laboratory ID	: R210160/1-5
Date of Sampling	: 22/01/2021
Date Received	: 22/01/2021
Test Period	: 22/01/2021 – 23/01/2021
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. QPL-15e, APHA 22ed 2540 D
Test Result	: Refer to the results on page 2.

For and on behalf of
Acumen Laboratory and Testing Limited

Authorized Signature: _____

Hui Wai Fung, Huntington
Laboratory Manager
Chemical Division

Acumen Laboratory and Testing Limited

Lot 12, Tam Kon Shan Road, Tsing Yi (N), Hong Kong
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Test Report

Report Number : Q210003aR210160

Job Number : R210160

Issue Date : 03/02/2021

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R210160/1	22/01/2021	C1	4.1
R210160/2	22/01/2021	C2	3.5
R210160/3	22/01/2021	M1	3.0
R210160/4	22/01/2021	M2	1.6
R210160/5	22/01/2021	M3	<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

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

Test Report

Report Number	: Q210003aR210161
Job Number	: R210161
Issue Date	: 03/02/2021
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-3113-799
Sample Description	: SS test
Laboratory ID	: R210161/1-5
Date of Sampling	: 25/01/2021
Date Received	: 25/01/2021
Test Period	: 25/01/2021 – 26/01/2021
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. QPL-15e, APHA 22ed 2540 D
Test Result	: Refer to the results on page 2.

For and on behalf of
Acumen Laboratory and Testing Limited

Authorized Signature: _____

Hui Wai Fung, Huntington
Laboratory Manager
Chemical Division

Acumen Laboratory and Testing Limited

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

Test Report

Report Number : Q210003aR210161

Job Number : R210161

Issue Date : 03/02/2021

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R210161/1	25/01/2021	C1	4.0
R210161/2	25/01/2021	C2	3.6
R210161/3	25/01/2021	M1	3.2
R210161/4	25/01/2021	M2	2.6
R210161/5	25/01/2021	M3	<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

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

Test Report

Report Number	: Q210003aR210162
Job Number	: R210162
Issue Date	: 03/02/2021
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-3113-800
Sample Description	: SS test
Laboratory ID	: R210162/1-5
Date of Sampling	: 27/01/2021
Date Received	: 27/01/2021
Test Period	: 27/01/2021 – 28/01/2021
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. QPL-15e, APHA 22ed 2540 D
Test Result	: Refer to the results on page 2.

For and on behalf of
Acumen Laboratory and Testing Limited

Authorized Signature: _____

Hui Wai Fung, Huntington
Laboratory Manager
Chemical Division

Acumen Laboratory and Testing Limited

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

Test Report

Report Number : Q210003aR210162

Job Number : R210162

Issue Date : 03/02/2021

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R210162/1	27/01/2021	C1	3.0
R210162/2	27/01/2021	C2	3.3
R210162/3	27/01/2021	M1	3.2
R210162/4	27/01/2021	M2	1.4
R210162/5	27/01/2021	M3	<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

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

Test Report

Report Number	: Q210003aR210163
Job Number	: R210163
Issue Date	: 03/02/2021
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-3113-801
Sample Description	: SS test
Laboratory ID	: R210163/1-5
Date of Sampling	: 29/01/2021
Date Received	: 29/01/2021
Test Period	: 29/01/2021 – 30/01/2021
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. QPL-15e, APHA 22ed 2540 D
Test Result	: Refer to the results on page 2.

For and on behalf of
Acumen Laboratory and Testing Limited

Authorized Signature: _____

Hui Wai Fung, Huntington
Laboratory Manager
Chemical Division

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

Test Report

Report Number : Q210003aR210163

Job Number : R210163

Issue Date : 03/02/2021

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R210163/1	29/01/2021	C1	4.1
R210163/2	29/01/2021	C2	4.2
R210163/3	29/01/2021	M1	3.1
R210163/4	29/01/2021	M2	5.2
R210163/5	29/01/2021	M3	<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

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.77

January 2021

TABLE OF CONTENTS

APPENDICES

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 sinensi*s), 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 sinensi*s) 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 Tree Report presents data collected on 22 and 28 January 2021. It contains the following information:

- Introduction (Section 1)
- Description Of Tree Monitoring Area (Section 2)
- Monitoring Methodology (Section 3)
- Result (Section 4)
- Summary

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

2. DESCRIPTION OF TREE MONITORING SITE

2.1 Incense Tree (*Aquilaria sinensis*) and Ailanthus (*Ailanthus fordii*) trees was transplanted within existing Sha Tin Water Treatment Works (STWTW) where it is the extended compensatory plantation area. The area was flat and without covering with concrete.

2.2 Lamb of Tartary (*Cibotium barometz*) will be transplanted to the Sha Tin South Fresh Water Service Reservoir (STSFWSR). Plough is required before planting on to this open corner of short grassland.

2.3 Other compensatory trees have been planted at STWTW and STSFWSR. Lamb of Tartary (*Cibotium barometz*) to be transplanted was temporally stored at a nursery garden at Shui Mei Tsuen, Kam Tin. Once the planting site at STSFWSR was ready; while the Lamb of Tartary (*Cibotium barometz*) are in acceptable (fair) condition, they will be planted at the planting site within one day.

3. MONITORING METHODOLOGY

3.1 Site inspection will be carried out by walking through the transplanting area. Health condition and survival rate will be observed during inspection.

3.4 Health condition of all transplanted vegetation including trees/Shrubs surveyed was evaluated according to the following criteria:

- Transplanted vegetation with good health are classified as **good**;
- Transplanted vegetation with few or no visible defects or health problems are classified as being **fair**;
- Transplanted vegetation was badly damaged or clearly suffering from decay die back or the effects of very heavy vine growth are classified as **poor**.

3.5 Survival rate for each of transplanted vegetation species will be calculated based on site observation.

4. RESULT

4.1 Monitoring inspections were conducted on 22 and 28 January 2021. Three trees TA572, TA326 and TA327 were transplanted to tree compensation area within the Sha Tin Water Treatment Works (STWTW) in 20 June 2016.

4.2 The condition of TA572 was observed in poor condition due to the damage of two main trunks. TA327 was also in poor condition. The already dead tree TA326 collapsed due to big hit by the Signal No.10 typhoon Mangkhut on 16 September 2018. Tree guying cables have been installed to provide external support to the remaining two transplanted trees.

4.3 All transplanted Lamb of Tartary (*Cibotium barometz*) have been severely damaged by Typhon Wipha on 30-31 July 2019. During the monitoring in December 2020, all are dehydrated without foliage in poor condition; however, 27 nos. new individuals are propagated from previously collected spores since then. A new shelter has been set up for these new individuals. They are generally in fair condition. Next few monitoring will be critical to assess their survival and suitability for transplanting back to the project site according to works progress.

4.4 The joint site meeting with our ecologist, Project Manager, Contractor and Landscape Contractor on 20 October 2020 revealed that the designated recipient site at STSFWSR was under excessive exposure of direct sunlight, strong winds, far from riparian zone/ moist valley and low in soil moisture. This is not a favourable microhabitat for *Cibotium barometz* to be transplanted back. Two best (but still sub-optimal) portions within this recipient site would be a corner with shading canopy from trees on a man-made feature nearby; as well as understory zone of an existing tree. Mitigation measures are proposed in Section 5 to enhance a sustainable survival of *Cibotium barometz* during the post-transplantation stage.

4.5 In general, all 27 Lamb of Tartary (*Cibotium barometz*) stored at the nursery are in fair condition. 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.

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 loss of transplanted Hong Kong Eagle's Claw which is in climber growing form, it is recommended to plant an individual of native climber species at compensatory planting site (STSFWSR) together with compensatory tree planting. Recommended list of species are given in the Table 1 below. It is suggested that about 1 species of climber to be selected from the following list according to availability of the nursery source. The recommended

plant species have been recorded from adjacent secondary woodland in an approved EIA Report (AEIAR-187/2015). These species would have certain ecological value in terms of plant ecology and the associated wildlife including birds.

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

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

5.2 Despite all 27 transplanted Lamb of Tartary (*Cibotium barometz*) are generally in fair condition, yellowish foliage was observed in those individuals that were placed at the edge of the shelter receiving excessive direct sunlight. It is recommended to retain them at the nursery garden under proper maintenance. A larger shelter (such as 遮光網) shall be provided to reduce the amount of sunlight received and avoid direct hit of rainstorm/ typhoon. Irrigation spray head has been installed to facilitate watering frequency whenever necessary. Once their condition has recovered to acceptable level, they can be moved to the recipient site at STSFWSR when the site is ready.

5.3 In order to enhance a sustainable survival of 27 nos. *Cibotium barometz* during the post-transplantation stage, the recipient site at STSFWSR shall install a shelter (such as 遮光網) to reduce intensity of direct sunlight received and avoid direct hit of rainstorm/ typhoon. Transplanted *Cibotium barometz* shall be watered at least once in the morning and once in the afternoon; before irrigation spray head has been installed to facilitate watering frequency whenever necessary.

5.4 Robust fencing (protection zone) shall be set up to enclose the 27 nos. transplanted *Cibotium barometz* (in two groups: one at the corner with shading canopy from trees on a man-made feature nearby; another at understory zone of an existing tree) to avoid unnecessary disturbance/ damage to them.

5.5 Weeding within the two protection zones of *Cibotium barometz* shall only be conducted by hand-held tools rather than grass cutting machine. No fire/ chemical weeding shall be allowed.

5.6 The 27 nos. transplanted *Cibotium barometz* shall be maintained with measures mentioned in Section 5.3-5.5 above for 12 months for establishment. A 12-month post-transplantation monitoring period helps to assess their survival during the establishment period.

5.7 Any dead individuals/ those in poor condition before transplant back to STSFWSR or during the post-transplantation period shall be replaced by planting healthy individuals of *Cibotium barometz*. Other possible fern candidate such as *Brainea insignis*, which is more adaptive to open grassland under direct sunlight, shall be sourced for compensatory planting.

5.8 The designated recipient site for transplanting 27 nos. *Cibotium barometz* at STSFWSR was under excessive exposure of direct sunlight, strong winds, far from riparian zone/ moist valley and low in soil moisture. This is not a favourable microhabitat for *Cibotium barometz*. Two best (but still sub-optimal) portions within this recipient site would be a corner with shading canopy from trees on a man-made feature nearby; as well as understory zone of an existing tree.

5.9 After transplantation, root ball of TA572 and TA327 tree should be kept moisture especially during non-raining day.

5.10 Incense Tree (*Aquilaria sinensis*) tagged as TA326 was observed dead during inspection on 10 August 2017. Its DBH was measured as 346cm. In according to the Tree Preservation, Development Bureau Technical Circular (Works) No. 7/2015, the compensatory planting will try to achieve the compensatory planting ratio of 1:1 in terms of aggregated DBH.

5.11 In total, 3 individual of native tree species with heavy standard size will be planted with 2.5-3 meters (center to center) spacing at compensatory planting site. Recommended list of species are given in the Table 2 below. It is suggested that at least 1 tree species to be selected from the following list according to availability of the nursery source. The recommended plant species have been recorded from adjacent secondary woodland in an approved EIA Report (AEIAR-187/2015). These species would have certain ecological value in terms of plant ecology and the associated wildlife including birds.

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

Native Tree Species			
Common Name	**Latin Name**	**Chinese Name**	**Growing Form**
Ivy Tree	*Schefflera heptaphylla*	鴨腳木	Tree
Levine's Syzygium	*Syzygium levinei*	山蒲桃	Tree
Chekiang Machilus	*Machilus chekiangensis*	浙江潤楠	Tree
Aporusa	*Aporusa dioica*	銀柴	Tree

Mountain Tallow Tree	*Sapium discolor*	山烏桕	Tree
Fragrant Litsea	*Litsea cubeba*	山蒼樹	Tree
Chinese Apea Ear-ring	*Archidendron lucidum*	亮葉猴耳環	Tree
Chinese Hackberry	*Celtis sinensis*	朴樹	Tree
Turn-in-the-wind	*Mallotus paniculatus*	白楸	Tree
Acronychia	*Acronychia pedunculata*	降真香	Tree

6. SUMMARY

6.1 The condition of TA572 was observed in poor condition due to broken of main trunk. TA327 was also in poor condition; while already dead TA326 collapsed under Signal No. 10 typhoon Mangkhut in September 2018. Tree guying cables have been installed to provide external support to the two remaining transplanted trees.

6.2 All Lamb of Tartary (*Cibotium barometz*) previously stored at the nursery have been severely damaged by Typhon Wipha on 30-31 July 2019. During the monitoring in December 2020, all are dehydrated without foliage in poor condition; however, 27 nos. new individuals are propagated from previously collected spores since then. A new shelter has been set up for these new individuals. They are generally in fair condition. Next few monitoring will be critical to assess their survival and suitability for transplanting back to the project site according to works progress.

6.3 Currently, Lamb of Tartary was temporally stored in a nursery garden at Shui Mei Tsuen, Kam Tin. The shelter (遮光網) for reducing the intensity of sunlight and avoid direct hit of rainstorm/ typhoon was a bit too small, as reflected by yellowish foliage under the edge of the shelter. It is recommended to retain them at the nursery garden under proper maintenance during current recovery stage. In case their condition is not in an acceptable level, new, healthy individuals of *Cibotium barometz* (or other possible candidate such as *Brainea insignis*) shall be replaced for compensatory planting at the STSFWSR recipient site.

6.4 Shelter, regular irrigation, protection zone and weeding by hand held tools within protection zone, shall also be provided to the 27 nos. *Cibotium barometz* after being transplanted to the STSFWSR recipient site in order to sustain their survival during the post-transplantation stage.

6.5 The 27 nos. transplanted *Cibotium barometz* shall be maintained for 12 months for their establishment at the STSFWSR recipient site, followed with a 12-month post-transplantation monitoring to assess their survival.

6.6 Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) was observed dead during inspection on 20 August 2016. In order to compensate for the loss of transplanted Hong Kong Eagle's Claw and Incense Tree TA326, it is recommended to plant an individual of native climber species and 3 heavy standard native tree species at compensatory planting site. The suggested species in planting

list would have certain ecological value in terms of plant ecology and the associated wildlife including birds.

6.7 After transplantation, root ball of TA572 and TA327 tree should be kept moisture especially during dry and non-raining day.

APPENDIX I

Photo

Photo 1. *Cibotium barometz* in fair condition

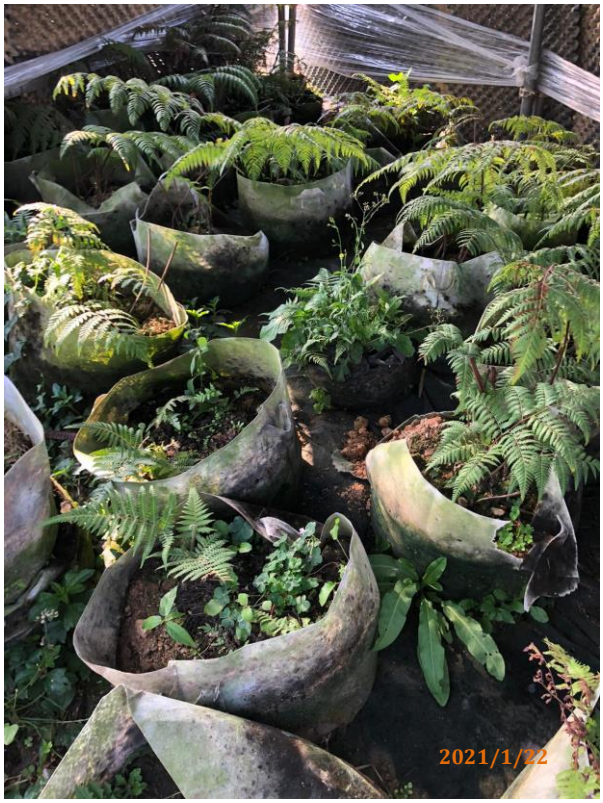

Photo 2. *Cibotium barometz* in fair condition

Photo 3. *Cibotium barometz* with sign of dehydration

Photo 4. Extra shading has been provided around four sides to reduce excessive direct sunlight on those individuals along the edges.

Photo 5. Extra shading has been provided around four sides to reduce excessive direct sunlight on those individuals along the edges.

Photo 6. Transplanted Incense Tree (*Aquilaria sinensis*) – TA327 (left); and Ailanthus (*Ailanthus fordii*) – TA572 (right); this site is too exposed under direct sunlight for *Cibotium barometz*.

Photo 7. Weak crown with dead twigs observed in of TA327.

Photo 8. Sprouts with new leaves at trunk base of TA327.

	
Photo 9. Collapsed fencing to be rectified	Photo 11. Weak crown and two broken trunks of TA572.

APPENDIX II

Table for condition of transplanted plant

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

No.	Species	Condition	Alive/Dead	Remark
1	*Cibotium barometz*	Fair	Alive	
2	*Cibotium barometz*	Fair	Alive	
3	*Cibotium barometz*	Fair	Alive	
4	*Cibotium barometz*	Fair	Alive	
5	*Cibotium barometz*	Fair	Alive	
6	*Cibotium barometz*	Fair	Alive	
7	*Cibotium barometz*	Fair	Alive	
8	*Cibotium barometz*	Fair	Alive	Previous batch were severely damaged by Typhon Wipha on 30-31 July 2019 and failed to recover until December 2020
9	*Cibotium barometz*	Fair	Alive	
10	*Cibotium barometz*	Fair	Alive	
11	*Cibotium barometz*	Fair	Alive	
12	*Cibotium barometz*	Fair	Alive	
13	*Cibotium barometz*	Fair	Alive	
14	*Cibotium barometz*	Fair	Alive	
15	*Cibotium barometz*	Fair	Alive	27 new individuals are propagated from previously collected spores as a replacement since then.
16	*Cibotium barometz*	Fair	Alive	
17	*Cibotium barometz*	Fair	Alive	
18	*Cibotium barometz*	Fair	Alive	
19	*Cibotium barometz*	Fair	Alive	
20	*Cibotium barometz*	Fair	Alive	
21	*Cibotium barometz*	Fair	Alive	
22	*Cibotium barometz*	Fair	Alive	
23	*Cibotium barometz*	Fair	Alive	
24	*Cibotium barometz*	Fair	Alive	
25	*Cibotium barometz*	Fair	Alive	
26	*Cibotium barometz*	Fair	Alive	
27	*Cibotium barometz*	Fair	Alive	
	The new shelter (such as 遮光網) is too small to provide shading and against direct hit of rainstorm/ typhoon on the plants, especially those under the edge.			
28	*Artabotrys hongkongensis*	--	Dead	--
		Survival rate (%)	96%	

Trees of Ailanthus and Incense Tree

No.	Species	Condition	Alive/Dead	Remark
TA572	*Ailanthus fordii*	Poor	Alive	Two main trunks were broken during typhoon on 23 August 2017. Cracks and wounds observed in one of the trunks. Weak canopy formed only by sprouts.
TA327	*Aquilaria sinensis*	Poor	Alive	Tree crown of TA327 was thinner after transplantation. Water sprouts, cracks on tree bark and would at trunk base observed.
TA326	*Aquilaria sinensis*	Dead	Dead	Collapsed due to the Signal No.10 typhoon Mangkhut in September 2018.
		Survival rate (%)	67%	

Appendix T
Monthly Summary of Waste Flow Table

Monthly Summary Waste Flow Table for 2021

Contract No.: 1/WSD/19

Contract Title: In-situ Reprovisioning of Sha Tin Water Treatment Works (South Works)
-Water Treatment Works and Ancillary Facilities

Month	Actual Quantities of Inert C&D Materials Generated / Imported (in '000m3)						Actual Quantities of C&D Wastes Generated				
	Total Quantity 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	Metals	Paper/ cardboard packaging	Plastics (bottles/containers,plastic sheets/foam package material)	Chemical Waste	Others, e.g. general refuse
	(a+b+c+d)	(a)	(b)	(c)	(d)		(in '000kg)	(in '000kg)	(in '000kg)	(in '000m^3)	(in '000m^3)
Jan	0.122	0	0	0	0.122	0	0	0	0	0	0.004
Feb											
Mar											
Apr											
May											
Jun											
Sub-total	0.122	0	0	0	0.122	0	0	0	0	0	0.004
Jul											
Aug											
Sep											
Oct											
Nov											
Dec											
Total	0.122	0	0	0	0.122	0	0	0	0	0	0.004

Note:

1. Assume the density of soil fill is 2 ton/m3.
2. Assume the density of rock and broken concrete is 2.5 ton/m3.
3. Assume each truck of C&D wastes is 5m3.
4. The inert C&D materials except slurry and bentonite are disposed at Tseung Kwun O 137.
5. The slurry and bentonite are disposed at Tseung Kwun O 137.
6. The non-inert C&D wastes are disposed at NENT.
7. Assume the density of metal is 7,850 kg/m3.
8. Assume the density of plastic is 941 kg/m3.
9. Assume the density of general refuse is 0.9(kg/l)
10. Density of waste oil is assumed to be 0.001 m3/L & 0.8 kg/L.. Chemical waste includes waste oil.

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 Measures	Implementation Agent	Relevant Legislation and Guidelines	Implementation Phase			Status
					D	C	O	
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 Ordinance and Air Pollution Control (Construction Dust) Regulation EM&A Manual		√		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			√		Y
4.7.1	Tarpaulin covering of all dusty vehicle loads transported to, from and between site locations.	All works areas	Contractor			√		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			√		Y
4.7.1	Imposition of speed controls for vehicles on site haul roads.	All works areas	Contractor			√		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								
5.6.4	Implement good site practices to reduce noise level	All works areas	Contractor	Noise Control Ordinance		√		Y
5.6.5	Adoption of Quiet PME	All works areas	Contractor			√		N/A
5.6.6	Use of Movable Noise Barrier	All works areas	Contractor			√		N/A
5.8	Noise monitoring	Monitoring points	Contractor			√		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		√		Y

	traps, silt traps and sedimentation basins. Channels or earth bunds or sand bag barriers should be provided on site to properly direct stormwater to such silt removal facilities. Perimeter channels at site boundaries should be provided where necessary to intercept storm run-off from outside the site so that it will not wash across the site. Catchpits and perimeter channels should be constructed in advance of site formation works and earthworks.			Site Drainage TM-DSS Water Pollution Control 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			√		Y
6.8.3	Temporary exposed slope surfaces should be covered and temporary access roads should be protected by crushed stone or gravel, as excavation proceeds. Intercepting channels should be provided to prevent storm run-off from washing across exposed soil surfaces.	All works area	Contractor			√		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			√		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			√		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			√		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			√		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			√		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			√		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			√		Y
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			√		N/A
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			√		Y
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			√		Y
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			√		Y
6.8.17	Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance.	All works areas	Contractor			√		Y
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			√		Y
6.8.19	Adopt relevant measures stated in ETWB TC (Works) No. 5/2005 “Protection of Natural Streams/rivers from Adverse Impacts arising from Construction Works” to minimize the potential water quality impacts from the construction works near any water courses.	All works areas	Contractor			√		Y
6.10	Water quality monitoring	Monitoring points	Contractor			√		Y
Waste Management								

7.6.1	Appropriate waste handling, transportation and disposal methods for all waste arisings generated during the construction works for the Project should be implemented to ensure that construction wastes do not enter the nearby streams or drainage channel.	All works areas	Contractor	Waste Disposal Ordinance DEVB TCW No. 6/2010, ETWB TCW No. 19/2005 Land (Miscellaneous Provisions) Ordinance Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes		√		Y
7.6.2	Implementation of good site practices for waste management	All works areas	Contractor			√		Y
7.6.3	Implementation of trip ticket system to control waste disposal	All works areas	Contractor			√		Y
7.6.4	Implementation of good site practices to reduce waste generations	All works areas	Contractor			√		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 C&D material and to facilitate the sorting process.	All works areas	Contractor			√		Y
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			√		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			√		N/A
7.6.10	A licensed asbestos waste collector will be appointed to collect the asbestos waste and deliver to the designated landfill for disposal. Application should be submitted to EPD.	All works areas	Contractor			√		N/A
7.6.11	If chemical wastes were to be produced at the construction site, the Contractor would be required to register with the EPD as a Chemical Waste Producer, and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the waste, such as explosive, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc. The Contractor shall use a licensed collector to transport the chemical wastes. The licensed collector shall deliver the waste to the Chemical Waste Treatment Centre at Tsing Yi, or other licenced facility, in accordance with	All works areas	Contractor			√		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 habitats All works areas	The Engineer/ Contractor	EIAO-TM EM&A Manual		√		Y
8.8.2	Reduce the amount of vegetation removal required and thereby minimize the footprint of the slope at the woodland habitat		The Engineer/ Contractor			√		Y
8.8.3	Conduct detailed vegetation survey and implement suggested measures for species of conservation importance.		The Engineer/ Contractor			√		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			√		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			√		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			√		N/A

Landscape and 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 EIAO TM		√		Y
	Compensatory Planting shall be provided in accordance with DEVB TCW No. 10/2013 – Tree Preservation.	All works areas	Contractor			√		Y
	Control of night-time lighting glare.	All works areas	Contractor			√		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			√		Y
Cultural Heritage								
10.6.2	Vibration monitoring at Ex KCR Beacon Hill Tunnel during piling works of Administration Building	Work site	The Engineer /Contractor			√		N/A
Land Contamination								
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)		√		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		√		Y
	Develop an audit procedure to ensure enforcement of speed limits and to ensure adequate site access control	All works areas	The Engineer			√		Y
	Ensure construction method statement is endorsed by the Engineer (AECOM)	All works areas	The Engineer			√		Y

	Ensure designated manoeuvring area for the new access road construction is away from the Chlorination House	New access road area	Contractor/ The Engineer			√		Y
	Ensure that the emergency response plan and procedures (including drills) cover the reprovisioning activities	All works areas	Contractor/ The Engineer			√		Y
	Safety training to be provided to construction workers and WSD/Engineer staff regarding evacuation procedures	All works area	Contractor/ The Engineer			√		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			√		N/A
	Ensure temporary suspension of crane operation and construction truck movements during chlorine delivery	All works areas	Contractor/ The Engineer			√		Y
	Provide a crash barrier between the construction site and the north side of the Chlorination House.	Chlorination House area	Contractor			√		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			√		Y
	Provide settlement monitoring for the Chlorination House to ensure no subsidence occurs from nearby excavation works.	Chlorination House area	Contractor			√		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			√		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			√		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			√		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			√		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			√		Y
Installation of Chlorine gas monitors with audible alarms in the relevant reprovisioning works area	Reprovisioning works areas	Contractor/ The Engineer			√		k.i.v.
Provision of an accompanying vehicle for the chlorine truck on the WTW site and ensuring that during the chlorine drums delivery construction works are stopped and the construction workers moved away from Chlorination House	All works areas	Contractor			√		Y
Establish a liaison between the contractor and HKCG and develop a chlorine/town gas emergency plan to ensure gas safety during the Construction Phase	Beacon Hill North Gas Offtake Station and Gas Pipelines in Old Beacon Hill Tunnel	The Engineer / Contractor / HKCG			√		k.i.v.
Temporary suspend chlorine delivery during the short period of construction of the concerned section of elevated walkway to avoid mobile crane impact on the chlorine truck		The Engineer / Contractor			√		N/A
Provide clear road signs for site vehicles	Chlorine delivery route and reprovisioning works access roads	The Engineer / Contractor			√		Y
Large equipment/plant movement should be controlled by 'Permit-to-move' system	All works areas	The Engineer / Contractor / WSD			√		Y
Define restricted zone for the equipment (i.e. keep the equipment from the Chlorination House at a safe distance). The extent of the restricted zone would be determined by the size of the equipment	Chlorination House area	The Engineer / Contractor			√		Y
Locate the construction site office at or near property boundary away from the Chlorination House as far as possible	Construction Office area	The Engineer / Contractor			√		Y
Entry of non-authorized personnel to the construction site to be prohibited	All works areas	Contractor			√		Y

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		√		k.i.v.
	Improved clamps with independent checks to prevent load shedding	Chlorine delivery trucks				√		F
	Installation of fire screen and larger fire extinguishers to prevent engine and wheel fires from spreading to the cargo area					√		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 & 12.38	Ban the use of retreaded tyres and perform regular visual checks on the tyres.					√		F
	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.					√		F
	Limit fuel tanks capacity at the beginning of the Project (Item 2.3 of Table 12.37 – advance measure).					√		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				√		k.i.v.
	Implement side, front and rear crash guards with high energy absorption in coordination and accordance with the relevant authorities.	Chlorine delivery trucks				√		k.i.v.
	Implement a sturdy steel frame to minimize the potential for chlorine release due to truck rollover					√		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			√		k.i.v.

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

Legend

D – Design Phase

C – Construction Phase

O – Operation Phase

Y - Compliance of Mitigation Measures

N/A – Not Applicable in Reporting Period

k.i.v – Keep In View

F - Completed

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

Statistical Summary of Exceedances

Air Quality			
Location	**Action Level**	**Limit Level**	**Total**
AM1	0	0	0
AM2	0	0	0
Noise			
Location	**Action Level**	**Limit Level**	**Total**
NM1	0	0	0
NM2	0	0	0
NM3	0	0	0

Water Quality									
Location	**Action Level**				**Limit Level**				**Total**
	DO	**Turbidity**	**SS**	**pH**	**DO**	**Turbidity**	**SS**	**pH**	
C1	0	0	0	0	0	0	0	0	0
C2	0	0	0	0	0	0	0	0	0
C3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
M1	0	0	0	0	0	0	0	0	0
M2	0	0	0	0	0	0	0	0	0
M3	0	0	0	0	0	0	0	0	0

Statistical Summary of Environmental Complaints

Reporting Period	**Environmental Complaint Statistics**		
	Frequency	**Complaint Nature**	**Cumulative**
1 January - 31 January 2021	0	N/A	4

Statistical Summary of Environmental Summons

Reporting Period	**Environmental Summons Statistics**		
	Frequency	**Details**	**Cumulative**
1 January - 31 January 2021	0	N/A	0

Statistical Summary of Environmental Prosecution

Reporting Period	**Environmental Prosecution Statistics**		
	Frequency	**Details**	**Cumulative**
1 January - 31 January 2021	0	N/A	0

Appendix W
Tentative schedule for environmental monitoring

Tentative Impact Monitoring Schedule for STWTW

Jan 21						
Sun	Mon	Tue	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 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	5	6 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	7	8 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	9
10	11 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	12	13 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	14	15 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	16
17	18 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	19	20 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	21	22 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	23
24	25 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	26	27 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	28	29 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	30
31						

Tentative Impact Monitoring Schedule for STWTW

Feb 21						
Sun	Mon	Tue	Wed	Thur	Fri	Sat
	1 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	2	3 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	4	5 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 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	9	10 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	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	17	18 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	19	20 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3
21	22 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	23	24 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	25	26 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	27
28						

Tentative Impact Monitoring Schedule for STWTW

Mar 21						
Sun	Mon	Tue	Wed	Thur	Fri	Sat
	1 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	2	3 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	4	5 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 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	9	10 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	11	12 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	13
14	15 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	16	17 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	18	19 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 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	23	24 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	25	26 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	27
28	29 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	30	31 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3			

Tentative Impact Monitoring Schedule for STWTW

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