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Acumen Environmental Engineering & Technologies Co., Ltd.
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(852) 2333-1316

Our Ref.: CJO-3113

14 January 2022

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 70th 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
2333 6823

c.c. Water Supplies Department
c.c. AECOM

浩科環境工業有限公司
Acumen Environmental Engineering & Technologies Co., Ltd.
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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)

14 January, 2022

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 70th 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 70th 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,

Mr. Wong, Vega, T. L.
Environmental Team Leader

c.c. Independent Environmental Checker

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12/F, Grand Central Plaza, Tower 2,
138 Shatin Rural Committee Road,
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Your Ref:
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By Hand & By Email

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

Attn: Mr. Edmund Huen

14 January 2022

Dear Sir,

Contract No.1/WSD/19
In-situ reprovisioning of Sha Tin Water Treatment Works (South Works) – Water Treatment Works and Ancillary Facilities
Submission of 70th Monthly EM&A Report for December 2021

Reference is made to Environmental Team (ET)'s 70th Monthly EM&A Report for December 2021 (Rev. 0) submitted on 14 January 2022.

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. 70)

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. 70)

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 and Reviewed by	Ms. Choy, Yiting, Y. T.	
Approved & Certified by	Mr. Wong, Vega, T. L. 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 - CW - MH JV (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 70th monthly Environmental Monitoring and Audit Report for Contract No. 1/WSD/19 covering the period from 1 to 31 December 2021 (the Reporting Period). As informed by the Contractor, major activities in the reporting period included:

- M1-M5 Water Main Diversion Work
- Washwater Equalization Tank (WET)- Excavation and ELS Work
- Site formation work –site formation excavation work
- Clarifier No.2,3 4 – Backfilling and Demolition Work
- DN1200 drainage work -drainage pile laying.
- Tree felling, transplantation, and landscape works
- MIC office Construction
- Asbestos Removal
- Relocation of M&E Equipment
- Demolition Aluminum Tank
- Relocate antique Item
- Pipe Pile Construction at RMF, SWPS

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	15
Noise	$L_{eq(30mins)}$ Daytime	5
Water Quality	Water Sampling	13
Inspection / Audit	ET Regular Environmental Site Inspection	5
	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 was 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 EPD site inspection was conducted on 1 and 14 December 2021 during the reporting period.

A.11 As informed by the Contractor, the major works for Contract No. 1/WSD/19 between January 2022 to March 2022 will be:

- M1-M5 Water Main Diversion
- Washwater Equalization Tank (WET)- Excavation Works
- Demolition of Chemical Building, Filter Bed, Aluminum Tank
- Excavation work on WET area
- DN1200 drainage work in Administration Building - drainage pile laying
- Tree felling, transplantation, and landscape works
- MIC office Construction
- Remove Asbestos
- Pipe pile work at Stage 1 Filter, Stage 2 Filter, RMF, SWPS, Ozone.
- Excavation Work at SWPS and Stage 1 Filter

A.12 EM&A monitoring for the 70th reporting period for Contract No. 1/WSD/19 has been completed. The 71st monthly EM&A report will cover the period from 1 to 31 January 2022.

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 – CW – MH JV (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	Senior Engineer	Mr. Ng, Horace, C. K.	2829 5693
AECOM	Chief Resident Engineer	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	Mr. Wong, Vega, T. L.	6113 2368
	Ecologist	Mr. Wan, Jay, P. H.	2333 6823

1.3. SCOPE OF REPORT

1.3.1 This is the 70th 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 December 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 are shown in **Appendix C**.

1.4.2 As informed by the Contractor, no major works for Contract No.3/WSD/15 will be conducted. The major works for Contract No. 1/WSD/19 in December 2021 are:

- M1-M5 Water Main Diversion Work
- Washwater Equalization Tank (WET)- Excavation and ELS Work
- Site formation work –site formation excavation work
- Clarifier No.2,3 4 – Backfilling and Demolition Work
- DN1200 drainage work -drainage pile laying.
- Tree felling, transplantation, and landscape works
- MIC office Construction
- Asbestos Removal
- Relocation of M&E Equipment

- Demolition Aluminum Tank
- Relocate antique Item
- Pipe Pile Construction at RMF, SWPS

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 AM 510
	CASC Model 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 five (5) 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
04/12/2021	Sunny	14:26	17:26	106	119	101
10/12/2021	Sunny	15:20	18:20	132	144	165
16/12/2021	Fine	09:40	12:40	99	102	110
22/12/2021	Cloudy	14:01	17:01	106	96	113
28/12/2021	Cloudy	14:03	17:03	98	114	84
Average				112.6		
Range				84 – 165		

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
04/12/2021	Sunny	14:33	17:33	116	132	128
10/12/2021	Sunny	15:28	18:28	144	152	147
16/12/2021	Fine	09:48	12:48	106	111	116
22/12/2021	Cloudy	14:08	17:08	88	114	105
28/12/2021	Cloudy	14:12	17:12	70	98	104
Average				115.4		
Range				70 – 152		

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	Svantek 958A
Sound Level Meter	Lutron SL-4033SD
Acoustic Calibrator	Svantek SV 33B
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 five (5) 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}**
04/12/2021	15:48 - 16:18	Sunny	60.7	62.2	60.6	63.2	64.1	61.9	62.3
10/12/2021	16:50 - 17:20	Sunny	64.1	63.2	62.2	62.6	62.2	60.6	62.6
16/12/2021	11:15 - 11:45	Fine	62.0	61.9	61.4	61.6	62.8	61.7	61.9
22/12/2021	14:01 - 14:31	Cloudy	62.4	61.9	60.7	62.2	63.1	62.4	62.2
28/12/2021	14:04 - 14:34	Cloudy	61.1	62.8	63.4	64.4	63.1	62.6	63.0
Limit Level >75dB(A)								**Average**	62.4
								Range	61.9 – 63.0

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}**
4/12/2021	14:33 - 15:03	Sunny	62.2	60.5	63.2	61.7	62.6	62.0	62.1
10/12/2021	15:28 - 15:58	Sunny	60.9	62.2	61.8	62.8	60.9	63.0	62.0
16/12/2021	09:48 - 10:18	Fine	62.2	60.5	61.7	62.0	60.9	62.6	61.7
22/12/2021	14:33 - 15:03	Cloudy	61.7	62.9	63.4	64.4	64.2	63.8	63.5
28/12/2021	14:38 - 15:08	Cloudy	64.1	62.7	60.9	62.5	63.3	64.2	63.1
Limit Level >75dB(A)								**Average**	62.5
								Range	61.7 – 63.5

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}
4/12/2021	15:06 - 15:36	Sunny	60.5	62.6	61.8	59.9	60.5	61.8	61.3
10/12/2021	16:02 - 16:32	Sunny	61.3	61.7	62.9	60.5	63.2	61.6	62.0
16/12/2021	10:22 - 10:52	Fine	62.6	63.0	60.6	62.0	60.5	60.7	61.7
22/12/2021	15:05 - 15:35	Cloudy	62.9	61.1	62.5	63.3	61.8	62.1	62.3
28/12/2021	15:12 - 15:42	Cloudy	60.9	62.2	61.7	62.2	63.8	64.9	62.8
Limit Level 70dB(A) during normal teaching periods ~~or 65dB(A) during examination periods~~			**Average**						62.1
			Range						61.3 – 62.8

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	10.25	10.50	N/A	11.07	11.14	10.95
Min.	8.32	8.32	N/A	9.24	9.06	9.38
Max.	13.90	14.13	N/A	14.97	13.06	14.64
Turbidity – Mid Depth (NTU)	**C1**	**C2**	**C3**	**M1**	**M2**	**M3**
Average	1.44	1.49	N/A	1.66	1.54	0.37
Min.	0.00	0.53	N/A	0.60	0.27	0.00
Max.	2.70	2.70	N/A	2.80	2.70	0.93
Suspended Solid – Mid depth (mg/L)	**C1**	**C2**	**C3**	**M1**	**M2**	**M3**
Average	1.70	2.49	N/A	1.38	1.48	<1
Min.	<1	<1	N/A	<1	<1	<1
Max.	**4.50**	**6.30**	N/A	2.20	2.80	<1
pH value (unit)	**C1**	**C2**	**C3**	**M1**	**M2**	**M3**
Average	7.67	7.59	N/A	7.55	7.67	7.67
Min.	7.34	7.23	N/A	6.86	7.26	7.47
Max	7.80	7.86	N/A	7.77	8.22	8.17

Remark 1: Exceedance of action level of suspended solids on 3 and 15 December 2021 at C2.
Remark 2: Exceedance of action level of suspended solids on 15 December 2021 at C1.

2.4.10 In this Reporting Month, all monitoring result were below or within the limit level. Exceedances in action level of suspended solid for water quality monitoring were recorded in this reporting period on 3 and 15 December 2021. There were 3 exceedances of Action Level. Since C1 and C2 are out of the site boundary and upstream of the construction site. All exceedance of Action Level at C1 and C2 were found non project related. Detailed monitoring results including in-situ measurements, laboratory analysis data are shown in Appendix R.

2.4.11 Investigation reports for the exceedance of Suspended Solid in November and December 2021 are supplemented in Appendix V.

2.5. ECOLOGY

2.5.1 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.

2.5.2 Compensatory planting of TA326 has been completed on 25 March 2020 by planting two Syzygium levinei and one Schefflera heptaphylla. However, the two native Syzygium levinei were mis-planted by two exotic Syzygium jambos, which has been replaced by another native tree species Celtis sinensis on 31 May 2021.

2.5.3 Desmos chinensis has been finalized as the candidate to compensate the loss of Artabotrys hongkongensis. Two individuals were planted at Wall C in STWTW on 1 April 2021.

2.5.4 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.

2.5.5 They are at acceptable condition to be transplanted back at Portion E of STSFWSR on 23 April 2021.

2.5.6 In order to enhance a sustainable survival during the post-transplantation stage, a shelter (such as 遮光網) has been installed to reduce intensity of direct sunlight received and avoid direct hit of rainstorm/ typhoon to the 27 nos. Cibotium barometz.

2.5.7 Regular irrigation, set up of protection zone and weeding by hand held tools within protection zone, shall also be provided to the transplanted/ compensated plants in order to sustain their survival during the post-transplantation (establishment) stage.

2.5.8 Root ball of TA572 and TA327 tree should be kept moisture especially during dry and non-raining day.

2.6. WASTE MANAGEMENT STATUS

2.6.1 The Contractor has submitted application form for registration as chemical waste producer under the Contract. Sufficient numbers of receptacles were available for general refuse collection and sorting. The Waste Producer Number to the Contractor is assigned in respect of the project site.

2.6.2 Wastes generated during this reporting period include mainly construction wastes (inert and non-inert). Waste flow table was prepared by the Contractor to record amount of waste generated and disposed (**Appendix T**).

2.6.3 The Contractor was advised to properly maintain on site C&D materials and waste collection, sorting and recording system, dispose of C&D materials and wastes at designated ground and maximize reuse/ recycle of C&D materials and wastes.

2.6.4 The Contractor was also reminded to properly maintain the site tidiness and dispose of the wastes accumulated on site regularly and properly. For chemical waste containers, the Contractor was reminded to treat properly and store temporarily in designated chemical waste storage area on site in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.

2.7. DELIVERY, STORAGE AND HANDLING OF CHLORINE

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

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

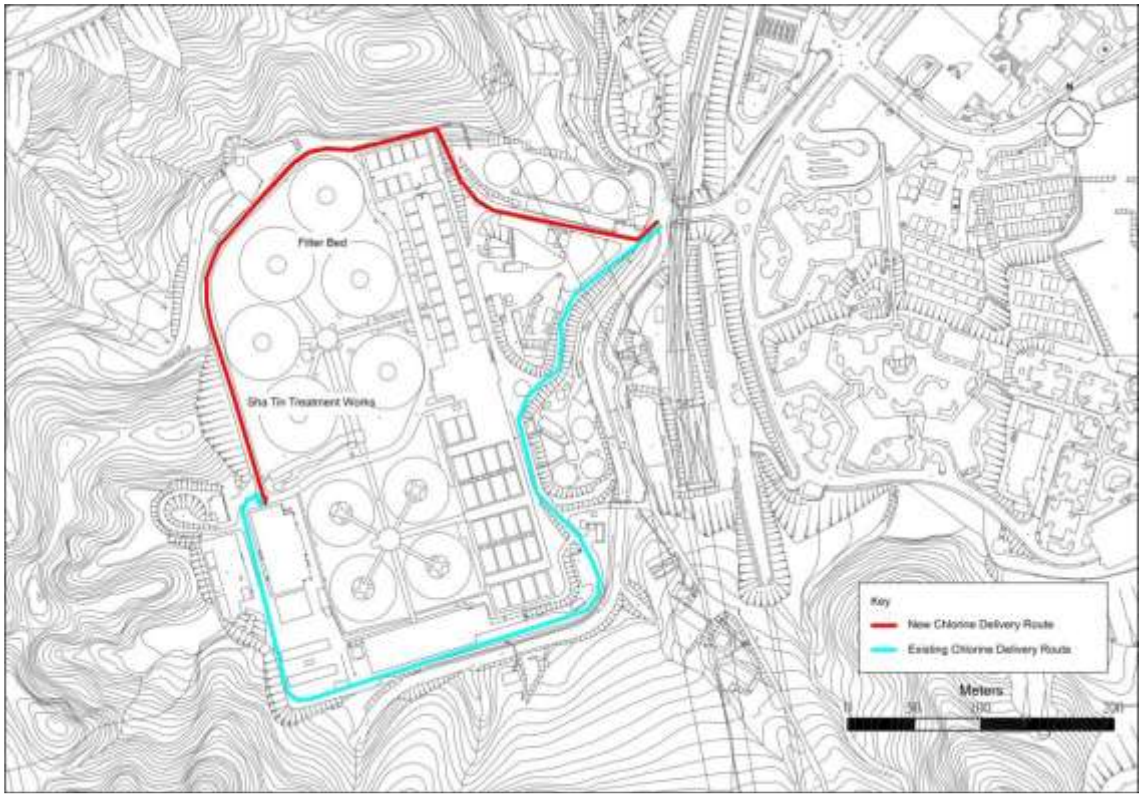
Table 2-15: Chlorine Truck Transport Route

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, five (5) site inspections were carried out on 1, 7, 13, 22 and 29 December 2021.

2.8.2 One joint site inspection with IEC also undertaken on 22 December 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
1 December 2021	It is observed that untreated wheel wash water might accidentally flow into discharge channel near WET. Contractor is reminded to block the discharge channel to avoid such scenarios.	The discharge channel is blocked.
7 December 2021	No environmental issue was observed during the site inspection.	N/A
13 December 2021	No environmental issue was observed during the site inspection.	N/A
22 December 2021	No environmental issue was observed during the site inspection.	N/A
24 November 2021	Water retained at the tarpaulin near the clarifier. Contractor is reminded to remove retained water.	Retained water is being removed.

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

2.9. ENVIRONMENTAL LICENSES AND PERMITS

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

Table 2-17: Summary of Environmental License and Permit

License / Permit	License / Permit No.	Date of Issue	Date of Expiry	License / Permit Holder	Remark
Environmental Permit	EP- 494/2015	28/01/2015	N/A	WSD	
Notification of Construction Works under the Air Pollution Control (Construction Dust) Regulation (Form NA)	Reference No: 458807	10/8/2020	N/A	ACMJV	
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 Licence	WT00037213-2020	19/1/2021	31/1/2026	ACMJV	
Construction Noise Permit	GW-RN0584-21	13/8/2021	18/2/2022	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

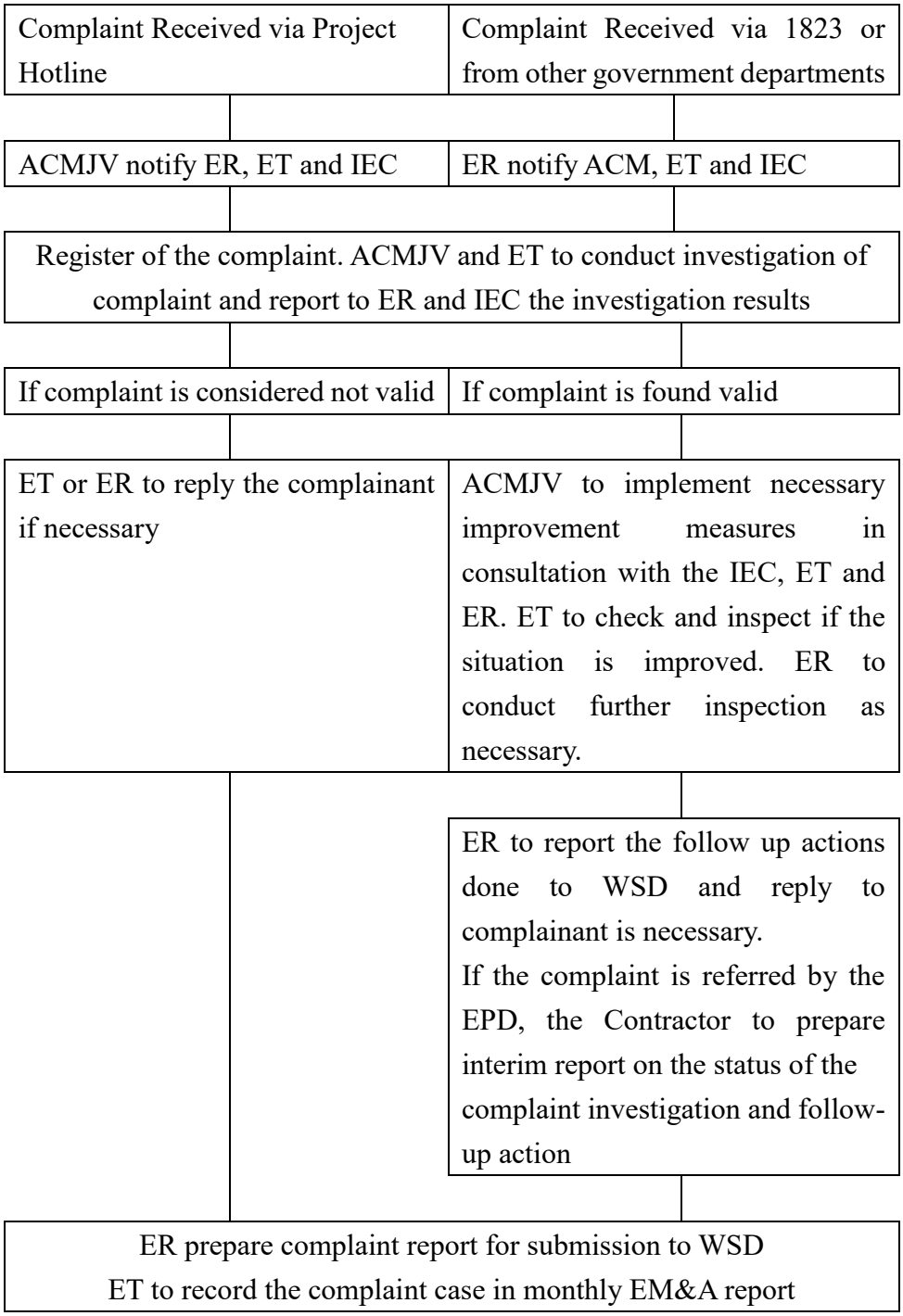
2.11.1 Results for 1-hour TSP and noise monitoring complied with the Action/ Limit levels in the reporting period. Results for water quality monitoring mostly complied with the Action/ Limit levels in the reporting period.

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 was received in the reporting period.

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

2.12.4 EPD visit was carried out on 1 and 14 December 2021 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 January 2022 to March 2022 will be:

- M1-M5 Water Main Diversion
- Washwater Equalization Tank (WET)- Excavation Works
- Demolition of Chemical Building, Filter Bed, Aluminum Tank
- Excavation work on WET area
- DN1200 drainage work in Administration Building - drainage pile laying
- Tree felling, transplantation, and landscape works
- MIC office Construction
- Remove Asbestos
- Pipe pile work at Stage 1 Filter, Stage 2 Filter, RMF, SWPS, Ozone.
- Excavation Work at SWPS and Stage 1 Filter

3.2. KEY ISSUES FOR COMING MONTH

3.2.1 Potential environmental impacts arising from the above upcoming construction activities in January 2022 are mainly associated with dust, noise, water quality issues and waste management issues.

3.2.2 The tentative monitoring schedule for January 2022 to March 2022 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. Most of the monitoring results are satisfactory, 3 exceedances of action level of suspended solids for water monitoring results in the reporting month were found exceeded and NOEs were therefore issued.

4.1.2 Five (5 nos.) environmental site inspections were conducted during the reporting period. Joint site inspection with IEC were carried out on 22 December 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

E **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 Dec 2021

Project Manager
WSD

Project Manager's
Delegate Representative

Construction Manager
TBC

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. Vega Wong
Mobile: 6113 2368

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

Works Manager
(Civil & Structural)
Mr. Calvin Hui
Mobile: 9318 6693

Environmental Officer
Mr. Yip Yun Lam
Mobile: 9532 7174

Environmental Consultant
Ms. YiTing Choy
Mobile: 9143 5086

Project Manager
Mr. Christopher Ho
Mobile: 9322 4514

Sub-Agent
Mr. Roger Chang Mr. Rock Chu Mr. Gordon Li
Mobile: 9015 9059 6480 8665 6016 6130

Assistant Environmental
Officer
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Qualified Ecologist
Mr. Pak-Ho Wan, Jay
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Engineer (ELL)
Mr. Henry Tsang Mr. Louie Yeung
9418 5514 6771 1577

Engineer (MCL)

Mr. Billy Tong Mr. Eric Siu
6359 0494 9121 5622

Mr. Herman Tang
6277 6515

Superintendent
Mr. Wong Yat Hong Mr. Lam Wai Hon
9640 8057 9868 3194

Senior Engineer
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G. Foreman
Mr. Calvin Ho Mr. Chan Ka Leung
5565 2513 9319 7706
Mr. Chan Wai Yung
9868 3194

Site Engineer
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Mobile: 6777 4936 9040 4078

Mr. George Wong Mr. Andy To
6436 6828 6354 3628

Environmental Supervisor

Roger Chang
Mobile : 9015 9059

Mr. Calvin Ho
Mobile: 5565 2513

Senior Forman
Mr. Chiu Wai Man Mr. Lee Foo Yung
Mobile: 9780 8168 5691 4386

Graduated Engineer
Mr. Ryan Tam Mr. Adam Lai
6628 4802 6117 6387

Mr. Michael Tai Mr. Kyle Lo
9273 1350 9011 8779

Mr. Alfred Lin
9188 0821

Foreman
Mr. Cheung Chong Ying Mr. Sony, Chan Chun Chau
Mobile:9456 9883 6422 1123
Mr. Wong Ying Choi
9623 6957

Assistant Foreman
Mr. Wong Chun Him
Mobile:5410 3416

Site Supervisor
Mr. Yam Kim Pang
Mobile: 9446 2998

Technical Apprentice
Mr. Lee Chi Shing Mr. Wong Ho Hin
Mobile: 6859 2631 6847 4497

Sub-Con. Rep's.

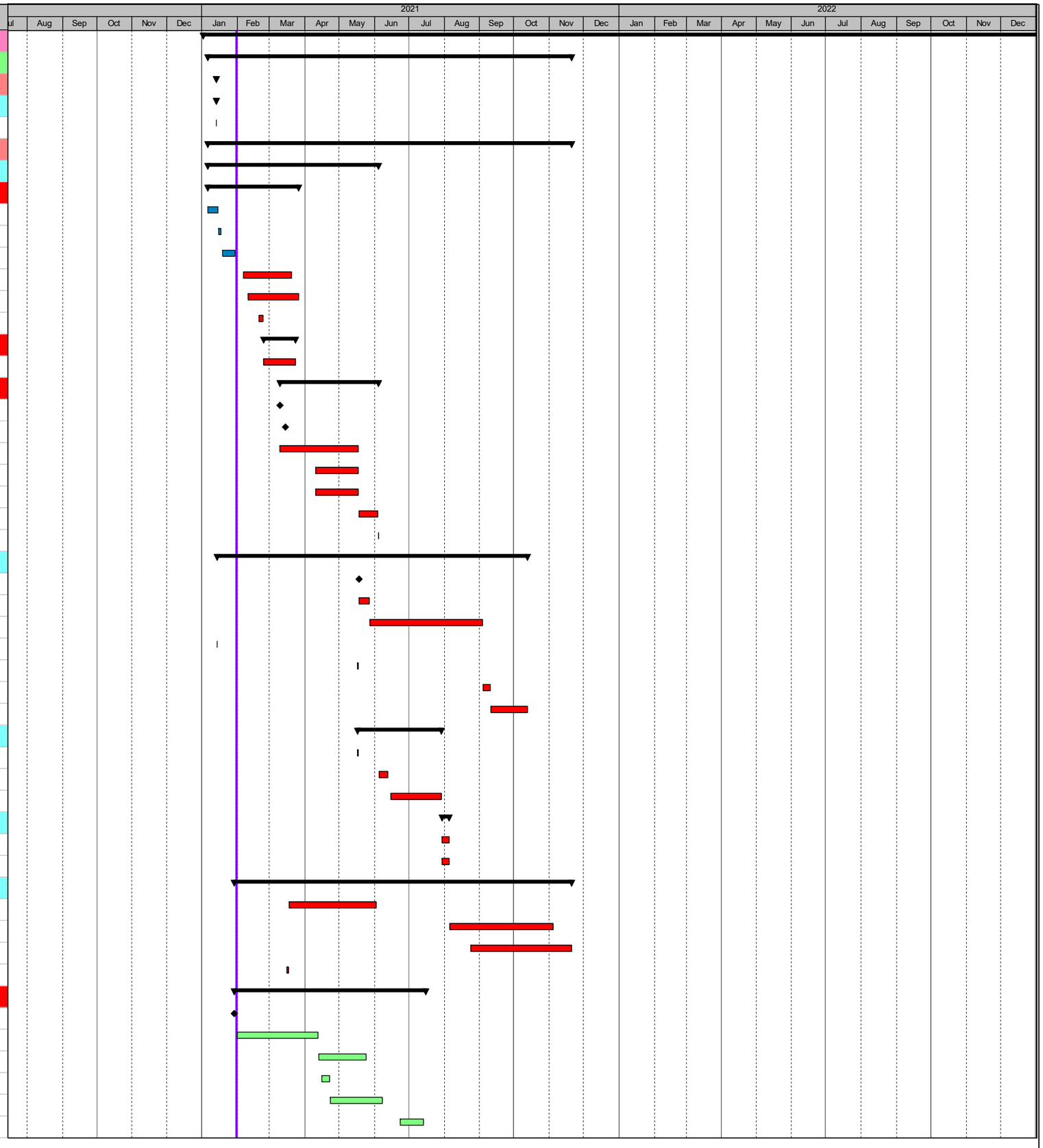
Dickie's	Mly	Harvest	Sung Wah	Wing Wo	Wing Hing Ironware	Toyo Greenland	City landscape
Mr. Chan Lok Fung	Mr. Joseph Ng	Mr. Chan Chi Kuen	Mr. Chan Kuen Por	Mr. Ben Chung	Mr. Barry Cheng	Ms. Yannis Chow	Mr. Mick Tong
Mobile: 9081 3715	6851 8202	6851 8202	9558 3776	6480 7623	9886 7788	3760 1918	9444 1738

易特	宏基	Wise	Kai Cheuk. Engineering	Lai Ming	Teemway
Ray Tse	Mr. Leung Tat Yin	Mr. Tong Kam Man	Mr.Lee Ying Tung	Timothy Leung	Mr. Chan Wan Chuen
Mobile: 9016 0667	6222 9655	9371 7876	6880 1111	9231 7779	9054 7420

UBW	集運
Mr. Law Chi Yan	Mr. Chow
6888 0666	9026 6423

Appendix C
Latest Construction Programme

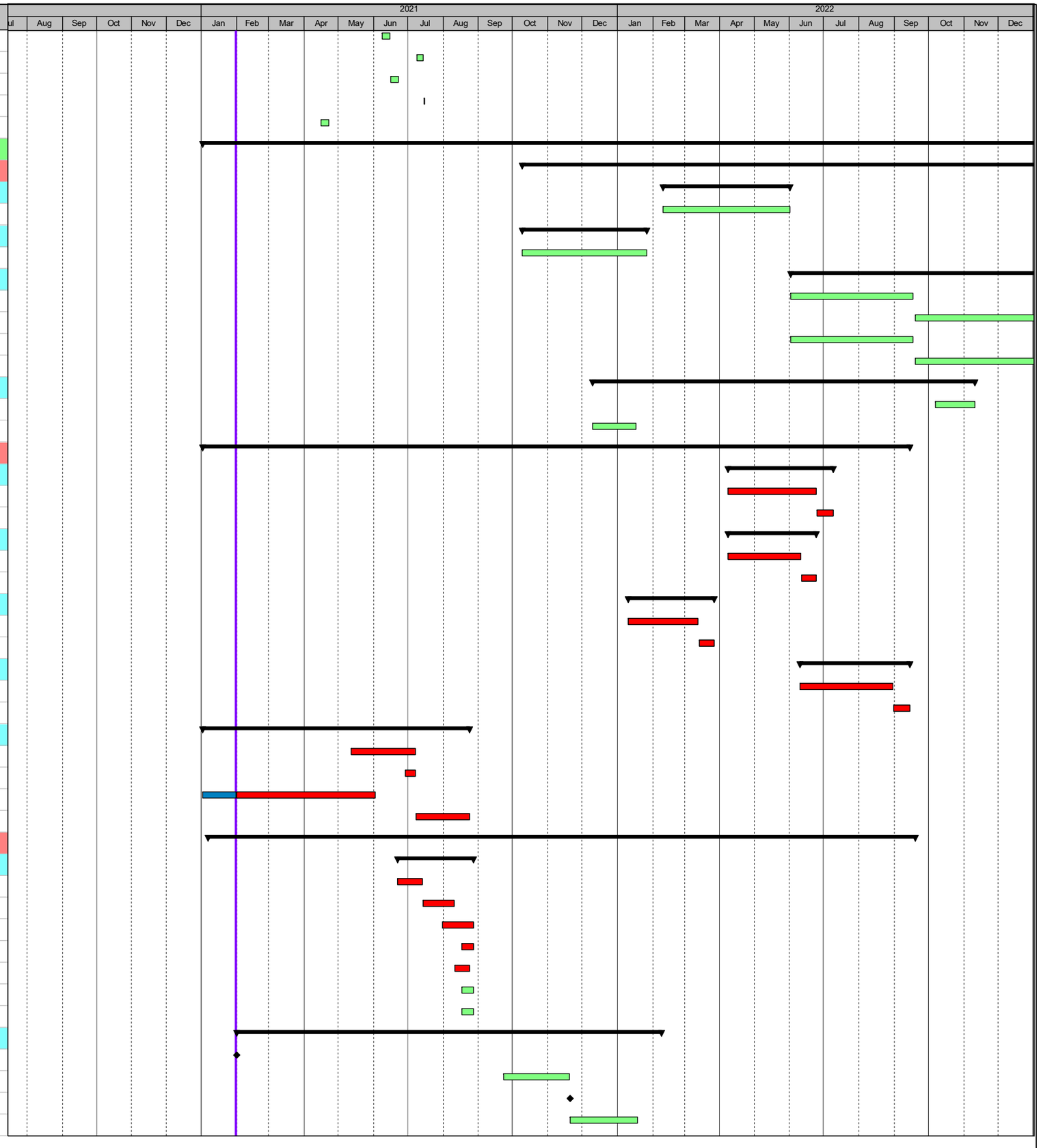
Activity ID	Activity Name	Original Duration	Start	Finish
Contract No. 1/WSD/19 - Monthly Update (Aug-21) Submissiton		639	02-Jan-21 A	15-Mar-23
Section 1 - Relocation of DG Stores, Site formation for new Administration Building		257	06-Jan-21 A	20-Nov-21
Statuory Submissions		7	14-Jan-21 A	14-Jan-21 A
Temp DG - FSD Submission prior to DG Installation		7	14-Jan-21 A	14-Jan-21 A
119.DG.SUB.10000	Temp. DG Store - FSD - Submission for DG Installation	7	14-Jan-21 A	14-Jan-21 A
Sec 1.1 - Relocation of DG Stores		257	06-Jan-21 A	20-Nov-21
Construction of New Temp. DG Store		117	06-Jan-21 A	04-Jun-21
Structure Construction		63	06-Jan-21 A	26-Mar-21
119.DG.SUP.10012	Temp. DG Stores - G/F slab upto +27.8mPD	12	06-Jan-21 A	15-Jan-21 A
119.DG.SUP.10014	Temp. DG Stores - Scaffolding erection	6	16-Jan-21 A	18-Jan-21 A
119.DG.SUP.10016	Temp. DG Stores - Construct walls and slab up to R/F	12	19-Jan-21 A	30-Jan-21 A
119.DG.SUP.10018	Temp. DG Stores - Laying of Waterproofing	31	06-Feb-21	20-Mar-21
119.DG.SUP.10020	Temp. DG Stores - Leakage test	33	10-Feb-21	26-Mar-21
119.DG.SUP.10022	Temp. DG Stores - Dismantle Scaffolding	3	20-Feb-21	23-Feb-21
ABWF & E&M Works		24	24-Feb-21	23-Mar-21
119.DG.ABWF.10000	Temp. DG Stores - ABWF works	24	24-Feb-21	23-Mar-21
Temp DG - E&M Works		69	10-Mar-21	04-Jun-21
119.DG.MEP.10000	Temp. DG Stores - Handover for E&M Installation - A1, A2	0	10-Mar-21	
119.DG.MEP.10001	Temp. DG Stores - Handover for E&M Installation - A3, B, C, D	0	15-Mar-21	
119.DG.MEP.10002	Temp. DG Stores - BS Electrical Installation	54	10-Mar-21	17-May-21
119.DG.MEP.10006	Temp. DG Stores - FS Installation	31	10-Apr-21	17-May-21
119.DG.MEP.10008	Temp. DG Stores - MVAC Installation	31	10-Apr-21	17-May-21
119.DG.MEP.10050	Temp. DG Stores - Submission and Approval T&C Procedure	14	18-May-21	03-Jun-21
119.DG.MEP.10052	Temp. DG Stores - T&C	1	04-Jun-21	04-Jun-21
DG Inspection		217	14-Jan-21 A	12-Oct-21
119.CE0013.1000	NCE-0013: Issued NCE-0013 to AECOM	0	18-May-21	
119.CE0013.1010	NCE-0013: Addressing the comments and submission to FSD	8	18-May-21	27-May-21
119.CE0013.1020	NCE-0013: FSD Approval for DG Inspection	83	28-May-21	03-Sep-21
119.DG.MEP.10009	Temp. DG Stores - Application of DG License	1	14-Jan-21 A	14-Jan-21 A
119.DG.MEP.10014	Temp. DG Stores - Report to FSD for DG Inspection	1	17-May-21	17-May-21
119.DG.MEP.10018	Temp. DG Stores - DG Inspection and additional Work DG Store(PMI)	6	04-Sep-21	10-Sep-21
119.DG.MEP.10022	Temp. DG Stores - Issuance of DG License by FSD	25	11-Sep-21	12-Oct-21
FSI Inspection		61	17-May-21	29-Jul-21
119.DG.MEP.10012	Temp. DG Stores - Submit FSI/314 and FSI/501	1	17-May-21	17-May-21
119.DG.MEP.10016	Temp. DG Stores - Fire Service Inspection and additional work for DG Store (PMI)	7	05-Jun-21	12-Jun-21
119.DG.MEP.10020	Temp. DG Stores - Issue Fire Cert 172	38	15-Jun-21	29-Jul-21
Relocate and Demolish Existing DG Store		6	30-Jul-21	05-Aug-21
119.DG.REL.10000	Relocate DG store material to new temp. DG store	6	30-Jul-21	05-Aug-21
119.DG.REL.10002	Preparation and Demolition works of the Existing DG Store	6	30-Jul-21	05-Aug-21
Site formation for new Administration Building		235	29-Jan-21 A	20-Nov-21
119.ADB.10000	Tree felling / Tree transplant	60	18-Mar-21	02-Jun-21
119.ADB.10002	Sheet Pile Construction (383 nos,) - Including NCE 20 - Unforeseeable Boulder and Rock	75	06-Aug-21	04-Nov-21
119.ADB.10004	Site formation at future Administration Buillding Area (Existing DG Stores area) (21716m3 @ 300 m3/d)	74	24-Aug-21	20-Nov-21
119.ADB.10006	Tree felling / Tree transplant - Lands Department submission and approval	2	16-Mar-21	17-Mar-21
CLP / HKT / Other utilities diversion for Administration Building area site formation (PMI No. 0003)		128	29-Jan-21 A	15-Jul-21
119.PMI003.10000	PMI No. 0003 received	0	29-Jan-21 A	
119.PMI003.10002	Preparation Work	51	01-Feb-21	12-Apr-21
119.PMI003.10004	UU detection & report submission	34	13-Apr-21	24-May-21
119.PMI003.10010	Site clearance and vegeterian removal	6	16-Apr-21	22-Apr-21
119.PMI003.10015	Site Preparation Work	37	23-Apr-21	07-Jun-21
119.PMI003.10016	Trench excavation , cable duct laying and drawpit construction (120m @ 5 m/d)	17	23-Jun-21	13-Jul-21



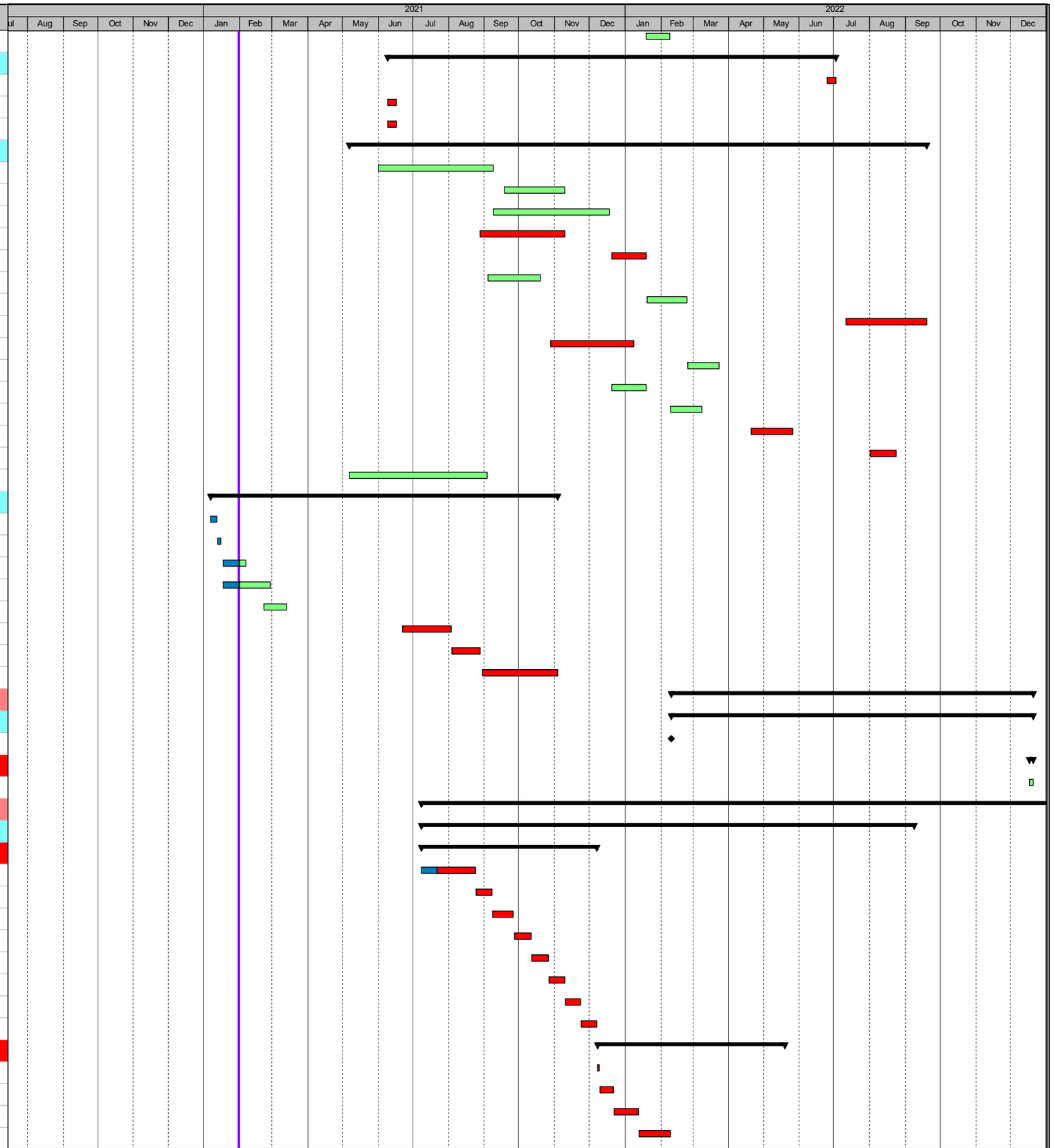
1/WSD/19 In-Situ Reprovisioning of Sha Tin Water Treatment Works (South Works) - Water Treatment Works and Ancillary Facilities
Months Rolling Programme (August-21)

◆ Milestone | Critical Work | Actual Work | Summary | Works

Activity ID	Activity Name	Original Duration	Start	Finish
119.PMI003.10018	Trench excavation , cable duct laying and drawpit construction (1st Road Crossing) (18m @ 1 m/d)	6	08-Jun-21	15-Jun-21
119.PMI003.10024	Cable laying	5	09-Jul-21	14-Jul-21
119.PMI003.10026	Trench excavation , cable duct laying and drawpit construction (2nd Road Crossing) (18m @ 1 m/d)	6	16-Jun-21	22-Jun-21
119.PMI003.10028	Backfilling & reinstatement	1	15-Jul-21	15-Jul-21
119.PMI003.10030	Trial pit excavation	6	16-Apr-21	22-Apr-21
Section 2 - Const new plant in Portion A&B, E&M in portion H, Pipeline diversion M1 to M5		629	02-Jan-21 A	15-Mar-23
Statuory Submissions		366	09-Oct-21	06-Jan-23
Building 1 - 4 - FSD Submission prior to Fire Services Installation		90	10-Feb-22	01-Jun-22
119.SUB.1020	FSD - Submission of GBP with VAC Layout Plan	90	10-Feb-22	01-Jun-22
Building 1 - 4 - FSD DG License Submission Prior to DG Installation (Ozone Building)		90	09-Oct-21	26-Jan-22
119.SUB.1050	FSD - Submission for DG Installation	90	09-Oct-21	26-Jan-22
Building 1 - 4 - WSD Submission prior to PD/FS Installation		180	02-Jun-22	06-Jan-23
119.SUB.1000	WSD - WSD WWO542 Submission (for FS Water)	90	02-Jun-22	17-Sep-22
119.SUB.1005	WSD - WSD WWO46 Part I & Part II Submission (for FS Water)	90	19-Sep-22	06-Jan-23
119.SUB.1010	WSD - WSD WWO542 Submission (for Plumbing)	90	02-Jun-22	17-Sep-22
119.SUB.1040	WSD - WSD WWO46 Part I & Part II Submission (for Plumbing)	90	19-Sep-22	06-Jan-23
Building 1 - 4 - EPD Submission prior to Chimney Installation		268	10-Dec-21	10-Nov-22
119.SUB.2000	EPD - Submission for Approval of Installation of Chimney (SWPS)	30	07-Oct-22	10-Nov-22
119.SUB.2010	EPD - Submission for Approval of Installation of Chimney (OZB)	30	10-Dec-21	17-Jan-22
Pipe Pile Wall Construction		472	02-Jan-21 A	14-Sep-22
Cofferdam (Stage 2 Filters)		73	08-Apr-22	09-Jul-22
119.COF.S2.10000	Stage 2 Filters - Install pipe pile & Grouting (183 no. @ 1.5 pile/day) - 2 Teams ; 24 King Post @ 3 days/post - 2 teams	61	08-Apr-22	24-Jun-22
119.COF.S2.10002	Cofferdam (Stage 2 Filters) - Sensitive Pumping Test	12	25-Jun-22	09-Jul-22
Cofferdam (South Work Pumping Station) & Cofferdam for Delivery Main		61	08-Apr-22	24-Jun-22
119.COF.SWPS.10000	SWPS- Install pipe pile & Grouting - (73 no. @ 1.5 pile/day) - 1 team; 11 King Post @ 3 days/post - 1 team	49	08-Apr-22	10-Jun-22
119.COF.SWPS.10006	Cofferdam (SWPS) - Sensitive Pumping Test	12	11-Jun-22	24-Jun-22
Cofferdam (Stage 1 Filters)		60	10-Jan-22	26-Mar-22
119.COF.S1.10000	Stage 1 Filters - Install pipe pile & Grouting - (98 no. @ 1.5 pile/day) - 2 teams; 16 King Post @ 3 days/post - 1 teams	48	10-Jan-22	12-Mar-22
119.COF.S1.10002	Cofferdam (Stage 1 Filters) - Sensitive Pumping Test	12	14-Mar-22	26-Mar-22
Cofferdam (Flocculation and Sedimentation Tanks , Ozone Building, Residual Management Facilities)		81	10-Jun-22	14-Sep-22
119.COF.OTHER.10000	F&S Tanks, Ozone Bldg, Res.Man.Fac - Install pipe pile & Grouting - (206 no. @ 1.5 pile/day) - 2 teams; 10KP-1 team	69	10-Jun-22	30-Aug-22
119.COF.OTHER.10002	Cofferdam (Flocculation & Sedimenatation Tanks,Ozone Bldg, Residual Management Facilities) - Sensitive Pumping Test	12	31-Aug-22	14-Sep-22
Cofferdam (Washwater Equalization Tanks)		162	02-Jan-21 A	24-Aug-21
119.COF.WET.10002	Cofferdam (Washwater Equalization Tanks) - Install pipe pile & Grout Curtain Installation	46	12-May-21	07-Jul-21
119.COF.WET.10004	King Post Installation (Wash Water Equalisation Tanks)	7	29-Jun-21	07-Jul-21
119.NCE.10002	NCE 007 - Uncharted Cable Diversion	118	02-Jan-21 A	02-Jun-21
119.PMI. 10010	PMI Item : UU detection and Utility Relocation	41	08-Jul-21 A	24-Aug-21
Decommissioning, Shut Down & Relocation of Works		488	07-Jan-21 A	19-Sep-22
Shut Down of South Works		57	22-Jun-21	27-Aug-21
119.DISCON.10000	Disconnect Filtered Water Tank	18	22-Jun-21	13-Jul-21
119.DISCON.10002	Disconnect SW air receiver from Air Compressor at NW Pumping Station	24	14-Jul-21	10-Aug-21
119.DISCON.10004	Abandon Washwater Pump inside SW Pumping Station	24	31-Jul-21	27-Aug-21
119.DISCON.10006	Remove Existing Dosing Pipes from Chemical House	10	17-Aug-21	27-Aug-21
119.DISCON.10008	Relocate Air Compressors at SW Filter Gallery for NW Surge Vessels	12	11-Aug-21	24-Aug-21
119.DISCON.10010	Disconnect SW Raw Water Channel at Raw Water Dividing Chamber	10	17-Aug-21	27-Aug-21
119.DISCON.10012	Disconnect Sludge Pipe at existing Sludge Collect Chamber	10	17-Aug-21	27-Aug-21
Relocation of Existing Emergency Power Generator for Chlorination House		294	01-Feb-21	08-Feb-22
119.EPG.10000	Handover existing M&E Workshop area (by Client)	0	01-Feb-21	
119.EPG.10002	Construct New Steel Shed for Emergency Power Generator	48	23-Sep-21	19-Nov-21
119.EPG.10004	Handover Steel Shed for E&M Installation	0	20-Nov-21	
119.EPG.10006	Installation of Building Services and Electrical Works	48	20-Nov-21	18-Jan-22

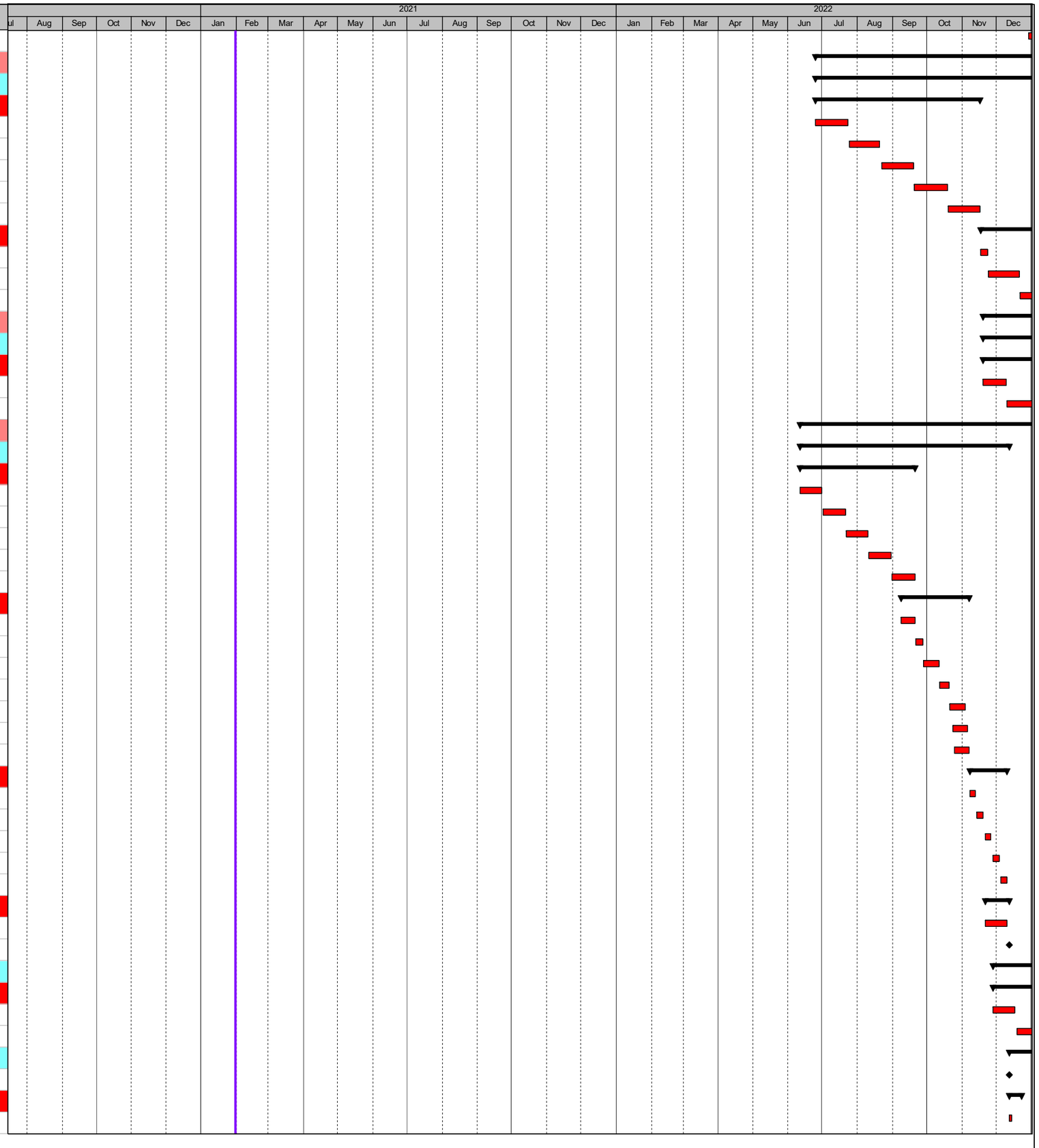


Activity ID	Activity Name	Original Duration	Start	Finish
119.EPG.10008	Relocation of the Existing Genset to Chlorine Building & Resume operation	12	19-Jan-22	08-Feb-22
Perservation and Relocation of Antique Objects		312	09-Jun-21	02-Jul-22
119.PRAO.10000	Relocation of Antique Object at South Work Filter Bed (Meter and Control panel and Etc.)	6	25-Jun-22	02-Jul-22
119.PRAO.10002	Relocation of Antique Object at South Work Pumping Station (Meter and Control panel and Etc.)	6	09-Jun-21	16-Jun-21
119.PRAO.10004	Relocation of Antique Object at Chemical Hosue (Dosing Unit, Pump , etc.)	6	09-Jun-21	16-Jun-21
Demolition of Major Existing Facilities		405	07-May-21	19-Sep-22
119.DEMOL.10000	Washwater Equalization Tank-Pipe Laying for Washwater Pipes - 1/2 Portion	84	01-Jun-21	08-Sep-21
119.DEMOL.10002	Demolition of Existing Alum Saturation Tanks	42	18-Sep-21	09-Nov-21
119.DEMOL.10004	Washwater Equalization Tank-Pipe Laying for Washwater Pipes - 2/2 Portion	84	09-Sep-21	18-Dec-21
119.DEMOL.10006	Preparation and Demolition of Existing Clarifiers No. 2, No.3 , No. 4	60	28-Aug-21	09-Nov-21
119.DEMOL.10008	Demolish existing South Works Pump Station	24	20-Dec-21	19-Jan-22
119.DEMOL.10010	Demolition of Existing M&E Workshop	36	04-Sep-21	19-Oct-21
119.DEMOL.10012	Demolish part of existing Main Pump Sump	24	20-Jan-22	23-Feb-22
119.DEMOL.10014	Demolition of Existing South Work Filter Beds	60	11-Jul-22	19-Sep-22
119.DEMOL.10016	Demolition of Existing Chemical House	60	28-Oct-21	08-Jan-22
119.DEMOL.10018	Demolition of Existing Raw Water Channel	24	24-Feb-22	23-Mar-22
119.DEMOL.10019	Demolition of Existing Sampling Room	24	20-Dec-21	19-Jan-22
119.DEMOL.10020	Demolition of Existing Emergency Generator for Chlorine House	24	09-Feb-22	08-Mar-22
119.DEMOL.10022	Decommissioning of M&E utilities for demolition of Existing Temp. Washwater Recovery Tanks	30	20-Apr-22	26-May-22
119.DEMOL.10024	Demolition of Existing Temp. Washwater Recovery Tanks	20	01-Aug-22	23-Aug-22
119.NCE023.10000	Delay of Handover of M&E WorkShop	100	07-May-21	03-Sep-21
Isolation of Clarifiers		232	07-Jan-21 A	03-Nov-21
119.ISOCLA.10004	Mass wall construction to close up the void	12	07-Jan-21 A	12-Jan-21 A
119.ISOCLA.10006	Stage 2 - Construction of RC walls for Settled Water Isolation (Wall 1 & 2) - Stage 2	12	13-Jan-21 A	16-Jan-21 A
119.ISOCLA.10008	Stage 2 - Defect repairing of wall 1 & 2 and grouting mass wall - Partly Settled Water Channel	12	18-Jan-21 A	06-Feb-21
119.ISOCLA.10010	STWTW request to reinstate opening from 1500x1500mm into 900x900mm with 150mm height kerb with hinged cover	30	18-Jan-21 A	27-Feb-21
119.ISOCLA.10012	Stage 3 - Construction of RC walls for Settled Water Isolation (Wall 6 & 7) - Raw Water Channel	18	22-Feb-21	13-Mar-21
119.ISOCLA.10014	Stage 4 - Construction of RC walls for Settled Water Isolation (Wall 3,4,5,8,9)	36	22-Jun-21	03-Aug-21
119.ISOCLA.10016	Stage 5- Disconnect SW & NW settled water channel / raw water channel	22	04-Aug-21	28-Aug-21
119.ISOCLA.10018	Isolate Clarifiers No.2, No.3 and No.4	54	30-Aug-21	03-Nov-21
Flowmeter House		258	10-Feb-22	20-Dec-22
Flowmeter House - M&E Works		258	10-Feb-22	20-Dec-22
119.FMH.MEP.10000	Flowmeter House - Handover of Flowmeter House for E&M Installation (Tentative)	0	10-Feb-22	
Flowmeter House - Delivery to Installation Area		3	17-Dec-22	20-Dec-22
119.FMH.MEP.10002	Flowmeter House - Delivery for Installation - Other Plants and Materials for Electrical Works (EM 3.1.1(2))	3	17-Dec-22	20-Dec-22
Washwater Equalization Tanks		484	08-Jul-21 A	15-Mar-23
Washwater Equalization Tanks - Structure		334	08-Jul-21 A	08-Sep-22
Excavation & ELS		116	08-Jul-21 A	07-Dec-21
119.WET.ELS.10000	Washwater Equilization Tank - Excav & Install ELS & Plate Loading Test - S1	12	08-Jul-21 A	24-Aug-21
119.WET.ELS.10002	Washwater Equilization Tank - Excav & Install ELS & Plate Loading Test - S2	12	25-Aug-21	07-Sep-21
119.WET.ELS.10004	Washwater Equilization Tank - Excav & Install ELS & Plate Loading Test - S3	15	08-Sep-21	25-Sep-21
119.WET.ELS.10006	Washwater Equilization Tank - Rock excavation 1st layer	12	27-Sep-21	11-Oct-21
119.WET.ELS.10008	Washwater Equilization Tank - Rock excavation 2nd layer	12	12-Oct-21	26-Oct-21
119.WET.ELS.10010	Washwater Equilization Tank - Rock excavation 3rd layer	12	27-Oct-21	09-Nov-21
119.WET.ELS.10012	Washwater Equilization Tank - Rock excavation 4th layer	12	10-Nov-21	23-Nov-21
119.WET.ELS.10014	Washwater Equilization Tank - Rock excavation final layer	12	24-Nov-21	07-Dec-21
Substructure		125	08-Dec-21	19-May-22
119.WET.SUB.10000	Washwater Equilization Tank - Blinding layer to sump pit + Base slab	2	08-Dec-21	09-Dec-21
119.WET.SUB.10002	Washwater Equilization Tank - Base slab (Tank) + kicker	10	10-Dec-21	21-Dec-21
119.WET.SUB.10004	Washwater Equilization Tank - Base slab (pump room + stairs)	16	22-Dec-21	12-Jan-22
119.WET.SUB.10006	Washwater Equilization Tank - 1st pour (3m) + kicker	18	13-Jan-22	09-Feb-22

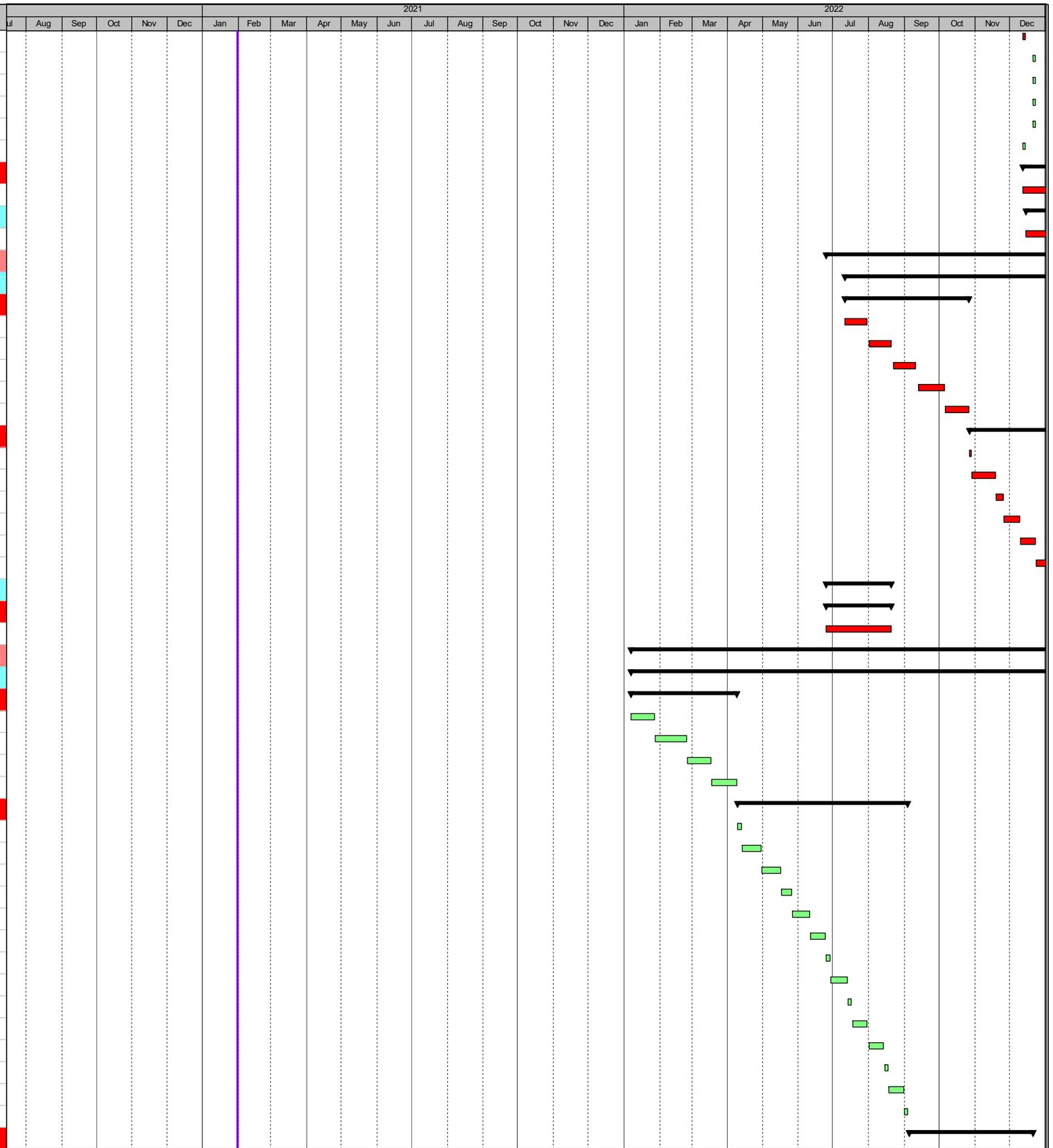


Activity ID	Activity Name	Original Duration	Start	Finish
119.WET.SUB.10008	Washwater Equilization Tank - 2nd pour wall (6m)	18	10-Feb-22	02-Mar-22
119.WET.SUB.10010	Washwater Equilization Tank - 3rd pour wall (6m) + G/F slab	24	04-Mar-22	31-Mar-22
119.WET.SUB.10012	Washwater Equilization Tank - Formwork removal & defects	12	01-Apr-22	19-Apr-22
119.WET.SUB.10014	Washwater Equilization Tank - Water test (Tank 1)	8	20-Apr-22	28-Apr-22
119.WET.SUB.10016	Washwater Equilization Tank - Water test (Tank 2)	8	29-Apr-22	10-May-22
119.WET.SUB.10018	Washwater Equilization Tank - Water test (Tank 1 & 2)	8	11-May-22	19-May-22
Superstructure		93	20-May-22	08-Sep-22
119.WET.SUP.10000	Washwater Equilization Tank - Scaffolding erection +24mPD to +27.4mPD	6	20-May-22	26-May-22
119.WET.SUP.10002	Washwater Equilization Tank - Formwork and rebar fixing for walls +24mPD to +27.4mPD	18	27-May-22	17-Jun-22
119.WET.SUP.10004	Washwater Equilization Tank - Concreting for walls (up to +27.4mPD)	2	17-Jun-22	18-Jun-22
119.WET.SUP.10006	Washwater Equilization Tank - Formwork and rebar fixing for floor slab (+27.4mPD)	18	20-Jun-22	11-Jul-22
119.WET.SUP.10008	Washwater Equilization Tank - Concreting for floor slab (+27.4mPD)	2	12-Jul-22	13-Jul-22
119.WET.SUP.10010	Washwater Equilization Tank - Scaffolding erection +27.4mPD to +31mPD (Roof)	6	14-Jul-22	20-Jul-22
119.WET.SUP.10012	Washwater Equilization Tank - Formwork and rebar fixing for walls +27.4mPD to +31mPD (Roof)	18	21-Jul-22	10-Aug-22
119.WET.SUP.10014	Washwater Equilization Tank - Concreting for walls (up to +31mPD) (Roof)	2	10-Aug-22	11-Aug-22
119.WET.SUP.10016	Washwater Equilization Tank - Formwork and rebar fixing for Roof slab (+31mPD)	18	12-Aug-22	01-Sep-22
119.WET.SUP.10018	Washwater Equilization Tank - Concreting for Roof slab (+31mPD)	2	02-Sep-22	03-Sep-22
119.WET.SUP.10020	Washwater Equilization Tank - Apply waterproofing	3	05-Sep-22	07-Sep-22
119.WET.SUP.10022	Washwater Equilization Tank - Completion of Civil Structure for E&M Installation	0	08-Sep-22	
Washwater Equalization Tanks - M&E Works		255	05-May-22	15-Mar-23
119.WET.MEP.10002	Washwater Equilization Tank - Handover of Washwater Equalization Tanks for E&M works (Temp. Operation)	0	20-May-22	
119.WET.MEP.10008	Washwater Equilization Tank - Handover of Washwater Equalization Tanks for E&M works	0	08-Sep-22	
Washwater Equalization Tanks - Delivery to Installation Area		190	05-May-22	19-Dec-22
119.WET.MEP.10000	Washwater Equilization Tank - Delivery for Installation - Pump, Pipeworks, LV switchgears and MCP for Temp. Operation	3	05-May-22	07-May-22
119.WET.MEP.10010	Washwater Equilization Tank - Delivery for Installation - LALG	3	08-Sep-22	10-Sep-22
119.WET.MEP.10014	Washwater Equilization Tank - Delivery for Installation - Penstocks	3	23-Sep-22	26-Sep-22
119.WET.MEP.10016	Washwater Equilization Tank - Delivery for Installation - Washwater Transfer Pump (EM 1.3.19.4)	3	16-Dec-22	19-Dec-22
119.WET.MEP.10018	Washwater Equilization Tank - Delivery for Installation - Other Plants and Materials for Electrical Works (EM 3.1.1)	3	19-Oct-22	21-Oct-22
119.WET.MEP.10022	Washwater Equilization Tank - Delivery for Installation - Recirculation Pumps (EM 1.3.19.4)	3	16-Dec-22	19-Dec-22
119.WET.MEP.10026	Washwater Equilization Tank - Delivery for Installation - Other Plants and Materials for BS Works (EM 4)	3	16-Dec-22	19-Dec-22
Washwater Equalization Tanks - Installation		243	20-May-22	15-Mar-23
119.WET.MEP.10004	Washwater Equilization Tank - Installation of Pump, Pipeworks, LV switchgears and MCP for Temp. Operation	45	20-May-22	13-Jul-22
119.WET.MEP.10006	Washwater Equilization Tank - Test and Ready for Temp. Operation	15	14-Jul-22	30-Jul-22
Washwater Equalization Tanks - Installation - Mechanical		147	13-Sep-22	15-Mar-23
119.WET.MEP.10012	Washwater Equilization Tank - Installation of LALG (1 set/gang/80 days)	84	13-Sep-22	21-Dec-22
119.WET.MEP.10024	Washwater Equilization Tank - Installation of Penstocks (1 set/gang/60 days)	63	22-Dec-22	15-Mar-23
Washwater Equalization Tanks - Installation - Electrical		63	22-Oct-22	06-Jan-23
119.WET.MEP.10020	Washwater Equilization Tank - Installation of Cable Containments - Stage 1 (1 set/gang/60 days)	63	22-Oct-22	06-Jan-23
Washwater Equalization Tanks - Setting to Work and Equipment Individual Tests		20	22-Dec-22	17-Jan-23
Washwater Equalization Tanks - Individual Tests - Mechanical		20	22-Dec-22	17-Jan-23
119.WET.TEST.10000	Washwater Equilization Tank - Individual Tests (IT) - Lifting Appliance (EM 6.9.13)	20	22-Dec-22	17-Jan-23
Flocculation and Sedimentation Tanks		96	15-Sep-22	10-Jan-23
Western Half of Flocculation & Sedimentation Tank Structure		96	15-Sep-22	10-Jan-23
Flocculation & Sedimentation Tank (Western Half) - Excavation and ELS		54	15-Sep-22	18-Nov-22
119.FST.ELS.10000	Flocc & Sed Tanks (Western Half) - Excav & Install ELS & Plate Loading Test - S1	18	15-Sep-22	07-Oct-22
119.FST.ELS.10002	Flocc & Sed Tanks (Western Half) - Excav & Install ELS & Plate Loading Test - S2	18	08-Oct-22	28-Oct-22
119.FST.ELS.10004	Flocc & Sed Tanks (Western Half) - Excav & Install ELS & Plate Loading Test - S3	18	29-Oct-22	18-Nov-22
Flocculation & Sedimentation Tank (Western Half) - Substructure		42	19-Nov-22	10-Jan-23
119.FST.SUB.10000	Flocc & Sed Tanks (Western Half) - Installation of underground earthing system or earth mat	2	19-Nov-22	21-Nov-22
119.FST.SUB.10002	Flocc & Sed Tanks (Western Half) - Backfilling to formation level	12	22-Nov-22	05-Dec-22
119.FST.SUB.10004	Flocc & Sed Tanks (Western Half) - Formwork and rebar fixing for Basement floor slab	18	06-Dec-22	28-Dec-22

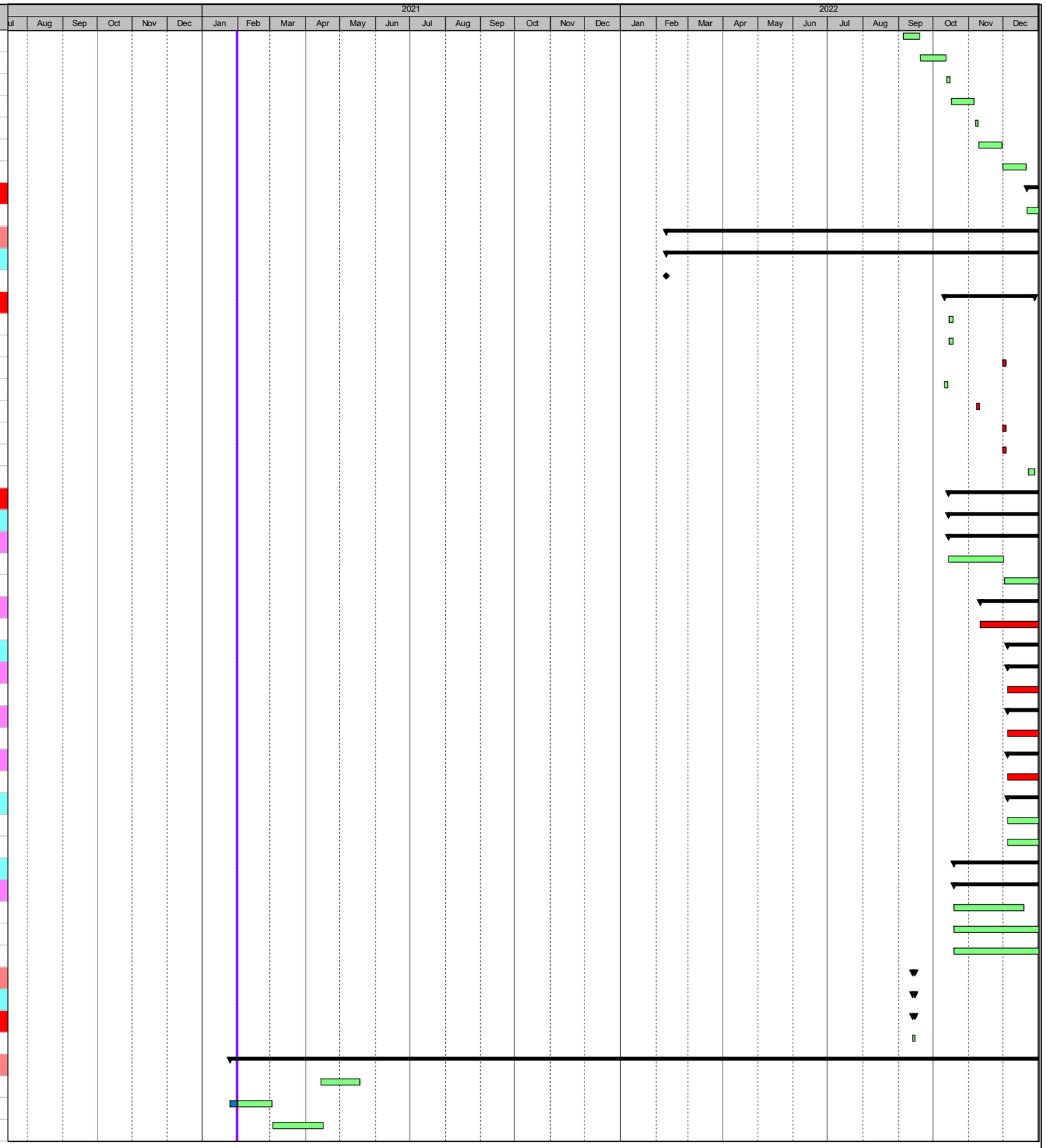
Activity ID	Activity Name	Original Duration	Start	Finish
119.FST.SUB.10006	Flocc & Sed Tanks (Western Half) - Concreting for Basement floor slab	10	29-Dec-22	10-Jan-23
South Works Pumping Station		162	25-Jun-22	07-Jan-23
South Works Pumping Station (SWPS) - Structure		162	25-Jun-22	07-Jan-23
South Works Pumping Station (SWPS) - Excavation & ELS		120	25-Jun-22	16-Nov-22
119.SWPS.ELS.10000	SWPS - Excav & Install ELS & Plate Loading Test - S1	24	25-Jun-22	23-Jul-22
119.SWPS.ELS.10002	SWPS - Excav & Install ELS & Plate Loading Test - S2	24	25-Jul-22	20-Aug-22
119.SWPS.ELS.10004	SWPS - Excav & Install ELS & Plate Loading Test - S3	24	22-Aug-22	19-Sep-22
119.SWPS.ELS.10004	SWPS - Excav & Install ELS & Plate Loading Test - S4	24	20-Sep-22	19-Oct-22
119.SWPS.ELS.10008	SWPS - Excav & Install ELS & Plate Loading Test - S5	24	20-Oct-22	16-Nov-22
South Works Pumping Station (SWPS) - Substructure		42	17-Nov-22	07-Jan-23
119.SWPS.SUB.10000	SWPS - Blinding and earth mat installation	6	17-Nov-22	23-Nov-22
119.SWPS.SUB.10002	SWPS - Backfilling to formation level	24	24-Nov-22	21-Dec-22
119.SWPS.SUB.10004	SWPS - Formwork and rebar fixing for Basement floor slab (LG2/F)	12	22-Dec-22	07-Jan-23
Ozone Building		36	19-Nov-22	03-Jan-23
Ozone Building - Structure		36	19-Nov-22	03-Jan-23
Ozone Building - Excavation and ELS		36	19-Nov-22	03-Jan-23
119.OB.ELS.10000	Ozone Building - Excav & Install ELS & Plate Loading Test - S1	18	19-Nov-22	09-Dec-22
119.OB.ELS.10002	Ozone Building - Excav & Install ELS & Plate Loading Test - S2	18	10-Dec-22	03-Jan-23
Stage 1 Filters		216	11-Jun-22	04-Mar-23
1st Half of Stage 1 Filters Structure (Northern Half)		153	11-Jun-22	12-Dec-22
Stage 1 Filters (1st Half - Northern Half) - Excavation and ELS		85	11-Jun-22	20-Sep-22
119.S1.ELS10000	Stage 1 Filter (1st Half - Northern) - Excav & Install ELS & Plate Loading Test - S1	17	11-Jun-22	30-Jun-22
119.S1.ELS10002	Stage 1 Filter (1st Half - Northern) - Excav & Install ELS & Plate Loading Test - S2	17	02-Jul-22	21-Jul-22
119.S1.ELS10004	Stage 1 Filter (1st Half - Northern) - Excav & Install ELS & Plate Loading Test - S3	17	22-Jul-22	10-Aug-22
119.S1.ELS10006	Stage 1 Filter (1st Half - Northern) - Excav & Install ELS & Plate Loading Test - S4	17	11-Aug-22	30-Aug-22
119.S1.ELS10008	Stage 1 Filter (1st Half - Northern) - Excav & Install ELS & Plate Loading Test - S5	17	31-Aug-22	20-Sep-22
Stage 1 Filters (1st Half - Northern Half) - Substructure		49	08-Sep-22	07-Nov-22
119.S1.SUB.10000	Stage 1 Filter (1st Half - Northern) - Tower Crane Construction	10	08-Sep-22	20-Sep-22
119.S1.SUB.10002	Stage 1 Filter (1st Half - Northern) - Backfilling to formation level	6	21-Sep-22	27-Sep-22
119.S1.SUB.10004	Stage 1 Filter (1st Half - Northern) - Formwork and rebar fixing for Basement floor slab (1st Half)	10	28-Sep-22	11-Oct-22
119.S1.SUB.10006	Stage 1 Filter (1st Half - Northern) - Concreting for Basement floor slab	8	12-Oct-22	20-Oct-22
119.S1.SUB.10008	Stage 1 Filter (1st Half - Northern) - Scaffolding erection	12	21-Oct-22	03-Nov-22
119.S1.SUB.10010	Stage 1 Filter (1st Half - Northern) - Formwork and rebar fixing for walls (up to G/F)	12	24-Oct-22	05-Nov-22
119.S1.SUB.10012	Stage 1 Filter (1st Half - Northern) - Concreting for walls (up to G/F)	12	25-Oct-22	07-Nov-22
Stage 1 Filters (1st Half - Northern Half) - Superstructure		29	08-Nov-22	10-Dec-22
119.S1.SUP.10000	Stage 1 Filter (1st Half - Northern) - Apply waterproofing	5	08-Nov-22	12-Nov-22
119.S1.SUP.10002	Stage 1 Filter (1st Half - Northern) - Water Test 1 (2 out of 8 tanks)	6	14-Nov-22	19-Nov-22
119.S1.SUP.10004	Stage 1 Filter (1st Half - Northern) - Water Test 2 (2 out of 8 tanks)	6	21-Nov-22	26-Nov-22
119.S1.SUP.10006	Stage 1 Filter (1st Half - Northern) - Water Test 3 (2 out of 8 tanks)	6	28-Nov-22	03-Dec-22
119.S1.SUP.10008	Stage 1 Filter (1st Half - Northern) - Water Test 4 (2 out of 8 tanks)	6	05-Dec-22	10-Dec-22
Stage 1 Filters (1st Half - Northern Half) - ABWF Works		18	21-Nov-22	12-Dec-22
119.S1.ABWF.10000	Stage 1 Filter (1st Half - Northern) - Wall tiling	18	21-Nov-22	10-Dec-22
119.S1.ABWF.10002	Stage 1 Filter (1st Half - Northern) - Completion of Civil Structure for E&M Installation (including Pipe Gallery)	0	12-Dec-22	
2nd Half of Stage 1 Filters Structure (Southern half)		36	28-Nov-22	11-Jan-23
Stage 1 Filters (2nd Half - Southern Half) - Excavation and ELS		36	28-Nov-22	11-Jan-23
119.S1.ELS.10010	Stage 1 Filter (2nd Half - Southern) - Excav & Install ELS & Plate Loading Test - S1	18	28-Nov-22	17-Dec-22
119.S1.ELS.10012	Stage 1 Filter (2nd Half - Southern) - Excav & Install ELS & Plate Loading Test - S2	18	19-Dec-22	11-Jan-23
Stage 1 Filters - M&E Works		63	12-Dec-22	04-Mar-23
119.S1.MEP.10000	Stage 1 Filters - Handover of 1st Half (Northern Half) for E&M works (including Pipe Gallery)	0	12-Dec-22	
Stage 1 Filters - Delivery to Installation Area		11	12-Dec-22	23-Dec-22
119.S1.MEP.10004	Stage 1 Filters - Delivery for Installation - Stop logs, penstocks and valves (PS 0.13.5(4))	3	12-Dec-22	14-Dec-22



Activity ID	Activity Name	Original Duration	Start	Finish
119.S1.MEP.10006	Stage 1 Filters - Delivery for Installation - LALG (PS 0.13.5(5))	3	12-Dec-22	14-Dec-22
119.S1.MEP.10014	Stage 1 Filters - Delivery for Installation - Filter installation (PS 0.13.5(1)) - Batch 1 (Filters 1-4)	3	21-Dec-22	23-Dec-22
119.S1.MEP.10016	Stage 1 Filters - Delivery for Installation - Filter installation (PS 0.13.5(1)) - Batch 2 (Filters 5-8)	3	21-Dec-22	23-Dec-22
119.S1.MEP.10018	Stage 1 Filters - Delivery for Installation - Filter installation (PS 0.13.5(1)) - Batch 3 (Filters 9-12)	3	21-Dec-22	23-Dec-22
119.S1.MEP.10020	Stage 1 Filters - Delivery for Installation - Filter installation (PS 0.13.5(1)) - Batch 4 (Filters 13-16)	3	21-Dec-22	23-Dec-22
119.S1.MEP.10022	Stage 1 Filters - Delivery for Installation - Chemical dosing facilities (PS 0.13.5(2))	3	12-Dec-22	14-Dec-22
Stage 1 Filters - Installation		63	12-Dec-22	04-Mar-23
119.S1.MEP.10002	Stage 1 Filters - Installation of Temporary Backwash Water Treatment Facilities - Stage 1 (1 set/gang/60 days)	63	12-Dec-22	04-Mar-23
Lower Floor		42	15-Dec-22	11-Feb-23
119.S1.MEP.10008	Stage 1 Filters - L/G - Installation of LALG (1 set/gang/80 days - 2 gangs)	42	15-Dec-22	11-Feb-23
Stage 2 Filters		164	25-Jun-22	10-Jan-23
Stage 2 Filters - Filters Structure 1st Half (Western Half)		152	11-Jul-22	10-Jan-23
Stage 2 Filters (1st Half - Western Half) - Excavation and ELS		90	11-Jul-22	26-Oct-22
119.S2.ELS.10002	Stage 2 Filter (1st Half - Western) - Excav & Install ELS & Plate Loading Test - S1	18	11-Jul-22	30-Jul-22
119.S2.ELS.10004	Stage 2 Filter (1st Half - Western) - Excav & Install ELS & Plate Loading Test - S2	18	01-Aug-22	20-Aug-22
119.S2.ELS.10006	Stage 2 Filter (1st Half - Western) - Excav & Install ELS & Plate Loading Test - S3	18	22-Aug-22	10-Sep-22
119.S2.ELS.10008	Stage 2 Filter (1st Half - Western) - Excav & Install ELS & Plate Loading Test - S4	18	13-Sep-22	05-Oct-22
119.S2.ELS.10010	Stage 2 Filter (1st Half - Western) - Excav & Install ELS & Plate Loading Test - S5	18	06-Oct-22	26-Oct-22
Stage 2 Filters (1st Half - Western Half) - Substructure		62	27-Oct-22	10-Jan-23
119.S2.SUB.10000	Stage 2 Filter (1st Half - Western) - Install underground earthing system or earth mat (if any)	2	27-Oct-22	28-Oct-22
119.S2.SUB.10002	Stage 2 Filter (1st Half - Western) - Tower Crane Constrction	18	29-Oct-22	18-Nov-22
119.S2.SUB.10004	Stage 2 Filter (1st Half - Western) - Backfilling to formation level	6	19-Nov-22	25-Nov-22
119.S2.SUB.10006	Stage 2 Filter (1st Half - Western) - Formwork and rebar fixing for Basement floor slab	12	26-Nov-22	09-Dec-22
119.S2.SUB.10008	Stage 2 Filter (1st Half - Western) - Concreting for Basement floor slab	12	10-Dec-22	23-Dec-22
119.S2.SUB.10010	Stage 2 Filter (1st Half - Western) - Scaffolding erection	12	24-Dec-22	10-Jan-23
Stage 2 Filters - Filters Structure 2nd Half (Eastern Half)		48	25-Jun-22	20-Aug-22
Stage 2 Filters (2nd Half - Eastern Half) - Excavation and ELS		48	25-Jun-22	20-Aug-22
119.S2.ELS.10000	Stage 2 Filter (2nd Half - Eastern) - Tree transplant	48	25-Jun-22	20-Aug-22
Residuals Management Factilities		317	07-Jan-22	10-Feb-23
Residuals Management Factilities (RMF) - Structure		317	07-Jan-22	10-Feb-23
Residuals Management Factilities (RMF) - Excavation & ELS		72	07-Jan-22	08-Apr-22
119.RMF.ELS.10000	RMF - Excav & Install ELS & Plate Loading Test - S1	18	07-Jan-22	27-Jan-22
119.RMF.ELS.10002	RMF - Excav & Install ELS & Plate Loading Test - S2	18	28-Jan-22	24-Feb-22
119.RMF.ELS.10004	RMF - Excav & Install ELS & Plate Loading Test - S3	18	25-Feb-22	17-Mar-22
119.RMF.ELS.10006	RMF - Excav & Install ELS & Plate Loading Test - S4	18	18-Mar-22	08-Apr-22
Residuals Management Factilities (RMF) - Substructure		120	09-Apr-22	03-Sep-22
119.RMF.SUB.10000	RMF - Blinding and earth mat installation	3	09-Apr-22	12-Apr-22
119.RMF.SUB.10002	RMF - Backfilling to formation level	12	13-Apr-22	29-Apr-22
119.RMF.SUB.10004	RMF - Formwork and rebar fixing for Basement floor slab (LG2/F)	12	30-Apr-22	16-May-22
119.RMF.SUB.10006	RMF - Concreting for Basement floor slab (LG2/F)	9	17-May-22	26-May-22
119.RMF.SUB.10008	RMF - Scaffolding erection (up to LG1/F)	12	27-May-22	10-Jun-22
119.RMF.SUB.10010	RMF - Formwork and rebar fixing for walls (up to LG1/F)	12	11-Jun-22	24-Jun-22
119.RMF.SUB.10012	RMF - Concreting for walls (up to LG1/F)	3	25-Jun-22	28-Jun-22
119.RMF.SUB.10014	RMF - Formwork and rebar fixing for LG1/F slab	12	29-Jun-22	13-Jul-22
119.RMF.SUB.10016	RMF - Concreting for LG1/F slab	3	14-Jul-22	16-Jul-22
119.RMF.SUB.10018	RMF - Scaffolding erection (up to G/F)	12	18-Jul-22	30-Jul-22
119.RMF.SUB.10020	RMF - Formwork and rebar fixing for walls (up to G/F)	12	01-Aug-22	13-Aug-22
119.RMF.SUB.10022	RMF - Concreting for walls (up to G/F)	3	15-Aug-22	17-Aug-22
119.RMF.SUB.10024	RMF - Formwork and rebar fixing for GF slab	12	18-Aug-22	31-Aug-22
119.RMF.SUB.10026	RMF - Concreting for G/F slab	3	01-Sep-22	03-Sep-22
Residuals Management Factilities (RMF) - Superstructure		90	05-Sep-22	21-Dec-22



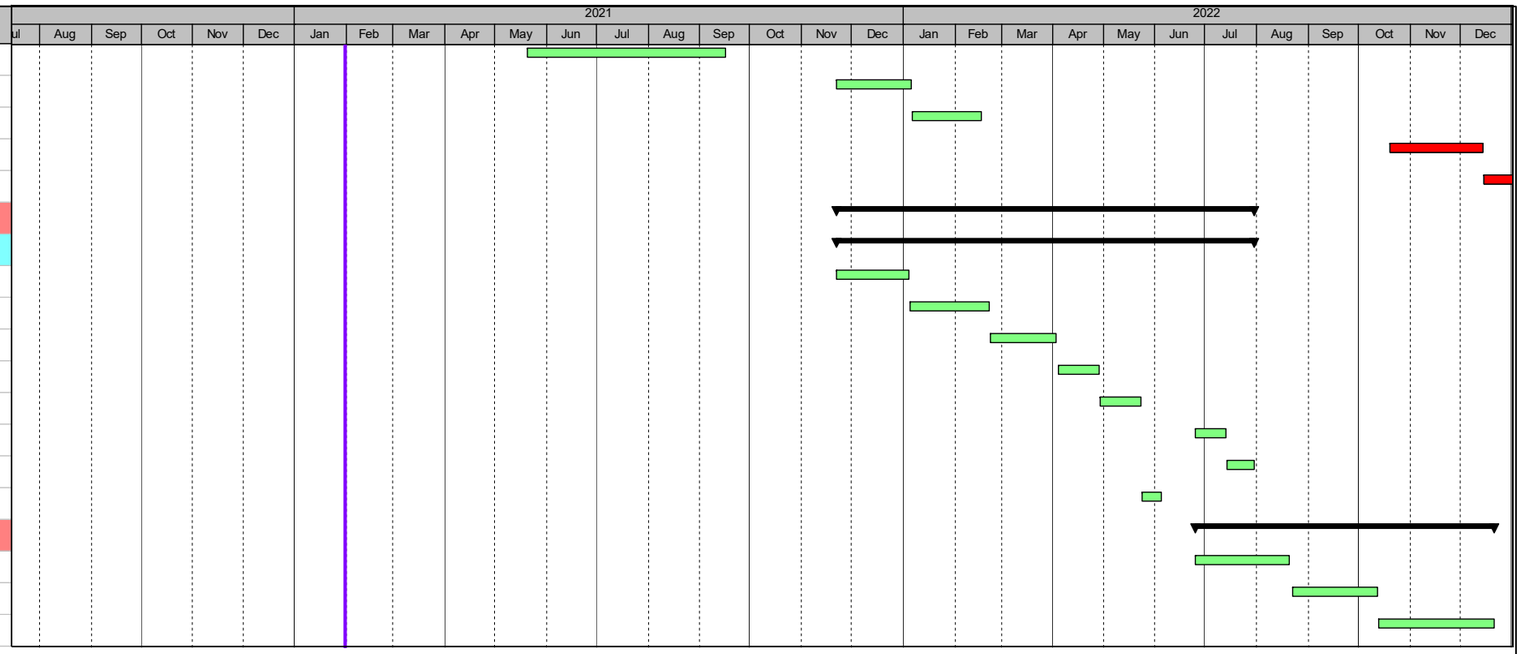
Activity ID	Activity Name	Original Duration	Start	Finish
119.RMF.SUP.10000	RMF - Scaffolding erection (upto Roof)	12	05-Sep-22	19-Sep-22
119.RMF.SUP.10002	RMF - Formwork and rebar fixing (upto Roof)	18	20-Sep-22	12-Oct-22
119.RMF.SUP.10004	RMF - Concreting (Upto Roof)	3	13-Oct-22	15-Oct-22
119.RMF.SUP.10006	RMF - Formwork and rebar fixing for Roof	18	17-Oct-22	05-Nov-22
119.RMF.SUP.10008	RMF - Concreting Roof	3	07-Nov-22	09-Nov-22
119.RMF.SUP.10010	RMF - Apply waterproofing	18	10-Nov-22	30-Nov-22
119.RMF.SUP.10012	RMF - Water Test	18	01-Dec-22	21-Dec-22
Residuals Management Factilities (RMF) - ABWF Works		35	22-Dec-22	10-Feb-23
119.RMF.ABWF.10000	RMF - Steel Roof installation	35	22-Dec-22	10-Feb-23
WTW Logistics Centre		308	10-Feb-22	27-Feb-23
WTW Logistics Centre - M&E Works		308	10-Feb-22	27-Feb-23
119.WTWLC.MEP.10000	WTWLC - Ready for E&M Works	0	10-Feb-22	
WTW Logistics Centre - Delivery to Installation Area		66	11-Oct-22	28-Dec-22
119.WTWLC.MEP.1000	WTWLC - Delivery for Installation - Other Plants and Materials for Electrical Works (EM 3.1.1(2))	3	15-Oct-22	18-Oct-22
119.WTWLC.MEP.1000	WTWLC - Delivery for Installation - Other Plants and Materials for BS Works (EM 4)	3	15-Oct-22	18-Oct-22
119.WTWLC.MEP.1001	WTWLC - Delivery for Installation - Fluoride dosing facility (PS 0.18.4(5))	3	01-Dec-22	03-Dec-22
119.WTWLC.MEP.1001	WTWLC - Delivery for Installation - Lime handling, mixing, storing and dosing systems (PS 0.18.4(1))	3	11-Oct-22	13-Oct-22
119.WTWLC.MEP.1002	WTWLC - Delivery for Installation - Polymer handling, mixing, storing and dosing systems (PS 0.18.4(2))	3	08-Nov-22	10-Nov-22
119.WTWLC.MEP.1002	WTWLC - Delivery for Installation - Disodium phosphate handling, mixing, storing and dosing systems (PS 0.18.4(4))	3	01-Dec-22	03-Dec-22
119.WTWLC.MEP.1003	WTWLC - Delivery for Installation - Ammonium sulphate handling, mixing, storing and dosing systems (PS 0.18.4(3))	3	01-Dec-22	03-Dec-22
119.WTWLC.MEP.1004	WTWLC - Delivery for Installation - Instrumentation, Control & Automation - DCS (EM 5)	3	23-Dec-22	28-Dec-22
WTW Logistics Centre - Installation		108	14-Oct-22	27-Feb-23
LG/2F		108	14-Oct-22	27-Feb-23
Hydrated Lime Plant		84	14-Oct-22	30-Jan-23
119.WTWLC.MEP.100	WTWLC - Installation of Lime Bulk Bag Unloader (1 set/gang/80 days - 2 gangs)	42	14-Oct-22	01-Dec-22
119.WTWLC.MEP.100	WTWLC - Installation of Lime Silo No 1 (1 set/gang/80 days - 2 gangs)	42	02-Dec-22	30-Jan-23
Polyer Plant		84	11-Nov-22	27-Feb-23
119.WTWLC.MEP.100	WTWLC - Installation of Flocculation Polymer Dosing Pumps (1 set/gang/80 days)	84	11-Nov-22	27-Feb-23
LG/1F		63	05-Dec-22	25-Feb-23
Fluoride Plant		63	05-Dec-22	25-Feb-23
119.WTWLC.MEP.100	WTWLC - Installation of Fluoride Dosing Pumps (1 set/gang/60 days)	63	05-Dec-22	25-Feb-23
Ammonium Sulphate Plant		63	05-Dec-22	25-Feb-23
119.WTWLC.MEP.100	WTWLC - Installation of Storage Handling and Wtting Trains (1 set/gang/60 days)	63	05-Dec-22	25-Feb-23
Sodium Phosphate Plant		63	05-Dec-22	25-Feb-23
119.WTWLC.MEP.100	WTWLC - Installation of Storage Handling and Wtting Trains (1 set/gang/60 days)	63	05-Dec-22	25-Feb-23
G/F		63	05-Dec-22	25-Feb-23
119.WTWLC.MEP.1002	WTWLC - Provision for Sodium Phosphate Storage (1 set/gang/60 days)	63	05-Dec-22	25-Feb-23
119.WTWLC.MEP.1003	WTWLC - Provision for Ammonium Sulphate Storage (1 set/gang/60 days)	63	05-Dec-22	25-Feb-23
General M&E Works		63	19-Oct-22	03-Jan-23
General M&E Works - Electrical		63	19-Oct-22	03-Jan-23
119.WTWLC.MEP.100	WTWLC - Installation of LMCPs (1 set/gang/50 days)	53	19-Oct-22	19-Dec-22
119.WTWLC.MEP.100	WTWLC - Modification of LV Switchboards (1 set/gang/60 days)	63	19-Oct-22	03-Jan-23
119.WTWLC.MEP.100	WTWLC - Installation of Cable Containments - Stage 1 (1 set/gang/60 days)	63	19-Oct-22	03-Jan-23
New Administration Building		3	13-Sep-22	15-Sep-22
New Administration Building - M&E Works		3	13-Sep-22	15-Sep-22
New Administration Building - Delivery to Installation Area		3	13-Sep-22	15-Sep-22
119.NADB.MEP.10004	New Adm. Bldg. - Delivery for Installation - Other Plants and Materials for Electrical Works (EM 3.1.1(2))	3	13-Sep-22	15-Sep-22
DN1200 Drainage near New Administration Building (ADB) Area		564	25-Jan-21 A	21-Jan-23
119.CE.10016	PMI0012/CE16 - Modification of Stormwater Drainage from SMH39 to SMH40	29	14-Apr-21	18-May-21
119.DN1200.10000	Drainage Works near ADB (DN1200) - Excavation for 1st Section (Outfall headwall to SMH40) (160m3 @ 6.5 m3/d/team)	24	25-Jan-21 A	02-Mar-21
119.DN1200.10002	Drainage Works near ADB (DN1200) - 1st Section drainage pipe laying (Outfall headwall to SMH40) (10m @ 0.5 m/d/team)	35	03-Mar-21	16-Apr-21



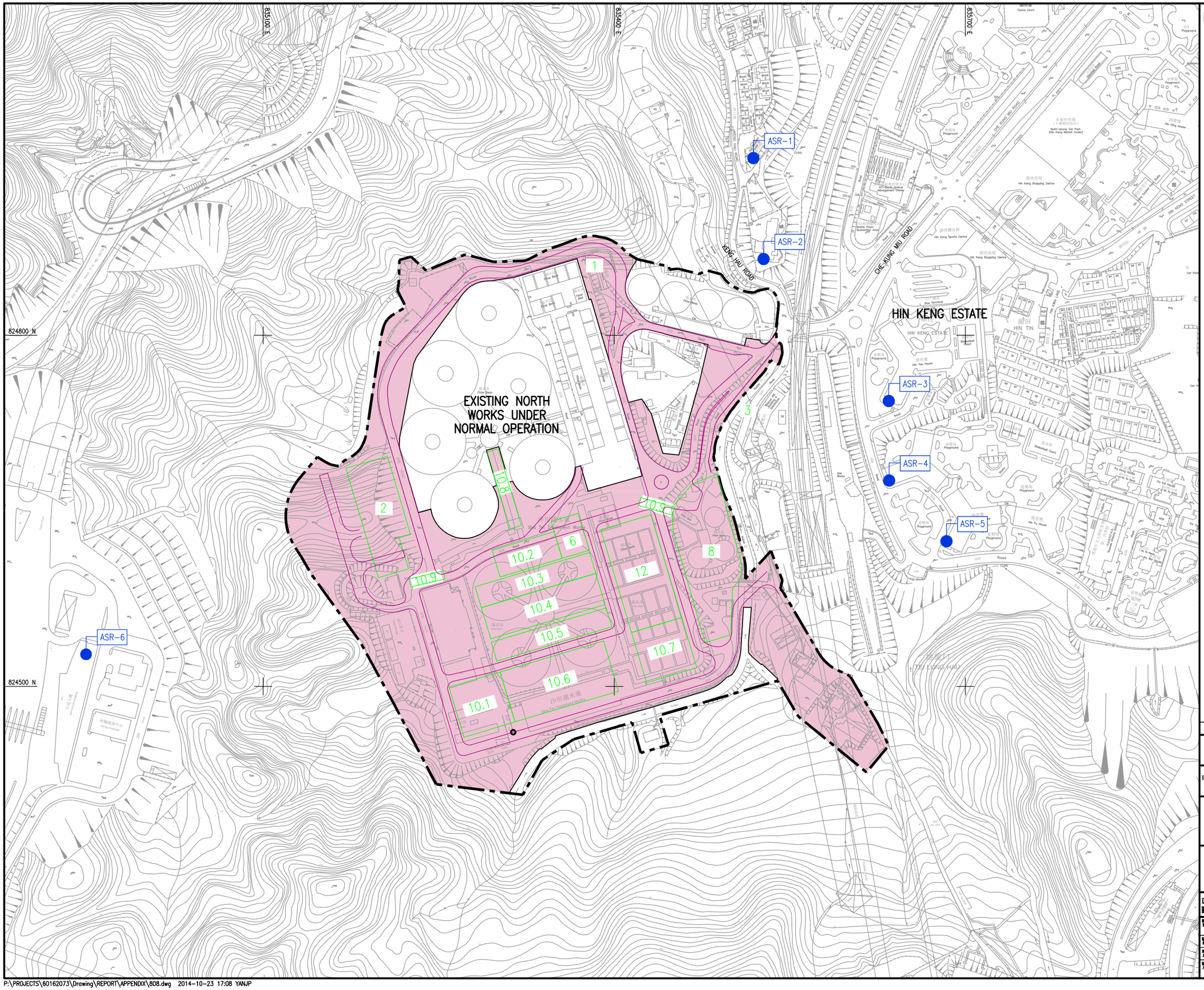
1/WSD/19 In-Situ Reprovisioning of Sha Tin Water Treatment Works (South Works) - Water Treatment Works and Ancillary Facilities
Months Rolling Programme (August-21)

Milestone
Actual Work
Works
Critical Work
Summary

Activity ID	Activity Name	Original Duration	Start	Finish
119.DN1200.10004	Drainage Works near ADB (DN1200) - Trenchless Excavation for 2nd Section (SMH40 to SMH39) Including Pit - 2nd Section	101	20-May-21	16-Sep-21
119.DN1200.10008	Drainage Works near ADB (DN1200) - Excavation for 3rd Section (SMH39 to SMH37)	36	22-Nov-21	05-Jan-22
119.DN1200.10010	Drainage Works near ADB (DN1200) - 3rd Section drainage pipe laying (SMH39 to SMH37)	30	06-Jan-22	16-Feb-22
119.DN1200.10012	Drainage Works near ADB (DN1200) - Excavation for 4th Section (SMH37 to SMH35)	48	20-Oct-22	14-Dec-22
119.DN1200.10014	Drainage Works near ADB (DN1200) - 4th Section drainage pipe laying (SMH37 to SMH35)	30	15-Dec-22	21-Jan-23
Geotechnical Works		199	22-Nov-21	30-Jul-22
Retaining Wall A, E, G & Soldier Pipe Wall B, F		199	22-Nov-21	30-Jul-22
119.WALLA.10000	L-Shape Retaining Wall A (Type RW1 and RW2) - 1st Section (29m @ 10m / 2wk / team)	35	22-Nov-21	04-Jan-22
119.WALLA.10002	L-Shape Retaining Wall A (Type RW1 and RW2) - 2nd Section (29m @ 10m / 2wk / team)	35	05-Jan-22	21-Feb-22
119.WALLA.10004	L-Shape Retaining Wall A (Type RW1 and RW2) - Final Section (29m @ 10m / 2wk / team)	35	22-Feb-22	02-Apr-22
119.WALLB.10000	Soldier Pile Wall B - 1st Section (27 no. @ 1.5 pile/day/team)	18	04-Apr-22	28-Apr-22
119.WALLB.10002	Soldier Pile Wall B - Final Section (28 no. @ 1.5 pile/day/team)	19	29-Apr-22	23-May-22
119.WALLF.10000	Soldier Pile Wall F - 1st Section (22 no.@ 1.5 pipe/day/team)	15	25-Jun-22	13-Jul-22
119.WALLF.10002	Soldier Pile Wall F - Final Section (22 no. @ 1.5 pipe/day)	15	14-Jul-22	30-Jul-22
119.WALLG.10002	L-Shape Retaining Wall G with Mini-Pile Foundaiton (7m @ 10m / 2wk / team)	10	24-May-22	04-Jun-22
M4/M5 Pipes Laying from Outside SWPS to South Gate		150	25-Jun-22	21-Dec-22
119.M1M5.10042	ELS for M4/M5 pipes laying from outside SWPS to SMH37	48	25-Jun-22	20-Aug-22
119.M1M5.10044	Excavation for M4/M5 pipes laying from outside SWPS to SMH37	42	22-Aug-22	12-Oct-22
119.M1M5.10046	M4/M5 pipes laying (from outside SWPS to SMH37)	60	13-Oct-22	21-Dec-22



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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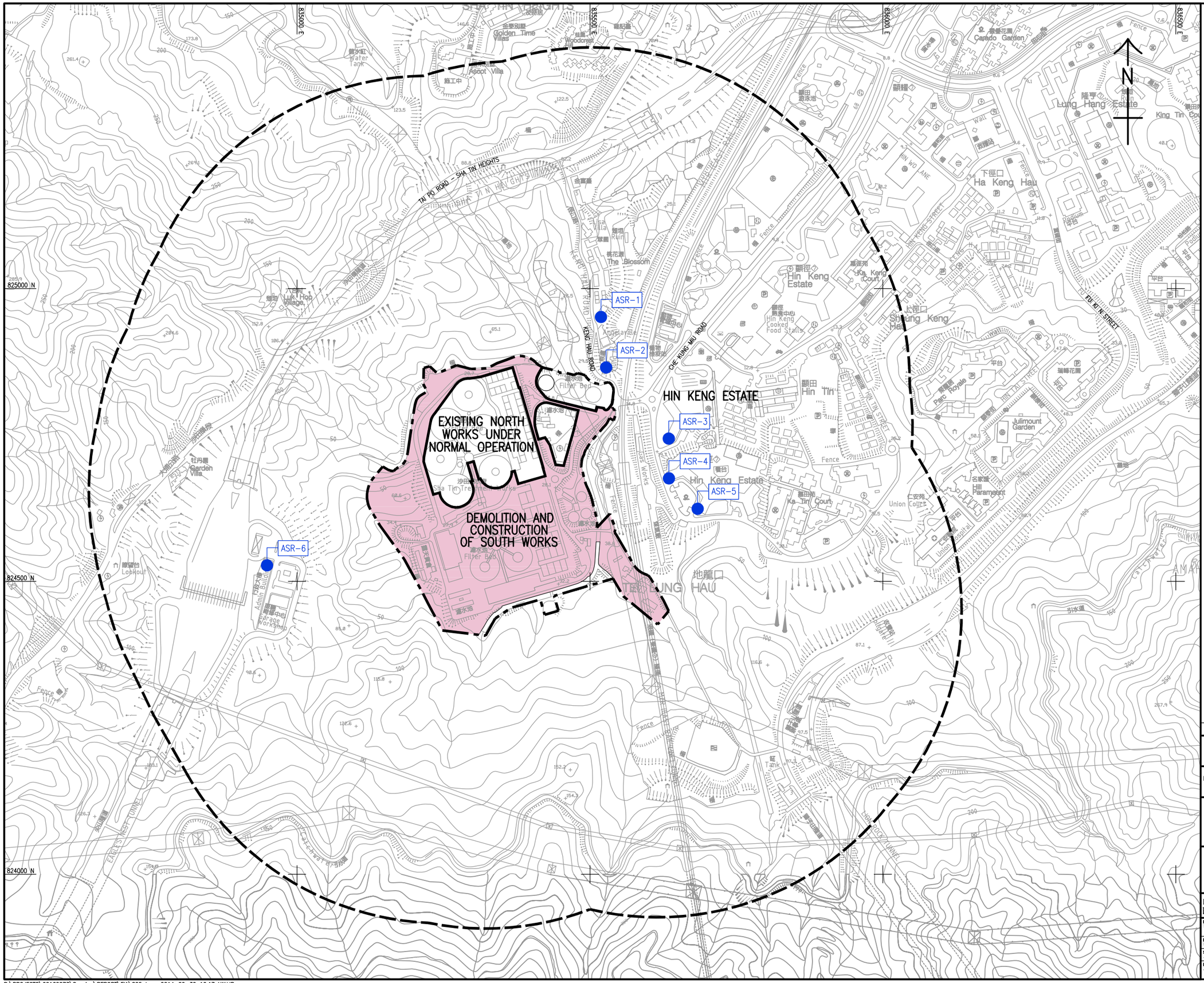
Appendix E
Environmental Sensitive Receivers in the Vicinity of the Projects



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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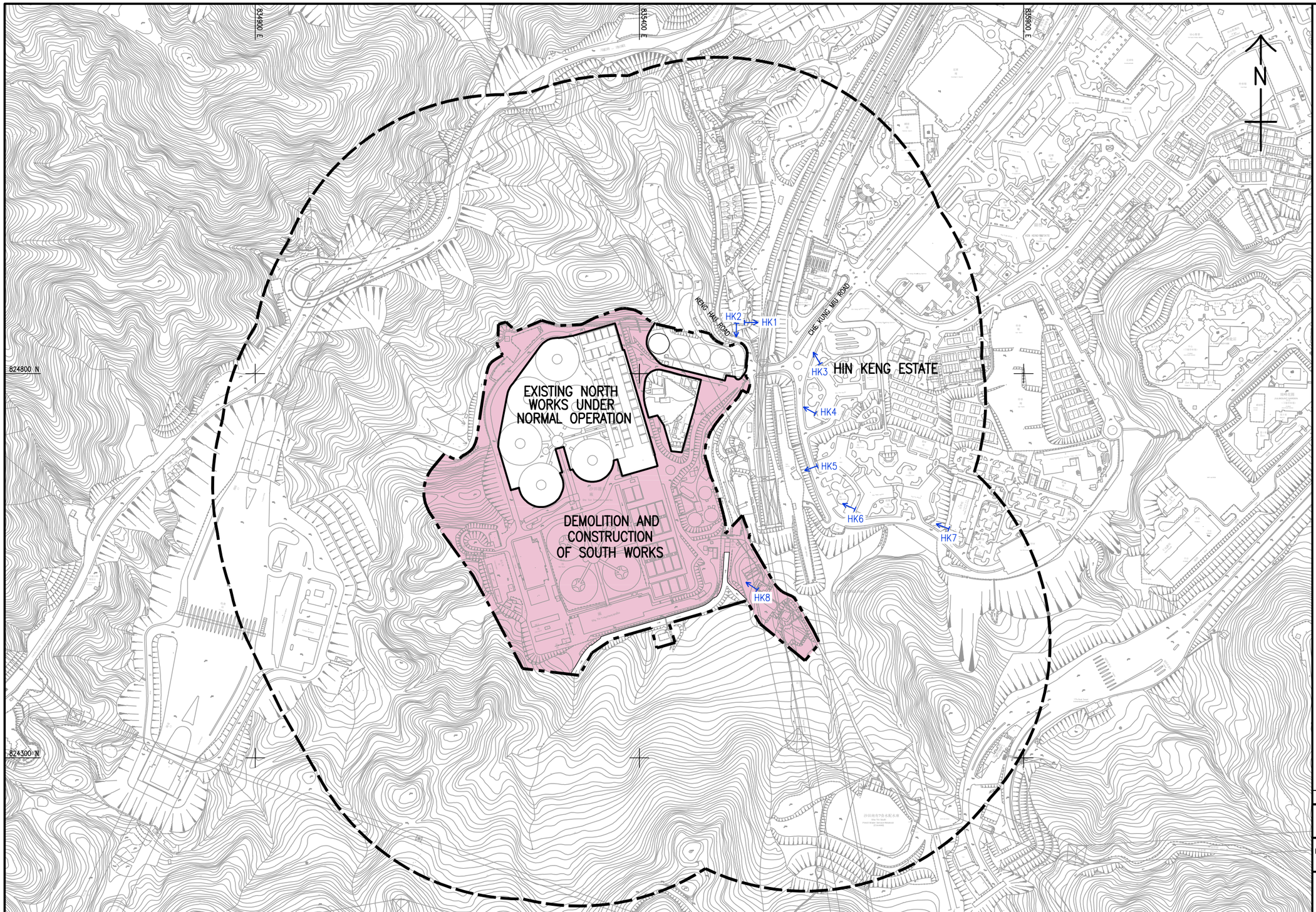

LEGEND:

- 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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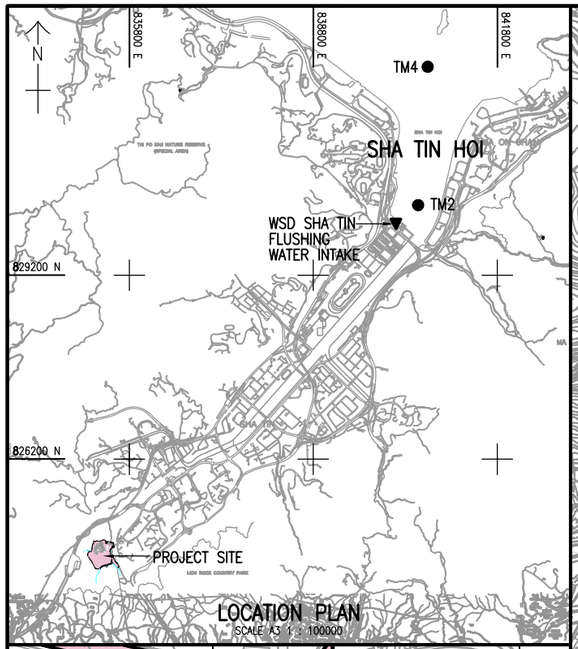
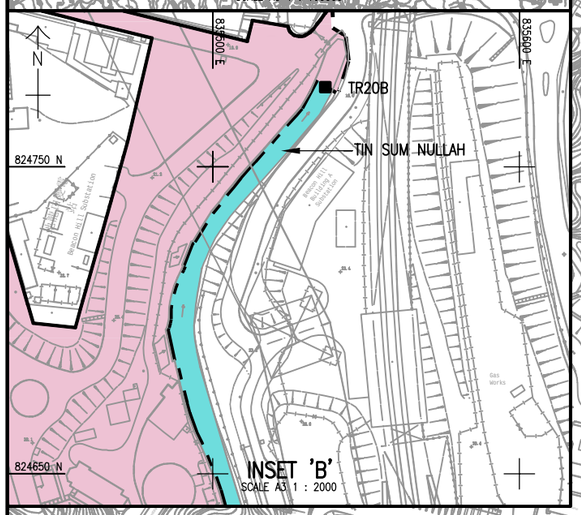
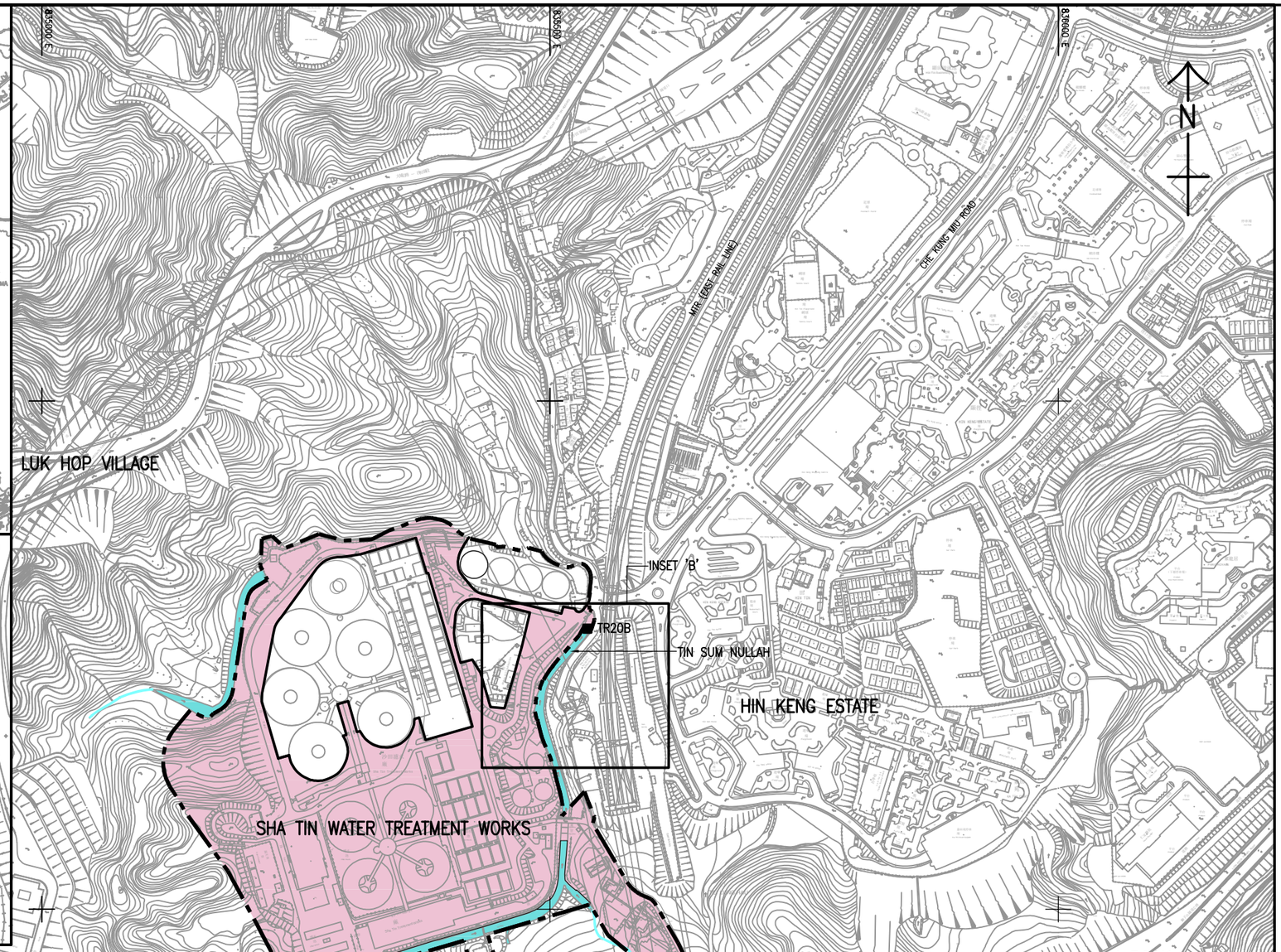


LOCATION PLAN
SCALE A3 1 : 100000



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;

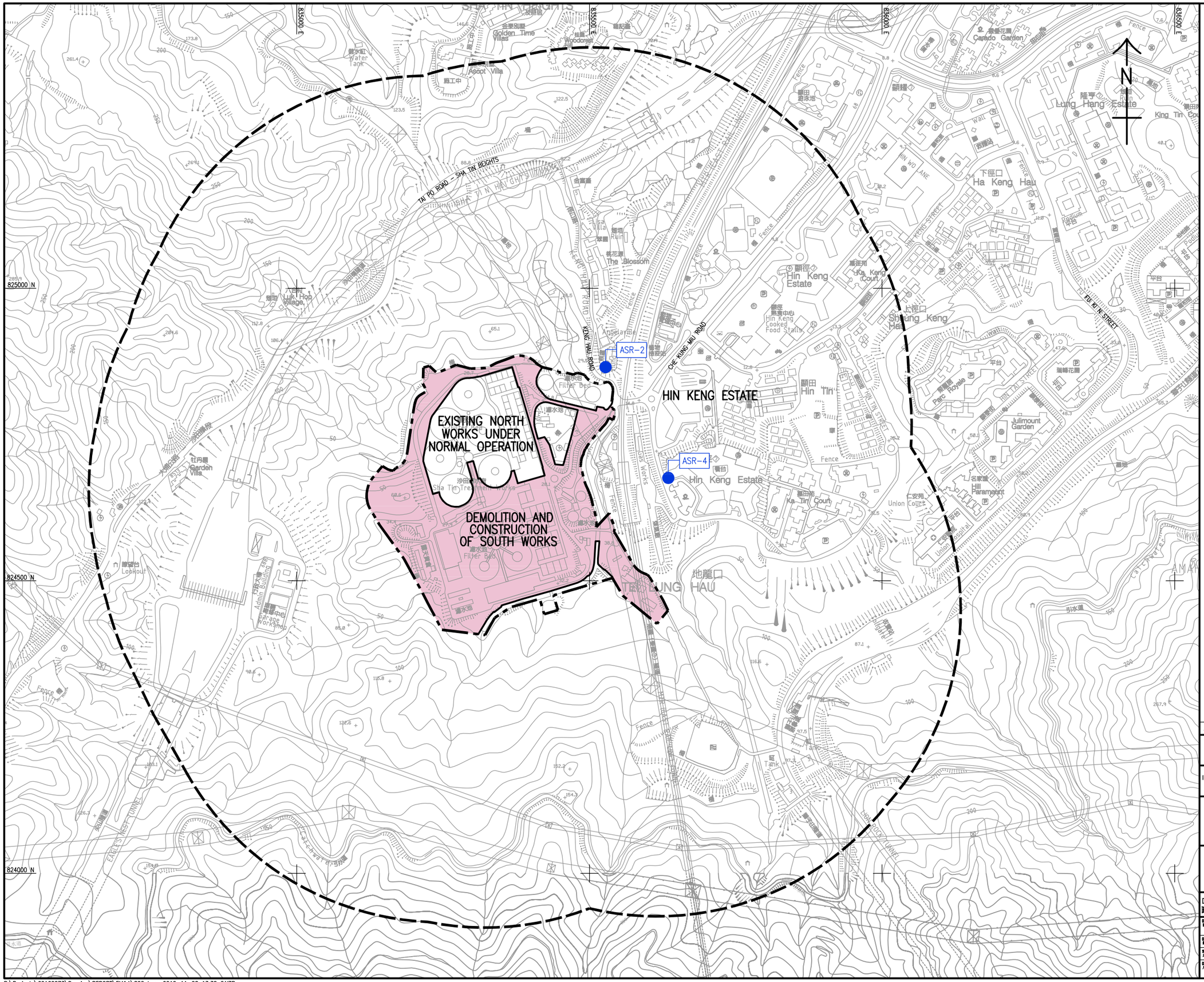
	implemented; Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days.		down or to stop all or part of the construction activities until no exceedance of Limit level.	● As directed by the ER, to slow down or to stop all or part of the construction activities.

Appendix H
Impact Monitoring Schedules

Tentative Impact Monitoring Schedule for STWTW

Dec-21						
Sun	Mon	Tue	Wed	Thur	Fri	Sat
			1 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	2	3 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	4 Impact Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3
5	6 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	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 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	14	15 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	16 Impact Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	17 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	18
19	20 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	21	22 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	23	24 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	25
26	27	28 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	29	30 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	31	

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

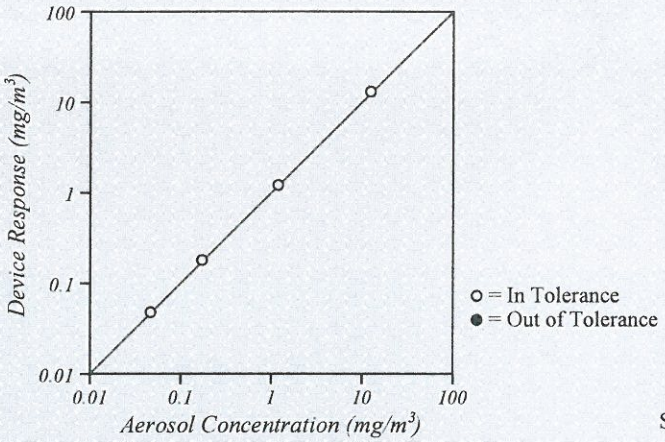
TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA
Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

Environment Conditions		
Temperature	75.29 (24.1)	°F (°C)
Relative Humidity	47.4	%RH
Barometric Pressure	29.11 (985.8)	inHg (hPa)

Model	**AM510**
Serial Number	**10712016**

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

Concentration Linearity Plot



System ID: DTII01-02

CONCENTRATION *Unit: mg/m3*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	1.176	1.143	1.058~1.294	3	0.046	0.045	0.032~0.060
2	0.170	0.169	0.144~0.196	4	12.285	12.277	11.056~13.514

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 4:1

Measurement Variable	System ID	Last Cal.	Cal. Due	Measurement Variable	System ID	Last Cal.	Cal. Due
DC Voltage	E003314	01-11-21	01-31-22	Photometer	E003319	02-15-21	08-31-21
Microbalance	M001324	01-29-21	01-31-23	Pressure	E003511	10-26-20	10-31-21
Flowmeter	E005626	03-09-21	03-31-22	DC Voltage	E003315	01-11-21	01-31-22

Tom Vang
Calibrated

June 28, 2021
Date

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.

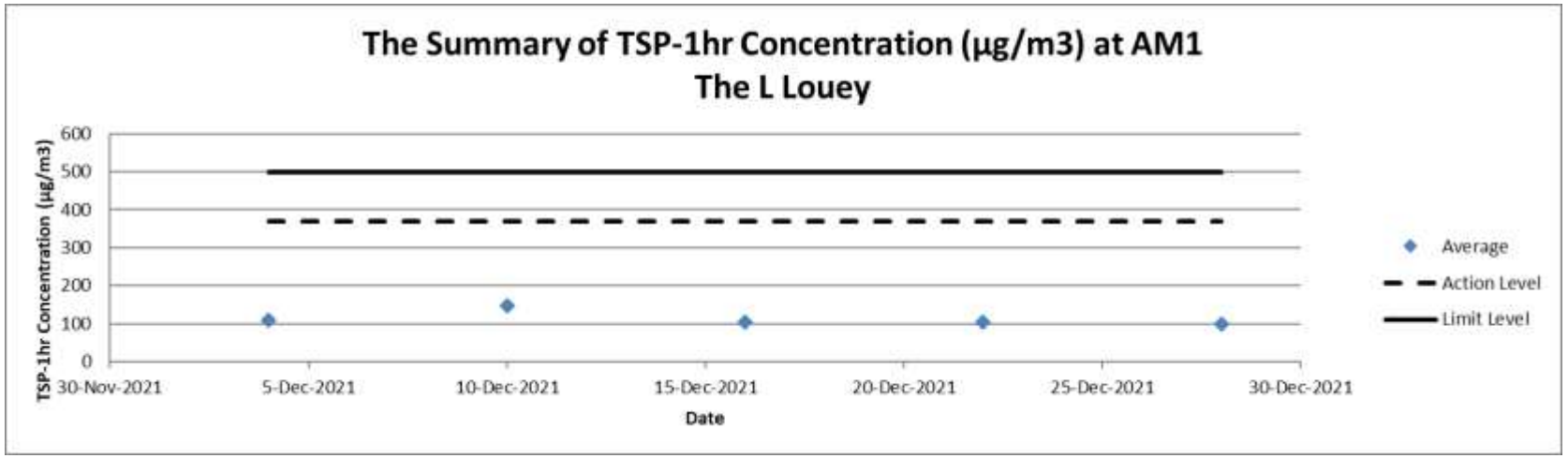
ADDITIONAL SPECIFICATIONS

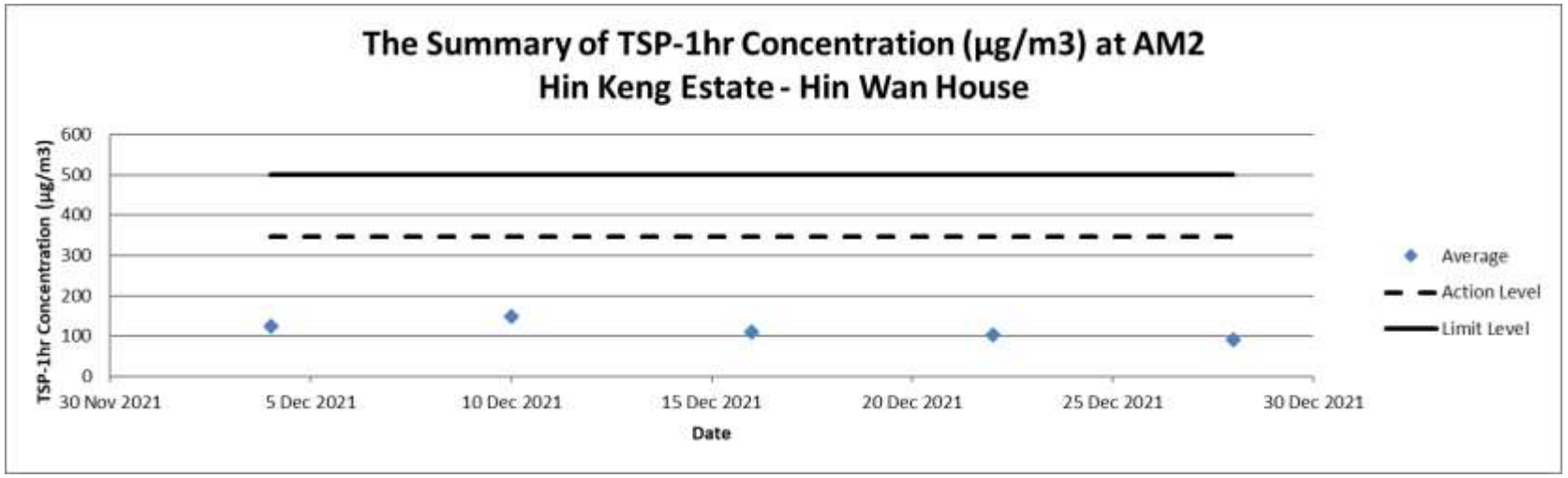
Display & Backlight	•	•		•										Reflective 3 1/2 digit LCD. Digit height 0.55 in / 9 mm. Aviation green electroluminescent backlight. Manual activation with auto-off.
			•		•	•								Reflective 5 digit LCD. Digit height 0.36 in / 9 mm. Choice of aviation green or visible red (NV models only) electroluminescent 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).

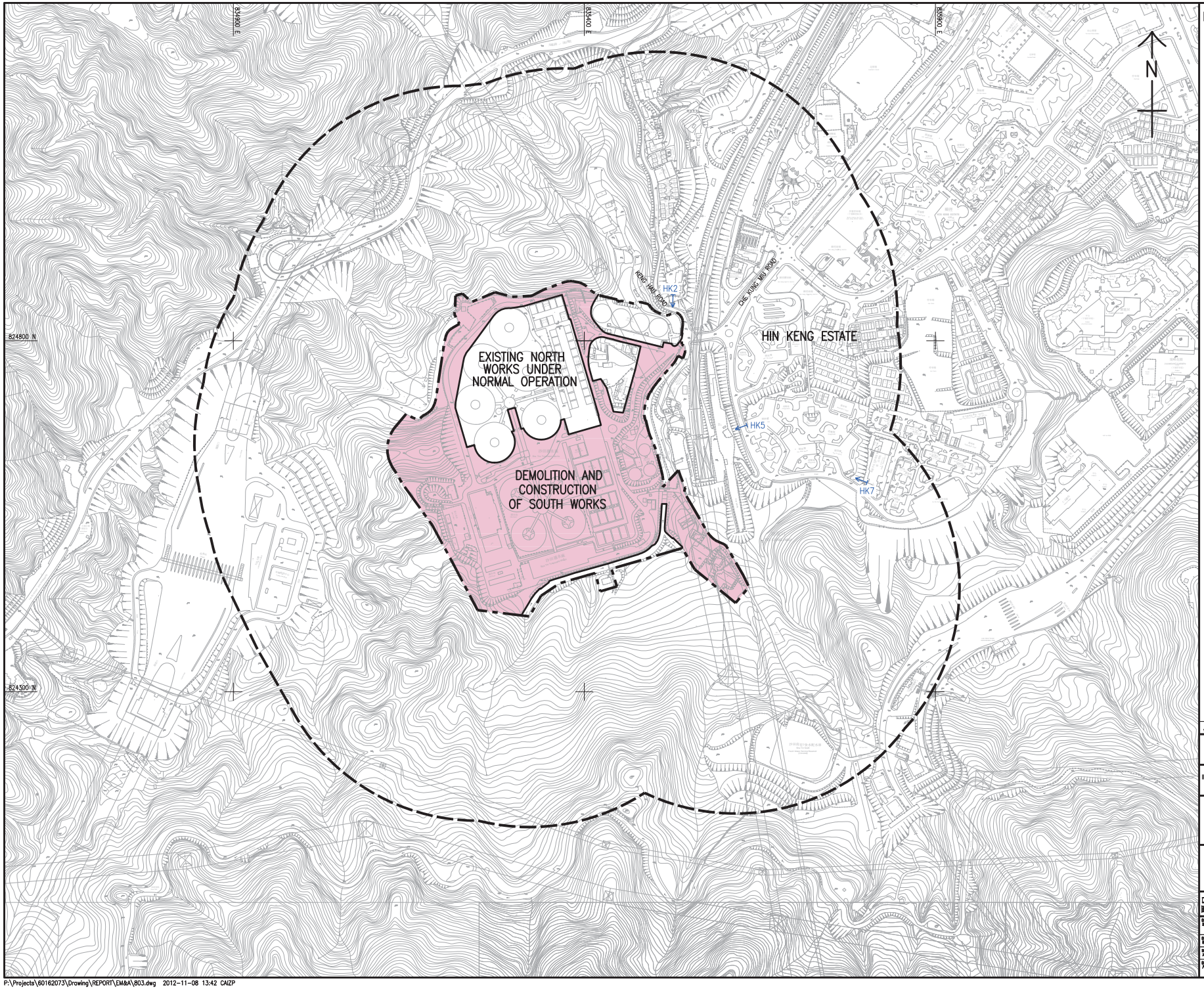
Please note, these specifications are valid for all Kestrel 4400 products and all other Kestrel 4000 series with a serial number higher than 659340. If your product has a lower serial number, please reference the previous version of the specifications.

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-Nov-2021
5-Dec-2021
10-Dec-2021
15-Dec-2021
20-Dec-2021
25-Dec-2021
30-Dec-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 Nov 2021
5 Dec 2021
10 Dec 2021
15 Dec 2021
20 Dec 2021
25 Dec 2021
30 Dec 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)

MAXLAB

CALIBRATION CERTIFICATE

Certificate Information

Date of Issue	8-Dec-2021	**Certificate Number**	MLCN213465S

Customer Information

Company Name	Acumen Environmental Engineering and Technologies Co. Ltd.
Address	Unit D, 12/F, Ford Glory Plaza, Nos. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong

Equipment-under-Test (EUT)

Description	Sound Level Meter
Manufacturer	Lutron
Model Number	SL-4033SD
Serial Number	I.485446
Equipment Number	--

Calibration Particular

Date of Calibration	8-Dec-2021		
Calibration Equipment	4231(MLTE008) / AV200063 / 23-Jun-2023		
Calibration Procedure	MLCG00, MLCG15		
Calibration Conditions	Laboratory	Temperature	23 °C ± 5 °C
		Relative Humidity	55% ± 25%
	EUT	Stabilizing Time	Over 3 hours
		Warm-up Time	10 minutes
		Power Supply	Internal battery
Calibration Results	Calibration data were detailed in the continuation pages. All calibration results were within EUT specification. The cover of the microphone was found damaged.		

Approved By & Date

K.O. Lo 8-Dec-2021

Statements

* Calibration equipment used for this calibration are traceable to national / international standards.
* The results on this Calibration Certificate only relate to the values measured at the time of the calibration and the uncertainties quoted will not include allowance for the EUT long term drift, variation with environmental changes, vibration and shock during transportation, overloading, mishandling, misuse, and the capacity of any other laboratory to repeat the measurement.
* MaxLab Calibration Centre Limited shall not be liable for any loss or damage resulting from the use of the EUT.
* The copy of this Certificate is owned by MaxLab Calibration Centre Limited. No part of this Certificate may be reproduced without the prior written approval of MaxLab Calibration Centre Limited.

萬儀校正中心有限公司
MaxLab Calibration Centre Limited
香港新界葵涌華星街 16-18 號保盈工業大廈 9 樓 B 室
Unit B, 9/F., Boldwin Industrial Bldg., 16-18 Wah Sing Street, Kwai Chung, N.T., Hong Kong Tel: (852) 2116 1380 Fax: (852) 2264 6480 Email: info@maxlab.com.hk

MAXLAB

Certificate No. MLCN213465S

Calibration Data

Frequency / Time Weighting	Range	EUT Reading	Standard Reading	EUT Error	Calibration Uncertainty	EUT Specification
A / FAST	50 - 100 dB	93.9 dB	94.0 dB	-0.1 dB	0.2 dB	± 1.1 dB
(1 kHz Input)	80 - 130 dB	93.8 dB	94.0 dB	-0.2 dB	0.2 dB	± 1.1 dB
		113.8 dB	114.0 dB	-0.2 dB	0.2 dB	± 1.1 dB
C / FAST	50 - 100 dB	94.1 dB	94.0 dB	0.1 dB	0.2 dB	± 1.1 dB
(1 kHz Input)	80 - 130 dB	93.8 dB	94.0 dB	-0.2 dB	0.2 dB	± 1.1 dB
		113.9 dB	114.0 dB	-0.1 dB	0.2 dB	± 1.1 dB
A / SLOW	50 - 100 dB	93.9 dB	94.0 dB	-0.1 dB	0.2 dB	± 1.1 dB
(1 kHz Input)	80 - 130 dB	113.8 dB	114.0 dB	-0.2 dB	0.2 dB	± 1.1 dB
C / SLOW	50 - 100 dB	94.1 dB	94.0 dB	0.1 dB	0.2 dB	± 1.1 dB
(1 kHz Input)	80 - 130 dB	113.9 dB	114.0 dB	-0.1 dB	0.2 dB	± 1.1 dB

- END -

Calibrated By : Dan
Date : 8-Dec-2021

Checked By : K.O. Lo
Date : 8-Dec-2021

萬儀校正中心有限公司
MaxLab Calibration Centre Limited
香港新界葵涌華星街 16-18 號保盈工業大廈 9 樓 B 室
Unit B, 9/F., Boldwin Industrial Bldg., 16-18 Wah Sing Street, Kwai Chung, N.T., Hong Kong Tel: (852) 2116 1380 Fax: (852) 2264 6480 Email: info@maxlab.com.hk

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CALIBRATION CERTIFICATE

Certificate Information

Date of Issue	11-Dec-2020	**Certificate Number**	MLCN203354S

Customer Information

Company Name	Acumen Environmental Engineering & Technologies Co Ltd.
Address	Lot 11, Tam Kon Shan Road, Tsing Yi (N), Hong Kong

Equipment-under-Test (EUT)

Description	Sound & Vibration Analyser
Manufacturer	Svantek
Model Number	SVAN 958A
Serial Number	36691
Equipment Number	--

Calibration Particular

Date of Calibration	11-Dec-2020		
Calibration Equipment	4231(MLTE008) / AV200063 / 23-Jun-2023 CE-7144(MLTE120) / SSD201909019 / 13-Nov-2022		
Calibration Procedure	MLCG00, MLCG15		
Calibration Conditions	Laboratory	Temperature	23 °C ± 5 °C
		Relative Humidity	55% ± 25%
	EUT	Stabilizing Time	Over 3 hours
		Warm-up Time	10 minutes
		Power Supply	Internal battery
Calibration Results	Svantek Vibration Accelerometer PNR: SV84, SNR : D6013. Calibration data were detailed in the continuation pages.		

Approved By & Date

K.O. Lo 11-Dec-2020

Statements

* Calibration equipment used for this calibration are traceable to national / international standards.
* The results on this Calibration Certificate only relate to the values measured at the time of the calibration and the uncertainties quoted will not include allowance for the EUT long term drift, variation with environmental changes, vibration and shock during transportation, overloading, mishandling, misuse, and the capacity of any other laboratory to repeat the measurement.
* MaxLab Calibration Centre Limited shall not be liable for any loss or damage resulting from the use of the EUT.
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Certificate No. MLCN203354S

Calibration Data

Channel / Mode	Test Frequency (Hz)	Direction	EUT Reading	Standard Reading	EUT Error (% of Rdg)	Calibration Uncertainty (% of Rdg)
CH1 / Vibration (peak)	Test Frequency 56 Hz Range 316 m/s^2	X-Axis	8.81 m/s^2	9.00 m/s^2	-2.1%	3%
			14.6 m/s^2	15.00 m/s^2	-2.7%	3%
			19.6 m/s^2	20.0 m/s^2	-2.0%	3%
			39.5 m/s^2	40.0 m/s^2	-1.3%	3%
CH2 / Vibration (peak)	Test Frequency 56 Hz Range 316 m/s^2	Y-Axis	8.94 m/s^2	9.00 m/s^2	-0.7%	3%
			14.9 m/s^2	15.00 m/s^2	-0.7%	3%
			19.8 m/s^2	20.0 m/s^2	-1.0%	3%
			40.0 m/s^2	40.0 m/s^2	0.0%	3%
CH3 / Vibration (peak)	Test Frequency 56 Hz Range 316 m/s^2	Z-Axis	8.97 m/s^2	9.00 m/s^2	-0.3%	3%
			14.9 m/s^2	15.00 m/s^2	-0.7%	3%
			19.9 m/s^2	20.0 m/s^2	-0.5%	3%
			40.0 m/s^2	40.0 m/s^2	0.0%	3%

Channel / Mode	Filter / Detector	Range	EUT Reading	Standard Reading	EUT Error	Calibration Uncertainty
CH4 / Sound	A / FAST (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
			114.1 dB	114.0 dB	0.1 dB	0.2 dB
	C / FAST (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
			114.1 dB	114.0 dB	0.1 dB	0.2 dB
	LIN / FAST (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
			114.1 dB	114.0 dB	0.1 dB	0.2 dB
	A / SLOW (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	114.1 dB	114.0 dB	0.1 dB	0.2 dB
	C / SLOW (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	114.1 dB	114.0 dB	0.1 dB	0.2 dB
	LIN / SLOW (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	114.1 dB	114.0 dB	0.1 dB	0.2 dB
	A / IMPULSE (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	114.1 dB	114.0 dB	0.1 dB	0.2 dB
	C / IMPULSE (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	114.1 dB	114.0 dB	0.1 dB	0.2 dB
	LIN / IMPULSE (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	114.1 dB	114.0 dB	0.1 dB	0.2 dB

- END -

Calibrated By : Dan
Date : 11-Dec-2020

Checked By : K.O. Lo
Date : 11-Dec-2020

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CALIBRATION CERTIFICATE

Certificate Information

Date of Issue	20-Mar-2021	**Certificate Number**	MLCN210569S

Customer Information

Company Name	Acuity Sustainability Consulting Limited
Address	Unit C, 11/F., Ford Glory Plaza, Nos. 37-39 Wing Hing Street, Cheung Sha Wan, Kowloon, HK

Equipment-under-Test (EUT)

Description	Sound Calibrator
Manufacturer	Svantek
Model Number	SV 33B
Serial Number	83042
Equipment Number	--

Calibration Particular

Date of Calibration	20-Mar-2021		
Calibration Equipment	4231(MLTE008) / AV200063 / 23-Jun-23 1357(MLTE190) / MLEC20/05/02 / 26-May-21		
Calibration Procedure	MLCG00, MLCG15		
Calibration Conditions	Laboratory	Temperature	23 °C ± 5 °C
		Relative Humidity	55% ± 25%
	EUT	Stabilizing Time	Over 3 hours
		Warm-up Time	Not applicable
		Power Supply	Internal battery
Calibration Results	Calibration data were detailed in the continuation pages. All calibration results were within EUT specification.		

Approved By & Date

K.O. Lo 20-Mar-2021

Statements

* Calibration equipment used for this calibration are traceable to national / international standards.
* The results on this Calibration Certificate only relate to the values measured at the time of the calibration and the uncertainties quoted will not include allowance for the EUT long term drift, variation with environmental changes, vibration and shock during transportation, overloading, mishandling, misuse, and the capacity of any other laboratory to repeat the measurement.
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Certificate No. MLCN210569S

Calibration Data

EUT Setting	Standard Reading	EUT Error	Calibration Uncertainty	EUT Specification
114 dB	114.0 dB	0.0 dB	0.15 dB	± 0.3 dB

- END -

Calibrated By : Dan
Date : 20-Mar-21

Checked K.O. Lo
Date : 20-Mar-21

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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.

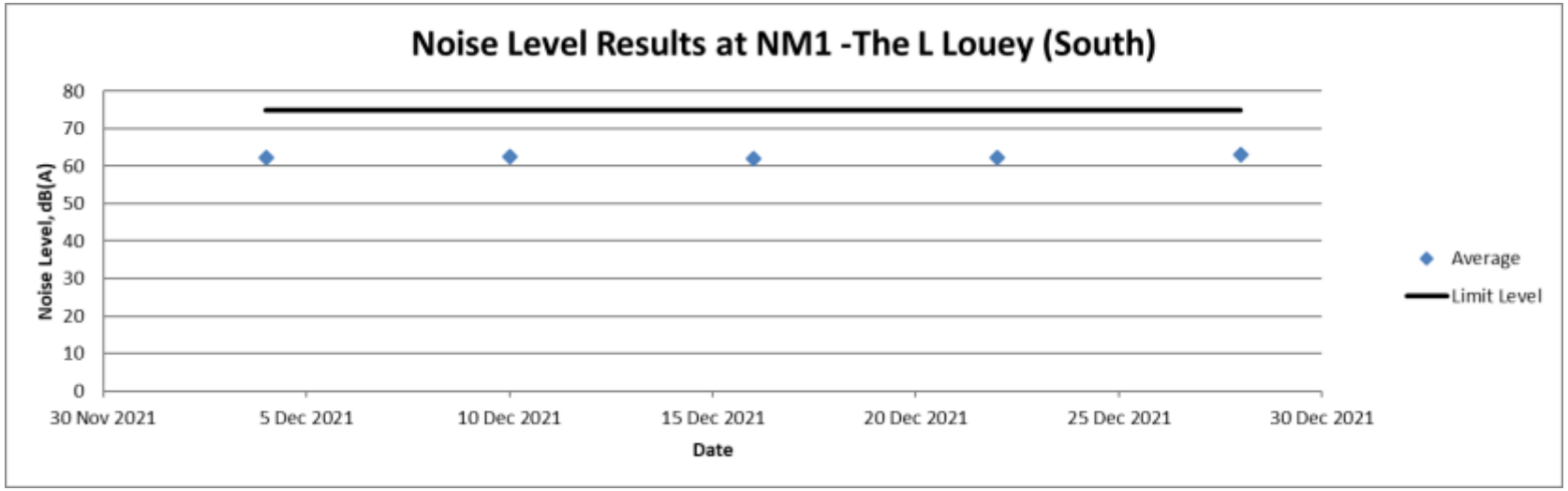
ADDITIONAL SPECIFICATIONS

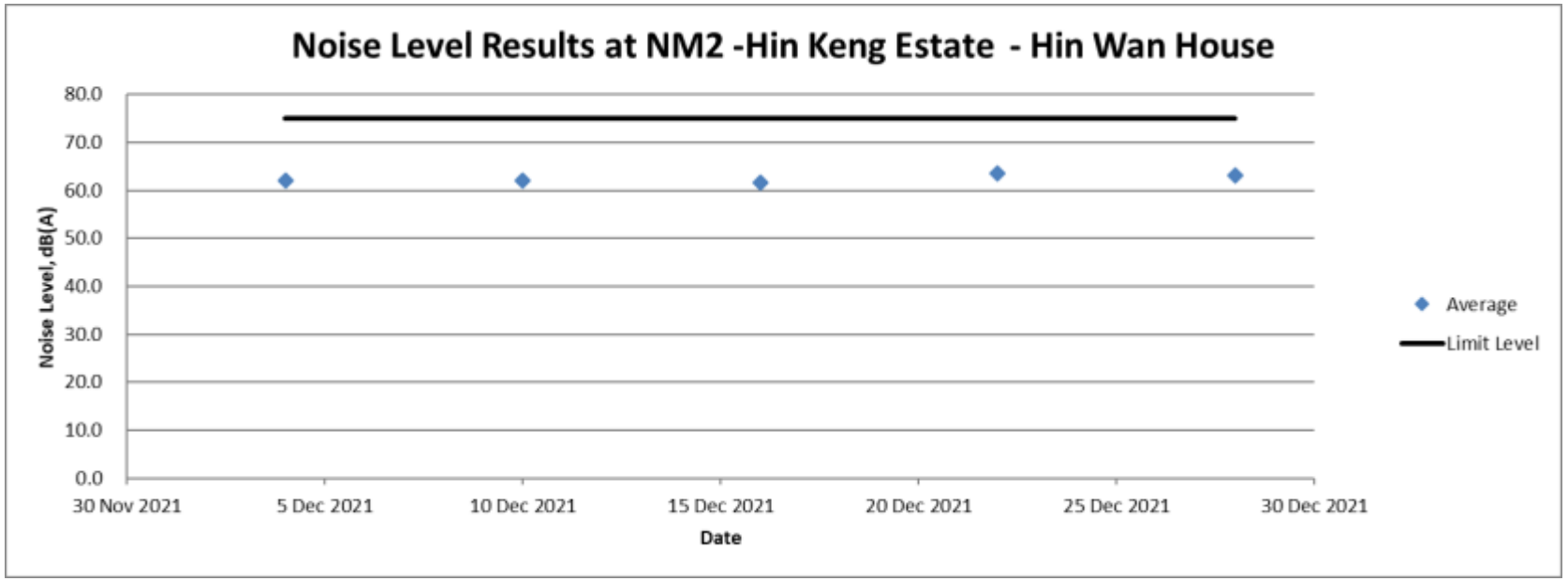
Display & Backlight	•	•		•										Reflective 3 1/2 digit LCD. Digit height 0.55 in / 9 mm. Aviation green electroluminescent backlight. Manual activation with auto-off.
			•		•	•								Reflective 5 digit LCD. Digit height 0.36 in / 9 mm. Choice of aviation green or visible red (NV models only) electroluminescent 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.

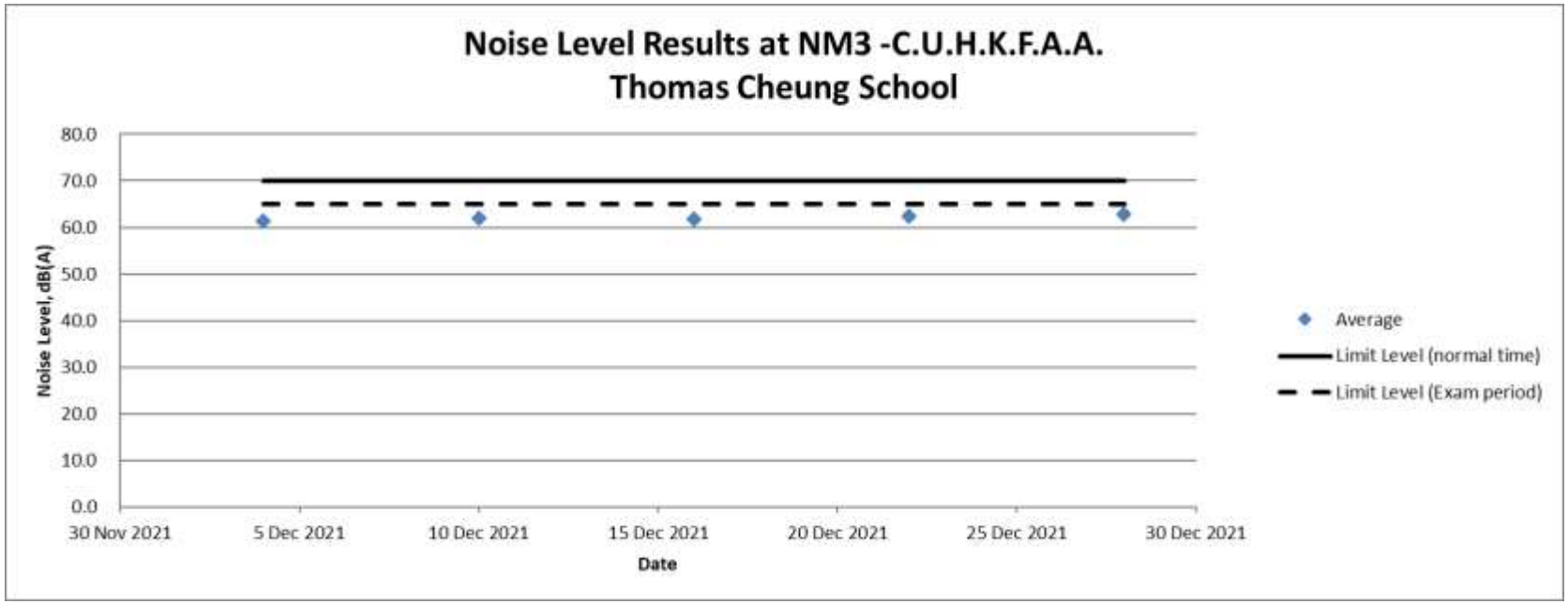
* NOTE. Accuracy calculated as uncertainty of the measurement derived from statistical analysis considering the comined effects from primary sensor specifications, circuit conversions, and all other sources of error using a coverage factor of k=2, or two standard deviations (2Σ).

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.

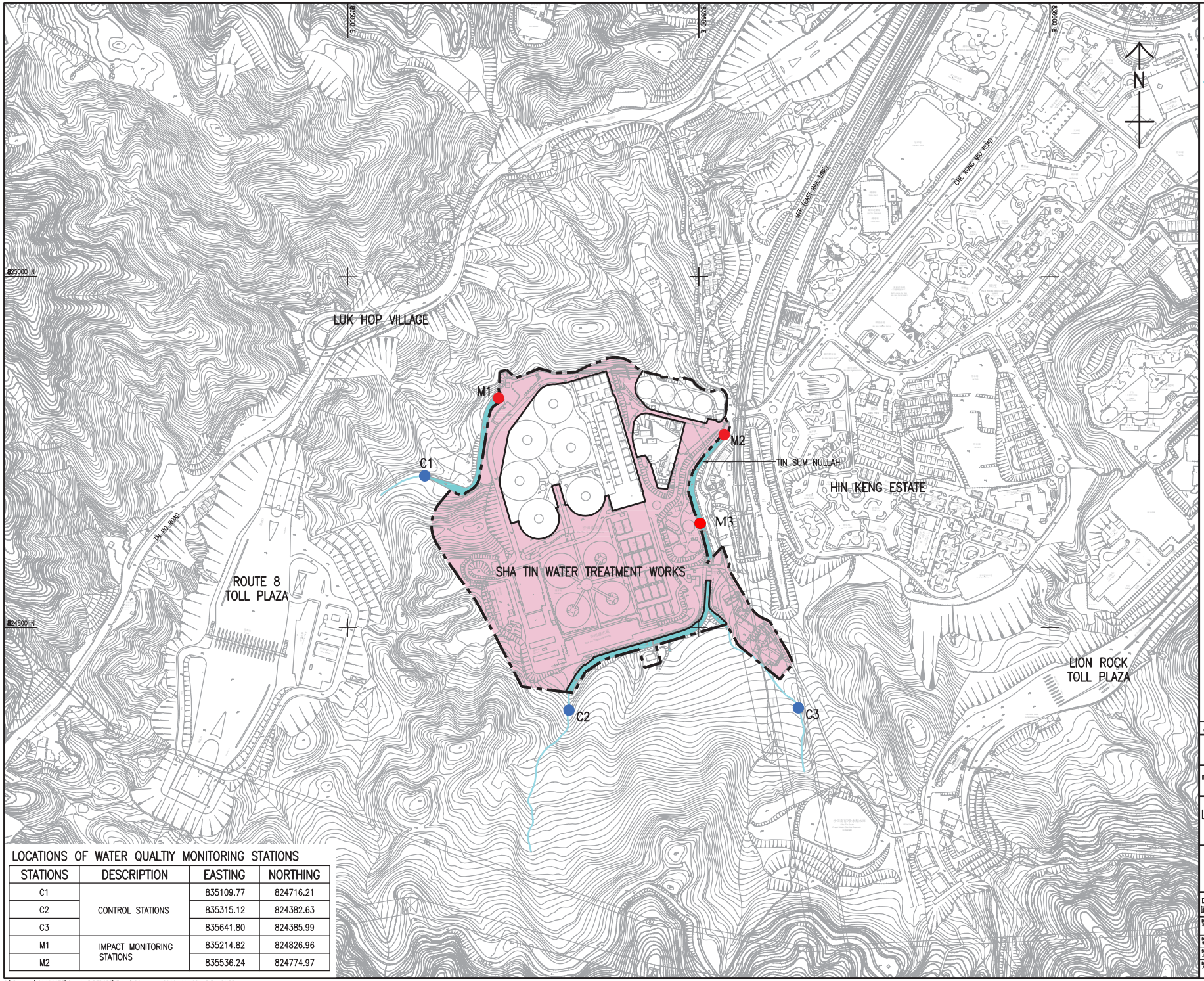
Appendix N
Impact Noise Monitoring Results and Graphical Presentation


Noise Level Results at NM1 -The L Louey (South)
Noise Level, dB(A)
80
70
60
50
40
30
20
10
0
30 Nov 2021
5 Dec 2021
10 Dec 2021
15 Dec 2021
20 Dec 2021
25 Dec 2021
30 Dec 2021
Date
Average
Limit Level


Noise Level Results at NM2 -Hin Keng Estate - Hin Wan House
Noise Level, dB(A)
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
30 Nov 2021
5 Dec 2021
10 Dec 2021
15 Dec 2021
20 Dec 2021
25 Dec 2021
30 Dec 2021
Date
Average
Limit Level


Noise Level Results at NM3 -C.U.H.K.F.A.A.
Thomas Cheung School
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Noise Level, dB(A)
30 Nov 2021
5 Dec 2021
10 Dec 2021
15 Dec 2021
20 Dec 2021
25 Dec 2021
30 Dec 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. : BA110010
Date of Issue : 09 November 2021

PART A – CUSTOMER INFORMATION

Acumen Environmental Engineering and Technologies Company Limited
Unit D, 12/F, Ford Glory Plaza
Nos. 37-39 Wing Hong Street
Cheung Sha Wan, Kowloon, HK
Attn: Alex Leung; Vega Wong

PART B – DESCRIPTION

Name of Equipment	:	Multi Water Quality Checker U-53
Manufacturer	:	Horiba
Serial Number	:	7900F01M
Date of Received	:	Nov 02, 2021
Date of Calibration	:	Nov 03, 2021
Date of Next Calibration[a]	:	Feb 03, 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	3.88	-0.12	Satisfactory
7.42	7.44	0.02	Satisfactory
10.01	10.04	0.03	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
15	15.65	0.65	Satisfactory
24	24.61	0.61	Satisfactory
32	32.18	0.18	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
Assistant Manager

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. : BA110010
Date of Issue : 09 November 2021

PART D – CALIBRATION RESULTS (Cont'd)

(3) Dissolved Oxygen

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)	Results
0.09	0.07	-0.02	Satisfactory
2.66	2.30	-0.36	Satisfactory
4.69	4.32	-0.37	Satisfactory
8.08	7.90	-0.18	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	9.07	-9.30	Satisfactory
20	18.99	-5.05	Satisfactory
30	29.28	-2.40	Satisfactory

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

(5) Turbidity

Expected Reading (NTU)	Displayed Reading[f] (NTU)	Tolerance[g] (%)	Results
0	0.31	--	Satisfactory
10	10.1	1.0	Satisfactory
20	20.4	2.0	Satisfactory
100	106	6.0	Satisfactory
800	797	-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
229	229	0	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

Acumen Laboratory and Testing Limited

Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Report Number	: Q210003aR211836
Job Number	: R211836
Issue Date	: 13/12/2021
Name of Applicant	: Acumen Environmental Engineering and Technologies Co., Ltd.
Address of Applicant	: Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Project Name	: CJO-3113-943
Sample Description	: SS test
Laboratory ID	: R211836/1-5
Date of Sampling	: 01/12/2021
Date Received	: 01/12/2021
Test Period	: 01/12/2021 – 02/12/2021
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. In-house Method, QPL-15e
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

Acumen Laboratory and Testing Limited
Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Report Number : Q210003aR211836

Job Number : R211836

Issue Date : 13/12/2021

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R211836/1	01/12/2021	C1	1.5
R211836/2	01/12/2021	C2	2.3
R211836/3	01/12/2021	M1	1.2
R211836/4	01/12/2021	M2	1.8
R211836/5	01/12/2021	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

Acumen Laboratory and Testing Limited
Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Report Number	: Q210003aR211718
Job Number	: R211718
Issue Date	: 07/12/2021
Name of Applicant	: Acumen Environmental Engineering and Technologies Co., Ltd.
Address of Applicant	: Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Project Name	: CJO-3113-931
Sample Description	: SS test
Laboratory ID	: R211718/1-5
Date of Sampling	: 03/12/2021
Date Received	: 03/12/2021
Test Period	: 03/12/2021 – 04/12/2021
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. In-house Method, QPL-15e
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

Acumen Laboratory and Testing Limited

Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Report Number : Q210003aR211718

Job Number : R211718

Issue Date : 07/12/2021

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R211718/1	03/12/2021	C1	<1
R211718/2	03/12/2021	C2	5.9
R211718/3	03/12/2021	M1	1.5
R211718/4	03/12/2021	M2	<1
R211718/5	03/12/2021	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

Acumen Laboratory and Testing Limited

Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Report Number	: Q220002aR220007
Job Number	: R220007
Issue Date	: 31/12/2021
Name of Applicant	: Acumen Environmental Engineering and Technologies Co., Ltd.
Address of Applicant	: Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Project Name	: CJO-3113-939
Sample Description	: SS test
Laboratory ID	: R220007/1-5
Date of Sampling	: 06/12/2021
Date Received	: 24/12/2021
Test Period	: 24/12/2021 – 25/12/2021
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. In-house Method, QPL-15e
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

Acumen Laboratory and Testing Limited
Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Report Number : Q220002aR220007

Job Number : R220007

Issue Date : 31/12/2021

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R220007/1	06/12/2021	C1	3.1
R220007/2	06/12/2021	C2	1.3
R220007/3	06/12/2021	M1	<1
R220007/4	06/12/2021	M2	1.2
R220007/5	06/12/2021	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

Acumen Laboratory and Testing Limited
Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Report Number	: Q210003aR211719
Job Number	: R211719
Issue Date	: 10/12/2021
Name of Applicant	: Acumen Environmental Engineering and Technologies Co., Ltd.
Address of Applicant	: Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Project Name	: CJO-3113-932
Sample Description	: SS test
Laboratory ID	: R211719/1-5
Date of Sampling	: 08/12/2021
Date Received	: 08/12/2021
Test Period	: 08/12/2021 – 09/12/2021
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. In-house Method, QPL-15e
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

Acumen Laboratory and Testing Limited

Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Report Number : Q210003aR211719

Job Number : R211719

Issue Date : 10/12/2021

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R211719/1	08/12/2021	C1	<1
R211719/2	08/12/2021	C2	<1
R211719/3	08/12/2021	M1	<1
R211719/4	08/12/2021	M2	<1
R211719/5	08/12/2021	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

Acumen Laboratory and Testing Limited
Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Report Number	: Q210003aR211744
Job Number	: R211744
Issue Date	: 14/12/2021
Name of Applicant	: Acumen Environmental Engineering and Technologies Co., Ltd.
Address of Applicant	: Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Project Name	: CJO-3113-933
Sample Description	: SS test
Laboratory ID	: R211744/1-5
Date of Sampling	: 10/12/2021
Date Received	: 10/12/2021
Test Period	: 10/12/2021 – 11/12/2021
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. In-house Method, QPL-15e
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

Acumen Laboratory and Testing Limited
Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Report Number : Q210003aR211744

Job Number : R211744

Issue Date : 14/12/2021

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R211744/1	10/12/2021	C1	<1
R211744/2	10/12/2021	C2	<1
R211744/3	10/12/2021	M1	<1
R211744/4	10/12/2021	M2	<1
R211744/5	10/12/2021	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

Acumen Laboratory and Testing Limited
Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Report Number	: Q210003aR211756
Job Number	: R211756
Issue Date	: 17/12/2021
Name of Applicant	: Acumen Environmental Engineering and Technologies Co., Ltd.
Address of Applicant	: Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Project Name	: CJO-3113-934
Sample Description	: SS test
Laboratory ID	: R211756/1-5
Date of Sampling	: 13/12/2021
Date Received	: 13/12/2021
Test Period	: 13/12/2021 – 14/12/2021
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. In-house Method, QPL-15e
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

Acumen Laboratory and Testing Limited
Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Report Number : Q210003aR211756

Job Number : R211756

Issue Date : 17/12/2021

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R211756/1	13/12/2021	C1	2.3
R211756/2	13/12/2021	C2	2.3
R211756/3	13/12/2021	M1	2.2
R211756/4	13/12/2021	M2	1.2
R211756/5	13/12/2021	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

Acumen Laboratory and Testing Limited
Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Report Number	: Q210003aR211779
Job Number	: R211779
Issue Date	: 21/12/2021
Name of Applicant	: Acumen Environmental Engineering and Technologies Co., Ltd.
Address of Applicant	: Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Project Name	: CJO-3113-935
Sample Description	: SS test
Laboratory ID	: R211779/1-5
Date of Sampling	: 15/12/2021
Date Received	: 15/12/2021
Test Period	: 15/12/2021 – 16/12/2021
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. In-house Method, QPL-15e
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

Acumen Laboratory and Testing Limited
Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Report Number : Q210003aR211779

Job Number : R211779

Issue Date : 21/12/2021

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R211779/1	15/12/2021	C1	4.5
R211779/2	15/12/2021	C2	6.3
R211779/3	15/12/2021	M1	1.8
R211779/4	15/12/2021	M2	1.6
R211779/5	15/12/2021	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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Acumen Laboratory and Testing Limited
Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Report Number	: Q210003aR211780
Job Number	: R211780
Issue Date	: 21/12/2021
Name of Applicant	: Acumen Environmental Engineering and Technologies Co., Ltd.
Address of Applicant	: Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Project Name	: CJO-3113-936
Sample Description	: SS test
Laboratory ID	: R211780/1-5
Date of Sampling	: 17/12/2021
Date Received	: 17/12/2021
Test Period	: 17/12/2021 – 18/12/2021
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. In-house Method, QPL-15e
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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Acumen Laboratory and Testing Limited
Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Report Number : Q210003aR211780

Job Number : R211780

Issue Date : 21/12/2021

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R211780/1	17/12/2021	C1	1.5
R211780/2	17/12/2021	C2	1.2
R211780/3	17/12/2021	M1	1.3
R211780/4	17/12/2021	M2	2.8
R211780/5	17/12/2021	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	: Q210003aR211804
Job Number	: R211804
Issue Date	: 28/12/2021
Name of Applicant	: Acumen Environmental Engineering and Technologies Co., Ltd.
Address of Applicant	: Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Project Name	: CJO-3113-937
Sample Description	: SS test
Laboratory ID	: R211804/1-5
Date of Sampling	: 20/12/2021
Date Received	: 20/12/2021
Test Period	: 20/12/2021 – 21/12/2021
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. In-house Method, QPL-15e
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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Acumen Laboratory and Testing Limited
Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Report Number : Q210003aR211804

Job Number : R211804

Issue Date : 28/12/2021

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Soiids (SS), mg/L
R211804/1	20/12/2021	C1	1.4
R211804/2	20/12/2021	C2	2.4
R211804/3	20/12/2021	M1	1.3
R211804/4	20/12/2021	M2	1.1
R211804/5	20/12/2021	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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Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Report Number	: Q210003aR211811
Job Number	: R211811
Issue Date	: 28/12/2021
Name of Applicant	: Acumen Environmental Engineering and Technologies Co., Ltd.
Address of Applicant	: Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Project Name	: CJO-3113-938
Sample Description	: SS test
Laboratory ID	: R211811/1-5
Date of Sampling	: 22/12/2021
Date Received	: 22/12/2021
Test Period	: 22/12/2021 – 23/12/2021
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. In-house Method, QPL-15e
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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Acumen Laboratory and Testing Limited
Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Report Number : Q210003aR211811

Job Number : R211811

Issue Date : 28/12/2021

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R211811/1	22/12/2021	C1	1.4
R211811/2	22/12/2021	C2	1.0
R211811/3	22/12/2021	M1	1.7
R211811/4	22/12/2021	M2	<1
R211811/5	22/12/2021	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	: Q220002aR220008
Job Number	: R220008
Issue Date	: 30/12/2021
Name of Applicant	: Acumen Environmental Engineering and Technologies Co., Ltd.
Address of Applicant	: Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Project Name	: CJO-3113-940
Sample Description	: SS test
Laboratory ID	: R220008/1-5
Date of Sampling	: 24/12/2021
Date Received	: 24/12/2021
Test Period	: 24/12/2021 – 25/12/2021
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. In-house Method, QPL-15e
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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Acumen Laboratory and Testing Limited

Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Report Number : Q220002aR220008

Job Number : R220008

Issue Date : 30/12/2021

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R220008/1	24/12/2021	C1	1.2
R220008/2	24/12/2021	C2	2.7
R220008/3	24/12/2021	M1	1.5
R220008/4	24/12/2021	M2	2.3
R220008/5	24/12/2021	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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Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Report Number	: Q220002aR220009
Job Number	: R220009
Issue Date	: 03/01/2022
Name of Applicant	: Acumen Environmental Engineering and Technologies Co., Ltd.
Address of Applicant	: Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Project Name	: CJO-3113-941
Sample Description	: SS test
Laboratory ID	: R220009/1-5
Date of Sampling	: 28/12/2021
Date Received	: 28/12/2021
Test Period	: 28/12/2021 – 29/12/2021
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. In-house Method, QPL-15e
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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Acumen Laboratory and Testing Limited

Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Report Number : Q220002aR220009

Job Number : R220009

Issue Date : 03/01/2022

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R220009/1	28/12/2021	C1	1.2
R220009/2	28/12/2021	C2	2.7
R220009/3	28/12/2021	M1	1.5
R220009/4	28/12/2021	M2	2.3
R220009/5	28/12/2021	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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Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Report Number	: Q220002aR220030
Job Number	: R220030
Issue Date	: 03/01/2022
Name of Applicant	: Acumen Environmental Engineering and Technologies Co., Ltd.
Address of Applicant	: Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Project Name	: CJO-3113-942
Sample Description	: SS test
Laboratory ID	: R220030/1-5
Date of Sampling	: 30/12/2021
Date Received	: 30/12/2021
Test Period	: 30/12/2021 – 31/12/2021
Test Required	: 1. Suspended Solids (SS)
Method Used	: 1. In-house Method, QPL-15e
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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Acumen Laboratory and Testing Limited

Unit D, 12/F, Ford Glory Plaza, No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong
Tel: (852) 2333 6823 Fax: (852) 2333 1316

Test Report

Report Number : Q220002aR220030

Job Number : R220030

Issue Date : 03/01/2022

Test Result:

Lab ID	Date of Sampling	Client Sample ID	Suspended Solids (SS), mg/L
R220030/1	30/12/2021	C1	<1
R220030/2	30/12/2021	C2	2.3
R220030/3	30/12/2021	M1	<1
R220030/4	30/12/2021	M2	<1
R220030/5	30/12/2021	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

Date	Time	Weather	Location	Co-ordinates		Water Depth	Sample Depth	Temp.		DO con.		Turbidity		pH		SS
				East	North	m	m	°C		mg/L		NTU		unit		mg/L
1/12/2021	12:43	Fine	C1	835110	824716	0.04	0.02	18.3	18.4	8.39	8.38	2.3	2.2	7.53	7.54	1.5
	13:05	Fine	C2	835403	824470	0.02	0.01	18.9	18.8	8.72	8.72	2.5	2.6	7.57	7.56	2.3
	N/A	Fine	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
	12:12	Fine	M1	835215	824827	0.8	0.4	18.9	18.9	9.27	9.27	2.7	2.6	7.7	7.71	1.2
	11:21	Fine	M2	835536	824775	0.05	0.025	18.8	18.7	9.1	9.09	2.4	2.4	7.26	7.26	1.8
	11:37	Fine	M3	835501	824648	0.02	0.01	18.2	18.2	9.38	9.38	0	0.1	7.53	7.52	<1
3/12/2021	12:55	Fine	C1	835110	824716	0.04	0.02	19.5	19.4	8.85	8.85	2.6	2.7	7.79	7.8	<1
	13:14	Fine	C2	835403	824470	0.02	0.01	19.4	19.3	8.67	8.66	2.7	2.7	7.23	7.23	**5.9**
	N/A	Fine	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
	12:29	Fine	M1	835215	824827	0.8	0.4	20	20	9.43	9.43	2.8	2.7	7.41	7.4	1.5
	11:38	Fine	M2	835536	824775	0.05	0.025	19.6	19.5	9.23	9.22	2.6	2.7	7.68	7.68	<1
	11:52	Fine	M3	835501	824648	0.02	0.01	19.9	19.8	9.62	9.61	0.2	0.2	7.64	7.65	<1
6/12/2021	16:35	Sunny	C1	835110	824716	0.04	0.02	19.6	19.6	8.32	8.32	2.6	2.7	7.73	7.74	3.1
	16:55	Sunny	C2	835403	824470	0.02	0.01	19.4	19.4	8.43	8.44	2.4	2.4	7.32	7.31	1.3
	N/A	Sunny	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
	16:07	Sunny	M1	835215	824827	0.8	0.4	19.9	20	9.28	9.29	2.5	2.5	7.28	7.29	<1
	15:23	Sunny	M2	835536	824775	0.05	0.025	19.8	19.8	9.45	9.46	2.3	2.3	7.66	7.66	1.2
	15:37	Sunny	M3	835501	824648	0.02	0.01	19.6	19.6	9.9	9.9	0	0	7.52	7.52	<1
8/12/2021	13:27	Sunny	C1	835110	824716	0.04	0.02	20.3	20.3	8.76	8.76	2.7	2.7	7.71	7.71	<1
	13:50	Sunny	C2	835403	824470	0.02	0.01	20.7	20.7	8.83	8.83	2.5	2.5	7.68	7.68	<1
	N/A	Sunny	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
	12:54	Sunny	M1	835215	824827	0.8	0.4	21	21	9.35	9.35	2.4	2.3	7.55	7.57	<1
	12:07	Sunny	M2	835536	824775	0.05	0.025	20.3	20.3	9.26	9.26	2.7	2.7	7.31	7.3	<1
	12:19	Sunny	M3	835501	824648	0.02	0.01	20.3	20.3	9.75	9.75	0.2	0.2	7.76	7.78	<1
10/12/2021	9:55	Sunny	C1	835110	824716	0.04	0.02	20.93	21.13	13.46	11.8	2.7	2.25	7.61	7.61	<1
	10:15	Sunny	C2	835403	824470	0.02	0.01	20.63	19.38	12.21	14.13	1.56	1.24	7.86	7.65	<1
	N/A	Sunny	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
	9:35	Sunny	M1	835215	824827	0.8	0.4	21.25	21.26	13.88	14.36	2.1	2.47	7.61	7.63	<1
	9:10	Sunny	M2	835536	824775	0.05	0.025	22.07	21.94	13.58	12.24	1.25	0.99	7.97	7.96	<1
	9:20	Sunny	M3	835501	824648	0.02	0.01	22.66	22.84	14.64	12.89	0	0.12	7.47	7.49	<1
13/12/2021	9:50	Sunny	C1	835110	824716	0.04	0.02	20.88	20.89	13.71	13.62	0	0.79	7.35	7.34	2.3
	10:11	Sunny	C2	835403	824470	0.02	0.01	20.88	20.83	12.33	12.35	2.45	2.36	7.25	7.24	2.3
	N/A	Sunny	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
	9:36	Sunny	M1	835215	824827	0.8	0.4	20.97	21.01	14.45	13.69	1.87	1.56	7.76	7.75	2.2
	9:07	Sunny	M2	835536	824775	0.05	0.025	21.05	21	13.22	13.45	1.51	1.26	7.4	7.38	1.2
	9:13	Sunny	M3	835501	824648	0.02	0.01	21.1	21.25	13.57	13.89	0.93	0.78	7.53	7.54	<1

15/12/2021	10:00	Sunny	C1	835110	824716	0.04	0.02	21.68	21.68	10.71	9.74	0.59	0.53	7.72	7.72	**4.5**
	9:30	Sunny	C2	835403	824470	0.02	0.01	21.83	21.81	13.56	12.61	1.38	1.15	7.83	7.82	**6.3**
	N/A	Sunny	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
	10:35	Sunny	M1	835215	824827	0.8	0.4	21.7	21.62	14.97	13.16	1.34	1.03	7.73	7.72	1.8
	9:14	Sunny	M2	835536	824775	0.05	0.025	21.7	21.71	13.36	11.47	1.35	1.12	7.68	7.67	1.6
	9:19	Sunny	M3	835501	824648	0.02	0.01	21.75	21.75	12.78	13.18	0.68	0.64	7.66	7.66	<1
17/12/2021	9:56	Sunny	C1	835110	824716	0.04	0.02	22.39	22.39	13.9	11.14	0.89	0.77	7.7	7.67	1.5
	9:45	Sunny	C2	835403	824470	0.02	0.01	22.62	22.47	13.83	11.12	0.65	0.6	7.72	7.68	1.2
	N/A	Sunny	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
	10:30	Sunny	M1	835215	824827	0.8	0.4	22.34	22.37	10.15	9.95	1.29	1.32	7.65	7.65	1.3
	9:25	Sunny	M2	835536	824775	0.05	0.025	22.36	22.35	13.27	13.54	0.85	0.69	7.69	7.66	2.8
	9:30	Sunny	M3	835501	824648	0.02	0.01	22.37	22.33	10.69	10.66	0.47	0.55	7.66	7.66	<1
20/12/2021	9:58	Cloudy	C1	835110	824716	0.04	0.02	19.66	19.66	10.91	10.46	1.38	1.59	7.77	7.76	1.4
	9:42	Cloudy	C2	835403	824470	0.02	0.01	19.83	19.66	10.93	11.61	0.53	0.62	7.78	7.78	2.4
	N/A	Cloudy	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
	10:39	Cloudy	M1	835215	824827	0.8	0.4	19.78	19.77	11.77	10.88	0.6	0.67	7.73	7.73	1.3
	9:30	Cloudy	M2	835536	824775	0.05	0.025	19.77	19.75	9.66	11.15	0.28	0.28	7.74	7.73	1.1
	9:33	Cloudy	M3	835501	824648	0.02	0.01	19.75	19.69	10.05	9.93	0.19	0.21	7.74	7.75	<1
22/12/2021	9:41	Fine	C1	835110	824716	0.04	0.02	20.42	20.43	12.63	12.14	0.5	0.54	7.73	7.72	1.4
	11:25	Fine	C2	835403	824470	0.02	0.01	20.77	20.79	10.26	8.95	0.8	0.78	7.7	7.7	1.0
	N/A	Fine	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
	10:35	Fine	M1	835215	824827	0.8	0.4	20.49	20.5	11.85	11.27	0.89	1.01	7.72	7.72	1.7
	9:15	Fine	M2	835536	824775	0.05	0.025	20.52	20.51	10.51	9.06	1.17	0.99	7.73	7.73	<1
	9:18	Fine	M3	835501	824648	0.02	0.01	20.5	20.5	10.66	10.26	0.55	0.65	7.74	7.74	<1
24/12/2021	10:01	Fine	C1	835110	824716	0.04	0.02	21.37	21.37	9.04	8.65	1.16	1	7.69	7.69	1.2
	10:30	Fine	C2	835403	824470	0.02	0.01	21.45	21.45	10.92	9.94	0.55	0.65	7.49	7.51	2.7
	N/A	Fine	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
	9:35	Fine	M1	835215	824827	0.8	0.4	21.39	21.39	11.23	11	1.17	1.14	7.31	7.32	1.5
	9:10	Fine	M2	835536	824775	0.05	0.025	21.14	21.15	13.6	12.82	0.27	0.29	7.72	7.71	2.3
	9:13	Fine	M3	835501	824648	0.02	0.01	21.12	21.11	12.17	10.48	0	0	7.71	7.7	<1
28/12/2021	10:10	Cloudy	C1	835110	824716	0.04	0.02	18.66	18.62	10.07	9.06	0.93	0.88	7.68	7.68	1.2
	10:32	Cloudy	C2	835403	824470	0.02	0.01	18.78	18.81	11.18	11.21	0.69	0.72	7.65	7.64	2.7
	N/A	Cloudy	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
	9:55	Cloudy	M1	835215	824827	0.8	0.4	18.77	18.76	11.11	10.86	0.87	0.93	6.9	6.86	1.5
	9:36	Cloudy	M2	835536	824775	0.05	0.025	18.24	18.46	13.37	12.38	1.74	1.67	7.73	7.72	2.3
	9:39	Cloudy	M3	835501	824648	0.02	0.01	18.35	18.31	12.29	10.33	0.71	0.63	7.78	7.83	<1
30/12/2021	10:09	Sunny	C1	835110	824716	0.04	0.02	20.36	20.41	8.42	8.42	0.23	0.19	7.65	7.75	<1
	10:36	Sunny	C2	835403	824470	0.02	0.01	20.45	20.5	8.32	8.32	0.85	0.97	7.73	7.71	2.3
	N/A	Sunny	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
	9:48	Sunny	M1	835215	824827	0.8	0.4	20.13	20.11	9.24	9.24	1.22	1.22	7.76	7.77	<1
	9:26	Sunny	M2	835536	824775	0.05	0.025	20.44	20.44	9.41	9.41	2.14	2.08	8.13	8.22	<1
	9:29	Sunny	M3	835501	824648	0.02	0.01	20.44	20.21	9.47	9.46	0.78	0.9	8.17	7.75	<1

Remark 1: Values that are <1 is assumed to be 1 during calculation.
Remark 2: Bolded values indicated exceedance of action level.

There were 3 exceedances of Action Level.
All exceedances were found non project related.

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.88

December 2021

TABLE OF CONTENTS

ANNEXES

1. INTRODUCTION

1.1 Pursuant to the Environmental Impact Assessment (EIA) Ordinance, the Director of Environmental Protection (DEP) granted the Environmental Permit (No. EP- 494/2015) to the Water Supplies Department (WSD) to construct and operate the designated project for "In-situ Reprovisioning of Sha Tin Water Treatment Works - South Works" ("The Project").

1.2 Upon the requirement of the Environmental Permit, a detailed vegetation report presenting the baseline vegetation condition for flora species with conservation interest, transplanting and monitoring programme for the Project has been prepared and approved by DEP in February 2016.

1.3 There were 4 flora species of conservation importance were recorded in the woodland habitat within project site including Ailanthus (*Ailanthus fordii*), Incense Tree (*Aquilaria sinensis*), Lamb of Tartary (*Cibotium barometz*) and Hong Kong Eagle's Claw (*Artabotrys hongkongensis*). In total, 2 nos. of Incense Tree (*Aquilaria sinensis*), 1 no. of Ailanthus (*Ailanthus fordii)* trees, 5 colonies of Lamb of Tartary (*Cibotium barometz)* and 1 no. Hong Kong Eagle's Claw (*Artabotrys hongkongensis)* was recommended to be transplanted in the approved detailed vegetation survey report.

1.4 Detailed vegetation report was planned that Incense Tree (*Aquilaria sinensis*) and Ailanthus (*Ailanthus fordii)* trees will be transplanted within existing Sha Tin Water Treatment Works (STWTW). All other shrubs including Lamb of Tartary (*Cibotium barometz)* and Hong Kong Eagle's Claw (*Artabotrys hongkongensis)* will be transplanted to the hillside slope at Sha Tin South Fresh Water Service Reservoir (STSFWSR).

1.2 Upon the requirement of the Environmental Permit, a qualified Ecologist was commissioned to prepare a post-transplantation monitoring report to present the status (health condition and survival rate) of transplanted vegetation and submitted to the DEP.

1.3 Monitoring of transplanted flora was conducted after the transplantation. The monitoring will be conducted at twice per month during the first year and once per month during the course of planting works. The parameters to be monitoring will include the health condition and survival rate of the transplanted flora. Any observations and recommendations will be reported in monthly EM&A reports.

1.3 This is Tree Report presents data collected on 31 December 2021. It contains the following information:

- Introduction (Section 1)
- Description of Tree Monitoring Area (Section 2)
- Monitoring Methodology (Section 3)
- Result (Section 4)
- Mitigation Measures (Section 5)
- Summary (Section 6)

- Photos (Annex I)
- Summary table (Annex II)
- Typhoon information (Annex 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.

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 is 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 31 December 2021. Three trees TA572, TA326 and TA327 were transplanted to tree compensation area within the Sha Tin Water Treatment Works (STWTW) on 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 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 was not a favourable microhabitat for *Cibotium barometz* to be transplanted back. Two best 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.

4.4 All 27 nos. of *Cibotium barometz* transplanted from the nursery at Shui Mei Tsuen, Kam Tin are generally in fair condition at their current location at STSFWSR.

4.5 The Hong Kong Eagle's Claw (*Artabotrys hongkongensis)* was observed dead during inspection on 20 August 2016.

4.6 Transplantation of the 27 nos. of *Cibotium barometz*; and compensatory planting of TA326 and the climber *Artabotrys hongkongensis* have been conducted as detailed in Section 5 during this monitoring month.

5. MITIGATION MEASURE

5.1 In order to compensate for the loss of transplanted *Artabotrys hongkongensis* which is in climber growing form, it is recommended to plant an individual of native climber species at compensatory planting site together with compensatory tree planting. Recommended list of species is 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*	蒼白秤鉤風	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-flowered Honeysuckle	*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 *Desmos chinensis* has been finalized as the candidate. Two individuals were planted at Wall C in STWTW on 1 April 2021 (Annex I).

5.3 Under proper maintenance in the nursery, with provision of sufficient shelter and irrigation spray head, all 27 nos. Lamb of Tartary (*Cibotium barometz*) are generally in fair condition. They are at acceptable condition to be transplanted back to the designated recipient site at STSFWSR in accordance with Project Programme.

5.4 All 27 nos. Lamb of Tartary (*Cibotium barometz*) were transplanted successfully back to Portion E of STSFWSR on 23 April 2021 (Annex I). In order to enhance a sustainable survival during the post-transplantation stage, a shelter (such as 遮光網) has been installed to reduce intensity of direct sunlight received and avoid direct hit of rainstorm/ typhoon.

5.5 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.

5.6 Robust fencing has been set up to enclose the 27 nos. transplanted *Cibotium barometz* (in groups when planted together) to avoid unnecessary disturbance/ damage to them. Any collapsed shelter and fencing shall be rectified promptly.

5.7 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.

5.8 The 27 nos. transplanted *Cibotium barometz* shall be maintained with proposed mitigated measures mentioned for 12 months for establishment. A 12-month post-transplantation monitoring period helps to assess their survival during the establishment period.

5.9 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 more exposed habitat under direct sunlight, can be sourced for compensatory planting.

5.10 Root ball of TA572 and TA327 tree should be kept moisture especially during non-raining day.

5.11 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.

5.12 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 is 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

5.13 Based on the Tree Survey Report, the following trees transplanted under Contract No. 3/WSD/15 were found dead. In accordance with GS 3.97 (3), replacement planting of TB0054, B0056, TB0101 and TC0138 has been completed on 25 March 2021 (Annex I).

5.14 Two *Syzygium levinei* and one *Schefflera heptaphylla* have been chosen from Table 2 as compensation for the loss of TA0326.

5.15 However, the two native *Syzygium levinei* (山蒲桃) were mis-planted by two exotic *Syzygium jambos* (蒲桃), of which both of their Chinese names and Scientific names are different by one word.

5.16 The two mis-planted *Syzygium jambos* was replaced by another native tree species *Celtis sinensis* chosen from Table 2 due to market availability at this moment. Replacement works was conducted on 31 May 2021.

Table 3. Summary table compensatory planting.

Tree No.	Species	Compensatory/ Replacement Planting
TA0326	*Aquilaria sinensis* 土沉香	Compensated by 1 no. of *Schefflera heptaphylla* and 2 nos. of *Celtis sinensis*

5.17 With completion of compensatory planting for the loss of *Artabotrys hongkongensis* and TA0326 (*Aquilaria sinensis*), survival is monitored for the replaced species from now on (i.e. 2 nos. of *Desmos chinensis*; 1 no. of *Schefflera heptaphylla* and 2 nos. of *Celtis sinensis*).

5.18 Survival of the 27 nos. of Lamb of Tartary (*Cibotium barometz*) transplanted back to STSFWSR is monitored too. No more individual is stored at the nursery.

5.19 Health condition and survival rate (started from 100% in this monitoring month) is shown in Annex II.

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 Compensatory planting of TA326 has been completed on 25 March 2020 by planting two *Syzygium levinei* and one *Schefflera heptaphylla*. However, the two native *Syzygium levinei* were mis-planted by two exotic *Syzygium jambos*, which has been replaced by another native tree species *Celtis sinensis* on 31 May 2021.

6.3 *Desmos chinensis* has been finalized as the candidate to compensate the loss of *Artabotrys hongkongensis*. Two individuals were planted at Wall C in STWTW on 1 April 2021.

6.4 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.

6.5 They are at acceptable condition to be transplanted back at Portion E of STSFWSR on 23 April 2021.

6.6 In order to enhance a sustainable survival during the post-transplantation stage, a shelter (such as 遮光網) has been installed to reduce intensity of direct sunlight received and avoid direct hit of rainstorm/ typhoon to the 27 nos. *Cibotium barometz*.

6.7 Regular irrigation, set up of protection zone and weeding by hand held tools within protection zone, shall also be provided to the transplanted/ compensated plants in order to sustain their survival during the post-transplantation (establishment) stage.

6.8 Root ball of TA572 and TA327 tree should be kept moisture especially during dry and non-raining day.

ANNEX I
Photo

	
Photo 1. Broken fencing to be rectified	Photo 2. Broken fencing to be rectified
	
Photo 3. The shelter effectively reduced the amount of direct sunlight to *Cibotium barometz*	Photo 4. *Cibotium barometz* under the shelter
	
Photo 5. Excessive weeds have been cleared	Photo 6. Collapsed shelter to be rectified to cover the exposed *Cibotium barometz*

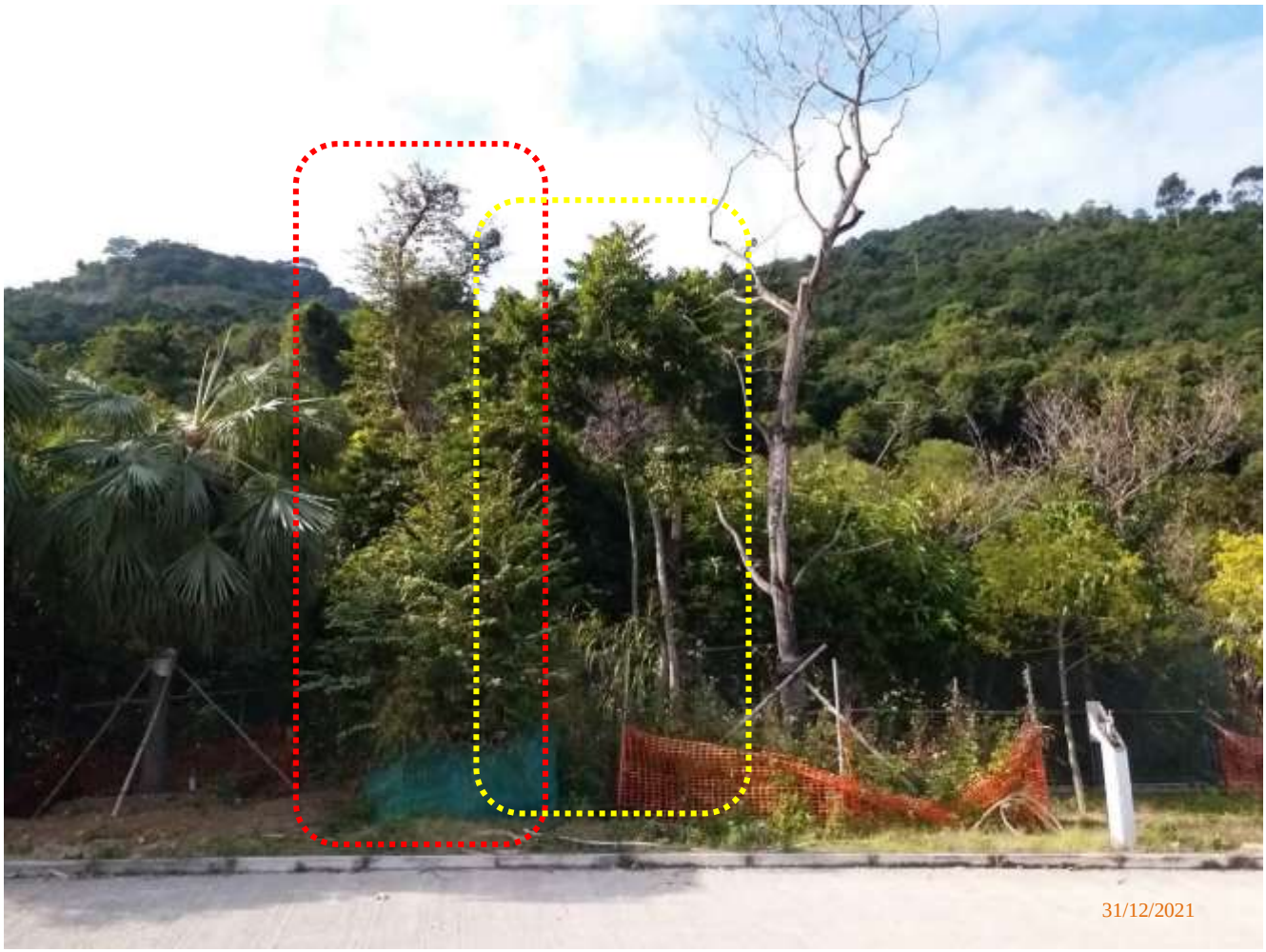


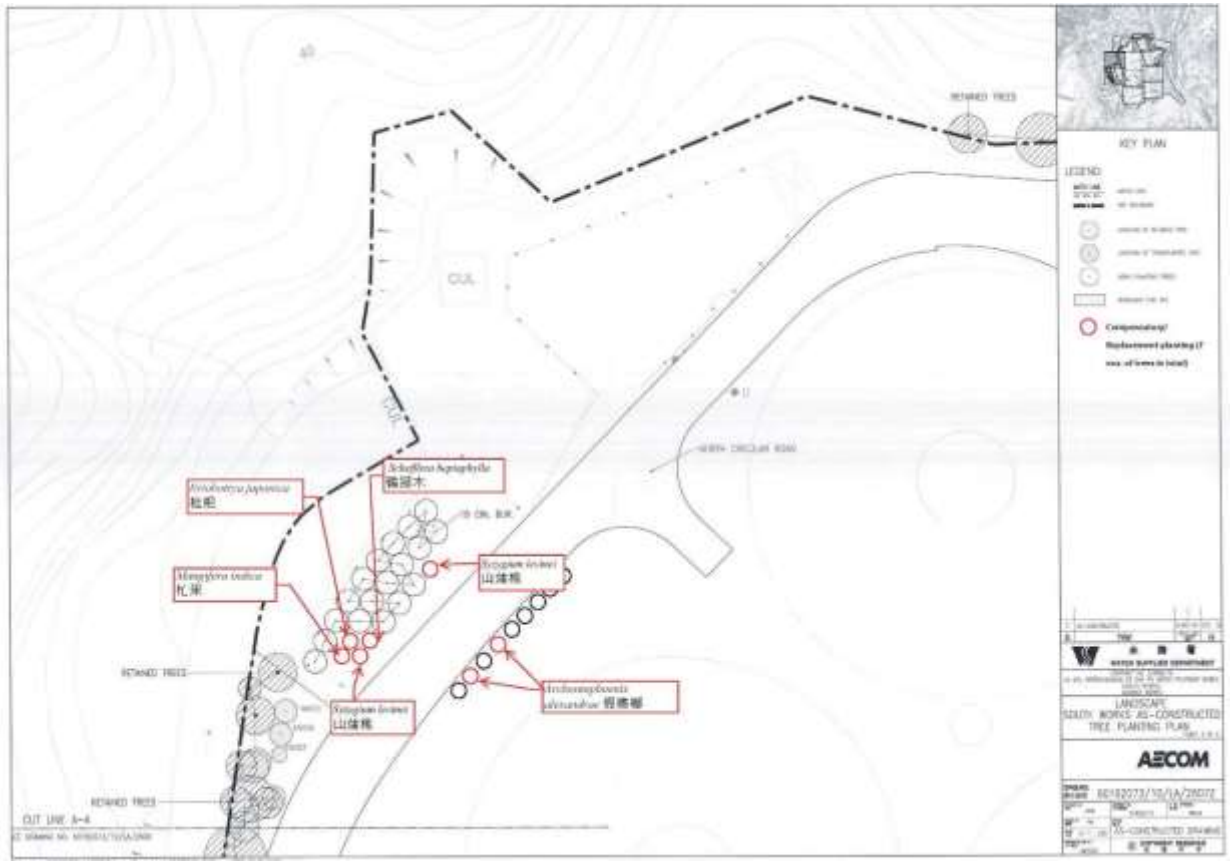
Photo 7. Transplanted Incense Tree (*Aquilaria sinensis*) – TA327 (left); and Ailanthus (*Ailanthus fordii*) – TA572 (right)

Photo 8. Weeding around TA327 shall be conducted.

Photo 9. Weak crown and two broken trunks of TA572.

	
Photo 10. Collapsed fencing to be rectified. The climbers and weeds have been cleared.	Photo 11. *Desmos chinensis* as compensatory planting of *Artabotrys hongkongensis*
	BLANK
Photo 12. *Schefflera heptaphylla* as compensatory planting of TA326;	

Photo 13 & 14. The two exotic *Syzygium jambos* (mis-treated as the native *Syzygium levine*i) are replaced by another native tree *Celtis sinensis* (due to market availability at this moment) as compensatory planting of TA326.



Indicative location of compensatory planting

ANNEX 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	27 individuals are transplanted back to STSFWSR on 23 April 2021.
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	
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	
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 shelter (such as 遮光網) has been set up to provide shading and against direct hit of rainstorm/ typhoon on the plants.			
28	*Desmos chinensis*	Fair	Alive	Two individuals were planted at Wall C in STWTW on 1 April 2021
		Survival rate (%)	100%	

Transplanted/ compensatory Trees

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.
N/A	*Celtis sinensis*	Fair	Alive	Compensate for TA326; *Syzygium jambos* replaced by *Celtis sinensis* on 31 May 2021.
N/A	*Celtis sinensis*	Fair	Alive	Compensate for TA326; *Syzygium jambos* replaced by *Celtis sinensis* on 31 May 2021.
N/A	*Schefflera heptaphylla*	Fair	Alive	Compensate for TA326; old leaved replaced by new leaf buds
		Survival rate (%)	100%	

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	4.300	0	0	0	0.004
Feb	0.128	0	0.017	0	0.111	0	0.000	0	0	0	0.004
Mar	0.365	0.032	0	0	0.333	0	6.300	0	0	0	0.015
Apr	0.033	0.009	0	0	0.024	0	16.600	0	0	0	0.019
May	0.098	0.011	0	0	0.087	0.026	7.460	0	0	0	0.016
Jun	0.066	0.008	0	0	0.058	0.039	27.820	0	0	0	0.020
Sub-total	0.812	0.060	0.017	0	0.734	0.065	62.480	0	0	0	0.077
Jul	0.528	0.024	0.306	0	0.197	0.042	8.480	0.037	0	0	0.020
Aug	4.898	0.005	4.733	0	0.160	0.038	124.520	0	0	0	0.024
Sep	11.193	0	11.180	0	0.014	0.209	47.330	0	0	0	0.019
Oct	7.828	0	7.799	0	0.028	0.126	54.230	0	0	0.140	0.018
Nov	3.129	0	2.958	0	0.171	0.043	62.550	0	0	0.291	0.043
Dec	2.436	0.095	2.307	0	0.034	0.031	202.650	0	0	0.241	0.169
Total	30.823	0.184	29.300	0.000	1.339	0.553	562.240	0.037	0.000	0.672	0.371

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 (December 2021)

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	1	0	0	0	0	0	1
C2	0	0	2	0	0	0	0	0	2
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

There were 3 exceedances of Action Level in December 2021. All exceedances were found non project related.

Statistical Summary of Exceedances (Cumulative)

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	3	0	0	0	1	0	4
C2	0	0	5	0	0	0	0	0	5
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	2	0	2
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 December - 31 December 2021	0	N/A	4

Statistical Summary of Environmental Summons

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

Statistical Summary of Environmental Prosecution

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

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Lot 12, Tam Kon Shan Road, Tsing Yi (N), Hong Kong
(852) 2333-6823 www.acumenhk.com
(852) 2333-1316

To	Mr. Fung, Y. W.	Fax No	By-email
Company	AECOM		
cc			
From	Yiting Choy	Date	10 November 2021
Our Ref	CJO - 3113		
RE	Contract No. 1/WSD/19 In-situ Provisioning of Sha Tin Water Treatment Works (South Works) – Water Treatment Works and Ancillary Facilities – Environmental Team Notification of Exceedance (NOE) and Investigation Report for Water Quality Monitoring on 2 November 2021		

Dear Sir,

Please find attached the “Investigation Report on Action or Limit Level Non-compliance” referenced above for your information.

Should you have any queries or need further information, please do not hesitate to contact us or the undersigned at Tel: 2333-6823 or Fax: 2333-1316.

Yours Faithfully,
For and on Behalf of
Acumen Environmental Engineering & Technologies Co., Ltd.

Yiting Choy
Assistant Environmental Consultant

Encl.
cc.
Mr. Clarence Yeung (Contractor, ATAL - CW - MH JV (ACMJV)) By email

CONTRACT NO. 1/WSD/19
IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS (SOUTH WORKS) – WATER TREATMENT WORKS AND ANCILLARY FACILITIES

Investigation Report on Action or Limit Level Non-compliance

(I) Summary of exceedance on 2 November 2021

Station	Parameter	Weather	Action Level	Limit Level	Measured Level	Range of Baseline	Exceedance
C1	Suspended Solids (mg/L)	Fine	4.19	6.73	3.2	<1 – 9.7	-
C2	Suspended Solids (mg/L)	Fine	4.33	8.16	4.5	<1 – 12.0	Action Level
M1	Suspended Solids (mg/L)	Fine	3.30	3.56	3.0	<1 – 4.7	-
M2	Suspended Solids (mg/L)	Fine	18.84	26.80	7.0	<1 - 38	-
M3	Suspended Solids (mg/L)	Fine	1.00	1.00	<1	<1 – 1.3	-

(II) Investigation Results, Recommendations & Mitigation Measures

1) According to the field observation from the Environmental Team (ET) on 2 November 2021, no polluted discharge made from construction site to the Control Station C2, since C2 is a control station upstream of Impact Monitoring Stations and out of the site boundary. In general, the condition of water at Impact Station C2 was in order and no discharge from construction was observed (Photo 1). No construction activities were conducted nearby C2 on 2 November, 2021. The water quality monitoring locations and contract site area are illustrated in Figure 1.

2) Weekly site inspection by the IEC, Contractor and ET was conducted on 5 November 2021 to audit the site environmental performance. The findings of the inspection are summarized below:

   (i) Stockpile was found near Wall D. Contractor was reminded to remove the stockpile.
   (ii) Small amount of sludge were found at the bottom of sedimentation tank near WET. Contractor was reminded to supply the storage tank for storing the sludge before removal.
   (iii) Precautionary measure for M123 need to be carried out at the end of the channel. Contractor was reminded to pump back to the water tank.

3) In our investigation, the Contractor had implemented water quality mitigation measures and no adverse water quality impact was observed during the site inspection. It is noted the value of suspended solid recorded at C2 was within the range of baseline. Based on the site observation, it is concluded that the exceedance of action limit was non-project related.

4) Nevertheless, the Contractor should continually fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.

Photo Record

Photo 1

According to the field observation from ET on 2 November 2021, no polluted discharge was observed at C2 during the water monitoring and the water condition at Control Station C2 was generally in order.

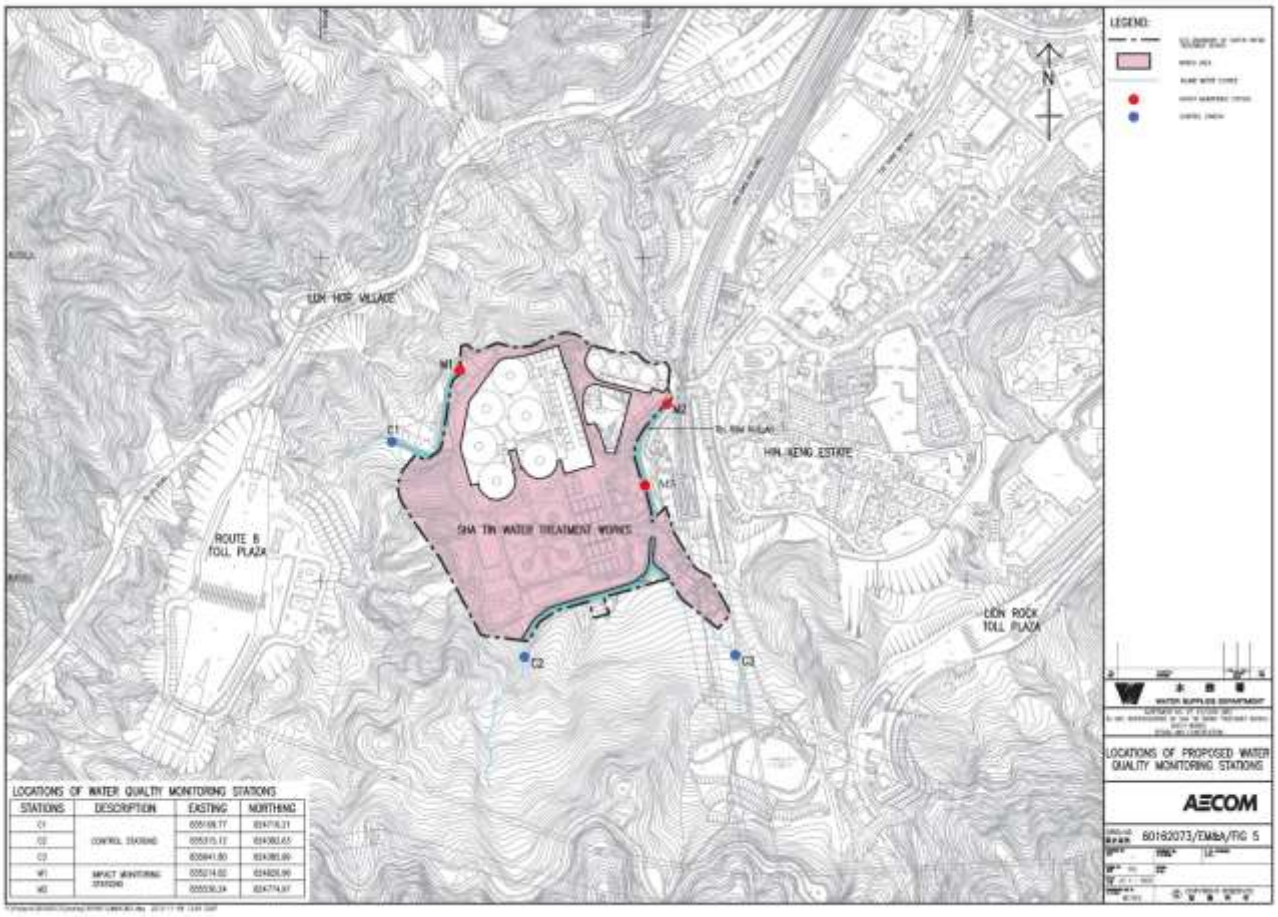

Figure 1 Location Map Water Quality Monitoring Location

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(852) 2333-1316

To	Mr. Fung, Y. W.	Fax No	By-email
Company	AECOM		
cc			
From	Yiting Choy	Date	17 November 2021
Our Ref	CJO - 3113		
RE	Contract No. 1/WSD/19 In-situ Provisioning of Sha Tin Water Treatment Works (South Works) – Water Treatment Works and Ancillary Facilities – Environmental Team Notification of Exceedance (NOE) and Investigation Report for Water Quality Monitoring on 10 November 2021		

Dear Sir,

Please find attached the “Investigation Report on Action or Limit Level Non-compliance” referenced above for your information.

Should you have any queries or need further information, please do not hesitate to contact us or the undersigned at Tel: 2333-6823 or Fax: 2333-1316.

Yours Faithfully,
For and on Behalf of
Acumen Environmental Engineering & Technologies Co., Ltd.

Yiting Choy
Assistant Environmental Consultant

Encl.
cc.
Mr. Clarence Yeung (Contractor, ATAL - CW - MH JV (ACMJV)) By email

CONTRACT NO. 1/WSD/19
IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS (SOUTH WORKS) – WATER TREATMENT WORKS AND ANCILLARY FACILITIES

Investigation Report on Action or Limit Level Non-compliance

(I) Summary of exceedance on 10 November 2021

Station	Parameter	Weather	Action Level	Limit Level	Measured Level	Range of Baseline	Exceedance
C1	Suspended Solids (mg/L)	Fine	4.19	6.73	4.5	<1 – 9.7	Action Level
C2	Suspended Solids (mg/L)	Fine	4.33	8.16	4.0	<1 – 12.0	-
M1	Suspended Solids (mg/L)	Fine	3.30	3.56	3.7	<1 – 4.7	Action Level Limit Level
M2	Suspended Solids (mg/L)	Fine	18.84	26.80	5.0	<1 - 38	-
M3	Suspended Solids (mg/L)	Fine	1.00	1.00	<1	<1 – 1.3	-

(II) Investigation Results, Recommendations & Mitigation Measures

1) According to the field observation from the Environmental Team (ET) on 10 November 2021, no polluted discharge made from construction site to the Control Station C1, since C1 is a control station upstream of Impact Monitoring Station M1 and out of the site boundary. However, the action level has been exceeded, exceedance is mostly likely due to the nature of dry season in November. Moreover, the construction of Logistic center (next to C1, Photo 3) have been completed in December 2020, no construction work was conducted nearby C1. In general, the condition of water at Control Station C1 was in order and no discharge from construction was observed (Photo 1). The water quality monitoring locations and contract site area are illustrated in Figure 1.

2) According to the field observation from the Environmental Team (ET) on 10 November 2021, no polluted discharge made from construction site to Impact Monitoring Station M1 (Photo 2). Exceedance of action level of suspended solid was found at Control Station C1, the exceedance of action and limit level of M1 is most likely to be carry over to M1 by the upstream C1.

3) Weekly site inspection by the Contractor and ET was conducted on 9 November 2021 to audit the site environmental performance. The overall site condition was in compliance.

4) In our investigation, the Contractor had implemented water quality mitigation measures and no adverse water quality impact was observed during the site inspection. It is noted the value of suspended solid recorded at C1 and M1 was within the range of baseline. Based on the site observation, it is concluded that the exceedance of action and limit was non-project related.

5) Nevertheless, the Contractor should continually fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.

Photo Record

Photo 1 (C1)

Photo 2 (M1)

Photo 3 (Logistic Center)

According to the field observation from ET on 10 November 2021, no polluted discharge was observed at C1 and M1 during the water monitoring and the water condition C1 and M1 was generally in order. The construction of Logistic center (next to C1, Photo 3) have been completed in December 2020, thus no construction work was conducted nearby.

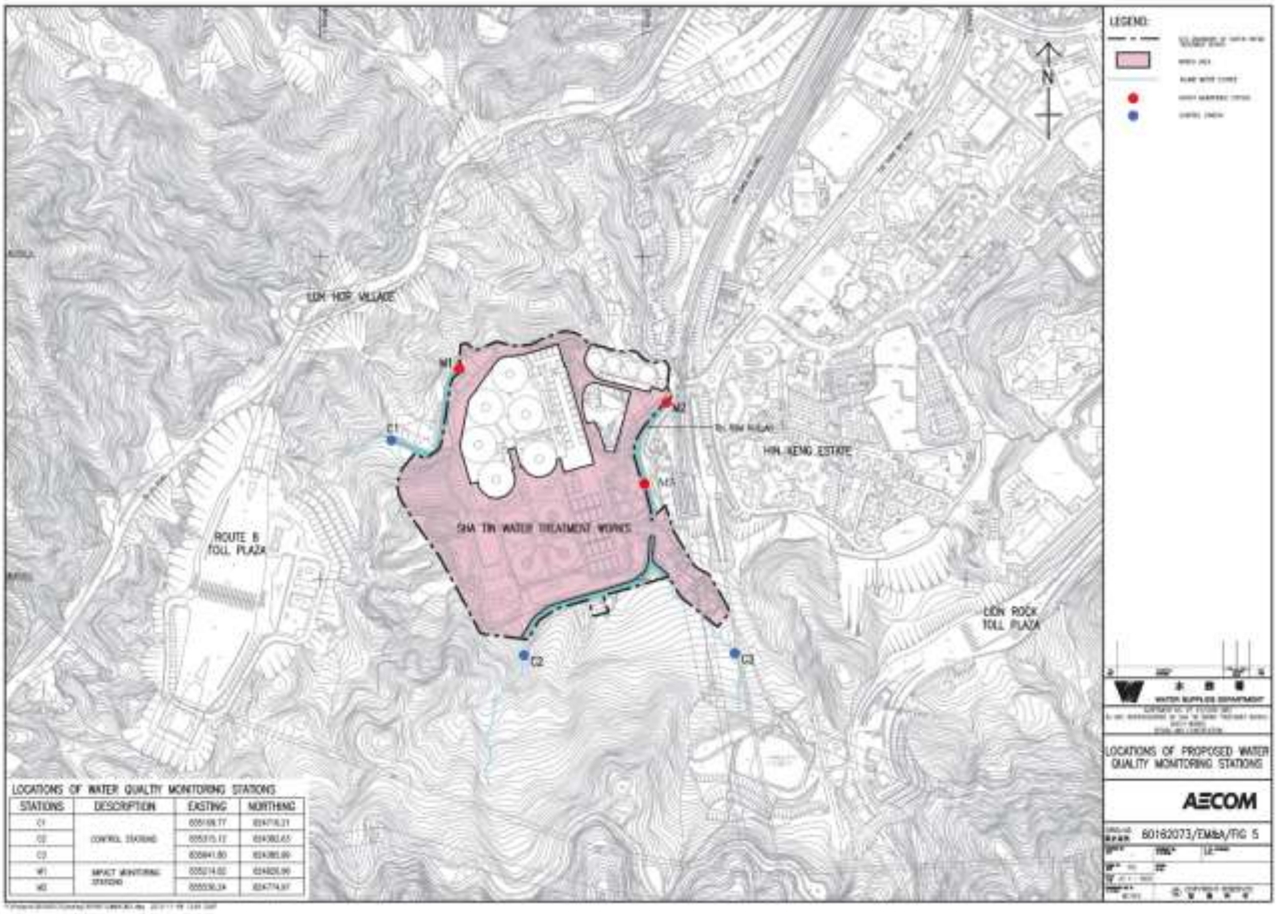

Figure 1 Location Map Water Quality Monitoring Location

浩科環境工業有限公司
Acumen Environmental Engineering & Technologies Co., Ltd.
香港青衣(北)担杆山路12號地段
Lot 12, Tam Kon Shan Road, Tsing Yi (N), Hong Kong
(852) 2333-6823 www.acumenhk.com
(852) 2333-1316

To	Mr. Fung, Y. W.	Fax No	By-email
Company	AECOM		
cc			
From	Yiting Choy	Date	17 November 2021
Our Ref	CJO - 3113		
RE	Contract No. 1/WSD/19 In-situ Provisioning of Sha Tin Water Treatment Works (South Works) – Water Treatment Works and Ancillary Facilities – Environmental Team Notification of Exceedance (NOE) and Investigation Report for Water Quality Monitoring on 12 November 2021		

Dear Sir,

Please find attached the “Investigation Report on Action or Limit Level Non-compliance” referenced above for your information.

Should you have any queries or need further information, please do not hesitate to contact us or the undersigned at Tel: 2333-6823 or Fax: 2333-1316.

Yours Faithfully,
For and on Behalf of
Acumen Environmental Engineering & Technologies Co., Ltd.

Yiting Choy
Assistant Environmental Consultant

Encl.
cc.
Mr. Clarence Yeung (Contractor, ATAL - CW - MH JV (ACMJV)) By email

CONTRACT NO. 1/WSD/19
IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS (SOUTH WORKS) – WATER TREATMENT WORKS AND ANCILLARY FACILITIES

Investigation Report on Action or Limit Level Non-compliance

(I) Summary of exceedance on 12 November 2021

Station	Parameter	Weather	Action Level	Limit Level	Measured Level	Range of Baseline	Exceedance
C1	Suspended Solids (mg/L)	Fine	4.19	6.73	3.0	<1 – 9.7	-
C2	Suspended Solids (mg/L)	Fine	4.33	8.16	4.4	<1 – 12.0	Action Level
M1	Suspended Solids (mg/L)	Fine	3.30	3.56	<1	<1 – 4.7	-
M2	Suspended Solids (mg/L)	Fine	18.84	26.80	<1	<1 - 38	-
M3	Suspended Solids (mg/L)	Fine	1.00	1.00	<1	<1 – 1.3	-

(II) Investigation Results, Recommendations & Mitigation Measures

1) According to the field observation from the Environmental Team (ET) on 12 November 2021, no polluted discharge made from construction site to the Control Station C2, since C2 is a control station upstream of Impact Monitoring Stations and out of the site boundary. In general, the condition of water at Impact Station C2 was in order and no discharge from construction was observed (Photo 1). The water quality monitoring locations and contract site area are illustrated in Figure 1.

2) Weekly site inspection by the Contractor and ET was conducted on 9 November 2021 to audit the site environmental performance. The overall site condition was in compliance.

3) In our investigation, the Contractor had implemented water quality mitigation measures and no adverse water quality impact was observed during the site inspection. It is noted the value of suspended solid recorded at C2 was within the range of baseline. Based on the site observation, it is concluded that the exceedance of action limit was non-project related.

4) Nevertheless, the Contractor should continually fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.

Photo Record

Photo 1

According to the field observation from ET on 12 November 2021, no polluted discharge was observed at C2 during the water monitoring and the water condition at Control Station C2 was generally in order.

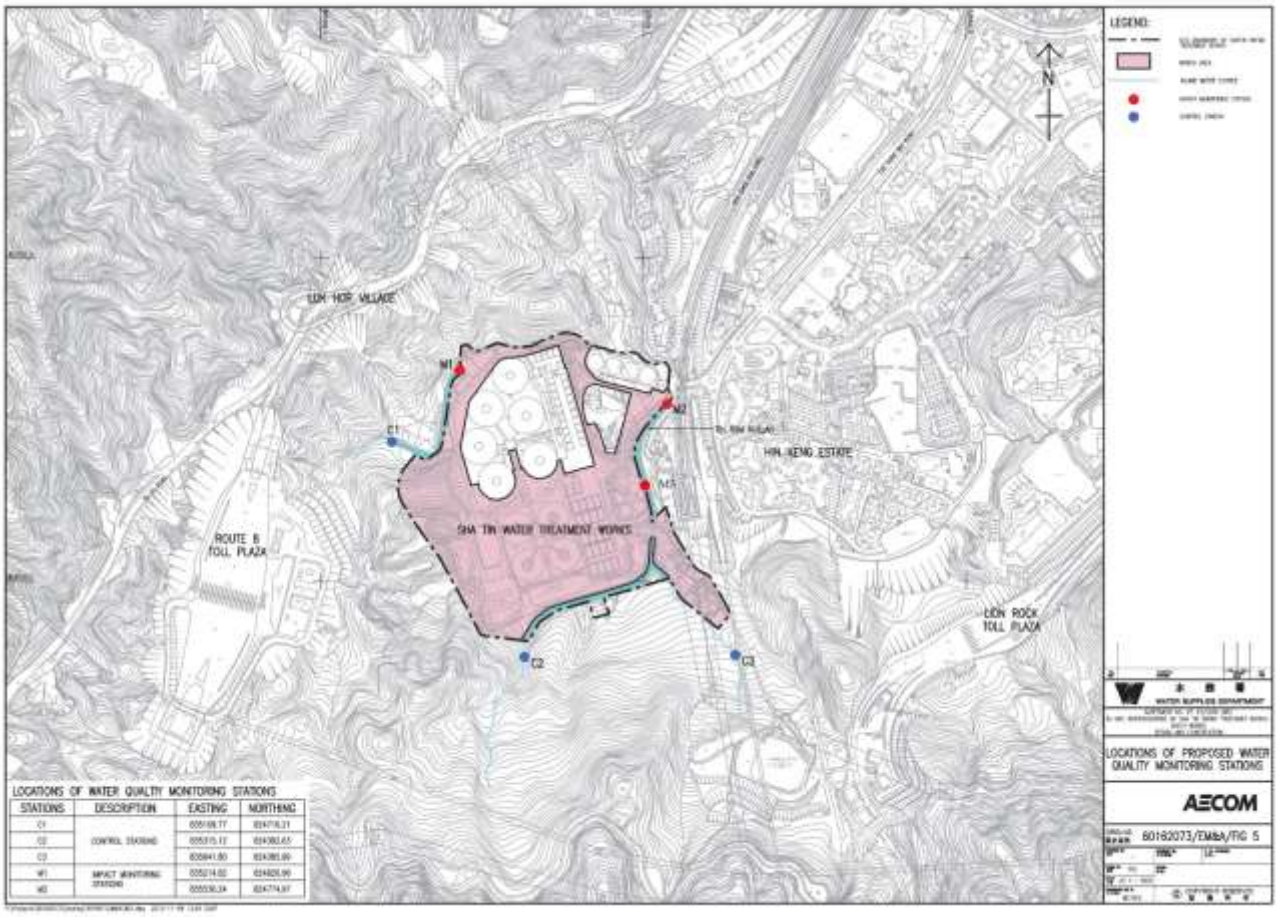

Figure 1 Location Map Water Quality Monitoring Location

浩科環境工業有限公司
Acumen Environmental Engineering & Technologies Co., Ltd.
香港青衣(北)担杆山路12號地段
Lot 12, Tam Kon Shan Road, Tsing Yi (N), Hong Kong
(852) 2333-6823 www.acumenhk.com
(852) 2333-1316

To	Mr. Fung, Y. W.	Fax No	By-email
Company	AECOM		
cc			
From	Yiting Choy	Date	22 November 2021
Our Ref	CJO - 3113		
RE	Contract No. 1/WSD/19 In-situ Provisioning of Sha Tin Water Treatment Works (South Works) – Water Treatment Works and Ancillary Facilities – Environmental Team Notification of Exceedance (NOE) and Investigation Report for Water Quality Monitoring on 15 November 2021		

Dear Sir,

Please find attached the “Investigation Report on Action or Limit Level Non-compliance” referenced above for your information.

Should you have any queries or need further information, please do not hesitate to contact us or the undersigned at Tel: 2333-6823 or Fax: 2333-1316.

Yours Faithfully,
For and on Behalf of
Acumen Environmental Engineering & Technologies Co., Ltd.

Yiting Choy
Assistant Environmental Consultant

Encl.
cc.
Mr. Clarence Yeung (Contractor, ATAL - CW - MH JV (ACMJV)) By email

CONTRACT NO. 1/WSD/19
IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS (SOUTH WORKS) – WATER TREATMENT WORKS AND ANCILLARY FACILITIES

Investigation Report on Action or Limit Level Non-compliance

(I) Summary of exceedance on 15 November 2021

Station	Parameter	Weather	Action Level	Limit Level	Measured Level	Range of Baseline	Exceedance
C1	Suspended Solids (mg/L)	Fine	4.19	6.73	4.8	<1 – 9.7	Action Level
C2	Suspended Solids (mg/L)	Fine	4.33	8.16	4.9	<1 – 12.0	Action Level
M1	Suspended Solids (mg/L)	Fine	3.30	3.56	3.6	<1 – 4.7	Action Level Limit Level
M2	Suspended Solids (mg/L)	Fine	18.84	26.80	5.8	<1 - 38	-
M3	Suspended Solids (mg/L)	Fine	1.00	1.00	<1	<1 – 1.3	-

(II) Investigation Results, Recommendations & Mitigation Measures

1) According to the field observation from the Environmental Team (ET) on 15 November 2021, no polluted discharge made from construction site to the Control Station C1, since C1 is a control station upstream of Impact Monitoring Station M1 and out of the site boundary. However, the action level has been exceeded, exceedance is mostly likely due to the nature of dry season in November. Moreover, the construction of Logistic center (next to C1, Photo 3) have been completed in December 2020, no construction work was conducted nearby C1. In general, the condition of water at Control Station C1 was in order and no discharge from construction was observed (Photo 1). The water quality monitoring locations and contract site area are illustrated in Figure 1.

2) According to the field observation from the Environmental Team (ET) on 15 November 2021, no polluted discharge made from construction site to Impact Monitoring Station M1 (Photo 2). Exceedance of action level of suspended solid was found at Control Station C1, the exceedance of action and limit level of M1 is most likely to be carry over to M1 by the upstream C1.

3) According to the field observation from the Environmental Team (ET) on 15 November 2021, no polluted discharge made from construction site to the Control Station C2, since C2 is a control station upstream of Impact Monitoring Stations and out of the site boundary. In general, the condition of water at Impact Station C2 was in order and no discharge from construction was observed (Photo 4). The water quality monitoring locations and contract site area are illustrated in Figure 1.

4) Weekly site inspection by the Contractor and ET was conducted on 17 November 2021 to audit the site environmental performance. The findings of the inspection are summarized below:

   (i) Accumulated waste were observed near material storage zone. Contractor was reminded to properly dispose them.

5) In our investigation, the Contractor had implemented water quality mitigation measures and no adverse water quality impact was observed during the site inspection. It is noted the value of suspended solid recorded at C1 and M1 was within the range of baseline. Based on the site observation, it is concluded that the exceedance of action and limit was non-project related.

6) Nevertheless, the Contractor should continually fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.

Photo Record

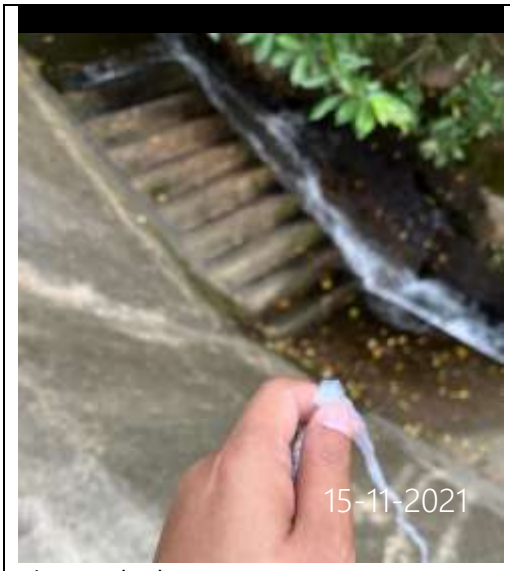

Photo 1 (C1)

Photo 2 (M1)

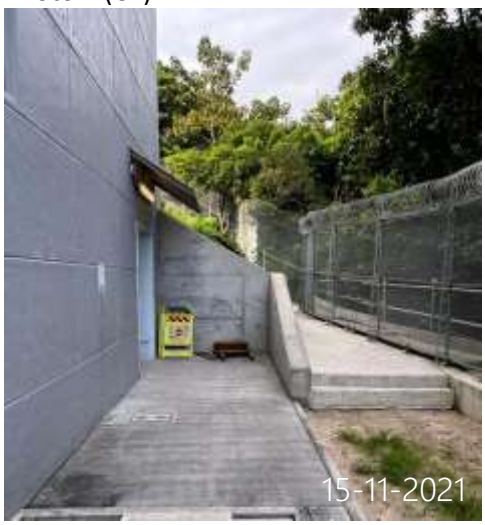

Photo 3 (Logistic Center)

Photo 4 (C2)

According to the field observation from ET on 15 November 2021, no polluted discharge was observed at C1, C2 and M1 during the water monitoring and the water condition C1, C2 and M1 was generally in order. The construction of Logistic center (next to C1, Photo 3) have been completed in December 2020, thus no construction work was conducted nearby.

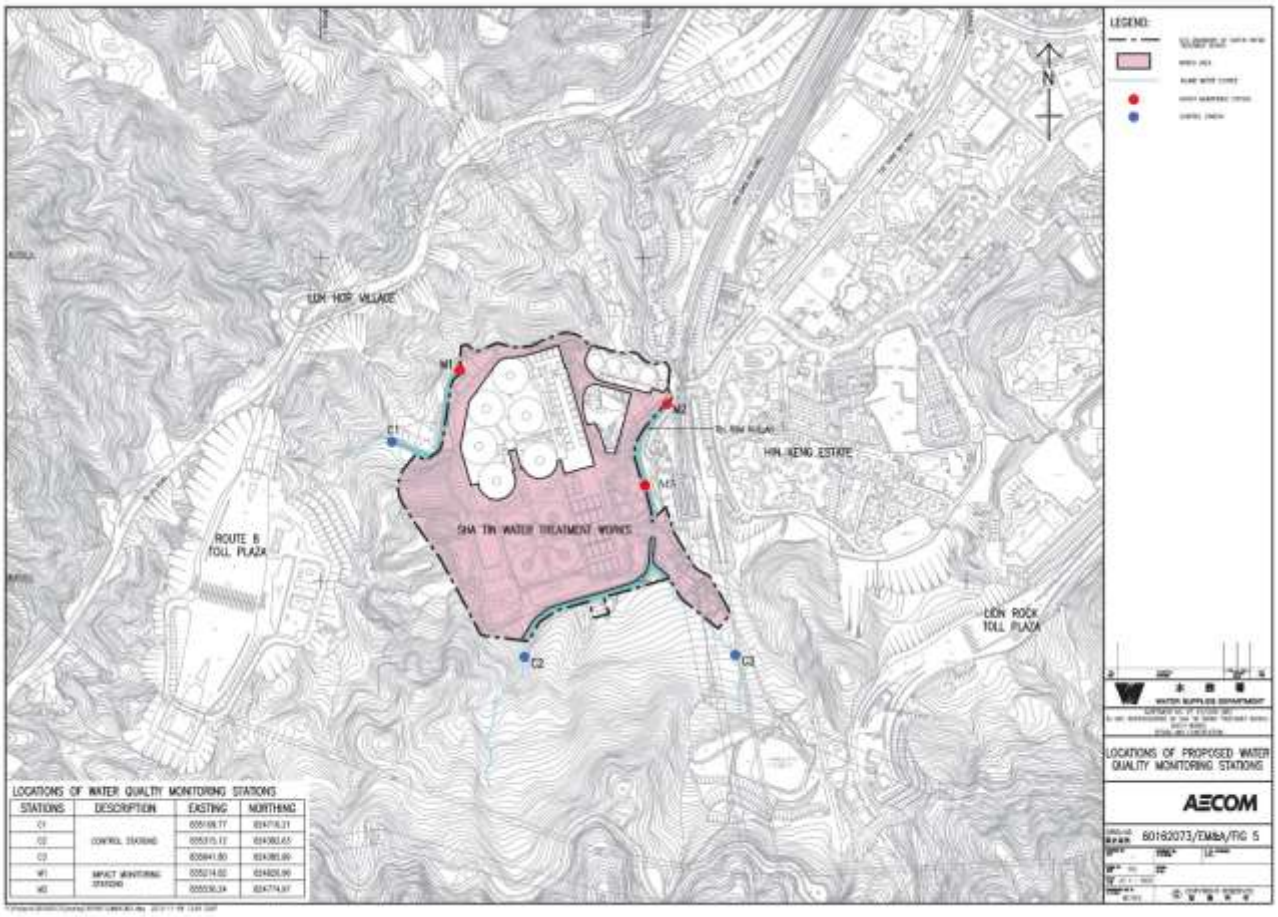

Figure 1 Location Map Water Quality Monitoring Location

浩科環境工業有限公司
Acumen Environmental Engineering & Technologies Co., Ltd.
香港青衣(北)担杆山路12號地段
Lot 12, Tam Kon Shan Road, Tsing Yi (N), Hong Kong
(852) 2333-6823 www.acumenhk.com
(852) 2333-1316

To	Mr. Fung, Y. W.	Fax No	By-email
Company	AECOM		
cc			
From	Yiting Choy	Date	22 November 2021
Our Ref	CJO - 3113		
RE	Contract No. 1/WSD/19 In-situ Provisioning of Sha Tin Water Treatment Works (South Works) – Water Treatment Works and Ancillary Facilities – Environmental Team Notification of Exceedance (NOE) and Investigation Report for Water Quality Monitoring on 17 November 2021		

Dear Sir,

Please find attached the “Investigation Report on Action or Limit Level Non-compliance” referenced above for your information.

Should you have any queries or need further information, please do not hesitate to contact us or the undersigned at Tel: 2333-6823 or Fax: 2333-1316.

Yours Faithfully,
For and on Behalf of
Acumen Environmental Engineering & Technologies Co., Ltd.

Yiting Choy
Assistant Environmental Consultant

Encl.
cc.
Mr. Clarence Yeung (Contractor, ATAL - CW - MH JV (ACMJV)) By email

CONTRACT NO. 1/WSD/19
IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS (SOUTH WORKS) – WATER TREATMENT WORKS AND ANCILLARY FACILITIES

Investigation Report on Action or Limit Level Non-compliance

(I) Summary of exceedance on 17 November 2021

Station	Parameter	Weather	Action Level	Limit Level	Measured Level	Range of Baseline	Exceedance
C1	Suspended Solids (mg/L)	Fine	4.19	6.73	8.1	<1 – 9.7	Action Level Limit Level
C2	Suspended Solids (mg/L)	Fine	4.33	8.16	1.4	<1 – 12.0	-
M1	Suspended Solids (mg/L)	Fine	3.30	3.56	1.9	<1 – 4.7	-
M2	Suspended Solids (mg/L)	Fine	18.84	26.80	<1	<1 - 38	-
M3	Suspended Solids (mg/L)	Fine	1.00	1.00	<1	<1 – 1.3	-

(II) Investigation Results, Recommendations & Mitigation Measures

1) According to the field observation from the Environmental Team (ET) on 17 November 2021, no polluted discharge made from construction site to the Control Station C1, since C1 is a control station upstream of Impact Monitoring Station M1 and out of the site boundary. However, the action and limit level have been exceeded, exceedance is mostly likely due to the nature of dry season in November. Moreover, the construction of Logistic center (next to C1, Photo 2) have been completed in December 2020, no construction work was conducted nearby C1. In general, the condition of water at Control Station C1 was in order and no discharge from construction was observed (Photo 1). The water quality monitoring locations and contract site area are illustrated in Figure 1.

2) Weekly site inspection by the Contractor and ET was conducted on 17 November 2021 to audit the site environmental performance. The findings of the inspection are summarized below:

   (i) Accumulated waste were observed near material storage zone. Contractor was reminded to properly dispose them.

3) In our investigation, the Contractor had implemented water quality mitigation measures and no adverse water quality impact was observed during the site inspection. It is noted the value of suspended solid recorded at C1 was within the range of baseline. Based on the site observation, it is concluded that the exceedance of action and limit was non-project related.

4) Nevertheless, the Contractor should continually fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.

Photo Record

Photo 1 (C1)

Photo 2 (Logistic Center)

According to the field observation from ET on 17 November 2021, no polluted discharge was observed at C1 during the water monitoring and the water condition C1 was generally in order. The construction of Logistic center (next to C1, Photo 2) have been completed in December 2020, thus no construction work was conducted nearby.

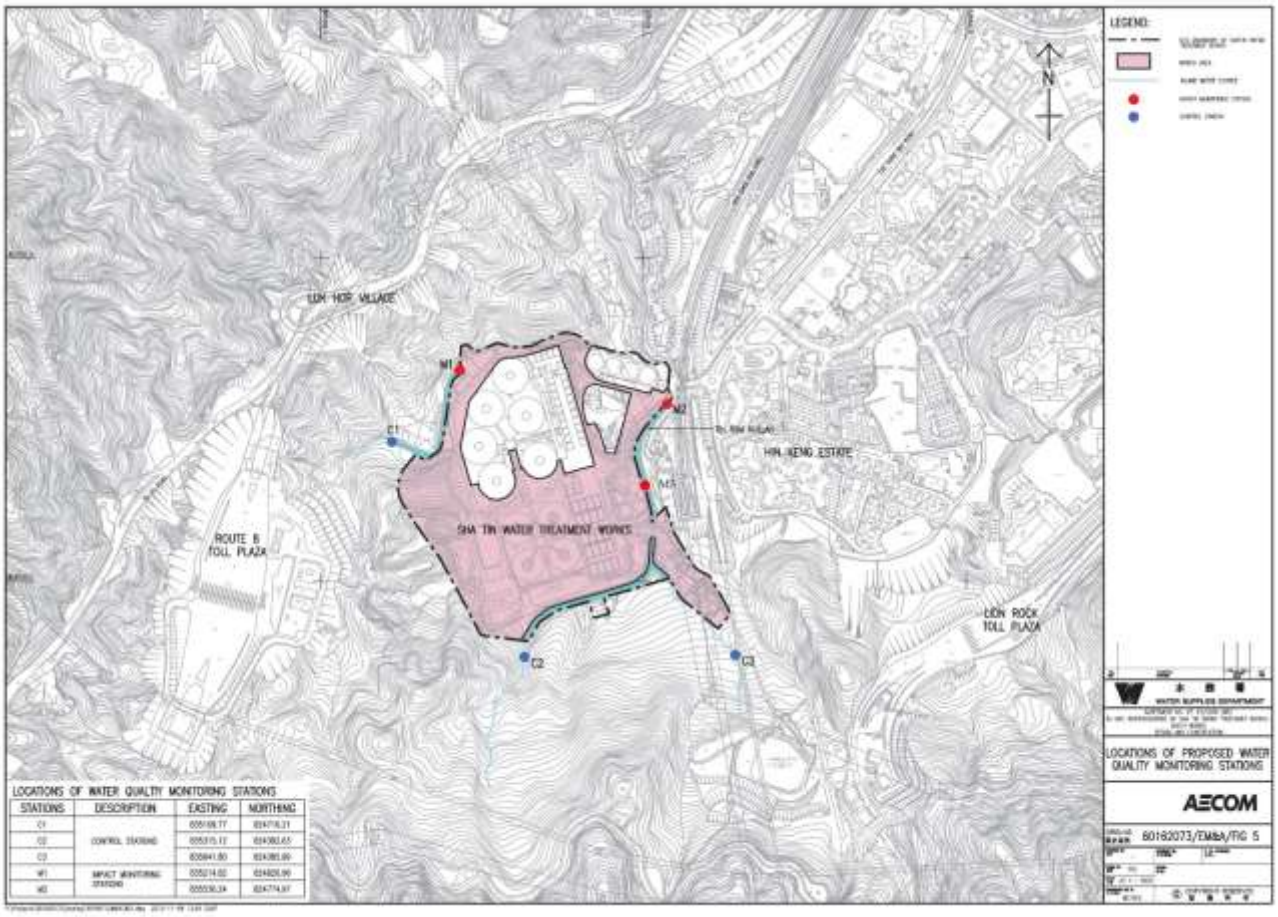

Figure 1 Location Map Water Quality Monitoring Location

浩科環境工業有限公司
Acumen Environmental Engineering & Technologies Co., Ltd.
香港青衣(北)担杆山路12號地段
Lot 12, Tam Kon Shan Road, Tsing Yi (N), Hong Kong
(852) 2333-6823 www.acumenhk.com
(852) 2333-1316

To	Mr. Fung, Y. W.	Fax No	By-email
Company	AECOM		
cc			
From	Yiting Choy	Date	10 December 2021
Our Ref	CJO - 3113		
RE	Contract No. 1/WSD/19 In-situ Provisioning of Sha Tin Water Treatment Works (South Works) – Water Treatment Works and Ancillary Facilities – Environmental Team Notification of Exceedance (NOE) and Investigation Report for Water Quality Monitoring on 3 December 2021		

Dear Sir,

Please find attached the “Investigation Report on Action Level Non-compliance” referenced above for your information.

Should you have any queries or need further information, please do not hesitate to contact us or the undersigned at Tel: 2333-6823 or Fax: 2333-1316.

Yours Faithfully,
For and on Behalf of
Acumen Environmental Engineering & Technologies Co., Ltd.

Yiting

Yiting Choy
Assistant Environmental Consultant

Encl.
cc.
Mr. Clarence Yeung (Contractor, ATAL - CW - MH JV (ACMJV)) By email

CONTRACT NO. 1/WSD/19
IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS (SOUTH WORKS) – WATER TREATMENT WORKS AND ANCILLARY FACILITIES

Investigation Report on Action Level Non-compliance

(I) Summary of exceedance on 3 December 2021

Station	Parameter	Weather	Action Level	Limit Level	Measured Level	Range of Baseline	Exceedance
C1	Suspended Solids (mg/L)	Fine	4.19	6.73	<1	<1 – 9.7	-
C2	Suspended Solids (mg/L)	Fine	4.33	8.16	5.9	<1 – 12.0	Action Level
M1	Suspended Solids (mg/L)	Fine	3.30	3.56	<1	<1 – 4.7	-
M2	Suspended Solids (mg/L)	Fine	18.84	26.80	<1	<1 - 38	-
M3	Suspended Solids (mg/L)	Fine	1.00	1.00	<1	<1 – 1.3	-

(II) Investigation Results, Recommendations & Mitigation Measures

1) According to the field observation from the Environmental Team (ET) on 3 December 2021, no polluted discharge made from construction site to the Control Station C2, since C2 is a control station upstream of Impact Monitoring Stations and out of the site boundary. In general, the condition of water at Impact Station C2 was in order and no discharge from construction was observed (Photo 1). The water quality monitoring locations and contract site area are illustrated in Figure 1.

2) Weekly site inspection by the Contractor and ET was conducted on 7 December 2021 to audit the site environmental performance. The overall site condition was in compliance.

3) In our investigation, the Contractor had implemented water quality mitigation measures and no adverse water quality impact was observed during the site inspection. It is noted the value of suspended solid recorded at C2 was within the range of baseline. Based on the site observation, it is concluded that the exceedance of action limit was non-project related.

4) Nevertheless, the Contractor should continually fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.

Photo Record

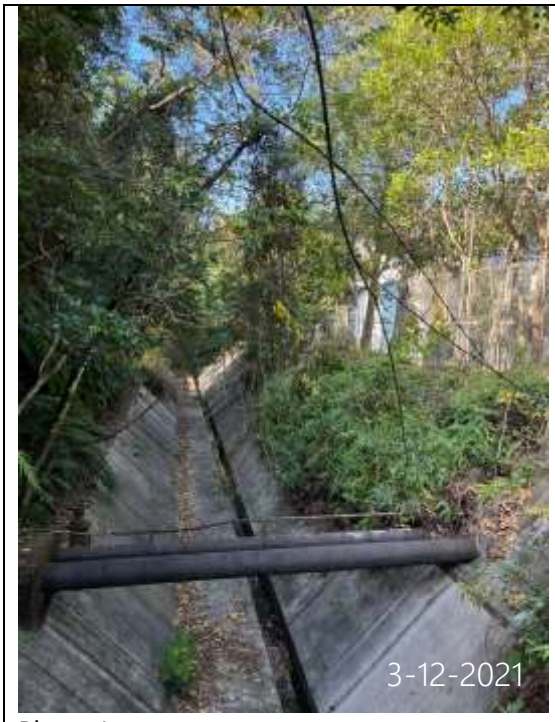

Photo 1

According to the field observation from ET on 3 December 2021, no polluted discharge was observed at C2 during the water monitoring and the water condition at Control Station C2 was generally in order.

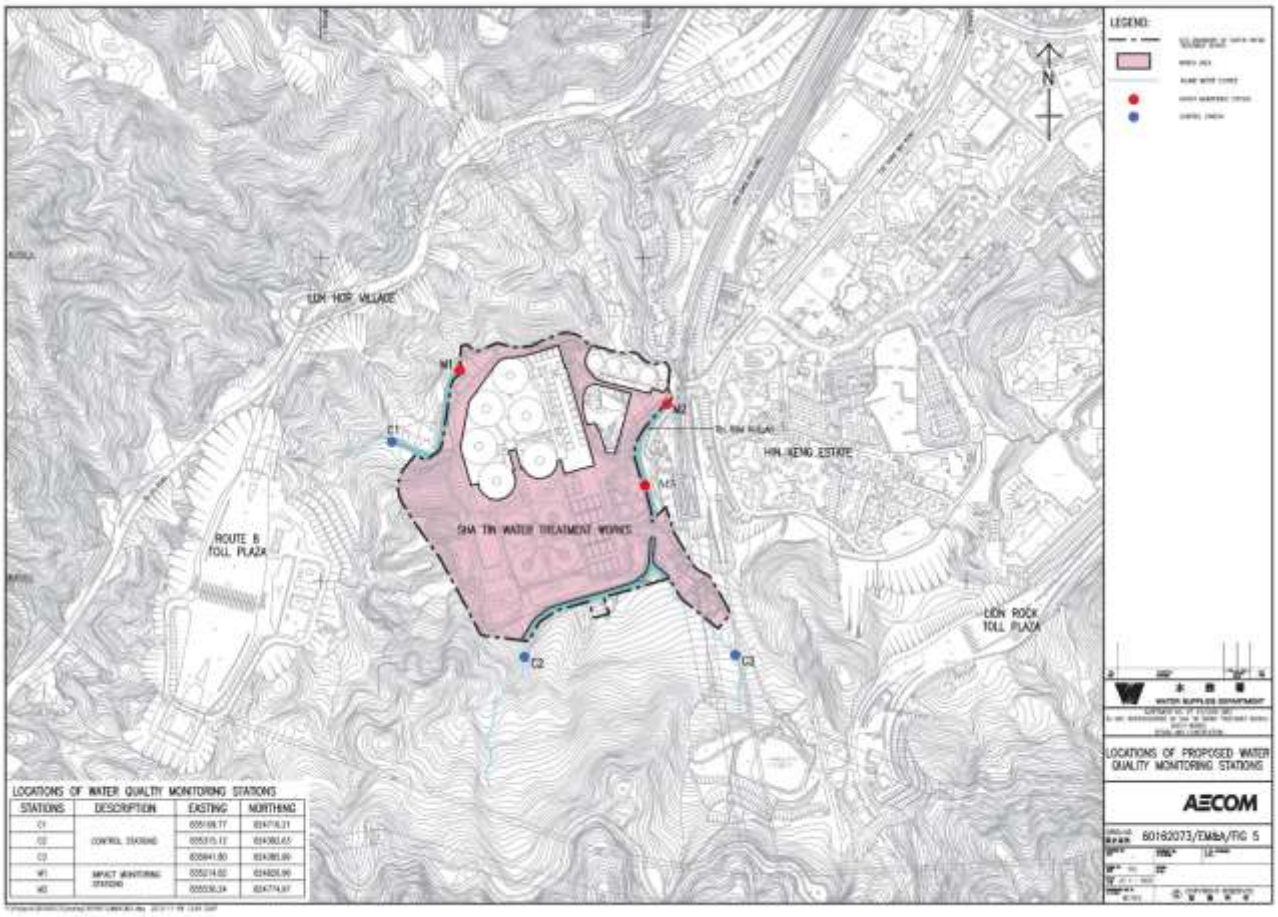

Figure 1 Location Map Water Quality Monitoring Location

浩科環境工業有限公司
Acumen Environmental Engineering & Technologies Co., Ltd.
香港青衣(北)担杆山路12號地段
Lot 12, Tam Kon Shan Road, Tsing Yi (N), Hong Kong
(852) 2333-6823 www.acumenhk.com
(852) 2333-1316

To	Mr. Fung, Y. W.	Fax No	By-email
Company	AECOM		
cc			
From	Yiting Choy	Date	23 December 2021
Our Ref	CJO - 3113		
RE	Contract No. 1/WSD/19 In-situ Provisioning of Sha Tin Water Treatment Works (South Works) – Water Treatment Works and Ancillary Facilities – Environmental Team Notification of Exceedance (NOE) and Investigation Report for Water Quality Monitoring on 15 December 2021		

Dear Sir,

Please find attached the “Investigation Report on Action or Limit Level Non-compliance” referenced above for your information.

Should you have any queries or need further information, please do not hesitate to contact us or the undersigned at Tel: 2333-6823 or Fax: 2333-1316.

Yours Faithfully,
For and on Behalf of
Acumen Environmental Engineering & Technologies Co., Ltd.

Yiting Choy
Assistant Environmental Consultant

Encl.
cc.
Mr. Clarence Yeung (Contractor, ATAL - CW - MH JV (ACMJV)) By email

CONTRACT NO. 1/WSD/19
IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS (SOUTH WORKS) – WATER TREATMENT WORKS AND ANCILLARY FACILITIES

Investigation Report on Action or Limit Level Non-compliance

(I) Summary of exceedance on 15 December 2021

Station	Parameter	Weather	Action Level	Limit Level	Measured Level	Range of Baseline	Exceedance
C1	Suspended Solids (mg/L)	Sunny	4.19	6.73	4.5	<1 – 9.7	Action Level
C2	Suspended Solids (mg/L)	Sunny	4.33	8.16	6.3	<1 – 12.0	Action Level
M1	Suspended Solids (mg/L)	Sunny	3.30	3.56	1.8	<1 – 4.7	-
M2	Suspended Solids (mg/L)	Sunny	18.84	26.80	1.6	<1 - 38	-
M3	Suspended Solids (mg/L)	Sunny	1.00	1.00	<1	<1 – 1.3	-

(II) Investigation Results, Recommendations & Mitigation Measures

1) According to the field observation from the Environmental Team (ET) on 15 December 2021, no polluted discharge made from construction site to the Control Station C1, since C1 is a control station upstream of construction site and out of the site boundary. However, the action level has been exceeded, exceedance is mostly likely due to the nature of dry season in December. Moreover, the construction of Logistic center (next to C1, Photo 2) have been completed in December 2020, no construction work was conducted nearby C1. In general, the condition of water at Control Station C1 was in order and no discharge from construction was observed (Photo 1). The water quality monitoring locations and contract site area are illustrated in Figure 1.

2) According to the field observation from the Environmental Team (ET) on 15 December 2021, no polluted discharge made from construction site to the Control Station C2, since C2 is a control station upstream of construction site and out of the site boundary. In general, the condition of water at Impact Station C2 was in order and no discharge from construction was observed (Photo 3). The water quality monitoring locations and contract site area are illustrated in Figure 1.

3) Weekly site inspection by the Contractor and ET was conducted on 13 December 2021 to audit the site environmental performance. The overall site condition was in compliance.

4) In our investigation, the Contractor had implemented water quality mitigation measures and no adverse water quality impact was observed during the site inspection. It is noted the value of suspended solid recorded at C1 and C2 was within the range of baseline. Based on the site observation, it is concluded that the exceedance of action level was non-project related.

5) Nevertheless, the Contractor should continually fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.

Photo Record

Photo 1 (C1)

Photo 2 (Logistic Center)

Photo 3 (C2)

According to the field observation from ET on 15 December 2021, no polluted discharge was observed at C1 and C2 during the water monitoring and the water condition C1 and C2 was generally in order. The construction of Logistic center (next to C1, Photo 2) have been completed in December 2020, thus no construction work was conducted nearby.

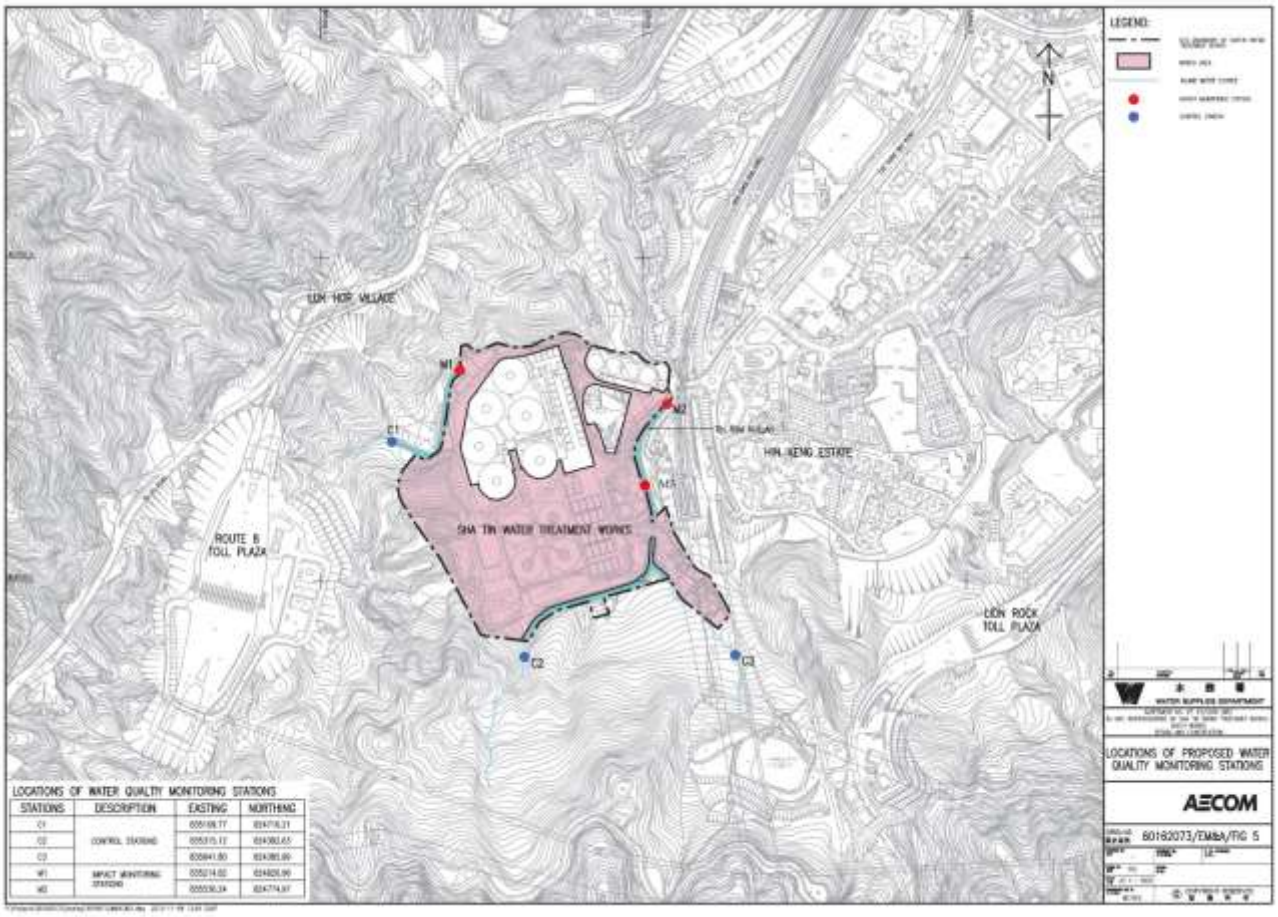

Figure 1 Location Map Water Quality Monitoring Location

Appendix W
Tentative Schedule of Impact Monitoring

Tentative Impact Monitoring Schedule for STWTW

Jan-22						
Sun	Mon	Tue	Wed	Thur	Fri	Sat
						1
2	3 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	4	5 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	6	7 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	8 Impact Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3
9	10 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	11	12 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	13	14 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	15
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	20 Impact Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	21 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	22
23	24 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	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	31 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3					

Impact Monitoring Schedule for STWTW

Feb-22

Sun	Mon	Tue	Wed	Thur	Fri	Sat
		1	2	3	4 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	5 Impact Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3
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 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	12
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	17 Impact Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	18 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	19
20	21 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	22	23 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	24	25 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	26
27	28 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3					

Impact Monitoring Schedule for STWTW

Mar-22						
Sun	Mon	Tue	Wed	Thur	Fri	Sat
		1 Impact Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	2 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	3	4 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	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 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	12 Impact 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	17	18 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	19
20	21 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	22	23 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	24 Impact Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	25 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	26
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	31		