

Our Ref.: CJO-3113

15 March 2022

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

**CONTRACT NO. 1/WSD/19 & 6/WSD/21**

**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 84<sup>th</sup> 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  
2698 8032

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

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)

15 March 2022

Dear Sir,

**In-Situ Re provisioning of Sha Tin Water Treatment Works (South Works) – Water Treatment Works and Ancillary Facilities  
Environmental Permit EP-494/2015  
Submission of 83<sup>rd</sup> 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 84<sup>th</sup> 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



Your Ref:  
Our Ref: 60479142/C/fyw2302141

**By Email**

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

Attn: Mr. Edmund Huen

14 March 2023

Dear Sir,

**Contract No.1/WSD/19**

**In-situ reprovisioning of Sha Tin Water Treatment Works (South Works) – Water Treatment Works and Ancillary Facilities**

**Contract No.6/WSD/21**

**In-situ reprovisioning of Sha Tin Water Treatment Works (South Works) – Administration Building**

**Submission of 83<sup>rd</sup> Monthly EM&A Report for January 2023**

Reference is made to Environmental Team (ET)'s 84<sup>th</sup> Monthly EM&A Report for February 2023 (Rev. 0) submitted on 10, 13 and 14 February 2023.

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 (via email)



Water Supplies Department



**MONTHLY ENVIRONMENTAL MONITORING AND AUDIT  
(EM&A) REPORT (NO. 84)**





**FOR**

**CONTRACT NO. 1/WSD/19 & 6/WSD/21  
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. 84)**

**FOR  
CONTRACT NO. 1/WSD/19 & 6/WSD/21  
IN-SITU REPROVISIONING OF SHA TIN WATER  
TREATMENT WORKS (SOUTH WORKS) – WATER TREATMENT WORKS AND  
ANCILLARY FACILITIES**

	Name	Signature
Prepared by	Mr. Chiu, Oliver, O. C.	
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)	

## **TABLE OF CONTENTS**

### **EXECUTIVE SUMMARY**

#### **1. INTRODUCTION**

- 1.1 PROJECT BACKGROUND**
- 1.2 ORGANIZATION STRUCTURE**
- 1.3 SCOPE OF REPORT**
- 1.4 SUMMARY OF CONSTRUCTION WORKS**

#### **2. EM&A RESULTS**

- 2.1 EM&A BACKGROUND**
- 2.2 AIR QUALITY MONITORING**
- 2.3 NOISE MONITORING**
- 2.4 WATER QUALITY MONITORING**
- 2.5 ECOLOGY**
- 2.6 WASTE MANAGEMENT STATUS**
- 2.7 DELIVERY, STORAGE AND HANDLING OF CHLORINE**
- 2.8 EM&A SITE INSPECTIONS**
- 2.9 ENVIRONMENTAL LICENSES AND PERMITS**
- 2.10 IMPLEMENTATION OF ENVIRONMENTAL MITIGATION MEASURES**
- 2.11 SUMMARY IF EXCEEDANCES OF ENVIRONMENTAL QUALITY PERFORMANCE LIMIT**
- 2.12 SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS**
- 2.13 DATA MANAGEMENT AND DATA QA/QC CONTROL**

#### **3. FUTURE KEY ISSUES**

- 3.1 CONSTRUCTION PROGRAMME FOR COMING MONTHS**
- 3.2 KEY ISSUES FOR THE COMING MONTH**

#### **4. CONCLUSIONS AND RECOMMENDATIONS**

- 4.1 SUMMARY**



### LIST OF APPENDICES

Appendix A	General Layout Plan
Appendix B	Project Organization
Appendix C	Latest Construction Programme
Appendix D	Location of Construction Activities
Appendix E	Environmental Sensitive Receivers in the Vicinity of the Project
Appendix F	Summary of Action and Limit Levels
Appendix G	Event Action Plan
Appendix H	Impact Monitoring Schedules
Appendix I	Location Plan of Air Quality Monitoring Stations
Appendix J	Calibration Certificates (Air monitoring)
Appendix K	Impact Air Quality Monitoring Results and Graphical Presentation
Appendix L	Location Plan of Noise Monitoring Station
Appendix M	Calibration Certificates (Noise)
Appendix N	Impact Noise Monitoring Results and Graphical Presentation
Appendix O	Location Plan of Water Quality Monitoring Station
Appendix P	Calibration Certificate (Water Quality)
Appendix Q	The Certification of Laboratory with HOKLAS accredited Analytical Tests
Appendix R	Impact Water Quality Monitoring Results
Appendix S	Impact Monitoring report for Ecology
Appendix T	Monthly Summary of Waste Flow Table
Appendix U	Implementation Schedule of Environmental Mitigation Measures (EMIS)
Appendix V	Cumulative Statistics on Exceedances, Complaints, Notifications of Summons and Successful Prosecutions
Appendix W	Tentative schedule for environmental monitoring



---

**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 and 6/WSD/21, ATAL - CW - MH JV (ACMJV) is commissioned by WSD to undertake the construction of the main 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 construction phase of Contract No. 6/WSD/21 commenced on 16 March 2022. 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 84<sup>th</sup> monthly Environmental Monitoring and Audit Report for the Project which covers the period from 1 to 28 February 2023 (the reporting period) for Contract No. 1/WSD/19 and 6/WSD/21.
- A.5 For Contract No. 1/WSD/19, as informed by the Contractor, major activities in the reporting period included:
- Wall construction for Washwater Equalization Tank (WET)
  - Demolition works for TWRT.
  - Road reinstatement works.
  - Excavation for Major ELS Work.
  - Soil Nail Installation for Major ELS Work.
  - Lagging wall construction for Major ELS work.
  - Struct and waling installation for Major ELS work.
  - Pumping test for S2F Pipe Pile.
  - Trail Pit at the future main building road
  - Rebar works for S1F, S2F, SWPS, RMF, FST, and Ozone building
  - Formwork and concrete works for S1F, S2F, SWPS, RMF, FST and Ozone Building
  - WET finishing works.
  - WET steel and metal works
  - Dispersion modelling for discharge from VPSA Nitrogen waste gas vents and pressure/Vacuum Relief Valves vents for Ozone off-gas.
  - PV Panel at Ozone Building, S1F and S2F.
  - Centrifugal pumps in LC and Sump Pumps for BS.
  - Supply and delivery of CPVC pipe and Valve.
  - Top slab construction for WET.
  - Lagging wall construction for Major ELS.
  - Pre-loading works for Major ELS.
- A.6 For Contract No. 6/WSD/21, as informed by the Contractor, major activities in the reporting period included:
- Waterproofing Works
  - Carry Out Excavation Down to + 18.0mPD
  - Concreting for Raft Slab (LG/F Level)



- Steel Plate Welding to Sheetpile for Waterproofing Works
- Excavation to Bottom Rockfill Level & Rockfill Replacement Work

A.7 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	12
Inspection / Audit	ET Regular Environmental Site Inspection	4
	IEC Monthly Environmental Site Audit	1

A.8 No exceedance of air quality and noise monitoring was recorded in this reporting period. There was no exceedance in action level and 1 exceedance in limit level for water quality monitoring was recorded in this reporting period.

A.9 No environmental complaint was received via EPD in this reporting period.

A.10 No notification of any summons and successful prosecutions was received in this reporting period.

A.11 No reporting change was made in this reporting period.

A.12 EPD site inspections was conducted on 17 February 2023 in the reporting period.

A.13 As informed by the Contractor, the major works for Contract No. 1/WSD/19 between March 2023 to May 2023 will be:

- Demolition works for TWRT.
- Road reinstatement works.
- Excavation for Major ELS Work.
- Soil Nail Installation for Major ELS Work.
- Lagging wall construction for Major ELS work.
- Struct and waling installation for Major ELS work.
- Pumping test for S2F Pipe Pile.
- Trail Pit at the future main building road
- Rebar works for RMF, FST, and Ozone building
- Formwork and concrete works for S1F, S2F, SWPS, RMF, FST and Ozone Building
- WET finishing works.
- WET steel and metal works
- Dispersion modelling for discharge from VPSA Nitrogen waste gas vents and pressure/Vacuum Relief Valves vents for Ozone off-gas.
- PV Panel at Ozone Building, S1F and S2F.
- Centrifugal pumps in LC and Sump Pumps for BS.
- Supply and delivery of CPVC pipe and Valve.
- Top slab construction for WET.
- Lagging wall construction for Major ELS.
- Pre-loading works for Major ELS.
- Installation of under structures pip

A.14 As informed by the Contractor, the major works for Contract No. 6/WSD/21 between March 2023 to May 2023 will be:

- Waterproofing Works



- Carry Out Excavation Down to +23.3mPD
- Concreting for Raft Slab (LG/F Level)
- Steel Plate Welding to Sheetpile for Waterproofing Works
- Carry Out Excavation to Final Excavation Level +21.0mPD
- MIC Installation
- Excavation to Bottom Rockfill Level & Rockfill Replacement Work

A.15 EM&A monitoring for the 84<sup>th</sup> reporting period for Contract No. 1/WSD/19 and 6/WSD/21 has been completed. The 85<sup>th</sup> monthly EM&A report will cover the period from 1 to 31 March 2023.





## 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 and 6/WSD/21, ATAL – CW – MH JV (ACMJV) and CW–FWS–JV are commissioned by WSD to undertake the construction of the main 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 construction phase of Contract No. 6/WSD/21 commenced on 16 March 2022. 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
CW-FWS JV	Construction Manager	Mr. Jacky Lo, J. L.	9400 3717
	Site Agent	Mr. Lo, H. B.	6498 8580
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 84<sup>th</sup> monthly EM&A Report under the Contract No. 1/WSD/19 and 6/WSD/21 In-situ Reprovisioning of Sha Tin Water Treatment Works (South Works) – Water Treatment Works and Ancillary Facilities covering the period from 1 to 28 February 2023 (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 February 2023 are:

- Wall construction for Washwater Equalization Tank (WET)
- Demolition works for TWRT.
- Road reinstatement works.
- Excavation for Major ELS Work.
- Soil Nail Installation for Major ELS Work.
- Lagging wall construction for Major ELS work.
- Struct and waling installation for Major ELS work.
- Pumping test for S2F Pipe Pile.
- Trail Pit at the future main building road
- Rebar works for S1F, S2F, SWPS, RMF, FST, and Ozone building
- Formwork and concrete works for S1F, S2F, SWPS, RMF, FST and Ozone Building



- WET finishing works.
- WET steel and metal works
- Dispersion modelling for discharge from VPSA Nitrogen waste gas vents and pressure/Vacuum Relief Valves vents for Ozone off-gas.
- PV Panel at Ozone Building, S1F and S2F.
- Centrifugal pumps in LC and Sump Pumps for BS.
- Supply and delivery of CPVC pipe and Valve.
- Top slab construction for WET.
- Lagging wall construction for Major ELS.
- Pre-loading works for Major ELS.

1.4.3 As informed by the Contractor, no major works for Contract No.3/WSD/15 will be conducted. The major works for Contract No. 6/WSD/21 in February 2023 are:

- Waterproofing Works
- Carry Out Excavation Down to + 18.0mPD
- Concreting for Raft Slab (LG/F Level)
- Steel Plate Welding to Sheetpile for Waterproofing Works
- Excavation to Bottom Rockfill Level & Rockfill Replacement Work

1.4.4 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 (°C)
	Laboratory analysis ● Suspended Solids (mg/L)



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

## 2.2. AIR QUALITY MONITORING

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

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

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

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

Table 2-4: Air Quality Impact Monitoring Equipment

Equipment	Model
Portable dust meter – 1-hour TSP	Qingdao Jingcheng 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° 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 ( $\mu\text{g}/\text{m}^3$ )				
		Start Time	End Time	1 <sup>st</sup> Measurement	2 <sup>nd</sup> Measurement	3 <sup>rd</sup> Measurement
2/2/2023	fine	12:54	15:54	54	56	53
8/2/2023	fine	09:44	12:44	29	34	36
14/2/2023	cloudy	12:53	15:53	36	42	33
20/2/2023	fine	13:45	16:45	107	106	110
25/2/2023	fine	12:55	15:55	75	67	63
<b>Average</b>				60.1		
<b>Range</b>				29 – 110		

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

Date	Weather	1-hour TSP ( $\mu\text{g}/\text{m}^3$ )				
		Start Time	End Time	1 <sup>st</sup> Measurement	2 <sup>nd</sup> Measurement	3 <sup>rd</sup> Measurement
2/2/2023	fine	12:58	15:58	58	66	63
8/2/2023	fine	09:48	12:48	39	36	34
14/2/2023	cloudy	12:57	15:57	36	37	32
20/2/2023	fine	13:49	16:49	106	103	102
25/2/2023	fine	12:59	15:59	68	72	79
<b>Average</b>				62.1		
<b>Range</b>				32 – 106		

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

Table 2-7: Details of Noise Monitoring Stations

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

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

Table 2-8: Noise Impact Monitoring Equipment

Noise	
Sound Level Meter	NTi Audio XL2
Acoustic Calibrator	Rion NC-75
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  $5 \text{ ms}^{-1}$  or wind with gusts exceeding  $10 \text{ ms}^{-1}$ . The wind speed was checked with a portable wind speed meter capable of measuring with speeds in  $\text{ms}^{-1}$ .

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	1 <sup>st</sup> Leq <sub>5min</sub>	2 <sup>nd</sup> Leq <sub>5min</sub>	3 <sup>rd</sup> Leq <sub>5min</sub>	4 <sup>th</sup> Leq <sub>5min</sub>	5 <sup>th</sup> Leq <sub>5min</sub>	6 <sup>th</sup> Leq <sub>5min</sub>	Leq <sub>30min</sub>
2/2/2023	12:54 - 17:16	fine	50.2	51.2	48.9	49.7	46.9	47.5	49.3
8/2/2023	10:18 - 13:30	fine	55.1	54.5	53.3	52.5	50.9	54.2	53.6
14/2/2023	12:53 - 14:00	cloudy	46.2	49.7	49.9	51.6	46.6	44.0	48.7
20/2/2023	14:47 - 13:20	fine	55.1	52.0	50.9	49.9	49.2	50.7	51.8
25/2/2023	12:55 - 13:30	fine	52.2	50.5	51.1	51.9	54.6	55.8	53.1
<b>Average</b>									51.7
<b>Range</b>									48.7 – 53.6
<b>Limit Level &gt;75dB(A)</b>									

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

Date	Time	Weather	1 <sup>st</sup> Leq <sub>5min</sub>	2 <sup>nd</sup> Leq <sub>5min</sub>	3 <sup>rd</sup> Leq <sub>5min</sub>	4 <sup>th</sup> Leq <sub>5min</sub>	5 <sup>th</sup> Leq <sub>5min</sub>	6 <sup>th</sup> Leq <sub>5min</sub>	Leq <sub>30min</sub>
2/2/2023	13:28 - 13:58	fine	49.1	47.9	48.2	45.5	46.0	44.9	47.2
8/2/2023	10:52 - 11:22	fine	52.3	51.8	50.4	49.7	48.3	48.5	50.4
14/2/2023	13:28 - 13:58	cloudy	49.4	48.2	47.1	47.5	48.6	49.6	48.5
20/2/2023	15:22 - 15:52	fine	47.6	49.2	50.5	48.6	48.1	46.0	48.6
25/2/2023	13:31 - 14:01	fine	47.9	47.4	44.2	46.7	46.0	45.1	46.4
<b>Average</b>									48.4
<b>Range</b>									46.4 – 50.4
<b>Limit Level &gt;75dB(A)</b>									





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

Date	Time	Weather	1 <sup>st</sup> Leq <sub>5min</sub>	2 <sup>nd</sup> Leq <sub>5min</sub>	3 <sup>rd</sup> Leq <sub>5min</sub>	4 <sup>th</sup> Leq <sub>5min</sub>	5 <sup>th</sup> Leq <sub>5min</sub>	6 <sup>th</sup> Leq <sub>5min</sub>	Leq <sub>30min</sub>
2/2/2023	14:02 - 14:32	fine	48.7	49.4	49.2	47.7	47.4	46.6	48.3
8/2/2023	11:26 - 11:56	fine	48.2	44.4	43.9	45.5	44.8	46.7	45.8
14/2/2023	14:02 - 14:32	cloudy	45.3	44.9	43.2	43.8	44.1	42.9	44.1
20/2/2023	15:56 - 16:26	fine	47.7	48.6	50.2	47.5	48.3	49.5	48.7
25/2/2023	14:05 - 14:35	fine	48.5	46.8	49.4	47.2	46.3	45.4	47.5
<b>Average</b>									47.2
<b>Range</b>									44.1 – 48.7
<b>Limit Level 70dB(A) during normal teaching periods or 65dB(A) during examination periods</b>									

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

<b>Water quality</b>	
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.
Turbidimeter	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 twelve (12) 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

<b>Dissolved Oxygen – Mid Depth (mg/L)</b>	<b>C1</b>	<b>C2</b>	<b>C3</b>	<b>M1</b>	<b>M2</b>	<b>M3</b>
Average	10.00	11.55	N/A	12.11	11.76	13.52
Min.	7.80	8.35	N/A	9.25	9.22	11.06
Max.	12.62	14.19	N/A	14.91	13.62	17.73
<b>Turbidity – Mid Depth (NTU)</b>	<b>C1</b>	<b>C2</b>	<b>C3</b>	<b>M1</b>	<b>M2</b>	<b>M3</b>
Average	2.08	1.28	N/A	3.06	2.43	0.45
Min.	0.00	0.00	N/A	0.24	0.00	0.00
Max.	3.74	3.09	N/A	4.30	7.20	1.09
<b>Suspended Solid – Mid depth (mg/L)</b>	<b>C1</b>	<b>C2</b>	<b>C3</b>	<b>M1</b>	<b>M2</b>	<b>M3</b>
Average	1.15	1.16	N/A	1.25	1.08	1.07
Min.	<1	<1	N/A	<1	<1	<1
Max.	2.60	2.30	N/A	2.30	1.90	<b>1.80</b>
<b>pH value (unit)</b>	<b>C1</b>	<b>C2</b>	<b>C3</b>	<b>M1</b>	<b>M2</b>	<b>M3</b>
Average	7.37	7.87	N/A	7.46	7.86	7.90
Min.	6.68	6.80	N/A	6.64	6.68	7.15
Max	7.87	8.44	N/A	8.14	8.56	8.42

Remark 1: Bolded values indicated exceedance of action level.

Remark 2: Underlined values indicated exceedance of limit level.

Remark 3: Details of exceedance of action level and or limit level, please refer to appendix R.

2.4.10 In this reporting month, most of the monitoring results were below or within the action level. There was no exceedance of action level and 1 exceedance of limit level in the reporting period, all was 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 water quality in February 2023 are supplemented in Appendix V.



## 2.5. ECOLOGY

- 2.5.1 The condition of TA572 was observed in fair health despite in poor form. 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 New small sprouts keep emerging from the two *Desmos chinensis* that have been reported dead previously. Construction materials was also found too close to the planter. An eye-catching protective fence shall be set up as a protection zone. No construction materials shall be placed near/ within the protection zone.
- 2.5.5 In order to enhance a sustainable survival during the post-transplantation stage, a shelter (such as shading net) has been installed to reduce intensity of direct sunlight received and avoid direct hit of rainstorm/ typhoon to the 27 nos. *Cibotium barometz* at Portion E of STSFWSR.
- 2.5.6 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.
- 2.5.7 Root ball of TA572 and TA327 tree should be kept moisture especially during dry and non-raining day.
- 2.5.8 Signs of ploughed soil by wild boar(s) at the two groups of transplanted *Cibotium barometz* were reported in previous monitoring. A robust fencing was recently installed to protect the group of *Cibotium barometz* from further damage caused by wild boars.
- 2.5.9 Given that leftover was observed nearby, illegal feeding of wild pigs or other wild animals was also suspected to occur. Warning signs of illegal feeding and plant protection zone may be put along the receptor site to remind the hikers. Reporting the case to the relevant government department, i.e. AFCD, is suggested to prevent further aggregation of wild boars in the area.



---

**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

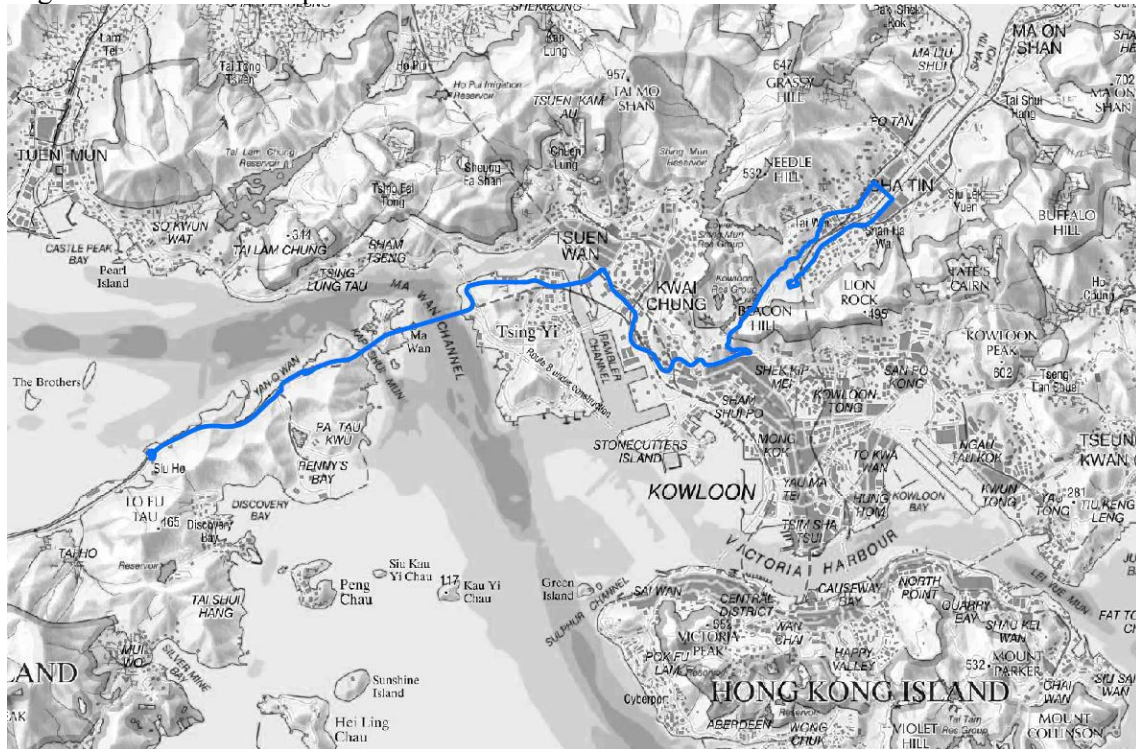


Table 2-15: Chlorine Truck Transport Route

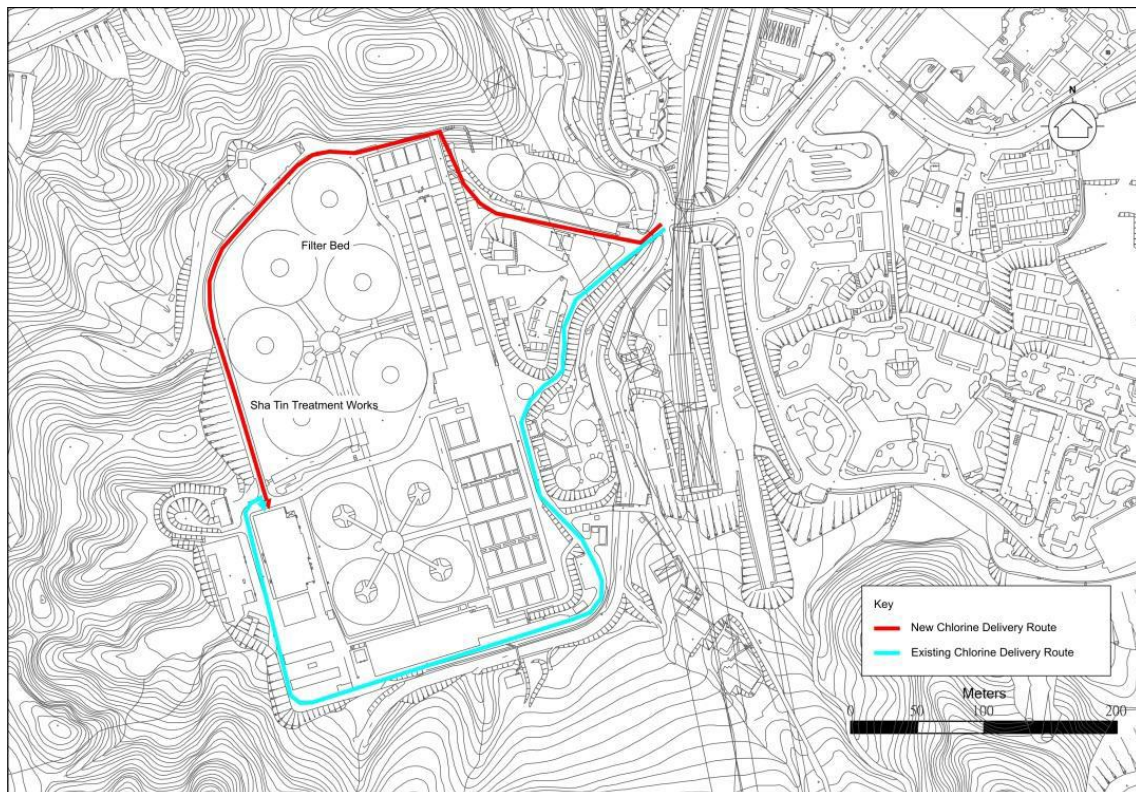


Destination	Route
From SSK Dock to Sha Tin WTW	Sham Shui Kok Dock > Cheung Tung Road > Sunny Bay Road > N Lantau Highway > Lantau Link > NW Tsing Yi Interchange > Tsing Yi North Coastal road > Tsing Tsuen Road > Tsuen Wan Road > Kwai Chung Road > Ching Cheung Road > Tai Po Road > Tai Po Road (Piper’s 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, contract No. 1/WSD/19 were five (5) site inspections carried out on 1, 8, 14, 22 and 28 February 2023. Contract No. 6/WSD/21 were five (5) site inspections carried out on 1, 8, 14, 22 and 28 February 2023.
- 2.8.2 One joint site inspection with IEC also undertaken on 28 February 2023. Minor deficiencies were observed during weekly site inspection or joint site inspection. Key observations during the site inspections are summarized in Table 2-16 (a) and Table 2-16 (b).

Table 2-16 (a): Site Observations (1/WSD/19)

<b>Date</b>	<b>Environmental Observations</b>	<b>Follow-up Status</b>
1 February 2023	No environmental issue was observed during the site inspection.	N/A
8 February 2023	It is observed that puddle on road area. Contractor is reminded to clear them	Puddle have been cleared up.
14 February 2023	No environmental issue was observed during the site inspection.	N/A
22 February 2023	No environmental issue was observed during the site inspection.	N/A
28 February 2023	It is observed that dusty on construction site. Contractor is reminded to spray water on construction site	Water have been sprayed on the construction site.

Table 2-16 (b): Site Observations (6/WSD/21)

<b>Date</b>	<b>Environmental Observations</b>	<b>Follow-up Status</b>
1 February 2023	No environmental issue was observed during the site inspection.	N/A
8 February 2023	No environmental issue was observed during the site inspection.	N/A
14 February 2023	No environmental issue was observed during the site inspection.	N/A
22 February 2023	Drains to site area have been blocked by mud and accumulated leaves. Contractor is reminded to clear them	Drains have been cleared up.
28 February 2023	No environmental issue was observed during the site inspection.	N/A

- 2.8.3 The Contractor has rectified all 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 (a) and Table 2-17 (b) below:

Table 2-17(a): Summary of Environmental License and Permit (1/WSD/19)

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	
Notification of Commencement of Asbestos Abatement Work	AX210503	30/8/2021	N/A	ACMJV	
Construction Noise Permit	GW-RN1154-22	08/12/2022	7/3/2023	ACMJV	
Special Wastes Permit	16982	17/08/2022	16/02/2023	ACMJV	

Table 2-17(b): Summary of Environmental License and Permit (6/WSD/21)

License / Permit	License / Permit No.	Date of Issue	Date of Expiry	License / Permit Holder	Remark
Notification of Construction Works under the Air Pollution Control (Construction Dust) Regulation (Form NA)	Reference No: 474147	24/11/2021	N/A	ACMJV	
Registration of Chemical Waste Producer	WPN5218-759-C4678-01	5/1/2022	N/A	ACMJV	
Trip Ticket (Chit) Account	7042460	8/12/2021	N/A	ACMJV	
Waste Water Discharge Licence	WT00040939-2022	11/5/2022	31/5/2027	ACMJV	
Construction Noise Permit	GW-RN1084-22	4/12/2022	3/3/2023	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	<ul style="list-style-type: none"> <li>- Tarpaulin covering of any dusty materials on a vehicle leaving the site;</li> <li>- Imposition of speed controls for vehicles on site haul roads;</li> <li>- Use of regular watering to reduce dust emissions from exposed site surfaces and roads;</li> <li>- Side enclosure and covering of any aggregate or stockpiling of dusty materials to reduce emissions;</li> <li>- Where possible, routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs.</li> </ul>
Noise	<ul style="list-style-type: none"> <li>- Good site practices to limit noise emissions at the sources;</li> <li>- Use of quiet plant and working methods;</li> <li>- Use of site hoarding or other mass materials as noise barrier to screen noise at ground level of NSRs;</li> <li>- Scheduling of construction works outside school examination period in critical area.</li> </ul>
Water	<ul style="list-style-type: none"> <li>- Drainage systems were regularly and adequately maintained;</li> <li>- Effluent discharged from the construction site should comply with standards stipulated in the TM-DSS;</li> <li>- Open stockpiles of construction materials on sites should be covered.</li> </ul>
General	<ul style="list-style-type: none"> <li>- The site was generally kept tidy and clean.</li> </ul>

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

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



---

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 site inspections was conducted on 17 February 2023 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 March 2023 to May 2023 will be:

- Demolition works for TWRT.
- Road reinstatement works.
- Excavation for Major ELS Work.
- Soil Nail Installation for Major ELS Work.
- Lagging wall construction for Major ELS work.
- Struct and waling installation for Major ELS work.
- Pumping test for S2F Pipe Pile.
- Trail Pit at the future main building road
- Rebar works for RMF, FST, and Ozone building
- Formwork and concrete works for S1F, S2F, SWPS, RMF, FST and Ozone Building
- WET finishing works.
- WET steel and metal works
- Dispersion modelling for discharge from VPSA Nitrogen waste gas vents and pressure/Vacuum Relief Valves vents for Ozone off-gas.
- PV Panel at Ozone Building, S1F and S2F.
- Centrifugal pumps in LC and Sump Pumps for BS.
- Supply and delivery of CPVC pipe and Valve.
- Top slab construction for WET.
- Lagging wall construction for Major ELS.
- Pre-loading works for Major ELS.
- Installation of under structures pipes

3.1.2 As informed by the Contractor, the major works for Contract No. 6/WSD/21 between March 2023 to May 2023 will be:

- Waterproofing Works
- Carry Out Excavation Down to +23.3mPD
- Concreting for Raft Slab (LG/F Level)
- Steel Plate Welding to Sheetpile for Waterproofing Works
- Carry Out Excavation to Final Excavation Level +21.0mPD
- MIC Installation
- Excavation to Bottlm Rockfill Level & Rockfill Replacement Work

#### **3.2. KEY ISSUES FOR COMING MONTH**

3.2.1 Potential environmental impacts arising from the above upcoming construction activities in February 2023 are mainly associated with dust, noise, water quality issues and waste management issues.

3.2.2 The tentative monitoring schedule for March 2023 to May 2023 can be found in **Appendix W**.



---

## **4. CONCLUSIONS AND RECOMMENDATIONS**

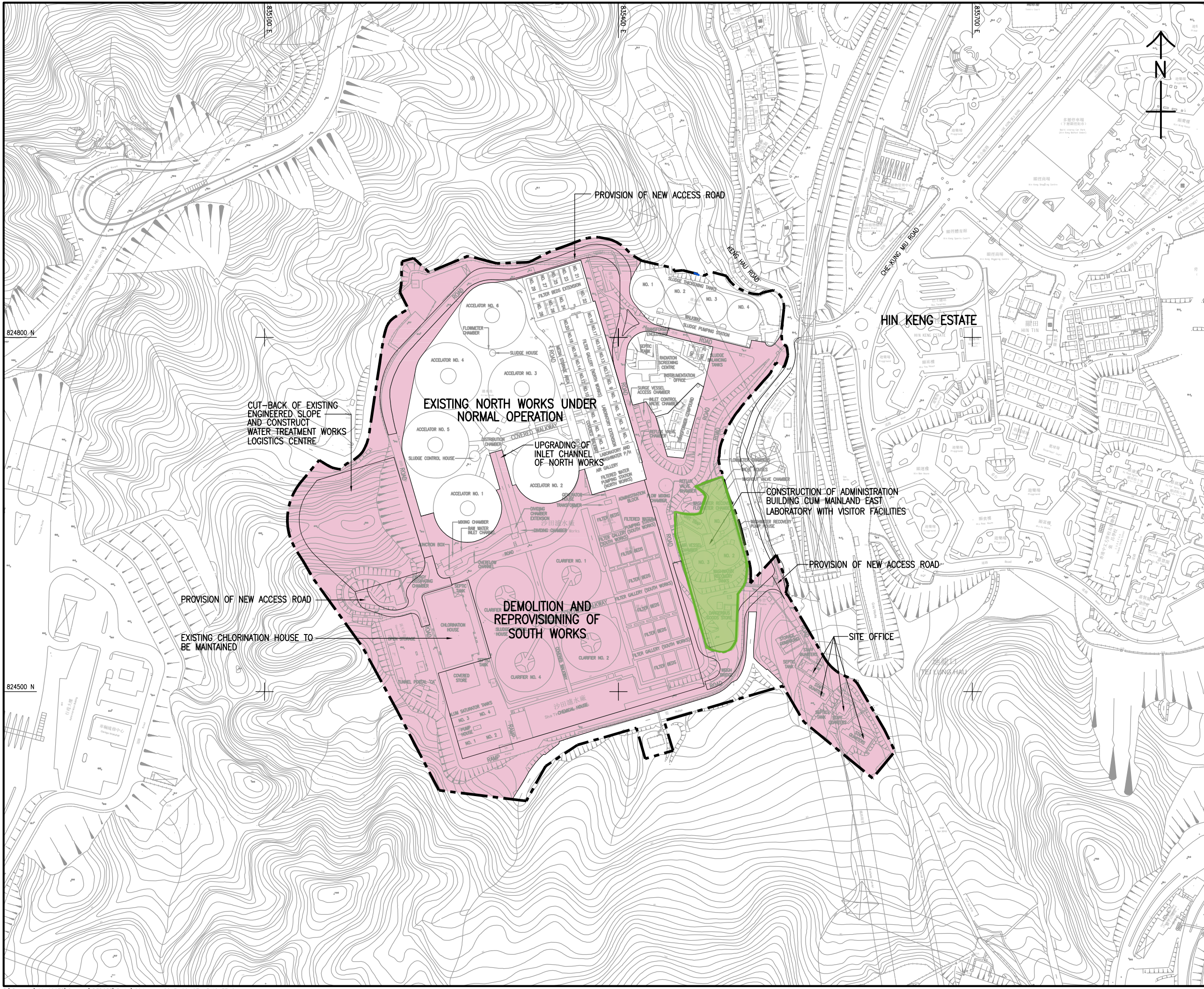
### **4.1. SUMMARY**

- 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, there were no exceedance of action level and no exceedance of limit level for water monitoring results in the reporting month were found and NOEs and Investigation Reports 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 28 February 2023. 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





**LEGEND:**

--- SITE BOUNDARY OF SHA TIN WATER TREATMENT WORKS

WORKS AREA

1/WSD/19

6/WSD/21

**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. 60162073/EM&A/FIG 1  
 圖紙編號

DESIGNED BY	CONTRACT NO.	P. DR. APPROVED
DRAWN BY	DATE	批准人
SCALE	比例尺	
DIMENSIONS ARE IN METRES		



# Appendix B

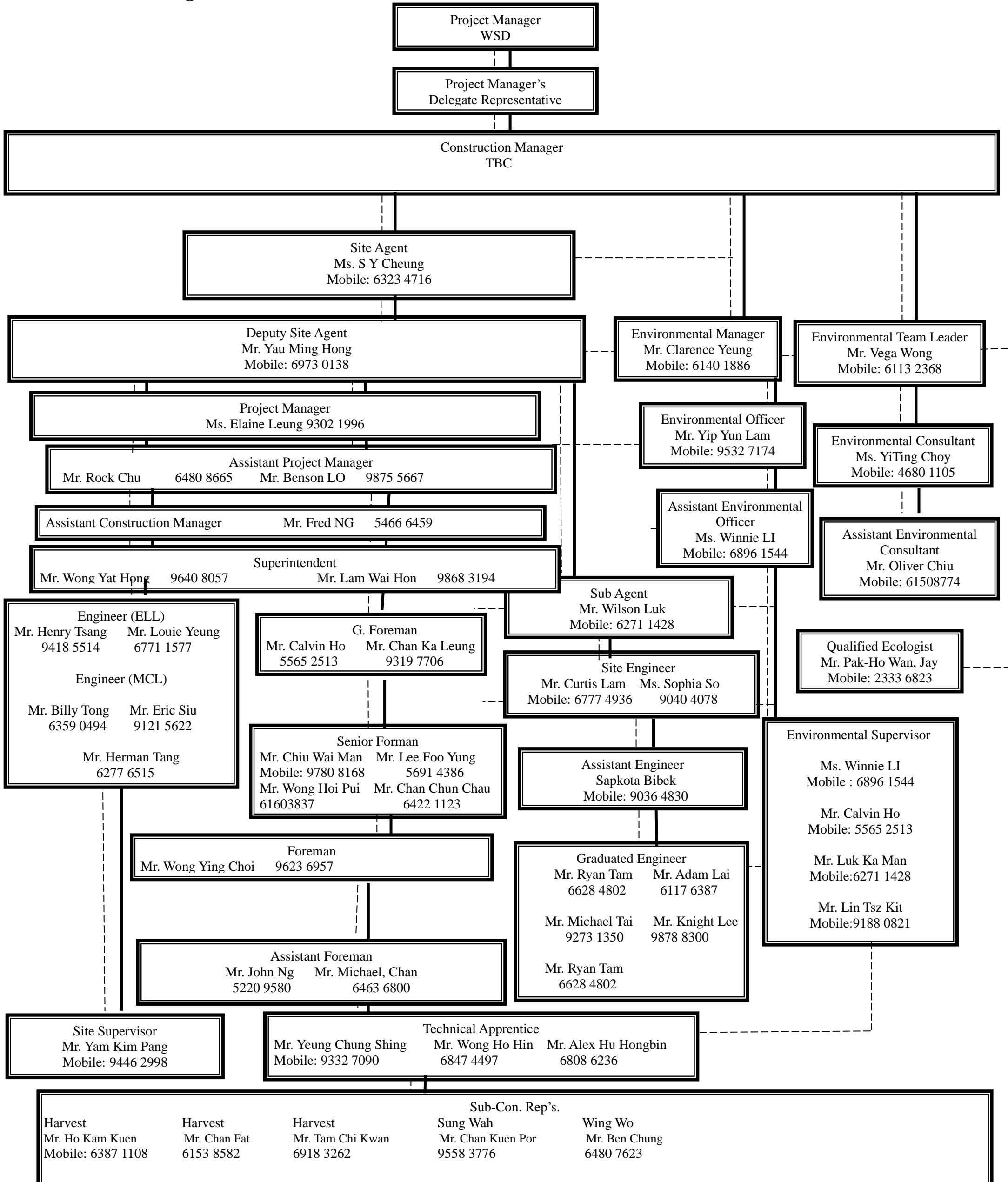
## Project Organization

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

- Water Treatment Works and Ancillary Facilities

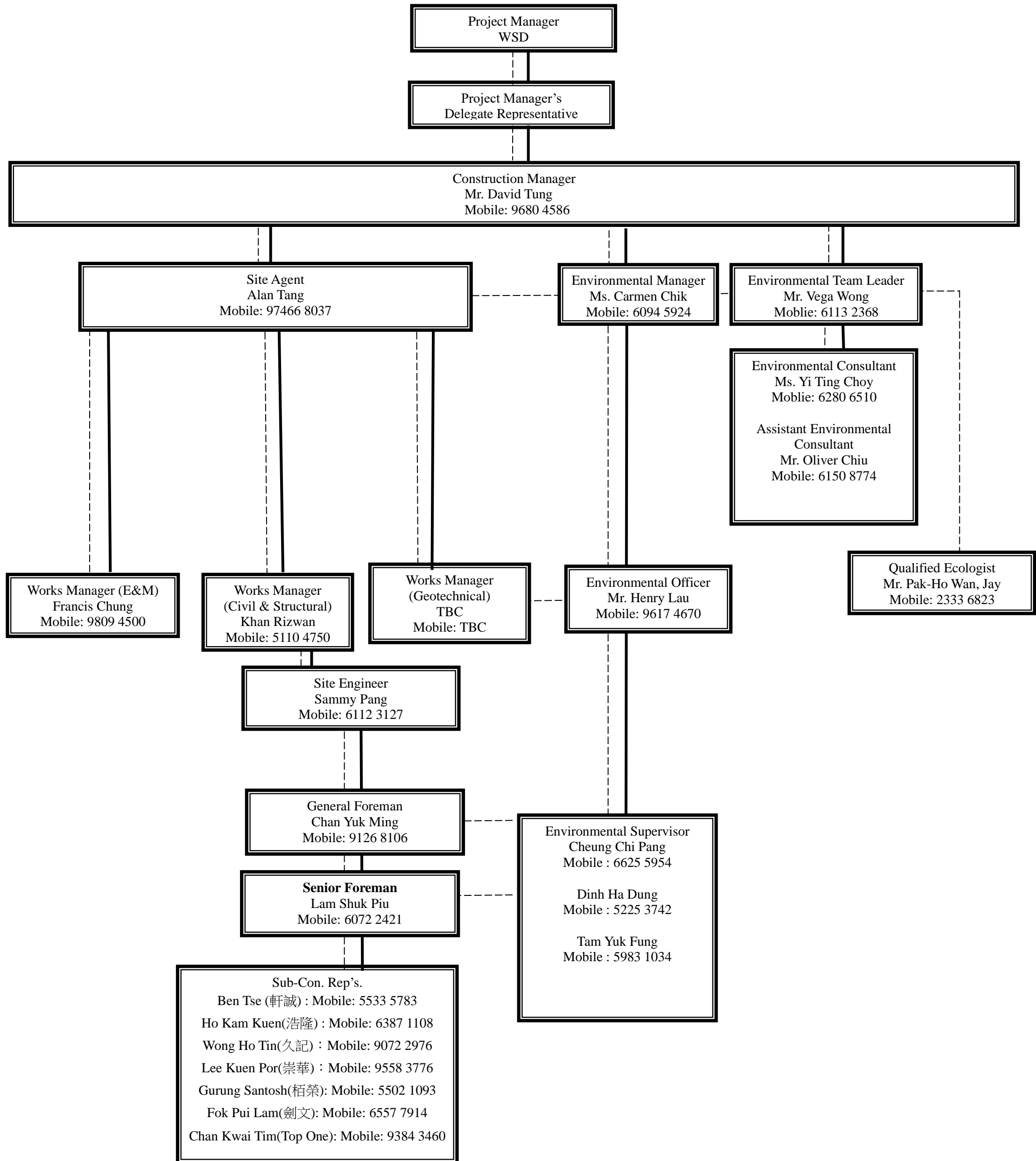
Environmental Organizational Chart

Date: 28 Feb 2023



— Authorization  
 - - - - - Communication Line

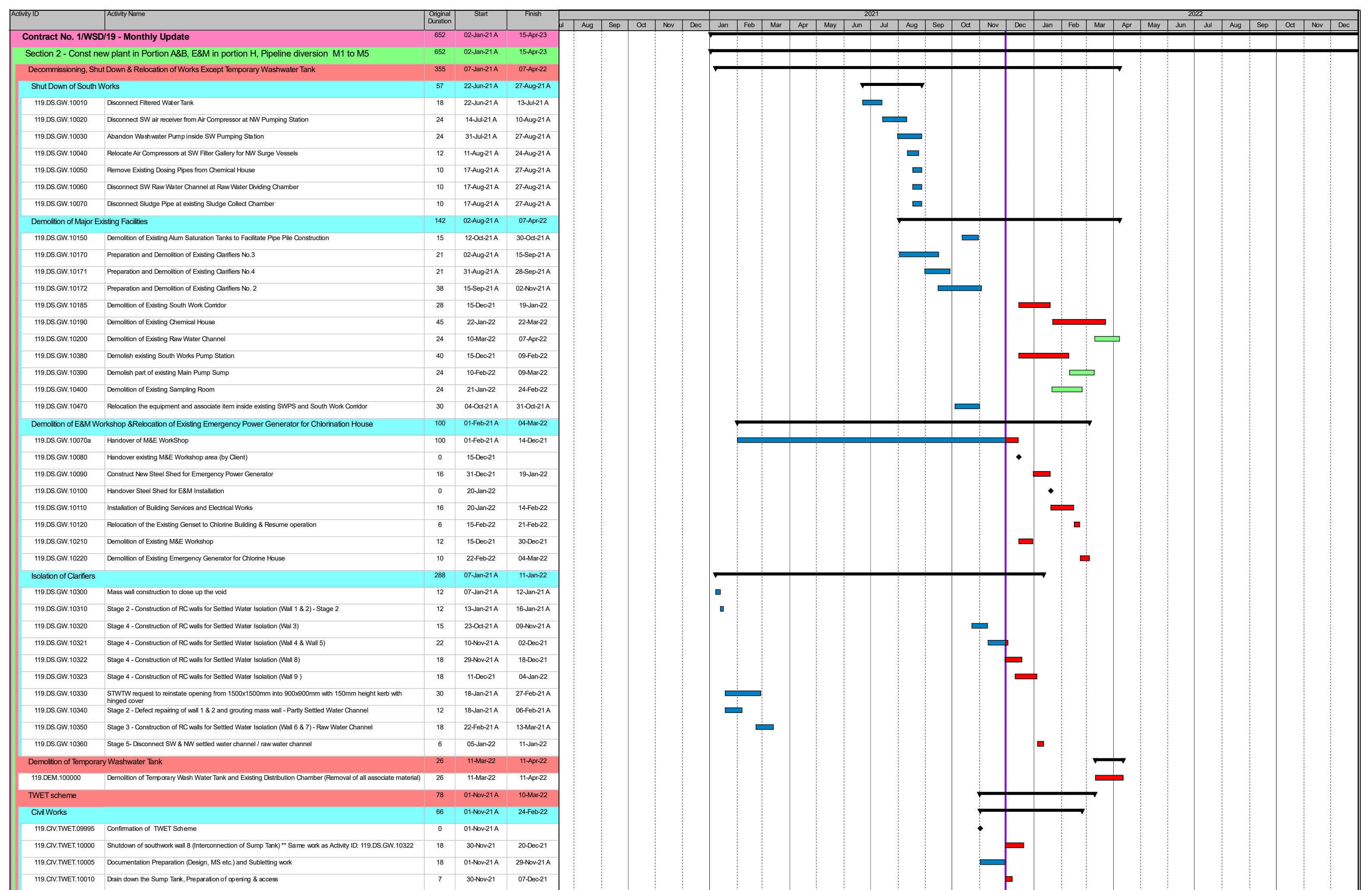
**Environmental Organizational Chart (2023.02)**



— Authorization  
- - - - - Communication Line

# Appendix C

## Latest Construction Programme





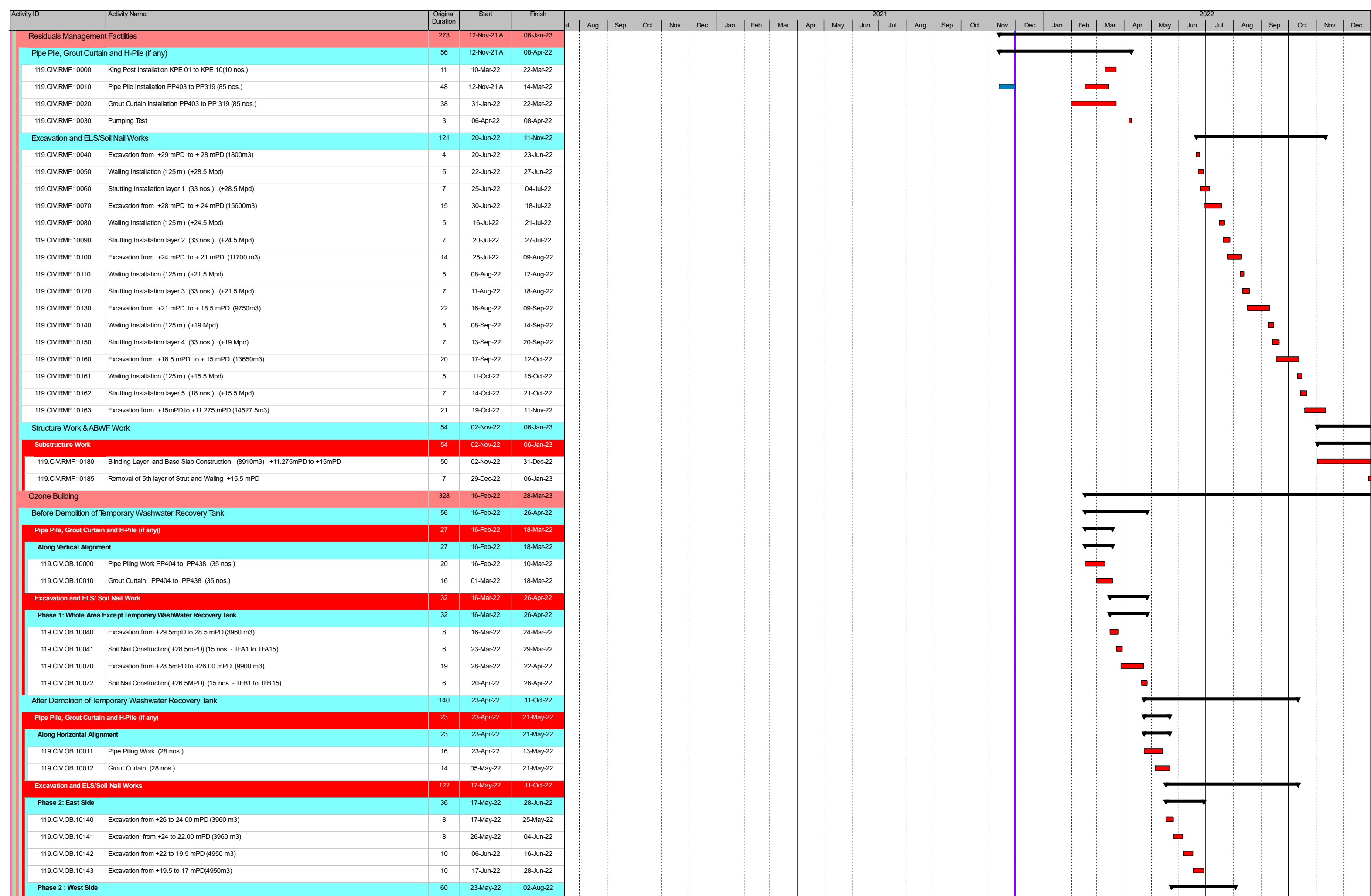




















P6 ID	Activity Name	Dur.	Start	Finish	Total Float	Late Start	Late Finish	Working Calendars	2022												2023												2024												2025												2026												2027												2028																
									N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M
<b>Total</b>		1633	10-Nov-21	30-Apr-26	0	10-Nov-21	30-Apr-26		[Gantt bar]																																																																																								
<b>In-situ Reprovisioning of Sha Tin WTW (South Works) - Admin. Bldg. (1st Programme)</b>		1633	10-Nov-21	30-Apr-26	0	10-Nov-21	30-Apr-26		[Gantt bar]																																																																																								
<b>Contract Dates</b>		1633	10-Nov-21	30-Apr-26	0	10-Nov-21	30-Apr-26	7d/w x10	[Gantt bar]																																																																																								
<b>Key Dates</b>		1268	10-Nov-21	30-Apr-25	0	10-Nov-21	30-Apr-25	7d/w x10	[Gantt bar]																																																																																								
WSD-CD-01	Contract Date	0	10-Nov-21*		0	10-Nov-21		7d/w x10	◆ Contract Date																																																																																								
WSD-CD-02	starting date	0	17-Nov-21		0	17-Nov-21		7d/w x10	◆ starting date																																																																																								
WSD-CD-03	Completion of Date	0		30-Apr-25*	0		30-Apr-25	7d/w x10																																					◆ Completion of Date																																																				
<b>Sectional Completion</b>		365	30-Apr-25	30-Apr-26	0	30-Apr-25	30-Apr-26	7d/w x10	[Gantt bar]																																																																																								
<b>Section 1 - All Works except the Works in Section 2 &amp; 2A</b>		0	30-Apr-25	30-Apr-25	0	30-Apr-25	30-Apr-25	7d/w x10																																																																																									
WSD-SC-1-01	Contractual Completion Date according to CDP1 (1260d after starting date)	0		30-Apr-25*	0		30-Apr-25	7d/w x10																																																	◆ Contractual Completion Date according to CDP1 (1260d after starting date)																																								
WSD-SC-1-02	Planned Completion Date	0		30-Apr-25*	0		30-Apr-25	7d/w x10																																																	◆ Planned Completion Date																																								
<b>Section 2 - Landscaping Softworks within Portion A</b>		0	30-Apr-25	30-Apr-25	0	30-Apr-25	30-Apr-25	7d/w x10																																																																																									
WSD-SC-2-01	Contractual Completion Date according to CDP1 (1260d after starting date)	0		30-Apr-25*	0		30-Apr-25	7d/w x10																																																	◆ Contractual Completion Date according to CDP1 (1260d after starting date)																																								
WSD-SC-2-02	Planned Completion Date	0		30-Apr-25*	0		30-Apr-25	7d/w x10																																																	◆ Planned Completion Date																																								
<b>Section 2A - Establishment Works within Portion A</b>		0	30-Apr-26	30-Apr-26	0	30-Apr-26	30-Apr-26	7d/w x10																																																																																									
WSD-SC-3-01	Contractual Completion Date according to CDP1 (1625d after starting date)	0		30-Apr-26*	0		30-Apr-26	7d/w x10																																																	◆ Contractual Completion Date according to CDP1 (1625d after starting date)																																								
WSD-SC-3-02	Planned Completion Date	0		30-Apr-26*	0		30-Apr-26	7d/w x10																																																	◆ Planned Completion Date																																								
<b>Key Dates-1</b>		265	21-Oct-23	12-Jul-24	0	21-Oct-23	12-Jul-24	7d/w x10	[Gantt bar]																																																																																								
<b>KD1 - Completion of the Works as specified in Clause PS 0.21</b>		0	21-Oct-23	21-Oct-23	0	21-Oct-23	21-Oct-23	7d/w x10																																																																																									
WSD-KD-1-01	Contractual Completion Date according to CDP1 (703d after starting date)	0		21-Oct-23*	0		21-Oct-23	7d/w x10																																																	◆ Contractual Completion Date according to CDP1 (703d after starting date)																																								
WSD-KD-1-02	Planned Completion Date	0		21-Oct-23*	0		21-Oct-23	7d/w x10																																																	◆ Planned Completion Date																																								
<b>KD2 - Completion of the Works as specified in Clause PS 0.22</b>		0	12-Jul-24	12-Jul-24	0	12-Jul-24	12-Jul-24	7d/w x10																																																																																									
WSD-KD-2-01	Contractual Completion Date according to CDP1 (968d after starting date)	0		12-Jul-24*	0		12-Jul-24	7d/w x10																																																	◆ Contractual Completion Date according to CDP1 (968d after starting date)																																								
WSD-KD-2-02	Planned Completion Date	0		12-Jul-24*	0		12-Jul-24	7d/w x10																																																	◆ Planned Completion Date																																								
<b>Access Date</b>		0	17-Nov-21	17-Nov-21	118	15-Mar-22	15-Mar-22	7d/w x10	[Gantt bar]																																																																																								
WSD-PS-01	Portion A & Portion B	0	17-Nov-21		118	15-Mar-22		7d/w x10	◆ Portion A & Portion B																																																																																								
<b>Major Submission / Procurement</b>		452	10-Nov-21	04-Feb-23	684	10-Nov-21	19-Dec-24	7d/w x10	[Gantt bar]																																																																																								
<b>Major Submission</b>		44	17-Nov-21	30-Dec-21	132	15-Dec-21	11-May-22	7d/w x10	[Gantt bar]																																																																																								
WSD-MS-01	Sub-contract Management Plan & Subletting Procedure - Submission & Approval by PM	30	17-Nov-21	16-Dec-21	28	15-Dec-21	13-Jan-22	7d/w x10	[Gantt bar]																																																																																								
WSD-MS-02	Safety Plan - Submission & Approval by PM	30	24-Nov-21	23-Dec-21	139	12-Apr-22	11-May-22	7d/w x10	[Gantt bar]																																																																																								
WSD-MS-03	Environmental Management Plan - Submission & Approval by PM	30	01-Dec-21	30-Dec-21	132	12-Apr-22	11-May-22	7d/w x10	[Gantt bar]																																																																																								
<b>Subletting Package</b>		452	10-Nov-21	04-Feb-23	684	10-Nov-21	19-Dec-24	7d/w x10	[Gantt bar]																																																																																								
WSD-P-00	Independent Checking Engineer/ AP/ RSE	30	17-Dec-21	15-Jan-22	118	14-Apr-22	13-May-22	7d/w x10	[Gantt bar]																																																																																								
WSD-P-01	Design Consultant for Foundation and ELS	30	10-Nov-21	09-Dec-21	0	10-Nov-21	09-Dec-21	7d/w x10	[Gantt bar]																																																																																								
WSD-P-02	Design Consultant for MIC	30	17-Dec-21	15-Jan-22	118	14-Apr-22	13-May-22	7d/w x10	[Gantt bar]																																																																																								
WSD-P-03	Design Consultant for Administration Building	30	17-Dec-21	15-Jan-22	145	11-May-22	09-Jun-22	7d/w x10	[Gantt bar]																																																																																								
WSD-P-04	Design Consultant for Other Permanent Structure incl. Elevated Walkways, Drainage	30	16-Jan-22	14-Feb-22	725	11-Jan-24	09-Feb-24	7d/w x10	[Gantt bar]																																																																																								
WSD-P-05	Sub-Contract for Prefabrication and Installation of MIC	60	15-Jul-22	12-Sep-22	88	11-Oct-22	09-Dec-22	7d/w x10	[Gantt bar]																																																																																								
WSD-P-06	Sub-Contract for Ground Investigation	45	15-Jan-22	28-Feb-22	28	12-Feb-22	28-Mar-22	7d/w x10	[Gantt bar]																																																																																								
WSD-P-07	Sub-Contract for Surveying & Setting-Out Works (by small work order)	30	15-Jan-22	13-Feb-22	53	09-Mar-22	07-Apr-22	7d/w x10	[Gantt bar]																																																																																								
WSD-P-08	Sub-Contract for Condition Survey Works (by small work order)	30	15-Jan-22	13-Feb-22	53	09-Mar-22	07-Apr-22	7d/w x10	[Gantt bar]																																																																																								
WSD-P-09	Sub-Contract for Refurbishment Works of PM's Site Office (by small work order)	30	15-Jan-22	13-Feb-22	1040	20-Nov-24	19-Dec-24	7d/w x10	[Gantt bar]																																																																																								
WSD-P-12	Sub-Contract for Provision of Material Hoist	60	17-Dec-21	14-Feb-22	412	02-Feb-23	02-Apr-23	7d/w x10	[Gantt bar]																																																																																								
WSD-P-13	Sub-Contract for Waterproofing Works of Administration Building	60	15-Feb-22	15-Apr-22	287	29-Nov-22	27-Jan-23	7d/w x10	[Gantt bar]																																																																																								
WSD-P-14	Sub-Contract for Provision of Furniture of Administration Building	60	16-Apr-22	14-Jun-22	729	14-Apr-24	12-Jun-24	7d/w x10	[Gantt bar]																																																																																								
WSD-P-15	Sub-Contract for ELS Works	60	17-Dec-21	14-Feb-22	129	25-Apr-22	23-Jun-22	7d/w x10	[Gantt bar]																																																																																								
WSD-P-16	Sub-Contract for Foundation Works of Administration Building	60	17-Dec-21	14-Feb-22	77	04-Mar-22	02-May-22	7d/w x10	[Gantt bar]																																																																																								
WSD-P-17	Sub-Contract for Superstructure Works of Administration Building	60	17-Dec-21	14-Feb-22	222	27-Jul-22	24-Sep-22	7d/w x10	[Gantt bar]																																																																																								
WSD-P-18	Sub-Contract for Mainland East Regional Lab for MIC Works	60	29-Jul-22	26-Sep-22	478	19-Nov-23	17-Jan-24	7d/w x10	[Gantt bar]																																																																																								
WSD-P-19	Sub-Contract for BS Installation Works of Administration Building	60	15-Feb-22	15-Apr-22	361	11-Feb-23	11-Apr-23	7d/w x10	[Gantt bar]																																																																																								

- ◆ Milestone
- ▬ Near Critical Task
- ▬ Critical Task
- ▬ Time Risk AL
- ▬ Non-Critical Task
- ▬ Finished Task
- ▬ Tasks Summary
- ▬ P6 Hammock

**FIRST PROGRAMME REV. 1**  
**ALL ACTIVITIES**



Date	Revision	Checked	Approved
03-Nov-21	Revision 0 First Issue	AH	WJ
19-Jan-22	Revision 1 First Issue	PF	AH
08-Feb-22	Revision 2 First Issue		

































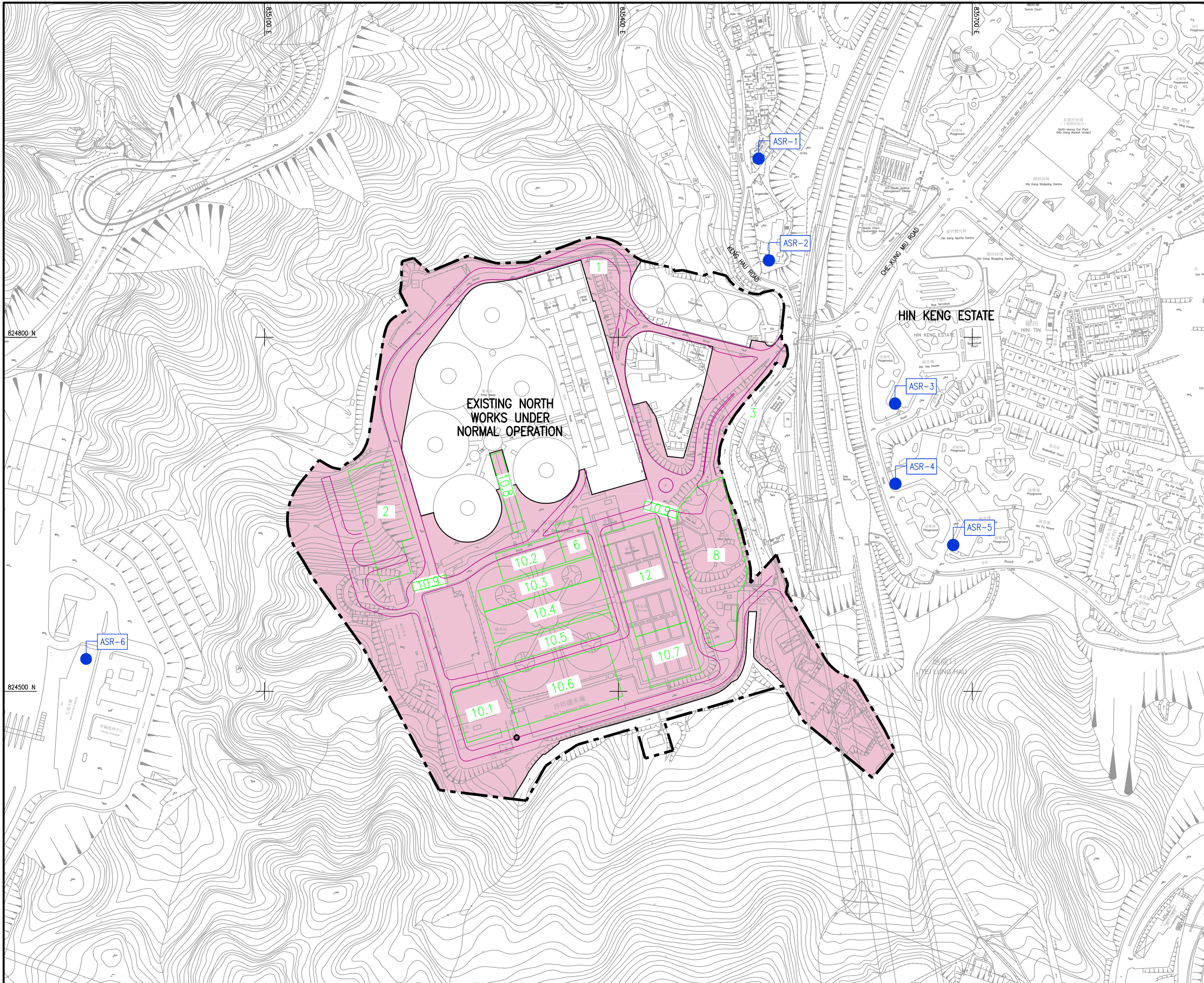




# Appendix D

## Location of Construction Activities





- LEGEND:**
- SITE BOUNDARY OF SHA TIN WATER TREATMENT WORKS
  - WORKS AREA
  - REPRESENTATIVE 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

	<b>水務署</b>			
<b>WATER SUPPLIES DEPARTMENT</b>				
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**



DRG. NO. 60162073/FIGURE 4.2	
DESIGNED BY	P. NO. APPROVED
DRAWN BY NHP	DATE
SCALE A3 1 : 3000	DATE
CONSTRUCTION AREA METRES	© COPYRIGHT RESERVED

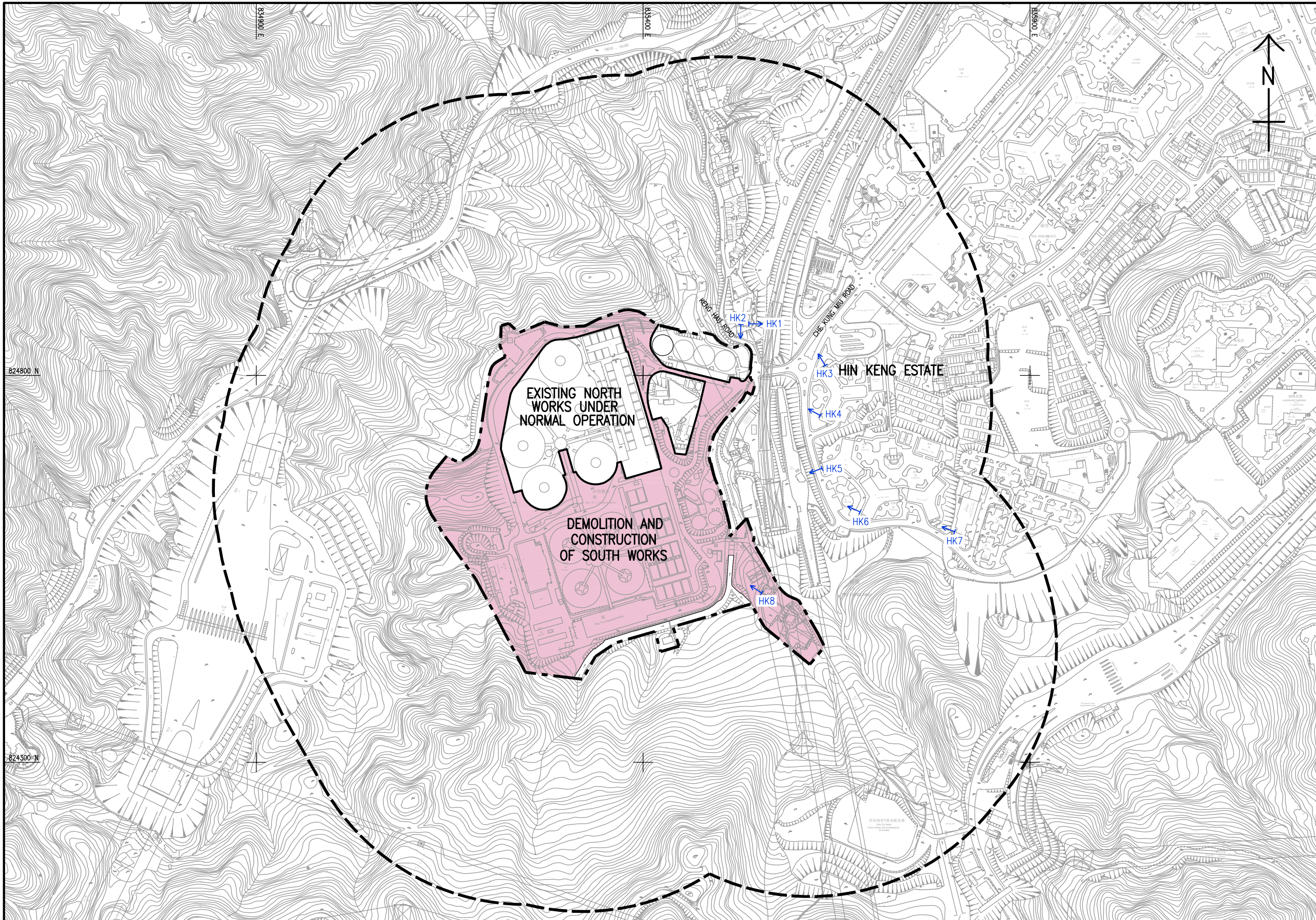


# Appendix E

## Environmental Sensitive Receivers in the Vicinity of the Projects







**LEGEND:**

- SITE BOUNDARY OF SHA TIN WATER TREATMENT WORKS
- 300m STUDY AREA
- WORKS AREA
- 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	Y

NO.	DESCRIPTION	DATE	BY
1	ISSUED FOR CONSTRUCTION	12/11/2012	WJ

**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**

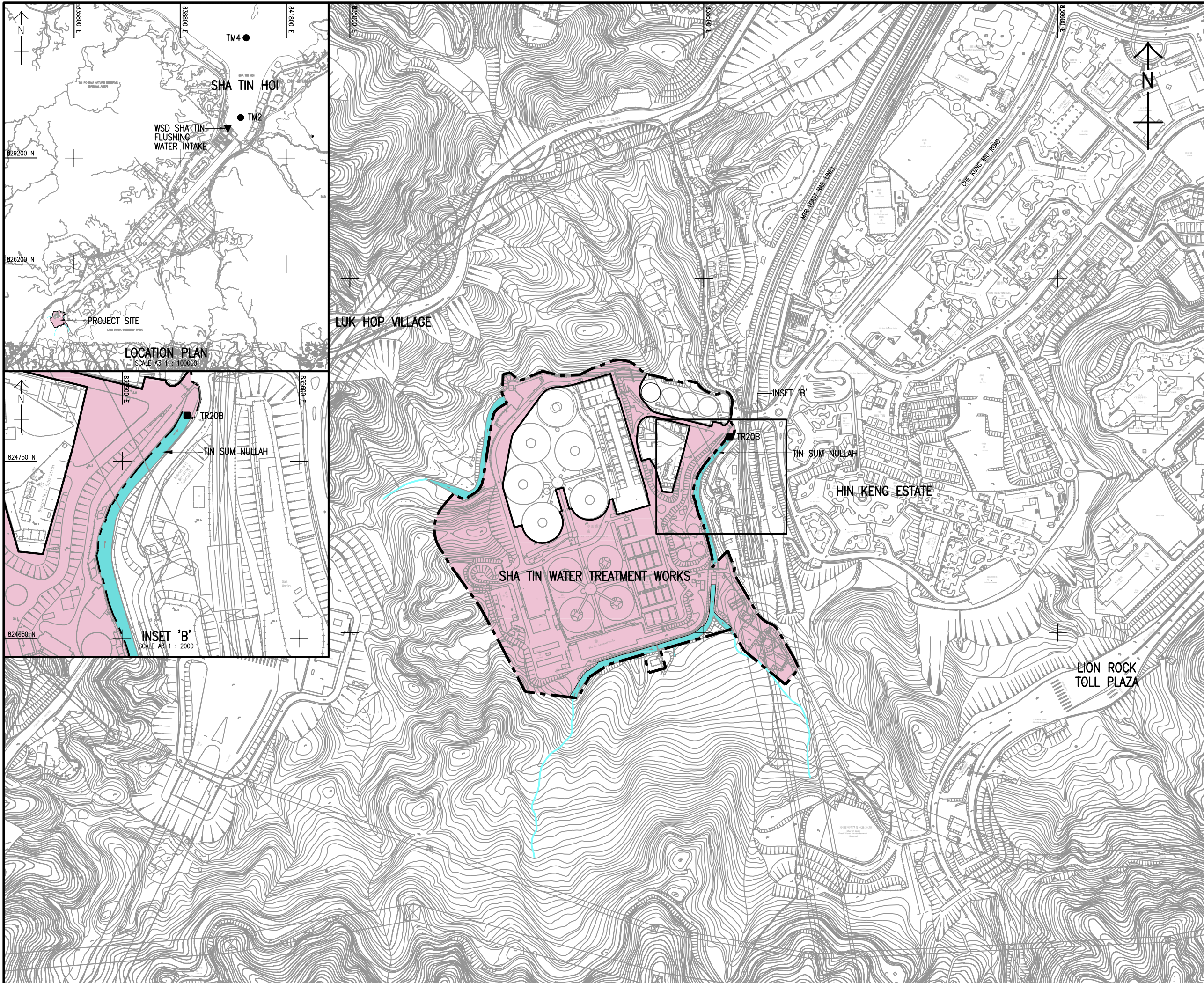
**AECOM**

DRG. NO. 60162073/EIA/FIG 5.1  
 圖紙編號

DESIGNED BY	CONTRACT NO.	P. NO. APPROVED
WJ	CE 13/2009 (WS)	5.1
DRAWN BY	SCALE	DATE
LJ	A3 1 : 5000	12/11/2012
DATE	SCALE	DATE
12/11/2012	A3 1 : 5000	12/11/2012
UNIT	METRES	

© COPYRIGHT RESERVED  
 版權所有





- 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.	DESCRIPTION	BY	CHK.	DATE

**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**



DRG. NO. 圖紙編號	60162073/EIA/FIG 6.1	
DESIGNED BY 設計	CONTRACT NO. 合約編號	P. No. APPROVED 批准人
DRAWN BY 繪圖	STATUS 階段	
SCALE 比例	A3 1 : 5000	
DIMENSIONS ARE IN 尺寸單位	METRES	
© COPYRIGHT RESERVED 版權所有		



# Appendix F

## Summary of Action and Limit Levels



**Determination of Action and Limit Levels for Air Quality**

<b>Monitoring Locations</b>	<b>Action Level 1-hour TSP, (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Limit Level 1-hour TSP, (<math>\mu\text{g}/\text{m}^3</math>)</b>
AM1	357	500
AM2	334	500

**Determination of Action and Limit Levels for Noise**

<b>Monitoring Location</b>	<b>Action Level</b>	<b>Limit Level in dB(A)</b>
	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**

<b>Water monitoring stations</b>	<b>Dissolved Oxygen (mg/L)</b>		<b>Suspended Solids (mg/L)</b>		<b>Turbidity (NTU)</b>		<b>pH</b>	
	<b>Action Level</b>	<b>Limit Level</b>	<b>Action Level</b>	<b>Limit Level</b>	<b>Action Level</b>	<b>Limit Level</b>	<b>Action Level</b>	<b>Limit Level</b>
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
<b>ACTION LEVEL</b>				
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.
<b>LIMIT LEVEL</b>				
<b>Event</b>	<b>ET</b>	<b>IEC</b>	<b>ER</b>	<b>CONTRACTOR</b>
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.

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

# Noise



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

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

# Water Quality

EVENT	ACTION			
	ET Leader	IEC	ER	CONTRACTOR
Action level being exceeded by one sampling day	<ul style="list-style-type: none"> <li>● Repeat <i>in situ</i> measurement to confirm findings;</li> <li>● Identify reasons for non-compliance and source(s) of impact;</li> <li>● Inform IEC and Contractor;</li> <li>● Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>● Discuss mitigation measures with IEC and Contractor;</li> <li>● Repeat measurement on next day of exceedance.</li> </ul>	<ul style="list-style-type: none"> <li>● Discuss with ET and Contractor on the mitigation measures;</li> <li>● Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly;</li> <li>● Assess the effectiveness of the Implemented mitigation measures.</li> </ul>	<ul style="list-style-type: none"> <li>● Discuss with IEC on the proposed mitigation measures;</li> <li>● Make agreement on the mitigation measures to be implemented.</li> <li>● Assess the effectiveness of the implemented mitigation measures.</li> </ul>	<ul style="list-style-type: none"> <li>● Inform the ER and confirm notification of the non-compliance in writing;</li> <li>● Rectify unacceptable practice;</li> <li>● Check all plant and equipment;</li> <li>● Consider changes of working methods;</li> <li>● Discuss with ET and IEC and propose mitigation measures to IEC and ER;</li> <li>● Implement the agreed mitigation measures.</li> </ul>

	<b>ET Leader</b>	<b>IEC</b>	<b>ER</b>	<b>CONTRACTOR</b>
Action level being exceeded by more than one consecutive sampling day	<ul style="list-style-type: none"> <li>● Repeat <i>in situ</i> measurement to confirm findings;</li> <li>● Identify reasons for non-compliance and source(s) of impact;</li> <li>● Inform IEC and Contractor;</li> <li>● Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>● Discuss mitigation measures with IEC and Contractor;</li> <li>● Ensure mitigation measures are implemented;</li> <li>● Prepare to increase the monitoring frequency to daily;</li> </ul>	<ul style="list-style-type: none"> <li>● Discuss with ET and Contractor on the mitigation measures;</li> <li>● Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly;</li> <li>● Assess the effectiveness of the implemented mitigation measures.</li> </ul>	<ul style="list-style-type: none"> <li>● Discuss with IEC on the proposed mitigation measures;</li> <li>● Make agreement on the mitigation measures to be implemented;</li> <li>● Assess the effectiveness of the implemented mitigation measures.</li> </ul>	<ul style="list-style-type: none"> <li>● Inform the ER and confirm notification of the non-compliance in writing;</li> <li>● Rectify unacceptable practice;</li> <li>● Check all plant and equipment;</li> <li>● Consider changes of working methods;</li> <li>● Discuss with ET and IEC and propose mitigation measures to IEC and ER within three working days;</li> <li>● Implement the agreed mitigation measures.</li> </ul>

	<ul style="list-style-type: none"> <li>● Repeat measurement on next day of exceedance.</li> </ul>			
	<b>ET Leader</b>	<b>IEC</b>	<b>ER</b>	<b>CONTRACTOR</b>
Limit level being exceeded by one sampling day	<ul style="list-style-type: none"> <li>● Repeat <i>in situ</i> measurement to confirm findings;</li> <li>● Identify reasons for non-compliance and source(s) of impact;</li> <li>● Inform IEC Contractor and EPD;</li> <li>● Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>● Discuss mitigation measures with IEC, ER and Contractor;</li> <li>● Ensure mitigation measures are implemented;</li> </ul>	<ul style="list-style-type: none"> <li>● Discuss with ET and Contractor on the mitigation measures;</li> <li>● Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly;</li> <li>● Assess the effectiveness of the implemented mitigation measures.</li> </ul>	<ul style="list-style-type: none"> <li>● Discuss with IEC, ET and Contractor on the proposed mitigation measures;</li> <li>● Request Contractor to critically review the working methods;</li> <li>● Make agreement on the mitigation measures to be implemented;</li> <li>● Assess the effectiveness of the implemented mitigation measures.</li> </ul>	<ul style="list-style-type: none"> <li>● Inform the ER and confirm notification of the non-compliance in writing;</li> <li>● Rectify unacceptable practice;</li> <li>● Check all plant and equipment;</li> <li>● Consider changes of working methods;</li> <li>● Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within three working days;</li> <li>● Implement the agreed mitigation measures.</li> </ul>



	<ul style="list-style-type: none"> <li>● Increase the monitoring frequency to daily until no exceedance of Limit level.</li> </ul>			
	<b>ET Leader</b>	<b>IEC</b>	<b>ER</b>	<b>CONTRACTOR</b>
Limit level being exceeded by more than one consecutive sampling day	<ul style="list-style-type: none"> <li>● Repeat <i>in situ</i> measurement to confirm findings;</li> <li>● Identify reasons for non-compliance and source(s) of impact;</li> <li>● Inform IEC Contractor and EPD;</li> <li>● Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>● Discuss mitigation measures with IEC, ER and Contractor;</li> <li>● Ensure mitigation measures are</li> </ul>	<ul style="list-style-type: none"> <li>● Discuss with ET and Contractor on the mitigation measures;</li> <li>● Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly;</li> <li>● Assess the effectiveness of the implemented mitigation measures.</li> </ul>	<ul style="list-style-type: none"> <li>● Discuss with IEC, ET and Contractor on the proposed mitigation measures;</li> <li>● Request Contractor to critically review the working methods;</li> <li>● Make agreement on the mitigation measures to be implemented;</li> <li>● Assess the effectiveness of the implemented mitigation measures;</li> <li>● Consider and instruct, if necessary, the Contractor to slow</li> </ul>	<ul style="list-style-type: none"> <li>● Inform the ER and confirm notification of the non-compliance in writing;</li> <li>● Rectify unacceptable practice;</li> <li>● Check all plant and equipment;</li> <li>● Consider changes of working methods;</li> <li>● Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within three working days;</li> <li>● Implement the agreed mitigation measures;</li> </ul>

	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.	<ul style="list-style-type: none"><li>● As directed by the ER, to slow down or to stop all or part of the construction activities.</li></ul>
--	--	--	--	--

# Appendix H

## Impact Monitoring Schedules

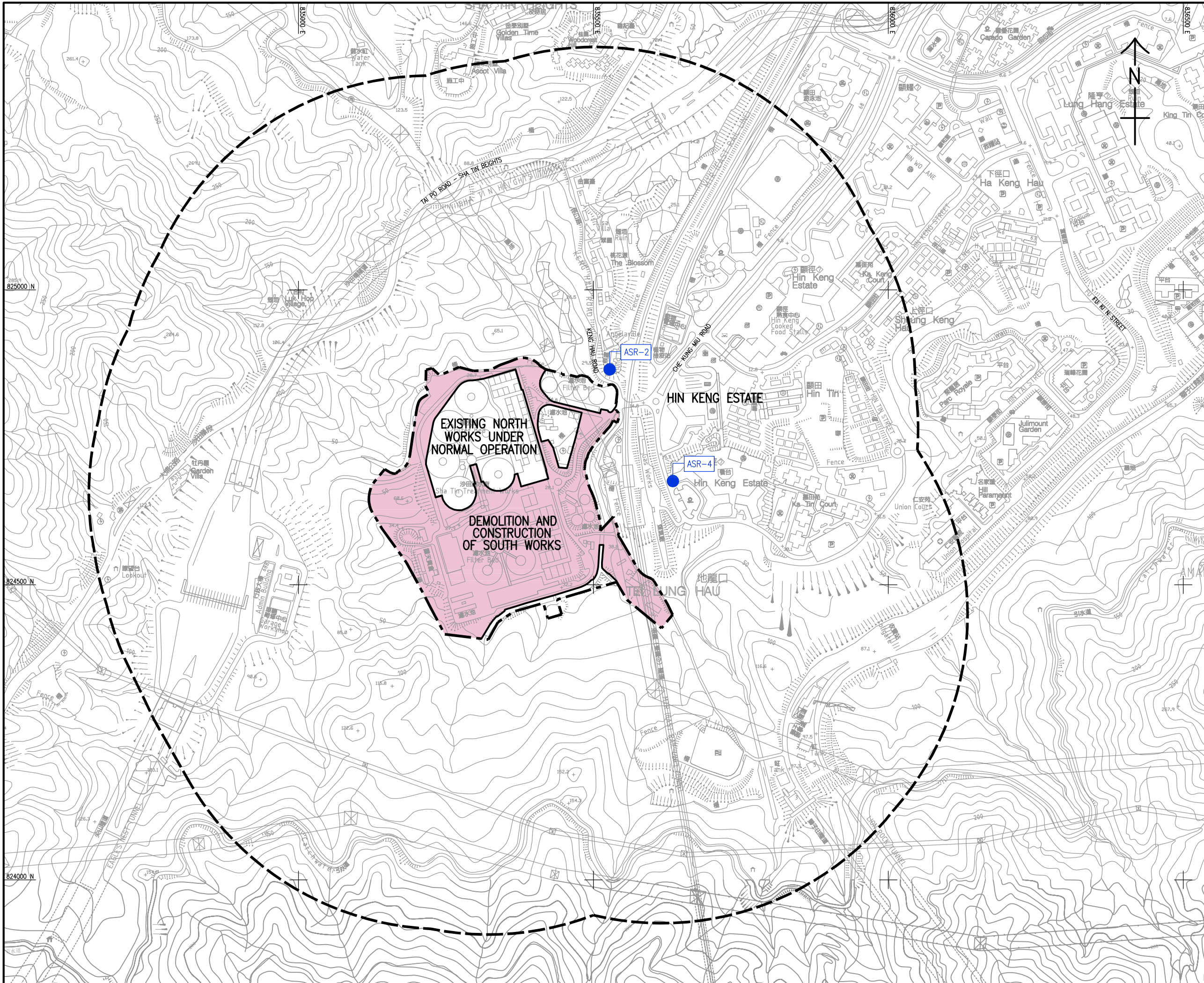
Impact Monitoring Schedule for STWTW

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

# Appendix I

## Location Plan of Air Quality Monitoring Station





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

REV.	DESCRIPTION	BY	CHK.	DATE

**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. 60162073/EM&A/FIG 3  
 圖紙編號

DESIGNED BY	CONTRACT NO.	P. DR. APPROVED
DRAWN BY		
SCALE		

# Appendix J

## Calibration Certificates

### (Air Monitoring)





# 北京航天计量测试技术研究所

Beijing Aerospace Institute for Metrology and Measurement Technology

证书编号: NO.HD1e-2022-07-28517842  
CERTIFICATE No:

第 1 页 共 3 页  
PAGE 1 OF 3 PAGES

## 校准证书

### CALIBRATION CERTIFICATE

委托方 CLIENT

名称: Acumen Environmental Engineering and Technologies Co. Ltd.  
NAME:  
地址: Flat/RM D, 12/F, Ford Glory Plaza, Nos. 37-39 Wing Hong Street, Kowloon, Hong Kong  
ADDRESS:

#### 计量器具 MEASURING INSTRUMENTS

名称: TSP 全尘浓度检测仪  
NAME:  
制造者: 青岛精诚仪器仪表有限公司  
MANUFACTURER:  
型号: PC-3A(E)  
TYPE:  
编号: JC-220710222  
No:

校准人:  
OPERATOR:

沈北松

核验人:  
INSPECTOR:

孙景波

签发人:  
APPROVED SIGNATORY:

杨广强



接收日期: 2022 年 07 月 08 日  
RECEIVED DATE: YEAR MONTH DAY  
校准日期: 2022 年 07 月 08 日  
CAL. DATE: YEAR MONTH DAY  
建议下次校准日期: 2023 年 07 月 07 日  
NEXT TIME TO CALIBRAT: YEAR MONTH 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](mailto:jiliang102@163.com)





# 北京航天计量测试技术研究所

Beijing Aerospace Institute for Metrology and Measurement Technology

证书编号: NO.HD1e-2022-07- 28517842  
CERTIFICATE No:

第 2 页 共 3 页  
PAGE 2 OF 3 PAGES

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 No 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 No 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 No170020180155

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/m <sup>3</sup>	5.0%	2021D11-09-10227	2022-08-25

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 °C

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: NO.HD1e-2022-07- 28517842  
CERTIFICATE No:

第 3 页 共 3 页  
PAGE 3 OF 3 PAGES

### 校准结果

#### RESULTS OF CALIBRATION

校准项目	技术要求	校准结果
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	$\pm 20\%$	-1.4%
示值重复性	$\pm 10\%$	2.0%
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 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  $\pm 1.04\%$  within the airspeed range 706.6 to 3923.9 fpm (3.59 to 19.93 m/s), and  $\pm 1.66\%$  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  $\pm 0.05$  °C.

#### Direction / Heading

The sensitivity of the magnetic directional sensor is verified 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  $\pm 5$  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  $\pm 0.2\%$  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  $\pm 0.02\%$  F.S.

#### Approved By:

Michael Naughton, Engineering Manager



SENSORS																		
SENSOR	1000	2000	2500	3000	3500	3500 DT	4000	4200	4250	4300	4400	4500	4500 HOR	ACCURACY (H+) <sup>1</sup>	RESOLUTION	SPECIFICATION RANGE	OPERATIONAL RANGE	NOTES
Wind Speed   Air Flow	•	•	•	•	•	•	•	•	•	•	•	•	•	0.1 m/s 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 1.2 to 77.8 knots 1 ft	0.6 to 60.0 m/s 116 to 7,874 ft/min 2.2 to 144.0 km/h 1.3 to 89.5 mph 1.2 to 116.6 knots 0 to 12 ft	0.6 to 60.0 m/s 116 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 ft	1 inch/25 mm diameter impeller with precision axle and low-friction 2Yzr88 bearings. Startup speed stated as lower limit, readings may be taken down to 0.4 m/s (78 ft/min)   1.5 km/h   0.9 mph   0.4 m/s after impeller startup. Off-axis accuracy: ±1% @ 5° off-axis; ±2% @ 10° off-axis. Calibration drift < 1% after 100 hours use at 16 MPH / 7 m/s. Replacement impeller (NK-PN-0801) field install without tools. (US Patent 5,763,753). Wind speed calibration and testing should be done with impeller located at the top front face of the Kestrel.
Ambient Temperature	•	•	•	•	•	•	•	•	•	•	•	•	•	0.5 °F 0.1 °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 m/s (1 m/s or greater) provides fastest response and reduction in insulation 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												•		1.4 °F 0.1 °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 m/s (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				•	•	•	•	•	•	•	•	•	•	0.03 inHg 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 1,000.0 hPa/mbar 4.35 to 15.95 PSI and 33.0 to 185.0 °F 0.0 to 85.0 °C	0.30 to 48.87 inHg 10.0 to 1,654.3 hPa/mbar 0.14 to 24.0 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 (H+) <sup>1</sup>	RESOLUTION	SPECIFICATION RANGE	SENSORS EMPLOYED	NOTES
Air Density								•	•					0.0002 lbm <sup>3</sup> 0.003 kg/m <sup>3</sup>	0.001 lbm <sup>3</sup> 0.001 kg/m <sup>3</sup>	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	Mass of air per unit volume
Air Flow								•						6.71%	1 cfm 1 m <sup>3</sup> /hr 0.1 m <sup>3</sup> /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: 256.0 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 890 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 1.1 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-air saturation temperature.
Evaporation Rate													•	0.01 lbm/hr 0.05 kg/m <sup>2</sup> /hr	0.01 lbm/hr 0.01 kg/m <sup>2</sup> /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 thermometer 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 Pressure	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 g/kg	0.1 gpp 0.01 g/kg	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	Mass of water vapor in a mass of air.
Relative Air Density													•	0.3%	0.1%	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	The ratio, expressed as a percentage, of measured air density to the air density of a standard atmosphere as defined by the ICAO.
Thermal Work Limit (TWL)													•	10.9 W/m <sup>2</sup>	0.1 W/m <sup>2</sup>	Refer to Ranges for Sensors Employed	Wind Speed Temperature Globe Temperature Relative Humidity Pressure	Estimated safe maximum continuously sustainable human metabolic rate (W/m <sup>2</sup> ) 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 (Twb), globe temperature (Tg), and dry bulb temperature (Td). User settable on-screen warning zones.
Wet Bulb Temperature - Naturally Aspirated (Twb)													•	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, Twb only undergoes forced convection from the ambient air velocity. Twb 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 0.29 in / 9 mm. Aviation green electroluminescent backlight. Manual activation with auto-off.
Response Time & Display Update	•	•	•	•	•	•	•	•	•	•	•	•	•	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.
Max/Avg Wind														Multi-function, multi-digit monochrome dot-matrix display. Choice of aviation green or visible red (NV models only) electroluminescent backlight. Automatic or manual activation.
Data Storage & Graphical Display, Min/Max/Avg History							•	•	•	•	•	•	•	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.
Data Upload & Bluetooth® Data Connect Option														One-button clear and restart of Max Wind Gust and Average Wind measurement.
Clock / Calendar	•	•	•	•	•	•	•	•	•	•	•	•	•	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.
Auto Shutdown	•	•	•	•	•	•	•	•	•	•	•	•	•	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 for 1 and 2 second intervals (code version 4.18 and later). Data capacity shown.
Languages	•	•	•	•	•	•	•	•	•	•	•	•	•	Requires optional PC interface (USB or RS-232) or Bluetooth data transfer option and provided software.
Certifications	•	•	•	•	•	•	•	•	•	•	•	•	•	Requires optional PC interface (USB or RS-232) or Bluetooth data transfer option and provided software.
Battery Origin	•	•	•	•	•	•	•	•	•	•	•	•	•	Requires optional PC interface (USB or RS-232) or Bluetooth data transfer option and provided software.
Shock Resistance	•	•	•	•	•	•	•	•	•	•	•	•	•	Requires optional PC interface (USB or RS-232) or Bluetooth data transfer option and provided software.
Sealing	•	•	•	•	•	•	•	•	•	•	•	•	•	Requires optional PC interface (USB or RS-232) or Bluetooth data transfer option and provided software.
Operational Temperature Limits	•	•	•	•	•	•	•	•	•	•	•	•	•	Standard Models: AAA Alkaline, two, included. Average life, 400 hours of use, reduced by backlight or Bluetooth radio transmission use.
Storage Temperature	•	•	•	•	•	•	•	•	•	•	•	•	•	MIL-STD-883C, Transient Shock, Method 516.5 Procedure IV, unit only, impact may damage replaceable impeller.
Size & Weight	•	•	•	•	•	•	•	•	•	•	•	•	•	Waterproof (IP67) and NEMA-6.

\* NOTE: Accuracy calculated as uncertainty of the measurement derived from statistical analysis considering the combined 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.

© 2013 Nielsen-Kellerman | 21 Creek Circle Boothwyn PA 19061 USA | www.NKHome.com





# 北京航天计量测试技术研究所

Beijing Aerospace Institute for Metrology and Measurement Technology

证书编号: NO.HD1e-2022-07- 28517845  
CERTIFICATE No:

第 1 页 共 2 页  
PAGE 1 OF 2 PAGES

## 校准证书

### CALIBRATION CERTIFICATE

委托方 CLIENT

名称: Acumen Environmental Engineering and Technologies Co. Ltd.  
NAME:  
地址: Flat/RM D, 12/F, Ford Glory Plaza, Nos. 37-39 Wing Hong Street, Kowloon, Hong Kong  
ADDRESS:

#### 计量器具 MEASURING INSTRUMENTS

名称: TSP 全尘浓度检测仪  
NAME:  
制造者: 青岛精诚仪器仪表有限公司  
MANUFACTURER:  
型号: PC-3A(E)  
TYPE:  
编号: JC-220710225  
No:

校准人:  
OPERATOR:

沈北明

核验人:  
INSPECTOR:

孙景璇

签发人:  
APPROVED SIGNATORY:

杨广强



接收日期:	2022	年	07	月	08	日
RECEIVED DATE:		YEAR		MONTH		DAY
校准日期:	2022	年	07	月	08	日
CAL. DATE:		YEAR		MONTH		DAY
建议下次校准日期:	2023	年	07	月	07	日
NEXT TIME TO CALIBRAT:		YEAR		MONTH		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





# 北京航天计量测试技术研究所

## Beijing Aerospace Institute for Metrology and Measurement Technology

证书编号: NO.HD1e-2022-07- 28517845  
CERTIFICATE No.:

第 2 页 共 3 页  
PAGE 2 OF 3 PAGES

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 No 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 No 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 No170020180155

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/m <sup>3</sup>	5.0%	2021D11-09-10227	2022-08-25

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 °C

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:





## 校准结果

### RESULTS OF CALIBRATION

校准项目	技术要求	校准结果
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	$\pm 20\%$	-2.6%
示值重复性	$\pm 10\%$	1.3%
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。

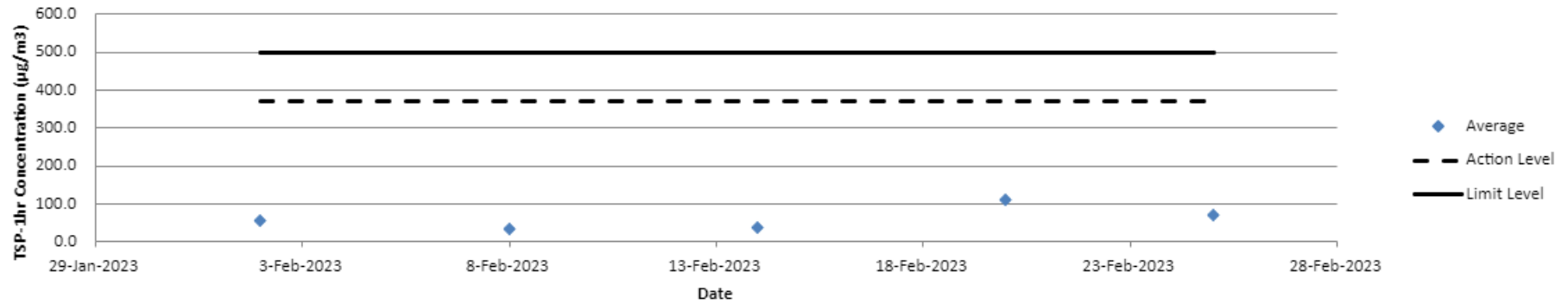
以下空白

Blank Below

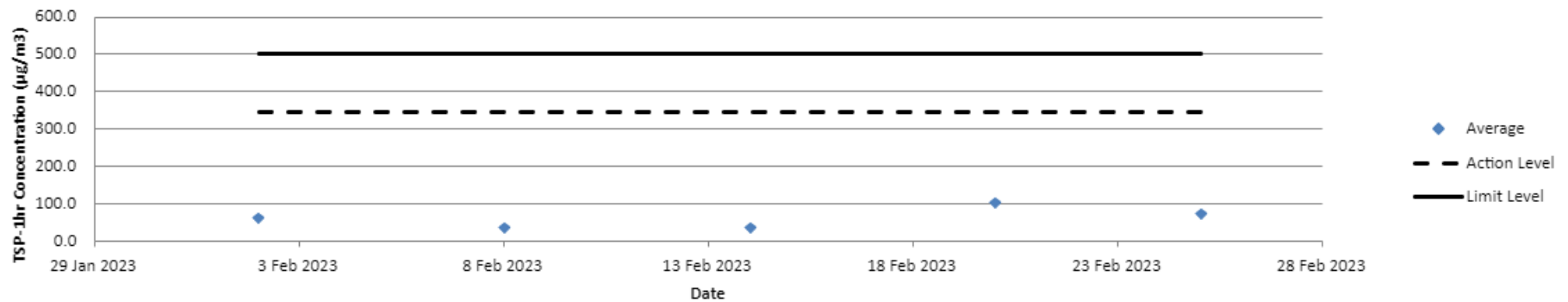
# Appendix K

## Impact Air Quality Monitoring Results and Graphical Presentation

### The Summary of TSP-1hr Concentration ( $\mu\text{g}/\text{m}^3$ ) at AM1 The L Louey



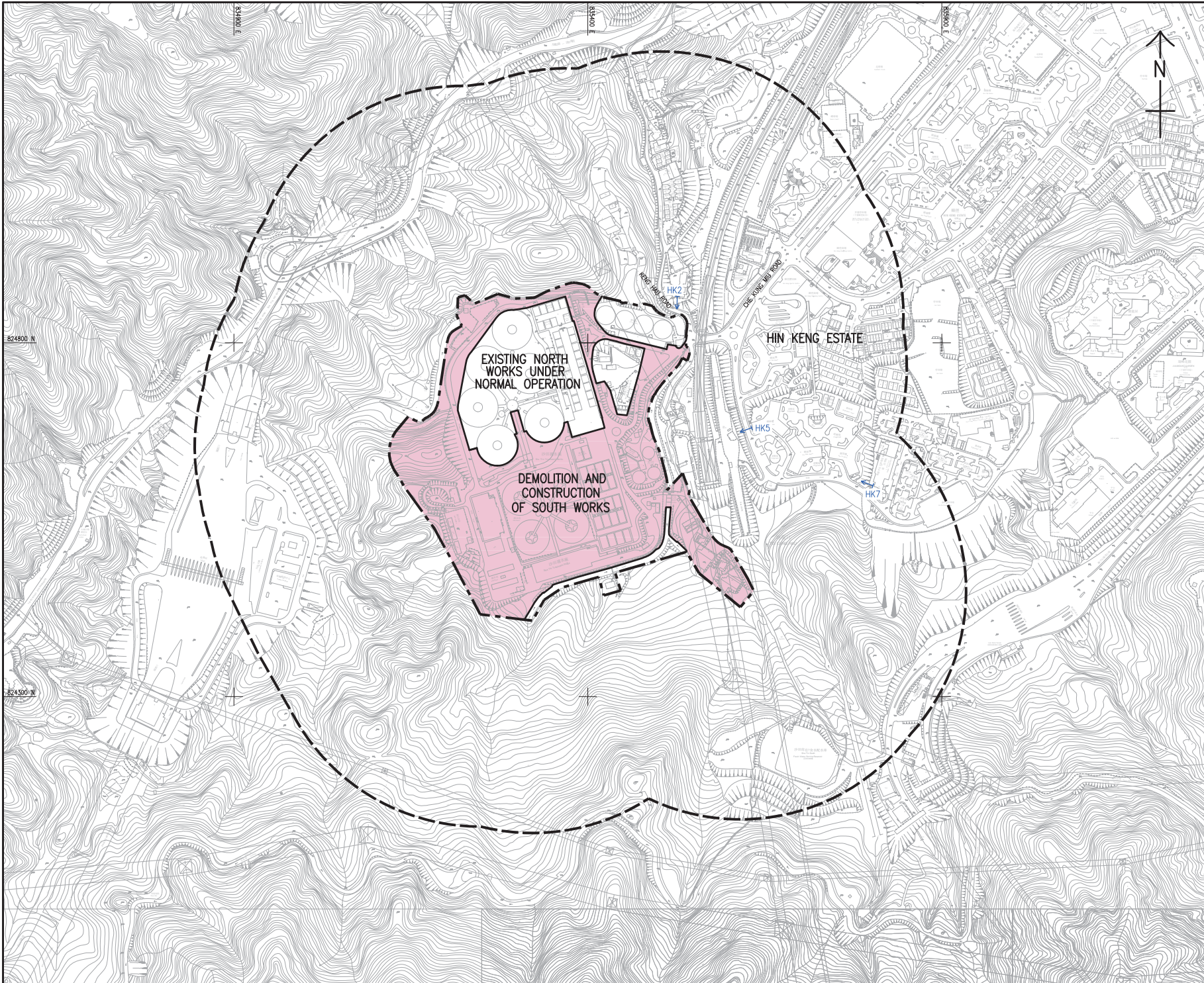
### The Summary of TSP-1hr Concentration ( $\mu\text{g}/\text{m}^3$ ) at AM2 Hin Keng Estate - Hin Wan House



# 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 LOU EY (SOUTH)
- HK5
- HIN KENG ESTATE - HIN WAN HOUSE
- HK7
- CHEUKFAA THOMAS CHEUNG SCHOOL

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 60162073/EM&A/FIG 4  
圖紙編號

DESIGNED BY NHP	CHECKED BY NHP	DATE A3 1 : 5000
© COPYRIGHT RESERVED 版權所有		



# Appendix M

## Calibration Certificates (Noise)



## CALIBRATION CERTIFICATE

Product : SOUND CALIBRATOR  
Type : NC-75  
Serial number : 34724243  
Manufacturer : RION CO., LTD.  
Calibration quantities : Sound pressure level (with reference standard microphone)  
Calibration method : Measured by specified secondary standard microphone  
according to JCSS calibration procedure specified by RION.  
Ambient conditions : Temperature 23.9 °C, Relative humidity 49 %,  
Static pressure 99.9 kPa  
Calibration date : 05/07/2022 (DD/MM/YYYY)  
Calibration location : 3-20-41 Higashimotomachi, Kokubunji, Tokyo 185-8533, Japan  
RION CO., LTD. Calibration Room

We hereby certify that the results of this calibration were as follows.

Issue date : 11/07/2022 (DD/MM/YYYY)

Junichi Kawamura  
Manager  
Quality Assurance Section,  
Quality Assurance Department,  
Environmental Instrument Division,  
RION CO., LTD.  
3-20-41 Higashimotomachi, Kokubunji,  
Tokyo 185-8533, Japan



This certificate is based on article 144 of the Measurement Law and indicates the result of calibration in accordance with measurement standards traceable to Primary Measurement Standards (National Standards) which realizes the physical units of measurement according to the International System of Units (SI).

The accreditation symbol is attestation of which the result of calibration is traceable to Primary Measurement Standards (National Standards).

The certificate shall not be reproduced except in full, without the written approval of the issuing laboratory.

The calibration laboratory who issued this calibration certificate conforms to ISO/IEC 17025:2017.

This calibration certificate was issued by the calibration laboratory accredited by IAJapan who is a signatory to the Mutual Recognition Arrangement (MRA) of International Laboratory Accreditation Cooperation (ILAC) and Asia Pacific Accreditation Cooperation (APAC). This (These) calibration result(s) may be accepted internationally through ILAC/APAC MRA.





## CALIBRATION RESULT

### 1. Sound pressure level (with reference standard microphone)

Measured value	Expanded uncertainty *1
93.99 dB	0.09 dB

Specified secondary standard microphone:

Type : 4160  
 Serial number : 2973341  
 Reference Sound pressure :  $2 \times 10^{-5}$  Pa

\*1 Defines an interval estimated to have a level of confidence of approximately 95 %.

Coverage factor  $k=2$

Calibration result is the calibration value in ambient conditions during calibration.

## BE OUT OF JCSS CALIBRATION

### 1. Frequency

Measured value	Measurement uncertainty ( $k=2$ )
1000.0 Hz	$3.9 \times 10^{-4}$ Hz

Working measurement standard universal counter:

Type : 53132A  
 Serial number : MY40005574  
 (JCSS Calibration Certificate No. 21081499079575510)

### 2. Total distortion

Measured value
0.2 %

Working measurement standard distortion meter:

Type : VA-2230A  
 Serial number : 11076061  
 (A2LA Calibration Certificate No. 1501-03080)

- closing -



# Certificate of Calibration

for

**Description:** Sound Level Meter  
**Manufacturer:** NTi Audio  
**Type No.:** XL2 (Serial No.: A2A-09696-E0)  
**Microphone:** ACO 7052 (Serial No.:68840)  
**Preamplifier:** NTi Audio M2211 MA220 (Serial No.:5287)

**Submitted by:**

**Customer:** 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

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

- Within  
 Outside

the allowable tolerance.

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

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory

**Date of receipt:** 24 March 2022

**Date of calibration:** 26 March 2022

**Calibrated by:**   
Calibration Technician

**Certified by:**   
Mr. Ng Yan Wa  
Laboratory Manager

**Date of issue:** 26 March 2022



Certificate No.: APJ21-161-CC001

Page 1 of 4

**1. Calibration Precaution:**

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 24 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- The results presented are the mean of 3 measurements at each calibration point.

**2. Calibration Conditions:**

Air Temperature: 22.6 °C  
 Air Pressure: 1006 hPa  
 Relative Humidity: 74.5 %

**3. Calibration Equipment:**

	Type	Serial No.	Calibration Report Number	Traceable to
Multifunction Calibrator	B&K 4226	2288467	AV200041	HOKLAS

**4. Calibration Results**

Sound Pressure Level

Reference Sound Pressure Level

Setting of Unit-under-test (UUT)				Applied value		UUT Reading, dB	IEC 61672 Class 1 Specification, dB
Range, dB	Freq. Weighting		Time Weighting	Level, dB	Frequency, Hz		
30-130	dBA	SPL	Fast	94	1000	94.1	±0.4

Linearity

Setting of Unit-under-test (UUT)				Applied value		UUT Reading, dB	IEC 61672 Class 1 Specification, dB
Range, dB	Freq. Weighting		Time Weighting	Level, dB	Frequency, Hz		
30-130	dBA	SPL	Fast	94	1000	94.1	Ref
				104		104.1	±0.3
				114		114.1	±0.3

Time Weighting

Setting of Unit-under-test (UUT)				Applied value		UUT Reading, dB	IEC 61672 Class 1 Specification, dB
Range, dB	Freq. Weighting		Time Weighting	Level, dB	Frequency, Hz		
30-130	dBA	SPL	Fast	94	1000	94.1	Ref
			Slow			94.1	±0.3

Certificate No.: APJ21-161-CC001



Page 2 of 4



Frequency Response

Linear Response

Setting of Unit-under-test (UUT)			Applied value		UUT Reading, dB	IEC 61672 Class 1 Specification, dB	
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz			
30-130	dB	SPL	Fast	94	31.5	94.0	±2.0
					63	94.1	±1.5
					125	94.1	±1.5
					250	94.0	±1.4
					500	94.1	±1.4
					1000	94.1	Ref
					2000	94.3	±1.6
					4000	94.9	±1.6
				8000	93.6	+2.1; -3.1	

A-weighting

Setting of Unit-under-test (UUT)			Applied value		UUT Reading, dB	IEC 61672 Class 1 Specification, dB	
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz			
30-130	dBA	SPL	Fast	94	31.5	54.7	-39.4±2.0
					63	67.9	-26.2±1.5
					125	78.0	-16.1±1.5
					250	85.4	-8.6±1.4
					500	90.9	-3.2±1.4
					1000	94.1	Ref
					2000	95.5	+1.2±1.6
					4000	95.9	+1.0±1.6
				8000	92.5	-1.1+2.1; -3.1	

C-weighting

Setting of Unit-under-test (UUT)			Applied value		UUT Reading, dB	IEC 61672 Class 1 Specification, dB	
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz			
30-130	dBC	SPL	Fast	94	31.5	91.0	-3.0±2.0
					63	93.2	-0.8±1.5
					125	93.9	-0.2±1.5
					250	94.0	-0.0±1.4
					500	94.1	-0.0±1.4
					1000	94.1	Ref
					2000	94.1	-0.2±1.6
					4000	94.1	-0.8±1.6
				8000	90.6	-3.0 +2.1; -3.1	

Certificate No.: APJ21-161-CC001



Page 3 of 4

## 5. Calibration Results Applied

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

Uncertainties of Applied Value:

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

The uncertainties are evaluated for a 95% confidence level.

Note:

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





**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  $\pm 1.04\%$  within the airspeed range 706.6 to 3923.9 fpm (3.59 to 19.93 m/s), and  $\pm 1.66\%$  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  $\pm 0.05$  °C.

#### Direction / Heading

The sensitivity of the magnetic directional sensor is verified 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  $\pm 5$  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  $\pm 0.2\%$  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  $\pm 0.02\%$  F.S.

#### Approved By:

Michael Naughton, Engineering Manager



SENSORS																		
SENSOR	1000	2000	2500	3000	3500	3500 DT	4000	4200	4250	4300	4400	4500	4500 HOR	ACCURACY (H+) <sup>1</sup>	RESOLUTION	SPECIFICATION RANGE	OPERATIONAL RANGE	NOTES
Wind Speed   Air Flow	•	•	•	•	•	•	•	•	•	•	•	•	•	0.1 m/s Larger of 3% of reading, least significant digit or 20 ft/min 0.1 km/h 0.1 mph 1.2 to 77.8 knots 1 ft	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 116.6 knots 0 to 12 ft	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 ft	1 inch/25 mm diameter impeller with precision axle and low-friction 2Yzr88 bearings. Startup speed stated as lower limit, readings may be taken down to 0.4 m/s (78 ft/min)   1.5 km/h   0.9 mph   0.4 m/s after impeller startup. Off-axis accuracy: ±1% @ 5° off-axis; ±2% @ 10° off-axis. Calibration drift < 1% after 100 hours use at 16 MPH / 7 m/s. Replacement impeller (NK-PN-0801) field install without tools. (US Patent 5,763,753). Wind speed calibration and testing should be done with impeller located at the top front face of the Kestrel.	
Ambient Temperature	•	•	•	•	•	•	•	•	•	•	•	•	•	0.5 °F 0.1 °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 m/s (1 m/s or greater) provides fastest response and reduction in insulation 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												•		1 °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 m/s (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				•	•	•	•	•	•	•	•	•	•	0.03 inHg 1.0 hPa/mbar 0.01 PSI	0.01 inHg 0.1 hPa/mbar 0.01 PSI	30.0 to 32.49 inHg 300.0 to 1,000.0 hPa/mbar 4.35 to 15.95 PSI and 33.0 to 185.0 °F 0.0 to 85.0 °C	0.30 to 48.67 inHg 10.0 to 1,654.3 hPa/mbar 0.14 to 24.0 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 (H+) <sup>1</sup>	RESOLUTION	SPECIFICATION RANGE	SENSORS EMPLOYED	NOTES
Air Density								•	•					0.0002 lb/ft <sup>3</sup> 0.003 kg/m <sup>3</sup>	0.001 lb/ft <sup>3</sup> 0.001 kg/m <sup>3</sup>	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	Mass of air per unit volume
Air Flow								•						6.71%	1 cfm 1 m <sup>3</sup> /hr 0.1 m <sup>3</sup> /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: ft, in, 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 890 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 1.1 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-air saturation temperature.
Evaporation Rate												•		0.01 lb/ft <sup>2</sup> /hr 0.05 kg/m <sup>2</sup> /hr	0.01 lb/ft <sup>2</sup> /hr 0.01 kg/m <sup>2</sup> /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 thermometer 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 Pressure	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 g/kg	0.1 gpp 0.01 g/kg	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	Mass of water vapor in a mass of air.
Relative Air Density													•	0.3%	0.1%	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	The ratio, expressed as a percentage, of measured air density to the air density of a standard atmosphere as defined by the ICAO.
Thermal Work Limit (TWL)												•		10.9 W/m <sup>2</sup>	0.1 W/m <sup>2</sup>	Refer to Ranges for Sensors Employed	Wind Speed Temperature Globe Temperature Relative Humidity Pressure	Estimated safe maximum continuously sustainable human metabolic rate (W/m <sup>2</sup> ) 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 (Twb), globe temperature (Tg), and dry bulb temperature (Td). User settable on-screen warning zones.
Wet Bulb Temperature - Naturally Aspirated (Twb)													•	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, Twb only undergoes forced convection from the ambient air velocity. Twb 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 0.29 in / 9 mm. Aviation green electroluminescent backlight. Manual activation with auto-off.
Response Time & Display Update	•	•	•	•	•	•	•	•	•	•	•	•	•	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.
Max/Avg Wind														Multi-function, multi-digit monochrome dot-matrix display. Choice of aviation green or visible red (NV models only) electroluminescent backlight. Automatic or manual activation.
Data Storage & Graphical Display, Min/Max/Avg History							•	•	•	•	•	•	•	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.
Data Upload & Bluetooth® Data Connect Option														One-button clear and restart of Max Wind Gust and Average Wind measurement.
Clock / Calendar	•	•	•	•	•	•	•	•	•	•	•	•	•	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.
Auto Shutdown	•	•	•	•	•	•	•	•	•	•	•	•	•	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 for 1 and 2 second intervals (code version 4.18 and later). Data capacity shown.
Languages	•	•	•	•	•	•	•	•	•	•	•	•	•	Requires optional PC interface (USB or RS-232) or Bluetooth data transfer option and provided software.
Certifications	•	•	•	•	•	•	•	•	•	•	•	•	•	Requires optional PC interface (USB or RS-232) or Bluetooth data transfer option and provided software.
Battery Origin	•	•	•	•	•	•	•	•	•	•	•	•	•	Requires optional PC interface (USB or RS-232) or Bluetooth data transfer option and provided software.
Shock Resistance	•	•	•	•	•	•	•	•	•	•	•	•	•	Requires optional PC interface (USB or RS-232) or Bluetooth data transfer option and provided software.
Sealing	•	•	•	•	•	•	•	•	•	•	•	•	•	Requires optional PC interface (USB or RS-232) or Bluetooth data transfer option and provided software.
Operational Temperature Limits	•	•	•	•	•	•	•	•	•	•	•	•	•	Standard Models: AAA Alkaline, two, included. Average life, 400 hours of use, reduced by backlight or Bluetooth radio transmission use.
Storage Temperature	•	•	•	•	•	•	•	•	•	•	•	•	•	MIL-STD-883C, Transient Shock, Method 516.5 Procedure IV, unit only, impact may damage replaceable impeller.
Size & Weight	•	•	•	•	•	•	•	•	•	•	•	•	•	Waterproof (IP67) and NEMA-6.

\* NOTE: Accuracy calculated as uncertainty of the measurement derived from statistical analysis considering the combined 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.

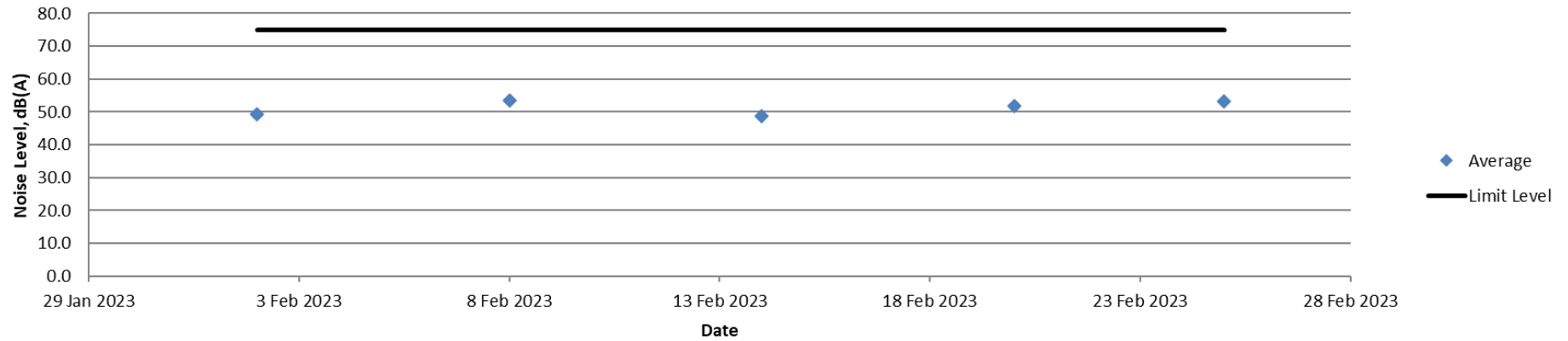
© 2013 Nielsen-Kellerman | 21 Creek Circle Boothwyn PA 19061 USA | www.NKhome.com



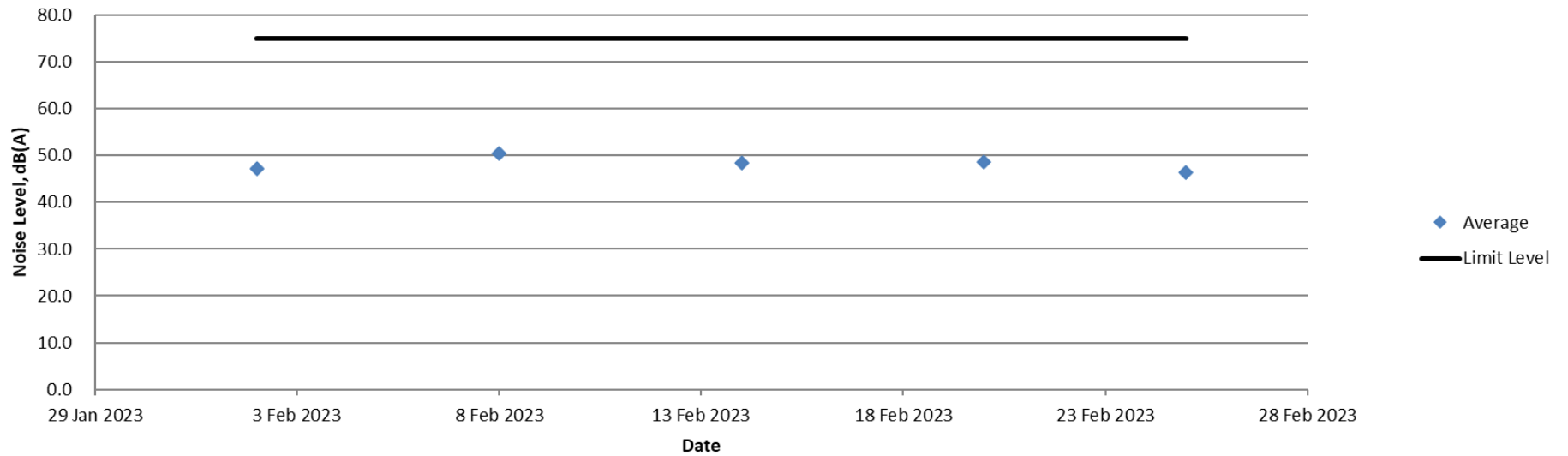
# Appendix N

## Impact Noise Monitoring Results and Graphical Presentation

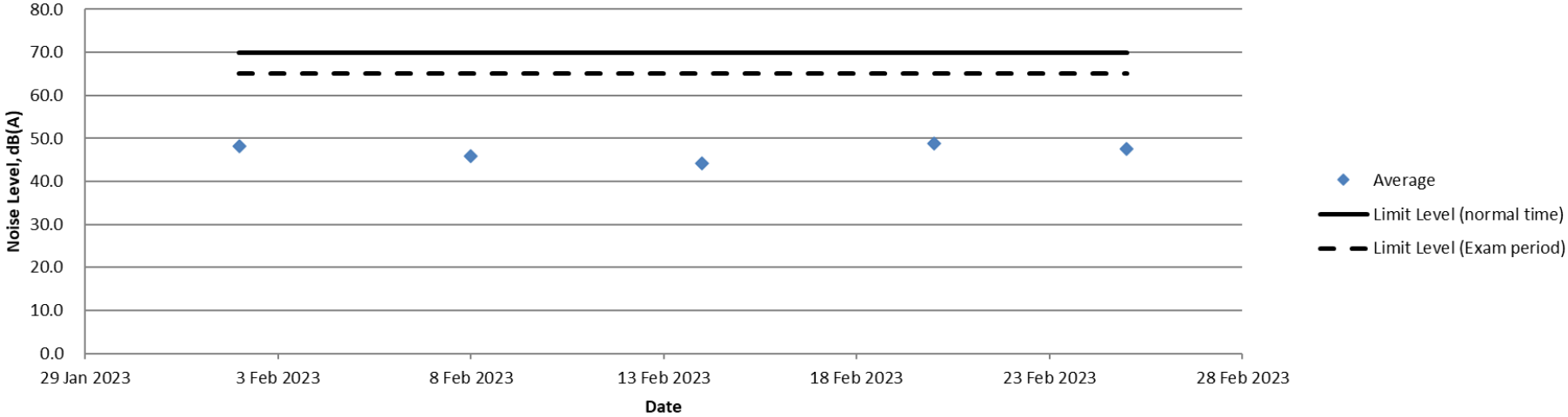
### Noise Level Results at NM1 -The L Louey (South)



### Noise Level Results at NM2 -Hin Keng Estate - Hin Wan House



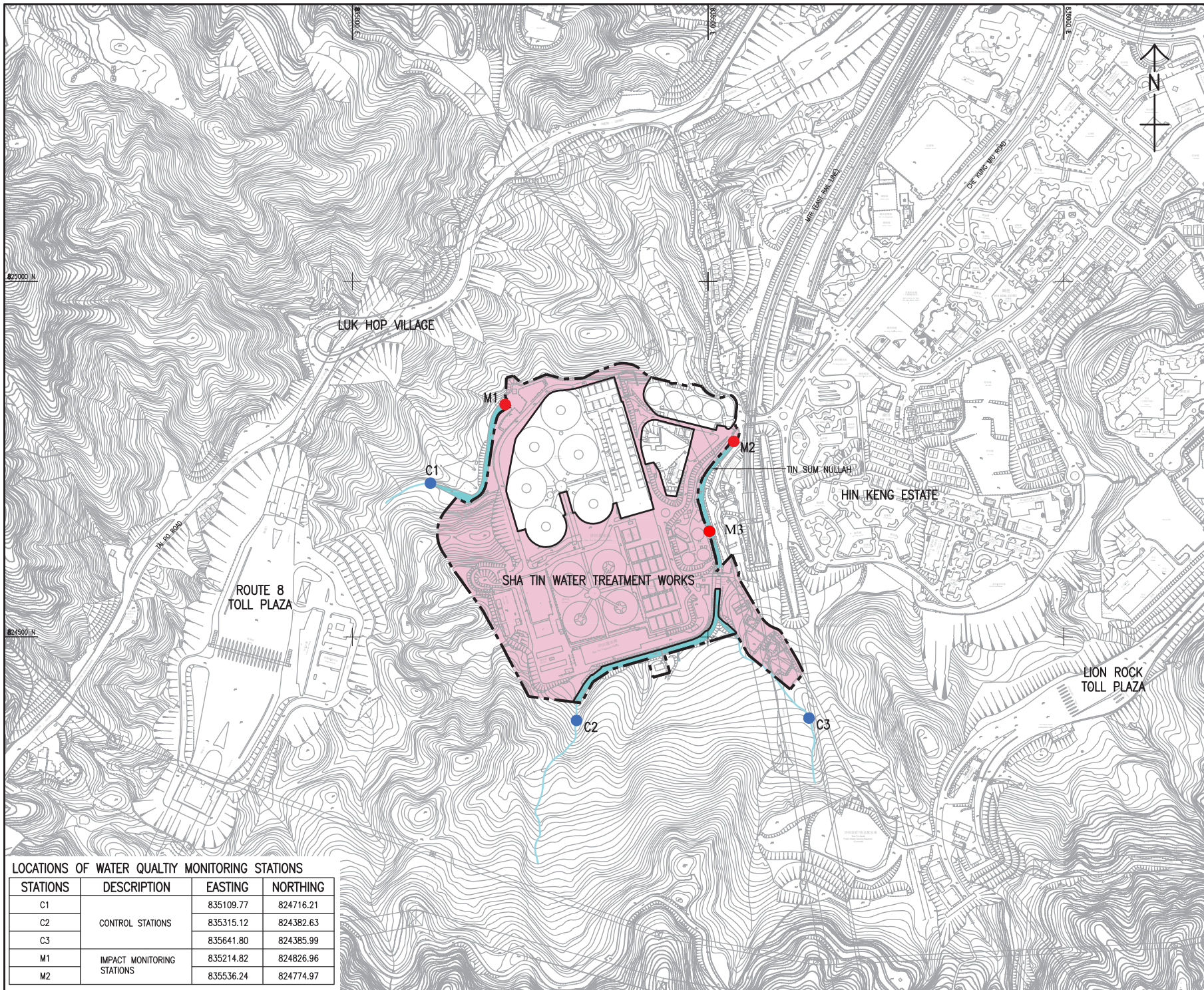
### Noise Level Results at NM3 -C.U.H.K.F.A.A. Thomas Cheung School



# 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 QUALITY 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

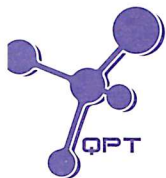
**AECOM**

DRG NO 60162073/EM&A/FIG 5  
 圖紙編號  
 DESIGNED BY: DXL  
 CHECKED BY: A3 1 : 5000  
 DATE: 12/11/12  
 SCALE: A3 1 : 5000  
 DRAWING NO. 12/11/12  
 P. NO. APPROVED: 12/11/12  
 METRES  
 © COPYRIGHT RESERVED  
 版權所有



# Appendix P

## Calibration Certificate (Water Quality)



專業化驗有限公司  
QUALITY PRO TEST-CONSULT LIMITED

Unit 10, 5/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

Test Report No. : R-BC020051  
Date of Issue : 14 February 2023  
Page No. : 1 of 2

### PART A - CUSTOMER INFORMATION

Acumen Environmental Engineering and Technologies Company Limited  
Unit D, 12/F Ford Glory Plaza No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong

### PART B - SAMPLE INFORMATION

Name of Equipment : HORIBA U-53  
Manufacturer : HORIBA  
Serial Number : TY4X3U54  
Date of Received : 10 February 2023  
Date of Calibration : 14 February 2023  
Date of Next Calibration : 13 May 2023  
Request No. : D-BC020051

### PART C - REFERENCE METHODS/ DOCUMENTS FOR THE CALIBRATION

Test Parameter	Reference Method
pH value	APHA 21e 4500 H <sup>+</sup>
Dissolved oxygen	APHA 21e 4500 O
Oxidation-Reduction Potential	APHA 22e 2580 B
Salinity	APHA 21e 2520 B
Temperature	Section 6 of international Accreditation New Zealand Technical Guide no. 3 Second edition March 2008: Working Thermometer Calibration Procedure
Turbidity	APHA 21e 2130 B

### PART D - CALIBRATION RESULT

#### (1) pH value

Target (pH unit)	Display Reading (pH unit)	Tolerance	Result
4.00	4.18	0.18	Satisfactory
7.42	7.60	0.18	Satisfactory
10.01	10.08	0.07	Satisfactory

Tolerance of pH value should be less than  $\pm 0.2$  (pH unit)

#### (2) Dissolved oxygen

Expected Reading (mg/L)	Display Reading (mg/L)	Tolerance	Result
0.32	0.36	0.04	Satisfactory
2.91	2.48	-0.43	Satisfactory
5.15	5.22	0.07	Satisfactory
8.24	8.30	0.06	Satisfactory

Tolerance of Dissolved oxygen should be less than  $\pm 0.5$  (mg/L)

#### (3) Oxidation-Reduction Potential

Expected Reading	Display Reading	Tolerance	Result
229	229	0	Satisfactory

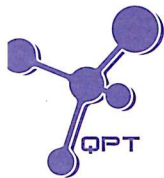
Tolerance of Oxidation-Reduction Potential should be less than  $\pm 10.0$  (mV)

--- CONTINUED ON NEXT PAGE ---

AUTHORIZED  
SIGNATORY:

LEE Chun-ning

Assistant Manager (Chemical Testing)



專業化驗有限公司  
QUALITY PRO TEST-CONSULT LIMITED

Unit 10, 5/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

Test Report No. : R-BC020051  
Date of Issue : 14 February 2023  
Page No. : 2 of 2

### (4) Salinity

Expected Reading ( g/L )	Display Reading ( g/L )	Tolerance ( % )	Result
10	10.01	0.10	Satisfactory
20	20.25	1.25	Satisfactory
30	30.71	2.37	Satisfactory

Tolerance of Salinity should be less than  $\pm 10.0$  ( % )

### (5) Temperature

Reading of Ref. thermometer ( °C )	Display Reading ( °C )	Tolerance	Result
14	14.78	0.78	Satisfactory
22	22.30	0.30	Satisfactory
39	38.82	-0.18	Satisfactory

Tolerance of Temperature should be less than  $\pm 2.0$  ( °C )

### (6) Turbidity

Expected Reading ( NTU )	Display Reading ( NTU )	Tolerance ( % )	Result
0	0.00	--	Satisfactory
10	10.8	8.0	Satisfactory
20	20.7	3.5	Satisfactory
100	99.9	-0.1	Satisfactory
800	806	0.8	Satisfactory

Tolerance of Turbidity should be less than  $\pm 10.0$  ( % )

### Remark(s)

- The "Date of Next Calibration" is recommended according to best practice principals as practiced by QPT or quoted form relevant international standards.
- The results relate only to the calibrated equipment as received
- The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.
- "Displayed Reading" denotes the figure shown on item under calibration/ checking regardless of equipment precision or significant figures.
- 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.

--- END OF REPORT ---





專業化驗有限公司  
QUALITY PRO TEST-CONSULT LIMITED

Unit 10, 5/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

Test Report No. : R-BB110013  
Date of Issue : 17 November 2022  
Page No. : 1 of 2

### PART A - CUSTOMER INFORMATION

Acumen Environmental Engineering and Technologies Company Limited  
Unit D, 12/F Ford Glory Plaza No. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong

### PART B - SAMPLE INFORMATION

Name of Equipment : HORIBA U-53  
Manufacturer : HORIBA  
Serial Number : TY4X3U54  
Date of Received : 07 November 2022  
Date of Calibration : 16 November 2022  
Date of Next Calibration : 16 February 2023  
Request No. : D-BB110013

### PART C - REFERENCE METHODS/ DOCUMENTS FOR THE CALIBRATION

Test Parameter	Reference Method
pH value	APHA 21e 4500 H <sup>+</sup>
Temperature	Section 6 of international Accreditation New Zealand Technical Guide no. 3 Second edition March 2008: Working Thermometer Calibration Procedure
Salinity	APHA 21e 2520 B
Dissolved oxygen	APHA 21e 4500 O
Turbidity	APHA 21e 2130 B
Oxidation-Reduction Potential	APHA 22e 2580 B

### PART D - CALIBRATION RESULT

#### (1) pH value

Target (pH unit)	Display Reading (pH unit)	Tolerance	Result
4.00	3.87	-0.13	Satisfactory
7.42	7.39	-0.03	Satisfactory
10.01	9.97	-0.04	Satisfactory

Tolerance of pH value should be less than  $\pm 0.2$  (pH unit)

#### (2) Temperature

Reading of Ref. thermometer (°C)	Display Reading (°C)	Tolerance	Result
10	10.63	0.63	Satisfactory
20	20.28	0.28	Satisfactory
31	31.08	0.08	Satisfactory

Tolerance of Temperature should be less than  $\pm 2.0$  (°C)

#### (3) Salinity

Expected Reading (g/L)	Display Reading (g/L)	Tolerance (%)	Result
10	9.51	-4.90	Satisfactory
20	19.03	-4.85	Satisfactory

--- CONTINUED ON NEXT PAGE ---

AUTHORIZED  
SIGNATORY:

  
LEE Chun-ning

Assistant Manager (Chemical Testing)



## REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION

Test Report No. : R-BB110013  
Date of Issue : 17 November 2022  
Page No. : 2 of 2

Expected Reading (g/L)	Display Reading (g/L)	Tolerance (%)	Result
30	29.10	-3.00	Satisfactory

Tolerance of Salinity should be less than  $\pm 10.0$  (%)

### (4) Dissolved oxygen

Expected Reading (mg/L)	Display Reading (mg/L)	Tolerance	Result
7.88	7.54	-0.34	Satisfactory
4.52	4.09	-0.43	Satisfactory
1.43	1.00	-0.43	Satisfactory
0.00	0.00	0.00	Satisfactory

Tolerance of Dissolved oxygen should be less than  $\pm 0.5$  (mg/L)

### (5) Turbidity

Expected Reading (NTU)	Display Reading (NTU)	Tolerance (%)	Result
0	0.00	--	Satisfactory
10	10.6	6.0	Satisfactory
20	21.2	6.0	Satisfactory
100	108	8.0	Satisfactory
800	816	2.0	Satisfactory

Tolerance of Turbidity should be less than  $\pm 10.0$  (%)

### (6) Oxidation-Reduction Potential

Expected Reading	Display Reading	Tolerance	Result
229	227	-2	Satisfactory

Tolerance of Oxidation-Reduction Potential should be less than  $\pm 10.0$  (mV)

### Remark(s)

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

--- END OF REPORT ---

# Appendix Q

## The Certification of Laboratory with HOKLAS accredited Analytical Tests



Hong Kong Accreditation Service  
香港認可處

**Certificate of Accreditation**  
認可證書

*This is to certify that*  
特此證明

**ACUMEN LABORATORY AND TESTING LIMITED**  
浩科檢測中心有限公司

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

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

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

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

**Environmental Testing**

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

**環境測試**

*This accreditation to ISO/IEC 17025:2005 demonstrates technical competence for a defined scope and  
the operation of a laboratory quality management system (see Joint IAF-ILAC-ISO Communiqué).  
此項 ISO/IEC 17025:2005 的認可資格證明此實驗所具備指定範圍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

Date	Time	Weather	Location	Co-ordinates		Water Depth m	Sample Depth m	Temp.		DO con.		Turbidity		pH		SS mg/L
				East	North			°C		mg/L		NTU		unit		
1/02/2023	12:36	Fine	C1	835110	824716	0.04	0.02	20.74	20.73	10.76	10	2.44	2.58	7.45	7.45	<1
	12:58	Fine	C2	835403	824470	0.02	0.01	20.57	20.57	12.37	11.33	2.54	2.77	7.43	7.41	<1
	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
	12:06	Fine	M1	835215	824827	0.8	0.4	20.94	20.95	12.94	11.51	4.15	4.21	6.64	6.66	1.1
	11:18	Fine	M2	835536	824775	0.05	0.025	20.94	20.94	11.12	11.74	4.94	4.97	6.68	6.79	<1
	11:30	Fine	M3	835501	824648	0.02	0.01	20.84	20.84	13.15	12.67	1.07	1.09	7.34	7.33	<1
3/02/2023	11:50	Sunny	C1	835110	824716	0.04	0.02	20.6	20.82	8.83	9.09	3.45	3.38	6.8	6.68	<1
	12:15	Sunny	C2	835403	824470	0.02	0.01	19.76	19.81	12.57	12.08	2.88	2.94	7.75	7.83	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
	11:25	Sunny	M1	835215	824827	0.8	0.4	22.02	21.93	9.25	9.54	4.3	4.25	6.9	6.83	1.2
	10:39	Sunny	M2	835536	824775	0.05	0.025	22.19	22.22	9.63	9.7	4.93	5.16	7.26	7.25	<1
	10:52	Sunny	M3	835501	824648	0.02	0.01	19.76	19.81	11.65	11.06	1.07	1.09	7.37	7.54	<1
6/02/2023	12:08	Fine	C1	835110	824716	0.04	0.02	21.72	21.73	9.46	10.1	3.34	3.21	7.35	7.25	<1
	12:29	Fine	C2	835403	824470	0.02	0.01	21.75	21.76	10.58	10.34	3.05	3.09	7.41	7.33	<1
	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
	11:42	Fine	M1	835215	824827	0.8	0.4	21.75	21.76	13.36	13.85	4.21	4.3	6.93	6.98	1.6
	10:53	Fine	M2	835536	824775	0.05	0.025	21.76	21.75	12.69	12.46	4.99	5.04	7.22	7.2	1.9
	11:07	Fine	M3	835501	824648	0.02	0.01	21.7	21.7	13.6	12.99	1.03	1.07	7.15	7.24	<1
8/02/2023	11:20	cloudy	C1	835110	824716	0.04	0.02	20.52	19.34	10.76	11.96	3.74	3.57	7.76	7.68	1.2
	11:42	cloudy	C2	835403	824470	0.02	0.01	20.08	19.58	11.26	10.13	3.06	3.07	8.23	8.34	<1
	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	19.21	19.92	10.42	12.58	4.18	4.24	7.67	7.76	<1
	9:48	cloudy	M2	835536	824775	0.05	0.025	19.14	19.07	9.73	10.57	6.17	7.2	7.76	7.69	<1
	10:03	cloudy	M3	835501	824648	0.02	0.01	19.23	19.11	14.11	13.72	1.05	1.03	8.27	8.27	<1
10/02/2023	12:41	Fine	C1	835110	824716	0.04	0.02	22.48	22.34	10.97	9.84	3.24	3.27	7.47	7.61	0.2
	13:05	Fine	C2	835403	824470	0.02	0.01	19.39	19.44	13.06	12.72	2.81	2.75	8.35	8.4	1.3
	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
	12:15	Fine	M1	835215	824827	0.8	0.4	23.84	23.83	10.28	10.96	3.46	3.37	7.84	7.84	<1
	11:29	Fine	M2	835536	824775	0.05	0.025	24.02	24	13.42	13.62	5.56	4.55	8.21	8.1	<1
	11:43	Fine	M3	835501	824648	0.02	0.01	19.99	20.08	17.73	17.3	1.07	0.99	8.21	8.29	1.8
13/02/2023	12:18	Fine	C1	835110	824716	0.04	0.02	23.1	23.11	9.42	9.35	3.3	3.45	7.7	7.81	<1
	12:40	Fine	C2	835403	824470	0.02	0.01	23.18	23.18	13.23	13.81	0	0	7.66	7.75	1.1
	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
	11:39	Fine	M1	835215	824827	0.8	0.4	23.13	23.14	14.56	13.47	4	3.87	7.61	7.7	<1
	10:55	Fine	M2	835536	824775	0.05	0.025	23.6	23.3	12.3	12.86	0	0	7.66	7.75	<1
	11:07	Fine	M3	835501	824648	0.02	0.01	23.69	23.7	12.77	12.37	0	0	8.3	8.37	<1

15/02/2023	12:26	Fine	C1	835110	824716	0.04	0.02	23.38	23.46	8.58	8.63	2.97	2.86	7.48	7.5	1.5
	12:42	Fine	C2	835403	824470	0.02	0.01	23.46	23.44	11.42	11.5	0	0	7.97	7.91	1.2
	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
	11:48	Fine	M1	835215	824827	0.8	0.4	23.27	23.46	11.83	11.66	4.1	4.14	7.53	7.49	<1
	11:02	Fine	M2	835536	824775	0.05	0.025	23.29	23.27	10.71	9.22	0.6	0.65	8.48	8.52	<1
	11:17	Fine	M3	835501	824648	0.02	0.01	23.43	23.29	11.77	12.62	0	0	8.36	8.42	<1
17/02/2023	13:53	Fine	C1	835110	824716	0.04	0.02	24.03	23.98	7.8	7.83	0	0	6.87	6.93	2.6
	14:10	Fine	C2	835403	824470	0.02	0.01	23.91	23.91	8.39	8.35	0	0	6.8	6.86	<1
	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
	13:12	Fine	M1	835215	824827	0.8	0.4	24.02	23.98	10.57	10.3	0.27	0.24	7.7	7.7	<1
	12:28	Fine	M2	835536	824775	0.05	0.025	23.66	23.64	12.41	12.61	0	0	7.82	7.88	<1
	12:43	Fine	M3	835501	824648	0.02	0.01	23.8	23.8	12.92	11.57	0	0	7.75	7.8	<1
20/02/2023	12:02	Fine	C1	835110	824716	0.04	0.02	22.14	22.14	9.8	9.34	1.18	1.2	6.73	6.81	<1
	12:19	Fine	C2	835403	824470	0.02	0.01	20.99	21.02	14.19	13.19	0.54	0.62	7.63	7.67	<1
	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
	11:21	Fine	M1	835215	824827	0.8	0.4	23.35	23.35	10.08	11.67	1.67	1.88	6.94	7.05	<1
	10:30	Fine	M2	835536	824775	0.05	0.025	21.4	21.49	12.31	13.25	0.89	0.95	7.76	7.83	<1
	10:43	Fine	M3	835501	824648	0.02	0.01	21.28	21.29	14.26	13.77	0	0	7.49	7.51	<1
22/02/2023	10:35	Fine	C1	835110	824716	0.04	0.02	22.96	22.94	12.62	12.1	0.53	0.57	7.74	7.71	1.1
	10:50	Fine	C2	835403	824470	0.02	0.01	21	21.01	11.46	10.25	0	0	8.25	8.29	<1
	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
	10:15	Fine	M1	835215	824827	0.8	0.4	23.17	23.16	14.55	14.91	2.77	2.87	7.61	7.61	1.8
	9:31	Fine	M2	835536	824775	0.05	0.025	21.47	21.51	12.27	11.74	0	0	8.32	8.37	<1
	9:34	Fine	M3	835501	824648	0.02	0.01	21.16	21.14	14.69	14.99	0	0	7.92	7.96	<1
24/02/2023	10:16	Sunny	C1	835110	824716	0.04	0.02	21.59	21.44	10.06	10.32	0.56	0.49	7.87	7.84	1.1
	10:28	Sunny	C2	835403	824470	0.02	0.01	21.58	21.59	10.59	10.92	0	0	8.36	8.38	<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
	10:02	Sunny	M1	835215	824827	0.8	0.4	21.59	21.48	13.59	12.86	0.71	0.69	7.9	7.89	2.3
	9:40	Sunny	M2	835536	824775	0.05	0.025	21.17	21.17	12.63	12.7	0.28	0.26	8.49	8.5	<1
	9:43	Sunny	M3	835501	824648	0.02	0.01	21.32	21.33	13.27	13.3	0	0	8.13	8.21	<1
27/02/2023	10:56	Fine	C1	835110	824716	0.04	0.02	20.99	21.03	11.73	10.63	0.3	0.26	7.14	7.22	1.1
	11:08	Fine	C2	835403	824470	0.02	0.01	21.45	21.44	11.59	11.91	0.26	0.28	8.4	8.44	<1
	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
	10:36	Fine	M1	835215	824827	0.8	0.4	23.04	23.05	13.39	12.49	2.9	2.75	8.14	8.1	<1
	10:09	Fine	M2	835536	824775	0.05	0.025	21.41	21.42	11.58	11.07	0.65	0.61	8.51	8.56	<1
	10:15	Fine	M3	835501	824648	0.02	0.01	21.6	21.64	13.73	14.43	0.13	0.14	8.2	8.26	<1

Remark 1: Values that are <1 is assumed to be 1 during calculation.

Remark 2: Underlined values indicated exceedance of limit level.

There were 0 exceedances of Action Level and 1 exceedances of Limit Level.

All exceedances were found non project related.



## Acumen Laboratory and Testing Limited

Flat/Rm D, 12/F, Ford Glory Plaza, Nos. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong  
Tel: (852) 2333 6823 Fax: (852) 2333 1316

### Test Report


Page 1 of 2

Report Number : Q230002aR230153  
Job Number : R230153  
Issue Date : 09/02/2023  
Applicant Name : Acumen Environmental Engineering and Technologies Co, Ltd.  
Applicant Address : Unit D, 12/F, Ford Glory Plaza, No.37-39 Wing Hong Street,  
Cheung Sha Wan, Kowloon, Hong Kong  
Project Name : CJO-3113-1108  
Test Required : Total Suspended Solids (TSS)  
Sampling Date : 01/02/2023  
Date Samples Received : 01/02/2023  
Sample Nature : Water  
Number of Samples Received : 5  
Condition Received : Sample(s) arrived laboratory in chilled condition  
Type of Container : HDPE Plastic Bottles  
Laboratory ID : R230153/1-5  
Test Period : 01/02/2023 – 02/02/2023  
Method Used : In-house Method, QPL-15e for Total Suspended Solids  
  
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 and Microbiological Division





## Acumen Laboratory and Testing Limited

Flat/Rm D, 12/F, Ford Glory Plaza, Nos. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong  
Tel: (852) 2333 6823 Fax: (852) 2333 1316

### Test Report

Page 2 of 2

Report Number : Q230002aR230153  
Job Number : R230153  
Issue Date : 09/02/2023

### Test Result:

Lab ID	Sampling Date	Client Sample ID	Total Suspended Solids (TSS), mg/L
R230153/1	01/02/2023	C1	<1
R230153/2	01/02/2023	C2	<1
R230153/3	01/02/2023	M1	1.1
R230153/4	01/02/2023	M2	<1
R230153/5	01/02/2023	M3	<1

#### Note:

1. mg/L indicates milligram per liter
2. < indicates less than.
3. Reporting limit is 2.5mg/L for 1L sample
4. Reporting limit is 1 mg/L for 2.5L sample
5. Applicant name, applicant address, project name, sampling date, sample ID and sample nature are provided by applicant.
6. The result(s) relate only to the item(s) tested.
7. The result(s) are applied only to the sample(s) received.

\*\*\*End of Report\*\*\*



## Acumen Laboratory and Testing Limited

Flat/Rm D, 12/F, Ford Glory Plaza, Nos. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong  
Tel: (852) 2333 6823 Fax: (852) 2333 1316

### Test Report


Page 1 of 2

Report Number : Q230002aR230154  
Job Number : R230154  
Issue Date : 09/02/2023  
Applicant Name : Acumen Environmental Engineering and Technologies Co, Ltd.  
Applicant Address : Unit D, 12/F, Ford Glory Plaza, No.37-39 Wing Hong Street,  
Cheung Sha Wan, Kowloon, Hong Kong  
Project Name : CJO-3113-1109  
Test Required : Total Suspended Solids (TSS)  
Sampling Date : 03/02/2023  
Date Samples Received : 03/02/2023  
Sample Nature : Water  
Number of Samples Received : 5  
Condition Received : Sample(s) arrived laboratory in chilled condition  
Type of Container : HDPE Plastic Bottles  
Laboratory ID : R230154/1-5  
Test Period : 03/02/2023 – 04/02/2023  
Method Used : In-house Method, QPL-15e for Total Suspended Solids  
  
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 and Microbiological Division



## Acumen Laboratory and Testing Limited

Flat/Rm D, 12/F, Ford Glory Plaza, Nos. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong  
Tel: (852) 2333 6823 Fax: (852) 2333 1316

### Test Report

Page 2 of 2

Report Number : Q230002aR230154  
Job Number : R230154  
Issue Date : 09/02/2023

### Test Result:

Lab ID	Sampling Date	Client Sample ID	Total Suspended Solids (TSS), mg/L
R230154/1	03/02/2023	C1	<1
R230154/2	03/02/2023	C2	2.3
R230154/3	03/02/2023	M1	1.2
R230154/4	03/02/2023	M2	<1
R230154/5	03/02/2023	M3	<1

Note:

1. mg/L indicates milligram per liter
2. < indicates less than.
3. Reporting limit is 2.5mg/L for 1L sample
4. Reporting limit is 1 mg/L for 2.5L sample
5. Applicant name, applicant address, project name, sampling date, sample ID and sample nature are provided by applicant.
6. The result(s) relate only to the item(s) tested.
7. The result(s) are applied only to the sample(s) received.

\*\*\*End of Report\*\*\*



## Acumen Laboratory and Testing Limited

Flat/Rm D, 12/F, Ford Glory Plaza, Nos. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong  
Tel: (852) 2333 6823 Fax: (852) 2333 1316

### Test Report


Page 1 of 2

Report Number : Q230002aR230178  
Job Number : R230178  
Issue Date : 15/02/2023  
Applicant Name : Acumen Environmental Engineering and Technologies Co, Ltd.  
Applicant Address : Unit D, 12/F, Ford Glory Plaza, No.37-39 Wing Hong Street,  
Cheung Sha Wan, Kowloon, Hong Kong  
Project Name : CJO-3113-1110  
Test Required : Total Suspended Solids (TSS)  
Sampling Date : 06/02/2023  
Date Samples Received : 06/02/2023  
Sample Nature : Water  
Number of Samples Received : 5  
Condition Received : Sample(s) arrived laboratory in chilled condition  
Type of Container : HDPE Plastic Bottles  
Laboratory ID : R230178/1-5  
Test Period : 06/02/2023 – 07/02/2023  
Method Used : In-house Method, QPL-15e for Total Suspended Solids  
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 and Microbiological Division





## Acumen Laboratory and Testing Limited

Flat/Rm D, 12/F, Ford Glory Plaza, Nos. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong  
Tel: (852) 2333 6823 Fax: (852) 2333 1316

### Test Report

Page 2 of 2

Report Number : Q230002aR230178  
Job Number : R230178  
Issue Date : 15/02/2023

### Test Result:

Lab ID	Sampling Date	Client Sample ID	Total Suspended Solids (TSS), mg/L
R230178/1	06/02/2023	C1	<1
R230178/2	06/02/2023	C2	<1
R230178/3	06/02/2023	M1	1.6
R230178/4	06/02/2023	M2	1.9
R230178/5	06/02/2023	M3	<1

Note:

1. mg/L indicates milligram per liter
2. < indicates less than.
3. Reporting limit is 2.5mg/L for 1L sample
4. Reporting limit is 1 mg/L for 2.5L sample
5. Applicant name, applicant address, project name, sampling date, sample ID and sample nature are provided by applicant.
6. The result(s) relate only to the item(s) tested.
7. The result(s) are applied only to the sample(s) received.

\*\*\*End of Report\*\*\*



## Acumen Laboratory and Testing Limited

Flat/Rm D, 12/F, Ford Glory Plaza, Nos. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong  
Tel: (852) 2333 6823 Fax: (852) 2333 1316

### Test Report


Page 1 of 2

Report Number : Q230002aR230188  
Job Number : R230188  
Issue Date : 16/02/2023  
Applicant Name : Acumen Environmental Engineering and Technologies Co, Ltd.  
Applicant Address : Unit D, 12/F, Ford Glory Plaza, No.37-39 Wing Hong Street,  
Cheung Sha Wan, Kowloon, Hong Kong  
Project Name : CJO-3113-1111  
Test Required : Total Suspended Solids (TSS)  
Sampling Date : 08/02/2023  
Date Samples Received : 08/02/2023  
Sample Nature : Water  
Number of Samples Received : 5  
Condition Received : Sample(s) arrived laboratory in chilled condition  
Type of Container : HDPE Plastic Bottles  
Laboratory ID : R230188/1-5  
Test Period : 08/02/2023 – 09/02/2023  
Method Used : In-house Method, QPL-15e for Total Suspended Solids  
  
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 and Microbiological Division

## Acumen Laboratory and Testing Limited

Flat/Rm D, 12/F, Ford Glory Plaza, Nos. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong  
Tel: (852) 2333 6823 Fax: (852) 2333 1316

### Test Report

Page 2 of 2

Report Number : Q230002aR230188  
Job Number : R230188  
Issue Date : 16/02/2023

### Test Result:

Lab ID	Sampling Date	Client Sample ID	Total Suspended Solids (TSS), mg/L
R230188/1	08/02/2023	C1	1.2
R230188/2	08/02/2023	C2	<1
R230188/3	08/02/2023	M1	<1
R230188/4	08/02/2023	M2	<1
R230188/5	08/02/2023	M3	<1

#### Note:

1. mg/L indicates milligram per liter
2. < indicates less than.
3. Reporting limit is 2.5mg/L for 1L sample
4. Reporting limit is 1 mg/L for 2.5L sample
5. Applicant name, applicant address, project name, sampling date, sample ID and sample nature are provided by applicant.
6. The result(s) relate only to the item(s) tested.
7. The result(s) are applied only to the sample(s) received.

\*\*\*End of Report\*\*\*



## Acumen Laboratory and Testing Limited

Flat/Rm D, 12/F, Ford Glory Plaza, Nos. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong  
Tel: (852) 2333 6823 Fax: (852) 2333 1316

### Test Report


Page 1 of 2

Report Number : Q230002aR230189  
Job Number : R230189  
Issue Date : 16/02/2023  
Applicant Name : Acumen Environmental Engineering and Technologies Co, Ltd.  
Applicant Address : Unit D, 12/F, Ford Glory Plaza, No.37-39 Wing Hong Street,  
Cheung Sha Wan, Kowloon, Hong Kong  
Project Name : CJO-3113-1112  
Test Required : Total Suspended Solids (TSS)  
Sampling Date : 10/02/2023  
Date Samples Received : 10/02/2023  
Sample Nature : Water  
Number of Samples Received : 5  
Condition Received : Sample(s) arrived laboratory in chilled condition  
Type of Container : HDPE Plastic Bottles  
Laboratory ID : R230189/1-5  
Test Period : 10/02/2023 – 11/02/2023  
Method Used : In-house Method, QPL-15e for Total Suspended Solids  
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 and Microbiological Division





## Acumen Laboratory and Testing Limited

Flat/Rm D, 12/F, Ford Glory Plaza, Nos. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong  
Tel: (852) 2333 6823 Fax: (852) 2333 1316

### Test Report

Page 2 of 2

Report Number : Q230002aR230189  
Job Number : R230189  
Issue Date : 16/02/2023

### Test Result:

Lab ID	Sampling Date	Client Sample ID	Total Suspended Solids (TSS), mg/L
R230189/1	10/02/2023	C1	0.2
R230189/2	10/02/2023	C2	1.3
R230189/3	10/02/2023	M1	<1
R230189/4	10/02/2023	M2	<1
R230189/5	10/02/2023	M3	1.8

Note:

1. mg/L indicates milligram per liter
2. < indicates less than.
3. Reporting limit is 2.5mg/L for 1L sample
4. Reporting limit is 1 mg/L for 2.5L sample
5. Applicant name, applicant address, project name, sampling date, sample ID and sample nature are provided by applicant.
6. The result(s) relate only to the item(s) tested.
7. The result(s) are applied only to the sample(s) received.

\*\*\*End of Report\*\*\*



## Acumen Laboratory and Testing Limited

Flat/Rm D, 12/F, Ford Glory Plaza, Nos. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong  
Tel: (852) 2333 6823 Fax: (852) 2333 1316

### Test Report


Page 1 of 2

Report Number : Q230002aR230190  
Job Number : R230190  
Issue Date : 16/02/2023  
Applicant Name : Acumen Environmental Engineering and Technologies Co, Ltd.  
Applicant Address : Unit D, 12/F, Ford Glory Plaza, No.37-39 Wing Hong Street,  
Cheung Sha Wan, Kowloon, Hong Kong  
Project Name : CJO-3113-1113  
Test Required : Total Suspended Solids (TSS)  
Sampling Date : 13/02/2023  
Date Samples Received : 13/02/2023  
Sample Nature : Water  
Number of Samples Received : 5  
Condition Received : Sample(s) arrived laboratory in chilled condition  
Type of Container : HDPE Plastic Bottles  
Laboratory ID : R230190/1-5  
Test Period : 13/02/2023 – 14/02/2023  
Method Used : In-house Method, QPL-15e for Total Suspended Solids  
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 and Microbiological Division



# Acumen Laboratory and Testing Limited

Flat/Rm D, 12/F, Ford Glory Plaza, Nos. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong  
Tel: (852) 2333 6823 Fax: (852) 2333 1316

## Test Report

Page 2 of 2

Report Number : Q230002aR230190  
Job Number : R230190  
Issue Date : 16/02/2023

### Test Result:

Lab ID	Sampling Date	Client Sample ID	Total Suspended Solids (TSS), mg/L
R230190/1	13/02/2023	C1	<1
R230190/2	13/02/2023	C2	1.1
R230190/3	13/02/2023	M1	<1
R230190/4	13/02/2023	M2	<1
R230190/5	13/02/2023	M3	<1

Note:

1. mg/L indicates milligram per liter
2. < indicates less than.
3. Reporting limit is 2.5mg/L for 1L sample
4. Reporting limit is 1 mg/L for 2.5L sample
5. Applicant name, applicant address, project name, sampling date, sample ID and sample nature are provided by applicant.
6. The result(s) relate only to the item(s) tested.
7. The result(s) are applied only to the sample(s) received.

\*\*\*End of Report\*\*\*



## Acumen Laboratory and Testing Limited

Flat/Rm D, 12/F, Ford Glory Plaza, Nos. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong  
Tel: (852) 2333 6823 Fax: (852) 2333 1316

### Test Report

Page 1 of 2

Report Number : Q230002aR230191  
Job Number : R230191  
Issue Date : 16/02/2023  
Applicant Name : Acumen Environmental Engineering and Technologies Co, Ltd.  
Applicant Address : Unit D, 12/F, Ford Glory Plaza, No.37-39 Wing Hong Street,  
Cheung Sha Wan, Kowloon, Hong Kong  
Project Name : CJO-3113-1114  
Test Required : Total Suspended Solids (TSS)  
Sampling Date : 15/02/2023  
Date Samples Received : 15/02/2023  
Sample Nature : Water  
Number of Samples Received : 5  
Condition Received : Sample(s) arrived laboratory in chilled condition  
Type of Container : HDPE Plastic Bottles  
Laboratory ID : R230191/1-5  
Test Period : 15/02/2023 – 16/02/2023  
Method Used : In-house Method, QPL-15e for Total Suspended Solids  
  
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 and Microbiological Division



## Acumen Laboratory and Testing Limited

Flat/Rm D, 12/F, Ford Glory Plaza, Nos. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong  
Tel: (852) 2333 6823 Fax: (852) 2333 1316

### Test Report

Page 2 of 2

Report Number : Q230002aR230191  
Job Number : R230191  
Issue Date : 16/02/2023

### Test Result:

Lab ID	Sampling Date	Client Sample ID	Total Suspended Solids (TSS), mg/L
R230191/1	15/02/2023	C1	1.5
R230191/2	15/02/2023	C2	1.2
R230191/3	15/02/2023	M1	<1
R230191/4	15/02/2023	M2	<1
R230191/5	15/02/2023	M3	<1

#### Note:

1. mg/L indicates milligram per liter
2. < indicates less than.
3. Reporting limit is 2.5mg/L for 1L sample
4. Reporting limit is 1 mg/L for 2.5L sample
5. Applicant name, applicant address, project name, sampling date, sample ID and sample nature are provided by applicant.
6. The result(s) relate only to the item(s) tested.
7. The result(s) are applied only to the sample(s) received.

\*\*\*End of Report\*\*\*



## Acumen Laboratory and Testing Limited

Flat/Rm D, 12/F, Ford Glory Plaza, Nos. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong  
Tel: (852) 2333 6823 Fax: (852) 2333 1316

### Test Report


Page 1 of 2

Report Number : Q230002aR230244  
Job Number : R230244  
Issue Date : 24/02/2023  
Applicant Name : Acumen Environmental Engineering and Technologies Co, Ltd.  
Applicant Address : Unit D, 12/F, Ford Glory Plaza, No.37-39 Wing Hong Street,  
Cheung Sha Wan, Kowloon, Hong Kong  
Project Name : CJO-3113-1115  
Test Required : Total Suspended Solids (TSS)  
Sampling Date : 17/02/2023  
Date Samples Received : 17/02/2023  
Sample Nature : Water  
Number of Samples Received : 5  
Condition Received : Sample(s) arrived laboratory in chilled condition  
Type of Container : HDPE Plastic Bottles  
Laboratory ID : R230244/1-5  
Test Period : 17/02/2023 – 18/02/2023  
Method Used : In-house Method, QPL-15e for Total Suspended Solids  
  
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 and Microbiological Division



## Acumen Laboratory and Testing Limited

Flat/Rm D, 12/F, Ford Glory Plaza, Nos. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong  
Tel: (852) 2333 6823 Fax: (852) 2333 1316

### Test Report

Page 2 of 2

Report Number : Q230002aR230244  
Job Number : R230244  
Issue Date : 24/02/2023

### Test Result:

Lab ID	Sampling Date	Client Sample ID	Total Suspended Solids (TSS), mg/L
R230244/1	17/02/2023	C1	2.6
R230244/2	17/02/2023	C2	<1
R230244/3	17/02/2023	M1	<1
R230244/4	17/02/2023	M2	<1
R230244/5	17/02/2023	M3	<1

#### Note:

1. mg/L indicates milligram per liter
2. < indicates less than.
3. Reporting limit is 2.5mg/L for 1L sample
4. Reporting limit is 1 mg/L for 2.5L sample
5. Applicant name, applicant address, project name, sampling date, sample ID and sample nature are provided by applicant.
6. The result(s) relate only to the item(s) tested.
7. The result(s) are applied only to the sample(s) received.

\*\*\*End of Report\*\*\*

## Acumen Laboratory and Testing Limited

Flat/Rm D, 12/F, Ford Glory Plaza, Nos. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong  
Tel: (852) 2333 6823 Fax: (852) 2333 1316

### Test Report


Page 1 of 2

Report Number : Q230002aR230258  
Job Number : R230258  
Issue Date : 27/02/2023  
Applicant Name : Acumen Environmental Engineering and Technologies Co, Ltd.  
Applicant Address : Unit D, 12/F, Ford Glory Plaza, No.37-39 Wing Hong Street,  
Cheung Sha Wan, Kowloon, Hong Kong  
Project Name : CJO-3113-1116  
Test Required : Total Suspended Solids (TSS)  
Sampling Date : 20/02/2023  
Date Samples Received : 20/02/2023  
Sample Nature : Water  
Number of Samples Received : 5  
Condition Received : Sample(s) arrived laboratory in chilled condition  
Type of Container : HDPE Plastic Bottles  
Laboratory ID : R230258/1-5  
Test Period : 20/02/2023 – 21/02/2023  
Method Used : In-house Method, QPL-15e for Total Suspended Solids  
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 and Microbiological Division





# Acumen Laboratory and Testing Limited

Flat/Rm D, 12/F, Ford Glory Plaza, Nos. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong  
Tel: (852) 2333 6823 Fax: (852) 2333 1316

## Test Report

Page 2 of 2

Report Number : Q230002aR230258  
Job Number : R230258  
Issue Date : 27/02/2023

### Test Result:

Lab ID	Sampling Date	Client Sample ID	Total Suspended Solids (TSS), mg/L
R230258/1	20/02/2023	C1	<1
R230258/2	20/02/2023	C2	<1
R230258/3	20/02/2023	M1	1.2
R230258/4	20/02/2023	M2	<1
R230258/5	20/02/2023	M3	<1

Note:

1. mg/L indicates milligram per liter
2. < indicates less than.
3. Reporting limit is 2.5mg/L for 1L sample
4. Reporting limit is 1 mg/L for 2.5L sample
5. Applicant name, applicant address, project name, sampling date, sample ID and sample nature are provided by applicant.
6. The result(s) relate only to the item(s) tested.
7. The result(s) are applied only to the sample(s) received.

\*\*\*End of Report\*\*\*

Hong Kong Accreditation Service (HKAS) has accredited Acumen Laboratory and Testing Limited (Reg. No. HOKLAS 241 - TEST) under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS directory of accredited laboratories. This report is issued subject to Acumen Laboratory and Testing Limited standard TERMS AND CONDITIONS, and shall not be reproduced except in full or with written approval by Acumen Laboratory and Testing Limited.



## Acumen Laboratory and Testing Limited

Flat/Rm D, 12/F, Ford Glory Plaza, Nos. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong  
Tel: (852) 2333 6823 Fax: (852) 2333 1316

### Test Report


Page 1 of 2

Report Number : Q230002aR230259  
Job Number : R230259  
Issue Date : 27/02/2023  
Applicant Name : Acumen Environmental Engineering and Technologies Co, Ltd.  
Applicant Address : Unit D, 12/F, Ford Glory Plaza, No.37-39 Wing Hong Street,  
Cheung Sha Wan, Kowloon, Hong Kong  
Project Name : CJO-3113-1117  
Test Required : Total Suspended Solids (TSS)  
Sampling Date : 22/02/2023  
Date Samples Received : 22/02/2023  
Sample Nature : Water  
Number of Samples Received : 5  
Condition Received : Sample(s) arrived laboratory in chilled condition  
Type of Container : HDPE Plastic Bottles  
Laboratory ID : R230259/1-5  
Test Period : 22/02/2023 – 23/02/2023  
Method Used : In-house Method, QPL-15e for Total Suspended Solids  
  
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 and Microbiological Division

## Acumen Laboratory and Testing Limited

Flat/Rm D, 12/F, Ford Glory Plaza, Nos. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong  
Tel: (852) 2333 6823 Fax: (852) 2333 1316

### Test Report

Page 2 of 2

Report Number : Q230002aR230259  
Job Number : R230259  
Issue Date : 27/02/2023

### Test Result:

Lab ID	Sampling Date	Client Sample ID	Total Suspended Solids (TSS), mg/L
R230259/1	22/02/2023	C1	1.1
R230259/2	22/02/2023	C2	<1
R230259/3	22/02/2023	M1	1.8
R230259/4	22/02/2023	M2	<1
R230259/5	22/02/2023	M3	<1

Note:

1. mg/L indicates milligram per liter
2. < indicates less than.
3. Reporting limit is 2.5mg/L for 1L sample
4. Reporting limit is 1 mg/L for 2.5L sample
5. Applicant name, applicant address, project name, sampling date, sample ID and sample nature are provided by applicant.
6. The result(s) relate only to the item(s) tested.
7. The result(s) are applied only to the sample(s) received.

\*\*\*End of Report\*\*\*



## Acumen Laboratory and Testing Limited

Flat/Rm D, 12/F, Ford Glory Plaza, Nos. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong  
Tel: (852) 2333 6823 Fax: (852) 2333 1316

### Test Report

Page 1 of 2


Report Number : Q230002aR230267  
Job Number : R230267  
Issue Date : 28/02/2023  
Applicant Name : Acumen Environmental Engineering and Technologies Co, Ltd.  
Applicant Address : Unit D, 12/F, Ford Glory Plaza, No.37-39 Wing Hong Street,  
Cheung Sha Wan, Kowloon, Hong Kong  
Project Name : CJO-3113-1118  
Test Required : Total Suspended Solids (TSS)  
Sampling Date : 24/02/2023  
Date Samples Received : 24/02/2023  
Sample Nature : Water  
Number of Samples Received : 5  
Condition Received : Sample(s) arrived laboratory in chilled condition  
Type of Container : HDPE Plastic Bottles  
Laboratory ID : R230267/1-5  
Test Period : 24/02/2023 – 25/02/2023  
Method Used : In-house Method, QPL-15e for Total Suspended Solids

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 and Microbiological Division



### Test Report

Report Number : Q230002aR230267  
Job Number : R230267  
Issue Date : 28/02/2023

### Test Result:

Lab ID	Sampling Date	Client Sample ID	Total Suspended Solids (TSS), mg/L
R230267/1	24/02/2023	C1	1.1
R230267/2	24/02/2023	C2	<1
R230267/3	24/02/2023	M1	2.3
R230267/4	24/02/2023	M2	<1
R230267/5	24/02/2023	M3	<1

#### Note:

1. mg/L indicates milligram per liter
2. < indicates less than.
3. Reporting limit is 2.5mg/L for 1L sample
4. Reporting limit is 1 mg/L for 2.5L sample
5. Applicant name, applicant address, project name, sampling date, sample ID and sample nature are provided by applicant.
6. The result(s) relate only to the item(s) tested.
7. The result(s) are applied only to the sample(s) received.

\*\*\*End of Report\*\*\*



## Acumen Laboratory and Testing Limited

Flat/Rm D, 12/F, Ford Glory Plaza, Nos. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong  
Tel: (852) 2333 6823 Fax: (852) 2333 1316

### Test Report


Page 1 of 2

Report Number : Q230002aR230286  
Job Number : R230286  
Issue Date : 02/03/2023  
Applicant Name : Acumen Environmental Engineering and Technologies Co, Ltd.  
Applicant Address : Unit D, 12/F, Ford Glory Plaza, No.37-39 Wing Hong Street,  
Cheung Sha Wan, Kowloon, Hong Kong  
Project Name : CJO-3113-1119  
Test Required : Total Suspended Solids (TSS)  
Sampling Date : 27/02/2023  
Date Samples Received : 27/02/2023  
Sample Nature : Water  
Number of Samples Received : 5  
Condition Received : Sample(s) arrived laboratory in chilled condition  
Type of Container : HDPE Plastic Bottles  
Laboratory ID : R230286/1-5  
Test Period : 27/02/2023 – 28/02/2023  
Method Used : In-house Method, QPL-15e for Total Suspended Solids  
  
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 and Microbiological Division

## Acumen Laboratory and Testing Limited

Flat/Rm D, 12/F, Ford Glory Plaza, Nos. 37-39 Wing Hong Street, Cheung Sha Wan, Kowloon, Hong Kong  
Tel: (852) 2333 6823 Fax: (852) 2333 1316

### Test Report

Page 2 of 2

Report Number : Q230002aR230286  
Job Number : R230286  
Issue Date : 02/03/2023

### Test Result:

Lab ID	Sampling Date	Client Sample ID	Total Suspended Solids (TSS), mg/L
R230286/1	27/02/2023	C1	1.1
R230286/2	27/02/2023	C2	<1
R230286/3	27/02/2023	M1	<1
R230286/4	27/02/2023	M2	<1
R230286/5	27/02/2023	M3	<1

#### Note:

1. mg/L indicates milligram per liter
2. < indicates less than.
3. Reporting limit is 2.5mg/L for 1L sample
4. Reporting limit is 1 mg/L for 2.5L sample
5. Applicant name, applicant address, project name, sampling date, sample ID and sample nature are provided by applicant.
6. The result(s) relate only to the item(s) tested.
7. The result(s) are applied only to the sample(s) received.

\*\*\*End of Report\*\*\*

# Appendix S

## Impact Monitoring report for Ecology



# **Post-Transplantation Monitoring Report**

**for Agreement No. CE 13/2009 (WS)**

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

**Report No. 102**

**February 2023**

**TABLE OF CONTENTS**

**1. INTRODUCTION ..... 2**

**2. DESCRIPTION OF TREE MONITORING SITE..... 3**

**3. MONITORING METHODOLOGY ..... 3**

**4. RESULT..... 3**

**5. MITIGATION MEASURE..... 4**

**6. SUMMARY ..... 9**

**ANNEXES**

**ANNEX I-  
Photos.....10**

**ANNEX II- Table for condition of transplanted plant.....17**

## 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*) tree, 5 colonies of Lamb of Tartary (*Cibotium barometz*) and 1 no. Hong Kong Eagle’s Claw (*Artabotrys hongkongensis*) were recommended to be transplanted in the approved detailed vegetation survey report.
- 1.4 As planned in the detailed vegetation report, Incense Tree (*Aquilaria sinensis*) and Ailanthus (*Ailanthus fordii*) trees would 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*) would 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 Tree Report presents survey findings on 26 February 2023. 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); and
- Typhoon information (Annex III).

## **2. DESCRIPTION OF TREE MONITORING SITE**

- 2.1 Incense Tree (*Aquilaria sinensis*) and Ailanthus (*Ailanthus fordii*) tree were transplanted to the extended compensatory plantation area within existing Sha Tin Water Treatment Works (STWTW). 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). Ploughing 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 was carried out by walking through the transplanting area. Health condition and survival rate were 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 is classified as being **fair**; and
  - Transplanted vegetation that was badly damaged or clearly suffering from decay die back or the effects of very heavy vine growth is classified as **poor**.
- 3.5 Survival rate for each of transplanted vegetation species will be calculated based on site observation.

## **4. RESULT**

- 4.1 The monthly monitoring inspection was conducted on 26 February 2023.
- 4.2 Three trees TA572, TA326 and TA327 were transplanted to tree compensation area within the Sha Tin Water Treatment Works (STWTW) on 20 June 2016.
- 4.3 The condition of TA572 was observed in fair health despite in poor form due to the damage of the two main trunks. TA327 was 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.

- 4.4 The joint site meeting with our ecologist, Project Manager, Contractor and Landscape Contractor on 20 October 2020 revealed that the designated recipient site at STSFWSR was under excessive exposure of direct sunlight, strong winds, far from riparian zone/ moist valley and low in soil moisture. This 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.
- 4.5 All 27 nos. of *Cibotium barometz* transplanted from the nursery at Shui Mei Tsuen, Kam Tin were generally in fair condition at their current location at STSFWSR.
- 4.6 The Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) was observed dead during inspection on 20 August 2016.
- 4.7 The transplantation of the 27 nos. of *Cibotium barometz* and the compensatory planting of TA326 and the climber *Artabotrys hongkongensis* have been conducted as detailed in Section 5.

## **5. MITIGATION MEASURE**

- 5.1 In order to compensate for the loss of the transplanted *Artabotrys hongkongensis* which is in climber growing form, it is recommended to plant an individual of native climber species at the 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 native climber species list to be planted**

Common Name	Latin Name	Chinese Name	Growing Form
Climbing Bauhinia	<i>Bauhinia glauca</i>	粉葉羊蹄甲	Climber
Spiny-fruited Vine	<i>Byttneria aspera</i>	刺果藤	Climber
Bentham's Rose-wood	<i>Dalbergia benthamii</i>	兩廣黃檀	Climber
Desmos	<i>Desmos chinensis</i>	假鷹爪	Climber
Glaucous Diploclisia	<i>Diploclisia glaucescens</i>	蒼白秤鈎風	Climber
Luofushan Joint-fir	<i>Gnetum luofuense</i>	羅浮買麻藤	Climber
Australian Cow-plant	<i>Gymnema sylvestre</i>	匙羹藤	Climber
Shining Hypserpa	<i>Hypserpa nitida</i>	夜花藤	Climber
Large-flowered Honeysuckle	<i>Lonicera macrantha</i>	大花忍冬	Climber
Splash-of-white	<i>Mussaenda pubescens</i>	玉葉金花	Climber
Rusty-haired Raspberry	<i>Rubus reflexus</i>	鏽毛莓	Climber
Sandpaper Vine	<i>Tetracera asiatica</i>	錫葉藤	Climber
Hong Kong Eagle's Claw	<i>Artabotrys hongkongensis</i>	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 New small sprouts keep emerging from the two *Desmos chinensis* that have been reported dead previously. Construction materials was also found too close to the planter. An eye-catching protective fence shall be set up as a protection zone. No construction materials shall be placed near/ within the protection zone.
- 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 An eye-catching protective net has been set up to enclose the 27 nos. transplanted *Cibotium barometz* (in groups when planted together) to avoid disturbance/ damage from works activities. Any collapsed shelter and fencing shall be rectified promptly.
- 5.7 Sign of disturbance by wild boar(s) were found at the two groups of transplanted *Cibotium barometz* previously. A robust fencing was recently installed so as to prevent them from any further disturbance.
- 5.8 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.
- 5.9 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.
- 5.10 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.
- 5.11 Root ball of TA572 and TA327 tree should be kept moisture especially during non-raining day.
- 5.12 The Incense Tree (*Aquilaria sinensis*) tagged as TA326 was observed dead during inspection on 10 August 2017. Its DBH was measured as 346mm. In accordance with the Tree Preservation, Development Bureau Technical Circular (Works) No. 7/2015, the compensatory planting aimed to achieve the compensatory planting ratio of 1:1 in terms of aggregated DBH.
- 5.13 In total, 3 individual of native tree species with heavy standard size were planted with 2.5-3 meters (center to center) spacing at compensatory planting site. Recommended list of species was given in the Table 2 below. It was 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 was 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 native tree species list to be planted**

Common Name	Latin Name	Chinese Name	Growing Form
Ivy Tree	<i>Schefflera heptaphylla</i>	鴨腳木	Tree
Levine’s Syzygium	<i>Syzygium levinei</i>	山蒲桃	Tree
Chekiang Machilus	<i>Machilus chekiangensis</i>	浙江潤楠	Tree
Aporusa	<i>Aporusa dioica</i>	銀柴	Tree
Mountain Tallow Tree	<i>Sapium discolor</i>	山烏柏	Tree
Fragrant Litsea	<i>Litsea cubeba</i>	山蒼樹	Tree
Chinese Apea Ear-ring	<i>Archidendron lucidum</i>	亮葉猴耳環	Tree
Chinese Hackberry	<i>Celtis sinensis</i>	朴樹	Tree
Turn-in-the-wind	<i>Mallotus paniculatus</i>	白楸	Tree
Acronychia	<i>Acronychia pedunculata</i>	降真香	Tree

- 5.14 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 was completed on 25 March 2021 (Annex I).
- 5.15 Two *Syzygium levinei* and one *Schefflera heptaphylla* were chosen from Table 2 as compensation for the loss of TA0326.
- 5.16 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.
- 5.17 The two mis-planted *Syzygium jambos* were then replaced by another native tree species *Celtis sinensis* chosen from Table 2 due to market availability at that time. Replacement work was conducted on 31 May 2021.

**Table 3. Summary table compensatory planting.**

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



- 5.18 With completion of compensatory planting for the loss of *Artabotrys hongkongensis* and TA0326 (*Aquilaria sinensis*), the survival of the replaced species has been monitored since then (i.e. 2 nos. of *Desmos chinensis*; 1 no. of *Schefflera heptaphylla* and 2 nos. of *Celtis sinensis*).
- 5.19 Survival of the 27 nos. of Lamb of Tartary (*Cibotium barometz*) transplanted back to STSFWSR has also been monitored too. No more individual was stored at the nursery.
- 5.20 Health condition and survival rate are shown in Annex II.

## **6. SUMMARY**

- 6.1 The condition of TA572 was observed in fair health despite in poor form. TA327 was 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 have 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 for the loss of *Artabotrys hongkongensis*. Two individuals were planted at Wall C in STWTW on 1 April 2021.
- 6.4 New small sprouts keep emerging from the two *Desmos chinensis* that have been reported dead previously. Construction materials was also found too close to the planter. An eye-catching protective fence shall be set up as a protection zone. No construction materials shall be placed near/ within the protection zone.
- 6.5 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. of transplanted *Cibotium barometz* at Portion E of STSFWSR.
- 6.6 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.
- 6.7 Root ball of TA572 and TA327 tree should be kept moisture especially during dry and non-raining day.
- 6.8 Signs of ploughed soil by wild boar(s) at the two groups of transplanted *Cibotium barometz* were reported in previous monitoring. A robust fencing was recently installed to protect the group of *Cibotium barometz* from further damage caused by wild boars.
- 6.9 Given that leftover/ garbage was observed nearby, illegal feeding of wild pigs or other wild animals was also suspected to occur. Warning signs of illegal feeding and plant protection zone may be put along the receptor site to remind the hikers. Reporting the case to the relevant government department, i.e. AFCD, is suggested to prevent further aggregation of wild boars in the area.

## **ANNEX I**

### Photo





Photo 1. A robust protection zone with eye-catching color was set up in both patches of *Cibotium barometz*.



Photo 2. A protective fence for another patch of *Cibotium barometz*.



Photo 3. Garbage was cleared out of the protection zone



Photo 4. The protective fence provides half-shade for the *Cibotium barometz*.



Photo 5 & 6. All *Cibotium barometz* individuals are now protected by robust fencing and growing in satisfactory condition.



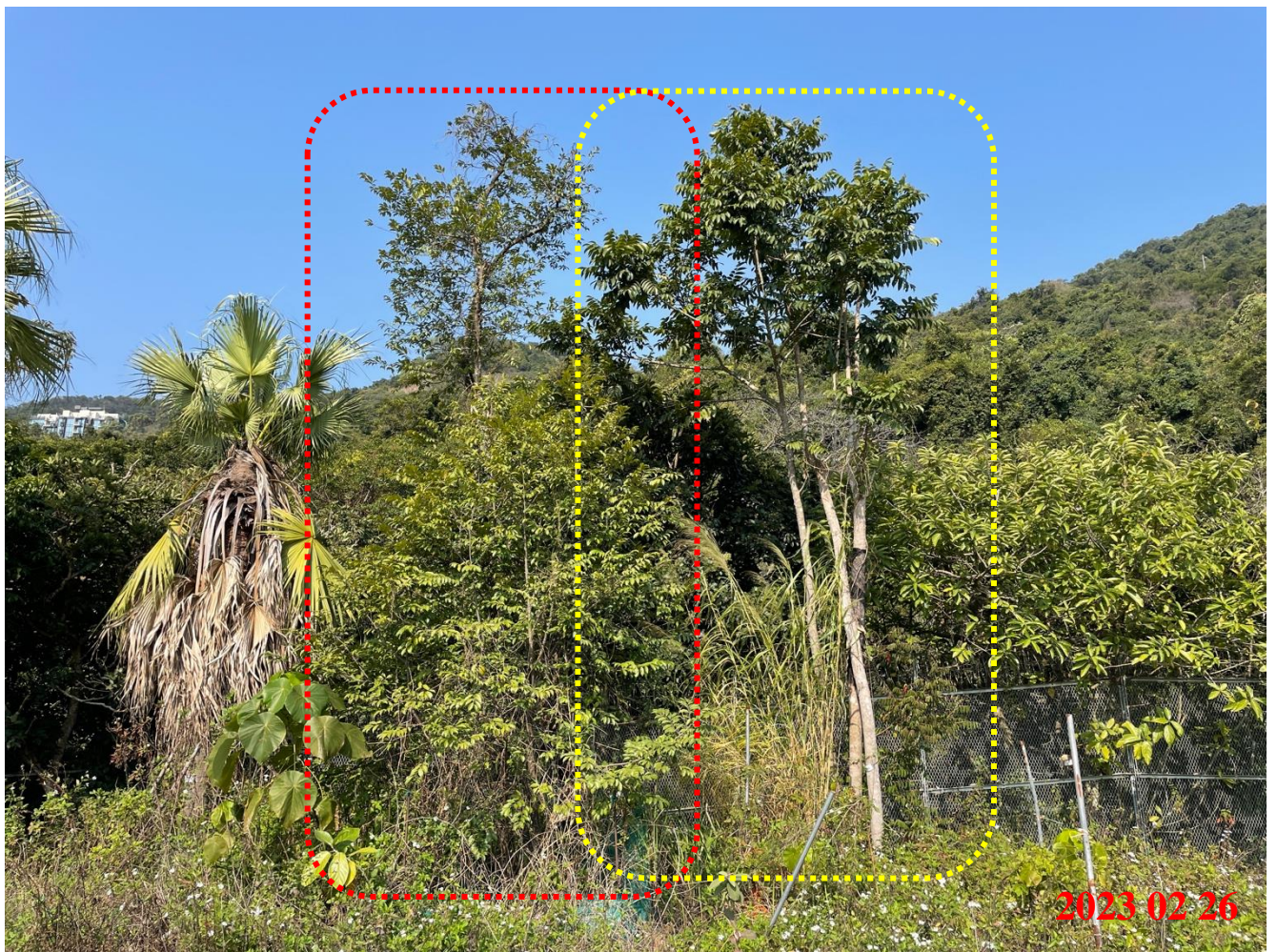


Photo 7. Transplanted Incense Tree (*Aquilaria sinensis*) – TA327 (left); and Ailanthus (*Ailanthus fordii*) – TA572 (right)





Photo 8. Sprouts at lower trunk of TA327 (*Aquilaria sinensis*).



Photo 9. TA572 (*Ailanthus fordii*) was found vigorous and in good condition.



Photo 10. New sprouts keep emerging from the *Desmos chinensis* that reported dead previously. Construction materials nearby shall be taken away.



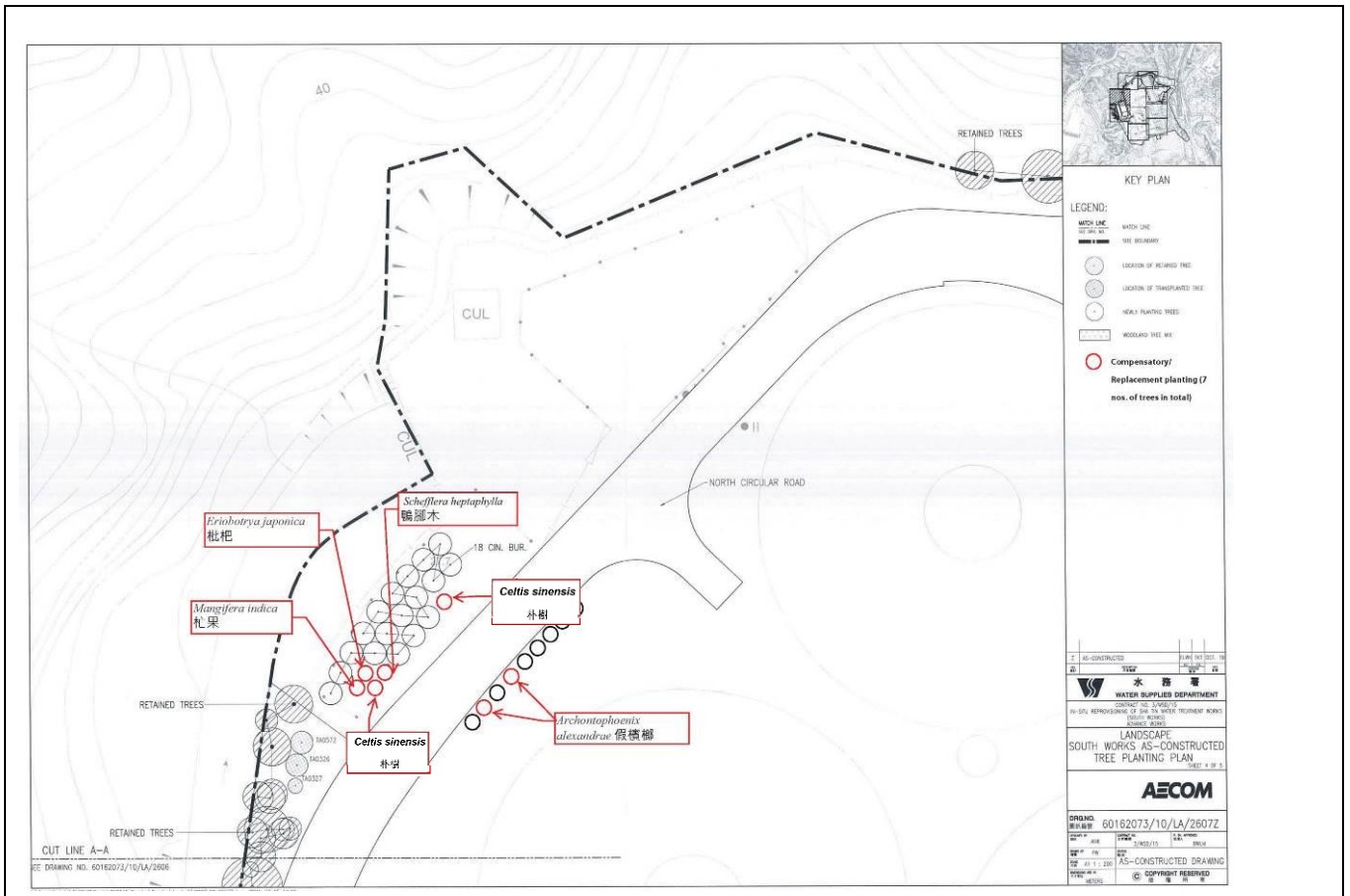
Photo 11. *Schefflera heptaphylla* as compensatory planting of TA326; sign of chlorosis.





Photo 12 and 13. The two exotic *Syzygium jambos* (mis-treated as the native *Syzygium levinei*) are replaced by another native tree *Celtis sinensis* (due to market availability) as compensatory planting of TA326. *Celtis sinensis* is a deciduous species and they were found producing new leaves.

Weeding shall be carried out during routine maintenance work



Indicative location of compensatory planting



## **ANNEX II**

Table for condition of transplanted plant

Fern *Cibotium barometz* and climber *Desmos chinensis*

No.	Species	Condition	Alive/Dead	Remark
1	<i>Cibotium barometz</i>	Fair	Alive	<p>27 individuals were transplanted back to STSFWSR on 23 April 2021.</p> <p>The shelter has been repeatedly damaged by wild boars, resulting the plants vulnerable to uprooting. Some individuals were exposed under direct sunlight due to the damage of shelter. A robust protection zone was recently set up in February 2023 which should prevent the plants from further disturbance by the wild boars. Any illegal feeding by hikers shall be reported to AFCD/ hotline 1823.</p> <p>The shelter (such as 遮光網) has been set up to provide shading and against direct hit of rainstorm/ typhoon on the plants.</p>
2	<i>Cibotium barometz</i>	Fair	Alive	
3	<i>Cibotium barometz</i>	Fair	Alive	
4	<i>Cibotium barometz</i>	Fair	Alive	
5	<i>Cibotium barometz</i>	Fair	Alive	
6	<i>Cibotium barometz</i>	Fair	Alive	
7	<i>Cibotium barometz</i>	Fair	Alive	
8	<i>Cibotium barometz</i>	Fair	Alive	
9	<i>Cibotium barometz</i>	Fair	Alive	
10	<i>Cibotium barometz</i>	Fair	Alive	
11	<i>Cibotium barometz</i>	Fair	Alive	
12	<i>Cibotium barometz</i>	Fair	Alive	
13	<i>Cibotium barometz</i>	Fair	Alive	
14	<i>Cibotium barometz</i>	Fair	Alive	
15	<i>Cibotium barometz</i>	Fair	Alive	
16	<i>Cibotium barometz</i>	Fair	Alive	
17	<i>Cibotium barometz</i>	Fair	Alive	
18	<i>Cibotium barometz</i>	Fair	Alive	
19	<i>Cibotium barometz</i>	Fair	Alive	
20	<i>Cibotium barometz</i>	Fair	Alive	
21	<i>Cibotium barometz</i>	Fair	Alive	
22	<i>Cibotium barometz</i>	Fair	Alive	
23	<i>Cibotium barometz</i>	Fair	Alive	
24	<i>Cibotium barometz</i>	Fair	Alive	
25	<i>Cibotium barometz</i>	Fair	Alive	
26	<i>Cibotium barometz</i>	Fair	Alive	
27	<i>Cibotium barometz</i>	Fair	Alive	

28	<i>Desmos chinensis</i>	Poor-Fair	Alive	Two individuals were planted at Wall C in STWTW on 1 April 2021; Resprouted since monitoring made on 30 November 2022
Survival rate (%)			100	

Transplanted/ compensatory Trees

No.	Species	Condition	Alive/Dead	Remark
TA572	<i>Ailanthus fordii</i>	Fair	Alive	Two main trunks were broken during typhoon on 23 August 2017. Cracks and wounds observed in one of the trunks. Canopy formed by sprouts.
TA327	<i>Aquilaria sinensis</i>	Fair	Alive	Tree crown of TA327 was thinner after transplantation. Water sprouts, cracks on tree bark and wound at trunk base observed.
N/A	<i>Celtis sinensis</i>	Fair	Alive	Compensate for TA326; <i>Syzygium jambos</i> replaced by <i>Celtis sinensis</i> on 31 May 2021.
N/A	<i>Celtis sinensis</i>	Fair	Alive	Compensate for TA326; <i>Syzygium jambos</i> replaced by <i>Celtis sinensis</i> on 31 May 2021.
N/A	<i>Schefflera heptaphylla</i>	Fair	Alive	Compensate for TA326; old leaved replaced by new leaf buds
Survival rate (%)			100%	



# Appendix T

## Monthly Summary of Waste Flow Table



俊和 - 方永勝聯營  
CW - FWS JV

Name of Department: WSD

Contract No.: 6/WSD/21

Monthly Summary Waste Flow Table for 2023 (year)

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)	(in tonnes)
2022	12970.60	0.00	0.00	10000.00	2695.72	207.15	31.63	0.19	0.01	0.00	35.90
Jan-23	978.96	0.00	0.00	971.74	0.00	0.00	0.00	0.02	0.00	0.00	7.20
Feb-23	9404.28	0.00	0.00	7518.52	1880.86	0.00	2.73	0.00	0.00	0.00	2.17
Mar-23											
Apr-23											
May-23											
Jun-23											
Sub-total	10383.24	0	0	8490.26	1880.86	0	2.731	0.022	0.0019	0	9.37
Jul-23											
Aug-23											
Sep-23											
Oct-23											
Nov-23											
Dec-23											
Total	23353.84	0.00	0.00	18490.26	4576.58	207.15	34.36	0.21	0.01	0.00	45.27

- Notes:
- (1) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.
  - (2) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material
  - (3) All recyclable materials, including metals, paper / cardboard packaging, plastics, etc. will be collected by registered collector for recycling.
  - (4) Conversion factors for reporting purpose:
    - in-situ: rock = 2.5 tonnes/m<sup>3</sup>; soil = 2.0 tonnes/m<sup>3</sup>
    - excavated: rock = 2.0 tonnes/m<sup>3</sup>; soil = 1.8 tonnes/m<sup>3</sup>; broken concrete and bitumen = 2.4 tonnes/m<sup>3</sup>
    - C&D Waste = 0.9 tonnes/m<sup>3</sup>; bentonite slurry = 2.8 tonnes/m<sup>3</sup>

Monthly Summary Waste Flow Table for 2023

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 '000m <sup>3</sup> )						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 <sup>3</sup> )	(in '000m <sup>3</sup> )
Jan	29.38182^	0.14400	0.00000	28.90055^	0.33727	0.45650	0.0000	0.00000	0.00000	0.00000	0.01788
Feb	20.96620*	0.16612	0.00000	20.67410*	0.12598	0.09300	52.3700	0.00000	0.00000	0.00000	0.03906
Mar	0.00000										
Apr	0.00000										
May	0.00000										
Jun	0.00000										
Sub-total	50.34802	0.31012	0.00000	49.57465	0.46325	0.54950	52.3700	0.00000	0.00000	0.00000	0.05694
Jul	0.00000										
Aug	0.00000										
Sep	0.00000										
Oct	0.00000										
Nov	0.00000										
Dec	0.00000										
Total	50.34802	0.31012	0.00000	49.57465	0.46325	0.54950	52.37000	0.00000	0.00000	0.00000	0.05694

Note: ^The waste record for January 2023 has been updated.

\* The waste record will be updated in the next reporting month.

# 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	
<b>Air Quality</b>								
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
<b>Noise</b>								
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
<b>Water Quality</b>								
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 wildlife 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 ( <i>Livistona chinensis</i> ) 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 trees 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		√		Y
	Compensatory Planting shall be provided in accordance with DEVB TCW No. 10/2013 – Tree Preservation.	All works areas	Contractor	EIAO TM		√		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.		WSD	EIAO-TM		√		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		√	
	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			

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 (February 2023)

Air Quality									
Location	Action Level				Limit Level				Total
AM1	0				0				0
AM2	0				0				0
Noise									
Location	Action Level				Limit Level				Total
NM1	0				0				0
NM2	0				0				0
NM3	0				0				0
Water Quality									
Location	Action Level				Limit Level				Total
	DO	Turbidity	SS	pH	DO	Turbidity	SS	pH	
C1	0	0	0	0	0	0	0	0	0
C2	0	0	0	0	0	0	0	0	0
C3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
M1	0	0	0	0	0	0	0	0	0
M2	0	0	0	0	0	0	0	0	0
M3	0	0	0	0	0	0	1	0	1

*There were 0 exceedance of Action Level and 1 exceedances of Limit Level in February 2023*

## 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	17	4	1	10	7	3	42
C2	0	1	11	1	5	9	6	1	34
C3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
M1	0	1	6	1	7	6	24	7	52
M2	0	0	0	0	9	3	2	0	14
M3	0	0	0	2	10	21	37	0	70



Statistical Summary of Environmental Complaints

Reporting Period	Environmental Complaint Statistics		
	Frequency	Complaint Nature	Cumulative
1 February - 28 February 2023	0	N/A	4

Statistical Summary of Environmental Summons

Reporting Period	Environmental Summons Statistics		
	Frequency	Details	Cumulative
1 February - 28 February 2023	0	N/A	0

Statistical Summary of Environmental Prosecution

Reporting Period	Environmental Prosecution Statistics		
	Frequency	Details	Cumulative
1 February - 28 February 2023	0	N/A	0

# Appendix W

## Tentative Schedule of Impact Monitoring

Mar-23						
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 &	11
12	13 Impact Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	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 &	23	24 Impact Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	25 Impact Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3
26	27 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	28 Impact Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	29 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	30	31 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	

Apr-23						
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 &	4 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	5	6 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 &	7	8
9	10	11 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	12 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 &	13 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	14	15
16	17 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	18 Impact Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	19 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	20	21 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	22
23	24 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 &	25	26 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	27	28 Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	29 Impact Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3
30						



Tentative Impact Monitoring Schedule for STWTW

May-23						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11	12	13
	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	
14	15	16	17	18	19	20
	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	Impact Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	
21	22	23	24	25	26	27
	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3 Air monitoring for AM1 & AM2 Noise monitoring for NM1, NM2 & NM3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3	
28	29	30	31			
	Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3		Impact Water Quality monitoring for C1, C2, C3, M1, M2 & M3			