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No. 17 Cheung Chau Sai Tai Road  
Cheung Chau, New Territories  
Hong Kong

**Attn: Mr. Titus Yeung – Senior Resident Engineer**

**Your Reference**

**Contract No. CM 04/2021**

**Our Reference**  
AFK/EC/TC/LL/kl/  
T601424122/L065

**Independent Environmental Checker for Environmental Monitoring Works for  
Upgrading of Cheung Chau Sewage Treatment and Disposal Facilities**

**Environmental Permit No. EP-488/2014/A**

Mott MacDonald  
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**Monthly EM&A Report for September 2023 (Rev. 2)**

14 November 2023

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**By Email**


Dear Sir,

I refer to the Monthly EM&A Report for October 2023 (Rev. 2) under the captioned Project, which was certified on 13 November 2023 by the Environmental Team Leader appointed under Condition 2.1 of Environmental Permit No. EP-488/2014/A (hereafter referred to as "EP").

I hereby verify the abovementioned submission in accordance with EP Conditions 1.9 and 4.4.

Should you have any queries regarding the captioned or require any further information, please contact the undersigned at 2828 5751.

Yours faithfully  
for MOTT MACDONALD HONG KONG LIMITED



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Mr. Alvin Lei / By Email  
Mr. Lawrence Lam



## Drainage Services Department

The Government of the Hong Kong Special Administrative Region




**Contract No. DC/2019/07**

### **Environmental Monitoring Works for Upgrading of Cheung Chau Sewage Collection, Treatment and Disposal Facilities**

### **27th Monthly Environmental Monitoring and Audit Report – October 2023**

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Position	Environmental Team Member	Environmental Team Member	Environmental Team Leader
Signature			
Date:	6/11/2023	7/11/2023	7/11/2023

## REVISION HISTORY

<b>REV.</b>	<b>DESCRIPTION OF MODIFICATION</b>	<b>DATE</b>
0	First Issue for Comments	7 November 2023
1	Updated according to IEC's comments	13 November 2023
2	Updated according to IEC's comments	13 November 2023

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## EXECUTIVE SUMMARY

- A.1 Pursuant to the Environmental Impact Assessment Ordinance (EIAO), the Director of Environmental Protection (DEP) granted the Environmental Permit (No. EP-488/2014/A) to DSD for the Project.
- A.2 Upon the requirement of the Environmental Permit (EP), the Monthly EM&A Monitoring Report shall be submitted to the DEP within 10 working days after the end of the reporting month. The submissions shall be verified by the Independent Environmental Checker (IEC) and complied with the requirements set out in the Environmental Monitoring and Audit (EM&A) Manual before submission to the DEP as stipulated in Condition 4.4 of the EP.
- A.3 The commencement date of the Project was 6 August 2021. Impact environmental monitoring of 24-hour TSP, 1-hour TSP and noise was conducted as stipulated in Condition 4.2 of the EP. This is the 27<sup>th</sup> Monthly EM&A Report for the Project summarizing the monitoring results and audit findings of the EM&A programme at selected locations at and around Cheung Chau during the reporting period from 1 to 31 October 2023.
- A.4 Key activities carried out in this reporting period for the Project included the followings:
- Trial Pit and Ground Investigation
  - Smart Sewage Monitoring
  - Excavation and Lateral Support (ELS) at CCSTW
  - Construction of Sludge Digester Building
  - Construction of MBR Treatment Facilities
  - Mechanical Installation of Sludge Digester Building and Sludge Holding Tanks
  - MVAC Installation Works
  - Construction of Sludge Holding Tank
  - Lifting Appliance Installation for Sludge Digester Building
- A.5 The major environmental impacts brought by the above construction works include:
- Construction dust and noise generation from construction works and piling works
  - Wastewater generated from construction activities
  - Waste generation from the construction activities
- A.6 The key environmental mitigation measures implemented for the Project in this reporting period associated with the above construction works include:
- Dust suppression by regular wetting and water spraying for construction works
  - Reduction of noise from equipment and machinery on-site
  - Mitigation measures preventing seepage of muddy water
  - Sorting and storage of general refuse and construction waste
- A.7 Six (6) sessions of air monitoring were carried out at all designated monitoring locations. No exceedance of Action or Limit Level was recorded.
- A.8 Five (5) sessions of noise monitoring were carried out at all designated monitoring locations. No exceedance of Action or Limit Level was recorded.
- A.9 Results of the monitoring for air quality and airborne noise are given in **Table A** and

**Table B** as follows:

**Table A – Monitoring Results (Dust)**

Location	Dust in $\mu\text{g}/\text{m}^3$			
	Average		Range	
	TSP-1hr	TSP-24hr	TSP-1hr	TSP-24hr
A1a	67	72	60 - 73	51 - 108
A2a	53	93	45 - 61	60 - 155

**Table B – Monitoring Results (Noise)**

Location	Noise in dB(A)	
	Average	Range
	$L_{\text{eq}}(30 \text{ min}) (7:00-19:00)$	$L_{\text{eq}}(30 \text{ min}) (7:00-19:00)$
N2a	71.7	70.3 - 72.7
N3a	72.0	69.6 - 73.4

s: +3 dB(A) free-field corrections have been made to N3a.

- A.10 According to Section 4.3.3 of the EM&A Manual, Site inspection shall be carried out by the ET and attention shall be paid to the mitigation measures recommended for water pollution control. Weekly site inspections were carried out and no non-compliance was spotted during the reporting month.
- A.11 Waste management mitigation measures were properly implemented in the reporting period.
- A.12 For cultural heritage impact, as this Project does not involve proposed sewers works, according to Section 6.1.5 of the EM&A Manual, no EM&A requirement is considered necessary during the construction and operational phase of upgrading of Cheung Chau STW and Pak She SPS.
- A.13 The recommended landscape and visual mitigation measures were properly implemented in the reporting period.
- A.14 Weekly site inspection of the construction work by ET were carried out on 03, 10, 17, 24 and 30 October 2023.
- A.15 No environmental complaint was received during the reporting period.
- A.16 No notification of summons or prosecution was received in the reporting period.
- A.17 A map of the construction site and monitoring locations are shown in [Appendix A](#).
- A.18 The summary of permit / licences for this Project is presented in **Table C** below:

**Table C – Summary of Permit / Licences**

<b>Nature</b>	<b>Number</b>	<b>Issue Date</b>	<b>Expiry Date</b>
Environmental Permit	EP-488/2014/A	13/05/2021	N/A
Notification pursuant to Air Pollution Control (Construction Dust) Regulation	462303	26/11/2020	N/A
Waste Disposal Billing Account	7039094	21/11/2020	N/A
Waste Disposal (Vessel) Billing Account	7040870	11/07/2023	10/10/2023
Chemical Waste Producer	5213-920-B2500-05	31/12/2020	N/A
Effluent Discharge Licence under Water Pollution Control Ordinance	WT00038597-2021	20/08/2021	31/08/2026

## 1. INTRODUCTION

### 1.1. BACKGROUND

- 1.1.1. Drainage Services Department (DSD) has contracted Build King Civil Engineering Limited (BK) to carry out the Outlying Islands Sewerage Stage 2 – Upgrading of Cheung Chau Sewage Collection, Treatment and Disposal Facilities under Contract No. DC/2019/07.
- 1.1.2. Acuity Sustainability Consulting Limited (ASCL) is commissioned by BK to undertake the Environmental Team (ET) services as required and/or implied, both explicitly and implicitly, in the Environmental Permit (EP), Environmental Impact Assessment Report (EIA Report) (Register No. AEIAR-181/2013) and Environmental Monitoring and Audit Manual (EM&A Manual) for the Project; and to carry out the Environmental Monitoring and Audit (EM&A) programme in fulfillment of the EIA Report's EM&A requirements under Agreement No. CE 15/2010 (DS).

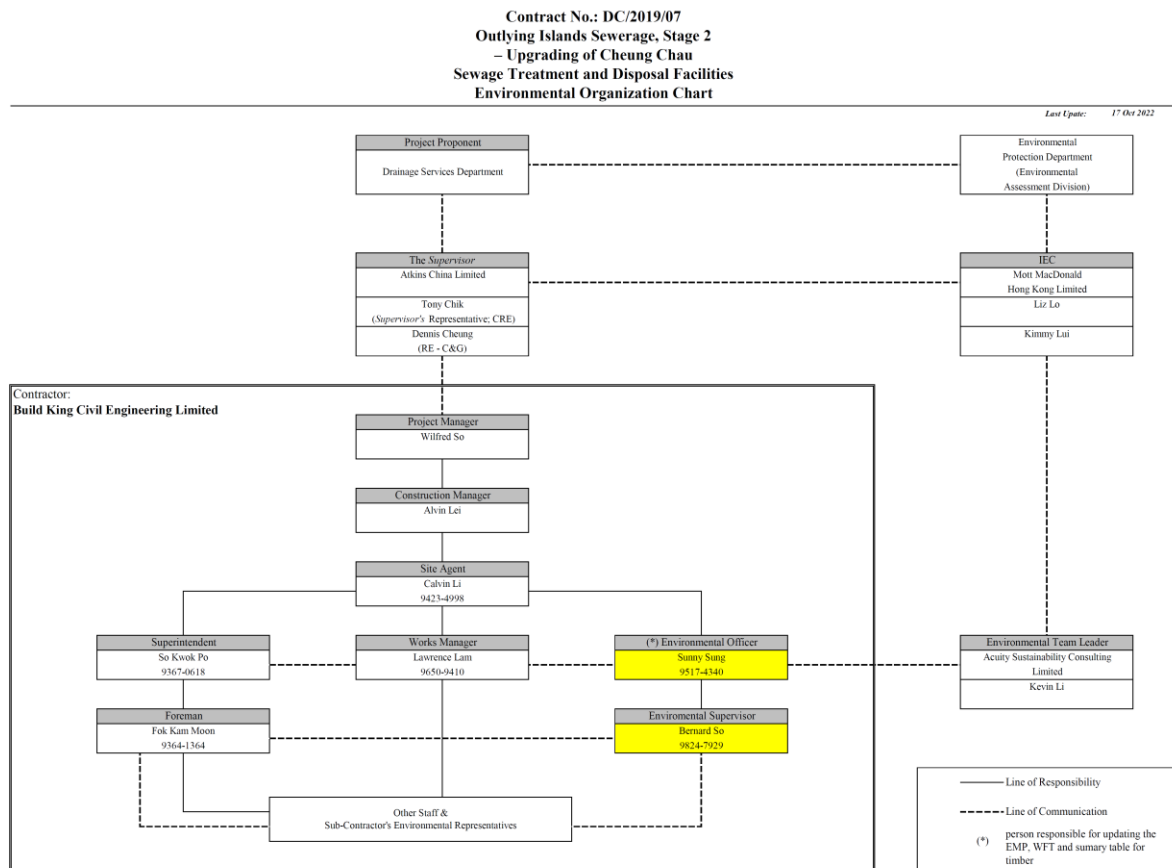
### 1.2. PROJECT DESCRIPTION

- 1.2.1. The purpose of the Project is to upgrade the sewerage collection, treatment and disposal facilities in Cheung Chau in order to cater for the projected ultimate population and planned developments in Cheung Chau to meet the increased demand and to achieve more stringent effluent quality standards. The key elements of the proposed works for the Project will include as follows:
- Expansion of the sewage treatment capacity and upgrading of the treatment level of the existing Cheung Chau Sewage Treatment Works (Cheung Chau STW) to secondary treatment level; and
  - Expansion of the pumping capacity of the existing Pak She Sewage Pumping Station (Pak She SPS).

### 1.3. PROJECT ORGANIZATION STRUCTURE

- 1.3.1. The Project organization structure is presented in **Figure 1.1**.

**Figure 1.1 Project Organization Structure**



Party	Role	Contact Person	Phone No.
Drainage Services Department HKSAR (DSD)	Project Proponent	QIU Yujiing, Eugene	2594 7298
Supervisor / Supervisor's Representative (Atkins China Limited)	Resident Engineer	Dennis Cheung	2675 3910
Environmental Team (Acuity Sustainability Consulting Limited)	Environmental Team Leader	Kevin Li	2698 6833
Independent Environmental Checker (Mott Macdonald Hong Kong Limited)	Independent Environmental Checker	Liz Lo	2828 5751
Contractor (Build King Construction Limited)	Site Agent	Calvin Li	9423 4998
	Environmental Officer	Sunny Sung	9517 4340
	Environmental Supervisor	Bernard So	9824 7929

#### 1.4. SUMMARY OF CONSTRUCTION WORKS

1.4.1. Details of the major construction activities undertaken in this and the next reporting periods are shown below. The construction programme is presented in **Appendix B**.

Key activities carried out in this reporting period for the Project included the followings:

- Trial Pit and Ground Investigation
- Smart Sewage Monitoring
- Excavation and Lateral Support (ELS) at CCSTW
- Construction of Sludge Digester Building
- Construction of MBR Treatment Facilities
- Mechanical Installation of Sludge Digester Building and Sludge Holding Tanks
- MVAC Installation Works
- Constructing of Sludge Holding Tank
- Lifting Appliance Installation for Sludge Digester Building

Key activities to be carried out in the next reporting period for the Project included the followings:

- Trial Pit and Ground Investigation
- Smart Sewage Monitoring
- Excavation and Lateral Support (ELS) at CCSTW
- Construction of Sludge Digester Building
- Construction of MBR Treatment Facilities
- Mechanical Installation of Sludge Digester Building and Sludge Holding Tanks
- MVAC Installation Works
- Constructing of Sludge Holding Tank
- Lifting Appliance Installation for Sludge Digester Building

#### 1.5. PURPOSE OF THE REPORT

1.5.1. According to the EM&A Manual for the Project, monitoring for air quality and noise should be conducted throughout the construction period of the Project.

1.5.2. The EM&A requirements for environmental monitoring are set out in the EM&A Manual. Environmental aspect of construction noise and air quality were identified as the key issues requiring implementation of monitoring programme during the construction phase of the Project.

1.5.3. This report is summarizing the monitoring results and audit findings of the EM&A programme during the reporting period from 1 October to 31 October 2023.

## 2. AIR QUALITY

### 2.1. AIR QUALITY PARAMETERS

2.1.1. The air quality parameters to be monitored includes:

- 24-hour TSP;
- 1-hour TSP; and

### 2.2. MONITORING CRITERIA

2.2.1. Dust monitoring was carried out at the designated monitoring location at least once in every six-days to obtain 24-hour TSP samples. One-hour TSP sampling shall also be done at least 3 times in every six-days while the highest dust impact occurs.

2.2.2. Before commencing the impact monitoring, the ET Leader shall inform the IEC of the impact monitoring programme such that the IEC can conduct on-site audit to ensure accuracy of the impact monitoring results.

2.2.3. In case of non-compliance with the air quality criteria, additional monitoring as specified in the Action Plan shall be conducted within 24 hours after the result is obtained. This additional monitoring shall be continued until the excessive dust emission or the deterioration in air quality is rectified.

### 2.3. MONITORING REQUIREMENTS AND EQUIPMENT

2.3.1. 1-hour and 24-hour TSP levels were measured to indicate the impacts of construction dust on air quality. The 24-hour TSP levels shall be measured by following the standard high volume sampling method as set out in the Title 40 of the United States Code of Federal Regulations, Chapter 1 (Part 50), Appendix B.

2.3.2. High volume samplers (HVSs) in compliance with the following specifications shall be used for carrying out the 1-hour and 24-hour TSP monitoring:

- 0.6 – 1.7 m<sup>3</sup> per minute adjustable flow range;
- equipped with a timing / control device with +/- 5 minutes accuracy for 24 hours operation;
- installed with elapsed-time meter with +/- 2 minutes accuracy for 24 hours operation;
- capable of providing a minimum exposed area of 406 cm<sup>2</sup>;
- flow control accuracy: +/- 2.5% deviation over 24-hour sampling period;
- equipped with a shelter to protect the filter and sampler;
- incorporated with an electronic mass flow rate controller or other equivalent devices;
- equipped with a flow recorder for continuous monitoring;
- provided with a peaked roof inlet;
- incorporated with a manometer;

- (xi) able to hold and seal the filter paper to the sampler housing at horizontal position;
  - (xii) easily changeable filter; and
  - (xiii) capable of operating continuously for a 24-hour period.
- 2.3.3. The ET is responsible for provision of the monitoring equipment. They shall ensure that sufficient number of HVSs with an appropriate calibration kit is available for carrying out the impact monitoring, and ad hoc monitoring. The HVSs shall be equipped with an electronic mass flow controller and be calibrated against a traceable standard at regular intervals. All the equipment, calibration kit, filter papers, etc., shall be clearly labelled.
- 2.3.4. Initial calibration of dust monitoring equipment shall be conducted upon installation and thereafter at bi-monthly intervals. The transfer standard shall be traceable to the internationally recognised primary standard and be calibrated annually. The concerned parties such as ER shall properly document the calibration data for future reference. All the data shall be converted into standard temperature and pressure condition.
- 2.3.5. If the ET proposes to use a direct reading dust meter to measure 1-hour TSP levels, he shall submit sufficient information to the ER to prove that the instrument is capable of achieving a comparable result to the HVS. The instrument shall also be calibrated regularly, and the 1-hour sampling shall be determined periodically by the HVS to check the validity and accuracy of the results measured by direct reading method.

#### Laboratory Measurement / Analysis

- 2.3.6. A clean laboratory with constant temperature and humidity control, and equipped with necessary measuring and conditioning instruments to handle the dust samples collected, shall be available for sample analysis, and equipment calibration and maintenance. The laboratory shall be HOKLAS accredited.
- 2.3.7. Filter paper of size 8" x 10" shall be labelled before sampling. It shall be a clean filter paper with no pinholes, and shall be conditioned in a humidity-controlled chamber for over 24-hours and be pre-weighed before use for the sampling
- 2.3.8. After sampling, the filter paper loaded with dust shall be kept in a clean and tightly sealed plastic bag. The filter paper shall then be returned to the laboratory for reconditioning in the humidity-controlled chamber followed by accurate weighing by an electronic balance with readout down to 0.1 mg. The balance shall be regularly calibrated against a traceable standard.
- 2.3.9. 1-hour TSP levels and 24-hour TSP had been measured with direct reading dust meters and High Volume Samplers respectively. The details of equipment used for monitoring are listed in **Table 2.1**, and the calibration certificates are presented in [Appendix C](#).



**Table 2.1 Equipment Used for Air Quality Monitoring**

<b>Equipment</b>	<b>Model</b>	<b>Serial Number</b>
Portable Dust Meter – 1-hour TSP	SIBATA Digital Dust Indicator (Model: LD-5R)	2Y6550 2Y6549
High Volume Samplers – 24-hour TSP	Tisch TE-5170X High Volume Air Sampler	1048 1085
Calibrator Kit	Tisch TE-5028A Calibration Kit	3702

## **2.4. MONITORING LOCATIONS**

2.4.1. The ET agreed with the ER and the IEC on the position of the HVS for the installation of the monitoring equipment. When positioning the samplers, the following points were noted:

- (i) a horizontal platform with appropriate support to secure the samplers against gusty wind shall be provided;
- (ii) no two samplers shall be placed less than 2 meters apart;
- (iii) the distance between the sampler and an obstacle, such as buildings, must be at least twice the height that the obstacle protrudes above the sampler;
- (iv) a minimum of 2 meters of separation from walls, parapets and penthouses is required for rooftop samplers;
- (v) a minimum of 2 meters separation from any supporting structure, measured horizontally is required;
- (vi) no furnace or incinerator flue is nearby;
- (vii) airflow around the sampler is unrestricted;
- (viii) the sampler is more than 20 meters from the dripline;
- (ix) any wire fence and gate, to protect the sampler, shall not cause any obstruction during monitoring
- (x) permission must be obtained to set up the samplers and to obtain access to the monitoring stations; and
- (xi) a secured supply of electricity is needed to operate the samplers.

2.4.2. The proposed dust monitoring station is presented in **Table 2.2** and the respective locations are shown in Figure 2.1 of the EM&A Manual.

**Table 2.2 Proposed Dust Monitoring Stations**


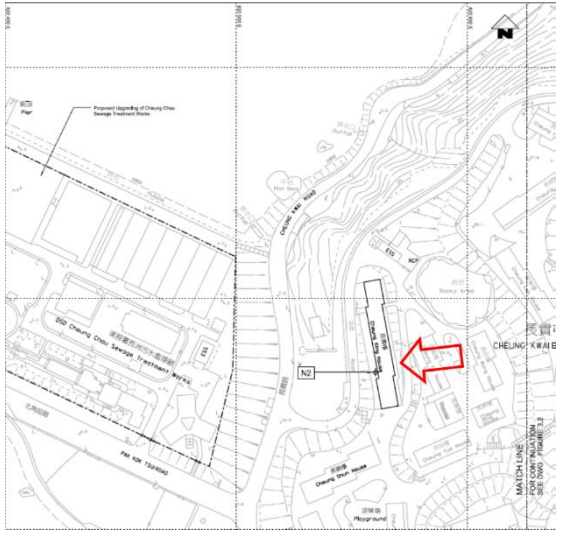

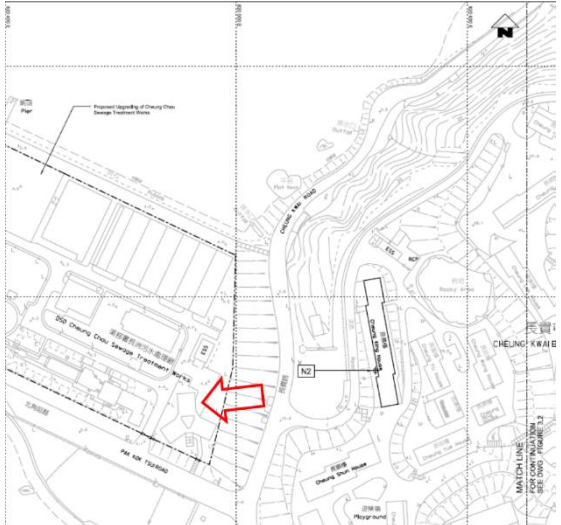
<b>ID No.</b>	<b>Location</b>	<b>Nature of Use</b>	<b>Remarks</b>
A1	Cheung King House, Cheung Kwai Estate	Residential	Specified in the EM&A Manual but proposed to change location
A1a	The admin building inside the construction site	Institutional	Proposed alternative location to replace A1
A2	Cheung Chau Slaughter House	Slaughter house	Specified in the EM&A Manual but proposed to change location
A2a	The existing outfall pumping station inside the construction site	Institutional	Proposed alternative location to replace A2


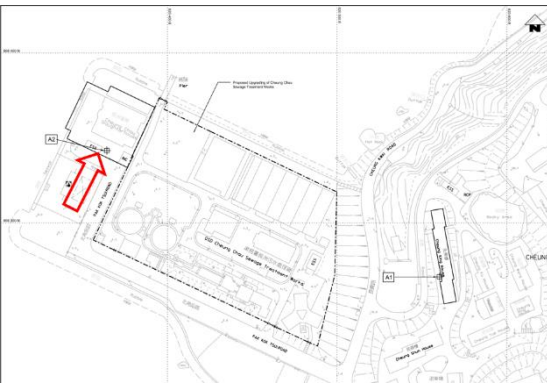

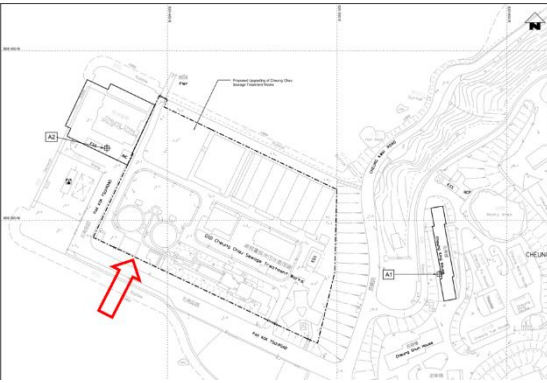
2.4.3. As secured electricity supply was not able to be provided at Monitoring Station A1, Monitoring Station A1a was then proposed. The proposed Monitoring Station A1a is the Admin Building inside the construction site. It is located at a similar direction as A1 from the construction site, but much closer to any major dust emission source than A1.

2.4.4. Monitoring Station A2 is now abandoned, only limited access can be granted and power supply cannot be guaranteed which may not be feasible to be a monitoring location. An alternative location A2a, which is the existing outfall pumping station Building inside the construction site. Location A2a is about 30 meter away from the Cheung Chau slaughter house and closer to the dust emission source.

2.4.5. The proposed alternative monitoring locations meet the guidelines and requirements specified in Section 2.4.1 and 2.4.2 of the EM&A Manual. **Table 2.3** shows the photographs of the air monitoring locations.

**Table 2.3 Photo of Proposed HVS Position at Dust Monitoring Stations**

ID	HVS Position	Direction of Photo
A1		
<p>The proposed Monitoring Station A1a is the Admin Building inside the construction site. It is located at a similar direction as A1 from the construction site, but much closer to any major dust emission source than A1.</p>		
A1a		

ID	HVS Position	Direction of Photo
A2		
<p>Because Monitoring Station A2 is now abandoned, only limited access can be granted and power supply cannot be guaranteed which may not be feasible to be a monitoring location.</p>		
A2a		

## 2.5. RESULTS AND ANALYSIS

2.5.1. The 1-hour TSP and 24-hour TSP measurement data are shown in [Appendix D](#) and summarized in **Table 2.4** and **Table 2.5** respectively.

**Table 2.4 Summary of 1-hour TSP Monitoring Results**

Monitoring Location	Average( $\mu\text{g}/\text{m}^3$ )	Range( $\mu\text{g}/\text{m}^3$ )
A1a	67	60 - 73
A2a	53	45 - 61

**Table 2.5 Summary of 24-hour TSP Monitoring Results**

Monitoring Location	Average( $\mu\text{g}/\text{m}^3$ )	Range( $\mu\text{g}/\text{m}^3$ )
A1a	72	51 - 108
A2a	93	60 - 155

## 2.6. ENVIRONMENTAL QUALITY PERFORMANCE LIMITS

2.6.1. The baseline monitoring results formed the basis for determining the air quality criteria for the impact monitoring. The ET shall compare the impact monitoring results with air quality criteria set up for 24-hour TSP and 1-hour TSP. **Table 2.6** shows the air quality criteria, namely Action and Limit levels to be used.

**Table 2.6 Action / Limit Levels for Air Quality**

Parameters	Action Level	Limit Level
1-hour TSP Level in $\mu\text{g}/\text{m}^3$	<p><u>For baseline level <math>\leq 200 \mu\text{g}/\text{m}^3</math></u>  <math>AL = (BL * 1.3 + LL)/2</math>  <u>For baseline level <math>&gt; 200 \mu\text{g}/\text{m}^3</math></u>  <math>AL = LL</math></p>	260 $\mu\text{g}/\text{m}^3$
24-hour TSP Level in $\mu\text{g}/\text{m}^3$	<p><u>For baseline level <math>\leq 384 \mu\text{g}/\text{m}^3</math></u>  <math>AL = (BL * 1.3 + LL)/2</math>  <u>For baseline level <math>&gt; 384 \mu\text{g}/\text{m}^3</math></u>  <math>AL = LL</math></p>	500 $\mu\text{g}/\text{m}^3$

2.6.2. The derived Action/Limit Levels are presented in **Table 2.7**.

**Table 2.7 Derived Action / Limit Levels for Air Quality**

Parameters	Monitoring Location	Action Level $\mu\text{g}/\text{m}^3$	Limit Level $\mu\text{g}/\text{m}^3$
1-hour TSP Level in $\mu\text{g}/\text{m}^3$	A1a	151	260
	A2a	154	
24-hour TSP Level in $\mu\text{g}/\text{m}^3$	A1a	270	500
	A2a	271	

## 2.7. EVENT AND ACTION PLAN

2.7.1. Should non-compliance of the air quality criteria occur, actions in accordance with the Action Plan in **Table 2.8** shall be carried out.

**Table 2.8 Event and Action Plan for Air Quality (Construction Dust)**

EVENT	ACTION PLAN FOR CONSTRUCTION DUST			
	ET	IEC	ER	CONTRACTOR
<b>ACTION LEVEL</b>				
Exceedance for one sample	<ol style="list-style-type: none"> <li>1. Identify source, investigate the causes of exceedance and propose remedial measures;</li> <li>2. Inform IEC and ER;</li> <li>3. Repeat measurement to confirm finding; and</li> <li>4. Increase monitoring frequency to daily.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET; and</li> <li>2. Check Contractor's working method.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify Contractor.</li> </ol>	<ol style="list-style-type: none"> <li>1. Rectify any unacceptable practice; and</li> <li>2. Amend working methods if appropriate.</li> </ol>
Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> <li>1. Identify source;</li> <li>2. Inform IEC and ER;</li> <li>3. Advise the ER on the effectiveness of the proposed remedial measures;</li> <li>4. Repeat measurements to confirm findings;</li> <li>5. Increase monitoring frequency to daily;</li> <li>6. Discuss with IEC and Contractor on remedial actions required;</li> <li>7. If exceedance continues, arrange meeting with IEC and ER; and</li> <li>8. If exceedance stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET;</li> <li>2. Check Contractor's working method;</li> <li>3. Discuss with ET and Contractor on possible remedial measures;</li> <li>4. Advise the ET on the effectiveness of the proposed remedial measures; and</li> <li>5. Supervise implementation of remedial measures</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing;</li> <li>2. Notify Contractor; and</li> <li>3. Ensure remedial measures properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit proposals for remedial to IEC within 3 working days of notification;</li> <li>2. Implement the agreed proposals; and</li> <li>3. Amend proposal if appropriate.</li> </ol>



### 3. NOISE

#### 3.1. MONITORING CRITERIA

- 3.1.1. Impact monitoring was conducted once a week between 07:00-19:00 hours on normal weekdays.
- 3.1.2. **Table 3.1** summarizes the monitoring parameters, frequency and duration of the noise monitoring.

**Table 3.1 Noise Monitoring Parameters, Time, Frequency and Duration**

Time	Duration	Interval	Parameters
Daytime: 0700-1900 hrs	Once per week	Continuously in L <sub>eq</sub> 5min/L <sub>eq</sub> 30min (average of 6 consecutive L <sub>eq</sub> 5min)	L <sub>eq</sub> 5min, L <sub>eq</sub> 30min, L <sub>10</sub> & L <sub>90</sub>

#### 3.2. MONITORING REQUIREMENTS AND EQUIPMENT

- 3.2.1. Sound level meters and calibrators shall comply with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specification as referred to in the Technical Memorandum (TM) issued under the Noise Control Ordinance.
- 3.2.2. Sound level meters were calibrated using a portable calibrator prior to and following each noise measurement. Where the difference between the calibration levels is greater than 1.0 dB(A), the measurement shall be repeated. Calibrated hand-held anemometers were supplied for the measurement of wind speeds during noise monitoring periods.
- 3.2.3. Noise measurements should not be made in fog, rain, wind with a steady speed exceeding 5 m/s or wind with gusts exceeding 10 m/s. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in m/s.
- 3.2.4. The details of equipment used for impact monitoring are listed in **Table 3.2**, and the calibration certificates are presented in [Appendix E](#).

**Table 3.2 Equipment Used for Noise Monitoring**

Equipment	Model	Serial Number
Sound Level Meter	SVANTEK 971	C119577
Acoustic Calibrator	Rion NC-75	35124528

#### 3.3. MONITORING LOCATION

- 3.3.1. According to the environmental findings detailed in the EIA report, the designated locations for the construction noise monitoring are listed in **Table 3.3** and shown in Figure 3.1 – 3.8 of the EM&A Manual.


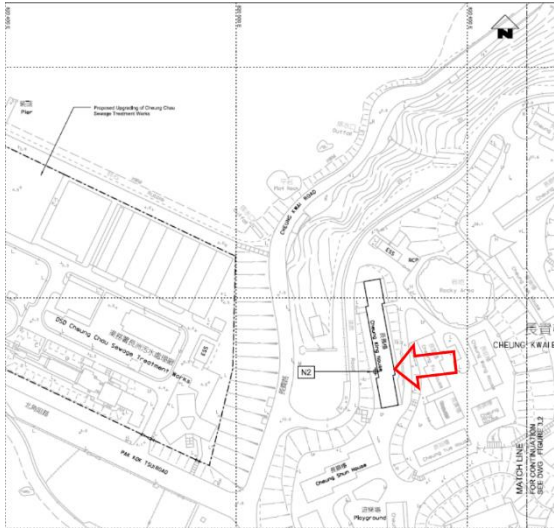

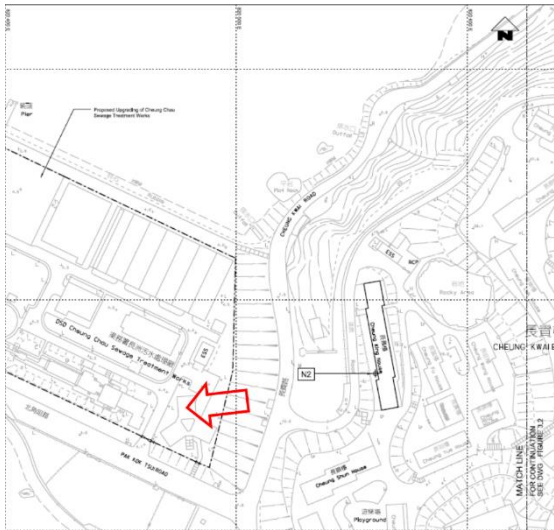
Table 3.3 Noise Monitoring Stations for Noise Monitoring


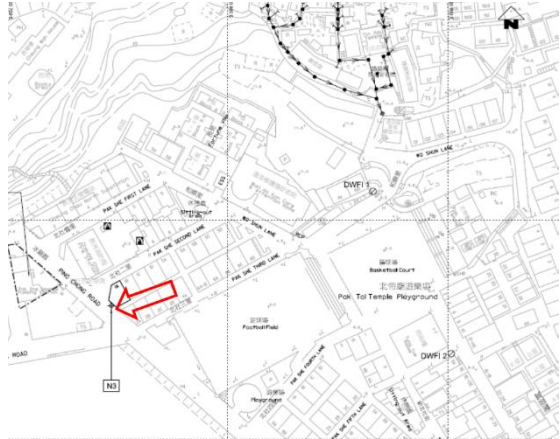
ID No.	Location	Nature of Uses	Remarks	Façade/Free-field
N2	Cheung King House, Cheung Kwai Estate	Residential	Specified in the EM&A Manual but proposed to change location	Façade
N2a	Admin Building inside the Construction Site	Institutional	Proposed alternative location to replace N2	Façade
N3	No. 1A Pak She Second Lane	Residential	Specified in the EM&A Manual but proposed to change location	Free-field
N3a	Cheung Chau Fire Station	Fire Station	Proposed alternative location to replace N3	Free-field

- 3.3.2. For this Contract, only N2 and N3 need to be monitored since all the other monitoring stations specified in the EM&A Manual are for sewers works but this Contract does not include sewers works.
- 3.3.3. The proposed Monitoring Station N2a is the Admin Building inside the construction site. It is located at a similar direction as N2 from the construction site, but much closer to any major noise emission source than N2.
- 3.3.4. According to Figure 3.3 of the EM&A Manual, Location N3 is placed in front of a restaurant on Ping Chong Road. It may pose potential danger to pedestrians, cyclists, drivers and the equipment. A proposed monitoring location N3a, which is about 5 m away from the original monitoring location. N3a is at the corner of the Cheung Chau Fire Station. This location is more safe and meets the guidelines and requirements specified in Section 3.4.1 and 3.4.2 of the EM&A Manual.
- 3.3.5. The monitoring locations should normally be made at a point 1m from the exterior of the NSRs building façade and be at a position 1.2m above the ground. **Table 3.4** showed photographs and indications of the proposed position of sound level meters to be placed for the baseline and impact monitoring.


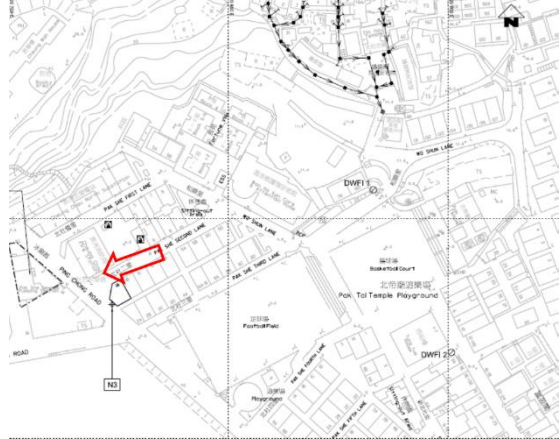


**Table 3.4 Photo of Proposed Sound Level Meter Position at Noise Monitoring Stations**

ID	Sound Level Meter Position	Direction of Photo
N2		
<p>The proposed Monitoring Station N2a is the Admin Building inside the construction site. It is located at a similar direction as N2 from the construction site, but much closer to any major noise emission source than N2.</p>		
N2a		

ID	Sound Level Meter Position	Direction of Photo
N3		

According to Figure 3.3 of the EM&A Manual, Location N3 is placed in front of a restaurant on Ping Chong Road. It may pose potential danger to pedestrians, cyclists, drivers and the equipment.

N3a		
-----	--	---

### 3.4. RESULTS AND ANALYSIS

3.4.1. The noise monitoring was carried out in October 2023. The measurement data are shown in [Appendix F](#) and summarized in **Tables 3.5**.

**Table 3.5 Summary of Noise Monitoring Results**

Monitoring Location	Time Period	Average[dB(A)]	Range[dB(A)]
N2a	Daytime (0700-1900)	71.7	70.3 - 72.7
N3a	Daytime (0700-1900)	72.0	69.6 - 73.4

s: +3 dB(A) free-field corrections have been made to the data of N3a.

### 3.5. ENVIRONMENTAL QUALITY PERFORMANCE LIMITS

3.5.1. The Action and Limit levels for construction noise are shown in **Table 3.6**. All NSRs identified in the Project are classified with an Area Sensitivity Rating (ASR) A in accordance with the Technical Memorandum on Noise from Construction Work Other Than Percussive Piling.

**Table 3.6 Action / Limit Levels for Construction Noise**

Time Period	Action	Limit
07:00-19:00 hours on normal weekdays;	When one or more documented complaints are received	75dB(A)

### 3.6. EVENT AND ACTION PLAN

3.6.1. Should non-compliance of the noise monitoring criteria occur, actions in accordance with the Action Plan in **Table 3.7** shall be carried out.

**Table 3.7 Event and Action Plan for Construction Noise**

Event	ET	IEC	ER	CONTRACTOR
Action Level	<ol style="list-style-type: none"> <li>1. Notify ER, IEC and Contractor;</li> <li>2. Carry out investigation;</li> <li>3. Report the results of investigation to the IEC, ER and Contractor;</li> <li>4. Discuss with the IEC and contractor and formulate remedial measures; and</li> <li>5. Increase monitoring frequency to check the effectiveness of mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Review the investigation results submitted by the ET;</li> <li>2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; and</li> <li>3. Advise the ER on the effectiveness of the proposed remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing;</li> <li>2. Notify Contractor;</li> <li>3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented; and</li> <li>4. Supervise the implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit noise mitigation proposals to IEC and ER; and</li> <li>2. Implement noise mitigation proposals.</li> </ol>
Limit Level	<ol style="list-style-type: none"> <li>1. Notify IEC, ER, EPD &amp; Contractor;</li> <li>2. Identify source and investigate the cause of exceedance;</li> <li>3. Repeat measurement to confirm findings;</li> <li>4. Increase monitoring frequency;</li> <li>5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented;</li> <li>6. Discuss with the IEC, Contractor and ER on remedial measures required;</li> <li>7. Assess the effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; and</li> <li>8. If exceedance stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss amongst ET, ER and Contractor on the potential remedial actions; and</li> <li>2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing;</li> <li>2. Notify Contractor;</li> <li>3. In consolidation with the EIC, agree with the Contractor on the remedial measures to be implemented;</li> <li>4. Supervise the implementation of remedial measures; and</li> <li>5. If exceedance continues, consider stopping the Contractor to continue working on that portion of work which causes the exceedance until the exceedance is abated.</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance;</li> <li>2. Submit proposals for remedial actions to IEC and ER within 3 working days of notification;</li> <li>3. Implement the agreed proposals;</li> <li>4. Submit further proposal if problem still not under control; and</li> <li>5. Stop the relevant portion of works as determined by ER, until the exceedance is abated.</li> </ol>

## 4. WATER QUALITY

- 4.1. As suggested in Section 4.3 of the EM&A Manual, regular site audit was carried out to ensure that the recommended mitigation measures were properly implemented during the construction phase of upgrading of Cheung Chau STW and Pak She SPS. Site audit included site inspections and compliance audits were conducted in the reporting period.
- 4.2. Site inspection was carried out by the ET on 03, 10, 17, 24 and 30 October 2023. No major deficiency was observed and the implementation of recommended for water pollution control was considered satisfactory.
- 4.3. Compliance audits were undertaken that a valid discharge license was issued by EPD on 20 August 2021. The Contractor was reminded to make sure any effluent discharge from construction activities of the Project site should meet the requirements stipulated in the discharge license and monitoring of the treated effluent quality from the Works Areas should be carried out in accordance with the Water Pollution Control Ordinance license that is under the ambit of the relevant regional EPD office.
- 4.4. According to the Specific Conditions B2 in Part B of the discharge licence issued under WPCO, a sample of discharge was taken on 11 October 2023 for testing.

## 5. WASTE MANAGEMENT

- 5.1. The waste generated from this Project includes inert construction and demolition (C&D) materials, and non-inert C&D materials. Non-inert C&D materials are made up of general refuse, vegetative wastes and recyclable wastes such as plastics and paper/cardboard packaging waste. Steel materials generated from the project are also grouped into non-inert C&D materials as the materials were not disposed of with other inert C&D materials. With reference to relevant handling records and trip tickets of this Project, the quantities of different types of waste generated in the reporting month are presented in **Table 5.1**.



Contract No. DC/2019/07  
 Environmental Monitoring Works for  
 Upgrading of Cheung Chau Sewage Collection, Treatment and Disposal Facilities  
 27<sup>th</sup> EM&A Report – October 2023



**Contract No: DC/2019/07**  
**Outlying Islands Sewerage Stage 2 – Upgrading of Cheung Chau Sewage Treatment and Disposal Facilities**

Name of Department : Drainage Services Department Contract No./ Work Order No. : DC/2019/07  
 Project Title: Outlying Islands Sewerage Stage 2 – Upgrading of Cheung Chau Sewage Treatment and Disposal Facilities  
 Contractor: Build King Civil Engineering Limited  
 Trip Ticket Account (Main Account): 7039094  
 Trip Ticket Account (Vessel Account): 7040870  
 Marine Dumping Permit (Type 1 - Open Sea Disposal): EP/MD/23-041  
 Marine Dumping Permit (Type 2 - Confined Marine Disposal): EP/MD/23-033

**Monthly Summary Waste Flow Table for 2023 (in Weight)**

(All quantities shall be rounded off to 3 decimal places)

updated on: 10-Oct-2023

Month	Actual Quantities of Inert C&D Materials Generated / Imported (in '000 kg)						Actual Quantities of Other C&D Materials / Wastes Generated					Marine Dumping	
	Total Quantities Generated	Broken Concrete (including rock for recycling into aggregates)	Reused in the Contract	Reused in Other Projects	Disposed as Public Fill	Imported C&D Material	Metal	Paper/ Cardboard Packaging (f)	Plastic (g) (bottles, containers, plastic sheets, films from package material)	Chemical Waste (h)	Others (i) (e.g. General Refuse etc.)	Type 1 - Open Sea Disposal	Type 2 - Confined Marine Disposal
	[a=b+c+d+e+f+g+h+i]	(a)	(b)	(c)	(d)		(e) (in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in m <sup>3</sup> )	(in m <sup>3</sup> )
Jan-2023	6752.4100	0.0000	0.0000	0.0000	6745.3900	0.0000	0.0000	0.0000	0.0000	7.0200	0.0000	0.0000	
Feb-2023	2032.0500	0.0000	0.0000	0.0000	2028.0000	0.0000	0.0000	0.0000	0.0000	4.0500	0.0000	0.0000	
Mar-2023	4282.9700	0.0000	0.0000	0.0000	4276.0000	0.0000	0.0000	0.0000	0.0000	6.9700	835.0000	1350.0000	
Apr-2023	2152.4200	0.0000	0.0000	0.0000	2148.0000	0.0000	0.0000	0.0000	0.0000	4.4200	0.0000	0.0000	
May-2023	1664.6600	0.0000	0.0000	0.0000	1657.0000	0.0000	0.0000	0.0000	0.0000	7.6600	0.0000	0.0000	
Jun-2023	1724.9700	0.0000	0.0000	0.0000	1717.0000	0.0000	0.0000	0.0000	0.0000	7.9700	0.0000	0.0000	
Half-year total	18609.4800	0.0000	0.0000	0.0000	18571.3900	0.0000	0.0000	0.0000	0.0000	38.0900	835.0000	1350.0000	
Jul-2023	7.7400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	7.7400	0.0000	0.0000	
Aug-2023	7520.7800	0.0000	0.0000	0.0000	7505.9000	0.0000	0.0000	0.0000	0.0000	14.8800	0.0000	0.0000	
Sep-2023	4859.1500	0.0000	0.0000	0.0000	4839.0000	0.0000	0.0000	0.0000	0.0000	20.1500	0.0000	0.0000	
Oct-2023	11840.2000	0.0000	0.0000	0.0000	11838.0000	0.0000	0.0000	0.0000	0.0000	2.2000	0.0000	0.0000	
Nov-2023													
Dec-2023													
Yearly Total	42837.3500	0.0000	0.0000	0.0000	42754.2900	0.0000	0.0000	0.0000	0.0000	83.0600	835.0000	1350.0000	

(All quantities shall be rounded off to 3 decimal places)

Year	Actual Quantities of Inert C&D Materials Generated / Imported (in '000 kg)						Actual Quantities of Other C&D Materials / Wastes Generated					Marine Dumping	
	Total Quantities Generated	Broken Concrete (including rock for recycling into aggregates)	Reused in the Contract	Reused in Other Projects	Disposed as Public Fill	Imported C&D Material	Metal	Paper/ Cardboard Packaging	Plastic (bottles, containers, plastic sheets, films from package material)	Chemical Waste	Others (e.g. General Refuse etc.)	Type 1 - Open Sea Disposal	Type 2 - Confined Marine Disposal
	[a=b+c+d+e+f+g+h+i]	(a)	(b)	(c)	(d)		(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in m <sup>3</sup> )	(in m <sup>3</sup> )
2020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
2021	858.3600	0.0000	0.0000	0.0000	786.3000	0.0000	0.0000	0.0000	0.0000	72.0600	0.0000	0.0000	
2022	17081.7200	0.0000	0.0000	0.0000	17032.3700	0.0000	0.0000	0.0000	0.0000	49.3500	525.0000	203.0000	
2023	42837.3500	0.0000	0.0000	0.0000	42754.2900	0.0000	0.0000	0.0000	0.0000	83.0600	835.0000	1350.0000	
2024	0.0000												
2025	0.0000												
2026	0.0000												
Total	60777.4300	0.0000	0.0000	0.0000	60572.9600	0.0000	0.0000	0.0000	0.0000	204.4700	1360.0000	1553.0000	

Remark:

- 1) Density of C&D material to be 2 metric ton/m<sup>3</sup>      3) Density of Chemical Waste to be 0.88 metric ton/m<sup>3</sup>  
 2) Density of General Refuse to be 1.6 metric ton/m<sup>3</sup>

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 Sites.  
 (2) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.  
 (3) The summary table shall be submitted to the Project Manager monthly together with the Waste Flow Table for review and monitoring in accordance with the PS Clause 25.20(8)

## 6. LANDSCAPE & VISUAL

- 6.1. The EIA Report has recommended landscape and visual mitigation measures to be undertaken during construction and operational phases of the upgrading of Cheung Chau STW under this Project. The implementation and maintenance of landscape mitigation measures were checked to ensure that they are fully realized and that potential conflicts between the proposed landscape measures and any other project works and without compromise to the intention of the mitigation measures.
- 6.2. Regular audits were carried out to ensure all the recommended landscape and visual mitigation measures were effectively implemented.
- 6.3. The EM&A Manual proposed mitigation measures were checked on a regular basis to ensure compliance with the intended aims of the EIA.

## 7. SITE INSPECTION AUDIT

- 7.1. 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, site inspections were carried out on 03, 10, 17, 24 and 30 October 2023. A joint site inspection with IEC was carried out on 30 October 2023.
- 7.2. Environmental deficiencies were observed during weekly site inspection. Key observations during the site inspections and during the reporting period are summarized in **Table 7.1**.

**Table 7.1 Site Observations**

<b>Date</b>	<b>Environmental Observations</b>	<b>Follow-up Status</b>	<b>Reminders</b>
03 October 2023	NIL	N/A	NIL
10 October 2023	NIL	N/A	1. Drain cover should be covered and surrounded by the tarpaulins and sandbags.
17 October 2023	NIL	N/A	NIL
24 October 2023	1. The sediments and the rubbish in the U-Channel should be cleaned	The sediments and the rubbish in the U-Channel has been cleaned.	NIL

Date	Environmental Observations	Follow-up Status	Reminders
30 October 2023	1. Gully should be covered or surrounded by tarpaulins and sandbags to prevent the muddy water outflow to the storm drain	The gully has been covered by tarpaulins and surrounded by sandbags to prevent the muddy water from outflowing to the storm drain.	1. The sediments in the U-Channel should be cleaned.

- 7.3. According to the EIA Study Report, Environmental Permit, contract documents and EM&A Manual, the mitigation measures detailed in the documents should be implemented as much as practical during the reporting period. An updated Implementation Status of Environmental Mitigation Measures (EMIS) is provided in **Appendix G**.

## 8. CONCLUSION

- 8.1. This is the 27<sup>th</sup> Monthly EM&A Report for the Project which summarizes the key findings of the programme during the reporting period from 1 October to 31 October 2023, in accordance with the EM&A Manual and the requirement under EP-488/2014/A.
- 8.2. Six (6) sessions of air and Five (5) sessions of noise monitoring were carried out at the monitoring locations sited at Cheung Chau in the reporting month.
- 8.3. Site audits were conducted as mitigation measures recommended for water pollution control and landscape and visual impact monitoring in the reporting period. Proper mitigation measures were implemented.
- 8.4. Weekly environmental site inspections were conducted during the reporting period. Only minor deficiencies were observed during site inspections. The environmental performance of the project was therefore considered satisfactory.
- 8.5. No exceedance of Action or Limit Level was recorded in the reporting period.
- 8.6. No environmental complaint was received in the reporting period.
- 8.7. No notification of summons or prosecution was received during the reporting period.

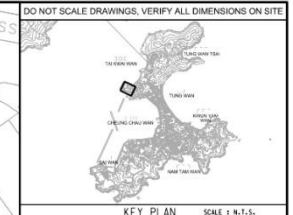
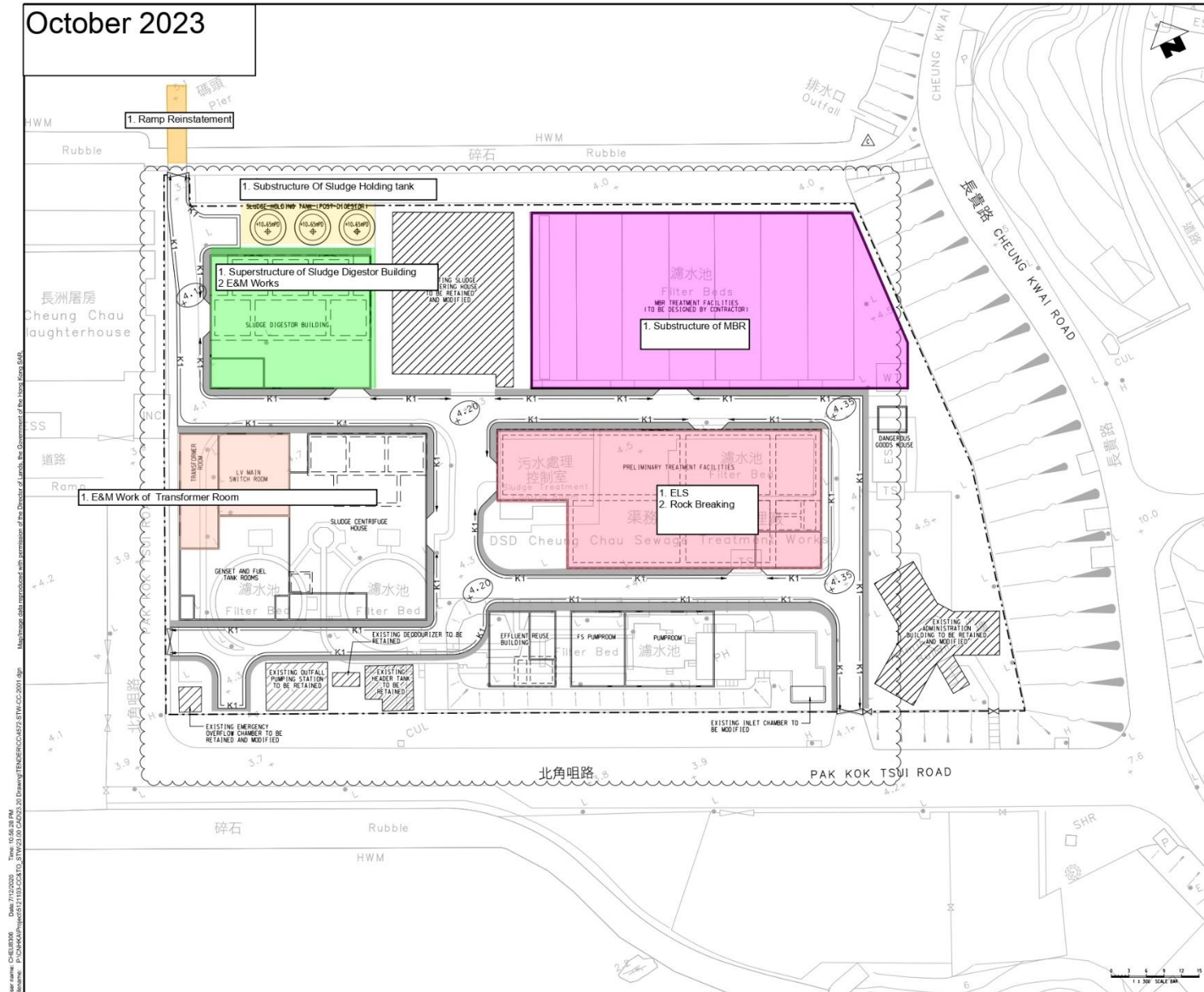


# APPENDIX A

## Location Plan and Noise and Dust Monitoring Stations

Contract No. DC/2019/07  
 Environmental Monitoring Works for  
 Upgrading of Cheung Chau Sewage Collection, Treatment and Disposal Facilities  
 27<sup>th</sup> EM&A Report – October 2023

October 2023



- NOTES:**
- FOR GENERAL NOTES AND LEGENDS, REFER TO DRAWING NO. 4572-STW-CC-2000.
  - BOUNDARY AND SECURITY FENCE, REFER TO DRAWING NOS. 4572-STW-CC-5045 AND 5046.
  - ALL ROAD SHALL BE IN CONCRETE PAVEMENT. FOR DETAILS OF CONCRETE PAVEMENT, REFER TO HIGHWAYS DEPARTMENT STANDARD DRAWING NO. 4572-STW-CC-2000. THE THICKNESS OF CONCRETE SUB-BASE SHALL BE 225MM. THE THICKNESS OF GRANULAR SUB-BASE SHALL BE 225MM OR EQUAL TO 9% CARBON BEARING RATIO (CBR) VALUE IS LARGER OR EQUAL TO 9%. GRANULAR FILL MATERIAL IN ACCORDANCE WITH SECTION 6 OF THE GENERAL SPECIFICATION FOR CIVIL ENGINEERING WORKS, IS REQUIRED AND THE THICKNESS OF THE GRANULAR SUB-BASE SHALL BE ADJUSTED IF CBR VALUE IS SMALLER THAN 9% ACCORDING TO THE HIGHWAYS DEPARTMENT GUIDANCE NOTES ON PAVEMENT DESIGN FOR CARRIAGEWAY CONSTRUCTION.
  - ALL FOOTWAY SHALL BE CONCRETE FOOTWAY. EXTENT OF FOOTWAY SHALL BE READ IN CONJUNCTION WITH DRAWINGS 4572-STW-CC-5000 AND 5000 SERIES. FOR DETAILS OF CONCRETE FOOTWAY, REFER TO HIGHWAYS DEPARTMENT STANDARD DRAWING N1108.
  - KERB SHALL BE TYPE K1. FOR DETAILS OF KERB TYPE K1, REFER TO HIGHWAYS DEPARTMENT STANDARD DRAWING N1118.

- LEGEND:**
- BOUNDARY OF CHEUNG CHAU SEWAGE TREATMENT WORKS
  - ACCESS GATE
  - EXISTING STRUCTURE TO BE RETAINED
  - PROPOSED GROUND LEVEL
  - FOOTWAY
  - KERB TYPE K1

Rev	Date	Description	By	Check	Appr
C	07/20	TENDER ADDENDUM NO. 5	MYWC	DSJS	XY
B	06/20	TENDER ADDENDUM NO. 4	MYWC	DSJS	XY
A	06/20	TENDER ADDENDUM NO. 3	MYWC	DSJS	XY
-	03/20	ISSUE FOR TENDER	MYWC	DSJS	XY

**TENDER**

**ATKINS**  
Member of the SNC-Lavalin Group

**wsp**

**ALEAD architects ltd.**  
奧達建築師事務所有限公司

Client: **渠務署**  
 Drainage Services Department  
 顧問工程管理部  
 Consultants Management Division

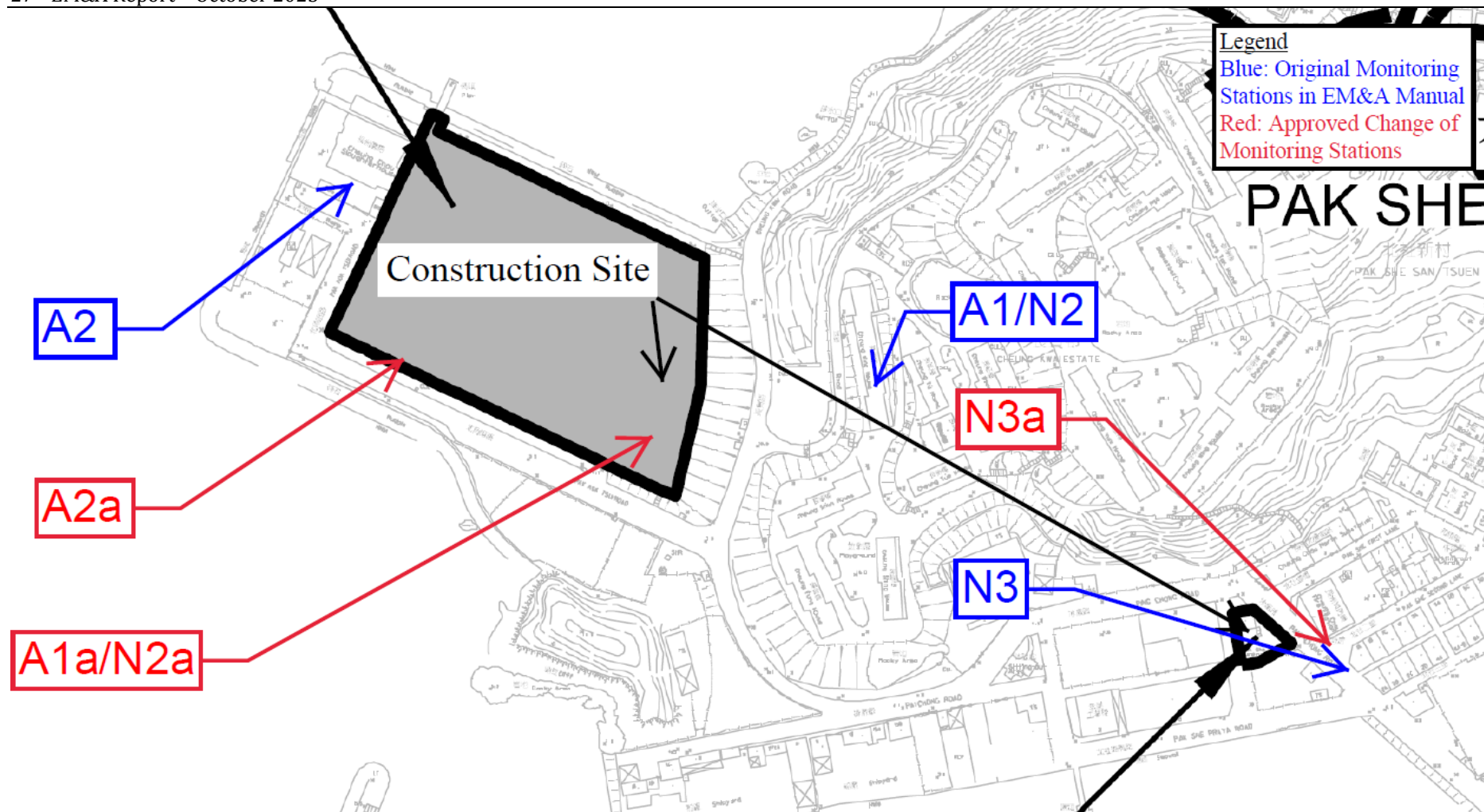
Contract Title:  
 CONTRACT NO. DC/2019/07  
 OUTLYING ISLANDS SEWERAGE STAGE 2 -  
 UPGRADING OF CHEUNG CHAU SEWAGE  
 TREATMENT AND DISPOSAL FACILITIES

Drawing Title:  
 UPGRADING OF CHEUNG CHAU  
 STW GENERAL LAYOUT

Scale	Design	Drawn	Checked	Authorized
Original Issue	Date	Date	Date	Date
1:300	WYWC	AC	DSJS	XY
A1	MAR 2020	MAR 2020	MAR 2020	MAR 2020

Drawing Number: 4572-STW-CC-2001

User name: CHEUNG06 Date: 05/06/2023 Time: 16:56:28 PM  
 File name: P:\CHINA\Projects\151118\DC2019\_07\Drawings\TENDER\04572-STW-CC-2001.dwg  
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# APPENDIX B

## Construction Programme



















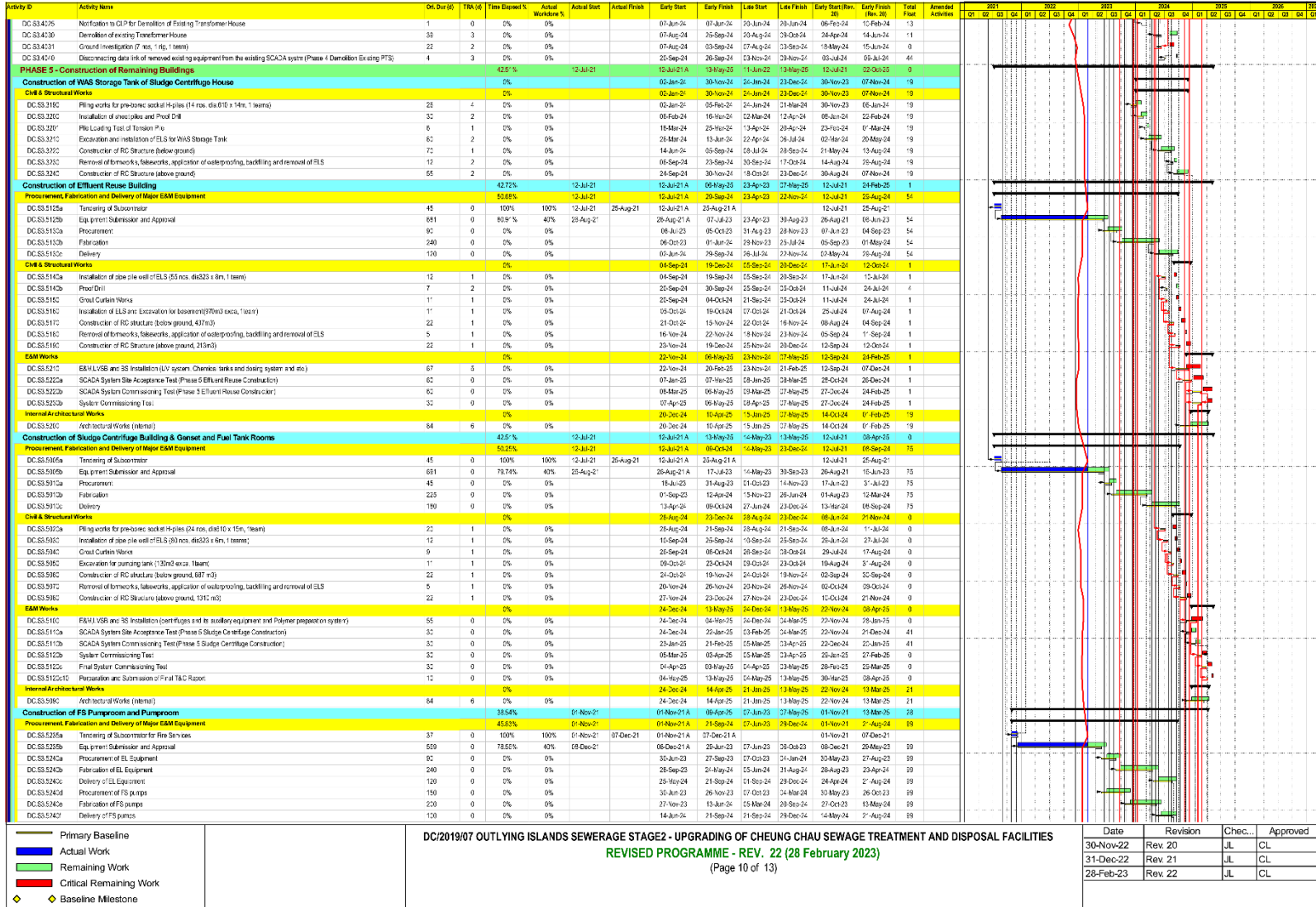
Contract No. DC/2019/07  
 Environmental Monitoring Works for  
 Upgrading of Cheung Chau Sewage Collection, Treatment and Disposal Facilities  
 27<sup>th</sup> EM&A Report – October 2023

Activity ID	Activity Name	DL Dur (d)	TRA (d)	Time Elapsed %	Actual Workdays %	Actual Start	Actual Finish	Early Start	Early Finish	Late Start	Late Finish	Earliest Start (Rev. 20)	Earliest Finish (Rev. 20)	Total Float	Amended Activities	Gantt Chart (2021-2026)																																																
																2021	2022				2023				2024				2025				2026				2027																											
DC.S3.142a	Subletting of Finishing Works	181	0	100%	100%	13-Jul-22	21-Jun-23	18-Jul-21 A	21-Jun-23 A			18-Jul-21	21-Jun-23			[Gantt Chart: 2021-2026]																																																
DC.S3.142b	Construction of RC Structure (Renewing)	123	2	100%	100%	15-Aug-22	19-Dec-22	15-Aug-22 A	19-Dec-22 A			15-Aug-22	19-Dec-22																																																			
<b>EMW Works</b>																																																																
DC.S3.150c	Installation of other EMW equipments	72	2	0%	0%			01-Apr-23	03-Jul-23	23-Aug-23	23-Jul-23	17-Dec-23	16-Feb-24	05-Aug-24	137																																																	
DC.S3.150cb	Installation of Electrical System	72	2	0%	0%			01-Apr-23	26-Jun-23	25-Aug-23	17-Nov-23			127																																																		
DC.S3.150cc	Installation of SCADA	38	0	0%	0%			18-May-23	26-Jun-23	27-Oct-23	17-Nov-23			210																																																		
DC.S3.150cd	Installation of BS System	45	0	0%	0%			03-May-23	28-Jun-23	23-Sep-23	17-Nov-23			130																																																		
DC.S3.151c	Site Acceptance Test	33	0	0%	0%			04-Jul-23	32-Aug-23	32-Aug-23	18-Nov-23	17-Dec-23	04-Jul-24	02-Aug-24	207																																																	
<b>Internal Structural Works</b>																																																																
DC.S3.1520a	Installation of BS equipment at CLP Transformer Rooms	34	2	5.88%	0%	25-Feb-23	25-Feb-23 A	25-Feb-23 A	28-Apr-23	23-Jul-23	23-Jul-23	17-Nov-23	16-Feb-24	25-Jun-24	140																																																	
DC.S3.1520b	Site Acceptance Test	4	0	0%	0%			13-Apr-23	16-Apr-23	11-Aug-23	30-Aug-23	16-Feb-24	23-Mar-24	116																																																		
DC.S3.1520c	CLP Inspection and Defect Rectification	0	0	0%	0%			17-Apr-23	26-Apr-23	20-Sep-23	13-Sep-23	02-Apr-24	20-Apr-24	116																																																		
DC.S3.1520d	CLP Reinforcement and Minor Defect Rectification	4	0	0%	0%			27-Apr-23	02-May-23	14-Sep-23	18-Sep-23	21-Apr-24	25-Apr-24	116																																																		
DC.S3.1530a10	Temporary Reinforcement of Access for CLP Works	12	0	0%	0%			17-Apr-23	28-Apr-23	25-Sep-23	18-Sep-23			117	*																																																	
DC.S3.1530b	Handover to CLP for CLP Works	48	0	0%	0%			03-May-23	28-Jun-23	19-Sep-23	16-Nov-23	22-Apr-24	19-Jun-24	116	*																																																	
DC.S3.1530f	Lighting	1	0	0%	0%			30-Jun-23	30-Jun-23	17-Nov-23	17-Nov-23	22-Jun-24	22-Jun-24	116	*																																																	
<b>Internal Structural Works (Internal)</b>																																																																
DC.S3.156c	Arch. Structural Works for CLP Transformer Rooms (Internal)	42	5	45.1%	33%	01-Feb-23	01-Feb-23 A	01-Feb-23 A	11-Mar-23	31-Mar-23	27-Aug-23	01-Feb-24	24-Mar-24	115	*																																																	
DC.S3.156d	Arch. Structural Works for CLP Transformer Rooms (Internal)	42	1	53.81%	100%	01-Feb-23	01-Feb-23 A	01-Feb-23 A	22-Mar-23	29-Mar-23	31-Mar-23	01-Feb-24	15-Feb-24	8	*																																																	
<b>Construction of Underground Utilities</b>																																																																
DC.S3.1600	Construction of Drainage and Sewerage System: Fire Services, Electrical & Plumbing Underground Utilities	32	2	0%	0%			18-Sep-23	30-Oct-23	29-Oct-23	17-Nov-23	14-Jun-24	25-Jul-24	16																																																		
<b>Temporary Sludge Digestion System</b>																																																																
DC.S3.1700	Construction of temporary Sludge Digester System ISG	88	3	100%	100%	24-Jun-22	10-Oct-22	24-Jun-22 A	10-Oct-22 A			24-Jun-22	10-Oct-22																																																			
DC.S3.1710	Temporary Flow Diversion and isolate existing aerobic sludge digester and relevant buildings	8	1	100%	100%	11-Oct-22	20-Oct-22	11-Oct-22 A	20-Oct-22 A			11-Oct-22	20-Oct-22																																																			
DC.S3.1720	Removal of temporary Sludge Digester System	11	0	0%	0%			18-Dec-23	30-Dec-23	19-Dec-23	30-Dec-23	13-Nov-24	29-Nov-24	0																																																		
<b>PHASE 2 - Site Clearance at the area of Proposed Preliminary Treatment Facilities</b>																																																																
<b>Demolition works</b>																																																																
DC.S3.2010	Demolition of existing Aerobic Sludge Digester	29	0	100%	100%	21-Oct-22	24-Nov-22	21-Oct-22 A	24-Nov-22 A			21-Oct-22	09-Dec-22																																																			
DC.S3.2020	Demolition of existing Blower and Pump House	29	0	100%	100%	21-Oct-22	24-Nov-22	21-Oct-22 A	24-Nov-22 A			21-Oct-22	09-Dec-22																																																			
DC.S3.2030	Demolition of existing Grease Room	28	0	100%	100%	21-Oct-22	24-Nov-22	21-Oct-22 A	24-Nov-22 A			21-Oct-22	09-Dec-22																																																			
DC.S3.2040	Disconnecting data link of removed existing equipment from the existing SCADA system	7	0	100%	100%	21-Oct-22	26-Oct-22	21-Oct-22 A	26-Oct-22 A			21-Oct-22	26-Oct-22																																																			
<b>PHASE 3 - Construction of Preliminary Treatment Facilities</b>																																																																
<b>Construction of Preliminary Treatment Facilities</b>																																																																
DC.S3.2055	Procurement, Fabrication and Delivery of Major EMW Equipment	51	25	51.22%	0%	12-Jul-21	12-Jul-21 A	12-Jul-21 A	16-Aug-21	28-Feb-22	28-Feb-22	12-Jul-21	23-Apr-21	0																																																		
DC.S3.2055a	Tendering of Subcontractor	45	0	100%	100%	13-Jul-21	25-Aug-21	12-Jul-21 A	25-Aug-21 A	21-Mar-22	28-Jun-24	12-Jul-21	14-Dec-22	90																																																		
DC.S3.2055b	Equip. procurement and Approval	544	0	83.62%	53%	03-Oct-21	30-May-22	03-Oct-21 A	30-May-22 A	21-Mar-23	20-Jan-24	03-Oct-21	14-Dec-22	21																																																		
<b>Procurement</b>																																																																
DC.S3.3015	Stopgap	1	0	0%	0%			01-Aug-23	01-Aug-23	22-Dec-23	22-Dec-23			72	*																																																	
DC.S3.3025	Peristaltic	1	0	0%	0%			01-Aug-23	01-Aug-23	22-Dec-23	22-Dec-23			72	*																																																	
DC.S3.3035	Mechanical Bar Screen - Coarse Screen	1	0	0%	0%			01-Aug-23	01-Aug-23	22-Dec-23	22-Dec-23			72	*																																																	
DC.S3.3045	Screw Conveyor	1	0	0%	0%			01-Aug-23	01-Aug-23	22-Dec-23	22-Dec-23			72	*																																																	
DC.S3.3055	Screw Conveyor	1	0	0%	0%			01-Aug-23	01-Aug-23	22-Dec-23	22-Dec-23			72	*																																																	
DC.S3.3065	Submersible Pump	1	0	0%	0%			01-Aug-23	01-Aug-23	22-Dec-23	22-Dec-23			72	*																																																	
DC.S3.3075	Submersible Jet Mixer	1	0	0%	0%			01-Aug-23	01-Aug-23	22-Dec-23	22-Dec-23			72	*																																																	
DC.S3.3085	Grit Pump	1	0	0%	0%			01-Aug-23	01-Aug-23	22-Dec-23	22-Dec-23			72	*																																																	
DC.S3.3095	Grit Classifier & Grit Mixer	1	0	0%	0%			01-Aug-23	01-Aug-23	22-Dec-23	22-Dec-23			72	*																																																	
DC.S3.3105	Mechanical Filter Mesh	1	0	0%	0%			01-Aug-23	01-Aug-23	22-Dec-23	22-Dec-23			72	*																																																	
DC.S3.3115	Lifting Appliance	1	0	0%	0%			05-Jul-23	03-Jul-23	26-Dec-23	26-Dec-23			196	*																																																	
DC.S3.3125	Oil Skimmer Pump	1	0	0%	0%			01-Aug-23	01-Aug-23	22-Dec-23	22-Dec-23			72	*																																																	
DC.S3.3135	Dewateration Unit (DPU)	1	0	0%	0%			01-Aug-23	01-Aug-23	22-Dec-23	22-Dec-23			72	*																																																	
DC.S3.3145	LV Switchgear+MCC	1	0	0%	0%			01-Aug-23	01-Aug-23	13-Dec-23	13-Dec-23			134	*																																																	
DC.S3.3155	VSD	1	0	0%	0%			01-Aug-23	01-Aug-23	13-Dec-23	13-Dec-23			134	*																																																	
DC.S3.3165	UPS with Inverter Transformer	1	0	0%	0%			02-Oct-23	02-Oct-23	11-Feb-24	11-Feb-24			127	*																																																	
DC.S3.3175	PLC Panel	1	0	0%	0%			01-Dec-23	06-Feb-24	28-Feb-24	28-Feb-24			82	*																																																	
DC.S3.3185	Instrumentation	1	0	0%	0%			01-Jun-23	01-Jun-23	14-Oct-23	14-Oct-23			35	*																																																	
<b>Procurement</b>																																																																
DC.S3.3195	Stopgap	125	0	0%	0%			02-Aug-23	04-Dec-23	23-Dec-23	23-Dec-23			72	*																																																	
DC.S3.3205	Peristaltic	125	0	0%	0%			02-Aug-23	04-Dec-23	23-Dec-23	23-Dec-23			72	*																																																	
DC.S3.3215	Mechanical Bar Screen - Coarse Screen	125	0	0%	0%			02-Aug-23	04-Dec-23	23-Dec-23	23-Dec-23			72	*																																																	
DC.S3.3225	Screw Conveyor	125	0	0%	0%			02-Aug-23	04-Dec-23	23-Dec-23	23-Dec-23			72	*																																																	
DC.S3.3235	Screw Conveyor	125	0	0%	0%			02-Aug-23	04-Dec-23	23-Dec-23	23-Dec-23			72	*																																																	
DC.S3.3245	Submersible Pump	125	0	0%	0%			02-Aug-23	04-Dec-23	23-Dec-23	23-Dec-23			72	*																																																	
DC.S3.3255	Submersible Jet Mixer	125	0	0%	0%			02-Aug-23	04-Dec-23	23-Dec-23	23-Dec-23			72	*																																																	
DC.S3.3265	Grit Pump	125	0	0%	0%			02-Aug-23	04-Dec-23	23-Dec-23	23-Dec-23			72	*																																																	
DC.S3.3275	Grit Classifier & Grit Mixer	125	0	0%	0%			02-Aug-23	04-Dec-23	23-Dec-23	23-Dec-23			72	*																																																	
DC.S3.3285	Mechanical Filter Mesh	125	0	0%	0%			02-Aug-23	04-Dec-23	23-Dec-23	23-Dec-23			72	*																																																	
DC.S3.3295	Lifting Appliance	125	0	0%	0%			04-Jul-23	05-Dec-23	27-Dec-23	27-Dec-23			106	*																																																	
DC.S3.3305	Oil Skimmer Pump	125	0	0%	0%			02-Aug-23	04-Dec-23	23-Dec-23	23-Dec-23			72	*																																																	
DC.S3.3315	Dewateration Unit (DPU)	125	0	0%	0%			02-Aug-23	04-Dec-23	23-Dec-23	23-Dec-23			72	*																																																	
DC.S3.3325	LV Switchgear+MCC	125	0	0%	0%			02-Aug-23	04-Dec-23	14-Oct-24	16-Apr-24			134	*																																																	





# Contract No. DC/2019/07 Environmental Monitoring Works for Upgrading of Cheung Chau Sewage Collection, Treatment and Disposal Facilities 27<sup>th</sup> EM&A Report – October 2023









Contract No. DC/2019/07  
 Environmental Monitoring Works for  
 Upgrading of Cheung Chau Sewage Collection, Treatment and Disposal Facilities  
 27<sup>th</sup> EM&A Report – October 2023

Activity ID	Activity Name	OK Dur (d)	TRK (d)	Time Elapsed %	Actual Workdone %	Actual Start	Actual Finish	Early Start	Early Finish	Late Start	Late Finish	Early Start (Rev. 20)	Early Finish (Rev. 20)	Total Float	Amended Activities	2021	2022	2023	2024	2025	2026	2027	
DC.S4.1040	30-month performance verification (At least 18 months before End of S4) (Period from 9th to 18th month)	274	0	0%	0%			08-May-25	05-Feb-26	08-May-25	05-Feb-26	08-May-25	05-Feb-26	0									
<b>External Architectural</b>																							
DC.S4.1100	External Architectural at MSR Treatment Facilities	90	6	0%	0%			14-May-25	04-Sep-25	08-Aug-25	01-Dec-25	08-Aug-25	05-Apr-25	72									
DC.S4.1100	External Architectural at Sludge Digester Building	62	4	0%	0%			14-May-25	29-Jul-25	15-Sep-25	01-Dec-25	08-Aug-25	05-Apr-25	104									
DC.S4.1100	External Architectural at Sludge Centrifuge House	62	4	0%	0%			14-May-25	29-Jul-25	15-Sep-25	01-Dec-25	08-Aug-25	05-Apr-25	104									
DC.S4.1130	External Architectural at Preliminary Treatment Facilities	90	6	0%	0%			14-May-25	04-Sep-25	08-Aug-25	01-Dec-25	08-Aug-25	05-Apr-25	72									
DC.S4.1130	External Architectural at Effluent Reuse Building	32	2	0%	0%			14-May-25	20-Jun-25	24-Oct-25	01-Dec-25	08-Aug-25	05-Apr-25	136									
DC.S4.1140	External Architectural at FS Pumproom and Pump room	32	2	0%	0%			14-May-25	20-Jun-25	24-Oct-25	01-Dec-25	08-Aug-25	05-Apr-25	136									
DC.S4.1180	External Architectural at Dangerous Goods House	32	2	0%	0%			14-May-25	20-Jun-25	24-Oct-25	01-Dec-25	08-Aug-25	05-Apr-25	136									
DC.S4.1180	External Architectural at Sludge Dewatering House	62	4	0%	0%			14-May-25	29-Jul-25	15-Sep-25	01-Dec-25	08-Aug-25	05-Apr-25	104									
DC.S4.1170	External Architectural at Administration Building	42	2	0%	0%			14-May-25	03-Jul-25	13-Oct-25	01-Dec-25	08-Aug-25	05-Apr-25	126									
<b>Landscaping Works &amp; Irrigation System</b>																							
DC.S4.1020	Site to visit landscaping works	97	7	0%	0%			11-Jul-25	12-Nov-25	12-Oct-25	13-Feb-26	11-Jul-25	11-Oct-25	70									
DC.S4.1030	Installation of Irrigation System	97	7	0%	0%			14-May-25	13-Sep-25	22-Oct-25	13-Feb-26	08-Apr-25	14-Aug-25	116									
<b>Construction of New Security Fence</b>																							
DC.S4.1030	Demolition of Existing Boundary Wall	62	4	0%	0%			14-May-25	29-Jul-25	08-Aug-25	21-Oct-25	08-Apr-25	27-Jun-25	70									
DC.S4.1040	Construction of New Security Fence R.C. Structures	62	4	0%	0%			24-Jun-25	06-Sep-25	15-Sep-25	01-Dec-25	23-May-25	07-Aug-25	70									
DC.S4.1070	Installation of New Security Fence Metal Wires	45	3	0%	0%			04-Aug-25	27-Sep-25	28-Dec-25	15-Feb-26	04-Jul-25	28-Aug-25	106									
<b>Completion of Section 4 (Working Day)</b>																							
DC.S4.1041	Pre-handover meeting with DSD/ST2	1	0	0%	0%			15-Nov-25	16-Nov-25	16-Jan-26	16-Jan-26	16-Jan-26	16-Sep-25	0									
DC.S4.1042	Handover meeting with DSD/ST2	1	0	0%	0%			16-Dec-25	16-Dec-25	15-Feb-26	15-Feb-26	11-Oct-25	16-Oct-25	0									
DC.S4.1050	Completion of Section 4	0	0	0%	0%			01-Feb-26*	01-Feb-26*	01-Feb-26	01-Feb-26	01-Feb-26	16-Oct-25	0									
<b>30-month performance verification (remaining 12 months after S4)</b>																							
DC.PV.100.0	30-month performance verification (remaining 12 months after S4) (Period from 18th to 30th month)	305	0	0%	0%			05-Feb-26	05-Feb-27	05-Feb-26	05-Feb-27	05-Feb-26	05-Feb-27	0									
DC.PV.100.0	Close of 12 months after S4	0	0	0%	0%			05-Feb-27*	05-Feb-27*	05-Feb-27	05-Feb-27	05-Feb-27	05-Feb-27	0									
DC.S3.0705d10	Submission of final O&M Manual	62	0	0%	0%			24-Feb-26	24-Apr-26	27-Dec-25	24-Feb-27	19-Dec-25	10-Feb-26	280									

<ul style="list-style-type: none"> <li><span style="color: green;">—</span> Primary Baseline</li> <li><span style="color: blue;">—</span> Actual Work</li> <li><span style="color: lightgreen;">—</span> Remaining Work</li> <li><span style="color: red;">—</span> Critical Remaining Work</li> <li><span style="color: blue;">◆</span> Baseline Milestone</li> </ul>	DC/2019/07 OUTLYING ISLANDS SEWERAGE STAGE2 - UPGRADING OF CHEUNG CHAU SEWAGE TREATMENT AND DISPOSAL FACILITIES REVISED PROGRAMME - REV. 22 (28 February 2023) (Page 13 of 13)	<table border="1"> <tr> <th>Date</th> <th>Revision</th> <th>Chec...</th> <th>Approved</th> </tr> <tr> <td>30-Nov-22</td> <td>Rev. 20</td> <td>JL</td> <td>CL</td> </tr> <tr> <td>31-Dec-22</td> <td>Rev. 21</td> <td>JL</td> <td>CL</td> </tr> <tr> <td>28-Feb-23</td> <td>Rev. 22</td> <td>JL</td> <td>CL</td> </tr> </table>	Date	Revision	Chec...	Approved	30-Nov-22	Rev. 20	JL	CL	31-Dec-22	Rev. 21	JL	CL	28-Feb-23	Rev. 22	JL	CL
Date	Revision	Chec...	Approved															
30-Nov-22	Rev. 20	JL	CL															
31-Dec-22	Rev. 21	JL	CL															
28-Feb-23	Rev. 22	JL	CL															

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# APPENDIX C

## Calibration Certificates

### (Air Monitoring)



<b>RECALIBRATION DUE DATE:</b>
<b>March 31, 2024</b>

## Certificate of Calibration

Calibration Certification Information			
Cal. Date: March 31, 2023	Rootsmeter S/N: 438320	Ta: 294	°K
Operator: Jim Tisch		Pa: 748.54	mm Hg
Calibration Model #: TE-5028A	Calibrator S/N: 3702		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.3110	4.1	1.50
2	3	4	1	1.0280	6.7	2.50
3	5	6	1	0.9340	8.1	3.00
4	7	8	1	0.8680	9.4	3.50
5	9	10	1	0.6580	16.2	6.00

Data Tabulation					
Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left( \frac{Pa}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H \left( Ta/Pa \right)}$ (y-axis)
0.9929	0.7573	1.2237	0.9945	0.7586	0.7676
0.9894	0.9624	1.5798	0.9910	0.9641	0.9909
0.9875	1.0573	1.7306	0.9892	1.0591	1.0855
0.9858	1.1357	1.8693	0.9874	1.1376	1.1725
0.9767	1.4844	2.4474	0.9784	1.4869	1.5351
<b>QSTD</b>	m=	<b>1.68024</b>	<b>QA</b>	m=	<b>1.05214</b>
	b=	<b>-0.04353</b>		b=	<b>-0.02731</b>
	r=	<b>0.99994</b>		r=	<b>0.99994</b>

Calculations	
Vstd= $\Delta Vol / ((Pa - \Delta P) / Pstd) (Tstd / Ta)$	Va= $\Delta Vol / ((Pa - \Delta P) / Pa)$
Qstd= $Vstd / \Delta Time$	Qa= $Va / \Delta Time$
For subsequent flow rate calculations:	
Qstd= $1/m \left( \left( \sqrt{\Delta H \left( \frac{Pa}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)} \right) - b \right)$	Qa= $1/m \left( \left( \sqrt{\Delta H \left( Ta/Pa \right)} \right) - b \right)$

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg
Key	
ΔH:	calibrator manometer reading (in H2O)
ΔP:	rootsmeter manometer reading (mm Hg)
Ta:	actual absolute temperature (°K)
Pa:	actual barometric pressure (mm Hg)
b:	intercept
m:	slope

RECALIBRATION
US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30.

Tisch Environmental, Inc.  
 145 South Miami Avenue  
 Village of Cleves, OH 45002

[www.tisch-env.com](http://www.tisch-env.com)  
 TOLL FREE: (877)263-7610  
 FAX: (513)467-9009



### HIVOL SAMPLER CALIBRATION DATA SHEET (TSP)

#### Site Information

Location:	The admin building inside the construction site	Site ID:	A1a	Date:	09-Oct-2023
Serial No:	1048	Model:	TE-5170X	Operator:	Andy Li

#### Ambient Condition

Actual Pressure during Calibration (P <sub>a</sub> ) (mm Hg):	760.0	Actual Temperature during Calibration (T <sub>a</sub> ) (deg K):	297.7
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#### Calibration Orifice

Model:	TE-5028A	Slope (m <sub>c</sub> ):	2.09632
Serial No.:	4167	Intercept (b <sub>c</sub> ):	-0.01179
Calibration Due Date:	19-Jun-24	Corr. Coeff:	0.99966

#### Calibration Data

Plate or Test #	ΔH <sub>2</sub> O (in)	Qa, X-Axis (m <sup>3</sup> /min)	I, CFM (chart)	IC, Y-Axis (corrected)
18	9.80	1.500	58.0	58.03
13	7.30	1.295	53.0	53.03
10	6.40	1.213	49.0	49.03
7	4.10	0.972	43.0	43.02
5	2.50	0.760	37.0	37.02

#### Sampler Calibration Relationship (Qa on x-axis, IC on y-axis)

m = 28.6125      b = 15.1772      Corr. Coeff: 0.9975

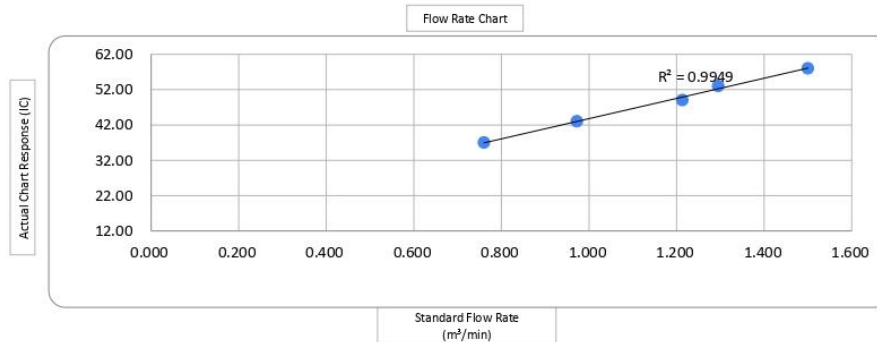
#### Calculations

$$Qa = 1/m_c * [ \text{Sqrt}(\Delta H_2O * (P_a/P_{std}) * (T_{std}/T_a)) * (T_{std}/T_a) ] - b_c$$

$$IC = I * ( \text{Sqrt}(P_a/P_{std}) * (T_{std}/T_a) )$$

Qa = actual flow rate  
 IC = corrected chart response  
 I = actual chart response  
 m<sub>c</sub> = calibrator slope  
 b<sub>c</sub> = calibrator intercept

m = sampler slope  
 b = sampler intercept  
 T<sub>std</sub> = 298 deg K  
 P<sub>std</sub> = 760 mm Hg  
 T<sub>a</sub> = actual temperature during calibration (deg K)  
 P<sub>a</sub> = actual pressure during calibration (mm Hg)



Checked by Tandy Tse  
 Senior Consultant, Environmental

Date: 09-Oct-2023



Andy Gill Lewis  
 Project Director  
 Tel: +852 2927 8322 | Fax: +852 2927 2369 | Email: andy.gill@acumen.com.hk  
 1/F, 12/F, Ford Glory Plaza, No. 27-28 Wing Hong Street, Kowloon, Hong Kong  
 www.acumen.com.hk | www.aurecon.com

ACUMEN aurecon

**HIVOL SAMPLER CALIBRATION DATA SHEET (TSP)**

**Site Information**

Location:	The existing outfall pumping station inside the construction site	Site ID:	A2A	Date:	09-Oct-2023
Serial No.:	1085	Model:	TE-5170X	Operator:	Andy Li

**Ambient Condition**

Actual Pressure during Calibration (P <sub>a</sub> ) (mm Hg):	760.0	Actual Temperature during Calibration (T <sub>a</sub> ) (deg K):	297.7
---	-------	--	-------

**Calibration Orifice**

Model:	TE-5028A	Slope (m <sub>c</sub> ):	2.09632
Serial No.:	4167	Intercept (b <sub>c</sub> ):	-0.01179
Calibration Due Date:	19-Jun-24	Corr. Coeff:	0.99966

**Calibration Data**

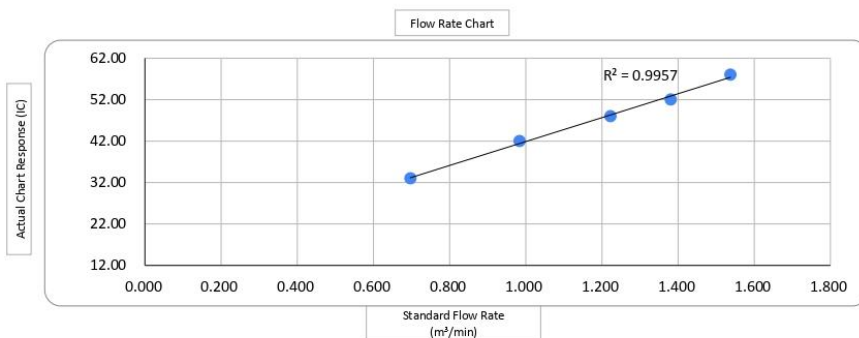
Plate or Test #	ΔH <sub>2</sub> O (in)	Qa, X-Axis (m <sup>3</sup> /min)	I, CFM (chart)	IC, Y-Axis (corrected)
18	10.30	1.537	58.0	58.03
13	8.30	1.381	52.0	52.03
10	6.50	1.222	48.0	48.03
7	4.20	0.984	42.0	42.02
5	2.10	0.697	33.0	33.02

Sampler Calibration Relationship (Qa on x-axis, IC on y-axis)  
 m = 28.8385      b = 13.0484      Corr. Coeff: 0.9979

$Qa = 1/m_c * [ \text{Sqrt} (\Delta H_2O * (P_a/P_{Std}) * (T_{Std}/T_a)) - b_c ]$   
 $IC = I * [ \text{Sqrt} (P_a/P_{Std}) * (T_{Std}/T_a) ]$

Qa = actual flow rate  
 IC = corrected chart response  
 I = actual chart response  
 m<sub>c</sub> = calibrator slope  
 b<sub>c</sub> = calibrator intercept

**Calculations**  
 m = sampler slope  
 b = sampler intercept  
 T<sub>Std</sub> = 298 deg K  
 P<sub>Std</sub> = 760 mm Hg  
 T<sub>a</sub> = actual temperature during calibration (deg K)  
 P<sub>a</sub> = actual pressure during calibration (mm Hg)



Checked by Tandy Tse   
 Senior Consultant, Environmental

Date: 09-Oct-2023



SIBATA SCIENTIFIC TECHNOLOGY LTD.  
1-1-62, Nakane, Soka, Saitama, 340-0005 Japan  
TEL. +81-48-933-1582 FAX. +81-48-933-1591

Date: January 23th, 2023

## CALIBRATION CERTIFICATE

Equipment Name : Digital Dust Indicator, Model LD-5R  
Code No. : 080000-73  
Quantity : 1 unit  
Serial No. : 2Y6549  
Sensitivity : 0.001 mg/m3  
Sensitivity Adjustment : 549 CPM  
Scale Setting : November 15th, 2022.

We hereby certify that the above mentioned instrument has been calibrated satisfactory.

Sincerely

(Signature)

*Tong Zhang*

Tong Zhang  
Overseas & New Business Group  
Overseas Sales Department





SIBATA SCIENTIFIC TECHNOLOGY LTD.  
1-1-62, Nakane, Soka, Saitama, 340-0005 Japan  
TEL. +81-48-933-1582 FAX. +81-48-933-1591

Date: January 23th, 2023

## CALIBRATION CERTIFICATE

Equipment Name : Digital Dust Indicator, Model LD-5R  
Code No. : 080000-73  
Quantity : 1 unit  
Serial No. : 2Y6550  
Sensitivity : 0.001 mg/m<sup>3</sup>  
Sensitivity Adjustment : 665 CPM  
Scale Setting : November 15th, 2022.

We hereby certify that the above mentioned instrument has been calibrated satisfactory.

Sincerely

(Signature)

*Tong Zhang*



Tong Zhang  
Overseas & New Business Group  
Overseas Sales Department



# APPENDIX D

## Monitoring Data (Air)

Location: A1a

Monitoring Period: October 2023

Parameter: TSP 1-hour

Major Dust Source Construction activities and daily operation of the sewerage treatment plant

Other Factors NA

Date	Weather	Start Time	1 <sup>st</sup> Hour (µg/m <sup>3</sup> )	2 <sup>nd</sup> Hour (µg/m <sup>3</sup> )	3 <sup>rd</sup> Hour (µg/m <sup>3</sup> )
3/10/2023	Fine	13:52	67	70	71
11/10/2023	Sunny	14:56	72	68	64
12/10/2023	Sunny	16:00	61	73	70
18/10/2023	Sunny	14:12	72	64	65
24/10/2023	Sunny	14:31	63	69	64
30/10/2023	Sunny	14:09	60	62	66
<b>Average</b>			67		
<b>Range</b>			60 - 73		

Location: A2a

Monitoring Period: October 2023

Parameter: TSP 1-hour

Major Dust Source Construction activities and daily operation of the sewerage treatment plant

Other Factors NA

Date	Weather	Start Time	1 <sup>st</sup> Hour (µg/m <sup>3</sup> )	2 <sup>nd</sup> Hour (µg/m <sup>3</sup> )	3 <sup>rd</sup> Hour (µg/m <sup>3</sup> )
3/10/2023	Fine	13:36	47	46	45
11/10/2023	Sunny	14:42	53	55	51
12/10/2023	Sunny	15:47	56	51	58
18/10/2023	Sunny	13:51	60	56	61
24/10/2023	Sunny	14:43	55	57	50
30/10/2023	Sunny	13:55	48	53	49
<b>Average</b>			53		
<b>Range</b>			45 - 61		

Figure D.1 Measured 1-Hour TSP at the admin building inside the construction site (A1a)

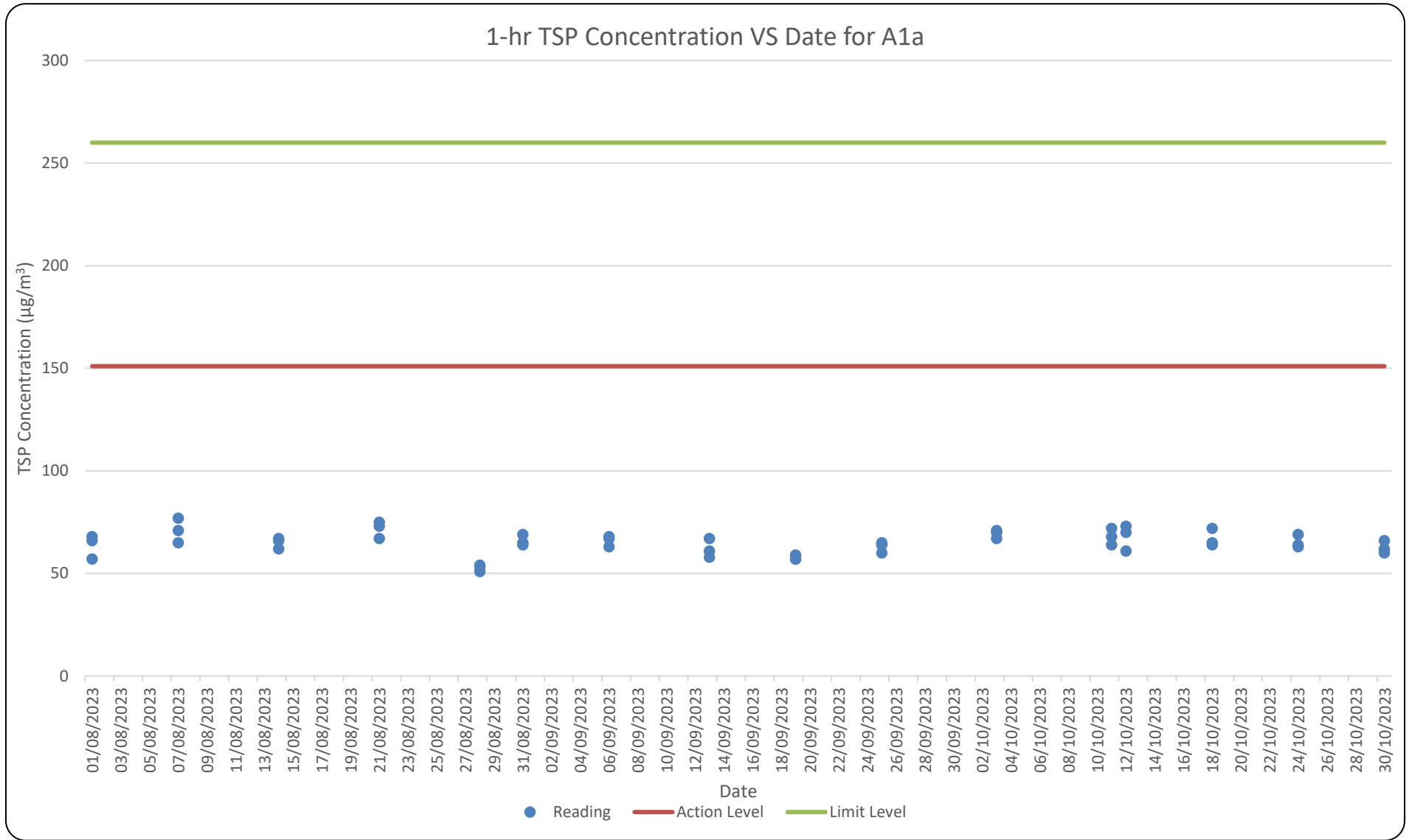
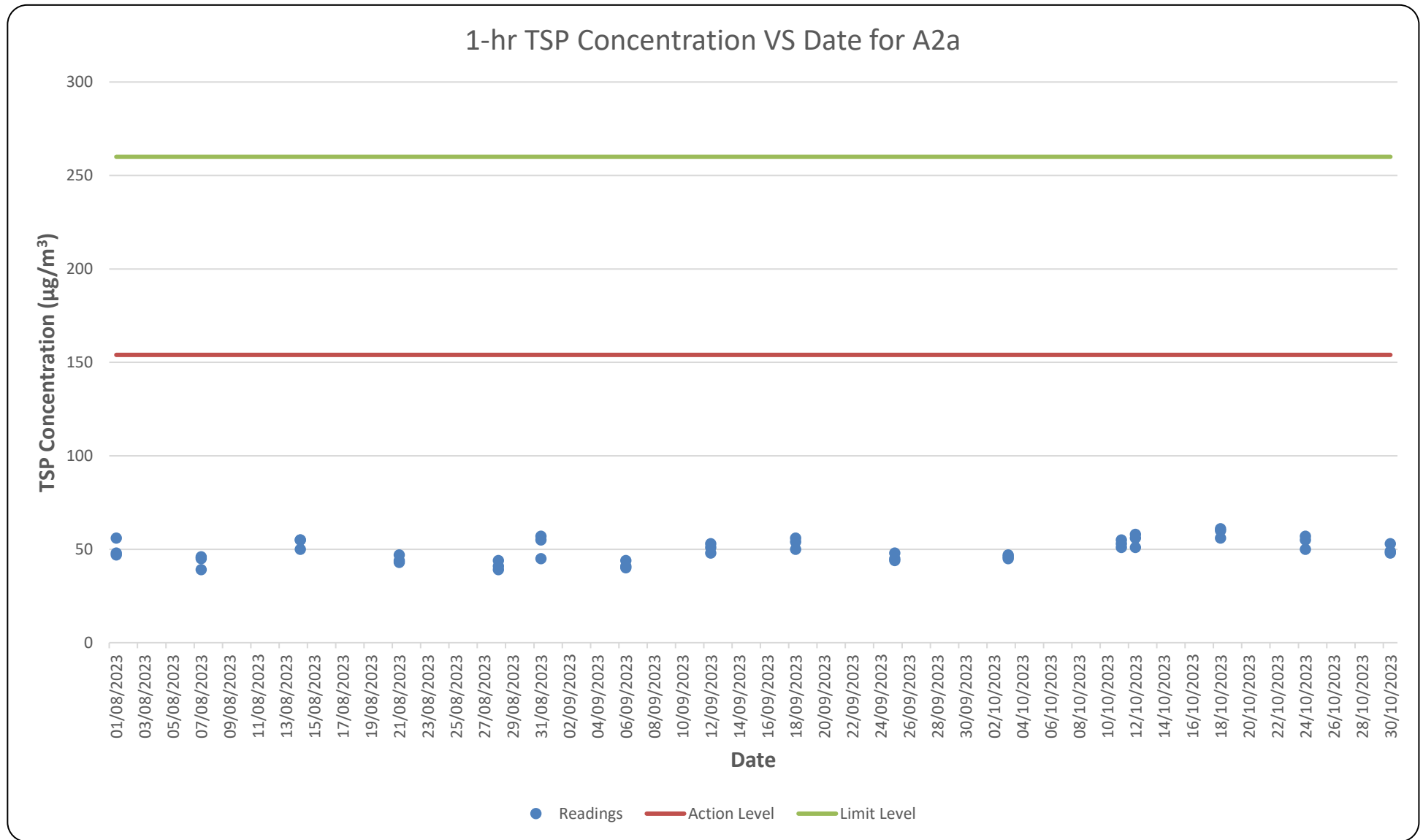


Figure D.2 Measured 1-Hour TSP at the existing outfall pumping station inside the construction site (A2a)



Location: A1a  
 Parameter: TSP 24-hour  
 Major dust source: Construction activities and daily operation of the sewerage treatment plant  
 Other Factors: NA

Start Date	Avg Air Temp	Avg Atmospheric Pressure	Weather Condition	Elapse Time		Sampling Time	Flow Rate	Standard Air Volume	Filter Weight (g)		Particulate weight	Conc.
	(°C)	(mm Hg)		Initial (min)	Final (min)	Actual (min)	(m <sup>3</sup> /min)	(m <sup>3</sup> )	Initial	Final	(g)	(µg/m <sup>3</sup> )
03/10/2023	30.1	1009.8	Sunny	509239	510819	1579	0.92	1453	2.6314	2.7882	0.1568	108
11/10/2023	25.7	1017.3	Sunny	510819	512319	1500	0.91	1360	2.7122	2.7942	0.0820	58
12/10/2023	26.2	1016.6	Sunny	512319	513819	1500	0.94	1409	2.6420	2.7204	0.0784	56
18/10/2023	25.0	1015.0	Sunny	513819	515319	1500	0.94	1410	2.7194	2.8443	0.1249	89
24/10/2023	26.7	1015.9	Sunny	515319	516818	1536	0.94	1439	2.7227	2.7960	0.0733	51
30/10/2023	26.0	1017.8	Sunny	516818	518258	1441	0.94	1357	2.6295	2.7284	0.0989	73
											Average	72
											Range	51 - 108

Location: A2a  
 Parameter: TSP 24-hour  
 Major Site Activities: Construction activities and daily operation of the sewerage treatment plant  
 Major dust source: Routine operation of the Sewage Treatment Plant  
 Other Factors: NA

Start Date	Avg Air Temp	Avg Atmospheric Pressure	Weather Condition	Elapse Time		Sampling Time	Flow Rate	Standard Air Volume	Filter Weight (g)		Particulate weight	Conc.
	(°C)	(mm Hg)		Initial (min)	Final (min)	Actual (min)	(m <sup>3</sup> /min)	(m <sup>3</sup> )	Initial	Final	(g)	(µg/m <sup>3</sup> )
03/10/2023	30.1	1009.8	Sunny	509239	510819	1580	0.99	1559	2.6396	2.8237	0.1841	118
11/10/2023	25.7	1017.3	Sunny	510819	512319	1500	1.01	1512	2.6492	2.7475	0.0983	65
12/10/2023	26.2	1016.6	Sunny	512319	513819	1500	0.94	1404	2.6530	2.7375	0.0845	60
18/10/2023	25.0	1015.0	Sunny	513819	515319	1500	0.97	1458	2.7169	2.9433	0.2264	155
24/10/2023	26.7	1015.9	Sunny	515319	516818	1499	0.92	1374	2.7128	2.8125	0.0997	73
30/10/2023	26.0	1017.8	Sunny	516818	518258	1440	1.01	1452	2.6523	2.7741	0.1218	84
											Average	93
											Range	60 - 155



Figure D.3 Measured 24-Hour TSP at the admin building inside the construction site (A1a)

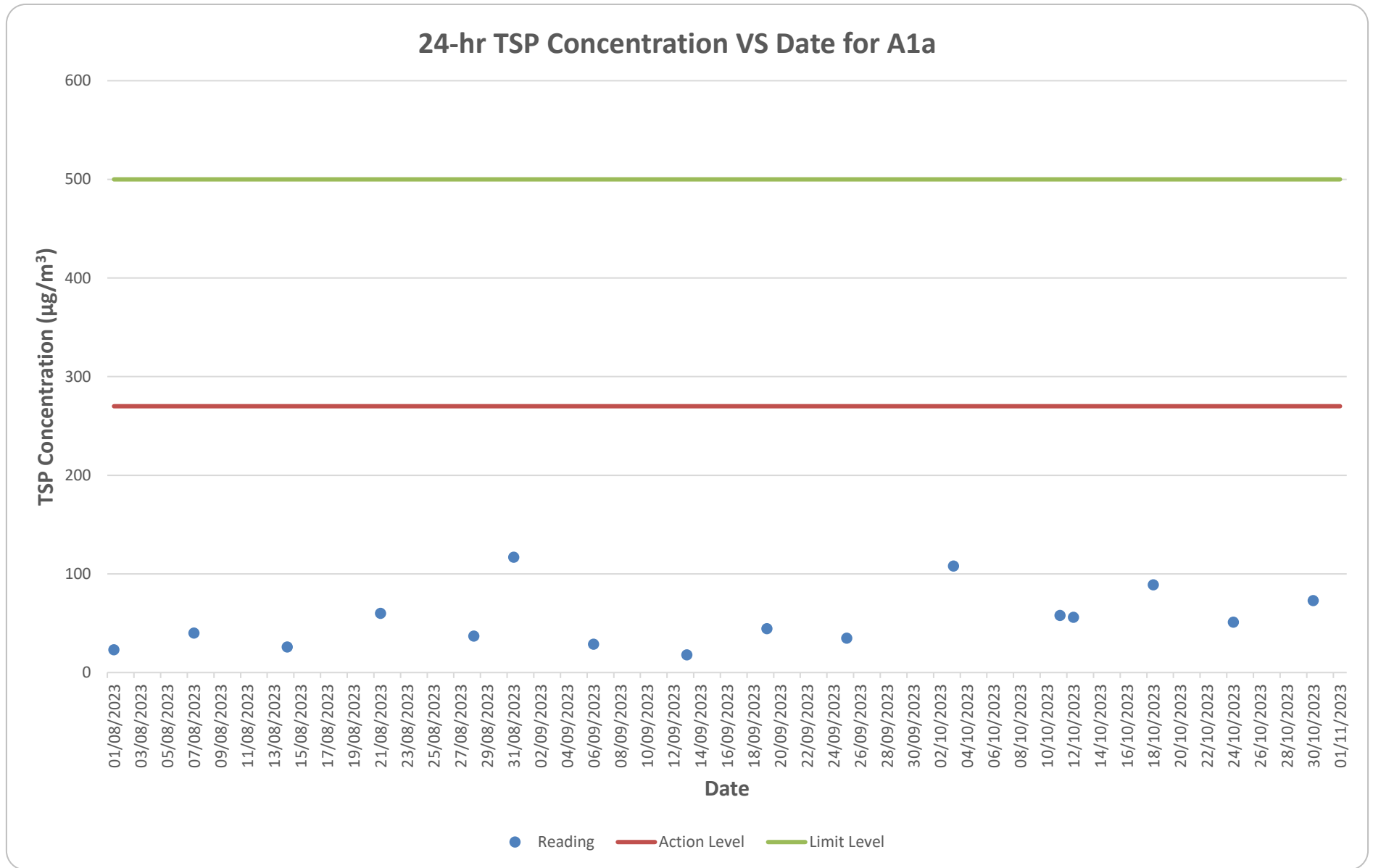
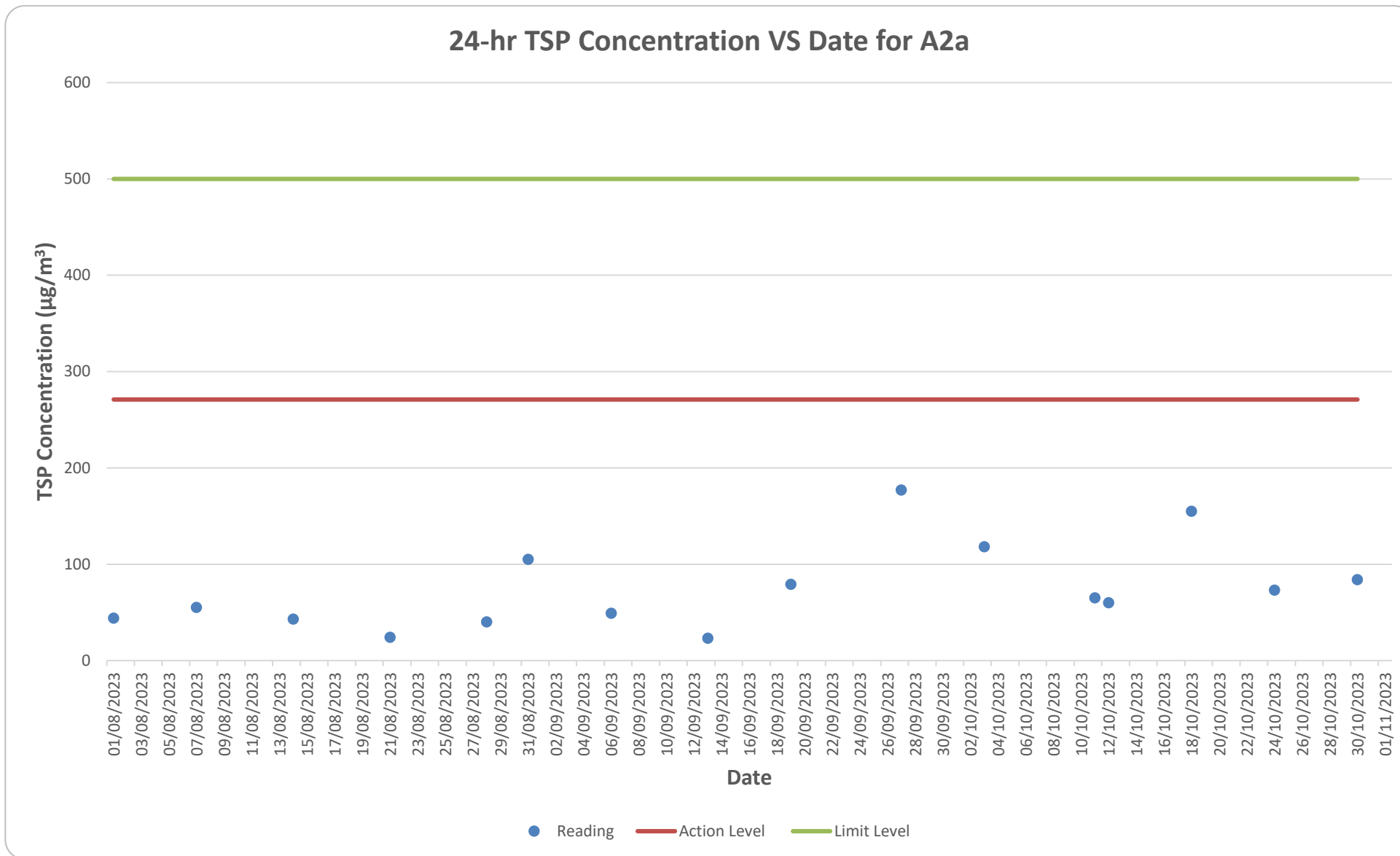


Figure D.4 Measured 24-Hour TSP at the existing outfall pumping station inside the construction site (A2a)



# APPENDIX E

## Calibration Certificates (Noise)



ISO9001 certified

**FACTORY CALIBRATION DATA OF THE SVAN 971 No. C119577**

with preamplifier SVANTEK type SV 18 No. C122487 and

with microphone ACO type 7052E No. 85197

**1. CALIBRATION\*** (acoustical)

LEVEL METER function; Range: Low; Reference frequency: 1000Hz; Sound Pressure Level: 114.03 dB

Characteristic	Correct value [dB]	Indication [dB]	Error [dB]
Z	114.03	114.05	0.02
A	114.03	114.05	0.02
C	114.03	114.05	0.02

Calibration measured with the microphone ACO type 7052E No. 85197. Calibration factor: 0.74 dB.

**2. LINEARITY TEST\*** (electrical)

LEVEL METER function; Range: Low; Characteristic: A;  $f_{sin}$  = 31.5 Hz

Nominal result LEQ [dB]	24.0	25.0	26.0	28.0	30.0	40.0	60.0	83.0
Error [dB]	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0

LEVEL METER function; Range: Low; Characteristic: A;  $f_{sin}$  = 1000 Hz

Nominal result LEQ [dB]	24.0	25.0	26.0	28.0	30.0	40.0	60.0	80.0	100.0	123.0
Error [dB]	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.0	-0.0	-0.0	-0.0

LEVEL METER function; Range: Low; Characteristic: A;  $f_{sin}$  = 8000 Hz

Nominal result LEQ [dB]	24.0	25.0	26.0	28.0	30.0	40.0	60.0	80.0	100.0	122.0
Error [dB]	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.0	-0.0	-0.0	-0.0

LEVEL METER function; Range: High; Characteristic: A;  $f_{sin}$  = 31.5 Hz

Nominal result LEQ [dB]	34.0	35.0	36.0	38.0	40.0	60.0	80.0	97.0
Error [dB]	0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0

LEVEL METER function; Range: High; Characteristic: A;  $f_{sin}$  = 1000 Hz

Nominal result LEQ [dB]	34.0	35.0	36.0	38.0	40.0	60.0	80.0	100.0	120.0	137.0
Error [dB]	-0.0	0.0	-0.0	-0.0	-0.1	-0.1	-0.0	-0.0	-0.0	-0.0

LEVEL METER function; Range: High; Characteristic: A;  $f_{sin}$  = 8000 Hz

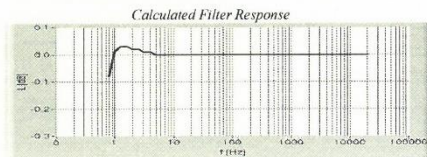
Nominal result LEQ [dB]	34.0	35.0	36.0	38.0	40.0	60.0	80.0	100.0	120.0	136.0
Error [dB]	-0.0	-0.0	-0.1	-0.1	-0.1	-0.1	0.0	0.0	-0.0	0.0

1/3 OCTAVE (1kHz); Range: Low;  $f_{sin}$  = 1000 Hz

Nominal result [dB]	25.0	30.0	40.0	60.0	80.0	100.0	120.0	123.0
Error [dB]	0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0

**4. FREQUENCY RESPONSE\*** (electrical)

LEVEL METER function; Characteristic: Z; Range: Low; Input signal = 120 dB;



Measured Filter Response with Preamplifier SV18  
 (f-frequency, L-level)

f [Hz]	L [dB]	f [Hz]	L [dB]	f [Hz]	L [dB]
10	-0.1	63	0.0	4000	0.0
12.5	-0.0	125	0.0	8000	0.0
16	0.0	250	0.0	16000	0.0
20	0.0	500	0.0	20000	0.0
25	0.0	1000	0.0		
31.5	0.0	2000	0.0		

All frequencies are nominal center values for the 1/3 octave bands

**5. INTERNAL NOISE LEVEL\*** (electrical - compensated)

LEVEL METER function; Range: Low; (Back-light – off); Calibration factor: 0dB

Characteristic	Z	A	C
Level [dB]	≤20	≤12	≤12

\* measured with preamplifier SVANTEK type SV 18 No. C122487.

**6. INTERNAL NOISE LEVEL** (acoustical - compensated)

LEVEL METER function; Characteristic: A; (Backlight – off)

Range	Low	High
Indication [dB]	≤15	20.5

Noise measured in special chamber, with reference microphone G.R.A.S type 40AN No. 73421

**ENVIRONMENTAL CONDITIONS**

Temperature	Relative humidity	Ambient pressure
23 °C	42%	1008 hPa

**TEST EQUIPMENT**

Item	Manufacturer	Model	Serial no.	Description
1.	SVANTEK	SVAN 401	100	Signal generator
2.	SVANTEK	SVAN 912A	4369	Sound & Vibration Analyser
3.	RIGOL	DM3068	DM30155100773	Digital multimeter
4.	SVANTEK	SV33B	93171	Acoustic calibrator
5.	SVANTEK	ST02	-	Microphone equivalent electrical impedance (18pF)

**CONFORMITY & TEST DECLARATION**

1. Herewith Svantek company declares that this instrument has been calibrated and tested in compliance with the internal ISO9001 procedures and meets all specification given in the Manual(s) or respectively surpass them.
2. The acoustic calibration was performed using the Sound Calibrator and is traceable to the GUM (Central Office of Measures) reference standard - sound level calibrator type 4231 No 2292773.
3. The information appearing on this sheet has been compiled specifically for this instrument. This form is produced with advanced equipment & procedures which permit comprehensive quality assurance verification of all data supplied herein.
4. This calibration sheet shall not be reproduced except in full, without written permission of the SVANTEK Ltd.

Calibration specialist: Cezary Dardziński .....



Test date: 2022-10-11



## CALIBRATION CERTIFICATE

Product : SOUND CALIBRATOR  
Type : NC-75  
Serial number : 35124528  
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 100.6 kPa  
Calibration date : 02/11/2022 (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 : 09/11/2022 (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 IA Japan 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	$2.7 \times 10^{-4}$ Hz

Working measurement standard universal counter:

Type : 53132A  
Serial number : MY40005574  
(JCSS Calibration Certificate No. 2208001889940)

### 2. Total distortion

Measured value
0.2 %

Working measurement standard distortion meter:

Type : VA-2230A  
Serial number : 11076061  
(A2LA Calibration Certificate No. 1502-03109)

- closing -



# APPENDIX F

## Monitoring Data (Noise)

Contract No. DC/2019/07  
 Environmental Monitoring Works for  
 Upgrading of Cheung Chau Sewage Collection, Treatment and Disposal Facilities  
 27<sup>th</sup> EM&A Report – October 2023

---

Location: N2a

Monitoring Period: October 2023

Parameter: Noise

Major Noise Source: Construction activities and daily operation of the sewerage treatment plant

Other Factors NA

Date	Weather	Start Time	L <sub>eq</sub>	L <sub>10</sub>	L <sub>90</sub>
4/10/2023	Fine	16:11	72.7	76.1	63.4
13/10/2023	Sunny	17:02	72.6	75.4	63.3
19/10/2023	Cloudy	15:12	71.3	73.7	66.3
25/10/2023	Sunny	16:07	70.3	72.8	65.4
31/10/2023	Sunny	14:10	71.1	73.5	66.8
<b>Average</b>			71.7		
<b>Range</b>			70.3 - 72.7		

Contract No. DC/2019/07  
 Environmental Monitoring Works for  
 Upgrading of Cheung Chau Sewage Collection, Treatment and Disposal Facilities  
 27<sup>th</sup> EM&A Report – October 2023

---

Location: N3a

Monitoring Period: October 2023

Parameter: Noise

Major Noise Source: Construction activities and daily operation of the sewerage treatment plant

Other Factors NA

Date	Weather	Start Time	L <sub>eq</sub>	L <sub>10</sub>	L <sub>90</sub>
4/10/2023	Fine	14:50	71.4	74.2	54.0
13/10/2023	Sunny	13:33	69.6	71.4	55.7
19/10/2023	Cloudy	13:27	72.1	75.3	55.2
25/10/2023	Sunny	14:25	72.7	75.5	53.2
31/10/2023	Sunny	13:05	73.4	75.5	54.6
<b>Average</b>			72.0		
<b>Range</b>			69.6 - 73.4		

Remarks: +3 dB(A) free-field corrections have been made to N3a.

Figure F.1 Measured daytime (0700-1900) noise level at the admin building inside the construction site (N2a)

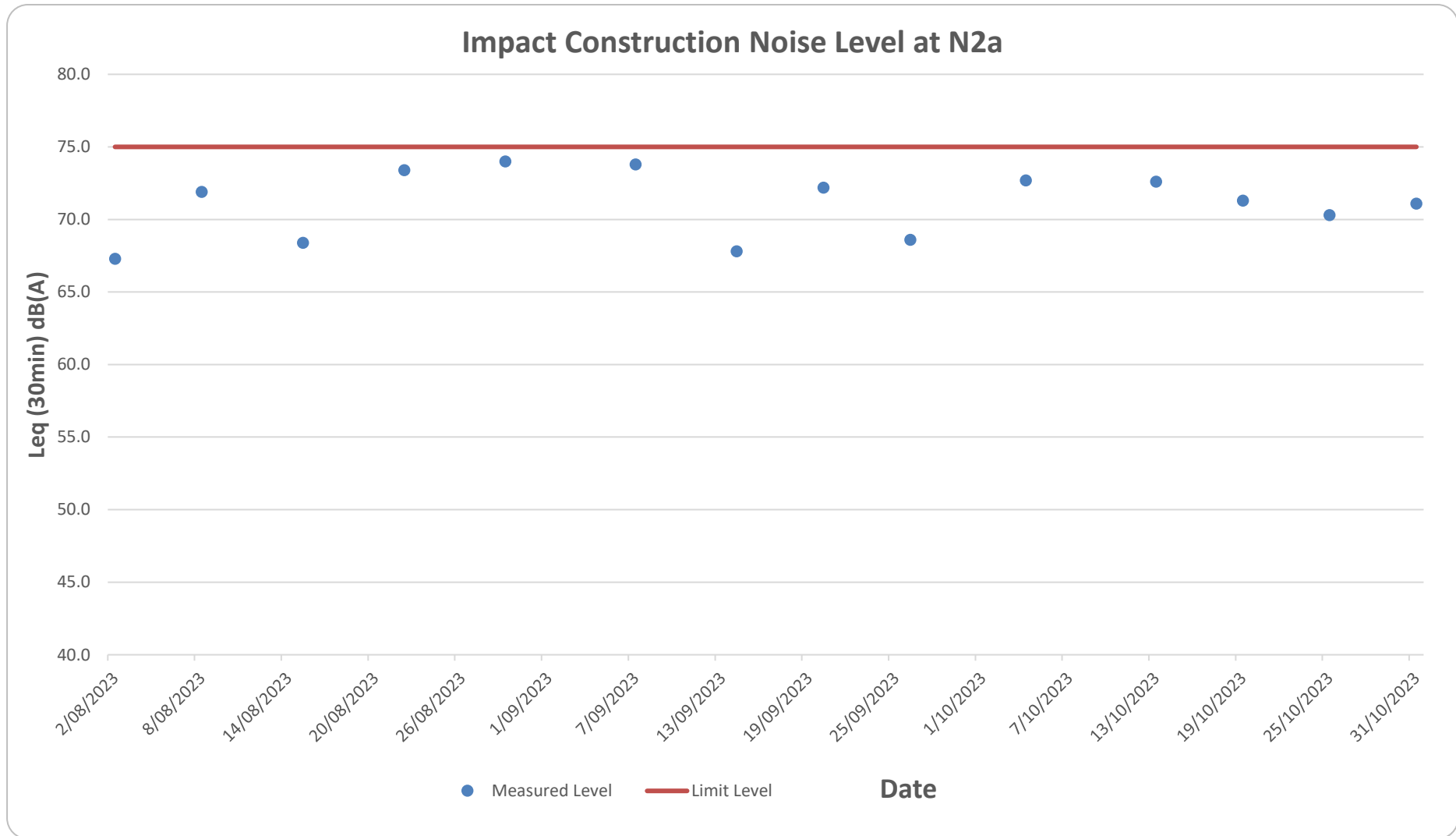
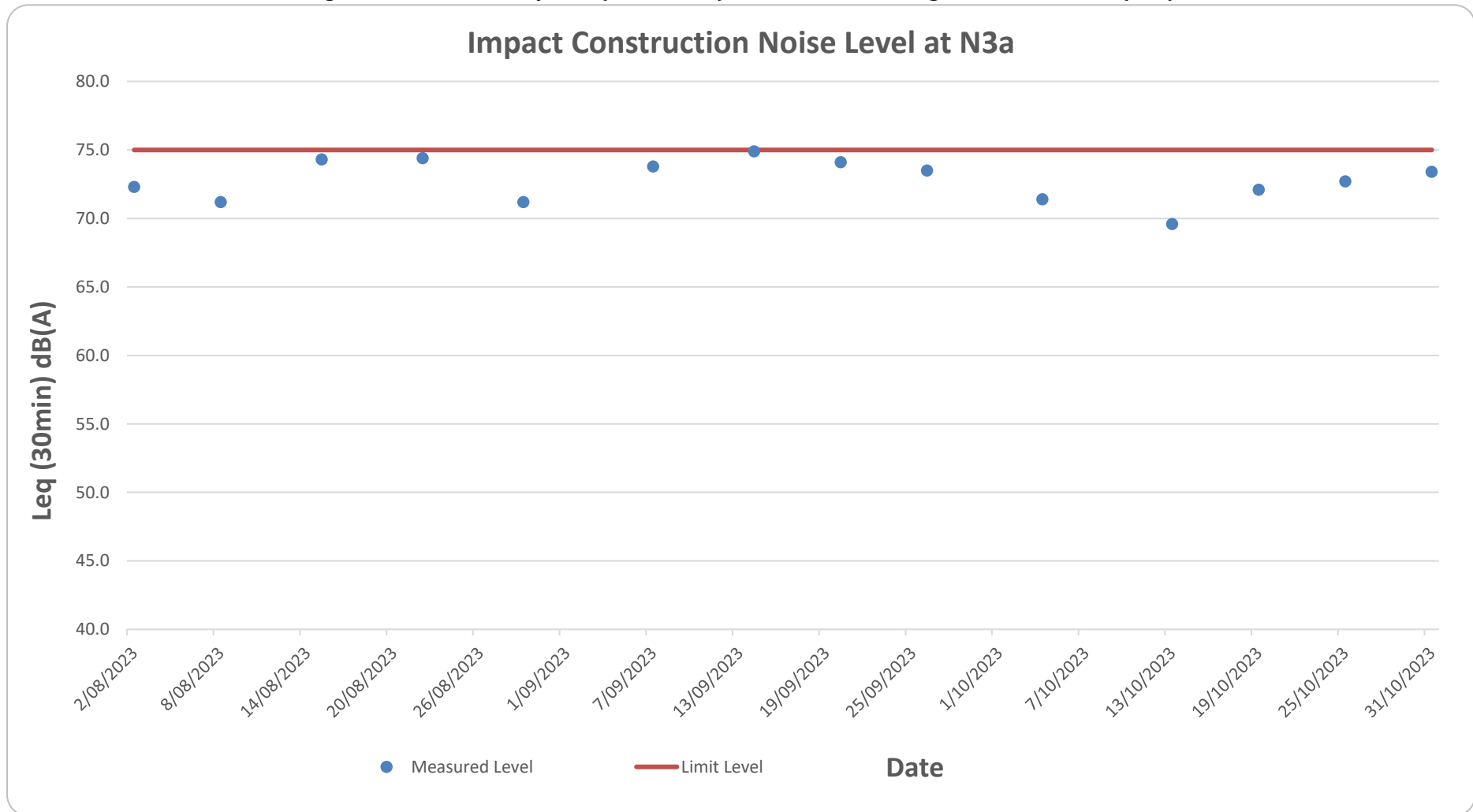


Figure F.2 Measured daytime (0700-1900) noise level at Cheung Chau Fire Station (N3a)



s: +3 dB(A) free-field corrections have been made to the data in the graph.

# APPENDIX G

## Implementation Schedule



EIA Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures			What requirements or standards for the measures to achieve?
				D	C	O	
<b>Construction Phase (Upgrading Works of Cheung Chau STW and Pak She SPS (DP Component))</b>							
S.3.5.5	Appropriate dust control measures should be implemented during the construction stage in accordance with the requirements in the Air Pollution Control (Construction Dust) Regulation. Dust control techniques should be considered to control dust to a level not exceeding the AQOs as well as the 1-hour TSP guideline level of 500 µg/m <sup>3</sup> . These measures include, but are not limited to, the following: <ul style="list-style-type: none"> <li>• Adoption of good site practices;</li> <li>• Avoid practices likely to raise dust level;</li> <li>• Frequent cleaning and damping down of stockpiles and dusty areas of the site;</li> <li>• Covering the exposed areas with tarpaulin;</li> <li>• Reducing drop height during material handling;</li> <li>• Provision of wheel-washing facilities for site vehicles leaving the site;</li> <li>• Regular plant maintenance to minimize exhaust emission; and</li> <li>• Sweep up dust and debris at the end of each shift.</li> </ul>	Air Quality (fugitive dust) Control during Construction Phase	Contractors		√		Annex 4 and Annex 12 of EIAO -TM, Air Pollution Control (Construction Dust) Regulation
S.3.10.1	All the dust control measures as recommended in the Air Pollution Control (Construction Dust) Regulation, where applicable, should be implemented. Typical dust control measures include:	Air Quality (fugitive dust) Control during Construction Phase	Contractors		√		Annex 4 and Annex 12 of EIAO -TM, Air Pollution Control (Construction Dust) Regulation

EIA Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures			What requirements or standards for the measures to achieve?
				D	C	O	
S.3.10.1	Watering every 1.5 hours on active works areas and paved haul roads to reduce dust emissions by 90.9% (e.g. watering intensity at 0.5 litres/m <sup>2</sup> . Actual application shall depend on the site condition and weather conditions).	Air Quality (fugitive dust) Control during Construction Phase	Contractors		√		EIA, Annex 4 and Annex 12 of EIAO -TM, Air Pollution Control (Construction Dust) Regulation
S.3.10.1	Watering every hour on unpaved areas and stockpiles of dusty materials (if no tarpaulin is provided) to reduce dust emissions by 90% (e.g. watering intensity at 1.5 litre/m <sup>2</sup> during the first hour, subsequent application at 0.2 litre/m <sup>2</sup> . Actual application shall depend on the site condition and weather conditions).	Air Quality (fugitive dust) Control during Construction Phase	Contractors		√		EIA, Annex 4 and Annex 12 of EIAO -TM, Air Pollution Control (Construction Dust) Regulation
S.3.10.1	Use of regular watering, with complete coverage, to reduce dust emissions from exposed site surfaces and unpaved roads, particularly during dry weather	Air Quality (fugitive dust) Control during Construction Phase	Contractors		√		Annex 4 and Annex 12 of EIAO -TM, Air Pollution Control (Construction Dust) Regulation
S.3.10.1	Use of frequent watering for particularly dusty construction areas and areas close to ASRs	Air Quality (fugitive dust) Control during Construction Phase	Contractors		√		Annex 4 and Annex 12 of EIAO -TM, Air Pollution Control (Construction Dust) Regulation
S.3.10.1	Vehicle washing facilities should be provided at every vehicle exit point	Air Quality (fugitive dust) Control during Construction Phase	Contractors		√		Annex 4 and Annex 12 of EIAO -TM, Air Pollution Control (Construction Dust) Regulation

EIA Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures			What requirements or standards for the measures to achieve?
				D	C	O	
S.3.10.1	Where a site boundary adjoins a road, streets or other areas accessible to the public, hoarding of not less than 2.4 m high from ground level should be provided along the entire length except for a site entrance or exit	Air Quality (fugitive dust) Control during Construction Phase	Contractors		√		Annex 4 and Annex 12 of EIAO -TM, Air Pollution Control (Construction Dust) Regulation
S.3.10.1	Stockpiles of imported material kept on site shall be contained within hoarding, dampened and/or covered during dry and windy weather	Air Quality (fugitive dust) Control during Construction Phase	Contractors		√		Annex 4 and Annex 12 of EIAO -TM, Air Pollution Control (Construction Dust) Regulation
S.3.10.1	Material stockpiled alongside trenches should be covered with tarpaulins	Air Quality (fugitive dust) Control during Construction Phase	Contractors		√		Annex 4 and Annex 12 of EIAO -TM, Air Pollution Control (Construction Dust) Regulation
S.3.10.1	Open stockpiles shall be avoided or covered. Where possible, prevent placing dusty material storage piles near ASRs	Air Quality (fugitive dust) Control during Construction Phase	Contractors		√		Annex 4 and Annex 12 of EIAO -TM, Air Pollution Control (Construction Dust) Regulation

EIA Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures			What requirements or standards for the measures to achieve?
				D	C	O	
S.3.10.1	Any excavated or stockpile of dusty material should be covered entirely by impervious sheeting or sprayed with water to maintain the entire surface wet during the non-working hours	Air Quality (fugitive dust) Control during Construction Phase	Contractors		√		Annex 4 and Annex 12 of EIAO -TM, Air Pollution Control (Construction Dust) Regulation
S.3.10.1	All dusty materials shall be sprayed with water prior to any loading, unloading or transfer operation so as to keep the dusty materials wet	Air Quality (fugitive dust) Control during Construction Phase	Contractors		√		Annex 4 and Annex 12 of EIAO -TM, Air Pollution Control (Construction Dust) Regulation
S.3.10.1	Water sprays shall be used during the delivery and handling of sands aggregates and the like	Air Quality (fugitive dust) Control during Construction Phase	Contractors		√		Annex 4 and Annex 12 of EIAO -TM, Air Pollution Control (Construction Dust) Regulation
S.3.10.1	All demolished items that may emit dust particles should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides within a day of demolition	Air Quality (fugitive dust) Control during Construction Phase	Contractors		√		Annex 4 and Annex 12 of EIAO -TM, Air Pollution Control (Construction Dust) Regulation

EIA Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures			What requirements or standards for the measures to achieve?
				D	C	O	
S.3.10.1	<p><u>Good site practices for concrete batching plant</u></p> <p>Every stock of more than 20 bags of cement or dry pulverized fuel ash(PFA) should be cover entirely by impervious sheeting or placed in an area sheltered on the top and the sides.</p> <p>Cement or dry PFA delivered in bulk should stored in a closed silo fitted with an audible high level alarm which is interlocked with the material filling line and no overfilling is allowed.</p> <p>Loading, unloading, transfer, handling or storage of bulk cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with effective fabric filter or equivalent air pollution control system (Maximum TSP emission factor of Silos and Mising Tower: 50mg/m<sup>3</sup>)</p>	Air Quality (fugitive dust) Control during Construction Phase	Contractors		√		<p>Annex 4 and Annex 12 of EIAO -TM, Air Pollution Control (Construction Dust) Regulation</p> <p>Best Practical Means for Cement Works (Concrete Batching Plant) BPM 3/2(93)</p>

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EIA Ref.	Recommended Environmental Protection Measures / Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
<b>Construction Phase (Upgrading Works of Cheung Chau STW and Pak She SPS (DP Component))</b>					
S.4.4.12	Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction works.	Noise control during construction	Contractors	At all construction areas of the site during the entire construction period	EIA, Contractual requirements
S.4.4.12	Machines and plant that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum.	Noise control during construction	Contractors	At all construction areas of the site during the entire construction period	EIA, Contractual requirements
S.4.4.12	Plant known to emit noise strongly in one direction should, where possible, be orientated to direct noise away from the NSRs.	Noise control during construction	Contractors	At all construction areas of the site during the entire construction period	EIA, Contractual requirements
S.4.4.12	Mobile plant should be sited as far away from NSRs as possible.	Noise control during construction	Contractors	At all construction areas of the site during the entire construction period	EIA, Contractual requirements
S.4.4.12	Material stockpiles and other structures should be effectively utilized, where practicable, to screen noise from on-site construction activities.	Noise control during construction	Contractors	At all construction areas of the site during the entire construction period	EIA, Contractual requirements

EIA Ref.	Recommended Environmental Protection Measures / Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
S.4.4.13	Use of quiet plant (PME): <ul style="list-style-type: none"> <li>• Generator</li> <li>• Poker, vibratory, hand-held</li> <li>• Breaker, excavator mounted (hydraulic)</li> <li>• Excavator</li> <li>• Tracked Mobile Crane</li> <li>• Vibratory Compactor</li> <li>• Dumper</li> <li>• Air compressor</li> <li>• Concrete Pump</li> <li>• Piling Rig</li> </ul>	Noise control during construction	Contractors	At all construction areas of the site during the entire construction period	EIA, Contractual requirements
S.4.4.14	Temporary site hoardings of 2.4 m high are recommended for the works at the Pak She SPS. The hoardings will be erected along the works boundary facing the NSRs. The PME involved in the works would be screened by the erected site hoardings. Without direct line of sight from the affected NSRs, a noise reduction of 10 dB(A) could be achieved provided that the hoardings have no openings or gaps and have a surface mass of at least 7 kg/m <sup>2</sup> . Nonetheless, a -5 dB(A) screening correction for site hoardings has been applied as a more conservative approach.	Noise control during construction	Contractors	At Pak She SPS during the entire construction period	EIA
S.4.4.23	For NSRs which would be affected by more than one Works Types, good scheduling works is recommended to minimize the cumulative construction noise impacts due to different Works Types.	Noise control during construction	Contractors	Construction areas near the specified locations during the construction period	EIA, Contractual requirements



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S.4.4.29	In order to prevent potential cumulative construction noise impacts to NSRs, the works at Tai Kwai Wan San Tsuen are recommended to be scheduled to avoid concurrent works at the areas near Tai Kwai Wan of the Improvement of Fresh Water Supply to Cheung Chau project.	Noise control during construction	DSD and Contractors	Construction areas near the specified locations during the construction period	EIA, Contractual requirements
S.4.4.30	The contractor shall liaise with “Replacement and Rehabilitation of Water Mains Stage 4, Mains on Hong Kong and Islands – Investigation, Design and Construction” contractors so as to avoid undertaking works concurrently with the works when they are in the close proximity as far as practicable.	Noise control during construction	DSD and Contractors	Construction areas near the specified locations during the construction period	EIA, Contractual requirements
S.4.4.31	The contractor shall liaise with Improvement to Existing Roads and Drains in Cheung Chau Old Town, Remaining Engineering Works Stage 3 works contractors so as to avoid undertaking works concurrently with the works when they are in the close proximity as far as practicable.	Noise control during construction	DSD and Contractors	Construction areas near the specified locations during the construction period	EIA, Contractual requirements

EIA Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	When to implement the measures?			What requirements or standards for the measures to achieve?
				D	C	O	
<b>Construction Phase (Upgrading Works of Cheung Chau STW and Pak She SPS (DP Component) and Sewers Works (non-DP Component))</b>							
S.5.7.1	<p>Practices outlined in ProPECC PN 1/94 Construction Site Drainage are recommended, as highlighted below:</p> <ul style="list-style-type: none"> <li>Perimeter channels are to be installed in works areas to intercept runoff at the site boundary prior to the commencement of any earthworks. Surface runoff should be discharged into storm drains via sand/ silt removal facilities with an adequate capacity;</li> <li>Works programme should be designed to minimize works areas to reduce soil exposure and site runoff;</li> <li>Silt removal facilities, channels and manholes should be maintained and cleaned regularly to ensure their proper functions;</li> <li>Works programme should be carefully planned to minimize the scale of soil excavation during the rainy season;</li> <li>Earthworks surfaces should be well compacted and subsequent permanent works or surface protection measures should be carried out immediately;</li> <li>All vehicles should be washed before they leave the construction site to avoid earth, mud, and debris being carried off from the site. Wash-water should be treated to remove sand and silt at least on a weekly basis to ensure the continued efficiency of the washing facility;</li> </ul>	Water Quality Control	Contractors		√		<ul style="list-style-type: none"> <li>WPCO;</li> <li>TM –Effluent Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Water</li> </ul>

EIA Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	When to implement the measures?			What requirements or standards for the measures to achieve?
				D	C	O	
(cont...)	<ul style="list-style-type: none"> <li>Open stockpiles of construction materials on site should be covered with tarpaulin or similar fabric materials during storms;</li> <li>For sections of pipes that need to be laid underneath water courses with the open cut method, site works should be carried out during the dry season with a temporary drainage diversion; and;</li> <li>Any construction works along Hak Pai Road immediately by the Kwun Yam beach and Cheung Chau Tung Wan beach should be avoided during the swimming season.</li> </ul>	Water Quality Control	Contractors		√		<ul style="list-style-type: none"> <li>WPCO;</li> <li>TM –Effluent Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Water</li> </ul>
S.5.7.2 and S.5.7.3	<p>Mitigations Measures for General Construction Activities:</p> <ul style="list-style-type: none"> <li>Good site practices should be adopted to regularly clean the construction sites to avoid rubbish, debris and litter from entering to nearby water bodies; and</li> <li>Good construction and site management practices should be implemented to ensure that litter, fuels, and solvents would not enter the public drainage systems.</li> </ul>	Water Quality Control	Contractors		√		<ul style="list-style-type: none"> <li>WPCO;</li> <li>TM –Effluent Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Water</li> </ul>

EIA Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	When to implement the measures?			What requirements or standards for the measures to achieve?
				D	C	O	
S.5.7.4	Domestic sewage generated by workforce would be collected and discharged to the STW for proper treatment. Portable toilets should be provided by the Contractor, where necessary, to handle sewage from the workforce. The Contractor should also be responsible for waste disposal.	Water Quality Control	Contractors		√		<ul style="list-style-type: none"> <li>• WPCO;</li> <li>• TM –Effluent Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Water</li> </ul>
S.5.7.5 and S.5.7.6	Mitigations Measures for Spillage of Chemicals: <ul style="list-style-type: none"> <li>• Registration to EPD as a Chemical Waste Producer if chemical wastes are generated and need to be disposed of;</li> <li>• Illegal disposal of chemicals should be strictly prohibited; and</li> <li>• Oils and fuels should only be used and stored in the designated area which has polluting prevention facilities.</li> </ul>	Water Quality Control	Contractors		√		<ul style="list-style-type: none"> <li>• WPCO;</li> <li>• TM –Effluent Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Water</li> </ul>

EIA Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	When to implement the measures?			What requirements or standards for the measures to achieve?
				D	C	O	
<b>Construction Phase (Upgrading Works of Cheung Chau STW and Pak She SPS (DP Component) and Sewers Works (non-DP Component))</b>							
S.6.6.1	The Contractor shall prepare a Waste Management Plan in accordance with the requirements set out in the ETWB TCW No. 19/2005, Waste Management on Construction Site, for the ER's approval. The WMP shall include monthly and yearly Waste Flow Tables that indicate the amounts of waste generated, recycled and disposed of (including final disposal site).	Waste management during construction	Contractors		√		ETWB TCW No. 19/2005, Waste Management on Construction Sites
S.6.6.1	The Contractor's waste management practices and effectiveness shall be audited by the Engineer's Representative on regular basis.	Waste management during construction	DSD		√		Waste Disposal Ordinance
S.6.6.1	The Contractor shall provide training for site staff concept of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycling.	Waste management during construction	Contractors		√		Waste Disposal Ordinance
S.6.6.1	Sufficient waste disposal points and regular collection of waste shall be provided.	Waste management during construction	Contractors		√		Waste Disposal Ordinance
S.6.6.1	Trucks with covering for the open-box bed and enclosed container shall be used to minimise windblown litter and dust during transportation of waste.	Waste management during construction	Contractors		√		Waste Disposal Ordinance
S.6.6.1	Regular cleaning and maintenance programme for drainage systems, pumps and oil interceptors.	Waste management during construction	Contractors		√		Waste Disposal Ordinance

EIA Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	When to implement the measures?			What requirements or standards for the measures to achieve?
				D	C	O	
S.6.6.1	Separation of chemical wastes for special handling and appropriate treatment at a Chemical Waste Treatment Facility (CWTF).	Waste management during construction	Contractors		√		Waste Disposal (Chemical Waste) (General) Regulation
S.6.6.1	Encourage collection of aluminium cans, paper and plastic bottles by providing separate labelled bins to enable these wastes to be segregated from other general refuse generated by the workforce.	Waste management during construction	Contractors		√		Waste Disposal Ordinance
S.6.6.1	Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal.	Waste management during construction	Contractors		√		Waste Disposal Ordinance
S.6.6.1	A recording system for the amount of wastes generated, recycled and disposed (including disposal sites) should be proposed.	Waste management during construction	Contractors		√		Waste Disposal Ordinance
S.6.6.1	Plan and stock construction materials to minimise amount of waste generated and avoid unnecessary generation of waste.	Waste management during construction	Contractors		√		Waste Disposal Ordinance
S.6.6.2	Alternatives C&D materials such as steel frameworks and plastic fencing can be considered to increase the chances for reuse.	Waste management during construction	Contractors		√		Waste Disposal Ordinance
S.6.6.3	In order to minimise the potential environmental impacts resulting from collection and transportation of C&D materials for off-site disposal, the excavated materials comprising fill materials should be reused on-site as backfilling materials as far as practicable.	Waste management during construction	Contractors		√		Waste Disposal Ordinance



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				D	C	O	
S.6.6.4	C&D waste, such as wood, plastic, steel and other metals should be reused or recycled and, as a last resort, disposed of to landfill sites. A suitable area should be designated within the site for temporary stockpiling of C&D materials and to facilitate the sorting process. In order to monitor the disposal of C&D materials at the designated public fill reception facility and landfill and to control fly-tipping, a trip ticket system should be included. Reference can be made to Development Bureau Technical Circular (Works) (TC(W)) No. 6/2010 for details.	Waste management during construction	Contractors		√		Development Bureau Technical Circular (Works) (TC(W)) No. 6/2010,  Waste Disposal Ordinance
S.6.6.5	The C&D materials to be disposed of at public filling reception facilities shall be only materials consist of brick, concrete, cement plaster, soil and inert building debris. The materials shall be free from plastics, chemical waste, industrial metals and other materials that are considered unsuitable at the facility.	Waste management during construction	Contractors		√		Waste Disposal Ordinance
S.6.6.6	General refuse should be stored in enclosed bins or compaction units separate from C&D materials. A reputable waste collector should be employed by the contractor to remove general refuse from the site regularly, separately from C&D materials. An enclosed and covered area is preferred to reduce the occurrence of 'wind blown' light materials. In addition, a sufficient number of enclosed bins shall be provided on site for containment of general refuse to prevent visual impacts and nuisance to the sensitive surrounding.	Waste management during construction	Contractors		√		Waste Disposal Ordinance



EIA Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	When to implement the measures?			What requirements or standards for the measures to achieve?
				D	C	O	
S.6.6.7	For the disposal of chemical wastes produced at the construction site, the Contractor is required to register with the EPD as a Chemical Waste Producer and to follow the requirements 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. Appropriate labels should be securely attached on each chemical waste container indicating the chemical characteristics of the chemical waste, such as explosives, flammable oxidizing, irritant, toxic, harmful, corrosive, etc. The Contractor shall also use a licensed waste collector engaged to transport and dispose of the chemical wastes in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.	Waste management during construction	Contractors		√		Waste Disposal (Chemical Waste) (General) Regulation
S.6.6.8	Chemical toilets to be provided on-site shall be regularly cleaned and the night-soil collected and transported by a licensed contractor to a Government Sewage Treatment Works facility for disposal.	Waste management during construction	Contractors		√		Waste Disposal Ordinance

EIA Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	When to implement the measures?			What requirements or standards for the measures to achieve?
				D	C	O	
<b>Construction Phase (Upgrading Works of Cheung Chau STW (DP Component))</b>							
Table 11.8	Visual Screen/Hoarding  Decorative hoarding or boundary fence for construction sites shall be considered, and designed to be compatible to the surroundings.	To minimise the potential visual impacts	Contractors		√		N/A

EIA Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	When to implement the measures?			What requirements or standards for the measures to achieve?
				D	C	O	
Table 11.8	<p>Protection to Existing Trees within Works Areas</p> <p>All existing trees which are not in direct conflict with the proposed works will be retained. The existing trees proposed to be retained shall be properly maintained and protected by means of fencing to prevent vehicular or pedestrian intrusion that may potentially damage tree canopies, trunks and root zones. Detailed tree protection specifications shall be allowed and included in the Contract Specification, which specifying the tree protection requirement, submission and approval system, and tree monitoring system. For trees with high preservation value, individual tree assessments and continuous tree monitoring reports shall be provided by a certified Arborist, Landscape Architect or related professional during construction. All retained trees shall be recorded photographically at the commencement of contract.</p> <p>Root pruning to the retained trees should be prohibited. Retained trees should be well-preserved by setting up a tree protection zone throughout the construction period for protecting the retained trees from damages.</p> <p>To maximize protection to existing trees and ground vegetation, construction contracts may designate “No-intrusion Zone” to various areas within the site boundary with rigid and durable fencing for each individual no-intrusion zone. The contractor should close monitor and restrict the site working staff not to enter the “no-intrusion zone”, even for non-direct construction activities and storage of equipment.</p>	Landscape mitigation measures	DSD and Contractors	√	√		EIA, Annex 10 and Annex 18 of EIAO-TM

EIA Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	When to implement the measures?			What requirements or standards for the measures to achieve?
				D	C	O	
Table 11.8	<p>Tree Transplanting</p> <p>Existing trees to be affected shall be directly transplanted to the proposed tree receiving sites, or to temporary tree nurseries alternatively. Temporary tree nurseries may be set up for the transplanted tree and proposed trees at an early stage to allow small trees to grow during the construction stage. By the time when planting area becomes available, trees have been mature and required minimal pruning and suffer much less damage during transplanting. The construction programme should also allow sufficient time for root pruning and root ball preparation prior to transplanting, if necessary, and transplanting operations to be carried out in planting season.</p> <p>Tree pruning such as topping, lion tailing would be prohibited as far as possible. Also, frequent keep watering would be necessary for transplanting trees. The proposed tree preservation measures during construction would be carried out and approved by the competent persons.</p>	Landscape mitigation measures	DSD and Contractors	√	√		EIA, Annex 10 and Annex 18 of EIAO-TM
Table 11.8	<p>Construction Light</p> <p>Security floodlight for construction areas shall be controlled, such as equipped with adjustable shield, frosted diffusers and reflective covers, at night to avoid excessive glare to the nearby areas and residents. Other security measures shall also be considered to minimize the visual impacts by construction light.</p>	To reduce the night-time glare effect to the surrounding environs.	Contractors		√		EIA, Annex 10 and Annex 18 of EIAO-TM

EIA Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	When to implement the measures?			What requirements or standards for the measures to achieve?
				D	C	O	
Table 11.8	Dust and Erosion Control for Exposed Soil Excavation works and demolition of existing building blocks shall be well planned with precautions to suppress dust. Exposed soil shall be covered or watered often. Areas that are expected to be left with bare soil for a long period of time after excavation shall be properly covered with suitable protective fabric. Suitable drainage shall be provided around construction sites to avoid discharge of contaminants and sediments into sensitive water-based habitats.	To minimise the disturbance to existing landscape resources and minimise the impacts on the visual amenity of the area	Contractors		√		EIA, Annex 10 and Annex 18 of EIAO-TM
Table 11.8	Reinstatement of Works Areas The affected works areas shall be properly reinstated to the satisfaction of relevant government departments.	Landscape mitigation measures	Contractors		√		EIA, Annex 10 and Annex 18 of EIAO-TM

# APPENDIX H

## Summary of All Complaints Received, Notification of Summons and Successful Prosecutions

Statistical Summary of Environmental Complaints

Reporting Period	Environmental Complaints Statistics		
	Frequency	Nature	Follow-up Actions
1 October 2023 - 31 October 2023	0	N/A	N/A
Cumulative	0	N/A	N/A

Statistical Summary of Environmental Summons

Reporting Period	Environmental Summons Statistics		
	Frequency	Nature	Follow-up Actions
1 October 2023 - 31 October 2023	0	N/A	N/A
Cumulative	0	N/A	N/A

Statistical Summary of Environmental Prosecution

Reporting Period	Environmental Prosecution Statistics		
	Frequency	Nature	Follow-up Actions
1 October 2023 - 31 October 2023	0	N/A	N/A
Cumulative	0	N/A	N/A

# APPENDIX I

## EM&A Monitoring Schedules in the Reporting Period and the Next Reporting Period (Tentative)



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Impact Monitoring Schedule for Upgrading of Cheung Chau Sewage Collection, Treatment and Disposal Facilities						
Oct-23						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
		24-hour TSP monitoring for A1a & A2a 1-hour TSP monitoring for A1a & A2a	Daytime Noise monitoring for N2a & N3a			
8	9	10	11	12	13	14
			24-hour TSP monitoring for A1a & A2a 1-hour TSP monitoring for A1a & A2a	24-hour TSP monitoring for A1a & A2a 1-hour TSP monitoring for A1a & A2a	Daytime Noise monitoring for N2a & N3a	
15	16	17	18	19	20	21
			24-hour TSP monitoring for A1a & A2a 1-hour TSP monitoring for A1a & A2a	Daytime Noise monitoring for N2a & N3a		
22	23	24	25	26	27	28
		24-hour TSP monitoring for A1a & A2a 1-hour TSP monitoring for A1a & A2a	Daytime Noise monitoring for N2a & N3a			
29	30	31				
	24-hour TSP monitoring for A1a & A2a 1-hour TSP monitoring for A1a & A2a	Daytime Noise monitoring for N2a & N3a				
Remarks:						
1. Daytime Noise Monitoring (07:00-1900)						
2. Due to the issued Black Rainstorm Signal on 9 October 2023, the date of TSP monitoring and Noise monitoring was rearranged.						

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Impact Monitoring Schedule for Upgrading of Cheung Chau Sewage Collection, Treatment and Disposal Facilities						
Nov-23						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
	24-hour TSP monitoring for A1a & A2a 1-hour TSP monitoring for A1a & A2a	Daytime Noise monitoring for N2a & N3a				
5	6	7	8	9	10	11
	24-hour TSP monitoring for A1a & A2a 1-hour TSP monitoring for A1a & A2a	Daytime Noise monitoring for N2a & N3a				
12	13	14	15	16	17	18
	24-hour TSP monitoring for A1a & A2a 1-hour TSP monitoring for A1a & A2a	Daytime Noise monitoring for N2a & N3a				
19	20	21	22	23	24	25
	24-hour TSP monitoring for A1a & A2a 1-hour TSP monitoring for A1a & A2a	Daytime Noise monitoring for N2a & N3a		24-hour TSP monitoring for A1a & A2a 1-hour TSP monitoring for A1a & A2a		
26	27	28	29	30		
			24-hour TSP monitoring for A1a & A2a 1-hour TSP monitoring for A1a & A2a	Daytime Noise monitoring for N2a & N3a		
Remarks:						
1. Daytime Noise Monitoring (07:00-1900)						