Environmental Permit (EP/618/2022)
Further Environmental Permit (FEP-01/618/2022)
Decommissioning of Remaining Portion of Middle Ash Lagoon in Tsang Tsui

Dust Monitoring Plan

Document Submission No.	
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Date	**5 June 2024**
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Date: 5 June 2024	Date: 5 June 2024
Verified By: **Independent Environmental Checker**	
James CHOI ANewR Consulting Limited	
Date: 5 June 2024	

Environmental Protection Department

Hong Kong Resources Recover Park

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Rev	Status	Purpose of Issue Description	Date	Prepared by	Checked by	Approved by
1	Draft	Issue for review by Checker	6-Dec-2023	Lam Siu Ho	Kenneth Lau	Victor Wu
2	Revision 1	Revised the Monitoring Parameters and site layout	4-Jan-2024	Lam Siu Ho	Kenneth Lau	Victor Wu
3	Revision 2	Revised the Monitoring Parameters and site layout	20-Feb-2024	Lam Siu Ho	Kenneth Lau	Victor Wu
4	Revision 3	Revised with EPD comments	4-Mar-2024	Lam Siu Ho	Kenneth Lau	Victor Wu
5	Revision 4	Revised with EPD comments	30-April-2024	Lam Siu Ho	Kenneth Lau	Victor Wu
6	Revision 5	Revised with EPD comments	5-June-2024	Lam Siu Ho	Kenneth Lau	Victor Wu

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1 INTRODUCTION

1.1 Background

1.1.1 Work Scope

1.1.1.1 Decommissioning of Remaining Portion of the Middle TTAL mainly involves site clearance, removal of asbestos pipes, minor levelling of Pulverized Fuel Ash (PFA) surface, covering of the levelled PFA surface with general fill and installation of temporary surface drainage system.

1.1.2 Environmental Impact Assessment Ordinance Requirements

Decommissioning of Remaining Portion of Middle TTAL

1.1.2.1 A Project Profile (PP) for the Decommissioning of Remaining Portion of Middle Ash Lagoon in Tsang Tsui (Register No. PP-649/2022) was submitted under the EIAO on 5 September 2022 for application for permission to apply directly for EP (DIR). The DIR was permitted by EPD on 3 October 2022. The EP for the proposed decommissioning works (Permit No. EP-618/2022) was subsequently granted by EPD on 24 October 2022.

Further Environmental Permit

1.1.2.2 Application to the Director of Environmental Protection under Section 12 of the EIAO for the Further Environmental Permits (FEP) of the Decommissioning of Remaining Portion of Middle TTAL has been arranged and HKRRP should take up the responsibility of the EP Holder the Decommissioning of Remaining Portion of Middle TTAL upon obtaining of the FEPs.

1.2 Key Objective of this Plan

1.2.1.1.1 This Dust Monitoring Plan is required in accordance with the Clause 2.2 of the Further Environmental Permit (FEP-01/618/2022) and Clause 2.2 of the Environmental Permit (EP/618/2022). With reference to the Project Profile of the Decommissioning of Remaining Portion of Middle TTAL and the approved EIA of Decommissioning of West Portion of the Middle Ash Lagoon at Tsang Tsui, Tuen Mun, details and reporting requirements of the dust monitoring during the Decommissioning works have been proposed in this Plan. Furthermore, dust

mitigation measures and the site audit have been discussed and proposed in the Project Environmental Management Plan.

1.3 Structure of this Plan

1.3.1.1 This report contains the following sections:

- Section 1 - Introduction
- Section 2 - Outline of Planning and Implementation Programme
- Section 3 - Potential Impact on the Environment
- Section 4 - Conclusion

2 OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

2.1 Project Time-table with updated key milestones

2.1.1.1 The tentative programme for the whole decommissioning work is approximately 10 months and the Site Layout Plan is show in **Figure 2.1**. Key implementation milestones of the Project are summarised in **Table 2.1** below.

2.1.1.2 The Project will provide flat buildable land for future development by the government and potential environmental impact associated with future development of the site is not within the scope of this Dust Monitoring Plan.

Table 2.1 Key Implementation Milestones of the Project

Key Milestone	Tentative Programme
Site Clearance	1st to 3rd month
Levelling of PFA platform and covering of at least 1m thick general fill	2nd to 9th month
Installation of temporary surface drainage system	8th to 10th month

3 POTENTIAL IMPACTS ON THE ENVIRONMENT

3.1 Preliminary Design of the Decommissioning Works of Remaining Portion of the Middle TTAL

3.1.1.1 The proposed works for decommissioning of the remaining portion of the Middle TTAL include:

- Decommissioning works on PFA Platform (Levelling of PFA surface and covering of at least one-meter thick general fill above the levelled final PFA surface.

3.1.1.2 In addition, the associated works for the decommissioning of the remaining portion of the Middle TTAL under the Project include the following:

- Site clearance works at the Project Site, asbestos pipes removal and
- Installation of temporary surface drainage system.

<u>Decommissioning works on PFA Platform</u>

3.1.1.3 The proposed method of decommissioning of the remaining portion of the Middle TTAL is the same as that proposed in the *Decommissioning of West Portion of the Middle Ash Lagoon, Tsang Tsui* EIA, which involves levelling of PFA surface followed by the covering of at least 1m thick general fill above the levelled final PFA surface.

3.1.1.4 The Site will be evened into a generally flat surface through levelling works. After levelling of the existing PFA surface, general fill will be deposited and compacted to at least 1m thick above the existing PFA platform to prevent it from being significantly disturbed due to any future development. The general fill will be delivered to the Project Site via the construction access roads located to the south of the Project Site by dump trucks. The general fill shall be deposited in layers by backhoe and compacted by vibratory rollers as per statutory requirements and the existing seawall will not be alternated during proposed decommissioning works.

Site clearance

3.1.1.5 Site clearance works, which mainly involve removal of existing trees and vegetation, will be carried out before levelling of PFA surface.

3.1.1.6 The existing construction access road at the southern end of the Project Site would be used to direct inbound and outbound construction vehicles away from the Project Site to cater for the decommissioning works.

Installation of temporary surface drainage system

3.1.1.7 Perimeter cut-off drains to direct off-site water around the Project Site will be constructed for site drainage. Site surface water drainage outlet pipe will be constructed at the northern end of the Project Site for temporary site stormwater drainage purposes, which form part of the temporary surface drainage system.

3.1.1.8 Sand/silt traps will also be provided to remove sand/silt particles from runoff to meet the requirements of the *Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters (TM-DSS*).

No decommissioning area

3.1.1.9 For the paved area along the northern and southern boundary, since it is concrete paved and no exposed PFA is found, only site clearance and levelling works but not any decommissioning works are required.

3.2 Potential Environmental Impacts during Decommissioning Phase

3.2.1.1 With reference to the proposed decommissioning method presented in **Section 3.1**, and the *Decommissioning of West Portion of the Middle Ash Lagoon at Tsang Tsui* EIA, the potential sources of air quality impact during decommissioning phase would be fugitive dust arising from the following works:

- Levelling of PFA surface;
- Covering of at least one-meter thick general fill above the levelled PFA surface;
- Installation of temporary surface drainage system.

3.2.1.2 With reference to the air quality impact assessment conducted for the EIA, with the implementation of practicable dust suppression measures stipulated in the *Air Pollution Control (Construction Dust) Regulation*, adverse air quality impact was not anticipated at the identified ASRs during decommissioning phase.

3.2.1.3 With consideration of the nature of the Project decommissioning works (similar to that for West Portion of Middle TTAL), that the Project Site is located immediately to the East of West Portion of Middle TTAL with similar historical use (storage of PFA), the large separation distance of the Project site to nearby ASR1, ASR2, ASR4 and ASR5 and that they have been equipped with air-conditioning with dust filter, with the implementation of the dust suppression measures stipulated in *Air Pollution Control (Construction Dust) Regulation*, adverse air quality impact during decommissioning phase is not anticipated at these ASRs. Since ASR3 is an open area for public use, dust monitoring is proposed at this location during decommissioning phase of the Project so as to ensure the implementation of the proposed dust mitigation measures and dust suppression measures stipulated in *Air Pollution Control (Construction Dust) Regulation* and the dust criteria stipulated in the EIAO-TM could be complied with at the nearest ASR3.

3.2.1.4 In order to minimize potential impact to the nearby ASRs, the Contractor should liaise with Food and Environmental Hygiene Department (FEHD), the operator of the Tsang Tsui Columbarium and Garden of Remembrance and decommissioning works should be scheduled to avoid days with higher volume of visitors (e.g. Ching Ming Festival –

April 2024 and Chung Yeung Festival – October 2024).

3.3 Environmental Monitoring and Audit (EM&A)

3.3.1 General

3.3.1.1 With the implementation of recommended mitigation measures, no adverse environmental impacts during the decommissioning phase would be anticipated. Due to the relatively close distance and public use nature of ASR3 to the Project site, dust monitoring during the decommissioning phase of the Project is proposed to ensure the recommended mitigation measures, from the project Environmental Management Plan are implemented properly.

3.3.2 Monitoring Location

3.3.2.1 The proposed dust monitoring location is shown in **Table 3.1**. Site visit has been conducted on 28th December2023 and after discussion with the management representative of the Tsang Tsui Columbarium, access authorization was rejected due to unsuitable conditions for equipment installation and lack of power supply.

Table 3.1 Description of Dust Monitoring Locations

Sensitive Receiver ID	Monitoring Parameters
ASR3	1-hr TSP

3.3.2.2 Alternative monitoring location is proposed, the following criteria, as far as practicable, have been considered and followed:

- At the site boundary or such locations close to the major dust emission source;
- Close to the sensitive receptors; and
- Account for the prevailing meteorological conditions.

An alternative location has been sought and proposed to the site boundary of the Middle Tsang Tsui Ash Lagoon and shown in **Table 3.2**. It is proposed to relocate the monitoring location (north facing) to the site boundary of Middle Tsang Tsui Ash Lagoon and at location avoid the burner emission from the Columbarium (east facing). This proposed monitoring location is approximately 10 meters away from the Tsang Tsui Columbarium- Garden of Remembrance. Both locations are situated to the north-west of the site boundary and experiencing the same prevailing meteorological conditions. The orginal monitoring location and proposed alternative monitoring

location was presented in **Figure 4.1**.

Table 3.2 Description of Alternative Dust Monitoring Locations

Sensitive Receiver ID	Monitoring Parameters
ASR3 Alternative location	1-hr TSP

3.3.2.3 When positioning the sampler, the following points shall be noted:

- a horizontal platform with appropriate support to secure the samplers against gusty wind should be provided;
- no two samplers should be placed less than 2 meter apart;
- 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;
- a minimum of 2 metres separation from walls, parapets and penthouses is required for rooftop samplers;
- a minimum of 2 metres separation from any supporting structure, measured horizontally is required;
- no furnace or incinerator flue is nearby;
- airflow around the sampler is unrestricted;
- the sampler is more than 20 metres from the drip-line;
- any wire fence and gate, to protect the sampler, should not cause any obstruction during monitoring;
- permission must be obtained to set up the samplers and to obtain access to the monitoring stations; and
- a secured supply of electricity is needed to operate the samplers.

3.3.3 Air Quality Parameters

3.3.3.1 Monitoring of the Total Suspended Particulate (TSP) levels shall be carried out to ensure that any deteriorating air quality could be readily detected and timely action be taken to rectify the situation. 1-hour TSP monitoring shall be conducted and the measurement is to indicate the impacts of construction dust on air quality. The TSP levels shall be measured by following the standard high volume sampling method as set out in the Title 40 of the Code of Federal Regulations, USA, Chapter 1 (Part 50),

Appendix B. Upon approval by the IEC, 1-hour TSP levels can be measured by direct reading methods which are capable of producing comparable results as that by the high volume sampling method, to indicate short event impacts.

3.3.3.2 All relevant data including temperature, pressure, weather conditions, elapsed-time meter reading for the start and stop of the sampler, identification and weight of the filter paper, and other special phenomena and work progress of the concerned site etc. shall be recorded down in details.

3.3.4 Monitoring Equipment

3.3.4.1 High volume sampler (HVS) in compliance with the following specifications shall be used for carrying out the 1-hr monitoring:

- 0.6-1.7 m3/min (20-60 SCFM) 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 cm2 (63 in2);
- flow control accuracy: +/- 2.5% deviation over 24-hr 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;
- able to hold and seal the filter paper to the sampler housing at horizontal position;
- easy to change the filter

3.3.4.2 Sufficient number of HVSs with an appropriate calibration kit are available for carrying out the baseline monitoring, regular impact monitoring and ad hoc monitoring when necessary. 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 labeled.

3.3.4.3 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 calibration data shall be properly documented for future reference. All the data should be converted into standard temperature and pressure condition. The flow-rate of the sampler before and after the sampling exercise with the filter in position shall be verified to be constant and be recorded down in the data sheet.

3.3.4.4 If it is necessary to proposes to use a direct reading dust meter to measure 1-hr TSP levels, sufficient information to the Design Checker and IEC to prove that the instrument is capable of achieving a comparable result as that of the HVS and may be used for the 1-hr sampling. The instrument should also be calibrated regularly basis.

3.3.4.5 Wind data monitoring equipment shall also be provided and set up at conspicuous locations for logging wind speed and wind direction near to the dust monitoring locations. The equipment installation location shall be proposed. For installation and operation of wind data monitoring equipment, the following points shall be observed:

- the wind sensors should be installed on masts at an elevated level 10m above ground so that they are clear of obstructions or turbulence caused by the buildings;
- the wind data should be captured by a data logger and to be downloaded for processing at least once a month;
- the wind data monitoring equipment should be re-calibrated at least once every six months; and
- wind direction should be divided into 16 sectors of 22.5 degrees each.

3.3.4.6 In exceptional situations, alternative methods to obtain representative wind data upon approval from the Design Checker and IEC, and agreement from EPD.

3.3.5 Laboratory Measurement/Analysis

3.3.5.1 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 should be HOKLAS accredited.

3.3.5.2 If a site laboratory is set up or a non-HOKLAS accredited laboratory is hired for carrying out the laboratory analysis, the laboratory equipment shall be approved by the Design Checker and IEC and the measurement procedures (first measurement) shall be witnessed by the Design Checker and IEC.

3.3.5.3 Filter paper of size 8"x10" shall be labeled before sampling. It shall be a clean filter

paper with no pin holes, and shall be conditioned in a humidity-controlled chamber for over 24-hr and be pre-weighed before use for the sampling.

3.3.5.4 After sampling, the filter paper loaded with dust shall be kept in a clean and tightly sealed plastic bag. The filter paper is then returned to the laboratory for reconditioning in the humidity-controlled chamber followed by accurate weighing by an electronic balance with a readout down to 0.1 mg. The balance shall be regularly calibrated against a traceable standard. All the collected samples shall be kept in a good condition for 6 months before disposal.

3.3.6 Baseline Monitoring

3.3.6.1 Baseline monitoring at the designated monitoring location for at least 14 consecutive days prior to the commencement of the construction works to obtain 1-hour sampling which shall be carried out 3 times per day for 1-hr TSP. During the baseline monitoring, there should not be any decommissioning construction or dust generation activities in the vicinity of the monitoring stations. Baseline air quality was conducted at the air quality monitoring station during the period of 26 Jan to 8 Feb 2024. Monitoring result for average 1-hr TSP concentration is 125 μg/m3 (while Min: 51μg/m3 and Max: 348μg/m3). The detailed 1-hr TSP monitoring data, graphical presentation, photographic record and calibration are shown in **Appendix 1**.

3.3.6.2 In exceptional case, when insufficient baseline monitoring data or questionable results are obtained, discussion with EPD to agree on an appropriate set of data to be used as a baseline reference and submit to Design Checker and IEC for approval.

3.3.6.3 Ambient conditions may vary seasonally and shall be reviewed at every three months. When the ambient conditions have been changed and a repeat of the baseline monitoring is required to be carried out for obtaining the updated baseline levels, the monitoring should be at times when the Contractor's activities are not generating dust, at least in the proximity of the monitoring stations. Should change in ambient conditions be determined, the baseline levels and, in turn, the air quality criteria, should be revised. The revised baseline levels and air quality criteria should be agreed with EPD.

3.3.7 Impact Monitoring

3.3.7.1 Impact monitoring will be carried out during the course of the Works. For regular impact monitoring for 1-hr TSP monitoring, the sampling frequency of at least three times in every six-days for 1-hr TSP during normal construction works period.

3.3.7.2 In case of non-compliance with the dust criteria, more frequent monitoring exercise, as specified in the Action Plan in **Section 3.3.8**, shall be conducted within 24 hours after the result is obtained. The additional monitoring shall be continued until the excessive dust emission or the deterioration in air quality is rectified.

3.3.8 Event and Action

3.3.8.1 The baseline monitoring results form the basis for determining the air quality criteria for the impact monitoring and compare the impact monitoring results with air quality criteria set up for 1-hour TSP. **Table 3.3** shows the dust criteria, namely Action and Limit levels to be used. Should non-compliance of the air quality criteria occur, the Design Checker, IEC and the Contractor shall undertake the relevant action in accordance with the Action Plan in **Table 3**.4.

Table 3.3 Action and Limit Levels for Dust Impact

Parameters	Action Level	Limit Level
1-hour TSP Level in µg/m3	331	500

Table 3.4 Event/Action Plan for Dust Impact

Event	Action			
	ET	IEC	Service Manager	Contractor
Action level exceedance for one sample	▪ Identify source ▪ Inform IEC, SM and Contractor ▪ Repeat measurement to confirm findings ▪ If the exceedance is confirmed to be Project related after investigation, increase monitoring frequency to daily	▪ Check monitoring data and Contractor's working methods	▪ Notify Contractor for the identification of cause	▪ Rectify any unacceptable practice ▪ Amend working methods if appropriate
Action Level exceedance for two or more consecutive	▪ Identify source ▪ Notify IEC, SM and Contractor ▪ Repeat measurements	▪ Review monitoring data submitted by ET ▪ Review the investigation	▪ Confirm receipt of notification of exceedance in writing	▪ Rectify any unacceptable practice ▪ Amend working methods if

samples	to confirm findings ▪ Investigate the cause of exceedance and check Contractor's working procedures ▪ If the exceedance is confirmed to be Project related after investigation, increase monitoring frequency to daily ▪ Discuss with IEC and SM for remedial actions required ▪ If exceedance continues, arrange meeting with IEC and Contractor ▪ If exceedance stops, cease additional monitoring	finding submitted by ET and check the Contractor's working method ▪ Review the proposed remedial measures by Contractor and advise SM accordingly ▪ Supervise the implementation of remedial measures	▪ Require Contractor to propose remedial measures for the analysed dust problem ▪ Ensure remedial measures properly implemented	appropriate ▪ Submit proposals for remedial actions to IEC within 3 working days of notification ▪ Implement the agreed proposals ▪ Amend proposal if appropriate
Limit level exceedance for one sample	▪ Identify source ▪ Inform IEC, SM, Contractor and EPD ▪ Repeat measurements to confirm findings. ▪ If the exceedance is confirmed to be Project related after investigation, increase monitoring frequency to daily ▪ Assess effectiveness of	▪ Review monitoring data submitted by ET ▪ Discuss amongs SM, ET Leader and Contractor on the potential remedial actions. ▪ Supervise the implementation of remedial measure	▪ Confirm receipt of notification of exceedance in writing ▪ Require Contractor to propose remedial measures for the analysed dust problem ▪ Ensure remedial measures properly implemented	▪ Take immediate action to avoid further exceedance ▪ Submit proposals for remedial actions to IEC within 3 working days of notification ▪ Implement the agreed proposals ▪ Amend proposal if appropriate

	Contractor's remedial actions and keep IEC, EPD and SM informed of the results			
Limit level exceedance for two or more consecutive samples	▪ Identify source ▪ Repeat measurements to confirm findings ▪ Inform IEC, SM, Contractor and EPD ▪ Investigate the cause of exceedance and carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented ▪ If the exceedance is confirmed to be Project related after investigation, increase monitoring frequency to daily. ▪ Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and SM informed of the results ▪ If exceedance continues, arrange meeting with IEC and Contractor ▪ If exceedance stops, cease	▪ Review monitoring data submitted by ET ▪ Discuss amongs SM, ET Leader and Contractor on the potential remedial actions. ▪ Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise SM accordingly ▪ Supervise the implementation of remedial measures.	▪ Require Contractor to propose remedial measures for the analysed dust problem ▪ Ensure remedial measures properly implemented ; ▪ If exceedance continues, consider what activity of the work is responsible and instruct Contractor to stop that activity of work until the exceedance is abated	▪ Take immediate action to avoid further exceedance; ▪ Submit proposals for remedial actions to IEC within 3 working days of notification; ▪ Implement the agreed proposals; ▪ Resubmit proposals if problem still not under control; ▪ Stop the relevant portion of works as determined by the ER until the exceedance is abated.

	additional monitoring.			

4 CONCLUSION

4.1.1.1 In view of the nature of the proposed project decommissioning works, with the implementation of the recommended mitigation measures for surrounding environment and the large separation distance between the Site to ASRs, no adverse residual impact would be anticipated from this Project.

4.1.1.2 Monthly Dust Monitoring Report will be submitted within 2 weeks after the end of the reporting month during decommissioning phase to include basic project information, impact monitoring data, non-compliance, findings and recommendations.

4.1.1.3 This Dust Monitoring Plan is prepared in accordance with the Clause 2.2 of the Further Environmental Permit (FEP-01/618/2022) and Clause 2.2 of the Environmental Permit (EP/618/2022), details and reporting requirements of the dust monitoring during the decommissioning works and no adverse residual impact would be anticipated from the decommissioning works.

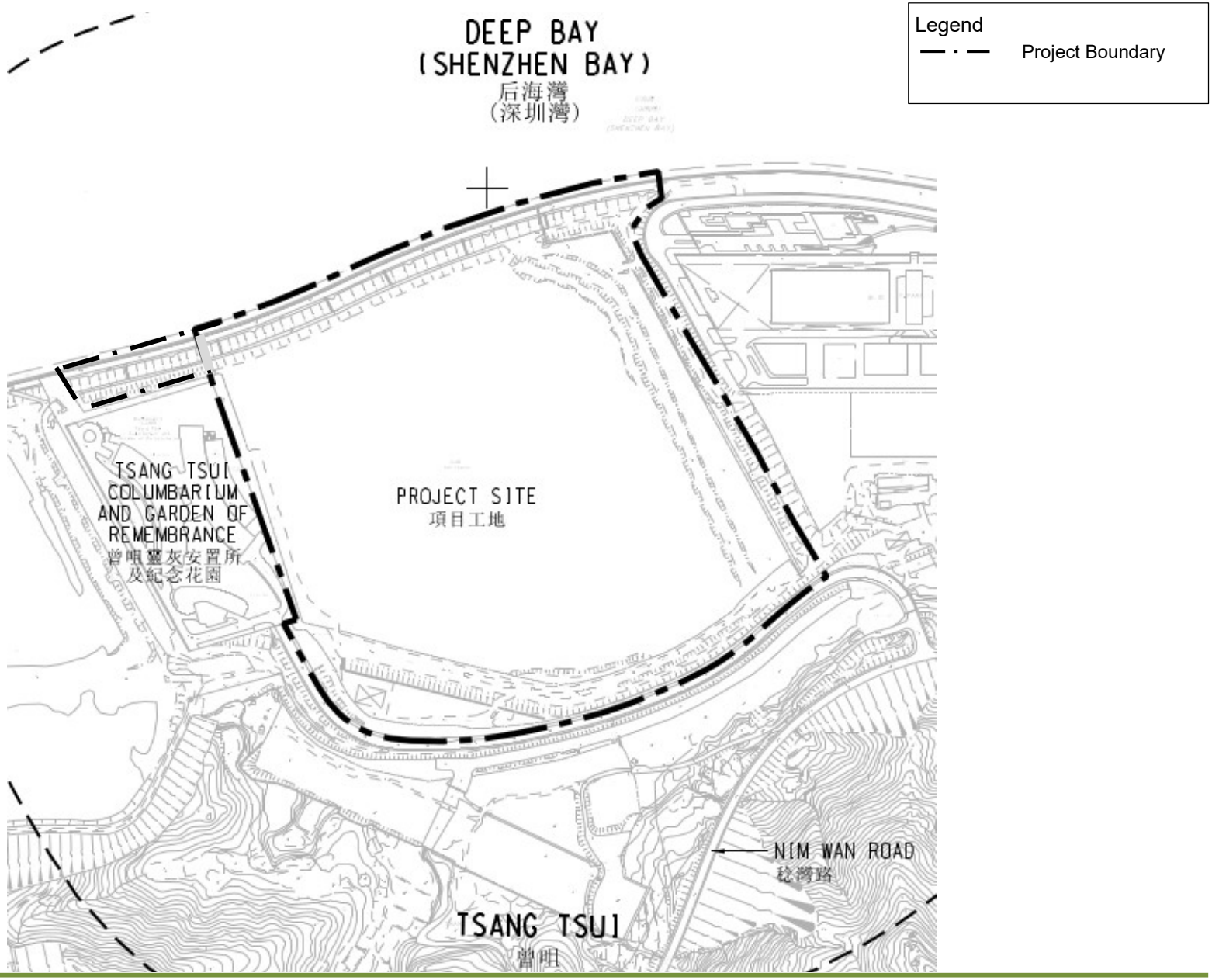


Figure 2.1 Site Layout Plan

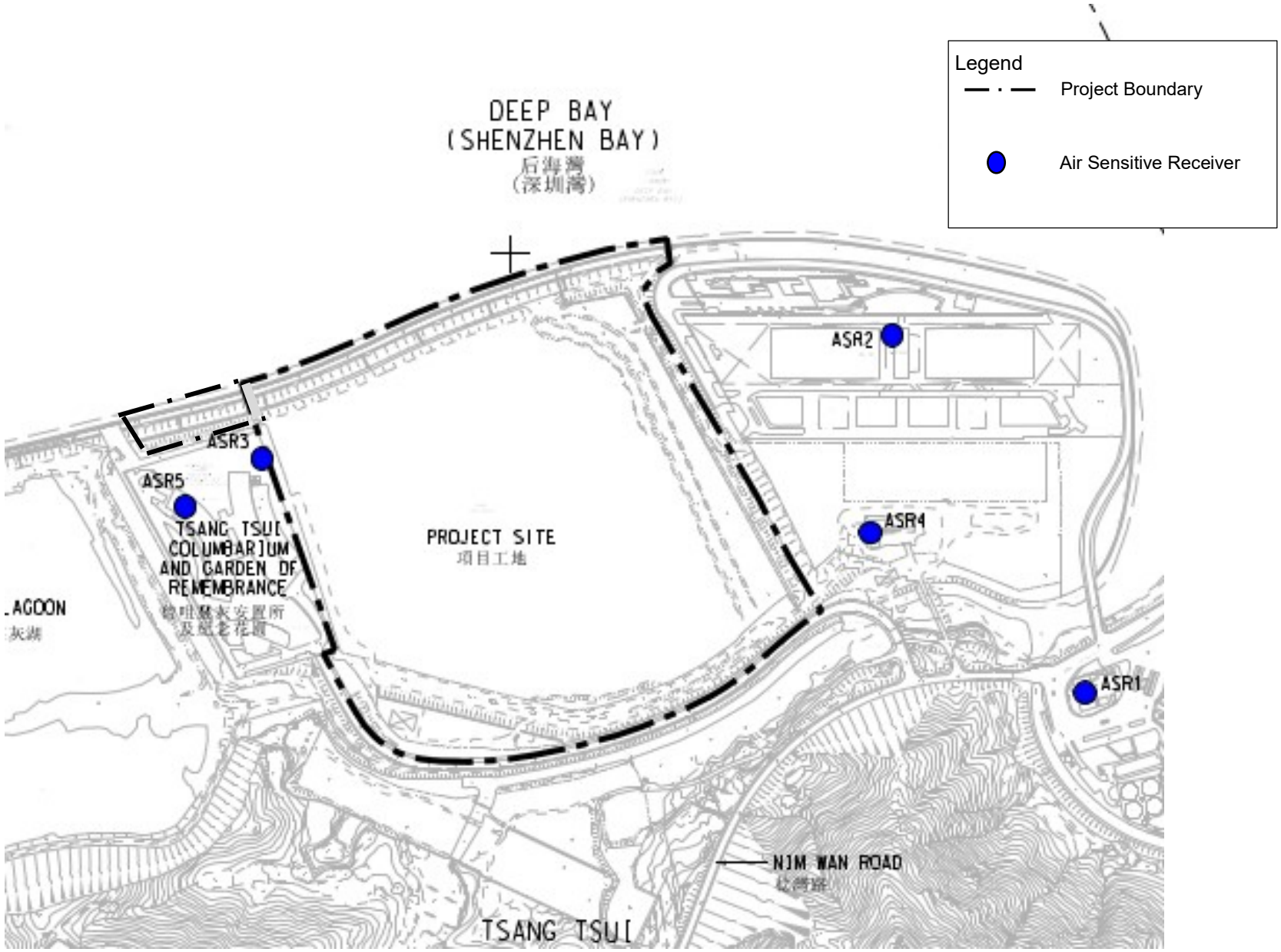


Figure 3.1 Location of Representative Air Sensitive Receivers

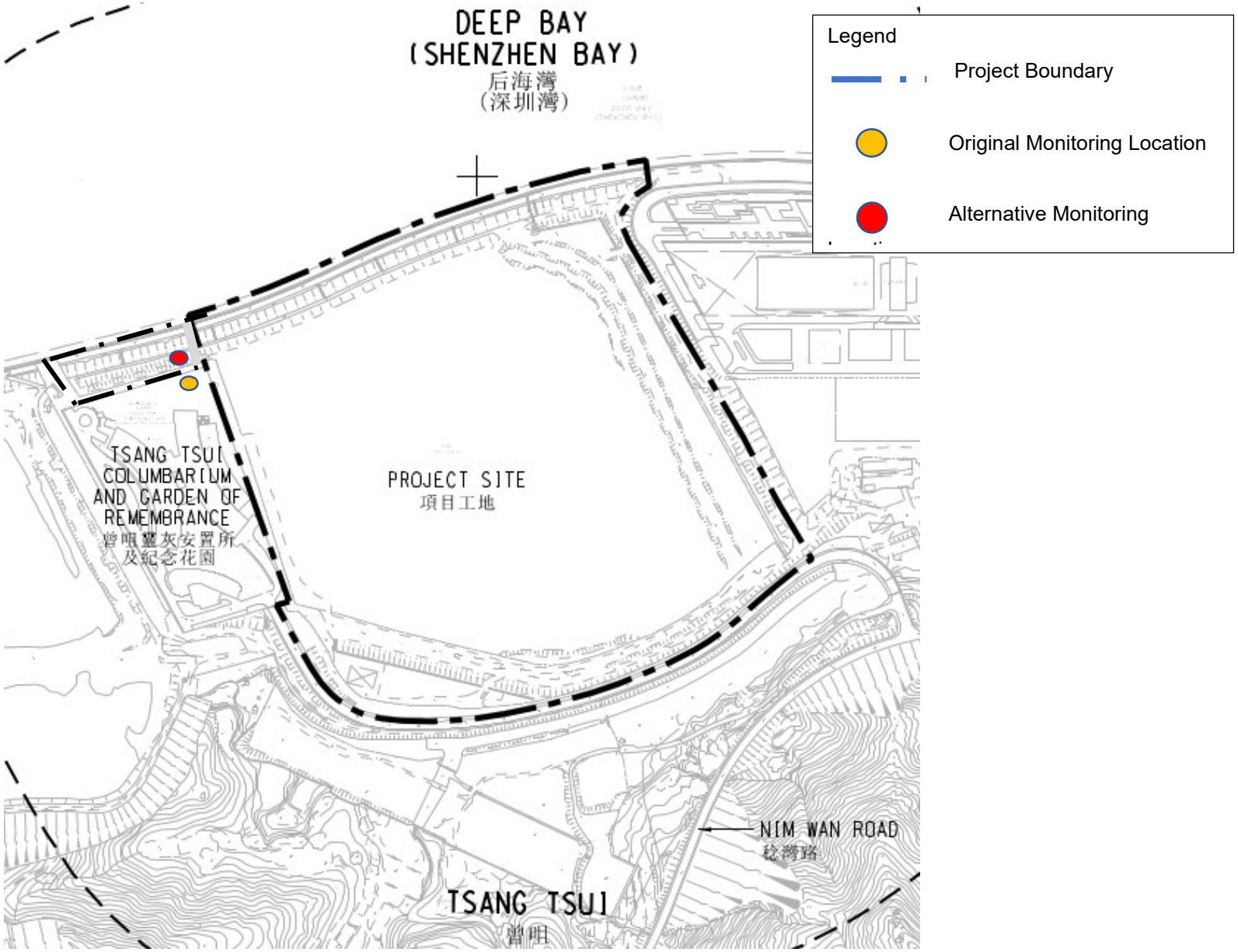
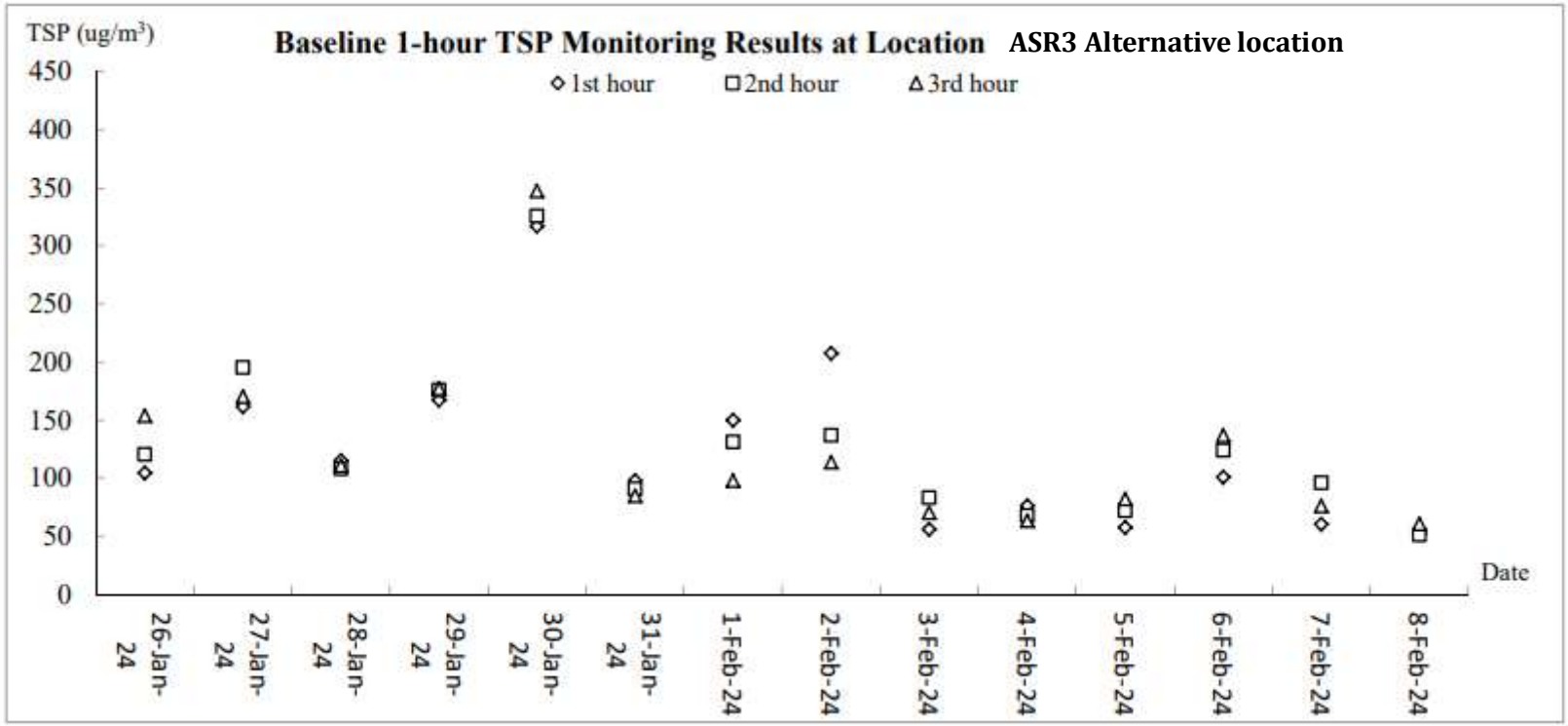


Figure 4.1 Monitoring Location

Appendix 1: Detailed 1-hr TSP Monitoring Data

Date	ASR3 Alternative Location				
	Start Time	1st hour	2nd hour	3rd hour	Equipment No.
26-Jan-24	13:52	105	121	154	EQ110
27-Jan-24	09:55	162	195	170	EQ105
28-Jan-24	12:30	115	108	111	EQ101
29-Jan-24	10:26	167	176	177	EQ101
30-Jan-24	10:25	317	326	348	EQ101
31-Jan-24	09:46	98	91	85	EQ101
1-Feb-24	12:22	150	131	98	EQ101
2-Feb-24	13:26	208	137	114	EQ101
3-Feb-24	13:00	56	83	70	EQ101
4-Feb-24	12:14	76	68	63	EQ101
5-Feb-24	14:28	58	72	82	EQ101
6-Feb-24	10:45	101	124	137	EQ101
7-Feb-24	12:09	60	96	76	EQ101
8-Feb-24	12:33	52	51	61	EQ101
	Average	:	125	µg/m3	
	Min	:	51	µg/m3	
	Max	:	348	µg/m3	

Appendix 1: Graphical Presentation



Appendix 1: Photographic Record

Appendix 1: Calibration Record

Equipment Verification Report (TSP)

Equipment Calibrated:

Type:	Laser Dust monitor
Manufacturer:	Sibata LD-3B
Serial No.	366410
Equipment Ref:	EQ110

Standard Equipment:

Standard Equipment:	Higher Volume Sampler (TSP)
Location & Location ID:	Site boundary of Middle Tsang Tsui Ash Lagoon
Equipment Ref:	HVS 022
Last Calibration Date:	16 January 2024

Equipment Verification Results:

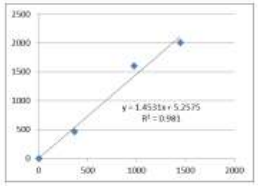
Verification Date: 16 January 2024

Date	Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in ug/m³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/min)
16-Jan-24	1hr 14min	12:07 ~ 13:21	18.7	1022.1	2004.6	106884	1448.3
16-Jan-24	1hr 07min	13:40 ~ 14:47	18.7	1022.1	1604.7	65450	974.0
16-Jan-24	1hr 07min	14:49 ~ 15:56	18.7	1022.1	464.8	24665	367.0

Sensitivity Adjustment Scale Setting (Before Calibration) 674 (CPM)
Sensitivity Adjustment Scale Setting (After Calibration) 674 (CPM)

Linear Regression of Y or X

Slope (K-factor): 1.4531 (μg/m³)/CPM
Correlation Coefficient (R) 0.9904
Date of Issue 25 January 2024



Remarks:

1. **Strong** Correlation (R>0.8)
2. Factor 1.4531 (μg/m³)/CPM should be apply for TSP monitoring

*If R<0.5, repair or re-verification is required for the equipment

Operator : Gary Ng Signature : Date : 25 January 2024

QC Reviewer : Ben Tam Signature : Date : 25 January 2024

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Site boundary of Middle Tsang Tsui Ash Lagoon	Date of Calibration:	16 Jan 24
Location ID :	AM(D)7a	Next Calibration Date:	16 Mar 24

CONDITIONS

Sea Level Pressure (hPa)	1022.1	Corrected Pressure (mm Hg)	766.575
Temperature (°C)	18.7	Temperature (K)	292

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.13163
Model->	5025A	Qstd Intercept ->	-0.03523
Calibration Date->	15-Dec-23	Expiry Date->	15-Dec-24

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION	
18	3.8	-8	11.8	1.652	58	58.88	Slope =	37.0901
13	2.6	-6.8	9.4	1.477	52	52.79	Intercept =	-1.8561
10	1.4	-5.7	7.1	1.285	46	46.69	Corr. coeff. =	0.9977
8	0.4	-4.5	4.9	1.071	38	38.57		
5	-0.4	-3.6	3.2	0.868	29	29.44		

Calculations :

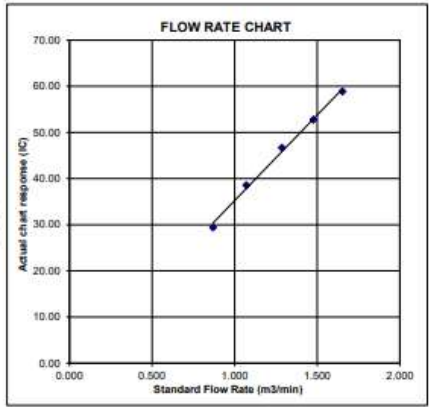
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

1/m(1)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



Equipment Verification Report (TSP)

Equipment Calibrated:

Type:	Laser Dust monitor
Manufacturer:	Sibata LD-3B
Serial No.	2X6145
Equipment Ref:	EQ105

Standard Equipment:

Standard Equipment:	Higher Volume Sampler (TSP)
Location & Location ID:	Site boundary of Middle Tsang Tsui Ash Lagoon
Equipment Ref:	HVS 022
Last Calibration Date:	16 January 2024

Equipment Verification Results:

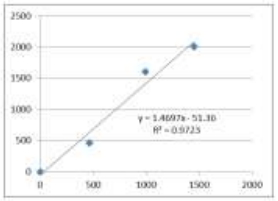
Verification Date: 16 January 2024

Date	Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in ug/m³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/min)
16-Jan-24	1hr 14min	12:07 ~ 13:21	18.7	1022.1	2004.6	107246	1453.2
16-Jan-24	1hr 07min	13:40 ~ 14:47	18.7	1022.1	1604.7	66880	995.2
16-Jan-24	1hr 07min	14:49 ~ 15:56	18.7	1022.1	464.8	31140	463.4

Sensitivity Adjustment Scale Setting (Before Calibration) 586 (CPM)
Sensitivity Adjustment Scale Setting (After Calibration) 586 (CPM)

Linear Regression of Y or X

Slope (K-factor): 1.4697 (μg/m³)/CPM
Correlation Coefficient (R) 0.9861
Date of Issue 25 January 2024



Remarks:

1. **Strong** Correlation (R>0.8)
2. Factor 1.4697 (μg/m³)/CPM should be apply for TSP monitoring

*If R<0.5, repair or re-verification is required for the equipment

Operator : Gary Ng Signature : Date : 25 January 2024

QC Reviewer : Ben Tam Signature : Date : 25 January 2024

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Site boundary of Middle Tsang Tsui Ash Lagoon	Date of Calibration:	16 Jan 24
Location ID :	AM(D)7a	Next Calibration Date:	16 Mar 24

CONDITIONS

Sea Level Pressure (hPa)	1022.1	Corrected Pressure (mm Hg)	766.575
Temperature (°C)	18.7	Temperature (K)	292

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.13163
Model->	5025A	Qstd Intercept ->	-0.03523
Calibration Date->	15-Dec-23	Expiry Date->	15-Dec-24

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION	
18	3.8	-8	11.8	1.652	58	58.88	Slope =	37.0901
13	2.6	-6.8	9.4	1.477	52	52.79	Intercept =	-1.8561
10	1.4	-5.7	7.1	1.285	46	46.69	Corr. coeff. =	0.9977
8	0.4	-4.5	4.9	1.071	38	38.57		
5	-0.4	-3.6	3.2	0.868	29	29.44		

Calculations :

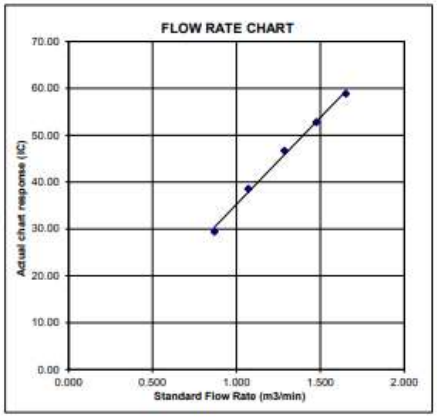
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

1/m(I)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



Equipment Verification Report (TSP)

Equipment Calibrated:

Type:	Laser Dust monitor
Manufacturer:	TSI AM510
Serial No.	11008060
Equipment Ref:	EQ101

Standard Equipment:

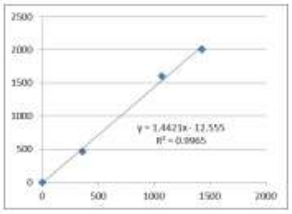
Standard Equipment:	Higher Volume Sampler (TSP)
Location & Location ID:	Site boundary of Middle Tsang Tsui Ash Lagoon
Equipment Ref:	HVS 022
Last Calibration Date:	16 January 2024

Equipment Verification Results:

Verification Date: 16 January 2024

Date	Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m³ (Standard Equipment)	Concentration in mg/m³ (Calibrated Equipment)	Tolerance (mg/m³)
16-Jan-24	1hr 14min	12:07 - 13:21	18.7	1022.1	2004.6	1430.0	-574.6
16-Jan-24	1hr 07min	13:40 - 14:47	18.7	1022.1	1604.7	1070.0	-534.7
16-Jan-24	1hr 07min	14:49 - 15:56	18.7	1022.1	464.8	360.0	-104.8

Linear Regression of Y or X
Slope (K-factor): 1.4421 (μg/m³)
Correlation Coefficient (R) 0.9982
Date of Issue 25 January 2024



Remarks:

1. **Strong** Correlation (R>0.8)
2. Factor 1.4421 (μg/m³) should be apply for TSP monitoring

*If R<0.5, repair or re-verification is required for the equipment

Operator : Gary Ng Signature : Date : 25 January 2024

QC Reviewer : Ben Tam Signature : Date : 25 January 2024

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Site boundary of Middle Tsang Tsui Ash Lagoon	Date of Calibration:	16 Jan 24
Location ID :	AM(D)7a	Next Calibration Date:	16 Mar 24

CONDITIONS

Sea Level Pressure (hPa)	1022.1	Corrected Pressure (mm Hg)	766.575
Temperature (°C)	18.7	Temperature (K)	292

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.13163
Model->	5025A	Qstd Intercept ->	-0.03523
Calibration Date->	15-Dec-23	Expiry Date->	15-Dec-24

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	3.8	-8	11.8	1.652	58	58.88	Slope = 37.0901
13	2.6	-6.8	9.4	1.477	52	52.79	Intercept = -1.8561
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8	0.4	-4.5	4.9	1.071	38	38.57	
5	-0.4	-3.6	3.2	0.868	29	29.44	

Calculations :

Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
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Qstd = standard flow rate
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For subsequent calculation of sampler flow:

1/m(I)[Sqrt(298/Tav)(Pav/760)]-b)

m = sampler slope
b = sampler intercept
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Tav = daily average temperature
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