

Our ref: 13-4-2023

13-4-2023

By hand

Environmental Protection Department

Environmental Assessment Division

Metro Assessment Group

Kowloon Section (2)

27th floor, Southorn Centre,

130 Hennessy Road,

Wan Chai, Hong Kong

(Attn: Mr. TANG Ho Him, Matthew)

Dear Mr. TANG,

Contract No. EDO 2/2020

Environmental Monitoring Works for Contract No. ED/2018/05 – Kai Tak Development – Stage 5B Infrastructure Works at the Former North Apron Area

Submission of Monthly EM&A Report for March 2023 (Version 1.0)

I refer to the Environment Permit (EP) No. EP-337/2009 for the captioned project.

Pursuant to Condition 3.3 of the EP-337/2009, please find enclosed four hard copies and one electronic copy of Monthly EM&A Report for March 2023 (Version 1.0), which has been verified by the IEC for your reference.

Thank you very much for your attention and please feel free to contact Mr. Lee at 2618 2166 should you require further information.

Yours faithfully,

For and on behalf of

Ka Shing Management Consultant Limited

AKCL

Applied knowledge center limited

Company Secretary

Encl. Monthly EM&A report for March 2023 (Version 1.0)

Date: 13 April 2023
Your ref:
Our ref: PL-202304008

AECOM Asia Company Limited
12/F, Grand Central Plaza, Tower 2,
138 Shatin Rural Committee Road,
Shatin, New Territories,
Hong Kong

Attn.: Ms. Mavis Law, SRE

Dear Ms. Law,

**Re: Agreement No. EDO 6/2019
Independent Environmental Checker for Contract No. ED/2018/05 Kai Tak Development –
Stage 5B Infrastructure Works at the Former North Apron Area
Verification of Monthly EM&A Report (March 2023)**

Reference is made to the Monthly EM&A Report (March 2023) (Version 1.0) issued by the Environmental Team on 12 April 2023.

Please be informed that we have no adverse comment on the captioned submission. We hereby verify the Monthly EM&A Report (March 2023) in accordance with Condition 3.3 of Environmental Permit No. EP-337/2009.

Thank you for your attention.

Yours sincerely,
For and on behalf of
Acuity Sustainability Consulting Limited



Kevin Li
Independent Environmental Checker

c.c.	CEDD	Attn.: Mr. Albert Tse	By email
	Ka Shing	Attn.: Mr. Chan Pang (ETL)	By email

Environmental Monitoring and Audit Report
for
Contract No. ED/2018/05 –
Kai Tak Development – Stage 5B infrastructure
works at the former north apron area

Contract No.: EDO 2/2020

March 2023

(Version 1.0)

Certified By:  _____

(Environmental Team Leader)

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EXECUTIVE SUMMARY

1. This is the 26th Monthly Environmental Monitoring & Audit (EM&A) report which summarises the findings of the EM&A Programme during the reporting period from 1 to 31 March 2023.

Breaches of Action and Limit Levels

2. 1-hour TSP monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.
3. 24-hour TSP monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.
4. Construction noise monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.
5. Summary of the non-compliance in the reporting month for the Project is tabulated in Table I.

Table I Non-compliance Record in the Reporting Month

Parameter	No. of Exceedance		Action Taken
	Action Level	Limit Level	
1-hr TSP	0	0	N/A
24-hr TSP	0	0	N/A
Construction noise	0	0	N/A

Complaint log

6. No complaint was received in the reporting month. Summary of complaints in the reporting month is tabulated in Table II.

Table II Summary of complaints in the Reporting Month

Date of complaint received	Date of complaint	Description of complaint	Recommendations / Action taken	Close-out date / Status
No complaint was received in the reporting month.	NA	NA	NA	NA

Notifications of summons and successful prosecutions

7. No notification of summons and successful prosecutions was received in the reporting month. Summary of summons and successful prosecutions in the reporting month is tabulated in Table III.

Table III Summary of summons and successful prosecutions in the Reporting Month

Date of receiving notification of summons or prosecutions	Date of event	Description of event	Action taken	Close-out date / Status
No notification of summons and successful prosecutions were received in the reporting month.	NA	NA	NA	NA

Report changes

8. There was no reporting change in the reporting month.

Key construction works in the reporting month

9. Major construction activities undertake during the reporting month included:
- Erection of falseworks and working platform for decking of Elevated Walkway LW-02
 - RC construction for decking of LW-02
 - RC construction works for lift and staircase of LW-02
 - ELS and excavation works for retrieving shaft at Sa Po Road
 - Steel back thrust construction at launching shaft for SB-01
 - Erect gantry crane at launching shaft for SB-01
 - Assembly of RTBM at launching shaft for SB-01

- Construction works for Road L16
- Construction works for DCS
- Construction works for Olympic Avenue
- RC construction for Subway KS10 Lift and Staircase
- Renovation works for existing subways KS9, KS32 and KS10
- Pre-bored socket H-pile construction works for Slip Road S14

Future key issues

10. The future key issues and potential impact in the coming month are given in Table IV.

Table IV Summary of future key issues and potential impact in the coming month

Future key issues in the coming month	Potential impact
Erection of falsework and working platform for decking of Elevated Walkway LW-02	Noise and Air Quality
RC construction of decking of LW-02	Noise and Air Quality
RC construction of LW02 lift and staircase	Noise and Air Quality
Excavation and ELS works for retrieving shaft at Sa Po Road	Noise and Air Quality
RC construction at Launching Shaft for SB-01	Noise and Air Quality
Construction of Road L16	Noise and Air Quality
Construction of DCS	Noise and Air Quality
Construction of Olympic Avenue	Noise and Air Quality
RC construction for Subway KS10 Lift and Staircase	Noise and Air Quality
Renovation works for existing Subways KS9, KS32 and KS10	Noise and Air Quality
Pre-bored socket H-pile construction works for Slip Road S14	Noise and Air Quality

1. INTRODUCTION

Project Background

- 1.1 The Kai Tak Development (KTD) is located in the southern part of Kowloon Peninsula of the HKSAR, comprising the apron and runway areas of the former Kai Tak Airport and existing waterfront areas at To Kwa Wan, Ma Tau Kok, Kowloon Bay, Kwun Tong and Cha Kwo Ling.
- 1.2 Contract No. ED/2018/05 - Kai Tak Development – stage 5B infrastructure works at the former north apron area (The Project), comprises mainly the design and construction of a section of dual two-lane Road D1; single two-lane Road L9 and Road L16; a single-lane slip road S14; a pedestrian subway SB-01; an elevated walkway LW-02; renovation of the existing pedestrian subways KS9, KS10 and KS32, as well as modification of the southern end of the existing pedestrian subway KS10; associated footpaths, street lighting, traffic aids, drainage, sewerage, water mains, landscaping, electrical and mechanical works, and ancillary works. The proposed works are shown in Figure 1 and Figure 2. The proposed works and site boundary are shown in Figure 3 and Figure 4. Civil Engineering and Development Department (CEDD) had completed an Environmental Impact Assessment (EIA) and is the Permit Holder.
- 1.3 In accordance with the approved EIA Reports, Environmental Monitoring and Audit (EM&A) programmes are recommended to ensure compliance with the EIA study recommendations. The project proponent was the Civil Engineering and Development Department (CEDD). AECOM Asia Co. Ltd. (AECOM) was commissioned by CEDD as Supervisor (act as Engineers' Representative (ER) listed in EM&A Manual). Acuity Sustainability Consulting Limited (Acuity) was commissioned as the Independent Environmental Checker (IEC). Build King – STEC Joint Venture (Build King) was appointed as the main Contractor for the construction works of Contract No. ED/2018/05. Ka Shing was commissioned by CEDD to undertake the role of the Environmental Team (ET) to implement the EM&A programme for The Project.
- 1.4 The construction work under ED/2018/05 comprises the EM&A Manual (EIA Register No. AEIAR-130/2009 for Kai Tak Development) and Environmental Permit No. EP- 337/2009.
- 1.5 Air quality and noise monitoring has been proposed in the EM&A Manual with EIA Register No. AEIAR-130/2009 for Kai Tak Development.

Project Organization

1.6 The project organization chart and with respect to the EM&A programme is shown in Appendix A. Information of key personnel contact names and telephone numbers are summarized in Table 1.1.

Table 1.1 Contact Information of Key Personnel

Party	Role	Contact Person	Position	Phone No.	E-mail
Civil Engineering and Development Department (CEDD)	Project Proponent	Mr. Lam Shing Tim	Permit Holder	3842 7090	st_lam@cedd.gov.hk
AECOM Asia Co. Ltd. (AECOM)	Supervisor (act as Engineers' Representative (ER) listed in EM&A Manual)	Mr. Vincent Lee	Supervisor's Delegate	2798 0771	sre2@ktd-stage5.com
Acuity Sustainability Consulting Limited (Acuity)	Independent Environmental Checker (IEC)	Mr. Kevin Li	IEC	9779 2247	kevin.li@aurecongroup.com
Ka Shing Management Consultant Limited (Ka Shing)	Environmental Team (ET)	Mr. Pang Chan	ET Leader	6082 2973	stage5b@ka-shing.net
Build King – STEC Joint Venture (BK-STEC)	Contractor	Mr. Rex Lau	Contractor's Representative	6282 5154	rex.lau@buildking.hk

Works Area and Construction Programme

1.7 The construction works commenced on 16 February 2021. The construction programme of the Project is given in Appendix B.

Construction works undertaken during reporting month

1.8 Major construction works of the Project in the reporting month are summarized in Table 1.2:

Table 1.2 Major activities of the Project during reporting month

Erection of falseworks for decking of Elevated Walkway LW-02	Assembly of RTBM at launching shaft for SB-01
RC construction for decking of LW-02	Construction works for Road L16
RC construction works for lift and staircase of LW-02	Construction works for DCS
ELS and excavation works for retrieving shaft at Sa Po Road	Construction works for Olympic Avenue
Steel back thrust construction at launching shaft for SB-01	RC construction for Subway KS10 Lift and Staircase
Erect gantry crane at launching shaft for SB-01	Renovation works for existing subways KS9, KS32 and KS10
Pre-bored socket H-pile construction works for Slip Road S14	

Submission Status under the Environmental Permits

1.9 The status of required submission under Environmental Permit (EP) conditions under EP-337/2009 are summarized in Table 1.3.

Table 1.3 Summary of Status of Required Submission of EPs

EP Condition EP-337/2009	Submission	Submission Date
Condition 1.11	Notification of Commencement Date of Construction of the Project	12 Jan 2021
Condition 2.3	Management Organization of Main Construction Companies	21 Sep 2020
Condition 2.3	Updated Management Organization of Main Construction Companies	4 July 2022
Condition 2.4	Design Drawings	12 Jan 2021
Condition 2.11	Landscape Mitigation Plans	17 Dec 2020
Condition 3.2	Baseline Monitoring Report	12 Jan 2021
Condition 3.3	Monthly EM&A Report (February 2023)	14 Mar 2023

2. AIR QUALITY MONITORING

Monitoring Requirements

2.1 In accordance with EM&A Manual (EIA Register No. AEIAR-130/2009), impact air quality monitoring shall be carried out during the construction phase of the Project. For regular impact monitoring, a sampling frequency of at least once in every six days will be strictly observed at all of the monitoring stations for 24-hour TSP. For 1-hour TSP monitoring, the sampling frequency of at least three times in every six days will be undertaken when the highest dust impact occurs.

Monitoring Locations

2.2 Two designated monitoring stations were selected for air quality monitoring programme. Impact air quality monitoring was conducted at two air quality monitoring stations in the reporting month. Table 2.1 describes the air quality monitoring locations, which are also depicted in Figure 5.

Table 2.1 Locations of Air Quality Monitoring Stations

Air Quality Monitoring Locations for the Project	Location of Measurement
AM2(A) – Ng Wah Catholic Secondary School	Rooftop
AM3 – Sky Tower	Podium floor near T7

Monitoring Parameters, Frequency and Duration

2.3 The air quality monitoring locations and monitoring frequency are listed in Table 2.2.

Table 2.2 Air Quality Monitoring Parameters, Frequency and Duration

Air Monitoring Station	Location for Measurement	Parameter	Duration	Frequency
AM2(A) – Ng Wah Catholic Secondary School	Rooftop	- 24-hour average TSP	- 24 hours	- Once every 6 days
AM3 – Sky Tower	Podium Floor near Tower 7	- 1-hour average TSP	- 1 hour	- Three times every 6 days

2.4 The monitoring schedule for reporting month and next month is presented in Appendix C.

2.5 Photographic records of the impact monitoring setup are shown in Appendix D.

Monitoring Equipment

2.6 24-hour average TSP and 1-hour average TSP levels were measured for impact monitoring. 24-hour average TSP levels were measured by the High Volume Samplers (HVS) and 1-hour average TSP levels were measured by direct reading method to indicate short-term impacts. Wind data monitoring equipment was set up at conspicuous locations for logging wind speed and wind direction near to the dust monitoring locations. Table 2.3 summarizes the equipment to be used in the air quality monitoring.

Table 2.3 Air Quality Monitoring Equipment

Equipment	Model	Quantity	Calibration Interval
HVS Sampler	TE-5170 X c/w of TSP sampling inlet	2	2 months
HVS Calibrator	TISCH TE-5025A	1	1 year
1-hour TSP Dust Meter	TSI Model AM510 SidePak Personal Aerosol Monitor	2	1 year
Weather Station	Davis Vantage Pro2 Weather Station	1	6 months

2.7 High volume samplers (HVS) (TE-5170 X c/w of TSP sampling inlet) comprising with appropriate sampling inlets were employed for 24-hour TSP monitoring. The sampler was composed of a motor, a filter holder, a flow controller and a sampling inlet and its performance specification complied with that required by USEPA Standard Title 40, Code of Federation Regulations Chapter 1 (Part 50).

2.8 Calibration certificates, catalogue of equipment are given in Appendix E.

Monitoring Methodology and QA/QC Procedure

24-hour TSP Monitoring

Operating/Analytical Procedures

2.9 Setup criteria of HVS are shown as follows:

- A horizontal platform with appropriate support to secure the samplers against gusty wind was provided.
- No two samplers were placed less than 2m apart.
- The distance between the sampler and an obstacle, such as buildings, was at least twice the height that the obstacle protrudes above the sampler.
- A minimum of 2m of separation from walls, parapets and penthouses was set for the rooftop samples.
- A minimum of 2m separation from any supporting structure, measured horizontally was set.
- No furnaces or incineration flues was nearby.
- Airflow around the sampler was unrestricted.
- Any wire fence and gate, to protect the samplers, was not caused any obstruction during monitoring.
- Permission were obtained to setup the samplers and to obtain access to the monitoring stations.
- A secured supply of electricity was provided to operate the samplers.

2.10 Prior to the commencement of the dust sampling, the flow rate of the HVS was properly set (between 1.1 m³/min. and 1.7 m³/min.) in accordance with the manufacturer's instruction to within the range recommended in USEPA Standard Title 40, CFR Part 50.

2.11 For TSP sampling, Glass Fiber Filter Media 8" x 10" having a collection efficiency of > 99 % for particles of 0.3 µm diameter were used.

2.12 The power supply was checked to ensure the sampler worked properly and then placed any filter media at the designated air monitoring station.

2.13 The filter holding frame was removed by loosening the four nuts and a weighted and conditioned filter was carefully centered with the stamped number upwards, on a supporting screen.

2.14 The filter was aligned on the screen so that the gasket formed an airtight seal on the outer edges of the filter. Then the filter holding frame was tightened to the filter holder with swing bolts. The applied pressure was sufficient to avoid air leakage at the edges.

2.15 The shelter lid was closed and secured with the aluminium strip.

2.16 The timer was programmed. Information was recorded on the record sheet, which included the starting time, the weather condition and the filter number (the initial weight of the filter paper can be found out by using the filter number).

2.17 After sampling, the filter was removed from the HVS and put into a clean and labeled seal plastic bag to avoid cross contamination. The elapsed time was also be recorded. The sampled filters were sent to the HOKLAS accredited or other internationally accredited laboratory for weighting.

Maintenance/Calibration

2.18 The following maintenance/calibration are required for the HVS:

- The HVS and their accessories were properly maintained. Appropriate maintenance such as routine motor brushes replacement and electrical wiring checking were made to ensure that the equipment and necessary power supply are in good working condition.
- High volume samplers were calibrated with at bi-monthly intervals using TE-5025A Calibration Kit throughout all stages of the air quality monitoring.

1-hour TSP Monitoring

Measurement Procedures

2.19 The measurement procedures of the 1-hour TSP were conducted in accordance with the Manufacturer's Instruction Manual as follows:

- Set up the dust meter on a tripod at 1.2m level.
- Turned on the dust meter and check the battery, if too low, change new ones. Pointed the meter to the source area or the planned measurement area.
- The zero calibration of the instrument was conducted before and after each sampling.
- TSP levels were recorded for 1-hour with 5-minute data logging interval.
- Recorded down the general meteorological conditions, Test ID no., start/end time, spot check reading at each sampling location for data processing.
- Recorded any activities that may generate dust during measurement period.

Maintenance/Calibration

2.20 The following maintenance/calibration are required for the direct dust meters:

- To validate the accuracy of dust meter, compare the results measured by dust meter and HVS every 12 months throughout all stages of the air quality monitoring.

Wind Data Monitoring

2.21 Wind Anemometer was installed at the roof-top of AM2(A) – Ng Wah Catholic Secondary School with 10m above ground and clear of constructions or turbulence caused by the buildings.

2.22 The wind data was captured by a data logger and the data was downloaded at least once per month for analysis.

2.23 The wind data monitoring equipment will be re-calibrated at least once every six months.

2.24 Wind direction is divided into 16 sectors of 22.5 degrees each.

2.25 Details of weather information during the monitoring period are shown in Appendix F.

Action and Limit Levels

2.26 The Action and Limit Levels of 24-hour average TSP and 1-hour average TSP are summarized in Table 2.4 and Table 2.5 respectively.

Table 2.4 Action and Limit Levels of 24-hour average TSP for Construction Dust Monitoring

Parameter	Air Monitoring Station	Action Level, $\mu\text{g}/\text{m}^3$	Limit Level, $\mu\text{g}/\text{m}^3$
24-hour average TSP	AM2(A)	175	260
	AM3	172	260

Table 2.5 Action and Limit Levels of 1-hour average TSP for Construction Dust Monitoring

Parameter	Air Monitoring Station	Action Level, $\mu\text{g}/\text{m}^3$	Limit Level, $\mu\text{g}/\text{m}^3$
1-hour average TSP	AM2(A)	302	500
	AM3	301	500

Impact Air Quality Monitoring results

2.27 Impact monitoring results for 24-hour average TSP and 1-hour average TSP levels at the designated air quality monitoring stations are summarized in Table 2.6 and Table 2.7 respectively.

Table 2.6 Summary of 24-hour average TSP Monitoring Data during the reporting month

Air Monitoring Station	Average TSP Concentration, $\mu\text{g}/\text{m}^3$	Range, $\mu\text{g}/\text{m}^3$	Action Level, $\mu\text{g}/\text{m}^3$	Limit Level, $\mu\text{g}/\text{m}^3$
AM2(A)	89	39 – 126	175	260
AM3	83	39 – 113	172	260

Table 2.7 Summary of 1-hour average TSP Monitoring Data during the reporting month

Air Monitoring Station	Average TSP Concentration, $\mu\text{g}/\text{m}^3$	Range, $\mu\text{g}/\text{m}^3$	Action Level, $\mu\text{g}/\text{m}^3$	Limit Level, $\mu\text{g}/\text{m}^3$
AM2(A)	76	35 – 108	302	500
AM3	70	33 – 99	301	500

2.28 There was no Action and Limit Level exceedance of 24-hour average TSP and 1-hour average TSP levels recorded during the reporting month.

2.29 Graphical presentation and detailed monitoring results of 24-hour average TSP and 1-hour average TSP levels are shown in Appendix G and Appendix H respectively.

2.30 The Event and Action Plan is provided in Appendix I.

2.31 Non-project related construction activities in the adjacent construction sites were observed during the reporting period and may affect the monitoring results.

2.32 Weather conditions during the monitoring periods were generally fine and did not affect the monitoring results.

3. NOISE MONITORING

Monitoring Requirements

- 3.1 In accordance with EM&A Manual (EIA Register No. AEIAR-130/2009), impact noise monitoring shall be carried out during the construction phase of the Project.
- 3.2 Regular monitoring, $L_{Aeq, 30\text{-minute}}$, for each station will be on a weekly basis and conduct one set of measurements between 0700 – 1900 hrs on normal weekdays.
- 3.3 If construction works are extended to include works during 1900 – 0700 hrs as well as public holidays and Sundays, additional weekly impact monitoring will be carried out during the respective restricted hours periods.

Monitoring Locations

- 3.4 Two designated monitoring stations were selected for noise monitoring programme. Impact noise monitoring was conducted at two noise monitoring stations in the reporting month. Table 3.1 describes the noise monitoring locations, which are also depicted in Figure 6.

Table 3.1 Locations of Noise Monitoring Stations

Noise Monitoring Locations for the Project	Location of Measurement
M4(A) – Le Billionnaire	Podium (Façade)
M5(A) – Prince Ritz	Podium (Façade)

Monitoring Parameters, Frequency and Duration

- 3.5 The noise monitoring locations and monitoring frequency are listed in Table 3.2.

Table 3.2 Noise Monitoring Parameters, Frequency and Duration

Noise Monitoring Station	Location for Measurement	Parameter	Frequency and Duration
M4(A) – Le Billionnaire	Podium (Façade)	L _{Aeq} , L _{A10} and L _{A90}	30-minute measurement at each monitoring station between 0700 – 1900 hrs on normal weekdays (Monday to Saturday) at frequency of once per week.
M5(A) – Prince Ritz	Podium (Façade)		

3.6 The monitoring schedule for reporting month and next month is presented in Appendix C.

3.7 Photographic records of the monitoring setup are shown in Appendix D.

Monitoring Equipment

3.8 As referred to the Technical Memorandum (TM) issued under the Noise Control Ordinance (NCO), sound level meters in compliance with the IEC 61672-1 (Type 1) standard [this standard replaced the International Electrotechnical Commission Publications 60651:1979 (Type 1) and 60804:1985 (Type 1)] were used for noise monitoring. Table 3.3 summarizes the equipment to be used in the noise monitoring.

Table 3.3 Noise Monitoring Equipment

Equipment	Model	Quantity	Calibration Interval
Sound Level Meter	RION NL52	1	1 year
Sound Level Calibrator	RION NC74	1	1 year
Air Flowmeter	TSI TA440 Air Velocity	1	1 year

3.9 Calibration certificates, catalogue of equipment are given in Appendix J.

Monitoring Methodology and QA/QC Procedure

3.10 The noise level measurement was conducted at 1m from the exterior of the nearby noise sensitive receivers building façade and at 1.2m above the ground and facing to the source area or the planned measurement area.

- 3.11 No noise measurement was conducted in the presence of fog, rain, wind with a steady speed exceeding 5 m/s or wind with gusts exceeding 10 m/s. Air flow was measured by air flow meter.
- 3.12 Turned on the sound level meter and check the battery, if too low, change new ones.
- 3.13 Calibration was conducted immediately prior to and after each noise measurement, the accuracy of the sound level meters was checked by using sound calibrator generating 1,000 Hz with 94dB. Measurement data was found to be valid only if the calibration levels from before and after the noise measurement agreed to within 1.0 dB.
- 3.14 Noise level was recorded.
- 3.15 Recorded any activities that may generate noise during measurement period.

Maintenance and Calibration

- 3.16 The microphone of the sound level meter and calibrator were cleaned with a soft cloth at quarterly intervals.
- 3.17 The sound level meter and sound calibrator were calibrated annually.
- 3.18 Calibration for sound level meter was conducted immediately prior to and following each noise measurement by using sound calibrator generating a known sound pressure level at a known frequency (1,000 Hz with 94dB). Measurements may be accepted as valid only if the calibration levels from before and after the noise measurement agree to within 1.0 dB.

Action and Limit Levels

- 3.19 The Baseline Noise Levels and Action and Limit Levels for construction noise is presented in Table 3.4.

Table 3.4 Baseline Noise Level and Action and Limit Levels for Construction Noise Monitoring

Time Period	Noise Monitoring Station	Baseline Noise Levels, dB (A)	Action Level	Limit Level [^]
0700 – 1900 hrs on normal weekdays	M4(A)	69.5	When one documented complaint is received.	75 dB(A)
	M5(A)	72.5		

Note: ^ If works are to be carried out during restricted hours, the conditions stipulated in the Construction Noise Permit (CNP) issued by the Noise Control Authority have to be followed.

Impact Noise Monitoring results

3.20 Impact noise monitoring results at the designated noise monitoring stations are summarized in Table 3.5 respectively.

Table 3.5 Summary of Noise Monitoring Data during the reporting month

Noise Monitoring Station	Measured $L_{Aeq, 30-min}$, Average, dB(A)	Measured $L_{Aeq, 30-min}$, Range, dB(A)	Action Level	Limit Level [^]
M4(A)	70.1	69.2 – 71.2	When one documented complaint is received	75 dB(A)
M5(A)	72.6	72.3 – 72.8		

Note: ^ If works are to be carried out during restricted hours, the conditions stipulated in the Construction Noise Permit (CNP) issued by the Noise Control Authority have to be followed.

3.21 There was no Action and Limit Level exceedance of $L_{Aeq, 30-min}$ recorded during the reporting month.

3.22 Graphical presentation and detailed monitoring results are shown in Appendix K.

3.23 The Event and Action Plan is provided in Appendix L.

3.24 Non-project related construction activities in the adjacent construction sites were observed during the reporting period and may affect the monitoring results.

3.25 Weather conditions during the monitoring periods were generally fine and did not affect the monitoring results.

4. COMPARISON OF EM&A RESULTS WITH EIA PREDICTIONS

4.1 The environmental impacts predictions were given in Agreement No. CE 35/2006(CE) Kai Tak Development Engineering Study cum Design and Construction of Advance Works - Investigation, Design and Construction - Kai Tak Development Environmental Impact Assessment Report, EIA Register No. AEIAR-130/2009 for Kai Tak Development (The EIA Report). The EM&A data was compared with the EIA predictions as summarized in Table 4.1 to Table 4.3.

Table 4.1 Comparison of 24-hour average TSP Monitoring Data with EIA predictions

Air Monitoring Station	ASR No. in EIA report	Predicted Cumulative Maximum 24-hour average TSP concentration		Measured 24-hr average TSP in Reporting Month (March 2023) $\mu\text{g}/\text{m}^3$
		Scenario 1 (Mid 2009 to Mid 2013), $\mu\text{g}/\text{m}^3$	Scenario 2 (Mid 2013 to Late 2016), $\mu\text{g}/\text{m}^3$	
AM2(A) - Ng Wah Catholic Secondary School	NA	NA	NA	39 – 126
AM3 - Sky Tower	A40 [^]	106 [^]	138 [^]	39 – 113

Note:

[^] Prediction results are given in the Table 3.13 of the EIA report EIA Register No. AEIAR-130/2009 for Kai Tak Development.

Table 4.2 Comparison of 1-hour average TSP Monitoring Data with EIA predictions

Air Monitoring Station	ASR No. in EIA report	Predicted Cumulative Maximum 1-hour average TSP concentration		Measured 1-hr average TSP in Reporting Month (March 2023) $\mu\text{g}/\text{m}^3$
		Scenario 1 (Mid 2009 to Mid 2013), $\mu\text{g}/\text{m}^3$	Scenario 2 (Mid 2013 to Late 2016), $\mu\text{g}/\text{m}^3$	
AM2(A) - Ng Wah Catholic Secondary School	NA	NA	NA	35 – 108
AM3 - Sky Tower	A40 [^]	217 [^]	247 [^]	33 – 99

Note:

[^] Prediction results are given in the Table 3.13 of the EIA report EIA Register No. AEIAR-130/2009 for Kai Tak Development.

Table 4.3 Comparison of Noise Monitoring Data with EIA predictions

Noise Monitoring Station	NSR No. in EIA report	Predicted Mitigated Construction Noise Levels during Normal Daytime Working Hour L _{Aeq, 30min} , dB(A)	Measured Noise Level in Reporting Month (March 2023) L _{Aeq, 30min} , dB(A)
M4(A) – Le Billionnaire	NA	NA	69.2 – 71.2
M5(A) – Prince Ritz	NA	NA	72.3 – 72.8

- 4.2 No prediction in the EIA Report for 24-hour TSP monitoring results at AM2(A).
- 4.3 24-hour TSP monitoring results at AM3 was recorded higher than the prediction for Scenario 1 (Mid 2009 to Mid 2013) in the EIA Report. Non-project related construction activities in the adjacent construction sites were observed during the reporting period and may affect the monitoring results.
- 4.4 No prediction in the EIA Report for 1-hour TSP monitoring results at AM2(A).
- 4.5 1-hour TSP monitoring results at AM3 was recorded lower than the prediction in the EIA Report. Non-project related construction activities in the adjacent construction sites were observed during the reporting period and may affect the monitoring results.
- 4.6 No prediction in the EIA Report for noise monitoring results at M4(A) and M5(A).

5. LANDSCAPE AND VISUAL MONITORING

5.1 In accordance with EM&A Manual (EIA Register No. AEIAR-130/2009), Landscape and Visual Monitoring shall be carried out during the construction phase of the Project. Regular impact monitoring will be conducted at least once per week.

Results and Observations

5.2 Site inspections were carried out on a weekly basis to monitor the timely implementation of proper environmental management practices and mitigation measures in the Project site.

5.3 Site inspections were conducted on 2, 9, 16, 23 and 30 March 2023 in the reporting month.

5.4 The summary of site audits is attached in Table 5.1.

Table 5.1 Summary of observations of Landscape and Visual impact during the reporting month

Inspection Date	Key Observations	Recommendations / Actions	Close-out Date / Status
2 March 2023	No	NA	NA
9 March 2023	No	NA	NA
16 March 2023	No	NA	NA
23 March 2023	No	NA	NA
30 March 2023	No	NA	NA

5.5 No non-compliance of the landscape and visual impact was recorded in the reporting month.

5.6 Should non-compliance of the landscape and visual impact occur, action in accordance with the action plan presented in Appendix M shall be performed.

6. ENVIRONMENTAL SITE INSPECTION AND AUDIT





Site Inspection






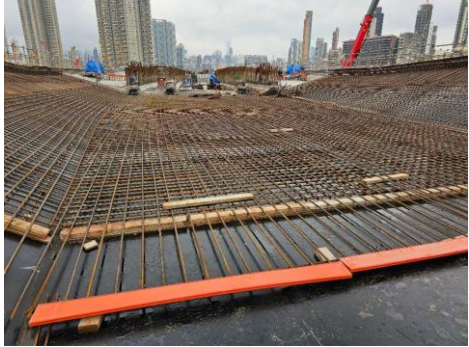
6.1 Site inspections were carried out on a weekly basis to monitor the timely implementation of proper environmental management practices and mitigation measures in the Project site.



6.2 Site inspections were conducted 2, 9, 16, 23 and 30 March 2023 in the reporting month.

6.3 The summaries of site audits are attached in Table 6.1.

Table 6.1 Summary of site inspections observations during the reporting month

Inspection Date	Key Observations	Recommendations / Actions	Close-out Date / Status
2 March 2023	 <p>Observation: Secondary container shall be provided for the plastic diesel engine oil to prevent soil contamination in LW02.</p>	 <p>Action Taken: The plastic diesel engine oil has been removed.</p>	Closed out on 9 March 2023
9 March 2023	 <p>Observation: The NNRM label for the excavator was missing. Please ensure the label is properly demonstrated.</p>	 <p>Action Taken: The NNRM label has been display for the excavator.</p>	Closed out on 16 March 2023

Inspection Date	Key Observations	Recommendations / Actions	Close-out Date / Status
16 March 2023	 <p>Observation: Secondary container shall be provided for the plastic diesel engine oil to prevent soil contamination.</p>	 <p>Action Taken: The plastic diesel engine oil has been removed.</p>	Closed out on 23 March 2023
23 March 2023	 <p>Observation: Every stock of more than 20 bags of cement should be covered entirely by impervious sheeting placed in an area sheltered on the top and the three sides.</p>	 <p>Action taken: Stockpiles have been removed.</p>	Closed out on 28 March 2023
30 March 2023	 <p>Observation: Construction waste on footbridge at LW02 shall be removed timely.</p>	 <p>Action taken: Construction waste on footbridge at LW02 has been removed.</p>	Closed out on 6 April 2023

Inspection Date	Key Observations	Recommendations / Actions	Close-out Date / Status
30 March 2023	 <p>Observation: Vehicle battery (chemical) shall be stored at proper area to avoid soil contamination.</p>	 <p>Action taken: Vehicle battery (Chemical) has been removed.</p>	Closed out on 6 April 2023

Status of Waste Management

6.4 The amount of wastes generated by the major site activities of the work contracts within the Project during the reporting month is shown in Appendix N.

6.5 The Contractor was registered as a chemical waste producer for the Project. The Contractor was reminded that chemical waste containers should be properly treated and stored temporarily in designated chemical waste storage area on site in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.

Status of Environmental Licenses, Notification and Permits

6.6 A summary of the relevant permits, licenses and/or notifications on environmental protection for the Project is shown in Table 6.2.

Table 6.2 Summary of Environmental Licenses, Notifications and Permits

Environmental Licenses, Notifications and Permits	Ref. No.	Valid Form	Valid Till
Environmental Permit under EIAO	EP-337/2009	23 Apr 2009	N/A
Construction Dust Notification under APCO	HA/1826/1	29 Dec 2020	N/A
Waste Disposal Billing Account	7038086	21 Aug 2020	N/A
Registration as a Chemical Waste Producer	5111-286-B2596-01	15 Sep 2020	N/A

Environmental Licenses, Notifications and Permits	Ref. No.	Valid Form	Valid Till
Wastewater Discharge License under WPCO	WT00037618-2021	29 Mar 2021	31 Mar 2026
	WT00037370-2021		
	WT00038562-2021	15 Jul 2021	31 Jul 2026
Construction Noise Permit	GW-RE1383-22	30 Dec 2022	19 Jun 2023
	GW-RE1385-22	23 Dec 2022	19 Jun 2023
	GW-RE1401-22	23 Dec 2022	19 Jun 2023

Implementation Status of Environmental Mitigation Measures

6.7 The Contractor has implemented environmental mitigation measures and requires as stated in the EIA report, the EP and the EM&A Manual. The implementation status of the mitigation measures is summarized in Appendix O.

Environmental Complaint and Non-compliance

6.8 No complaint was received in the reporting month. Summary of complaints in the reporting month is tabulated in Table 6.3.

Table 6.3 Summary of complaints in the Reporting Month

Date of complaint received	Date of complaint	Description of complaint	Recommendations / Action taken	Close-out date / Status
No complaint was received in the reporting month.	NA	NA	NA	NA

6.9 Complaint log is shown in Appendix P.

Notifications of summons and successful prosecutions

6.10 No notification of summons and successful prosecutions was received in the reporting month. Summary of summons and successful prosecutions in the reporting month is tabulated in Table 6.4.

Table 6.4 Summary of summons and successful prosecutions in the Reporting Month

Date of receiving notification of summons or prosecutions	Date of event	Description of event	Action taken	Close-out date / Status
No notification of summons and successful prosecutions were received in the reporting month.	NA	NA	NA	NA

6.11 The summaries of cumulative environmental complaint, warning, summon and notification of successful prosecution for the Project is presented in Appendix P.

7. FUTURE KEY ISSUES

Construction Programme in the coming month

7.1 The major construction activities and potential impacts in the next reporting month are as follows:

Table 7.1 Summary of future key issues and potential impact in the coming month

Future key issues in the coming month	Potential impact
Erection of falsework and working platform for decking of Elevated Walkway LW-02	Noise and Air Quality
RC construction of decking of LW-02	Noise and Air Quality
RC construction of LW02 lift and staircase	Noise and Air Quality
Excavation and ELS works for retrieving shaft at Sa Po Road	Noise and Air Quality
RC construction at Launching Shaft for SB-01	Noise and Air Quality
Construction of Road L16	Noise and Air Quality
Construction of DCS	Noise and Air Quality
Construction of Olympic Avenue	Noise and Air Quality
RC construction for Subway KS10 Lift and Staircase	Noise and Air Quality
Renovation works for existing Subways KS9, KS32 and KS10	Noise and Air Quality
Pre-bored socket H-pile construction works for Slip Road S14	Noise and Air Quality

7.2 The mitigation measures for environmental impact including Air Quality, Construction Noise, Water Quality, Chemical and Waste Management, Landscape and Visual shall be implemented:

- Sufficient watering of the works site with the active dust emitting activities,
- Limitation of the speed for vehicles on unpaved site roads,
- Properly cover the stockpiles,
- Good maintenance to the plant and equipment,
- Use of quieter plant and Quality Powered Mechanical Equipment (QPME),
- Provide movable noise barriers,
- Appropriate desilting/ sedimentation devices provided on site for treatment before discharge,
- Well maintain the drainage system to prevent the spillage of wastewater during heavy rainfall,
- Onsite waste sorting and implementation of trip ticket system,
- Good management and control on construction waste reduction,
- Erection of decorative screen hoarding,
- Strictly following the Environmental Permits and Licenses, and

- Provide sufficient mitigation measures as recommended in Approved EIA Report.

7.3 The recommended environmental measures proposed in the EM&A Manual (EIA Register No. AEIAR-130/2009) shall be effectively implemented to minimize the potential environmental impacts. The Contractor is reminded to implement the mitigation measures properly.

Environmental Site Inspection and Monitoring Schedule for next month

7.4 The tentative schedule for weekly site inspection and air quality and noise monitoring in the next month is provided in Appendix C.

8. CONCLUSIONS

- 8.1 Environmental monitoring works were performed in the reporting month and all monitoring results were checked and reviewed.
- 8.2 1-hour TSP monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.
- 8.3 24-hour TSP monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.
- 8.4 Construction noise monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.
- 8.5 No complaint was received in the reporting month.
- 8.6 No notification of summons and successful prosecutions was received in the reporting month.
- 8.7 Based on the site inspection and audits, impact air quality and noise monitoring results, it was considered that the mitigation measures were effective to control the potential environmental impacts from the Project during the reporting period.

Figure

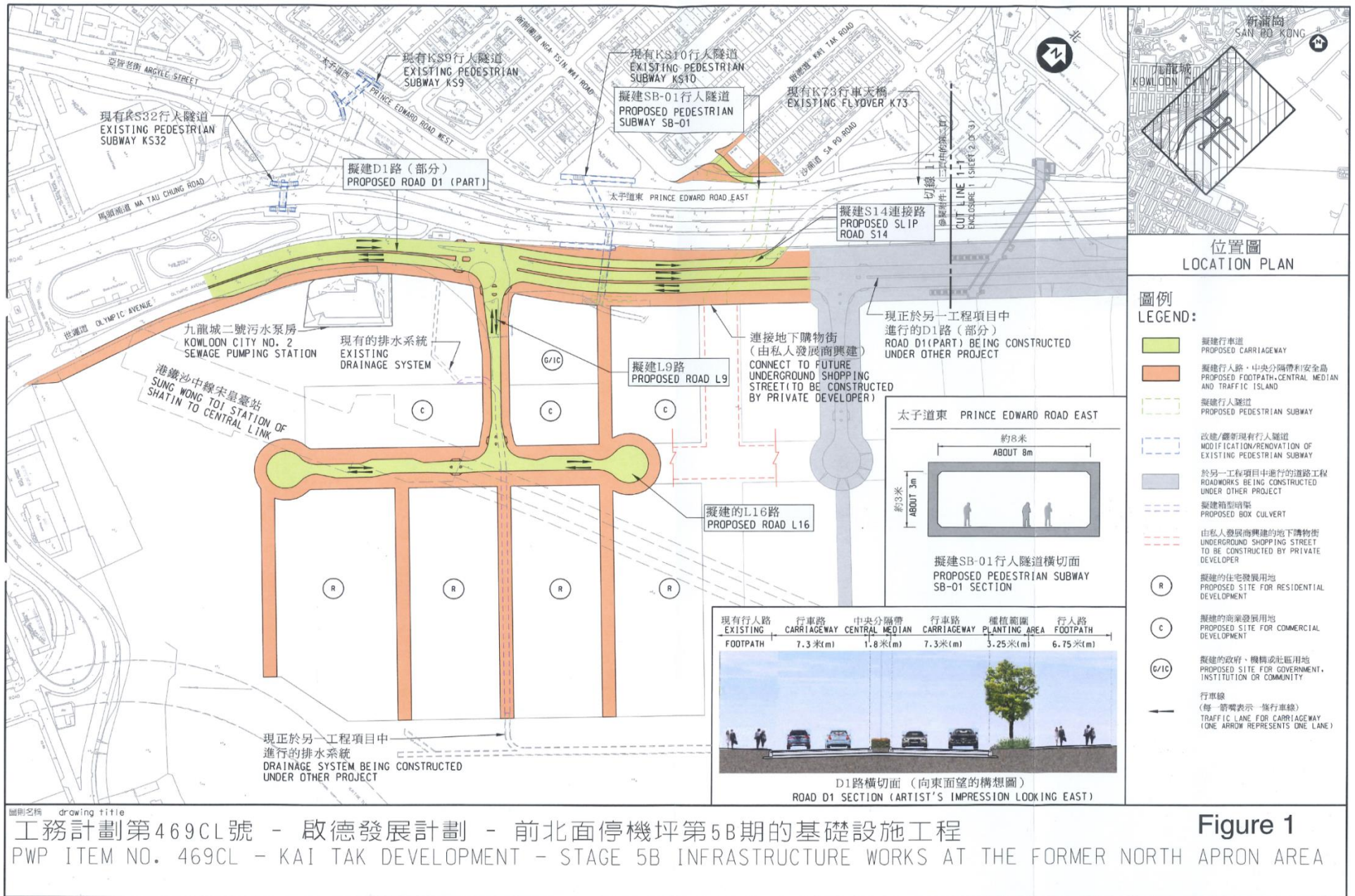


Figure 1 – Proposed works of Contract No. ED/2018/05

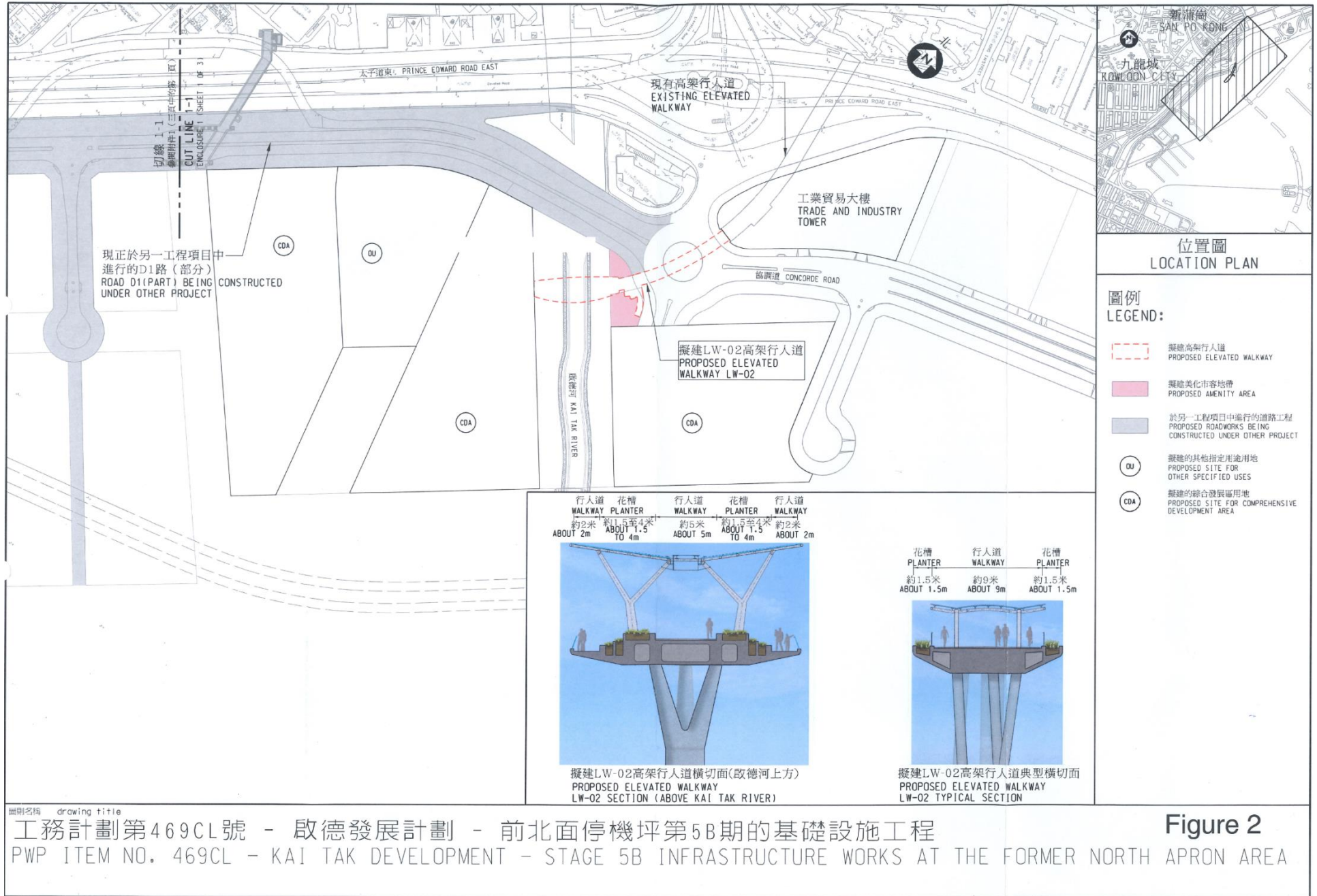


Figure 2

Figure 2 – Proposed works of Contract No. ED/2018/05

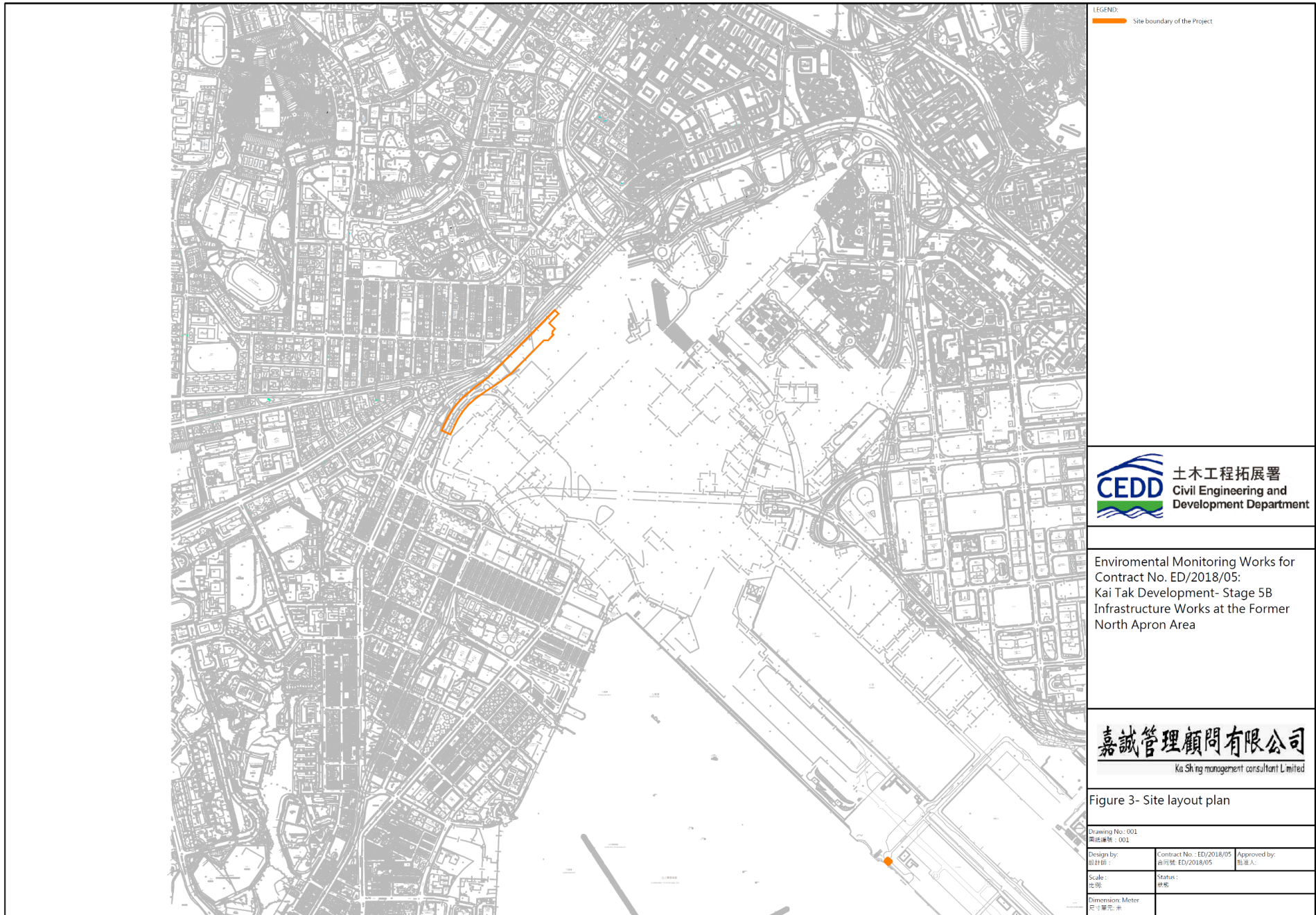


Figure 3 – D1 Road Site Layout Plan

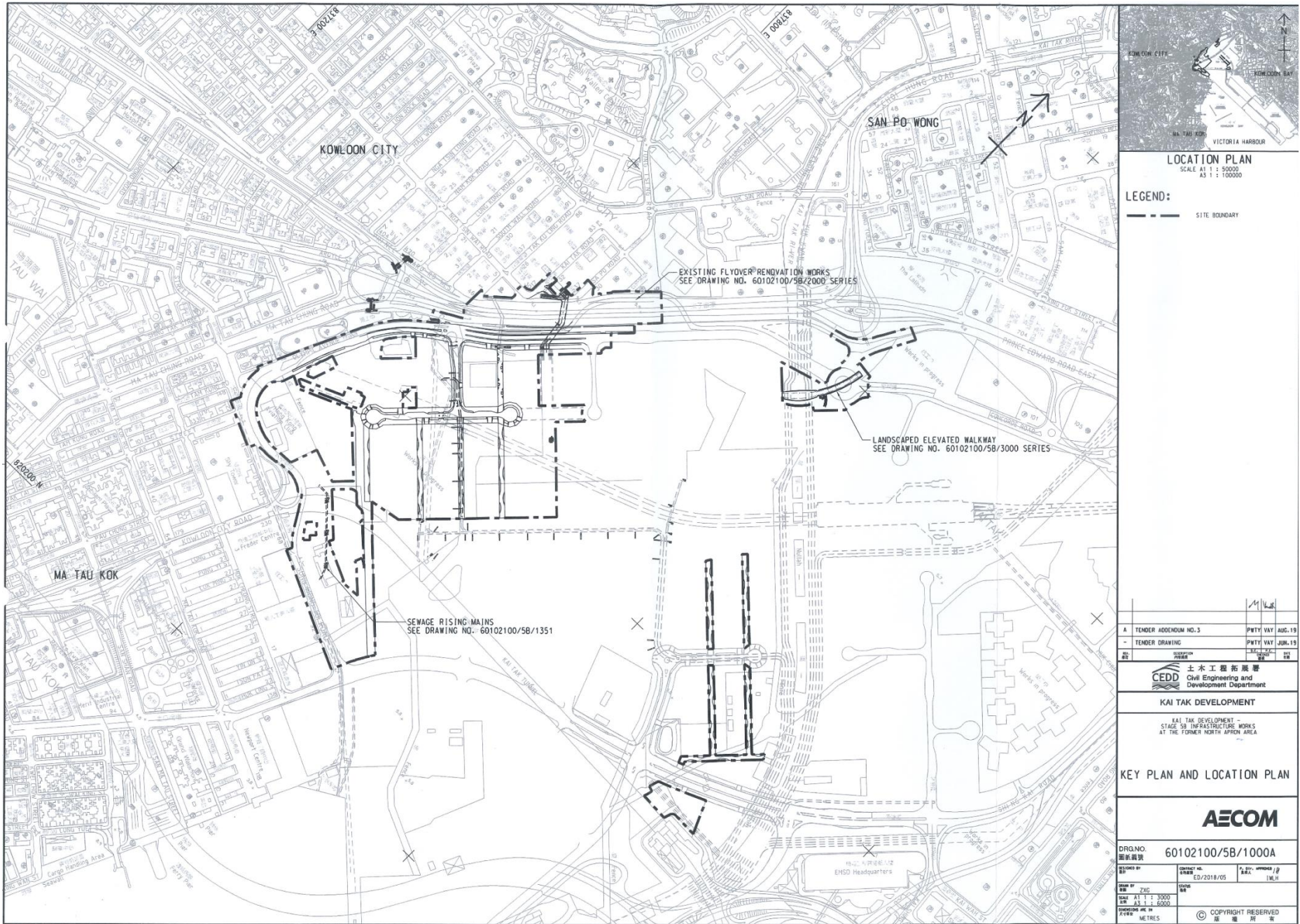
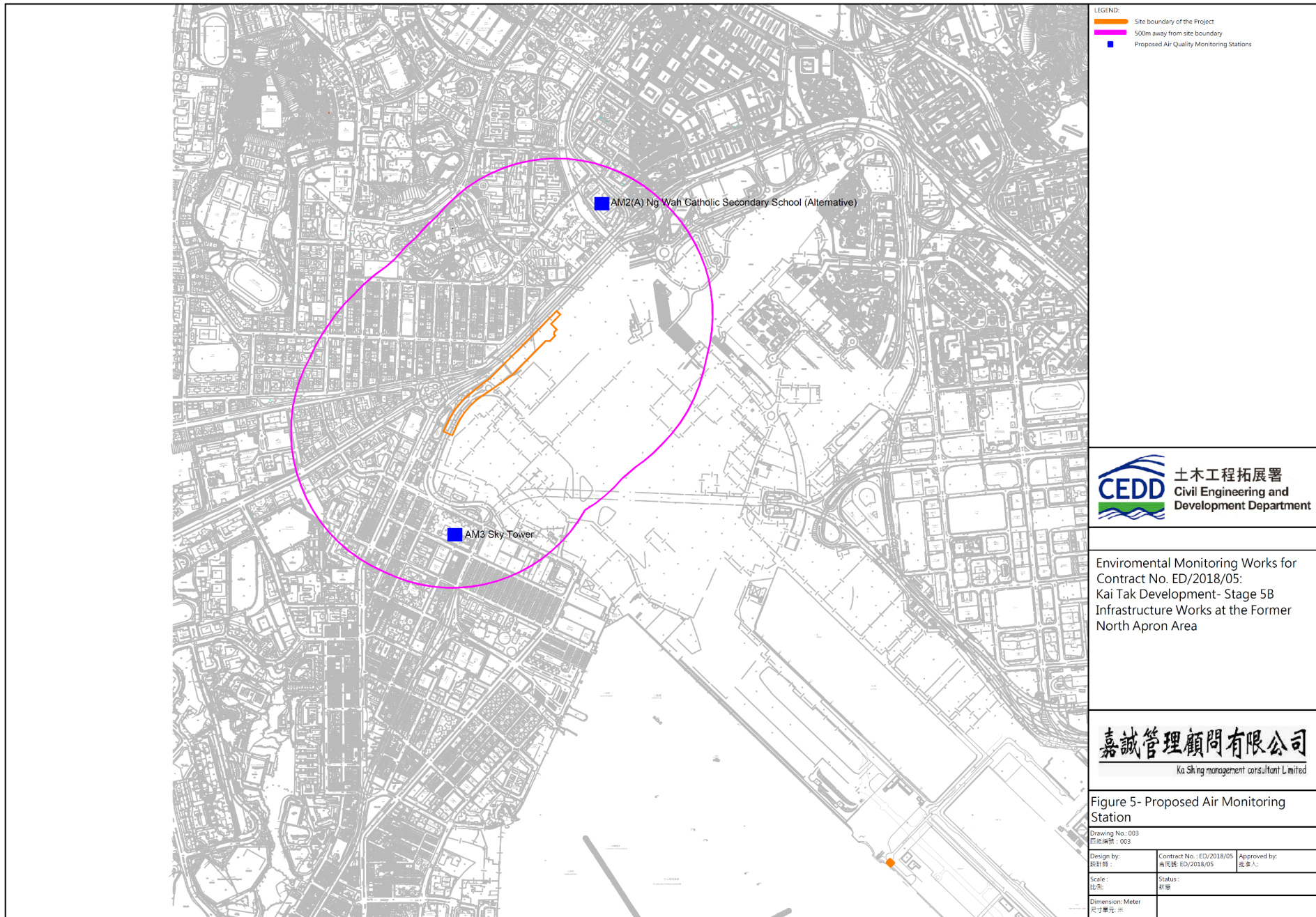


Figure 4 – Site Layout Plan



LEGEND:
 Site boundary of the Project
 500m away from site boundary
 Proposed Air Quality Monitoring Stations

 土木工程拓展署
 Civil Engineering and
 Development Department

Environmental Monitoring Works for
 Contract No. ED/2018/05:
 Kai Tak Development- Stage 5B
 Infrastructure Works at the Former
 North Apron Area

嘉誠管理顧問有限公司
 Ka Sing management consultant Limited

Figure 5- Proposed Air Monitoring
 Station

Drawing No: 003 圖則編號: 003		
Design by: 設計師:	Contract No.: ED/2018/05 合同編號: ED/2018/05	Approved by: 批審人:
Scale: 比例:	Status: 狀態:	
Dimension: Meter 尺寸單位: 米		

Figure 5 – Air Quality Monitoring Stations

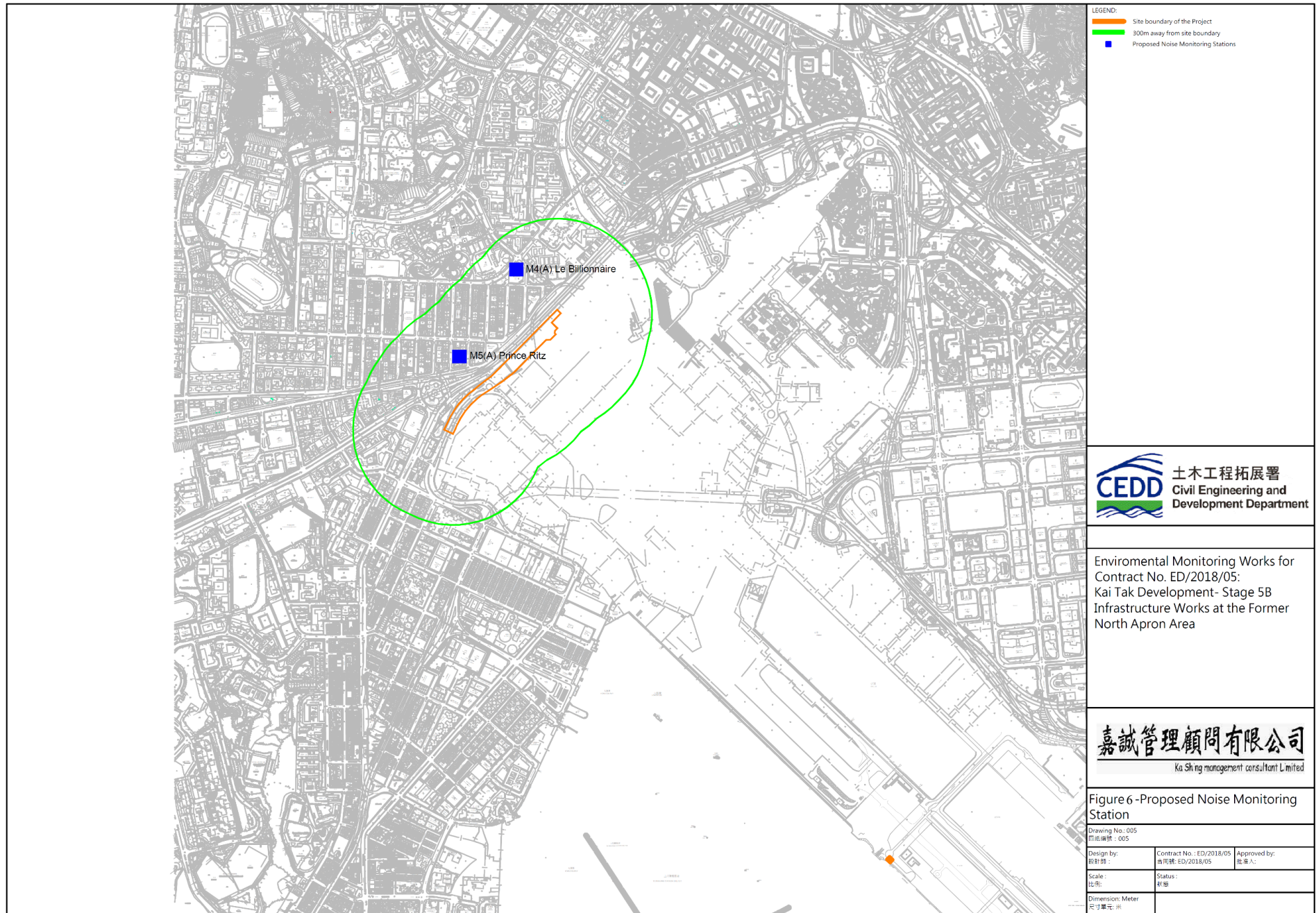
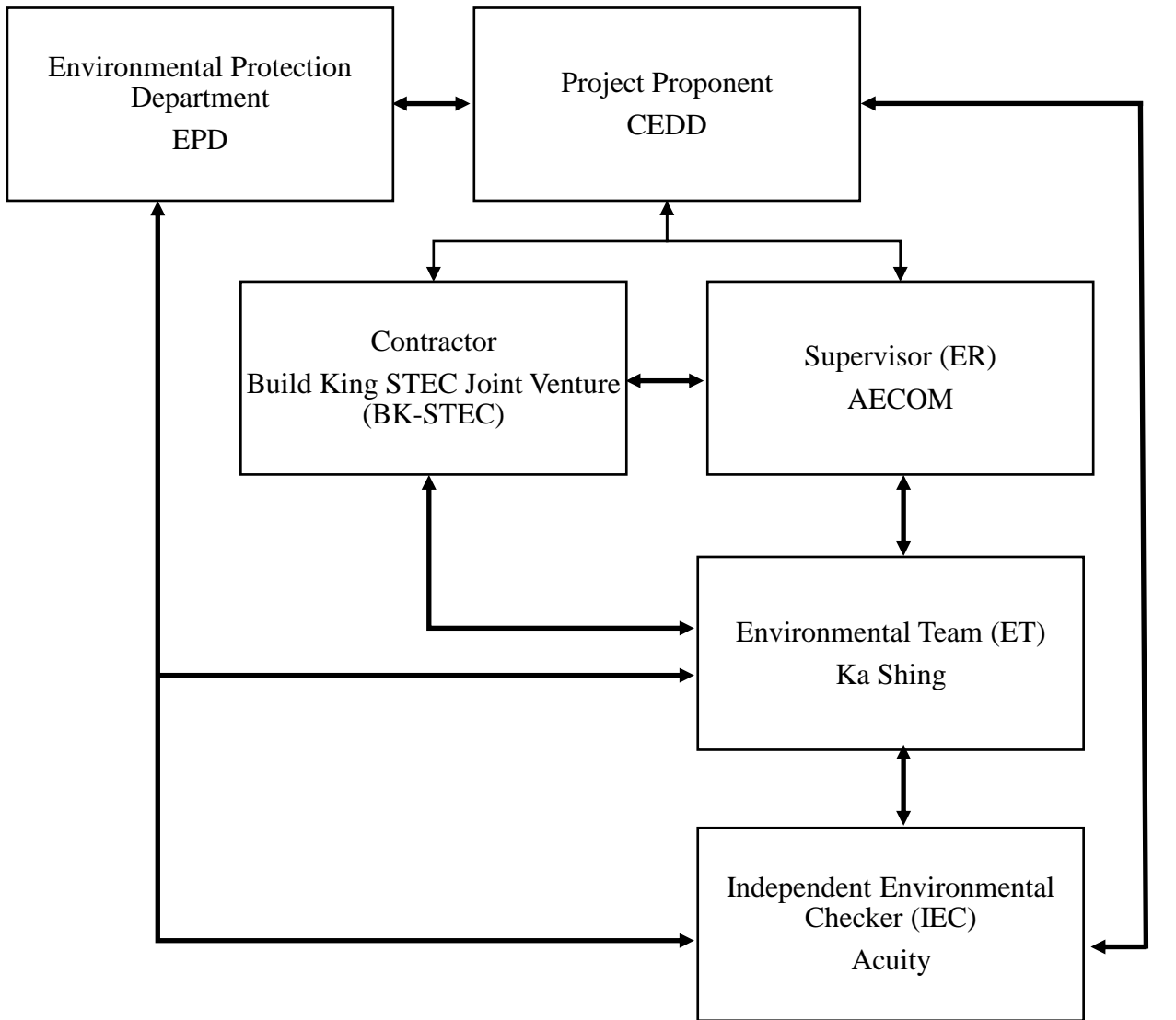


Figure 6 – Noise Monitoring Stations

Appendix A – Organization Chart of EM&A Team



↔ Link of communication

Appendix B – Construction Programme

Appendix C – Environmental monitoring schedules

Contract No. EDO 2/2020 Environmental Monitoring at Kai Tak Development – Stage 5B infrastructure works at the former north apron area
 Environmental Monitoring and Weekly Site Inspection Schedule for March 2023

March 2023

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2 Weekly Site Inspection	3 24-hr TSP and 1-hrX3 TSP: AM2(A), AM3 30-min Noise: M4(A), M5(A)	4
5	6	7	8	9 Weekly Site Inspection 24-hr TSP and 1-hrX3 TSP: AM2(A), AM3 30-min Noise: M4(A), M5(A)	10	11
12	13	14	15 24-hr TSP and 1-hrX3 TSP: AM2(A), AM3 30-min Noise: M4(A), M5(A)	16 Weekly Site Inspection	17	18
19	20	21 24-hr TSP and 1-hrX3 TSP: AM2(A), AM3 30-min Noise: M4(A), M5(A)	22	23 Weekly Site Inspection	24	25
26	27 24-hr TSP and 1-hrX3 TSP: AM2(A), AM3 30-min Noise: M4(A), M5(A)	28	29	30 Weekly Site Inspection + SSMC meeting	31	

Air Quality Monitoring Station

AM2(A) Ng Wah Catholic Secondary School
 AM3 - Sky Tower

Noise Quality Monitoring Station

M4(A) - Le Billionnaire
 M5(A) - Prince Ritz

Contract No. EDO 2/2020 Environmental Monitoring at Kai Tak Development – Stage 5B infrastructure works at the former north apron area
Tentative Environmental Monitoring and Weekly Site Inspection Schedule for April 2023

April 2023

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1 24-hr TSP and 1-hrX3 TSP: AM2(A), AM3
2	3	4	5	6 Weekly Site Inspection 24-hr TSP and 1-hrX3 TSP: AM2(A), AM3 30-min Noise: M4(A), M5(A)	7	8
9	10	11	12 24-hr TSP and 1-hrX3 TSP: AM2(A), AM3 30-min Noise: M4(A), M5(A)	13 Weekly Site Inspection	14	15
16	17	18 24-hr TSP and 1-hrX3 TSP: AM2(A), AM3 30-min Noise: M4(A), M5(A)	19	20 Weekly Site Inspection	21	22
23	24 24-hr TSP and 1-hrX3 TSP: AM2(A), AM3 30-min Noise: M4(A), M5(A)	25	26	27 Weekly Site Inspection + SSMC meeting	28	29 24-hr TSP and 1-hrX3 TSP: AM2(A), AM3
30						

NOTE:

1) Site inspection schedule and Impact monitoring schedule may be changed due to unforeseen circumstance (e.g. adverse weather).

Air Quality Monitoring Station

AM2(A) Ng Wah Catholic Secondary School
AM3 - Sky Tower

Noise Quality Monitoring Station

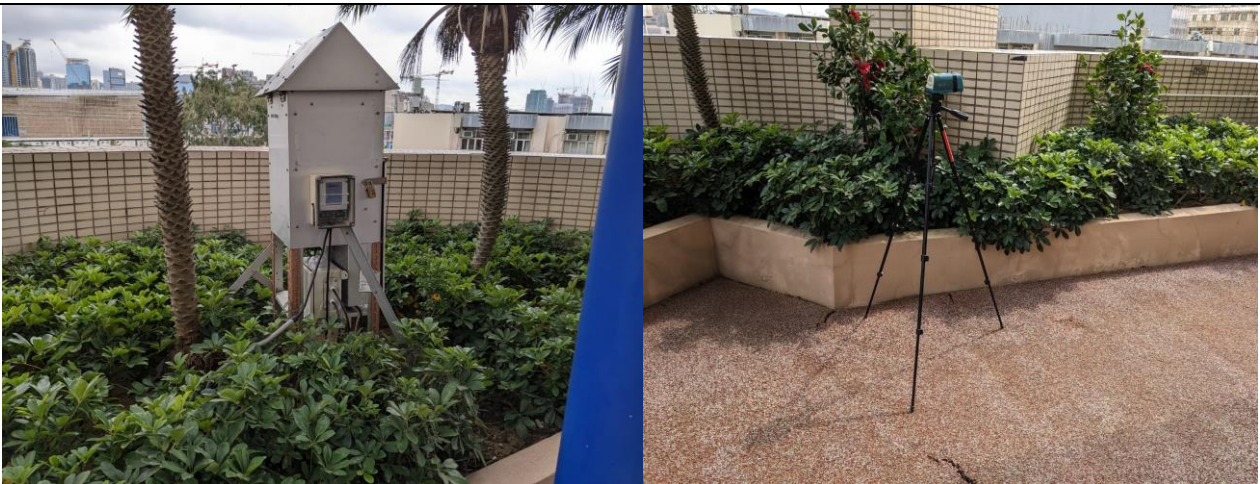
M4(A) - Le Billionnaire
M5(A) - Prince Ritz

Appendix D – Photographic records

Impact Air Quality Monitoring



Measurement setup at AM2(A)



Measurement setup at AM3



Weather Station at the rooftop of Ng Wah Catholic Secondary School

Impact Noise Monitoring



Measurement setup at M4(A)



Measurement setup at M5(A)

Appendix E – Calibration certificates, catalogue of air quality monitoring equipment

Catalogue of High Volume Sampler (HVS)



TSP MFC

Total Suspended Particulate, Mass Flow Controlled



MFC TSP
Ambient Air Sampler

The TE-5170 is a high volume ambient Total Suspended Particulate (TSP) air sampler featuring a mass flow controller (MFC) for accurate and consistent particulate sampling. The mass flow controller adjust the motor speed as the filter media collects particulate to maintain a constant flow rate throughout the entire sample duration. The system utilizes a stainless steel filter holder for use with standard 8" x 10" filter paper. The anodized aluminum shelter and robust electrical components allow the system to operate a continuous 24 hour sample.

ABOUT US: Tisch Environmental Inc. Tisch Environmental is the benchmark for high volume air sampling, particulate, metals, volatiles, and specialty monitoring equipment. Since the company's inception in 1953 as General Metal Works, our product line has expanded from the first high volume air sampler to include high-tech and custom samplers. Our clients are professionals from every sector of the regulatory and industrial markets.

- ✔ Meets EPA CFR, Appendix B to Part 50
- ✔ Total Suspended Particulate(TSP)
- ✔ Mass Flow Controlled
- ✔ 7-Day Mechanical Timer
- ✔ Elapsed Time Indicator
- ✔ Aluminum Outdoor Shelter
- ✔ Brush Style Motor
- ✔ Dickson Chart Recorder, 24 Hour
- ✔ Stainless Steel Filter Holder
- ✔ 36-60 CFM
- ✔ Made In USA

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Tisch Environmental
145 S. Miami Ave
Cleveland, OH 44102
513-487-3000
sales@tisch-env.com



TSP MFC

MFC TSP Ambient Air Sampler

General System Specifications

Particulate Size:Total Suspended Particulate (TSP)
EPA Designation: CFR 40 Part 50 Appendix B
Flow Controller: Mass Flow Controller
Motor Style:Brush Style Motor Assembly
Pressure Recorder:Dickson Chart Recorder, 24 hour
Timer:7 Day Mechanical
Elapsed Time Indicator:Mechanical, Hours and Tenths
Flow Range:39-60CFM, 1.09M³M-1.68M³M
Housing:Anodized Aluminum
Filter Holder:Stainless Steel, 8" x 10"
4" Recorder Charts: Box of 100
Filter Holder: 8" x 10" Stainless Steel with hold down frame

Applications

US EPA Reference Method Sampling, CFR Appendix J Part 50 Regulatory Compliance
 Institutional Studies
 Construction Sites
 Bridge and Water Tower Painting Sites
 Fence Line Monitoring
 Industrial Monitoring
 Landfill Monitoring
 Public Health Applications

Available Models

TE-5170 TSP MFC, 110 Volt 60 Hertz, 8 Amps
 TE-5170X TSP MFC, 220 Volt 50 Hertz 4 Amps
 TE-5170XZ TSP MFC, 220 Volts 60 Hertz, 4 Amps

Calibration Equipment

TE-5028 -Variable Flow Calibration Kit
 TE-HVC-V Xcalibrator HiVol Calibrator

Optional Equipment

TE-3000 Filter Holder Cartridge
 TE-G653 8" x 10" Glass Fiber Filter Media
 TE-33384 Motor Brush Set (110volt)
 TE-33378 Motor Brush Set (220volt)
 TE-116311 Replacement Motor (110volt)
 TE-116312 Replacement Motor (220volt)
 TE-106 Recorder Charts
 TE-160 Recorder Pen Points
 TE-5018 Gasket 8" x 10"

Physical Specifications

Weight: 75lbs, Shelter
Shipping Dimensions: 46"W x 23"L x 20" H, Shelter
 19"W x 19"L x 20"H, Lid
Assembled Dimensions: 28"W x 28"L x 61"H

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Calibration Certificate of HVS

Air Sampler Calibration Curve Plotting & Calculation (Dickson recorder)

Calibration curve ref. No. : ATSPC-01-2023022101 Date of calibration : 21/02/2023

Model no : Sky Tower Sampler : TE-5170X
Serial Number : 4687

Calibration Data

Ambient barometric pressure, Pa = 766.6 (mmHg) Ambient temperature, Ta = 292.75 (deg K)

Calibration Orifice

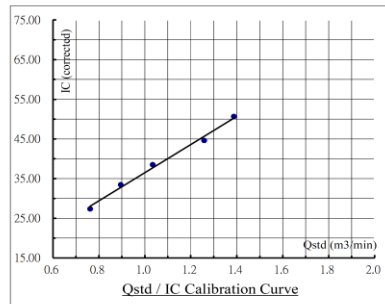
Model = TE-5025A Qstd Slope, m = 2.06418
Serial No. = 0006 Qstd Intercept, b = -0.03593
Calibration Due Date: 16/05/2023 Qstd Corr. coeff., r = 0.99993

Calibration Curve

Plate No.	H ₂ O (in)	Qstd (m ³ /min)	I (chart)	IC (corrected)
18	7.80	1.388	50.0	50.67
13	6.40	1.259	44.0	44.59
10	4.30	1.035	38.0	38.51
7	3.20	0.896	33.0	33.44
5	2.30	0.762	27.0	27.36

Subsequent calculation of sampler flow

Method	Calibration equation	Slope, m	Intercept, b	Corr. coeff., r
Dickson recorder	$Qstd = 1 / m \{ (1) (\text{Sqrt} ((Pa / 760) (298 / Ta))) - b \}$	35.474	1.0277	0.9957



Calibration curve requirements : (A). $r > 0.990$; (B). At least 3 Qstd numbers are in the TSP range (1.1 - 1.7 m³ / min).

Remark : $Qstd (m^3 / min) = 1/m [\text{Sqrt} (H_2O (Pa / 760) (298 / Ta)) - b]$.
 $IC (corrected) = I [\text{Sqrt} ((Pa / 760) (298 / Ta))]$.
 $FLOW (corrected) = \text{Sqrt} (FLOW (mano) (Pa / 760) (298 / Ta))$.

Calibrated by :  21/02/2023 Checked by :  21/02/2023
Name : (Ben Poon) Name : (Tommy Wong)

Form No. INS-HVS-CAL.dtl 16.01.2020

Air Sampler Calibration Curve Plotting & Calculation (Dickson recorder)

Calibration curve ref. No. : ATSPC-01-2023022104 Date of calibration : 21/02/2023

Model no : Ng Wah Catholic Secondary School Sampler : TE-5170X
Serial Number : 4360

Calibration Data

Ambient barometric pressure, Pa = 766.6 (mmHg) Ambient temperature, Ta = 292.75 (deg K)

Calibration Orifice

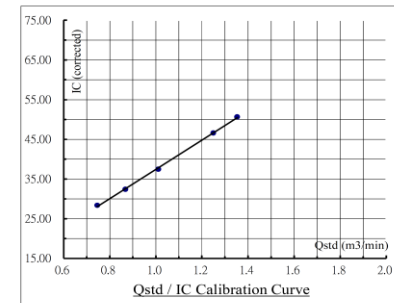
Model = TE-5025A Qstd Slope, m = 2.06418
Serial No. = 0006 Qstd Intercept, b = -0.03593
Calibration Due Date: 16/05/2023 Qstd Corr. coeff., r = 0.99993

Calibration Curve

Plate No.	H ₂ O (in)	Qstd (m ³ /min)	I (chart)	IC (corrected)
18	7.40	1.353	50.0	50.67
13	6.30	1.250	46.0	46.61
10	4.10	1.011	37.0	37.49
7	3.00	0.868	32.0	32.43
5	2.20	0.746	28.0	28.37

Subsequent calculation of sampler flow

Method	Calibration equation	Slope, m	Intercept, b	Corr. coeff., r
Dickson recorder	$Qstd = 1 / m \{ (1) (\text{Sqrt} ((Pa / 760) (298 / Ta))) - b \}$	36.892	0.5397	0.9996



Calibration curve requirements : (A). $r > 0.990$; (B). At least 3 Qstd numbers are in the TSP range (1.1 - 1.7 m³ / min).

Remark : $Qstd (m^3 / min) = 1/m [\text{Sqrt} (H_2O (Pa / 760) (298 / Ta)) - b]$.
 $IC (corrected) = I [\text{Sqrt} ((Pa / 760) (298 / Ta))]$.
 $FLOW (corrected) = \text{Sqrt} (FLOW (mano) (Pa / 760) (298 / Ta))$.

Calibrated by :  21/02/2023 Checked by :  21/02/2023
Name : (Ben Poon) Name : (Tommy Wong)

Form No. INS-HVS-CAL.dtl 16.01.2020

Calibration Certificate of HVS used for performance check of Dust Meter

Orifice Transfer Standard Certification Worksheet TE-5025A

Air Sampler Calibration Curve Plotting & Calculation (Dickson recorder)

Calibration curve ref. No. : ATSPC-01-2022061301 Date of calibration : 20/06/2022
 Model no : GS2310 Serial number : 10346

Calibration Data

Ambient barometric pressure, Pa = 753.1 (mmHg) Ambient temperature, Ta = 303.35 (deg K)

Calibration Orifice

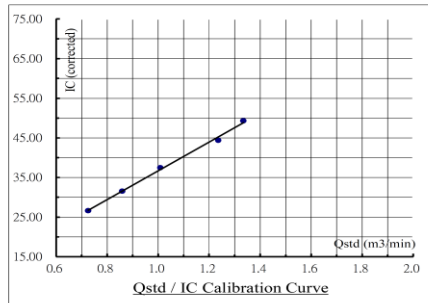
Model = TE-5025A Qstd Slope, m = 2.06418
 Serial No. = 0006 Qstd Intercept, b = -0.03593
 Calibration Due Date: 16/05/2023 Qstd Corr. coeff., r = 0.99993

Calibration Curve

Plate No.	H ₂ O (in)	Qstd (m ³ /min)	I (chart)	IC (corrected)
18	7.60	1.335	50.0	49.33
13	6.50	1.236	45.0	44.40
10	4.30	1.009	38.0	37.49
7	3.10	0.859	32.0	31.57
5	2.20	0.726	27.0	26.64

Subsequent calculation of sampler flow

Method	Calibration equation	Slope, m	Intercept, b	Corr. coeff., r
Dickson recorder	$Qstd = 1/m [(I \sqrt{ (Pa / 760) (298 / Ta) }) - b]$	36.268	0.4215	0.9982



Calibration curve requirements : (A). $r > 0.990$; (B). At least 3 Qstd numbers are in the TSP range (1.1 - 1.7 m³ / min).

Remark : $Qstd (m^3 / min) = 1/m [\text{Sqrt} (H_2O (Pa / 760) (298 / Ta)) - b]$.
 $IC (\text{corrected}) = I [\text{Sqrt} ((Pa / 760) (298 / Ta))]$.
 $FLOW (\text{corrected}) = \text{Sqrt} (FLOW (\text{mano}) (Pa / 760) (298 / Ta))$.

Calibrated by : Ben Poon 20/06/2022 Checked by : Tommy Wong 20/06/2022
 Name : (Ben Poon) Name : (Tommy Wong)

Form No. INS-HVS-CAL.dtl 16 01 2020



RECALIBRATION
DUE DATE:
May 16, 2023

Certificate of Calibration

Calibration Certification Information			
Cal. Date: May 16, 2022	Rootsmeter S/N: 438320	Ta: 296 °K	
Operator: Jim Tisch		Pa: 746.8 mm Hg	
Calibration Model #: TE-5025A	Calibrator S/N: 0006		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4050	3.2	2.00
2	3	4	1	1.0020	6.4	4.00
3	5	6	1	0.8930	7.9	5.00
4	7	8	1	0.8550	8.7	5.50
5	9	10	1	0.7030	12.8	8.00

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)	$\sqrt{\Delta H (Ta / Pa)}$ (y-axis)	
0.9850	0.7011	1.4066	0.9957	0.7087	0.8904	
0.9807	0.9788	1.9892	0.9914	0.9895	1.2592	
0.9788	1.0960	2.2240	0.9894	1.1080	1.4078	
0.9777	1.1435	2.3325	0.9883	1.1560	1.4765	
0.9723	1.3830	2.8131	0.9829	1.3981	1.7807	
QSTD	m=	2.06418	QA	m=	1.29255	
	b=	-0.03593		b=	-0.02274	
	r=	0.99993		r=	0.99993	

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

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 1988 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
 TOLL FREE: (877)263-7610
 FAX: (513)467-9009

Catalogue of Dust Meter (TSI Sidepak AM510)

The SidePak AM510 monitor's easy-to-read display shows your data as both real-time aerosol mass-concentration and 8-hour time-weighted average (TWA). With its convenient data logging and long battery life, the AMS10 is also ideal for extended sampling. The easy-to-use TrakPro Data Analysis Software lets you create effective graphs and reports.



User Friendly

- + Small, lightweight and quiet to maximize worker acceptance
- + Rugged design with secure belt clip
- + Easy-to-understand user interface with only four keys
- + Lockable keypad prevents tampering while sampling
- + User-adjustable sample flow rate
- + Define, label and store multiple calibration constants
- + Easy-to-read LCD display
- + Convenient, threaded tripod socket accommodates area sampling

Advanced Features

- + Smart Battery Management System provides precise run time information, maximizes battery capacity and speeds charging
- + Integrated pump allows use of size-selective aerosol inlet conditioners
- + Built-in impactors let you choose "none," 1.0, 2.5 or 10-micron cut off
- + 10-mm Dorr-Oliver cyclone for respirable sampling
- + Display shows real-time concentrations (mg/m³) and "on-the-fly" TWA as you data log
- + Display statistics: max, min and average readings, elapsed time and 8-hour TWA

Quick and Easy Reports

- + Convenient preprogramming for occupational exposure sampling
- + Data log for long periods and store multiple tests
- + Analyze data, print graphs and create reports with TrakPro Data Analysis Software
- + USB port lets you conveniently connect to your computer

Power to Spare

- + Long-lasting NiMH rechargeable battery packs eliminate "memory" issues
- + Choice of rechargeable NiMH smart battery packs or AA-cell pack

Model AM510 SidePak Personal Aerosol Monitor

Sensitivity

Sensor Type 90° light scattering, 670 nm laser diode
Aerosol Concentration Range 0.001 to 20 mg/m³ (calibrated to respirable fraction of ISO 12103-1, A1 test dust)
Particle Size Range 0.1 to 10 micrometer (µm)
Minimum Resolution 0.001 mg/m³
Zero stability ±0.001 mg/m³ over 24 hours using 10-second time-constant
Temperature Coefficient Approximately +0.0005 mg/m³ per °C (for variations from temperature at which instrument was last zeroed)

Flow Rate

Range User-adjustable, 0.7 to 1.8 liters/min (L/min)

Temperature Range

Operating Range 32 to 120°F (0 to 50°C)
Storage Range -4 to 140°F (-20 to 60°C)

Operational Humidity

0 to 95% RH, non-condensing

Time Constant (LCD display)

Range User-adjustable, 1 to 60 seconds

Data Logging

Data Points Approx. 31,000
Logging Interval User-adjustable, 1 second to 1 hour

User-Select Calibration Factors

Factory Setting 1.0 (non-adjustable)
User-defined Settings 3, with user-defined labels
Range 0.1 to 10.0, user-adjustable

Physical

External Dimensions 4.2 x 3.7 x 2.8 in. (106 x 92 x 70 mm) with 801723, 801724, 801729 or 801743 battery
5.1 x 3.7 x 2.8 in. (130 x 92 x 70 mm) with 801708, 801722, 801728, 801735, or 801736 battery
Weight 16 oz (0.46 kg) with 801723, 801724, 801729 or 801743 battery
19 oz (0.54 kg) with 801708, 01722, 801728, 801735, or 801736 battery
Display 2 line x 12 character LCD
Tripod Socket 1/4-20 female thread

Power Supply/Charger (P/N 2613210)

Input Voltage Range 100 to 240 VAC, 50 to 60 Hz
Output Voltage 9 VDC @ 1.0 A

Maintenance

Factory Clean/Calibrate Recommended annually
User Zero Calibration Before each use
User Flow Calibration As needed

Communications Interface

Type USB 1.1
Connector, Instrument USB Mini-B (socket)

Minimum Computer Requirements for TrakPro™ Data Analysis Software

Communications Port Universal Serial Bus (USB) v 1.1 or higher
Operating System Microsoft Windows® XP, or 7 (32-bit or 64-bit) operating systems

Battery Performance

Battery Options	Charge Time (hrs)*	Intrinsic Safety Rating	Run Time (hrs @ 1.7 L/min)
1600 mAh NiMH Pack, 4.8 V (P/N 801723)	3.0	No	7.1
1650 mAh NiMH Pack, 4.8 V (P/N 801724, 801729 or 801743)	3.5	CSA**	7.5
2700 mAh NiMH Pack, 4.8 V (P/N 801722 or 801728)	5.5	No	12.0
2700 mAh NiMH Pack, 4.8 V (P/N 801735)	5.5	No	12.0
6-Cell AA-size Alkaline Pack*** (P/N 801708 or 801736 with six user-supplied AA cells)	N/A	No	22.5

*Of a fully depleted battery

**All dust plugs and dust gaskets must be installed.

***Using Energizer AA-size, E91 alkaline batteries.

Battery Level Indicator

The Smart Battery Management System™ technology utilizes a built-in "gauge" in the SidePak™ battery packs. The gauge monitors battery capacity and calculates run time information by dividing capacity of the battery (mAh) by the instantaneous current consumed by the instrument (mA). This calculation is correct for current operating conditions and can change due to current (mA) consumption or changes in battery capacity.

Calibration Certificate of Dust Meter (TSI Sidepak AM510)



Cal Lab Limited 校正實驗室有限公司
 Room 2103, Technology Plaza, 29-35 Sha Tsui Road,
 Tsuen Wan, NT, Hong Kong
 Tel: +852 25680106 Email: info@callab.com.hk
 Fax: +852 30116194 Website: www.callab.com.hk



Calibration Certificate No.: CC0482208

Customer Information
 Customer: Castco Testing Centre Limited
 Address: 33, On Kui Street, Fanling, N.T.

Equipment Identification				
Equipment Description	Manufacturer	Model No.	Serial No.	Assigned equipment No.
Aerosol Monitor	TSI	SidePak AM510	11208032	AAST-RSP-01

Certificate Information			
Date of Receipt:	30 August 2022	Calibration Condition:	24.1°C, 54%RH, 1001hPa
Date of Calibration:	2 September 2022	Adjustment:	N/A
Due Date of Calibration:	N/A	Appearance:	Good
Calibration Procedure:	ISO 21501-4:2018	Remark:	N/A

Reference Equipment Identification			
Equipment Description	Model	Serial No.	Expiration Date
Aerosol Monitor	8534	8534182605	6 September 2022

Result of Calibration Indication						
Gas	Reference Setting (mg/m ³)	Measured reading (mg/m ³)	Error (%)	Uncertainty (%FS)	Technical Requirement	Technical Reference Doc.
Dust - TSP	0.000	0.000	N/A	14.0	N/A	Mfr's Spec.
Dust - TSP	0.101	0.103	1.9	14.0	N/A	Mfr's Spec.
Dust - TSP	0.205	0.210	2.4	14.0	N/A	Mfr's Spec.
Dust - TSP	0.307	0.313	2.0	14.0	N/A	Mfr's Spec.

Note1: The estimated expanded uncertainties have been calculated in "Evaluation and expression of uncertainty in measurement" and give an internal estimated to have a level of confidence of 95%. A coverage factor of 2 is assumed unless explicitly stated.
 Note2: The standard (s) and instrument used in the calibration are traceable to national or international recognized standard and are calibrated on a schedule to maintain the accuracy and good condition.
 Note3: The result reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long term stability of the instrument.
 Note4: The result shows in this calibration certificate relate only to the item calibrated, and the result only applies to the calibration item as received.

Calibrated By: Wing Cheng
 Checked and Approved By: Warren Yeung
 Company Chop: Certificate Issue Date: 5 September 2022

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 2. The certificate is issued subject to the latest Terms and Conditions, available at our web site

Personal Aerosol Monitor Performance check with High Volume Sampler

Performance Check ref. No. AS0220624-7 Report Issue Date 24/06/2022
 Date of performance check 22/06/2022

Objective:

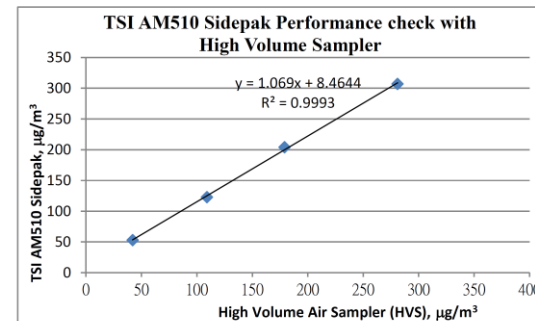
A dust meter and a Total Suspended Particulate High Volume Air Sampler (HVS) were placed together to measure the Total Suspended Particulate (TSP) concentrations simultaneously to check the performance.

Equipment Used:

Equipment	Manufacturer and Model	Serial Number
Personal Aerosol Monitor	TSI AM510 Sidepak	11208032
Total Suspended Particulate High Volume Air Sampler	GS2310	10346

Result:

Equipment	Measurement Result, µg/m ³			
	53	123	204	307
TSI AM510 Sidepak	53	123	204	307
High Volume Air Sampler (HVS)	42	109	179	281



Tested by: Ben Poon 24/06/2022
 Checked by: Tommy Wong 24/06/2022

Form No. ENV CAL SAMPLER CCI 4412/12/2003

Calibration Certificate of Dust Meter (TSI Sidepak AM510)

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

Environment Conditions			Model	AM510
Temperature	74.7 (23.7)	°F (°C)		
Relative Humidity	29	%RH		
Barometric Pressure	29.31 (992.6)	inHg (hPa)		
			Serial Number	11306015

As Left In Tolerance
 As Found Out of Tolerance

Concentration Linearity Plot

System ID: DT101-02

CONCENTRATION Unit: mg/m³							
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	1.539	1.465	1.385-1.693	3	0.090	0.092	0.063-0.117
2	0.218	0.221	0.185-0.251	4	10.681	10.742	9.613-11.749

TSI Incorporated does hereby certify that all materials, components, and workmanship used in the manufacture of this equipment are in strict accordance with the applicable specifications agreed upon by TSI and the customer and with all published specifications. All performance and acceptance tests required under this contract were successfully conducted according to required specifications. There is no NIST standard for optical mass measurements. Calibration of this instrument performed by TSI has been done using emery oil and has been nominally adjusted to respirable mass per standard ISO 12103-1, A1 test dust (Arizona dust). Our calibration ratio is greater than 4:1

Measurement Variable	System ID	Last Cal.	Cal. Due	Measurement Variable	System ID	Last Cal.	Cal. Due
DC Voltage	E003314	01-11-22	01-31-23	Photometer	E003319	08-30-22	02-28-23
Microbalance	M001324	01-29-21	01-31-23	Pressure	E003511	10-26-21	10-31-22
Flowmeter	E004025	06-24-22	06-30-23	DC Voltage	E003315	01-11-22	01-31-23

 Calibrated

September 27, 2022

 Date

Personal Aerosol Monitor Performance check with High Volume Sampler

Performance Check ref. No. AS0220624-3 Report Issue Date 24/06/2022
 Date of performance check 23/06/2022

Objective:

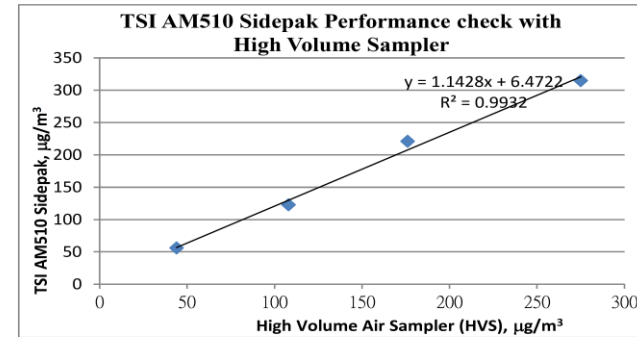
A dust meter and a Total Suspended Particulate High Volume Air Sampler (HVS) were placed together to measure the Total Suspended Particulate (TSP) concentrations simultaneously to check the performance.

Equipment Used:

Equipment	Manufacturer and Model	Serial Number
Personal Aerosol Monitor	TSI AM510 Sidepak	11306015
Total Suspended Particulate High Volume Air Sampler	GS2310	10346

Result:

Equipment	Measurement Result, µg/m ³			
TSI AM510 Sidepak	56	123	221	315
High Volume Air Sampler (HVS)	44	108	176	275



Tested by : Ben Poon 24/06/2022 Tommy Wong 24/06/2022
 Name : (Ben Poon) Name : (Tommy Wong)

Form No. ENV CAL SAMPLER CCI d012/12/2003

Catalogue of Weather Station

Cabled Vantage Pro2™ & Vantage Pro2 Plus™ Stations



**6152C
6162C**
Vantage Pro2™

The Vantage Pro2™ (# 6152C) and Vantage Pro2™ Plus (# 6162C) cabled weather stations include two components: the Integrated Sensor Suite (ISS) and the console. The ISS contains the sensor interface module (SIM), rain collector, an anemometer, and a passive radiation shield. The Vantage Pro2 console provides the user interface, data display, and calculations. The Vantage Pro2 Plus weather station includes two additional sensors that are optional on the Vantage Pro2 and purchased separately: the UV Sensor and the Solar Radiation Sensor. The console and ISS are powered by an AC-power adapter connected to the console. Batteries can be installed in the console to provide a backup power supply. Use WeatherLink® to let your weather station interface with a computer, log data, and upload weather information to the Internet. The 6152C and 6162C models rely on passive shielding to reduce solar-radiation induced temperature errors in the outside temperature sensor readings.

Integrated Sensor Suite (ISS)

Operating Temperature	-40° to +150°F (-40° to +65°C)
Non-operating Temperature	-40° to +158°F (-40° to +70°C)
Current Draw	5 mA (average) at 4 to 6 VDC for ISS only, 10 mA average for both console and ISS
Connectors, Sensor	Modular RJ-11
Cable Type	4-conductor, 26 AWG
Cable Length, Anemometer	40' (12 m) (included); 240' (73 m) (maximum recommended)

Note: Maximum displayable wind decreases as the length of cable increases. At 140' (42 m) of cable, the maximum wind speed displayed is 135 mph (60 m/s); at 240' (73 m), the maximum wind speed displayed is 100 mph (34 m/s).

Wind Speed Sensor	Solid state magnetic sensor
Wind Direction Sensor	Wind vane with potentiometer
Rain Collector Type	Tipping bucket, 0.01" per tip (0.2 mm with metric rain adapter), 33.2 in ² (214 cm ²) collection area
Temperature Sensor Type	PN Junction Silicon Diode
Relative Humidity Sensor Type	Film capacitor element
Housing Material	UV-resistant ABS, polypropylene
Sensor Inputs	
RF Filtering	RC low-pass filter on each signal line

ISS Dimensions(not including anemometer or bird spikes):

Vantage Pro2 with Standard Rad Shield	14.0" x 9.4" x 14.5" (356 mm x 239 mm x 368 mm)
Vantage Pro2 with Fan-Asprated Rad Shield	20.8" x 9.4" x 16.0" (528 mm x 239 mm x 406 mm)
Vantage Pro2 Plus with Standard Rad Shield	14.3" x 9.7" x 14.5" (363 mm x 246 mm x 368 mm)
Vantage Pro2 Plus with Fan-Aspirated Rad Shield	21.1" x 9.7" x 16.0" (536 mm x 246 mm x 406 mm)

DAVIS **Davis Instruments** 3465 Diablo Ave., Hayward, CA 94545-2778 USA
(510) 732-9229 • FAX (510) 670-0589 • sales@davisinstruments.com • www.davisinstruments.com

DS6152C, 6162C Rev. W 12/7/18
1

7
Vantage Pro2™

Ultra Violet (UV) Radiation Index (requires UV sensor)

Resolution and Units	0.1 Index
Range	0 to 16 Index
Accuracy	±5% of full scale (Reference: Yankee UVB-1 at UV index 10 (Extremely High))
Cosine Response	±4% FS (0° to 90° zenith angle)
Update Interval	50 seconds to 1 minute (5 minutes when dark)
Current Graph Data	Instant Reading and Hourly Average; Daily, Monthly High
Historical Graph Data	Hourly Average, Daily, Monthly Highs
Alarm	High Threshold from Instant Calculation

Wind

Wind Chill (Calculated)	
Resolution and Units	1°F or 1°C (user-selectable); °C is converted from °F and rounded to the nearest 1°C
Range	-110° to +135°F (-79° to +57°C)
Accuracy	±2°F (±1°C) (typical)
Update Interval	10 to 12 seconds
Source	United States National Weather Service (NWS)/NOAA
Equation Used	Osczevski (1995) (adopted by US NWS in 2001)
Variables Used	Instant Outside Temperature and 10-min. Avg. Wind Speed
Current Display Data	Instant Calculation
Current Graph Data	Instant Calculation; Hourly, Daily and Monthly Low
Historical Graph Data	Hourly, Daily and Monthly Lows
Alarm	Low Threshold from Instant Calculation

Wind Direction

Range	1 - 360°
Display Resolution	16 points (22.5°) on compass rose, 1° in numeric display
Accuracy	±3°
Update Interval	2.5 to 3 seconds
Current Graph Data	Instant Reading (user adjustable); 10-min. Dominant; Hourly, Daily, Monthly Dominant
Historical Graph Data	Past 6 10-min. Dominants on compass rose only; Hourly, Daily, Monthly Dominants

Wind Speed

Resolution and Units	1 mph, 1 km/h, 0.4 m/s, or 1 knot (user-selectable) Measured in mph; other units are converted from mph and rounded to nearest 1 km/hr, 0.1 m/s, or 1 knot.
Range	0 to 200 mph, 0 to 173 knots, 0 to 89 m/s, 0 to 322 km/h
Update Interval	Instant Reading; 2.5 to 3 seconds, 10-minute Average: 1 minute
Accuracy	±2 mph (2 kts, 3.2 km/h, 0.9 m/s) or ±5%, whichever is greater
Maximum Cable Length	540' (165 m) (Note that maximum wind speed reading decreases as length of cable from anemometer to ISS increases.)
Current Display Data	Instant
Current Graph Data	Instant Reading; 10-minute and Hourly Average; Hourly High; Daily, Monthly and Yearly High with Direction of High
Historical Graph Data	10-min. and Hourly Averages; Hourly Highs; Daily, Monthly and Yearly Highs with Direction of Highs
Alarms	High Thresholds from Instant Reading and 10-minute Average

Calibration Certificate of Weather Station



Cal Lab Limited 校正實驗室有限公司
 Room 2103, Technology Plaza, 29-35 Sha Tsui Road,
 Tsuen Wan, NT, Hong Kong
 Tel: +852 25680106 Email: info@callab.com.hk
 Fax: +852 30116194 Website: www.callab.com.hk

Calibration Certificate No.: CC0402302

Customer Information

Customer: Castco Testing Centre Limited
 Address: 33, On Kui Street, Fanling, N.T.

Equipment Identification

Equipment Description	Manufacturer	Model No.	Serial No.	Assigned equipment No.:
Weather Station	Davis Vantage PRO 2	6152CEU	AZ170710012	AAST-WS-02

Certificate Information

Date of Receipt:	8 February 2023	Calibration Condition:	24.5°C, 54%RH, 1010hPa
Date of Calibration:	20 February 2023	Adjustment:	N/A
Due Date of Calibration:	N/A	Appearance:	Good
Calibration Procedure:	JJF 1183-2007, JJF 1076-2001, SOP-116	Remark:	N/A

Reference Equipment Identification

Equipment Description	Model	Serial No.	Expiration Date
Platinum resistance thermometer	KPPRHT-A-1	KCI I-1095, KCI P-1095	9 November 2024
Humidity sensor	KPPRHT-A-1	KCI I-1095, KCI P-1095	9 November 2024
Hot Wire Anemometer	9535	T95351316004	11 August 2024

- Note1: The estimated expanded uncertainties have been calculated in "Evaluation and expression of uncertainty in measurement" and give an internal estimated to have a level of confidence of 95%. A coverage factor of 2 is assumed unless explicitly stated.
 Note2: The standard (s) and instrument used in the calibration are traceable to national or international recognized standard and are calibrated on a schedule to maintain the accuracy and good condition.
 Note3: The result reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long term stability of the instrument.
 Note4: The result shows in this calibration certificate relate only to the item calibrated, and the result only applies to the calibration item as received.

Approved By:

Warren Yeung
 Warren Yeung

Company Chop:



Certificate Issue Date: 20 February 2023

CF-BEG-03

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CC0402302
 Page 1 of 2



Cal Lab Limited 校正實驗室有限公司
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 Tsuen Wan, NT, Hong Kong
 Tel: +852 25680106 Email: info@callab.com.hk
 Fax: +852 30116194 Website: www.callab.com.hk

Result of Calibration

Temperature

Reference reading (°C)	Reading (°C)	Error (°C)	Uncertainty (°C)
15.0	15	0	2
20.0	21	1	2
25.0	26	1	2
30.0	30	0	2

Relative Humidity

Reference reading (%RH)	Reading (%RH)	Error (%RH)	Uncertainty (%RH)
40.0	44	4	2
50.0	54	4	2
70.0	69	-1	2

Wind Speed

Reference reading (m/s)	Measured reading (m/s)	Error (%)	Uncertainty (%)
0.0	0.0	N/A	3.6
2.0	2.0	0.0	3.6
5.0	4.8	-4.0	3.6
8.0	7.6	-5.0	3.6

Wind Direction

Reference reading	Measured reading	Error	Uncertainty
0°	0°	0°	5°
45°	45°	0°	5°
90°	90°	0°	5°
135°	135°	0°	5°
180°	180°	0°	5°
225°	225°	0°	5°
270°	270°	0°	5°
315°	315°	0°	5°

*** End of Certificate ***

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CC0402302
 Page 2 of 2

Appendix F – Weather information

General Information

Date	Absolute Daily Min Temperature (°C)	Absolute Daily Max Temperature (°C)	Total Rainfall (mm)	Mean Relative Humidity (%)
01/03/2023	16.4	24.4	0.0	71
02/03/2023	17.8	23.2	0.0	70
03/03/2023	16.5	22.4	0.0	56
04/03/2023	17.3	23.8	0.0	65
05/03/2023	17.3	23.5	0.0	57
06/03/2023	17.4	24.1	0.0	50
07/03/2023	17.7	24.1	0.0	56
08/03/2023	19.1	25.7	0.0	77
09/03/2023	19.5	27.0	0.0	75
10/03/2023	20.3	26.6	0.0	68
11/03/2023	19.9	26.0	0.0	67
12/03/2023	20.2	25.6	0.1	71
13/03/2023	19.1	22.4	Trace	64
14/03/2023	18.7	22.9	0.0	73
15/03/2023	18.7	24.5	0.0	77
16/03/2023	19.4	25.8	Trace	72
17/03/2023	20.0	26.1	0.5	83
18/03/2023	19.8	26.8	0.0	80
19/03/2023	20.0	21.9	0.6	86
20/03/2023	20.1	24.4	0.3	88
21/03/2023	22.1	25.4	Trace	85
22/03/2023	24.1	25.6	Trace	83
23/03/2023	24.1	26.3	0.0	81
24/03/2023	23.3	29.0	0.0	80
25/03/2023	20.9	26.4	53.5	89
26/03/2023	20.0	21.6	5.9	91
27/03/2023	17.5	20.0	6.3	86
28/03/2023	17.2	20.1	Trace	84
29/03/2023	18.4	21.8	0.9	86
30/03/2023	19.8	21.4	0.3	89
31/03/2023	19.6	21.1	1.9	92

NOTE1: The above weather information was obtained from manned weather station of Hong Kong Observatory.

NOTE2: Trace means rainfall less than 0.12 mm

<https://www.hko.gov.hk/en/cis/dailyExtract.htm?y=2023&m=03>

Kai Tak Runway Park Information

Date	Absolute Daily Min Temperature (°C)	Absolute Daily Max Temperature (°C)
01/03/2023	16.1	23.5
02/03/2023	17.4	21.9
03/03/2023	16.5	21.1
04/03/2023	17.0	21.6
05/03/2023	16.6	22.8
06/03/2023	16.9	23.4
07/03/2023	17.4	23.2
08/03/2023	18.2	23.3
09/03/2023	18.5	26.0
10/03/2023	19.8	24.9
11/03/2023	19.4	24.0
12/03/2023	19.6	25.9
13/03/2023	18.0	21.2
14/03/2023	18.4	21.1
15/03/2023	18.2	22.8
16/03/2023	18.8	25.8
17/03/2023	19.8	23.6
18/03/2023	19.4	25.4
19/03/2023	19.9	21.6
20/03/2023	19.9	23.1
21/03/2023	21.3	25.2
22/03/2023	23.7	25.9
23/03/2023	23.6	26.8
24/03/2023	22.8	27.0
25/03/2023	21.1	24.5
26/03/2023	19.7	21.8
27/03/2023	17.2	19.7
28/03/2023	17.0	20.3
29/03/2023	18.4	21.2
30/03/2023	19.7	21.4
31/03/2023	19.6	21.1

NOTE1: The above weather information was obtained from manned weather station of Kai Tak Runway Park.

https://i-lens.hk/hkweather/history_chart.php?date=2023-03-01&chart_type=DG_TEMP

Mean Wind Speed and Wind Direction recorded by the weather station setup at the rooftop of Ng Wah Catholic Secondary School

Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction
01/03/2023	0:00	0.4	90	02/03/2023	0:00	1.3	112.5	03/03/2023	0:00	0.4	112.5	04/03/2023	0:00	0.4	67.5
01/03/2023	1:00	0.9	90	02/03/2023	1:00	0.9	90	03/03/2023	1:00	0.4	112.5	04/03/2023	1:00	0.4	67.5
01/03/2023	2:00	0.9	90	02/03/2023	2:00	0.9	112.5	03/03/2023	2:00	1.3	90	04/03/2023	2:00	1.3	0
01/03/2023	3:00	0	67.5	02/03/2023	3:00	0.4	135	03/03/2023	3:00	0.4	112.5	04/03/2023	3:00	0	67.5
01/03/2023	4:00	0.4	67.5	02/03/2023	4:00	0.4	90	03/03/2023	4:00	1.3	112.5	04/03/2023	4:00	0.4	90
01/03/2023	5:00	0.4	67.5	02/03/2023	5:00	0.9	135	03/03/2023	5:00	0.9	135	04/03/2023	5:00	0.4	90
01/03/2023	6:00	1.3	0	02/03/2023	6:00	0.4	112.5	03/03/2023	6:00	0.9	135	04/03/2023	6:00	0.4	67.5
01/03/2023	7:00	0	67.5	02/03/2023	7:00	1.8	45	03/03/2023	7:00	1.8	112.5	04/03/2023	7:00	0.9	90
01/03/2023	8:00	0.4	90	02/03/2023	8:00	1.3	112.5	03/03/2023	8:00	1.3	90	04/03/2023	8:00	1.3	135
01/03/2023	9:00	0.4	90	02/03/2023	9:00	1.8	67.5	03/03/2023	9:00	0.9	112.5	04/03/2023	9:00	0.9	67.5
01/03/2023	12:00	0.4	67.5	02/03/2023	12:00	0.9	112.5	03/03/2023	12:00	0.9	112.5	04/03/2023	12:00	1.3	90
01/03/2023	12:00	0.9	90	02/03/2023	12:00	1.3	90	03/03/2023	12:00	1.3	90	04/03/2023	12:00	1.3	90
01/03/2023	12:00	1.3	135	02/03/2023	12:00	1.3	90	03/03/2023	12:00	0.9	112.5	04/03/2023	12:00	1.3	112.5
01/03/2023	13:00	0.4	67.5	02/03/2023	13:00	0.4	270	03/03/2023	13:00	0.9	45	04/03/2023	13:00	0.9	90
01/03/2023	14:00	0.9	45	02/03/2023	14:00	0.9	0	03/03/2023	14:00	0.9	337.5	04/03/2023	14:00	0.4	112.5
01/03/2023	15:00	0.4	135	02/03/2023	15:00	0.4	225	03/03/2023	15:00	0.4	112.5	04/03/2023	15:00	0.9	45
01/03/2023	16:00	0.4	135	02/03/2023	16:00	0.4	90	03/03/2023	16:00	0.9	292.5	04/03/2023	16:00	0.9	112.5
01/03/2023	17:00	0.4	112.5	02/03/2023	17:00	0.4	157.5	03/03/2023	17:00	0.9	157.5	04/03/2023	17:00	0.4	315
01/03/2023	18:00	0.9	22.5	02/03/2023	18:00	0.9	112.5	03/03/2023	18:00	0.9	67.5	04/03/2023	18:00	1.8	67.5
01/03/2023	19:00	0.9	90	02/03/2023	19:00	1.3	112.5	03/03/2023	19:00	1.8	22.5	04/03/2023	19:00	1.3	22.5
01/03/2023	20:00	0.4	135	02/03/2023	20:00	0.9	135	03/03/2023	20:00	0.4	90	04/03/2023	20:00	1.8	112.5
01/03/2023	21:00	0.4	225	02/03/2023	21:00	0.9	135	03/03/2023	21:00	0.4	112.5	04/03/2023	21:00	1.3	45
01/03/2023	22:00	0.4	157.5	02/03/2023	22:00	0.9	112.5	03/03/2023	22:00	1.3	112.5	04/03/2023	22:00	1.8	90
01/03/2023	23:00	1.3	90	02/03/2023	23:00	0.4	112.5	03/03/2023	23:00	1.8	112.5	04/03/2023	23:00	1.3	90

Mean Wind Speed and Wind Direction recorded by the weather station setup at the rooftop of Ng Wah Catholic Secondary School

Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction
05/03/2023	0:00	0.4	270	06/03/2023	0:00	0.4	315	07/03/2023	0:00	0.9	45	08/03/2023	0:00	0.9	67.5
05/03/2023	1:00	0	270	06/03/2023	1:00	0.9	45	07/03/2023	1:00	1.3	247.5	08/03/2023	1:00	1.8	67.5
05/03/2023	2:00	0	337.5	06/03/2023	2:00	1.3	270	07/03/2023	2:00	1.3	247.5	08/03/2023	2:00	1.8	90
05/03/2023	3:00	0.4	270	06/03/2023	3:00	0.9	22.5	07/03/2023	3:00	0.4	135	08/03/2023	3:00	0.9	67.5
05/03/2023	4:00	0.4	225	06/03/2023	4:00	1.3	67.5	07/03/2023	4:00	0.4	292.5	08/03/2023	4:00	0.9	67.5
05/03/2023	5:00	0.4	0	06/03/2023	5:00	0.9	135	07/03/2023	5:00	0.4	90	08/03/2023	5:00	1.3	45
05/03/2023	6:00	0.9	135	06/03/2023	6:00	0.4	45	07/03/2023	6:00	1.3	225	08/03/2023	6:00	1.3	67.5
05/03/2023	7:00	0.4	90	06/03/2023	7:00	0.9	90	07/03/2023	7:00	1.3	90	08/03/2023	7:00	0.4	180
05/03/2023	8:00	0.4	135	06/03/2023	8:00	1.3	90	07/03/2023	8:00	0.9	45	08/03/2023	8:00	0.9	135
05/03/2023	9:00	0.9	22.5	06/03/2023	9:00	1.3	67.5	07/03/2023	9:00	0.9	45	08/03/2023	9:00	0.4	90
05/03/2023	12:00	0.9	90	06/03/2023	12:00	0.9	45	07/03/2023	12:00	1.3	180	08/03/2023	12:00	0.4	135
05/03/2023	12:00	0.4	135	06/03/2023	12:00	1.3	112.5	07/03/2023	12:00	0.9	45	08/03/2023	12:00	0.9	67.5
05/03/2023	12:00	0.9	112.5	06/03/2023	12:00	0.9	180	07/03/2023	12:00	0.9	67.5	08/03/2023	12:00	0.9	180
05/03/2023	13:00	1.3	90	06/03/2023	13:00	0.4	225	07/03/2023	13:00	1.3	90	08/03/2023	13:00	0.9	180
05/03/2023	14:00	0.9	0	06/03/2023	14:00	0.9	225	07/03/2023	14:00	0	247.5	08/03/2023	14:00	0.9	135
05/03/2023	15:00	1.3	0	06/03/2023	15:00	0.9	135	07/03/2023	15:00	0.9	202.5	08/03/2023	15:00	1.3	67.5
05/03/2023	16:00	0.9	67.5	06/03/2023	16:00	0.9	247.5	07/03/2023	16:00	0.4	270	08/03/2023	16:00	0.9	112.5
05/03/2023	17:00	0.9	67.5	06/03/2023	17:00	0.4	180	07/03/2023	17:00	0.4	292.5	08/03/2023	17:00	1.3	112.5
05/03/2023	18:00	1.3	67.5	06/03/2023	18:00	0.4	270	07/03/2023	18:00	0.4	135	08/03/2023	18:00	1.3	67.5
05/03/2023	19:00	0.9	67.5	06/03/2023	19:00	0.9	180	07/03/2023	19:00	0.4	112.5	08/03/2023	19:00	1.3	45
05/03/2023	20:00	0.9	135	06/03/2023	20:00	0.4	157.5	07/03/2023	20:00	0.4	135	08/03/2023	20:00	0.9	180
05/03/2023	21:00	0.4	22.5	06/03/2023	21:00	0.4	112.5	07/03/2023	21:00	0.9	225	08/03/2023	21:00	0.9	112.5
05/03/2023	22:00	0.4	157.5	06/03/2023	22:00	0.9	90	07/03/2023	22:00	0.4	225	08/03/2023	22:00	1.3	45
05/03/2023	23:00	0.9	45	06/03/2023	23:00	0.4	270	07/03/2023	23:00	0.9	67.5	08/03/2023	23:00	0.9	180

Mean Wind Speed and Wind Direction recorded by the weather station setup at the rooftop of Ng Wah Catholic Secondary School

Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction
09/03/2023	0:00	0.4	112.5	10/03/2023	0:00	0.4	135	11/03/2023	0:00	0.4	112.5	12/03/2023	0:00	0.4	247.5
09/03/2023	1:00	0.4	135	10/03/2023	1:00	0.9	112.5	11/03/2023	1:00	0.9	112.5	12/03/2023	1:00	0.4	247.5
09/03/2023	2:00	0	112.5	10/03/2023	2:00	0.4	112.5	11/03/2023	2:00	0.9	112.5	12/03/2023	2:00	0.4	247.5
09/03/2023	3:00	0.4	112.5	10/03/2023	3:00	0.9	112.5	11/03/2023	3:00	0.4	135	12/03/2023	3:00	0.9	112.5
09/03/2023	4:00	0.4	112.5	10/03/2023	4:00	0.4	135	11/03/2023	4:00	0.4	135	12/03/2023	4:00	0.4	247.5
09/03/2023	5:00	0.4	112.5	10/03/2023	5:00	0.9	112.5	11/03/2023	5:00	0.4	112.5	12/03/2023	5:00	0.4	292.5
09/03/2023	6:00	0.9	112.5	10/03/2023	6:00	0	112.5	11/03/2023	6:00	0.4	112.5	12/03/2023	6:00	0.4	247.5
09/03/2023	7:00	0.9	112.5	10/03/2023	7:00	0.4	112.5	11/03/2023	7:00	1.3	112.5	12/03/2023	7:00	0.4	270
09/03/2023	8:00	1.3	112.5	10/03/2023	8:00	0.9	135	11/03/2023	8:00	0.4	112.5	2/03/2023	8:00	0.4	225
09/03/2023	9:00	0.9	112.5	10/03/2023	9:00	0.4	112.5	11/03/2023	9:00	0.4	135	12/03/2023	9:00	1.3	247.5
09/03/2023	12:00	0.9	247.5	10/03/2023	12:00	0.4	112.5	11/03/2023	12:00	0.9	112.5	12/03/2023	12:00	1.3	247.5
09/03/2023	12:00	0.4	247.5	10/03/2023	12:00	1.3	135	11/03/2023	12:00	0.4	112.5	12/03/2023	12:00	0.9	225
09/03/2023	12:00	0	270	10/03/2023	12:00	0	112.5	11/03/2023	12:00	0.4	112.5	12/03/2023	12:00	0.4	247.5
09/03/2023	13:00	0.4	112.5	10/03/2023	13:00	0.4	112.5	11/03/2023	13:00	1.3	112.5	12/03/2023	13:00	0.4	247.5
09/03/2023	14:00	0.4	112.5	10/03/2023	14:00	1.3	112.5	11/03/2023	14:00	1.3	112.5	12/03/2023	14:00	1.3	112.5
09/03/2023	15:00	0.4	112.5	10/03/2023	15:00	0.4	112.5	11/03/2023	15:00	1.3	67.5	12/03/2023	15:00	1.8	45
09/03/2023	16:00	0.9	112.5	10/03/2023	16:00	1.3	157.5	11/03/2023	16:00	0.9	135	12/03/2023	16:00	1.8	112.5
09/03/2023	17:00	0.9	112.5	10/03/2023	17:00	0.9	90	11/03/2023	17:00	0.4	315	12/03/2023	17:00	1.3	90
09/03/2023	18:00	0.4	112.5	10/03/2023	18:00	0.9	112.5	11/03/2023	18:00	0.9	157.5	12/03/2023	18:00	1.3	22.5
09/03/2023	19:00	0.4	90	10/03/2023	19:00	1.3	90	11/03/2023	19:00	0.4	45	12/03/2023	19:00	1.3	112.5
09/03/2023	20:00	0.4	90	10/03/2023	20:00	0.9	112.5	11/03/2023	20:00	0.9	112.5	12/03/2023	20:00	1.3	112.5
09/03/2023	21:00	0	90	10/03/2023	21:00	1.3	112.5	11/03/2023	21:00	0.4	112.5	12/03/2023	21:00	1.3	0
09/03/2023	22:00	0.4	90	10/03/2023	22:00	1.3	90	11/03/2023	22:00	0.4	67.5	12/03/2023	22:00	0.4	292.5
09/03/2023	23:00	0.4	112.5	10/03/2023	23:00	1.3	90	11/03/2023	23:00	0.9	135	12/03/2023	23:00	0.9	45

Mean Wind Speed and Wind Direction recorded by the weather station setup at the rooftop of Ng Wah Catholic Secondary School

Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction
13/03/2023	0:00	0.4	90	14/03/2023	0:00	0.9	90	15/03/2023	0:00	1.3	67.5	16/03/2023	0:00	0.9	135
13/03/2023	1:00	0.4	90	14/03/2023	1:00	0.9	112.5	15/03/2023	1:00	1.3	157.5	16/03/2023	1:00	0.9	112.5
13/03/2023	2:00	0.4	112.5	14/03/2023	2:00	0.9	90	15/03/2023	2:00	0.9	67.5	16/03/2023	2:00	0.9	90
13/03/2023	3:00	0.9	225	14/03/2023	3:00	1.3	112.5	15/03/2023	3:00	1.3	112.5	16/03/2023	3:00	0.9	90
13/03/2023	4:00	0.9	202.5	14/03/2023	4:00	1.3	112.5	15/03/2023	4:00	0.9	112.5	16/03/2023	4:00	0.9	90
13/03/2023	5:00	0.9	112.5	14/03/2023	5:00	1.3	90	15/03/2023	5:00	1.3	22.5	16/03/2023	5:00	0.4	112.5
13/03/2023	6:00	0.9	135	14/03/2023	6:00	1.3	112.5	15/03/2023	6:00	1.3	45	16/03/2023	6:00	0.4	90
13/03/2023	7:00	0.9	90	14/03/2023	7:00	1.3	112.5	15/03/2023	7:00	0.9	315	16/03/2023	7:00	0.4	135
13/03/2023	8:00	1.3	90	14/03/2023	8:00	1.3	112.5	15/03/2023	8:00	0.9	112.5	16/03/2023	8:00	0.9	90
13/03/2023	9:00	1.8	112.	14/03/2023	9:00	1.8	112.5	15/03/2023	9:00	0.9	135	16/03/2023	9:00	0.9	157.5
13/03/2023	12:00	0.9	90	14/03/2023	12:00	1.3	112.5	15/03/2023	12:00	1.3	112.5	16/03/2023	12:00	0.4	112.5
13/03/2023	12:00	0.4	112.5	14/03/2023	12:00	1.8	45	15/03/2023	12:00	0.9	112.5	16/03/2023	12:00	0.9	112.5
13/03/2023	12:00	0.9	135	14/03/2023	12:00	1.3	337.5	15/03/2023	12:00	1.3	112.5	16/03/2023	12:00	0.9	112.5
13/03/2023	13:00	0.4	135	14/03/2023	13:00	0.9	112.5	15/03/2023	13:00	0.9	135	16/03/2023	13:00	0.9	112.5
13/03/2023	14:00	0.4	157.5	14/03/2023	14:00	1.3	135	15/03/2023	14:00	0.9	157.5	16/03/2023	14:00	0.9	135
13/03/2023	15:00	0.4	135	14/03/2023	15:00	1.8	90	15/03/2023	15:00	0.9	135	16/03/2023	15:00	1.3	90
13/03/2023	16:00	0.4	135	14/03/2023	16:00	1.8	135	15/03/2023	16:00	0.9	112.5	16/03/2023	16:00	0.9	135
13/03/2023	17:00	0.4	112.5	14/03/2023	17:00	1.3	135	15/03/2023	17:00	0.9	112.5	16/03/2023	17:00	1.3	90
13/03/2023	18:00	0.9	135	14/03/2023	18:00	1.8	67.5	15/03/2023	18:00	0.9	112.5	16/03/2023	18:00	0.9	112.5
13/03/2023	19:00	0.9	112.5	14/03/2023	19:00	0.9	90	15/03/2023	19:00	0.4	135	16/03/2023	19:00	0.9	135
13/03/2023	20:00	0.9	112.5	14/03/2023	20:00	1.8	225	15/03/2023	20:00	0.4	135	16/03/2023	20:00	1.3	112.5
13/03/2023	21:00	0.4	135	14/03/2023	21:00	1.3	67.5	15/03/2023	21:00	0.9	45	16/03/2023	21:00	1.3	112.5
13/03/2023	22:00	0.4	337.5	14/03/2023	22:00	0.9	22.5	15/03/2023	22:00	0.4	90	16/03/2023	22:00	0.9	112.5
13/03/2023	23:00	0.4	112.5	14/03/2023	23:00	0.4	292.5	15/03/2023	23:00	0.4	67.5	16/03/2023	23:00	1.3	112.5

Mean Wind Speed and Wind Direction recorded by the weather station setup at the rooftop of Ng Wah Catholic Secondary School

Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction
17/03/2023	0:00	0.9	112.5	18/03/2023	0:00	0.9	112.5	19/03/2023	0:00	1.3	135	20/03/2023	0:00	1.3	90
17/03/2023	1:00	0.9	135	18/03/2023	1:00	1.3	112.5	19/03/2023	1:00	1.8	135	20/03/2023	1:00	1.3	45
17/03/2023	2:00	0.9	112.5	18/03/2023	2:00	0.9	135	19/03/2023	2:00	1.3	112.5	20/03/2023	2:00	0.9	67.5
17/03/2023	3:00	0.9	112.5	18/03/2023	3:00	0.9	90	19/03/2023	3:00	1.3	90	20/03/2023	3:00	1.3	45
17/03/2023	4:00	1.3	112.5	18/03/2023	4:00	1.3	112.5	19/03/2023	4:00	1.3	90	20/03/2023	4:00	1.3	22.5
17/03/2023	5:00	0.9	112.5	18/03/2023	5:00	1.3	112.5	19/03/2023	5:00	1.3	112.5	20/03/2023	5:00	1.3	22.5
17/03/2023	6:00	1.3	90	18/03/2023	6:00	1.3	135	19/03/2023	6:00	1.3	112.5	20/03/2023	6:00	0.9	22.5
17/03/2023	7:00	0.9	292.5	18/03/2023	7:00	1.3	135	19/03/2023	7:00	0.9	45	20/03/2023	7:00	0.9	247.5
17/03/2023	8:00	1.3	112.5	18/03/2023	8:00	1.8	112.5	19/03/2023	8:00	0.9	112.5	20/03/2023	8:00	0.9	45
17/03/2023	9:00	0.9	112.5	18/03/2023	9:00	0.9	90	19/03/2023	9:00	0.9	90	20/03/2023	9:00	1.3	45
17/03/2023	12:00	0.4	112.5	18/03/2023	12:00	1.3	135	19/03/2023	12:00	0.9	90	20/03/2023	12:00	0.9	45
17/03/2023	12:00	0.4	112.5	18/03/2023	12:00	0.9	112.5	19/03/2023	12:00	0.9	90	20/03/2023	12:00	0.9	90
17/03/2023	12:00	0.9	112.5	18/03/2023	12:00	0.9	112.5	19/03/2023	12:00	1.3	112.5	20/03/2023	12:00	1.3	90
17/03/2023	13:00	2.2	112.5	18/03/2023	13:00	1.3	135	19/03/2023	13:00	1.3	112.5	20/03/2023	13:00	1.3	67.5
17/03/2023	14:00	1.3	135	18/03/2023	14:00	0.9	90	19/03/2023	14:00	1.3	112.5	20/03/2023	14:00	1.3	67.5
17/03/2023	15:00	0.4	112.5	18/03/2023	15:00	0.9	112.5	19/03/2023	15:00	0.4	135	20/03/2023	15:00	0.4	22.5
17/03/2023	16:00	0.9	112.5	18/03/2023	16:00	0.9	112.5	19/03/2023	16:00	0.4	135	20/03/2023	16:00	0.9	135
17/03/2023	17:00	0.9	112.5	18/03/2023	17:00	0.9	112.5	19/03/2023	17:00	0.9	225	20/03/2023	17:00	0.9	90
17/03/2023	18:00	0.4	135	18/03/2023	18:00	0.9	90	19/03/2023	18:00	0.9	112.5	20/03/2023	18:00	1.3	112.5
17/03/2023	19:00	0.4	112.5	18/03/2023	19:00	1.3	112.5	19/03/2023	19:00	0.4	112.5	20/03/2023	19:00	1.3	135
17/03/2023	20:00	0.9	112.5	18/03/2023	20:00	0.9	90	19/03/2023	20:00	0.4	112.5	20/03/2023	20:00	0.4	112.5
17/03/2023	21:00	0.9	112.5	18/03/2023	21:00	0.9	90	19/03/2023	21:00	0.9	90	20/03/2023	21:00	0.9	90
17/03/2023	22:00	1.3	112.5	18/03/2023	22:00	0.9	112.5	19/03/2023	22:00	1.3	90	20/03/2023	22:00	1.3	112.5
17/03/2023	23:00	0.9	135	18/03/2023	23:00	0.9	112.5	19/03/2023	23:00	0.4	90	20/03/2023	23:00	1.3	90

Mean Wind Speed and Wind Direction recorded by the weather station setup at the rooftop of Ng Wah Catholic Secondary School

Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction
21/03/2023	0:00	1.3	45	22/03/2023	0:00	1.3	112.5	23/03/2023	0:00	0.9	67.5	24/03/2023	0:00	0.9	135
21/03/2023	1:00	0.9	112.5	22/03/2023	1:00	1.3	112.5	23/03/2023	1:00	0.9	112.5	24/03/2023	1:00	0.9	112.5
21/03/2023	2:00	0.4	90	22/03/2023	2:00	0.9	90	23/03/2023	2:00	1.3	135	24/03/2023	2:00	0.9	90
21/03/2023	3:00	0.4	90	22/03/2023	3:00	0.9	112.5	23/03/2023	3:00	0.4	135	24/03/2023	3:00	0.4	90
21/03/2023	4:00	1.3	45	22/03/2023	4:00	0.9	112.5	23/03/2023	4:00	0.9	135	24/03/2023	4:00	0.9	112.5
21/03/2023	5:00	0.4	112.5	22/03/2023	5:00	0.9	180	23/03/2023	5:00	0.9	135	24/03/2023	5:00	0.4	112.5
21/03/2023	6:00	0.9	45	22/03/2023	6:00	1.3	45	23/03/2023	6:00	0.9	112.5	24/03/2023	6:00	0.4	112.5
21/03/2023	7:00	1.3	90	22/03/2023	7:00	0.9	112.5	23/03/2023	7:00	0.9	67.5	24/03/2023	7:00	0.4	90
21/03/2023	8:00	0.9	90	22/03/2023	8:00	1.3	112.5	23/03/2023	8:00	0.4	135	24/03/2023	8:00	0.4	90
21/03/2023	9:00	0.4	112.5	22/03/2023	9:00	0.9	292.5	23/03/2023	9:00	0.9	157.5	24/03/2023	9:00	0.9	112.5
21/03/2023	12:00	1.3	90	22/03/2023	12:00	0.9	112.5	23/03/2023	12:00	0.4	22.5	24/03/2023	12:00	1.3	90
21/03/2023	12:00	0.9	112.5	22/03/2023	12:00	1.3	45	23/03/2023	12:00	0.4	22.5	24/03/2023	12:00	0.9	270
21/03/2023	12:00	0.9	112.5	22/03/2023	12:00	1.3	112.5	23/03/2023	12:00	0.4	112.5	24/03/2023	12:00	0.9	135
21/03/2023	13:00	0.4	90	22/03/2023	13:00	1.3	112.5	23/03/2023	13:00	0.9	90	24/03/2023	13:00	0.9	112.5
21/03/2023	14:00	1.3	112.5	22/03/2023	14:00	1.3	202.5	23/03/2023	14:00	0.9	135	24/03/2023	14:00	1.3	135
21/03/2023	15:00	0.9	112.5	22/03/2023	15:00	1.3	45	23/03/2023	15:00	0.9	112.5	24/03/2023	15:00	0.4	112.5
21/03/2023	16:00	1.3	112.5	22/03/2023	16:00	1.3	90	23/03/2023	16:00	0.9	90	24/03/2023	16:00	0.4	90
21/03/2023	17:00	1.3	315	22/03/2023	17:00	0.9	135	23/03/2023	17:00	0.4	90	24/03/2023	17:00	0.4	112.5
21/03/2023	18:00	0.9	247.5	22/03/2023	18:00	0.9	270	23/03/2023	18:00	0.9	112.5	24/03/2023	18:00	0.9	90
21/03/2023	19:00	0.9	22.5	22/03/2023	19:00	0.9	247.5	23/03/2023	19:00	0.4	112.5	24/03/2023	19:00	0.9	112.5
21/03/2023	20:00	0.9	45	22/03/2023	20:00	0.9	202.5	23/03/2023	20:00	0.4	112.5	24/03/2023	20:00	0.4	90
21/03/2023	21:00	0.4	67.5	22/03/2023	21:00	1.3	270	23/03/2023	21:00	0.4	90	24/03/2023	21:00	0.9	112.5
21/03/2023	22:00	0.9	112.5	22/03/2023	22:00	1.3	247.5	23/03/2023	22:00	0.4	90	24/03/2023	22:00	0.4	112.5
21/03/2023	23:00	0.4	112.5	22/03/2023	23:00	1.3	247.5	23/03/2023	23:00	0.9	112.5	24/03/2023	23:00	0.4	90

Mean Wind Speed and Wind Direction recorded by the weather station setup at the rooftop of Ng Wah Catholic Secondary School

Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction
25/03/2023	0:00	0.9	135	26/03/2023	0:00	0.9	0	27/03/2023	0:00	0.9	112.5	28/03/2023	0:00	0.4	247.5
25/03/2023	1:00	0.4	112.5	26/03/2023	1:00	0.9	45	27/03/2023	1:00	1.3	90	28/03/2023	1:00	0.9	247.5
25/03/2023	2:00	0.4	292.5	26/03/2023	2:00	1.3	45	27/03/2023	2:00	0.9	112.5	28/03/2023	2:00	0.9	180
25/03/2023	3:00	0.9	112.5	26/03/2023	3:00	0.9	22.5	27/03/2023	3:00	0.9	90	28/03/2023	3:00	0.9	247.5
25/03/2023	4:00	0.4	225	26/03/2023	4:00	1.3	22.5	27/03/2023	4:00	0.9	90	28/03/2023	4:00	1.3	270
25/03/2023	5:00	0.4	315	26/03/2023	5:00	1.3	22.5	27/03/2023	5:00	0.9	67.5	28/03/2023	5:00	1.3	247.5
25/03/2023	6:00	0.4	112.5	26/03/2023	6:00	0.9	135	27/03/2023	6:00	0.4	112.5	28/03/2023	6:00	0.9	67.5
25/03/2023	7:00	0.4	112.5	26/03/2023	7:00	0.4	67.5	27/03/2023	7:00	0.4	135	28/03/2023	7:00	0.9	90
25/03/2023	8:00	0.9	45	26/03/2023	8:00	0.9	22.5	27/03/2023	8:00	0.4	112.5	28/03/2023	8:00	0.9	90
25/03/2023	9:00	0.4	67.5	26/03/2023	9:00	1.3	22.5	27/03/2023	9:00	0.9	112.5	28/03/2023	9:00	1.3	45
25/03/2023	12:00	0.4	45	26/03/2023	12:00	1.3	22.5	27/03/2023	12:00	0.9	112.5	28/03/2023	12:00	0.9	67.5
25/03/2023	12:00	0.4	67.5	26/03/2023	12:00	0.4	90	27/03/2023	12:00	0.9	90	28/03/2023	12:00	0.4	22.5
25/03/2023	12:00	0.9	112.5	26/03/2023	12:00	1.3	337.5	27/03/2023	12:00	0.9	112.5	28/03/2023	12:00	1.3	292.5
25/03/2023	13:00	0.9	135	26/03/2023	13:00	0.9	22.5	27/03/2023	13:00	0.4	112.5	28/03/2023	13:00	0.9	112.5
25/03/2023	14:00	0.4	112.5	26/03/2023	14:00	0.4	90	27/03/2023	14:00	0.4	112.5	28/03/2023	14:00	0.9	90
25/03/2023	15:00	0.4	135	26/03/2023	15:00	0.4	112.5	27/03/2023	15:00	0.4	225	28/03/2023	15:00	0.9	90
25/03/2023	16:00	0	112.5	26/03/2023	16:00	0.4	135	27/03/2023	16:00	0.4	202.5	28/03/2023	16:00	0.4	112.5
25/03/2023	17:00	0.4	112.5	26/03/2023	17:00	0.9	67.5	27/03/2023	17:00	0.4	135	28/03/2023	17:00	0.4	112.5
25/03/2023	18:00	0.4	112.5	26/03/2023	18:00	0.9	90	27/03/2023	18:00	0.9	112.5	28/03/2023	18:00	0.4	112.5
25/03/2023	19:00	0.4	112.5	26/03/2023	19:00	0.9	45	27/03/2023	19:00	0.9	112.5	28/03/2023	19:00	0.4	112.5
25/03/2023	20:00	0.9	112.5	26/03/2023	20:00	0.9	90	27/03/2023	20:00	0.9	135	28/03/2023	20:00	0.9	90
25/03/2023	21:00	0.9	112.5	26/03/2023	21:00	0.9	67.5	27/03/2023	21:00	0.9	112.5	28/03/2023	21:00	0.4	90
25/03/2023	22:00	1.3	112.5	26/03/2023	22:00	0.9	90	27/03/2023	22:00	1.3	112.5	28/03/2023	22:00	0.9	90
25/03/2023	23:00	0	90	26/03/2023	23:00	0.9	90	27/03/2023	23:00	0.9	112.5	28/03/2023	23:00	0.9	112.5

Mean Wind Speed and Wind Direction recorded by the weather station setup at the rooftop of Ng Wah Catholic Secondary School

Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction	Date	Time	Wind Speed (m/s)	Wind Direction
29/03/2023	0:00	0.9	112.5	30/03/2023	0:00	0.9	112.5	31/03/2023	0:00	0.9	270				
29/03/2023	1:00	1.3	202.5	30/03/2023	1:00	1.3	112.5	31/03/2023	1:00	0.4	247.5				
29/03/2023	2:00	1.3	112.5	30/03/2023	2:00	1.3	112.5	31/03/2023	2:00	0.9	247.5				
29/03/2023	3:00	1.3	112.5	30/03/2023	3:00	1.3	90	31/03/2023	3:00	0.9	247.5				
29/03/2023	4:00	0.9	67.5	30/03/2023	4:00	1.3	90	31/03/2023	4:00	0.9	135				
29/03/2023	5:00	0.9	112.5	30/03/2023	5:00	0.9	90	31/03/2023	5:00	0.9	112.5				
29/03/2023	6:00	1.8	112.5	30/03/2023	6:00	0.9	135	31/03/2023	6:00	0.9	112.5				
29/03/2023	7:00	1.3	90	30/03/2023	7:00	0.9	135	31/03/2023	7:00	1.3	112.5				
29/03/2023	8:00	1.3	90	30/03/2023	8:00	0.9	22.5	31/03/2023	8:00	1.3	112.5				
29/03/2023	9:00	0.9	67.5	30/03/2023	9:00	0.4	157.5	31/03/2023	9:00	0.4	90				
29/03/2023	12:00	1.3	90	30/03/2023	12:00	0.4	67.5	31/03/2023	12:00	0.4	112.5				
29/03/2023	12:00	1.8	112.5	30/03/2023	12:00	0.9	112.5	31/03/2023	12:00	0.4	112.5				
29/03/2023	12:00	2.2	112.5	30/03/2023	12:00	0.9	112.5	31/03/2023	12:00	0.9	247.5				
29/03/2023	13:00	1.3	112.5	30/03/2023	13:00	0.9	112.5	31/03/2023	13:00	1.3	270				
29/03/2023	14:00	1.3	112.5	30/03/2023	14:00	0.9	112.5	31/03/2023	14:00	0	135				
29/03/2023	15:00	1.3	202.5	30/03/2023	15:00	0.9	45	31/03/2023	15:00	0.4	292.5				
29/03/2023	16:00	1.3	112.5	30/03/2023	16:00	0.4	67.5	31/03/2023	16:00	0	90				
29/03/2023	17:00	1.3	67.5	30/03/2023	17:00	0.4	67.5	31/03/2023	17:00	0.4	112.5				
29/03/2023	18:00	0.9	67.5	30/03/2023	18:00	0.4	67.5	31/03/2023	18:00	0.9	112.5				
29/03/2023	19:00	0.9	90	30/03/2023	19:00	0.9	90	31/03/2023	19:00	0.9	135				
29/03/2023	20:00	0.4	180	30/03/2023	20:00	0.9	112.5	31/03/2023	20:00	0.9	90				
29/03/2023	21:00	0.4	180	30/03/2023	21:00	1.3	90	31/03/2023	21:00	0.9	45				
29/03/2023	22:00	0.9	112.5	30/03/2023	22:00	1.3	67.5	31/03/2023	22:00	0.9	45				
29/03/2023	23:00	0.4	202.5	30/03/2023	23:00	0.4	67.5	31/03/2023	23:00	0.4	135				

Appendix G – 24-hr TSP monitoring results and graphical presentation

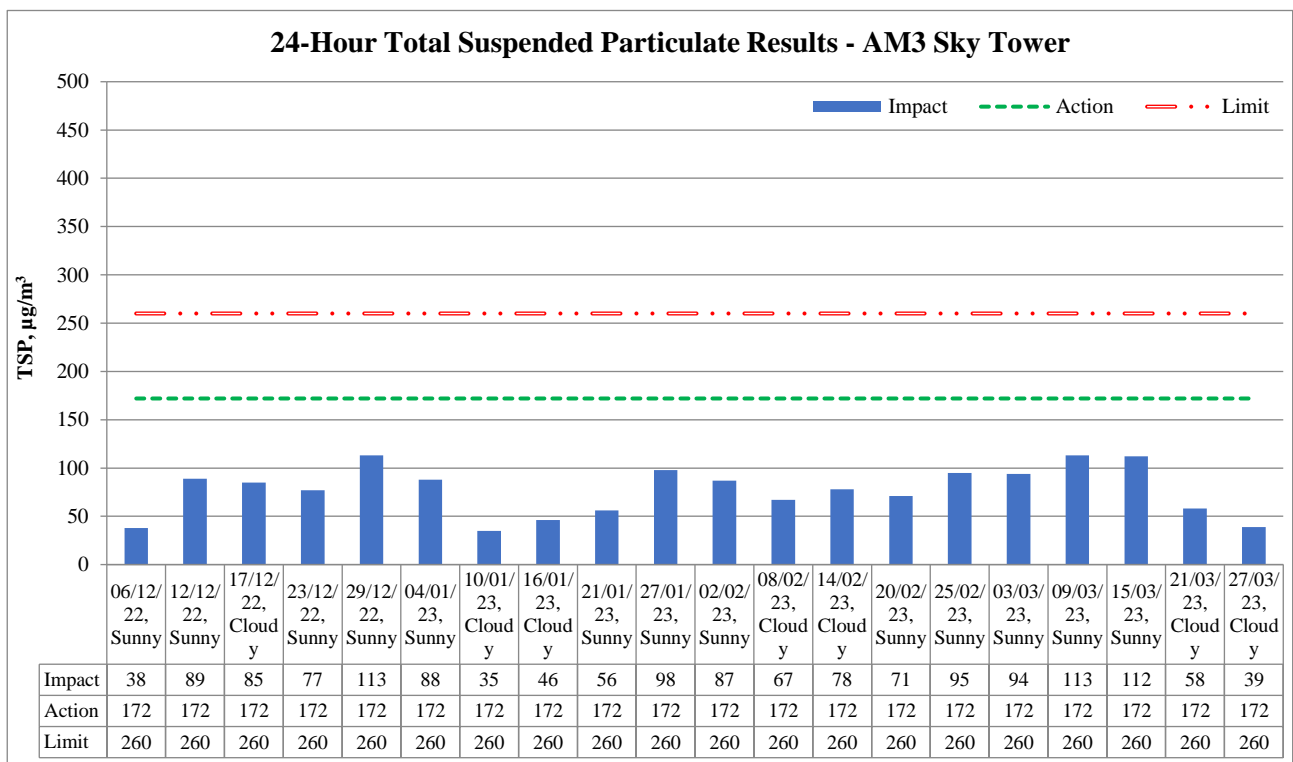
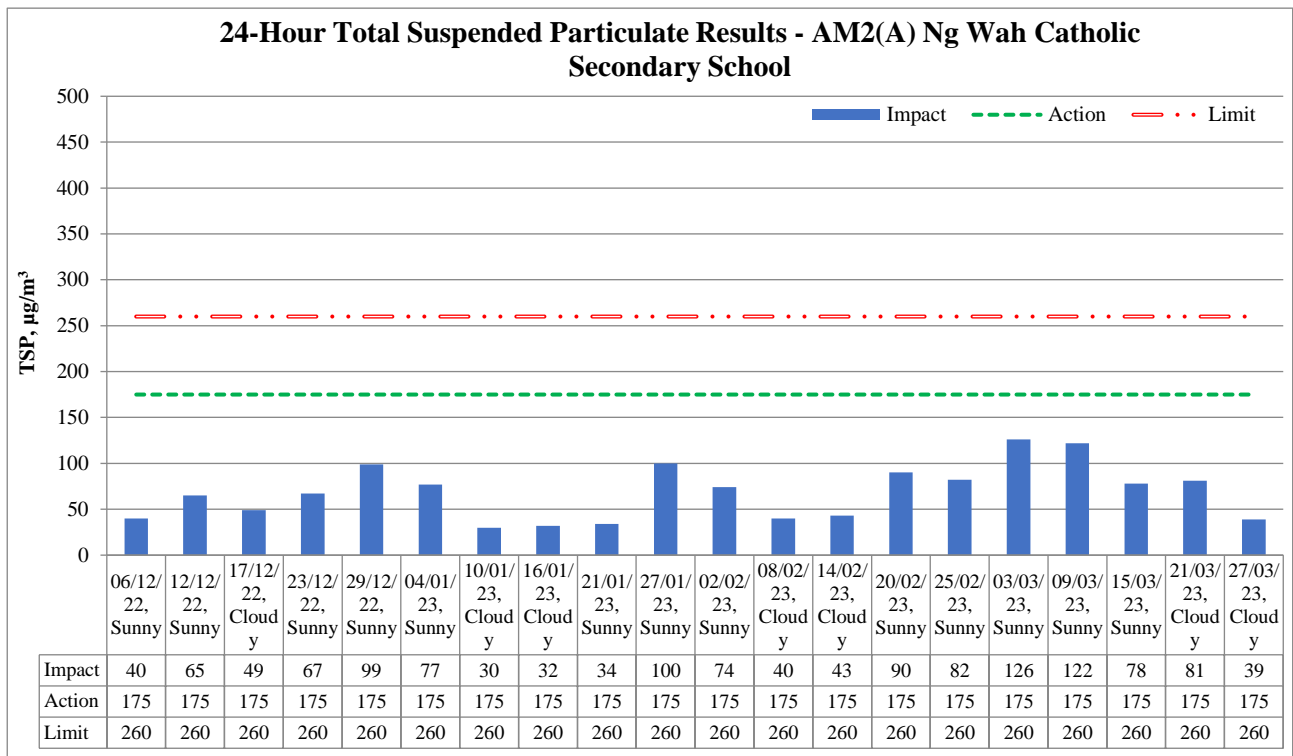
Location: AM2(A) – Ng Wah Catholic Secondary School

Start Date	Weather	Air Temp. (°C)	Atmospheric Pressure (hPa)	Filter weight (g)		Particulate weight (g)	Elapse Time		Sampling Time (min)	Flow Rate (cfm)		Av. Flow (m ³ /min)	Total vol. (m ³)	Conc. (µg/m ³)
				Initial	Final		Initial	Final		Initial	Final			
03/03/2023	Sunny	21.1	1024.9	15.4815	15.7273	0.2458	2023/3/3 13:05	2023/3/4 13:05	1440	50	50	1.36	1955	126
09/03/2023	Sunny	26	1017.7	18.4322	18.6681	0.2359	2023/3/9 9:10	2023/3/10 9:10	1440	50	50	1.34	1932	122
15/03/2023	Sunny	23.5	1017.4	18.1723	18.3232	0.1509	2023/3/15 13:00	2023/3/16 13:00	1440	50	50	1.35	1939	78
21/03/2023	Cloudy	25.2	1009.2	18.5943	18.7505	0.1562	2023/3/21 13:05	2023/3/22 13:05	1440	50	50	1.34	1926	81
27/03/2023	Cloudy	17.9	1016.2	14.5712	14.6504	0.0792	2023/3/27 9:00	2023/3/28 9:00	1440	52	52	1.41	2036	39
												Maximum	126	
												Minimum	39	
												Average	89	
												Action Level	175	
												Limit Level	260	

Location: AM3 – Sky Tower

Start Date	Weather	Air Temp. (°C)	Atmospheric Pressure (hPa)	Filter weight (g)		Particulate weight (g)	Elapse Time		Sampling Time (min)	Flow Rate (cfm)		Av. Flow (m ³ /min)	Total vol. (m ³)	Conc. (µg/m ³)
				Initial	Final		Initial	Final		Initial	Final			
03/03/2023	Sunny	21.1	1024.9	18.0786	18.2516	0.1730	2023/3/3 9:25	2023/3/4 9:25	1440	46	46	1.28	1849	94
09/03/2023	Sunny	26	1017.7	18.2272	18.4426	0.2154	2023/3/9 13:23	2023/3/10 13:23	1440	48	48	1.32	1908	113
15/03/2023	Sunny	23.5	1017.4	17.8541	18.0693	0.2152	2023/3/15 9:34	2023/3/16 9:34	1440	48	48	1.33	1916	112
21/03/2023	Cloudy	25.2	1009.2	18.5503	18.6563	0.1060	2023/3/21 13:30	2023/3/22 13:30	1440	46	46	1.26	1821	58
27/03/2023	Cloudy	17.9	1016.2	18.8042	18.8729	0.0687	2023/3/27 13:24	2023/3/28 13:24	1440	44	44	1.23	1769	39
												Maximum	113	
												Minimum	39	
												Average	83	
												Action Level	172	
												Limit Level	260	

24-hour average TSP



Major Construction Activities	Reporting Period			
	Dec 2022	Jan 2023	Feb 2023	Mar 2023
Construction works for DCS	✓	✓	✓	✓
Construction works for Road L16	✓	✓	✓	✓
Construction works for Olympic Avenue	✓	✓	✓	✓
Construction works for additional run-in at Road L7	✓	✓		
Construction of gantry footing at launching shaft for subway SB-01		✓	✓	
Dismantling of gantry crane at casting yard	✓	✓		
ELS and excavation works at Sa Po Road	✓	✓	✓	
ELS and excavation works for retrieving shaft at Sa Po Road				✓
ELS and excavation works for lift and staircase of LW-02		✓		
ELS modification at launching shaft for SB-01			✓	
Post-piling tests and proof drilling for LW02 lift and staircase	✓			
Pre-bored socket H-pile construction works for Slip Road S14	✓	✓	✓	✓
Pile cap construction works for lift and staircase of LW-02			✓	
Erection of falseworks and working platform for decking of Elevated Walkway LW-02	✓	✓	✓	✓
Erection of gantry crane at launching shaft for SB-01			✓	
RC construction at launching shaft for subway SB-01	✓	✓		
RC construction for decking of LW-02				✓
Construction works for Pedestrian Street No. 2	✓			
RC construction for Subway KS10 Lift and Staircase	✓	✓	✓	✓
RC construction works for lift and staircase of LW-02				✓
Renovation works for existing subways KS9, KS32 and KS10	✓	✓	✓	✓
Steel back thrust construction at launching shaft for SB-01				✓
Erect gantry crane at launching shaft for SB-01				✓
Assembly of RTBM at launching shaft for SB-01				✓

Factors might affect the monitoring results	Reporting Period			
	Dec 2022	Jan 2023	Feb 2023	Mar 2023
Non-project related construction activities in the adjacent construction sites were observed.	✓	✓	✓	✓

Appendix H – 1-hr TSP monitoring results and graphical presentation

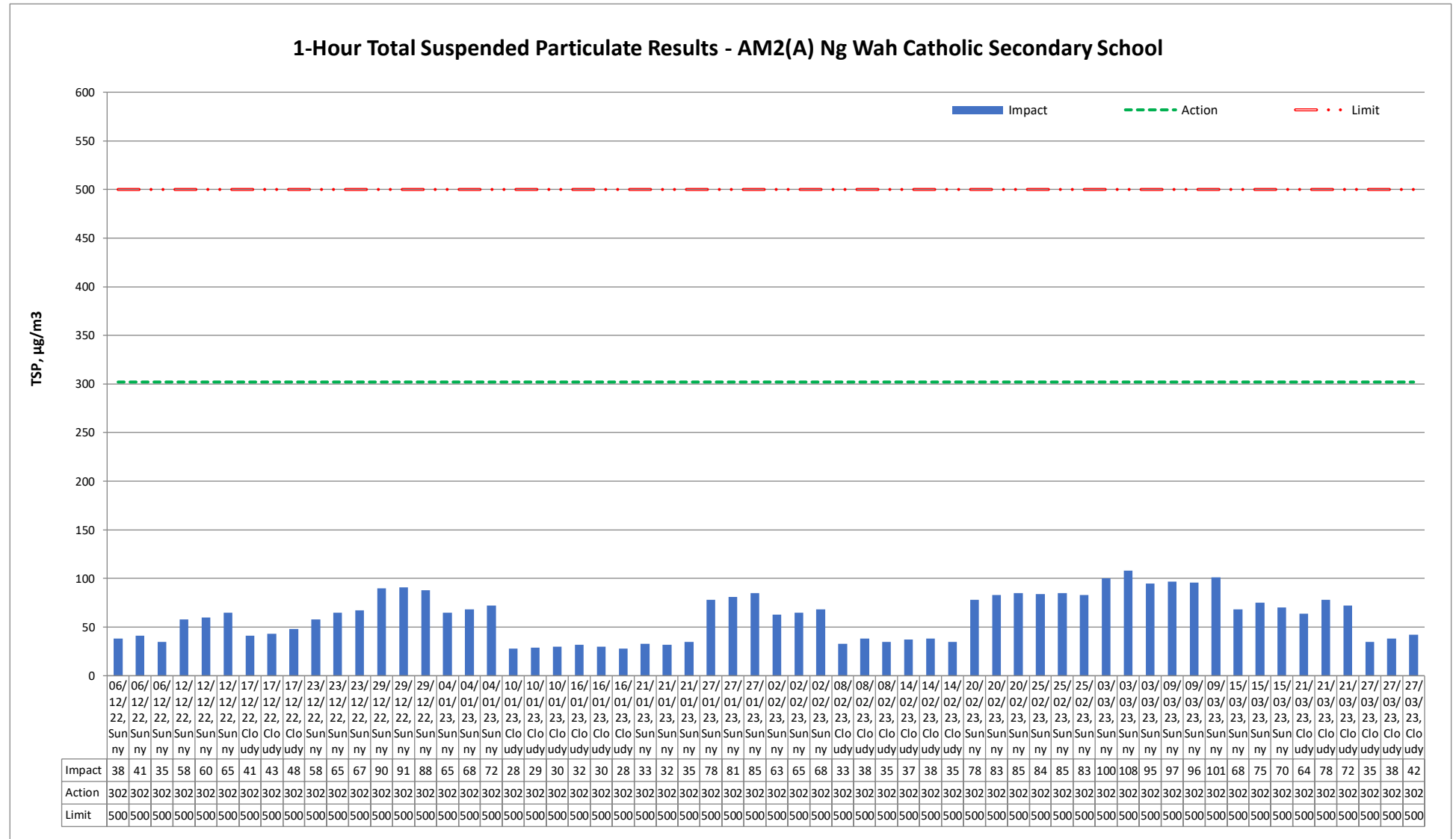
Location:
**AM2(A) –
 Ng Wah Catholic
 Secondary School**

Date	Measurement Period			1-hr TSP concentration, $\mu\text{g}/\text{m}^3$	Weather
		-			
03/03/2023	13:00	-	14:00	100	Sunny
	14:00	-	15:00	108	
	15:00	-	16:00	95	
09/03/2023	9:00	-	10:00	97	Sunny
	10:00	-	11:00	96	
	11:00	-	12:00	101	
15/03/2023	13:00	-	14:00	68	Sunny
	14:00	-	15:00	75	
	15:00	-	16:00	70	
21/03/2023	13:00	-	14:00	64	Cloudy
	14:00	-	15:00	78	
	15:00	-	16:00	72	
27/03/2023	9:00	-	10:00	35	Cloudy
	10:00	-	11:00	38	
	11:00	-	12:00	42	
Maximum				108	
Minimum				35	
Average				76	
Action Level				302	
Limit Level				500	

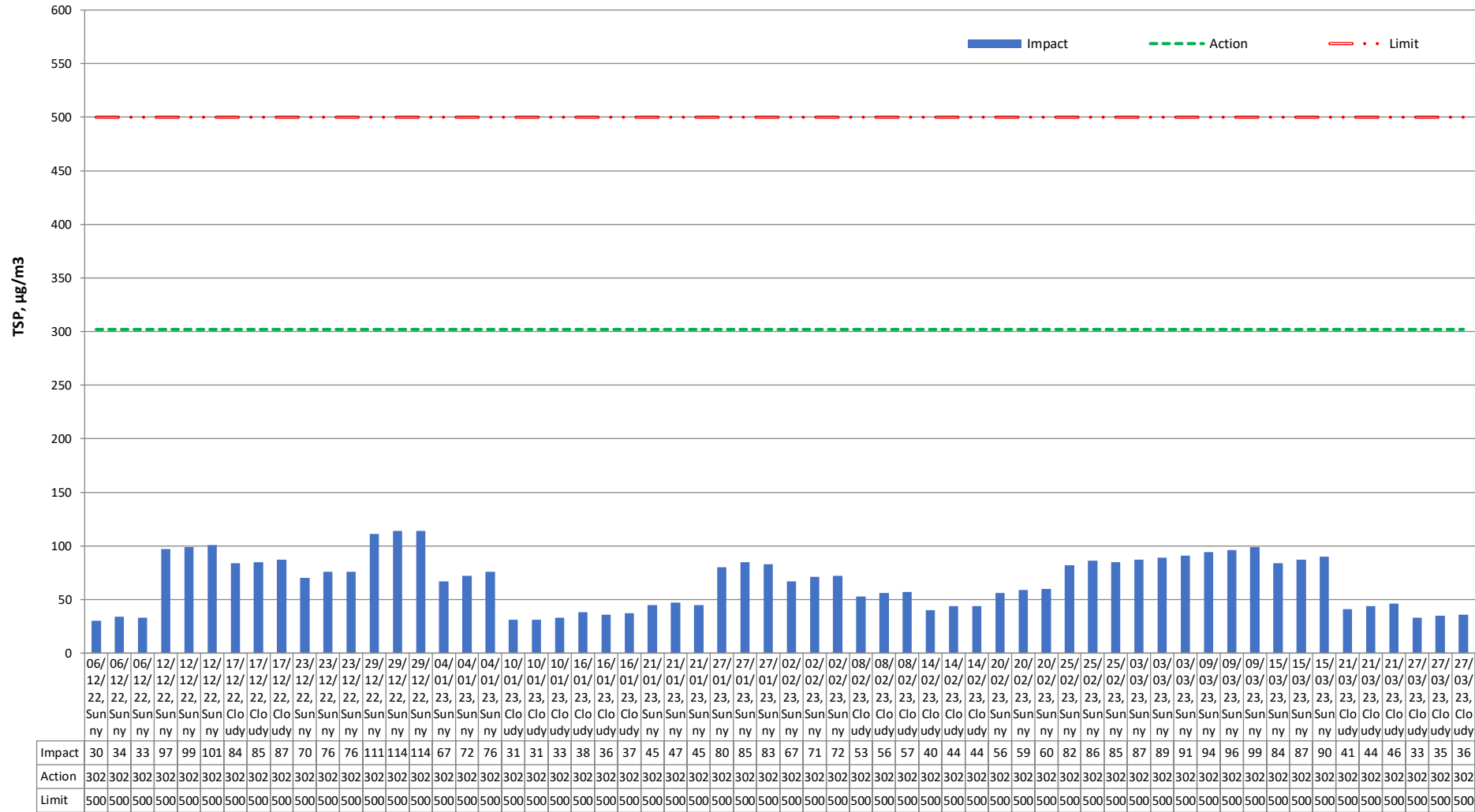
Location:
**AM3 -
 Sky Tower**

Date	Measurement Period			1-hr TSP concentration, μg/m ³	Weather
	9:00	-	10:00		
03/03/2023	9:00	-	10:00	87	Sunny
	10:00	-	11:00	89	
	11:00	-	12:00	91	
09/03/2023	13:00	-	14:00	94	Sunny
	14:00	-	15:00	96	
	15:00	-	16:00	99	
15/03/2023	9:00	-	10:00	84	Sunny
	10:00	-	11:00	87	
	11:00	-	12:00	90	
21/03/2023	13:00	-	14:00	41	Cloudy
	14:00	-	15:00	44	
	15:00	-	16:00	46	
27/03/2023	13:00	-	14:00	33	Cloudy
	14:00	-	15:00	35	
	15:00	-	16:00	36	
Maximum				99	
Minimum				33	
Average				70	
Action Level				301	
Limit Level				500	

1-hour average TSP



1-Hour Total Suspended Particulate Results - AM3 Sky Tower



Major Construction Activities	Reporting Period			
	Dec 2022	Jan 2023	Feb 2023	Mar 2023
Construction works for DCS	✓	✓	✓	✓
Construction works for Road L16	✓	✓	✓	✓
Construction works for Olympic Avenue	✓	✓	✓	✓
Construction works for additional run-in at Road L7	✓	✓		
Construction of gantry footing at launching shaft for subway SB-01		✓	✓	
Dismantling of gantry crane at casting yard	✓	✓		
ELS and excavation works at Sa Po Road	✓	✓	✓	
ELS and excavation works for retrieving shaft at Sa Po Road				✓
ELS and excavation works for lift and staircase of LW-02		✓		
ELS modification at launching shaft for SB-01			✓	
Post-piling tests and proof drilling for LW02 lift and staircase	✓			
Pre-bored socket H-pile construction works for Slip Road S14	✓	✓	✓	✓
Pile cap construction works for lift and staircase of LW-02			✓	
Erection of falseworks and working platform for decking of Elevated Walkway LW-02	✓	✓	✓	✓
Erection of gantry crane at launching shaft for SB-01			✓	
RC construction at launching shaft for subway SB-01	✓	✓		
RC construction for decking of LW-02				✓
Construction works for Pedestrian Street No. 2	✓			
RC construction for Subway KS10 Lift and Staircase	✓	✓	✓	✓
RC construction works for lift and staircase of LW-02				✓
Renovation works for existing subways KS9, KS32 and KS10	✓	✓	✓	✓
Steel back thrust construction at launching shaft for SB-01				✓
Erect gantry crane at launching shaft for SB-01				✓
Assembly of RTBM at launching shaft for SB-01				✓

Factors might affect the monitoring results	Reporting Period			
	Dec 2022	Jan 2023	Feb 2023	Mar 2023
Non-project related construction activities in the adjacent construction sites were observed.	✓	✓	✓	✓

Appendix I – Event and Action Plan for air quality

Event	Action			
	ET	IEC	Supervisor / ER	Contractor
Action Level being exceeded by one sampling	<ol style="list-style-type: none"> 1. Identify source and investigate the causes of exceedance; 2. Inform Contractor, IEC and Supervisor /ER; 3. Repeat measurement to confirm finding. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method. 	<ol style="list-style-type: none"> 1. Notify Contractor. 	<ol style="list-style-type: none"> 1. Rectify any unacceptable practice; 2. Amend working methods if appropriate.
Action Level being exceeded by two or more consecutive sampling	<ol style="list-style-type: none"> 1. Identify source and investigate the causes of exceedance; 2. Inform Contractor, IEC and Supervisor /ER; 3. Increase monitoring frequency to daily; 4. Discuss with IEC and Contractor on remedial actions required; 5. Assess the effectiveness of Contractor's remedial actions; 6. If exceedance continues, arrange meeting with IEC and Supervisor /ER; 7. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the Supervisor /ER on the effectiveness of the proposed remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Supervise implementation of remedial measures; 5. Conduct meeting with ET and IEC if exceedance continues. 	<ol style="list-style-type: none"> 1. Discuss with ET and IEC on proper remedial actions; 2. Submit proposals for remedial actions to Supervisor /ER and IEC within three working day of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate.
Limit Level being exceeded by one sampling	<ol style="list-style-type: none"> 1. Identify source and investigate the causes of exceedance; 2. Inform Contractor, IEC, Supervisor /ER, and EPD; 3. Repeat measurement to confirm finding; 4. Assess effectiveness of 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss possible remedial measures with ET and Contractor; 4. Advise the Supervisor /ER 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Discuss with ET and IEC on proper remedial actions; 3. Submit proposal for remedial actions to Supervisor /ER and IEC

Event	Action			
	ET	IEC	Supervisor / ER	Contractor
	Contractor's remedial actions and keep EPD, IEC and Supervisor /ER informed of the results.	on the effectiveness of the proposed remedial measures.	4. Implemented; Supervise implementation of remedial measures; 5. Conduct meeting with ET and IEC if exceedance continues.	within three working days of notification; 4. Implement the agreed proposals.
Limit Level being exceeded by two or more consecutive sampling	<ol style="list-style-type: none"> 1. Notify IEC, Supervisor /ER, Contractor and EPD; 2. Repeat measurement to confirm findings; 3. Carry out analysis of Contractor's working procedures to identify source and investigate the causes of exceedance; 4. Increase monitoring frequency to daily; 5. Arrange meeting with IEC, Supervisor /ER and Contractor to discuss the remedial action to be taken; 6. Assess effectiveness of Contractor's remedial actions and keep EPD, IEC and Supervisor /ER informed of the results; 7. If exceedance stop, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with Supervisor /ER, ET, and Contractor on the potential remedial actions; 4. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the Supervisor /ER accordingly. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Supervise implementation of remedial measures; 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. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Discuss with ET and IEC on proper remedial actions; 3. Submit proposal for remedial actions to Supervisor /ER and IEC within three working days of notification; 4. Implement the agreed proposals; 5. Submit further remedial actions if problem still not under control; 6. Stop the relevant portion of works as instructed by the Supervisor /ER until the exceedance is abated.

Appendix J – Calibration certificates, catalogue of noise monitoring equipment

Catalogue of Sound Level Meter

Specifications

	NL-52	NL-42
Applicable standards	IEC 61672-1: 2002 Class 1 ANSI S1.4-1983 Type 1 ANSI S1.4A-1985 Type 1 ANSI S1.43-1997 Type 1 JIS C 1509-1: 2005 Class 1	IEC 61672-1: 2002 Class 2 ANSI S1.4-1983 Type 2 ANSI S1.4A-1985 Type 2 ANSI S1.43-1997 Type 2 JIS C 1509-1: 2005 Class 2
Measurement functions	Simultaneous measurement of the following items, with selected time weighting and frequency weighting Instantaneous sound pressure level: L_p Equivalent continuous sound pressure level: L_{eq} Sound exposure level: L_E Maximum sound pressure level: L_{max} Minimum sound pressure level: L_{min} Percentile sound levels: L_N (0.1 to 99.9%, 0.1-increment steps, max. 5 values)	
Processing (main ch)	Instantaneous sound pressure level: L_p Equivalent continuous sound pressure level: L_{eq} Sound exposure level: L_E Maximum sound pressure level: L_{max} Minimum sound pressure level: L_{min} Percentile sound levels: L_N (0.1 to 99.9%, 0.1-increment steps, max. 5 values)	
Processing (sub ch)	Instantaneous sound pressure level: L_p	
Additional processing	In addition to main processing items, one of the following can be selected for simultaneous processing: C-weighted equivalent continuous sound level: L_{Ceq} C-weighted peak sound level: L_{Cpeak} Z-weighted peak sound level: L_{Zpeak} 1-time-weighted equivalent continuous sound level: $L_{A,1eq}^{*2}$ Maximum 1-time-weighted equivalent continuous sound level: $L_{A,1max}^{*2}$ The power average of the maximum level of each 5 second interval: $L_{A,1max}$ The frequency weighting for the additional processing synchronizes with the frequency weighting of the sub-channel, so when the sub-channel has A-weighting, $L_{A,1max}$ can be selected. When C-weighting (Z-weighting) is selected, the additional processing L_{Ceq} and L_{Cpeak} (L_{Zpeak}) are selectable.	
Measuring time	10 s, 1, 5, 10, 15, 30 m, 1, 8, 24 h, and manual (maximum 24 h)	
Microphone	Type: UC-59 Sensitivity level: -27 dB	Type: UC-52 Sensitivity level: -33 dB
Measurement range	A-weighting: 25 dB to 138 dB C-weighting: 33 dB to 138 dB Z-weighting: 38 dB to 138 dB C-weighting peak sound level: 55 dB to 141 dB Z-weighting peak sound level: 60 dB to 141 dB	
Inherent noise	A-weighting: 17 dB or less C-weighting: 25 dB or less Z-weighting: 30 dB or less	19 dB or less 27 dB or less 32 dB or less
Frequency range	20 Hz to 20 kHz	
Frequency weighting	A, C, and Z	
Time weighting	F (Fast) and S (Slow)	
Level range	Single range (Linearity range: 113 dB) Bar graph display range max: Max. 110 dB (20 to 130 dB) Switching of bar graph display: Set the upper/lower limit in 10 dB increments.	
RMS detection circuit	Digital processing method	
Sampling cycle	20.8 μ s (L_p , L_{eq} , L_E , L_{max} , L_{min} , L_{peak}): sampling frequency: 48 kHz) 100 ms (L_N)	
Calibration	Measurement Law: electrical calibration performed according to IEC and JIS standards, using internally generated signals; acoustic calibration performed with the NC-74.	
Correction functions	Windscreen correction: Compliant with IEC 61672-1 and JIS C 1509-1 standards when the windscreen is installed. Diffuse sound field correction: Correction of frequency characteristics in order to comply with standards (ANSI S1.4) in diffuse sound field.	
Delay time	The meter can be set to start measuring a specified time (OFF, 1, 3, 5 or 10 s) after the start button has been pressed or when a user-set trigger is exceeded.	
Back erase function	When the PAUSE key is pressed to pause measurement, the preceding (user selectable) 0, 1, 3 or 5 s data are excluded from processing.	
Display	Backlit semitransparent color TFT LCD display WQVGA (400 x 240 dots) * LCD with touch panel (Capacitive Touch Panel) Numerical display update frequency: 1 s Bar graph update frequency: 100 ms	
Store	Manual Number of data: Internal memory: max. 1000 sets SD Card: depends on the capacity of the SD Card*1	Auto*2 Instantaneous values (L_p mode) and processed values (L_{eq} mode) are stored continuously and automatically at preset intervals. L_p sampling cycle: 100 ms, 200 ms, 1 s, L_{eq} 1 s L_{eq} sampling cycle: 10 s, 1, 5, 10, 15, 30 ms, 1, 8, 24 h Measurement Time: Max. 1000 h (depends on the capacity of the SD Card)*1

* Windows is a trademark of Microsoft Corporation.
 * Specifications subject to change without notice.

Distributed by:

Data recall	Allows viewing of stored data
Setup memory	Up to five setup configurations can be saved in internal memory, for later recall Start up via file settings previously stored on SD card possible
Waveform recording*3	
File format	Uncompressed waveform WAVE file
Sampling frequency	Select 48 kHz, 24 kHz or 12 kHz
Data length	Select 24 bit or 16 bit
Outputs	
DC output	Output DC signals using a frequency weighting characteristic selected by processing.
Output voltage	2.5 V, 25 mV / dB at bar graph display full scale
AC output	Output AC signals using a frequency weighting characteristic selected by processing or by A, C, Z-weighting.
Output voltage	1 V (rms values) at bar graph display full scale
Comparator output*2	Turns on when the open-collector output exceeds the set value (max. applied voltage 24 V, max. current 60 mA, allowable dissipation 300 mW)
USB*1	Allows USB to be connected to a computer and recognized as a removable disk Allows USB to be controlled via communication commands
RS-232C communication	Allows for RS-232C communication via use of a dedicated cable
Data continuous output*2	
Type of data	Instantaneous value: L_p Processed value: L_{eq} , L_{max} , L_{min} , L_{peak}
Output interval	100 ms
Print out	Printing of measurement results on dedicated printer DPU-414
Power requirements	Four IEC R6 (size AA) batteries (alkaline or rechargeable batteries) or external power supply
Battery life (23 °C)	Alkaline battery LR6 (AA): 26 h NI-MH secondary battery: 25 h At the maximum * Depends on the setting
AC adapter	NC-98C (NC-34 for previous models cannot be used)
External power voltage	5 to 7 V (rated voltage: 6 V)
Current consumption	Approximately 90 mA (normal operation, rated voltage)
Ambient conditions	Temperature: -10 to +50 °C Humidity: 10 to 90% RH (non-condensing)
Dustproof / water-resistant performance*4	IP code: IP54 (except for microphone) See precautions regarding waterproofing
Dimensions, weight	Approx. 250 (H) x 76 (W) x 33 mm(D), approx. 400 g (with batteries)
Supplied accessories	Storage case x 1, Windscreen WS-10 x 1, Windscreen fall prevention rubber x 1, Hand strap x 1, LR6 (AA) alkaline batteries x 4, SD card 512 MB x 1 (NX-42EX preinstalled model only)

Options

Product name	Product number
Extended function program (Inst on 512 MB SD card)	NX-42EX
Waveform recording program*2 (Inst on 2 GB SD card)	NX-42WR
Octave, 1/3 octave real-time analysis program*2 (Inst on 512 MB SD card)	NX-42RT
FFT analysis program*2 (Inst on 512 MB SD card)	NX-42FT
Data management software for environmental measurement	AS-60
Data management software for environmental measurement (Includes the octave and 1/3 octave data management software)	AS-60RT
Data management software for environmental measurement (Includes the vibration level data management software)	AS-60VM
Waveform analysis software	CAT-WAVE
SD Card 512 MB	SD-512M
SD Card 2 GB	SD-2G
AC adapter (100 V to 240 V)	NC-98C
Battery pack	BP-21
Microphone extension cables	EC-04 (from 2 m)
BNC-Pin output code	CC-24
Comparator output cable	CC-42C
Printer	DPU-414
Printer cable	CC-42P
RS 232C serial I/O cable	CC-42R
USB cable	—
Sound calibrator	NC-74
All-weather windscreen	WS-15
Windscreen mounting adapter	WS-1500
Rain-protection windscreen	WS-16
Sound level meter tripod	ST-80
All-weather windscreen tripod	ST-81

*1 Use Rion fully guaranteed products. *2 NX-42EX required (sold separately). *3 NX-42WR required (sold separately).
 *4 Protection against harmful dust and water splashing from any direction.

Precautions regarding waterproofing

Before use, verify that the rubber bottom cover and the battery compartment lid are firmly closed.
 To maintain the water and dust proof rating, internal packing replacement is required every two years (at cost).



ISO 14001 RION CO., LTD.
 ISO 9001 RION CO., LTD.

RION CO., LTD.
<http://www.rion.co.jp/english/>

3-20-41, Higashimotomachi, Kokubunji, Tokyo 185-8533, Japan
 Tel: +81-42-359-7888 Fax: +81-42-359-7442

This product is environment-friendly. It does not include toxic chemicals on our policy.
 This product is certified to an International Protection rating of IP54 (dust protected and resistant to splashing water).
 This leaflet is printed with environmentally friendly vegetable-based ink on recycled paper.

1011-4 212.P.D

Calibration Certificate of Sound Level Meter



中国赛宝实验室计量检测中心
(工业和信息化部电子第五研究所计量检测中心)
CHINA CEPREI LABORATORY CALIBRATION & TESTING CENTRE

校准证书 CALIBRATION CERTIFICATE

证书编号: 2HB22001076-0003
Certificate No.



委托单位: Castco Testing Centre Limited
Client
仪器名称: Sound Level Meter
Description
型号规格: NL-52
Model/Type
制造商: RION
Manufacturer
机身号: 00976204
Serial No.
管理号: AAST-SLM-11
Asset No.
接收日期: 2022-07-21 校准日期: 2022-08-03
Rec. Date Cal. Date
签发日期: 2022-08-04 建议校准周期: 12个月(12 months)
App. Date Reference Cal. Period
结论: 所校准项目合格(Passed at Calibration Items)
Conclusion

校准: 赵文钰
Calibrated by
签发: 郝木力
Approved by

检验: 钟灏
Inspected by
印章:
Stamp

赛宝计量检测中心
广州总部地址: 广州市增城区朱村街朱村大道西78号
客服电话: 020-87237633 传真: 020-87236189
投诉电话: 020-87236896
邮件: cal@ceprei.com
网址: www.ceprei-cal.com

CEPREI Calibration and Testing Centre
HQ Addr: No.78,Zhuacun Avenue West,Zengcheng District,Guangzhou,China
Service Tel: 020-87237633 Fax: 020-87236189
Complaint Tel: 020-87236896
Email: cal@ceprei.com
Website: www.ceprei-cal.com

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证书编号(Certificate No.): 2HB22001076-0003

说明 DIRECTIONS

1. 本机构质量管理体系符合ISO/IEC 17025:2017标准的要求, 获得中国合格评定国家认可委员会(CNAS) 认可, 认可证书号为: CNAS L13344。
This laboratory quality management system meets the ISO/IEC 17025:2017 and is accredited by the China National Accreditation Service for Conformity Assessment, No. CNAS L13344.

2. 本次校准的技术依据及CNAS认可范围(Reference documents and CNAS accredited scopes):
* JJG 188-2017 声级计检定规程: Sound pressure level: (20~130)dB; Frequency Weighting: (20~130)dB@(10 Hz~20kHz).
* 详细内容请查看CNAS网站中注册编号为L13344的证书附件。超出范围的内容未被认可, 其结果/结论所依据的合格评定活动不在认可范围内。(Please see the attachment of certificate No. L13344 at CNAS website for details, beyond which is not accredited, the conformity assessment activities on which the results/conclusions are based are outside the scope of accreditation.)

3. 本次校准所使用的主要测量标准(The main measurement standards used during the calibration):

名称 (Description)	证书号/有效期/溯源单位 (Certificate No./Due Date/Traceability to)	技术指标 (Specification)	测量范围 (Measuring Range)
步进衰减器	4GC22000181-0032/2023-04-18/赛宝(广州)	±3dB	(0~110) dB/10dB step @DC~1GHz
声校准器	4GC21000572-0101/2022-12-07/赛宝(广州)	1级 First Level	31.5Hz~16kHz
PULSE分析系统	4GC22000014-0140/2023-01-15/赛宝(广州)	频率: $U_{eq}=0.001\%$, $k=2$; 电压: $U_{eq}=0.04\%$, $k=2$	频率: 0.001Hz~51.2kHz, 电压: $(1 \times 10^{-3} \sim 30)V$
数字多用表	4GC21000526-0026/2022-11-30/赛宝(广州)	DCV: $\pm 0.0035\%$; ACV: $\pm 0.06\%$; DCI: $\pm 0.05\%$; ACI: $\pm 0.1\%$; RI: $\pm 0.01\%$; f: $\pm 0.001\%$	DCV: (0~1000)V; ACV: (0.001~750)V@(3Hz~300kHz); DCI: (0~3)A; ACI: (0~3)A@(3Hz~5kHz); RI: (0~100)M Ω ; f: 3Hz~300kHz
正弦信号发生器	4GC21000496-0024/2022-11-01/赛宝(广州)	f: $\pm 1mHz$; 失真度 Distortion: $< -70dB$	f: 0.001Hz~200kHz; U: 100 μV ~5Vrms
标准传声器	GFJGJL1001220311961/2023-03-27/航空304所	$U=(0.05 \sim 0.20)dB$ ($k=2$)	10Hz~20kHz
前置放大器	GFJGJL1001220311960/2023-03-27/航空304所	$U=0.3dB$ ($k=2$)	(10~50000) Hz

4. 校准地点(The calibration place):
广州市增城区朱村街朱村大道西78号9栋110室

5. 环境条件(Environmental conditions):
温度(Temperature): 23.2°C 相对湿度(Relative Humidity): 58%

6. 本证书中给出的扩展不确定度依据JJF1059.1-2012《测量不确定度的评定与表示》评定, 由合成标准不确定度乘以包含概率约为95%时对应的包含因子k得到。
The extended uncertainty given in this certificate is evaluated according to JJF1059.1-2012 "Evaluation and Expression of Uncertainty in Measurement", and is calculated by multiplying the combined standard uncertainty by the coverage factor k which corresponding to the coverage probability about 95%.

7. 证书中"P"、"合格"代表"测量结果在允许范围内", "F"、"不合格"代表"测量结果不在允许范围内", "N/A"代表"不适用或技术指标暂时无法确认等"。本证书报告的结论仅供参考, 使用人员应结合实际测量的要求合理使用, 如考虑测量结果测量不确定度的影响等。
"P" and "Pass" in this certificate stand for "Low Limit<the measured value ≤High Limit", "F" and "Fail" stand for "the measured value < Low Limit or the measured value > High Limit", "N/A" stands for "Not Applicable or the technical specification has not been confirmed etc". The conclusions of this certificate are for reference only. Users should use them reasonably according to the actual measurement requirements, such as considering the impact of measurement uncertainty, etc.

8. 建议校准周期是本实验室依据本证书报告的技术依据和仪器设备常规使用条件给出的建议, 供委托方参考。委托方可以根据实际使用情况自行决定样品的校准周期。

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Calibration Certificate of Sound Level Meter



证书编号(Certificate No.): 2HB22001076-0003

1 外观与工作正常性检查 (Appearance and Function Check)

无影响证书中测量结果准确度的因素和缺陷。

There are no factor and defect that affect the measurement result accuracy of the certificate.

2 指示声级调整 (Indication SPL Calibration)

频率(Frequency)=1000Hz

传声器型号 (Microphone Type)	传声器编号 (Microphone SN.)	放大器型号 (Preamplifier Type)	放大器编号 (Preamplifier SN.)
/	/	/	/

声校准器型号 (Calibrator Type)	标准声压级 (Reference SPL) (dB)	校准前示值 (Before Calibration) (dB)	校准后示值 (After Calibration) (dB)	U (k=2) (dB)
4226	94.0	93.8	93.8	0.2

3 级线性 (Level Linearity)

3.1 参考级量程 (Reference Range)

频率(Frequency): 8000Hz

起始点指示声级(Sound Level Indication of Start Point):	90.0 dB
起始点以上间隔10dB点的最大误差(Maximum Error for each 10dB above Start Point):	-0.2 dB
U (k=2)	0.6 dB
上限以下5dB间隔1dB点的最大误差(Maximum Error for each 1dB below Upper Limit 5dB):	-0.2 dB
U (k=2)	0.6 dB
起始点以下间隔10dB点的最大误差(Maximum Error for each 10dB below Start Point):	-0.2 dB
U (k=2)	0.6 dB
下限以上5dB间隔1dB点的最大误差(Maximum Error for each 1dB above Lower Limit 5dB):	-0.2 dB
U (k=2)	0.6 dB

3.2 其它级量程 (Other Range)

频率(Frequency): 1000Hz

起始点指示声级(Sound Level Indication of Start Point):	90.0 dB
起始点以上间隔10dB点的最大误差(Maximum Error for each 10dB above Start Point):	-0.1 dB
U (k=2)	0.4 dB
上限以下5dB间隔1dB点的最大误差(Maximum Error for each 1dB below Upper Limit 5dB):	-0.1 dB
U (k=2)	0.4 dB
起始点以下间隔10dB点的最大误差(Maximum Error for each 10dB below Start Point):	-0.1 dB
U (k=2)	0.4 dB
下限以上5dB间隔1dB点的最大误差(Maximum Error for each 1dB above Lower Limit 5dB):	-0.1 dB
U (k=2)	0.4 dB

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证书编号(Certificate No.): 2HB22001076-0003

4 A计权特性(A-Weighting Characteristic)

频率 (Frequency) (Hz)	实测值 (Actual) (dB)	理论值 (Theoretical value) (dB)	误差 (Error) (dB)	允许误差 (Limit) (dB)	结论 (Pass/Fail) (P/F)	U (k=2) (dB)
20	-50.5	-50.5	0.0	±2.0	P	0.5
25	-44.9	-44.7	-0.2	+2.0 ~ -1.5	P	0.5
31.5	-39.7	-39.4	-0.3	±1.5	P	0.5
40	-34.5	-34.6	0.1	±1.0	P	0.5
50	-30.3	-30.2	-0.1	±1.0	P	0.5
63	-26.2	-26.2	0.0	±1.0	P	0.5
80	-22.3	-22.5	0.2	±1.0	P	0.5
100	-19.1	-19.1	0.0	±1.0	P	0.5
125	-16.1	-16.1	0.0	±1.0	P	0.5
160	-13.2	-13.4	0.2	±1.0	P	0.5
200	-10.8	-10.9	0.1	±1.0	P	0.5
250	-8.6	-8.6	0.0	±1.0	P	0.5
315	-6.6	-6.6	0.0	±1.0	P	0.4
400	-4.7	-4.8	0.1	±1.0	P	0.4
500	-3.2	-3.2	0.0	±1.0	P	0.4
630	-1.9	-1.9	0.0	±1.0	P	0.4
800	-0.8	-0.8	0.0	±1.0	P	0.4
1000(Ref.)	0.0	0.0	0.0	±0.7	P	0.4
1250	0.5	0.6	-0.1	±1.0	P	0.6
1600	0.9	1.0	-0.1	±1.0	P	0.6
2000	1.0	1.2	-0.2	±1.0	P	0.6
2500	1.1	1.3	-0.2	±1.0	P	0.6
3150	0.9	1.2	-0.3	±1.0	P	0.6
4000	0.7	1.0	-0.3	±1.0	P	0.6
5000	0.3	0.5	-0.2	±1.5	P	0.6
6300	-0.2	-0.1	-0.1	+1.5 ~ -2.0	P	0.6
8000	-1.1	-1.1	0.0	+1.5 ~ -2.5	P	0.6
10000	-2.3	-2.5	0.2	+2.0 ~ -3.0	P	0.6
12500	-4.3	-4.3	0.0	+2.0 ~ -5.0	P	1.0
16000	-8.5	-6.6	-1.9	+2.5 ~ -16.0	P	1.0
20000	-18.5	-9.3	-9.2	+3.0 ~ -∞	P	1.0

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数据页(Data sheet) ID: 071288

Calibration Certificate of Sound Level Meter



证书编号(Certificate No.): 2HB22001076-0003

5 计权特性(C-Weighting Characteristic)

频率 (Frequency) (Hz)	实测值 (Actual) (dB)	理论值 (Theoretical value) (dB)	误差 (Error) (dB)	允许误差 (Limit) (dB)	结论 (Pass/Fail) (P/F)	U (k=2) (dB)
20	-6.6	-6.2	-0.4	±2.0	P	0.5
25	-4.7	-4.4	-0.3	+2.0 ~ -1.5	P	0.5
31.5	-3.0	-3.0	0.0	±1.5	P	0.5
40	-2.0	-2.0	0.0	±1.0	P	0.5
50	-1.3	-1.3	0.0	±1.0	P	0.5
63	-0.8	-0.8	0.0	±1.0	P	0.5
80	-0.4	-0.5	0.1	±1.0	P	0.5
100	-0.2	-0.3	0.1	±1.0	P	0.5
125	-0.1	-0.2	0.1	±1.0	P	0.5
160	0.0	-0.1	0.1	±1.0	P	0.5
200	0.0	0.0	0.0	±1.0	P	0.5
250	0.0	0.0	0.0	±1.0	P	0.5
315	0.0	0.0	0.0	±1.0	P	0.4
400	0.0	0.0	0.0	±1.0	P	0.4
500	0.0	0.0	0.0	±1.0	P	0.4
630	0.0	0.0	0.0	±1.0	P	0.4
800	0.0	0.0	0.0	±1.0	P	0.4
1000(Ref.)	0.0	0.0	0.0	±0.7	P	0.4
1250	-0.1	0.0	-0.1	±1.0	P	0.6
1600	-0.2	-0.1	-0.1	±1.0	P	0.6
2000	-0.3	-0.2	-0.1	±1.0	P	0.6
2500	-0.5	-0.3	-0.2	±1.0	P	0.6
3150	-0.8	-0.5	-0.3	±1.0	P	0.6
4000	-1.1	-0.8	-0.3	±1.0	P	0.6
5000	-1.5	-1.3	-0.2	±1.5	P	0.6
6300	-2.1	-2.0	-0.1	+1.5 ~ -2.0	P	0.6
8000	-3.0	-3.0	0.0	+1.5 ~ -2.5	P	0.6
10000	-4.2	-4.4	0.2	+2.0 ~ -3.0	P	0.6
12500	-6.2	-6.2	0.0	+2.0 ~ -5.0	P	1.0
16000	-10.4	-8.5	-1.9	+2.5 ~ -16.0	P	1.0
20000	-20.4	-11.2	-9.2	+3.0 ~ ∞	P	1.0

Catalogue of Sound Calibrator

For microphone calibration **NC-74**

How to use

Carefully insert the microphone all the way into the coupler of the NC-74. Then simply turn the power on to apply a constant sound pressure level to the diaphragm of the microphone.

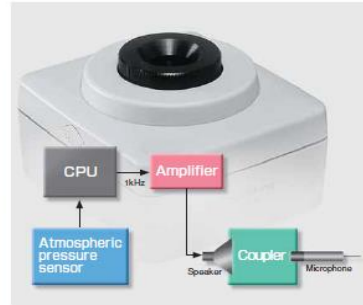


Usage example (NL series)

The performance of the NC-74 is suitable for calibration of high-precision sound level meters. The unit is compact, lightweight, and easy to use. Two IEC LR6 (size AA) alkaline batteries will power the unit for more than 30 hours of continuous use at room temperature.

Atmospheric pressure compensation principle

The NC-74 incorporates a sensor that detects atmospheric pressure. Based on the information provided by the sensor, the CPU controls the signal amplitude. This allows the unit to always provide the correct output for achieving constant sound pressure level, regardless of fluctuations in atmospheric pressure.



Using the 1/2-inch adapter

To allow calibration of sound level meter microphones with 1 inch diameter, the 1/2-inch microphone adapter can be removed. 1/2-inch microphones are calibrated with the adapter in place.



Specifications

Applicable standards	IEC 60942:2003 Class 1 JIS C 1515:2004 Class 1
Suitable microphones	1-inch microphones IEC 61094-1 Type L81P UC-27 UC-28 UC-34
	1/2-inch microphones IEC 61094-1 Type L82aP UC-69 UC-67 UC-62A UC-62 UC-26 UC-30 UC-31 UC-33P
Nominal sound pressure level	94 dB
Sound pressure level tolerance	±1.0 dB
Nominal frequency	1 kHz
Frequency tolerance	±1.0 % or less
Power requirements	IEC LR6 (size AA) alkaline battery × 2
Dimensions, mass	Approx. 49 (H) × 80 (W) × 74 (D) mm Approx. 200 g (including batteries)
Supplied accessories	Class 1 IEC LR6 (size AA) alkaline battery × 2 1/2-inch microphone adapter NC-74-002 × 1

* Specification subject to change without notice.

RION CO., LTD.

3-20-41, Higashimotomachi, Kokubunji, Tokyo 185-8533, Japan
Tel: +81-42-359-7888 Fax: +81-42-359-7442
http://www.rion.co.jp/english/

Distributed by:

ISO 14001 RION CO., LTD.
ISO 9001 RION CO., LTD.



Printed in Japan 0510-1 0807.P.MP

Calibration Certificate of Sound Calibrator



中国赛宝实验室计量检测中心
(工业和信息化部电子第五研究所计量检测中心)
CHINA CEPREI LABORATORY CALIBRATION & TESTING CENTRE

校准证书 CALIBRATION CERTIFICATE

证书编号: 2HB22001358-0007
Certificate No.



委托单位: Castco Testing Centre Limited
Client
仪器名称: Sound Level Calibrator
Description
型号规格: NC-74
Model/Type
制造商: RION
Manufacturer
机身号: 34678556
Serial No.
管理号: AAST-SLC-06
Asset No.
接收日期: 2022-08-24 校准日期: 2022-09-14
Rec. Date Cal. Date
签发日期: 2022-09-15 建议校准周期: 12个月(12 months)
App. Date Reference Cal. Period
结论: 所校准项目合格(Passed at Calibration Items)
Conclusion

校准: 赵文钰
Calibrated by

核验: 钟灏
Inspected by

签发: 郭木力
Approved by

印章:
Stamp

赛宝计量检测中心
广州总部地址: 广州市增城区朱村街朱村大道西78号
客服电话: 020-87237633 传真: 020-87236189
投诉电话: 020-87236896
邮件: cal@ceprei.com
网址: www.ceprei-cal.com

CEPREI Calibration and Testing Centre
HQ Addr: No.78,Zhuocun Avenue West,Zengcheng District,Guangzhou,China
Service Tel: 020-87237633 Fax: 020-87236189
Complaint Tel: 020-87236896
Email: cal@ceprei.com
Website: www.ceprei-cal.com

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Calibration Certificate of Sound Calibrator

证书编号(Certificate No.): 2HB22001358-0007

说 明 DIRECTIONS

1. 本机构质量管理体系符合ISO/IEC 17025:2017标准的要求，获得中国合格评定国家认可委员会（CNAS）认可，认可证书号为：CNAS L13344。

This laboratory quality management system meets the ISO/IEC 17025:2017 and is accredited by the China National Accreditation Service for Conformity Assessment, No. CNAS L13344.

2. 本次校准的技术依据及CNAS认可范围(Reference documents and CNAS accredited scopes):

* JJG 176-2005 声校准器检定规程: Sound Pressure Level: 94dB、104dB、114dB、124dB(63Hz~8kHz); 94dB、104dB、114dB(31.5Hz~16kHz); Frequency: 31.5Hz~16kHz; Harmonic Distortion: 0~10%, (20Hz~20 kHz).

* 详细内容请查看CNAS网站中注册编号为L13344的证书附件，超出范围的内容未被认可，其结果/结论所依据的合格评定活动不在认可范围内。(Please see the attachment of certificate No. L13344 at CNAS website for details, beyond which is not accredited, the conformity assessment activities on which the results/conclusions are based are outside the scope of accreditation.)

3. 本次校准所使用的主要测量标准(The main measurement standards used during the calibration):

名称 (Description)	证书号/有效期/溯源单位 (Certificate No./Due Date/Traceability to)	技术指标 (Specification)	测量范围 (Measuring Range)
标准传声器(2246093)	GFJGJL1001220311961/2023-05-27/航空304所	$U=(0.05-0.20)dB (k=2)$	10Hz~20kHz
前置放大器(2239843)	GFJGJL1001220311960/2023-03-27/航空304所	频率响应: $\pm 0.1dB$	(10~50000) Hz
PULSE分析系统(3160-106540)	4GC22000014-0140/2023-01-15/塞宝(广州)	频率: $U_{rel}=0.001\%,k=2$;电压: $U_{rel}=0.04\%,k=2$	频率:0.001Hz~51.2kHz;电压: $(1 \times 10^{-5} \sim 30)V$

4. 校准地点(The calibration place):

广州市增城区朱村街朱村大道西78号9栋110室

5. 环境条件(Environmental conditions):

温度(Temperature): 23.8°C 相对湿度(Relative Humidity): 61%

6. 本证书中给出的扩展不确定度依据JJF1059.1-2012《测量不确定度的评定与表示》评定，由合成标准不确定度乘以包含概率约为95%时对应的包含因子 k 得到。

The extended uncertainty given in this certificate is evaluated according to JJF1059.1-2012 "Evaluation and Expression of Uncertainty in Measurement", and is calculated by multiplying the combined standard uncertainty by the coverage factor k which corresponding to the coverage probability about 95%.

7. 证书中"P"、"合格"代表"测量结果在允许范围内"，"F"、"不合格"代表"测量结果不在允许范围内"，"N/A"代表"不适用或技术指标暂时无法确认等"。本证书报告的结论仅供参考，使用人员应结合实际测量的要求合理使用，如考虑测量结果测量不确定度的影响等。

"P" and "Pass" in this certificate stand for "Low Limit≤the measured value ≤High Limit", "F" and "Fail" stand for "the measured value < Low Limit or the measured value > High Limit", "N/A" stands for "Not Applicable or The technical specification has not been confirmed etc". The conclusions of this certificate are for reference only. Users should use them reasonably according to the actual measurement requirements, such as considering the impact of measurement uncertainty, etc.

8. 建议校准周期是本实验室依据本证书报告的技术依据和仪器设备常规使用条件给出的建议，供委托方参考。委托方可以根据实际使用情况自行决定样品的校准周期。

The reference calibration period is based on the reference documents and normal operating conditions of the calibrated instrument. It is only for reference. The client may decide the calibration period of the instrument according to the actual use.

注: 1. 本证书未经本机构书面授权，不得部分复制。(The certificate shall not be partly reproduced without written approval of the laboratory.)

2. 本次校准结果仅与被校物有关。(The results are only related to the items calibrated.)

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证书编号(Certificate No.): 2HB22001358-0007

1 外观与工作正常性检查 (Appearance and Function Check)

无影响证书中校准结果准确度的因素和缺陷。

There are no factor and defect that affect the calibration result accuracy of the certificate.

2 声压级 (Sound Pressure Level)

规定声压级 (Prescribed SPL)	测量声压级 (Measured SPL)	声压级差的绝对值 (Absolute value of SPL)	允许范围 (Limit)	结论 (Pass/Fail)	U (k=2)
(dB)	(dB)	(dB)	(dB)		(dB)
94	93.93	0.07	≤0.40	P	0.10

3 频率 (Frequency)

规定频率 (Prescribed Fre.)	测量频率 (Measured Fre.)	频率误差的绝对值 (Absolute value of Fre.)	允许范围 (Limit)	结论 (Pass/Fail)	U_{rel} (k=2)
(Hz)	(Hz)	(%)	(%)		(%)
1000	1003.7	0.37	≤1.00	P	0.10

4 总失真 (Distortion)

规定声压级 (Prescribed SPL)	规定频率 (Measured Fre.)	总失真 (Distortion)	允许范围 (Limit)	结论 (Pass/Fail)	U_{rel} (k=2)
(dB)	(Hz)	(%)	(%)		(%)
94	1000	0.02	≤3.00	P	5.0

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Catalogue of Air Flow Meter (TSI TA440)

SPECIFICATIONS

THERMAL ANEMOMETERS
MODELS TA410, TA430 AND TA440

Velocity

Range (TA410)	0 to 20 m/s (0 to 4,000 ft/min)
Range (TA430, TA440)	0 to 30 m/s (0 to 6,000 ft/min)
Accuracy (TA410) ^{1,2}	±5% of reading or ±0.025 m/s (±5 ft/min), whichever is greater
Accuracy (TA430, TA440) ^{1,2}	±3% of reading or ±0.015 m/s (±3 ft/min), whichever is greater
Resolution	0.01 m/s (1 ft/min)

Duct Size (TA430, TA440)

Dimensions	1 to 635 cm in increments of 0.1 cm (1 to 250 inches in increments of 0.1 in.)
------------	--

Volumetric Flow Rate (TA430, TA440)

Range	Actual range is a function of velocity, and duct size
-------	---

Temperature

Range (TA410, TA430)	-18 to 93°C (0 to 200°F)
Range (TA440)	-10 to 60°C (14 to 140°F)
Accuracy ³	±0.3°C (±0.5°F)
Resolution	0.1°C (0.1°F)

Relative Humidity (TA440 only)

Range	5 to 95% RH
Accuracy ⁴	±3% RH
Resolution	0.1% RH

Wet Bulb Temperature (TA440 only)

Range	5 to 60°C (40 to 140°F)
Resolution	0.1°C (0.1°F)

Dew Point (TA440 only)

Range	-15 to 49°C (5 to 120°F)
Resolution	0.1°C (0.1°F)

Instrument Temperature Range

Operating (Electronics)	5 to 45°C (40 to 113°F)
Model TA410, TA430	-18 to 93°C (0 to 200°F)
Operating (Probe)	-10 to 60°C (14 to 140°F)
Model TA440	-10 to 60°C (14 to 140°F)
Operating (Probe)	-20 to 60°C (-4 to 140°F)
Storage	-20 to 60°C (-4 to 140°F)

Data Storage Capabilities (TA430, TA440)

Range	12,700+ samples and 100 test IDs
-------	----------------------------------

Logging Interval (TA430, TA440)

1 second to 1 hour

Specifications subject to change without notice.

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Visit our website at www.airflowinstruments.co.uk for more information.

UK Tel: +44 149 4 459200 Germany Tel: +49 241 523030
France Tel: +33 491 11 87 64

P/N 2980548 Rev D (A4) ©2014 TSI Incorporated

Time Constant (TA430, TA440)

User selectable

External Meter Dimensions

8.4 cm x 17.8 cm x 4.4 cm (3.3 in. x 7.0 in. x 1.8 in.)

Meter Weight with Batteries

0.27 kg (0.6 lbs.)

Meter Probe Dimensions

Probe Length	101.6 cm (40 in.)
Probe Diameter of Tip	7.0 mm (0.28 in.)
Probe Diameter of Base	13.0 mm (0.51 in.)

Articulating Probe Dimensions

Articulating Section Length	19.7 cm (7.8 in.)
Diameter of Articulating Knuckle	9.5 mm (0.38 in.)

Power Requirements

Four AA-size batteries or AC adapter

	TA410	TA430, TA430-A	TA440, TA440-A
Velocity range 0 to 20.00 m/s (0 to 4000 ft/min)	+		
Velocity range 0 to 30.00 m/s (0 to 6000 ft/min)		+	+
Temperature	+	+	+
Flow		+	+
Humidity, wet bulb, dew point			+
Probe	Straight	Straight or -A articulated	Straight or -A articulated
Variable time constant		+	+
Manual data logging		+	+
Auto save data logging			+
Statistics		+	+
Review data		+	+
LogDat2 downloading software		+	+
Free Certificate of Calibration	+	+	+

¹Temperature compensated over an air temperature range of 5 to 65°C (40 to 150°F).
²The accuracy statement begins at 30 ft/min through 4000 ft/min (0.15 m/s through 20 m/s) for the Model TA410, and 30 ft/min through 6,000 ft/min (0.15 m/s through 30 m/s) for Models TA430 and TA440.
³Accuracy with instrument case at 25°C (77°F), add uncertainty of 0.03°C (0.05°F) for change in instrument temperature.
⁴Accuracy with probe at 25°C (77°F). Add uncertainty of 0.2% RH/°C (0.1% RH/°F) for change in probe temperature. Includes 1% hysteresis.

Calibration Certificate of Air Flow Meter



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Calibration Certificate No.: CC0222301

Customer Information

Customer: Castco Testing Centre Limited
Address: 33, On Kui Street, Fanling, N.T.

Equipment Identification

Equipment Description	Manufacturer	Model No.	Serial No.	Assigned equipment No.
Air Velocity Monitor	TSI	AIRFLOW TA440	TA4401706003	AAST-FLOW-03

Certificate Information

Date of Receipt:	11 January 2023	Calibration Condition:	23.5°C, 58%RH, 1003hPa
Date of Calibration:	13 January 2023	Adjustment:	N/A
Due Date of Calibration:	N/A	Appearance:	Good
Calibration Procedure:	SOP-112	Remark:	N/A

Reference Equipment Identification

Equipment Description	Model	Serial No.	Expiration Date
Hot Wire Anemometer	9535	T95351316004	11 August 2024

Result of Calibration

Air flow rate – Error of indication

Reference reading (L/min)	Measured reading (L/min)	Error (%)	Uncertainty (%FS)	Technical Requirement	Technical Reference Doc.
0.5	0.51	2.0	3.6	± 5 %	JIG 956-2013
1.0	0.99	-1.0	3.6	± 5 %	JIG 956-2013
2.0	2.03	1.5	3.6	± 5 %	JIG 956-2013
5.0	5.07	1.4	3.6	± 5 %	JIG 956-2013

CT-AFR-01

Note1: The estimated expanded uncertainties have been calculated in "Evaluation and expression of uncertainty in measurement" and give an internal estimated to have a level of confidence of 95%. A coverage factor of 2 is assumed unless explicitly stated.
Note2: The standard (s) and instrument used in the calibration are traceable to national or international recognized standard and are calibrated on a schedule to maintain the accuracy and good condition.
Note3: The result reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long term stability of the instrument.
Note4: The result shows in this calibration certificate relate only to the item calibrated, and the result only applies to the calibration item as received.

Calibrated By:

Wing Cheng

Checked and Approved By:

Warren Yeung

Company Chop:



Certificate Issue Date: 13 January 2023

*** End of Certificate ***

CT-BEG-03

1. The certificate shall not be reproduced except in full, without written approval of Cal Lab Calibration
2. The certificate is issued subject to the latest Terms and Conditions, available at our web site

CC0222301
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Appendix K – Noise monitoring results and graphical presentation

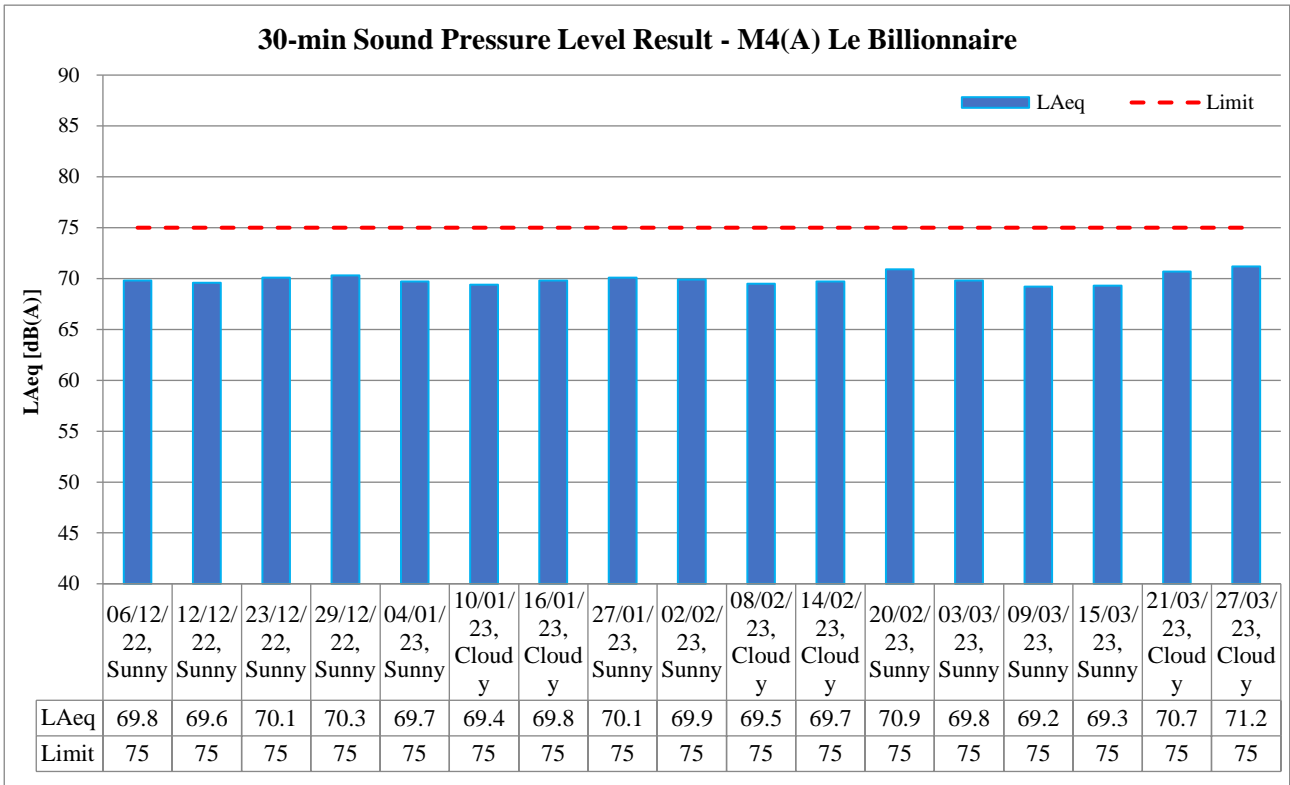
M4(A) – Le Billionnaire

Date	Temp (°C)	Weather	Measured Noise Level at M4(A), dB(A)							Limit
			Time			Baseline	L _{Aeq}	L _{A10}	L _{A90}	
03/03/2023	21.1	Sunny	9:05	-	9:35	69.5	69.8	71.3	68.1	75
09/03/2023	26.0	Sunny	13:10	-	13:40	69.5	69.2	70.1	67.5	75
15/03/2023	23.5	Sunny	13:05	-	13:35	69.5	69.3	70.5	67.6	75
21/03/2023	25.2	Cloudy	9:15	-	9:45	69.5	70.7	71.6	69.2	75
27/03/2023	17.9	Cloudy	13:00	-	13:30	69.5	71.2	72.7	69.5	75
							Maximum	71.2		
							Minimum	69.2		
							Average	70.1		

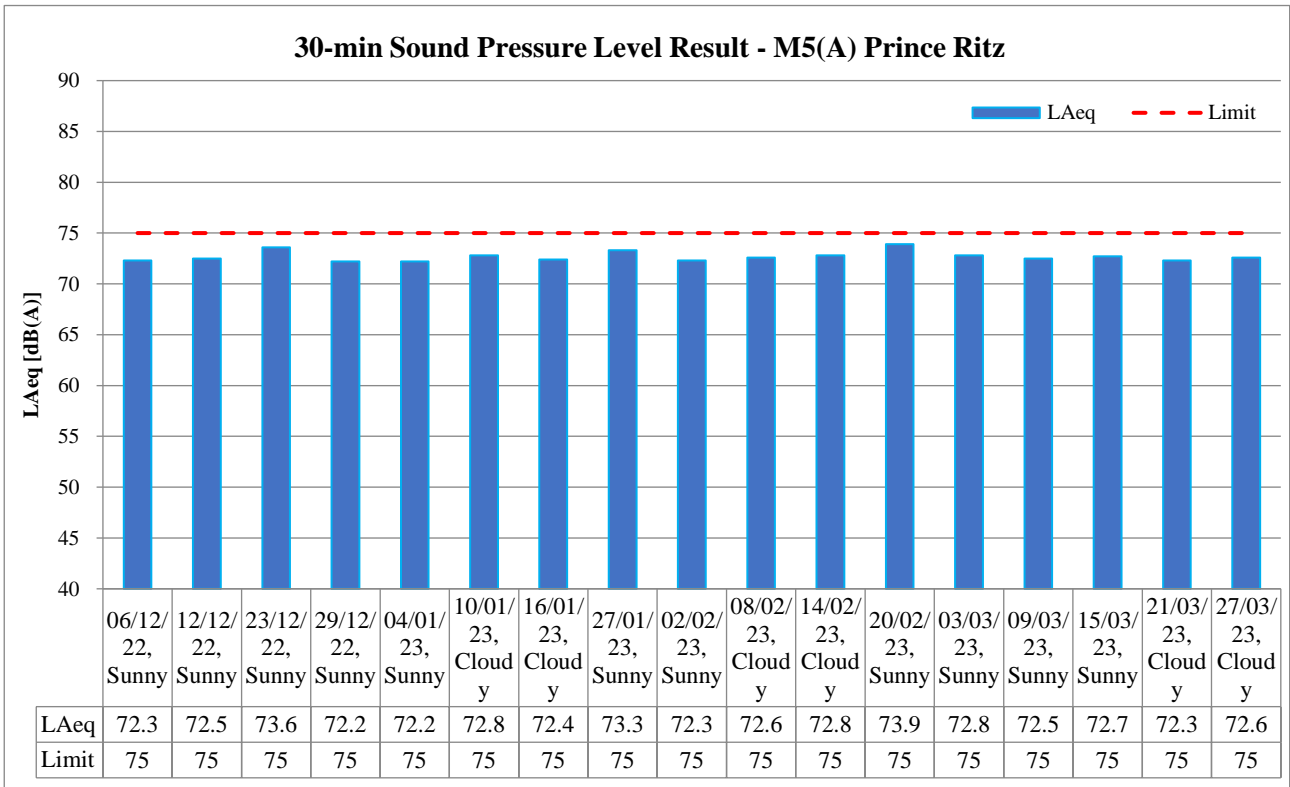
M5(A) – Prince Ritz

Date	Temp (°C)	Weather	Measured Noise Level at M5(A), dB(A)							Limit
			Time			Baseline	L _{Aeq}	L _{A10}	L _{A90}	
03/03/2023	21.1	Sunny	10:10	-	10:40	72.5	72.8	74.8	69.6	75
09/03/2023	26.0	Sunny	14:25	-	14:55	72.5	72.5	74.1	69.3	75
15/03/2023	23.5	Sunny	14:25	-	14:55	72.5	72.7	74.5	69.5	75
21/03/2023	25.2	Cloudy	10:30	-	11:00	72.5	72.3	74.2	68.7	75
27/03/2023	17.9	Cloudy	14:32	-	15:02	72.5	72.6	74.6	69.0	75
							Maximum	72.8		
							Minimum	72.3		
							Average	72.6		

L_{Aeq}, 30-min graphical results of M4(A) – Le Billionnaire



L_{Aeq}, 30-min graphical results of M5(A) – Prince Ritz



Major Construction Activities	Reporting Period			
	Dec 2022	Jan 2023	Feb 2023	Mar 2023
Construction works for DCS	✓	✓	✓	✓
Construction works for Road L16	✓	✓	✓	✓
Construction works for Olympic Avenue	✓	✓	✓	✓
Construction works for additional run-in at Road L7	✓	✓		
Construction of gantry footing at launching shaft for subway SB-01		✓	✓	
Dismantling of gantry crane at casting yard	✓	✓		
ELS and excavation works at Sa Po Road	✓	✓	✓	
ELS and excavation works for retrieving shaft at Sa Po Road				✓
ELS and excavation works for lift and staircase of LW-02		✓		
ELS modification at launching shaft for SB-01			✓	
Post-piling tests and proof drilling for LW02 lift and staircase	✓			
Pre-bored socket H-pile construction works for Slip Road S14	✓	✓	✓	✓
Pile cap construction works for lift and staircase of LW-02			✓	
Erection of falseworks and working platform for decking of Elevated Walkway LW-02	✓	✓	✓	✓
Erection of gantry crane at launching shaft for SB-01			✓	
RC construction at launching shaft for subway SB-01	✓	✓		
RC construction for decking of LW-02				✓
Construction works for Pedestrian Street No. 2	✓			
RC construction for Subway KS10 Lift and Staircase	✓	✓	✓	✓
RC construction works for lift and staircase of LW-02				✓
Renovation works for existing subways KS9, KS32 and KS10	✓	✓	✓	✓
Steel back thrust construction at launching shaft for SB-01				✓
Erect gantry crane at launching shaft for SB-01				✓
Assembly of RTBM at launching shaft for SB-01				✓

Factors might affect the monitoring results	Reporting Period			
	Dec 2022	Jan 2023	Feb 2023	Mar 2023
Non-project related construction activities in the adjacent construction sites were observed.	✓	✓	✓	✓

Appendix L – Event and Action Plan for noise

Event	Action			
	ET	IEC	Supervisor / ER	Contractor
Action Level being exceeded	<ol style="list-style-type: none"> 1. Notify Supervisor / ER, IEC and Contractor; 2. Carry out investigation; 3. Report the results of investigation to the IEC, Supervisor / ER and Contractor; 4. Discuss with the IEC and Contractor on remedial measures required; 5. Increase monitoring frequency to check mitigation effectiveness. <p>(The above actions should be taken within 2 working days after the exceedance is identified.)</p>	<ol style="list-style-type: none"> 1. Review the investigation results submitted by the ET; 2. Review the proposed remedial measures submitted by the Contractor and advise the ER accordingly; 3. Advise the Supervisor / ER on the proposed remedial measures. <p>(The above actions should be taken within 2 working days after the exceedance is identified.)</p>	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Supervise the implementation of remedial measures. <p>(The above actions should be taken within 2 working days after the exceedance is identified.)</p>	<ol style="list-style-type: none"> 1. Submit noise mitigation proposal to IEC and Supervisor / ER; 2. Implement noise mitigation proposals. <p>(The above actions should be taken within 2 working days after the exceedance is identified.)</p>
Limit Level being exceeded	<ol style="list-style-type: none"> 1. Inform IEC, Supervisor /ER, Contractor and EPD; 2. Repeat measurement to confirm findings; 3. Increase monitoring frequency; 4. Identify source and investigate the cause of exceedance; 5. Carry out analysis of Contract's working procedure; 6. Discuss remedial measures required with the IEC, Contractor and Supervisor /ER; 7. Assess effectiveness of 	<ol style="list-style-type: none"> 1. Discuss the potential remedial actions with Supervisor /ER, ET and Contractor; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the Supervisor /ER accordingly. <p>(The above actions should be taken within 2 working days after the exceedance is identified.)</p>	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Supervise the implementation of remedial measures; 5. If exceedance continues, consider stopping the Contractor to continue working on that portion of work which causes the 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC and Supervisor /ER within 3 working days of notification; 3. Implement the agreed proposal; 4. Submit further proposal if problem still not under control; 5. Stop the relevant portion of works as instructed by the Supervisor /ER until the exceedance is abated. <p>(The above actions should be</p>

Event	Action			
	ET	IEC	Supervisor / ER	Contractor
	<p>Contractor's remedial actions and keep IEC, EPD, and Supervisor /ER informed of the results;</p> <p>8. If exceedance stops, cease additional monitoring. (The above actions should be taken within 2 working days after the exceedance is identified.)</p>		<p>exceedance until the exceedance is abated. (The above actions should be taken within 2 working days after the exceedance is identified.)</p>	<p>taken within 2 working days after the exceedance is identified.)</p>

Appendix M – Event and Action Plan for Landscape and Visual Impact

Event	Action			
	ET	IEC	Supervisor / ER	Contractor
Design Check	1. Check final design conforms to the requirements of EP and prepare report.	1. Check report. 2. Recommend remedial design if necessary.	1. Undertake remedial design if necessary.	
Non-conformity on one occasion	1. Identify Source. 2. Inform IEC and Supervisor /ER. 3. Discuss remedial actions with IEC, Supervisor /ER and Contractor. 4. Monitor remedial actions until rectification has been completed.	1. Check report. 2. Check Contractor's working method. 3. Discuss with ET and Contractor on possible remedial measures. 4. Advise Supervisor /ER on effectiveness of proposed remedial measures. 5. Check implementation of remedial measures.	1. Notify Contractor. 2. Ensure remedial measures are properly implemented.	1. Amend working methods. 2. Rectify damage and undertake any necessary replacement.
Repeated Non-conformity	1. Identify Source. 2. Inform IEC and Supervisor /ER. 3. Increase monitoring frequency. 4. Discuss remedial actions with IEC, Supervisor /ER and Contractor. 5. Monitor remedial actions until rectification has been completed. 6. If non-conformity stops, cease additional monitoring.	1. Check monitoring report. 2. Check Contractor's working method. 3. Discuss with ET and Contractor on possible remedial measures. 4. Advise Supervisor /ER on effectiveness of proposed remedial measures. 5. Supervise implementation of remedial measures.	1. Notify Contractor. 2. Ensure remedial measures are properly implemented.	1. Amend working methods. 2. Rectify damage and undertake any necessary replacement.

Appendix N – Waste Flow Table

MONTHLY SUMMARY WASTE FLOW TABLE FOR 2023 (YEAR)

Month	Actual Quantities of Inert C&D Materials Generated Monthly								Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated A + B	Broken Concrete Generated A	General fill Generated B	Broken Concrete Reused in the Contract	General Fill Reused in the Contract	Reused in other Projects	Disposal as Public Fill	Import Fill	Metals	Paper / Cardboard Packaging	Plastics (3)	Chemical Waste	Other, e.g. general refuse
	[in '000m ³]	[in '000m ³]	[in '000m ³]	[in '000m ³]	[in '000m ³]	[in '000m ³]	[in '000m ³]	[in '000m ³]	[in '000kg]	[in '000kg]	[in '000kg]	[in '000kg]	[in '000m ³]
JAN	0.67	0.00	0.67	0.00	0.09	0.00	0.58	0.00	0.00	0.00	0.00	0.00	0.01
FEB	0.81	0.00	0.81	0.00	0.08	0.00	0.73	0.00	0.00	0.00	0.00	0.00	0.01
MAR	0.79	0.00	0.79	0.00	0.08	0.00	0.71	0.00	0.00	0.00	0.00	0.00	0.01
APR													
MAY													
JUNE													
SUB-TOTAL	2.27	0.00	2.27	0.00	0.25	0.00	2.02	0.00	0.00	0.00	0.00	0.00	0.03
JULY													
AUG													
SEPT													
OCT													
NOV													
DEC													
TOTAL	2.27	0.00	2.27	0.00	0.25	0.00	2.02	0.00	0.00	0.00	0.00	0.00	0.03

**Appendix O – Environmental Mitigation Implementation Schedule
(EMIS)**

EIA Ref	Recommended Mitigation Measures	Implementation			
		Not Observed	Yes	No	Remark
Part B Water Quality					
S8.8	Exposed soil areas should be minimised to reduce the potential for increased siltation, contamination of runoff, and erosion. Construction runoff related impacts associated with the above ground construction activities can be readily controlled through the use of appropriate mitigation measures which include use of sediment traps and adequate maintenance of drainage systems to prevent flooding and overflow.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S8.8	Construction site should be provided with adequately designed perimeter channel and pre-treatment facilities and proper maintenance. The boundaries of critical areas of earthworks should be marked and surrounded by dykes or embankments for flood protection. Temporary ditches should be provided to facilitate runoff discharge into the appropriate watercourses, via a silt retention pond. Permanent drainage channels should incorporate sediment basins or traps and baffles to enhance deposition rates. The design of efficient silt removal facilities should be based on the guidelines in Appendix A1 of ProPECC PN 1/94.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S8.8	Construction works should be programmed to minimise surface excavation works during the rainy season (April to September). All exposed earth areas should be completed as soon as possible after earthworks have been completed, or alternatively, within 14 days of the cessation of earthworks where practicable. If excavation of soil cannot be avoided during the rainy season, or at any time of year when rainstorms are likely, exposed slope surfaces should be covered by tarpaulin or other means.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S8.8	Sediment tanks of sufficient capacity, constructed from pre-formed individual cells of approximately 6 to 8 m ³ capacity, are recommended as a general mitigation measure which can be used for settling surface runoff prior to disposal. The system capacity is flexible and able to handle multiple inputs from a variety of sources and particularly suited to applications where the influent is pumped.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S8.8	Open stockpiles of construction materials (for examples, aggregates, sand and fill material) of more than 50 m ³ should be covered with tarpaulin or similar fabric during rainstorms. Measures should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S8.8	Manholes (including newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris being washed into the drainage system and storm runoff being directed into foul sewers.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S8.8	Precautions to be taken at any time of year when rainstorms are likely, actions to be taken when a rainstorm is imminent or forecast, and actions to be taken during or after rainstorms. Particular attention should be paid to the control of silty surface runoff during storm events.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S8.8	Oil interceptors should be provided in the drainage system and regularly cleaned to prevent the release of oils and grease into the storm water drainage system after accidental spillages. The interceptor should have a bypass to prevent flushing during periods of heavy rain.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S8.8	All vehicles and plant should be cleaned before leaving a construction site to ensure no earth, mud, debris and the like is deposited by them on roads. An adequately designed and located wheel washing bay should be provided at every site exit, and wash water should have sand and silt settled out and removed at least on a weekly basis to ensure the continued efficiency of the process. The section of access road leading to, and exiting from, the wheel wash bay to the public road should be paved with sufficient backfall toward the wheel wash bay to prevent vehicle tracking of soil and silty water to public roads and drains.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
S8.8	<i>Drainage</i> On-site drainage system should be installed prior to the commencement of other construction activities. Sediment traps should be installed in order to minimise the sediment loading of the effluent prior to discharge into foul sewers. There should be no direct discharge of effluent from the site into the sea.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S8.8	All temporary and permanent drainage pipes and culverts provided to facilitate runoff discharge should be adequately designed for the controlled release of storm flows. All sediment control measures should be regularly inspected and maintained to ensure proper and efficient operation at all times and particularly following rain storms. The temporarily diverted drainage should be reinstated to its original condition when the construction work has finished or the temporary diversion is no longer required.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S8.8	All fuel tanks and storage areas should be provided with locks and be located on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank, to prevent spilled fuel oils from reaching the coastal waters of the Victoria Harbour WCZ	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S8.8	<i>Sewage Effluent</i> Construction work force sewage discharges on site are expected to be connected to the existing trunk sewer or sewage treatment facilities. The construction sewage may need to be handled by portable chemical toilets prior to the commission of the on-site sewer system. Appropriate numbers of portable toilets should be provided by a licensed contractor to serve the large number of construction workers over the construction site. The Contractor should also be responsible for waste disposal and maintenance practices.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S8.8	<i>Stormwater Discharges</i> Minimum distances of 100 m should be maintained between the existing or planned stormwater discharges and the existing or planned seawater intakes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S8.8	<i>Debris and Litter</i> In order to maintain water quality in acceptable conditions with regard to aesthetic quality, contractors should be required, under conditions of contract, to ensure that site management	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

EIA Ref	Recommended Mitigation Measures	Implementation			
	is optimised and that disposal of any solid materials, litter or wastes to marine waters does not occur				
S8.8	Construction Works at or in Close Proximity of Storm Culvert or Seafront The proposed works should preferably be carried out within the dry season where the flow in the drainage channel /storm culvert/ nullah is low.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S8.8	The use of less or smaller construction plants may be specified to reduce the disturbance to the bottom sediment at the drainage channel /storm culvert / nullah.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S8.8	Temporary storage of materials (e.g. equipment, filling materials, chemicals and fuel) and temporary stockpile of construction materials should be located well away from any water courses during carrying out of the construction works.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S8.8	Stockpiling of construction materials and dusty materials should be covered and located away from any water courses.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
S8.8	Construction debris and spoil should be covered up and/or disposed of as soon as possible to avoid being washed into the nearby water receivers	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
S8.8	Construction activities, which generate large amount of wastewater, should be carried out in a distance away from the waterfront, where practicable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S8.8	Mitigation measures to control site runoff from entering the nearby water environment should be implemented to minimize water quality impacts. Surface channels should be provided along the edge of the waterfront within the work sites to intercept the runoff.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S8.8	Construction effluent, site run-off and sewage should be properly collected and/or treated.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S8.8	Any works site inside the storm water courses should be temporarily isolated, such as by placing of sandbags or silt curtains with lead edge at bottom and properly supported props to prevent adverse impact on the storm water quality.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S8.8	Silt curtain may be installed around the construction activities at the seafront to minimize the potential impacts due to accidental spillage of construction materials.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S8.8	Proper shoring may need to be erected in order to prevent soil/mud from slipping into the storm culvert/drainage channel/sea.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S8.8	Supervisory staff should be assigned to station on site to closely supervise and monitor the works	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Part C Construction Noise Impact		Not Observed	Yes	No	Remark
S7.8	Use of quiet PME, movable barriers for Asphalt Paver, Breaker , Excavator and Hand-held breaker and full enclosure for Air Compressor, Bar Bender, Concrete Pump , Generator and Water Pump	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
S7.9	Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction program. Silencers or mufflers on construction equipment should be utilized and should be properly maintained during the construction program. Mobile plant, if any, should be sited as far away from NSRs as possible.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Machines and plant (such as trucks) that may be in intermittent use should be shut down between works periods or should be throttled down to a minimum. Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activities.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Part D Waste / Chemical Management		Not Observed	Yes	No	Remark
S5.2	Prepare a Waste Management Plan, which becomes a part of the Environmental Management Plan, in accordance with the requirements stipulated in ETWB TC(W) No. 19/2005, approved by the Engineer/Supervising Officer of the Project based on current practices on construction sites	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Training of site personnel in site cleanliness, proper waste management and chemical waste handling procedures	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Provision of sufficient waste disposal points and regular collection for waste. Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors. Separation of chemical wastes for special handling and appropriate treatment	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S9.5	1)Nomination of an approved person, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site 2)Training of site personnel in proper waste management and chemical waste handling procedures 3)Provision of sufficient waste disposal points and regular collection for disposal 4)Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers 5)A recording system for the amount of wastes generated, recycled and disposed of (including the disposal sites)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

EIA Ref	Recommended Mitigation Measures	Implementation			
S9.5	Waste Reduction Measures 1) Sort C&D waste from demolition of the remaining structures to recover recyclable portions such as metals 2) 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 3) Encourage collection of aluminum cans, PET bottles and paper by providing separate labelled bins to enable these wastes to be segregated from other general refuse generated by the work force 4) Any unused chemicals or those with remaining functional capacity should be recycled 5) Proper storage and site practices to minimize the potential for damage or contamination of construction materials	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S9.5	Construction and Demolition Material Mitigation measures and good site practices should be incorporated into contract document to control potential environmental impact from handling and transportation of C&D material. The mitigation measures include: 1) Where it is unavoidable to have transient stockpiles of C&D material within the Project work site pending collection for disposal, the transient stockpiles should be located away from waterfront or storm drains as far as possible 2) Open stockpiles of construction materials or construction wastes on-site should be covered with tarpaulin or similar fabric 3) Skip hoist for material transport should be totally enclosed by impervious sheeting 4) Every vehicle should be washed to remove any dusty materials from its body and wheels before leaving a construction site 5) The area where vehicle washing takes place and the section of the road between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores 6) The load of dusty materials carried by vehicle leaving a construction site should be covered entirely by clean impervious sheeting to ensure dust materials do not leak from the vehicle 7) All dusty materials should be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
S9.5	When delivering inert C&D material to public fill reception facilities, the material should consist entirely of inert construction waste and of size less than 250mm or other sizes as agreed with the Secretary of the Public Fill Committee. In order to monitor the disposal of the surplus C&D material at the designed public fill reception facility and to control fly tipping, a trip-ticket system as stipulated in the ETWB TCW No. 31/2004 "Trip Ticket System for Disposal of Construction	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S9.5	Chemical Waste After use, chemical wastes (for example, cleaning fluids, solvents, lubrication oil and fuel) should be handled according to the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Spent chemicals should be collected by a licensed collector for disposal at the CWTF or other licensed facility, in accordance with the <i>Waste Disposal (Chemical Waste) (General) Regulation</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Part E Landscape & Visual		Not Observed	Yes	No	Remark
S13.9	CM1 - All existing trees should be carefully protected during construction. CM2 - Trees unavoidably affected by the works should be transplanted where practical. Detailed transplanting proposal will be submitted to relevant government departments for approval in accordance with ETWBC 2/2004 and 3/2006. Final locations of transplanted trees should be agreed prior to commencement of the work. CM3 - Control of night-time lighting. CM4 - Erection of decorative screen hoarding.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Part F Air Quality		Not Observed	Yes	No	Remark
S6.8	Stockpiling site(s) should be lined with impermeable sheeting and bunded. Stockpiles should be fully covered by impermeable sheeting to reduce dust emission.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
S6.8	Misting for the dusty material should be carried out before being loaded into the vehicle.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S6.8	Material having the potential to create dust should not be loaded from a level higher than the side and tail boards and should be dampened and covered by a clean tarpaulin.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S6.8	The tarpaulin should be properly secured and should extend at least 300 mm over the edges of the sides and tailboards. The material should also be dampened if necessary before transportation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S6.8	The vehicles should be restricted to maximum speed of 10 km per hour and confined haulage and delivery vehicle to designated roadways inside the site. On-site unpaved roads should be compacted and kept free of loose materials	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
S6.8	Vehicle washing facilities should be provided at every vehicle exit point	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S6.8	The area where vehicle washing takes place and the section of the road between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
S6.8	Every main haul road should be sealed with concrete and kept clear of dusty materials or sprayed with water so as to maintain the entire road surface wet.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

EIA Ref	Recommended Mitigation Measures	Implementation			
S6.8	Every stock of more than 20 bags of cement should be covered entirely by impervious sheeting placed in an area sheltered on the top and the three sides.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
S6.8	Every vehicle should be washed to remove any dusty materials from its body and wheels before leaving the construction sites.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
S6.5	8 times daily watering of the work site with active dust emitting activities.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

**Appendix P – Summaries of Environmental Complaint, Warning,
Summon and Notification of Successful Prosecution**

Reporting Month: March 2023

Contract No.	Record of Complaint (Yes/No)	Record of Warning (Yes/No)	Notification of Summons and Successful Prosecutions (Yes/No)
ED/2018/05	No	No	No

Cumulative Statistics on Complaints, Notification of Summons and Successful Prosecutions upto reporting month

Contract No.	Record of Complaint	Record of Warning	Notification of Summons and Successful Prosecutions
ED/2018/05	1	0	0