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ENVIRONMENTAL PIONEERS & SOLUTIONS LIMITED
Member of FSE Engineering Holdings (Stock Code: 331)

Proposed Road Improvement Works in West Kowloon Reclamation Development – Phase 1

Environmental Monitoring & Audit Report

01/4/2017 – 30/04/2017

The Contents of this report have been certified by:

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Executive Summary

This is the fifteenth monthly Environmental Monitoring and Audit (EM&A) Report for Proposed Road Improvement Works in West Kowloon Reclamation Development – Phase 1. The project commenced on 6 February 2016. This report documents the finding of EM&A Works conducted from 1 April 2017 to 30 April 2017.

Environmental Monitoring and Audit Progress

Air Quality Monitoring

1-hr Total Suspended Particulates (TSP) monitoring and 24-hr TSP monitoring were carried out on 5, 10, 13, 19, 22 and 28 April 2017.

Noise Monitoring

30-min LEQ noise monitoring was carried out on 5, 10, 13, 19, 22 and 28 April 2017.

Waste Management

According to Contractor's waste flow data, 2006.4 tonnes of inert C&D materials and 10.43 tonnes of general refuse were generated and disposed of.

Landscape and Visual Impact

Bi-weekly inspections were conducted on 7 and 21 April 2017. Most of the necessary mitigation measures have been implemented. Details of the audit findings and implementation status are presented in Section 6.

Environmental Site Inspection

Joint weekly inspections were conducted by representatives of the Contract Administrator, Engineer, Contractor and ET on 3, 10, 19 and 24 April 2017. The representative of the IEC conducted the site inspection on 19 April 2017. Details of the audit findings and implementation status are presented in Section 6.

Environmental Exceedance / Non-compliance / Compliant / Summons and Successful Prosecution

No exceedance of action level and limit level was recorded for TSP. Six exceedances were recorded at NM4 on 5, 10, 13, 19, 22 and 28 April 2017 for Noise. No Non-compliance event, notification of summons and successful prosecution against the Project were received in this reporting month.

EPD received a complaint by a driver referred from 1823 about muddy water from construction work near West Kowloon Highway (towards the direction of Olympic City) which flowed to the area of 3-way interchange junction of West Kowloon Highway and would endanger the road users and contaminate the vehicles passing by. Letter from EPD by fax was received on 11 April 2017. On the other hand, HyD/Works, the Employer of this contract, informed PB and VC on 23 March 2017 that a 1823 complaint regarding the captioned issue was received by HyD/Region on 23 March 2017.

ET had conducted a site investigation with the representatives of the Engineer and the Contractor on 27 March 2017 to resolve the concern and review the follow up actions and mitigation measures. The environmental complaint was concluded to be caused by an unexpected incident. The Complaint Investigation Report had been done and submitted to EPD on 27 April 2017. The details of the investigation report and complaint log are shown in **Appendix I**.

Variation in Construction Method

No variation in construction method from the proposed construction programme was made and affected the EM&A.

Future Key Issues

The major construction works to be undertaken in the next reporting month include:

- Portion I – Underground Investigation Works
- Portion I – Utilities Diversion Works
- Portion I – Piling Works
- Portion HA – Underground Investigation Works
- Portion HA – Utilities Diversion Works
- Portion HA – Piling Works
- Portion J – Utilities Diversion Works
- Portion J – Construction of Retaining Walls

- Portion Q – Road Works (excavation and utilities diversion)

1 Introduction

1.1 The Project

This is a road improvement project in West Kowloon Reclamation Development (WKRD) for completing the developments and the commissioning of the new transport facilities.

Apart from the additional traffic impacts arising from the major development and transport facilities in WKRD, several major junctions in the area are currently operating with insufficient capacity causing serious congestion to some existing major road corridors such as Jordan Road (JRD), Ferry Street (FST) and Canton Road (CRD).

To enhance the road network of the area, Transport Department commissioned the "West Kowloon Reclamation Development Traffic Study" which identified and recommended Core and Additional Schemes together with the improvement works at the junction of CRD/FST/JRD. Implementation of these schemes would enable most of the key road junctions in the study area to operate with spare capacity, and the traffic queue length would also be reduced avoiding blockage to the upstream junctions

The Environmental Team (ET), Environmental Pioneers & Solutions Limited (EPSL), was appointed by Vibro Construction Co. Ltd. to undertake the Environmental Monitoring and Audit (EM&A) programme during construction phase of the Proposed Road Improvement Works in West Kowloon Reclamation Development – Phase 1. The project proponent is Highways Department. This is a Designated Project under the Environmental Impact Assessment Ordinance (Cap.499). The No. of Environment Permit is EP-455/2013.

The construction works and EM&A programme of this project was commenced on 6 February 2016. The construction programme and project layout plan are shown in **Appendix A**.

1.2 Construction Programme and Activities

A summary of the major construction activities undertaken in this reporting period is shown as follows.

- Portion I – Underground Investigation Works
- Portion I – Utilities Diversion Works
- Portion HA – Underground Investigation Works
- Portion HA – Utilities Diversion Works
- Portion HA – Piling Works
- Portion J – Utilities Diversion Works
- Portion J – Construction of Retaining Walls
- Portion Q – Road Works (excavation and utilities diversion)

1.3 Project Organization

The project organization chart and contact details are shown in **Appendix B**.

1.4 Status of Environmental Licences, Notification and Permits

A summary of the relevant permits, licences, and notifications on environmental protection for this Project is presented in Table 1.4.1.

Table 1.4.1 Summary of the Status of Environmental Licences, Notification and Permits

Permit / License No.	Valid Period		Status	Remark
	From	To		
Notification pursuant to Air Pollution Control (Construction Dust) Regulation				
Ref. No. 386894	23/03/2015	N/A	Valid	/
Effluent Discharge License				
WT00021818-2015	18/06/2015	30/06/2020	Valid	Portion I
WT00021822-2015	18/06/2015	30/06/2020	Valid	Portion HA
WT00021825-2015	18/06/2015	30/06/2020	Valid	Portion J
WT00021826-2015	18/06/2015	30/06/2020	Valid	Portion Q
WT00021903-2015	26/06/2015	30/06/2020	Valid	Works area 1
Waste Disposal (Charges for Disposal of Construction Waste) Regulation				
Billing Account No.7022012	31/03/2015	N/A	Valid	/
Registration of Chemical Waste Producer				

WPN5213-229-V2215-01	01/06/2015	N/A	Valid	/
Construction Noise Permit				
GW-RE1183-15	04/12/2015	03/06/2016	Expire	Portion HA
GW-RE0469-16	04/06/2016	03/12/2016	Expire	Portion HA
GW-RE0330-17	25/04/2017	23/10/2017	Valid	Portion HA

2 Air Quality Monitoring

2.1 Monitoring Locations

According to the EM&A Manual Section 3.5, four impact monitoring locations have been established for air quality monitoring, which are summarized in Table 2.1.1.

Table 2.1.1 Air Quality Monitoring Locations

Identification No.	Monitoring Location	Description	Parameter
AM1	Marine Department New Yau Ma Tei Public Cargo Working Area Administrative Building	Ground Floor Face to Hoi Po Road	1-hr TSP 24-hr TSP
AM2	Garden Building	Ground Floor Face to Canton Road	1-hr TSP 24-hr TSP
AM3	The Cullinan I	Ground Floor Face to Nga Cheung Road	1-hr TSP 24-hr TSP
AM4	Lai Chack Middle School	Ground Floor Face to Canton Road	1-hr TSP 24-hr TSP

Due to the rejection from the representatives/ property management of the premises, high volume samplers are not feasible to be installed at AM3 and AM4 for the 24-hr TSP monitoring. Alternative locations AM3-B and AM4-A are proposed accordingly. The monitoring locations are summarized in Table 2.1.2. The details of monitoring location plan are shown in **Appendix C**.

Table 2.1.2 Air Quality Monitoring Locations

ID No.	Monitoring Location	Description	Coordinates	Parameter
AM1	Marine Department New Yau Ma Tei Public Cargo Working Area Administrative Building	Ground Floor Face to Hoi Po Road	22°18’44.8”N 114°09’37.4”E	1-hr TSP
AM2	Garden Building	Ground Floor Face to Canton Road	22°18’12.7”N 114°10’05.7”E	1-hr TSP
AM3	The Cullinan I	Ground Floor	22°18’22.0”N	1-hr TSP

		Face to Nga Cheung Road	114°09'39.3"E	
AM4	Lai Chack Middle School	Ground Floor Face to Canton Road	22°18'05.4"N 114°10'05.3"E	1-hr TSP
AM1	Marine Department New Yau Ma Tei Public Cargo Working Area Administrative Building	Rooftop Face to Hoi Po Road	22°18'44.8"N 114°09'37.4"E	24-hr TSP
AM2	Garden Building	Ground Floor Face to Canton Road	22°18'12.7"N 114°10'05.7"E	24-hr TSP
AM3-B*1	The Cullinan II (W Hong Kong)	Ground Floor Face to The Cullinan II	22°18'16.3"N 114°09'34.5"E	24-hr TSP
AM4-A	Tsim Sha Tsui Fire Station	Ground Floor Face to Canton Road	22°18'05.5"N 114°10'04.0"E	24-hr TSP

Remark:

*1 Monitoring station was amended from AM3-A to AM3-B from October 2016. AM3-B is located at the site boundary of Scheme I. There is no obstacle between the site (dust emission source) and monitoring point. It is more representative for monitoring the dust impact caused by the construction activities.

2.2 Monitoring Frequency

For 1-hr TSP monitoring, the sampling frequency is at least three times in every six days when the highest dust impact occurs.

For 24-hr TSP monitoring, the sampling frequency is once in every six days when the highest dust impact occurs.

Monitoring was carried out on 5, 10, 13, 19, 22 and 28 April 2017.

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2.3 Monitoring Equipment

1-hr TSP monitoring was carried out by the portable dust meters. A comparison test for the portable dust meters with the HVS was carried out to ensure the accuracy for direct reading of the portable dust meter. 24-hr TSP monitoring was carried out by the high volume samplers. The monitoring equipment is listed in Table 2.3.1 and Calibration Certificates of the equipment are shown in **Appendix D**.

Table 2.3.1 Air Quality Monitoring Equipment

Equipment	Manufacturer & Model No.	Serial No.	Latest Calibration Date	Next Calibration Date
Portable Dust Meter	TSI AM520	5201707001	24/02/2017	23/02/2018
		5201707002	24/02/2017	23/02/2018
		5201707003	24/02/2017	23/02/2018
		5201707004	24/02/2017	23/02/2018
High Volume Sampler	Tisch TE-5170	0001	05/04/2017	04/06/2017
		0002	05/04/2017	04/06/2017
		0003	05/04/2017	04/06/2017
		0004	01/03/2017	30/04/2017
Calibration Kit	Tisch TE-5028A	2137	01/02/2017	31/01/2018

2.4 Monitoring Methodology and Parameters

Measurements of 1-hr TSP monitoring were taken by a Dust Trak aerosol monitor or its equivalent that is a portable and battery-operated laser photometer capable of performing real time 1-hr TSP measurements.

Field monitoring procedures are as follows:

- The monitoring station was set at a point 1m from the exterior of the sensitive receivers building façade and set at a position 1.2m above the ground.
- The battery condition was checked to ensure good functioning of the dust monitor.
- Zero Cal was conducted to the dust monitor to each test for ensuring more accurate data.

- Logging setup and Instrument setup such as log interval, test length, number of test and impactor adaptor will set as follows:
  - log interval : 1min
  - test length : 60mins
  - number of test : 3
  - Impactor adaptor: 100μ
- Start the monitoring lasting 3 hours for each monitoring location
- At the end of the monitoring period, the Average, Maximum and Minimum of each TSP test shall be recorded. In addition on a standard record sheet.

Measurements of 24-hr TSP monitoring were taken by High Volume Samplers (HVSs).

HVSs fitted with appropriate sampling inlets were employed for air quality monitoring. Each sampler was composed of a motor, a filter holder, a flow controller and a sampling inlet and its performance specification complies with that required by USEPA Standard Title 40, Code of Federation Regulations Chapter 1 (Part 50).

Installation of HVSs:

- A horizontal platform with appropriate support to secure the samplers against gusty wind should be provided;
- No two samplers should be placed less than 2 meters apart;
- The distance between the sampler and an obstacle, such as buildings, must be at least twice the height that the obstacle protrudes above the sampler;
- A minimum of 2 meters of separation from walls, parapets and penthouses is required for rooftop samplers;
- A minimum of 2 meters separation from any supporting structure, measured horizontally is required;
- No furnace or incinerator flue is nearby;
- Airflow around the sampler is unrestricted;
- The sampler is more than 20 meters from the dripline;
- Any wire fence and gate, to protect the sampler, should not cause any obstruction during monitoring;
- Permission must be obtained to set up the samplers and to obtain access to the monitoring stations; and
- A secured supply of electricity is needed to operate the samplers.

Data of wind speed and wind direction was extracted from King's Park Meteorological Station of Hong Kong Observatory. The collection of wind data meets the prescribed

criteria in S.3.4.3 of the EM&A Manual.

Other relevant data such as monitoring location, time, weather conditions and any other special phenomena at the construction site were recorded during the measurement period.

2.5 Maintenance and Calibration

Dust Trak aerosol monitors were calibrated by the manufacturer or a HOKLAS Laboratory for every year and on-site Zero Cal before every monitoring. HVSs were calibrated after installation and re-calibrated on bi-monthly basis.

2.6 Quality Assurance / Quality Control Results and Detection Limits

The portable dust meter was calibrated annually by the manufacturer or a HOKLAS laboratory. HVSs were first been calibrated after installation and repeated on bi-monthly basis. Calibration Kit for HVSs was calibrated annually by the manufacturer or a HOKLAS laboratory. The detection limits of the HVSs meet with the prescribed standard. Calibration details and current Calibration Certificates are shown in **Appendix D**.

2.7 Action and Limit Level for 1-hr TSP and 24-hr TSP

The Action and Limit levels for air quality impact monitoring results at all monitoring locations are summarized in Table 2.7.1, which would be applied for compliance assessment of air quality for this project. If the air quality monitoring results at any monitoring stations exceeded the criteria, the actions in accordance with the Event and Action Plan in Table 2.7.2 shall be taken.

Table 2.7.1 Established TSP Actions and Limit Level

Monitoring Locations	Monitoring Parameter	Action Level ($\mu g/m^3$)	Limit Level ($\mu g/m^3$)
AM1	1-hr TSP	288	500
AM2		299	500
AM3		299	500
AM4		303	500
AM1	24-hr TSP	157	260
AM2		183	260
AM3-B		177	260
AM4-A		176	260

Table 2.7.2 Event and action Plan for Air Quality

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
ACTION LEVEL				
1. Exceedance for one sample	1. Inform IEC, ER and Contractor; 2. Identify source, investigate the causes of exceedance and propose remedial measures; 3. Repeat measurement to confirm finding.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method.	1. Notify Contractor.	1. Rectify any unacceptable practice; 2. Amend working methods if appropriate.
2. Exceedance for two or more consecutive samples	1. Inform IEC, ER and Contractor; 2. Identify source; 3. Advise the ER on the effectiveness of the proposed remedial measures; 4. Repeat measurements to confirm findings; 5. Increase monitoring frequency to daily; 6. Discuss with IEC, ER and Contractor on remedial actions required; 7. If exceedance continues, arrange meeting with IEC and ER; 8. If exceedance stops, cease additional monitoring.	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 ET/ER on the effectiveness of the proposed remedial measures; 5. Supervise Implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Submit proposals for remedial to ER and IEC within 3 working days of notification; 2. Implement the agreed proposals; 3. Amend proposal if appropriate.

LIMIT LEVEL				
1.Exceedance for one sample	1. Inform IEC, ER, Contractor and EPD; 2. Identify source, investigate the causes of exceedance and propose remedial measures; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; 5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results.	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 ER on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Take immediate action to avoid further exceedance; 2. Discuss with ET and IEC on remedial actions 3. Submit proposals for remedial actions to IEC within 3 working days of notification; 4. Implement the agreed proposals; 5. Amend proposal if appropriate.
2.Exceedance for two or more consecutive samples	1. Notify IEC, ER, Contractor and EPD; 2. Identify source; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with IEC and ER and Contractor to discuss the remedial actions to be taken; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 4. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 5. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to terminate that portion of work until the exceedance ceases.	1. Take immediate action to avoid further exceedance; 2. Discuss with ET and IEC on remedial actions 3. Submit proposals for remedial actions to ER and IEC within 3 working days of notification; 4. Implement the agreed proposals; 5. Resubmit proposals if problems still not under control; 6. Stop the relevant portion of works as determined by the ER until the exceedance ceases.

2.8 Monitoring Results and Observations

1-hr TSP monitoring was conducted at four monitoring locations. The monitoring results are summarized in Table 2.8.1. 24-hr TSP monitoring was conducted at three monitoring locations. The monitoring results are summarized in Table 2.8.2. Detailed impact monitoring data of 1-hr TSP, 24-hr TSP and meteorological data are shown in **Appendix E**.

Table 2.8.1 Summary of average 1-hr TSP monitoring data

Monitoring Locations	Average 1-hr TSP ($\mu g/m^3$)	Range 1-hr TSP ($\mu g/m^3$)	Action Level ($\mu g/m^3$)	Limit Level ($\mu g/m^3$)
AM1	68	22 – 112	288	500
AM2	73	41 – 101	299	500
AM3	63	32 – 101	299	500
AM4	57	26 – 90	303	500

Table 2.8.2 Summary of average 24-hr TSP monitoring data

Monitoring Locations	Average 24-hr TSP (µg/m^3)	Range 24-hr TSP (µg/m^3)	Action Level (µg/m^3)	Limit Level (µg/m^3)
AM1	51	25 – 93	157	260
AM2	65	31 – 171	183	260
AM3-B	75	42 – 114	177	260
AM4-A	45	38 – 51	176	260

In accordance with the established action and limited levels for impact monitoring, there was no exceedance recorded in the reporting period.

During the monitoring period, vehicle emissions were identified as one of the dust sources for AM1, AM2, AM3, AM4,AM3-B and AM4-A. TSP levels of AM2, AM4 and AM4-A may be affected by the construction activities from other construction sites near Canton Road.

2.9 Monitoring Schedule for Next Reporting Month

The monitoring schedule for next reporting month is scheduled on 4, 10, 16, 22 and 27 May 2017.

3 Noise Monitoring

3.1 Monitoring Locations

According to the EM&A Manual Section 4.5, five impact monitoring locations have been established for noise impact monitoring during the construction phase of the project, which are summarized in Table 3.1.1. The details of monitoring location plan are shown in **Appendix C**.

Table 3.1.1 Noise Monitoring Locations

Identification No.	Noise Monitoring Location	Description	Measurement Type
NM1	Sorrento - Tower 1	Podium Level Face to Nga Cheung Road	Façade
NM2	Yau Ma Ti Catholic Primary School (Hoi Wang Road)	Ground Floor Face to Hoi Ting Road	Façade
NM3	The Cullinan I	Ground Floor Face to Nga Cheung Road	Façade
NM4	Lai Chack Middle School	Ground Floor Face to Canton Road	Façade
NM5	Yue Tak Building	Ground Floor Face to Jordan Road	Façade

3.2 Monitoring Frequency

The regular monitoring for each location was performed on a weekly basis.

Monitoring was carried out on 5, 10, 13, 19, 22 and 28 April 2017.

3.3 Monitoring Equipment

Noise monitoring was conducted by using SVANTEK 958 and SVANTEK 971 which complied with the International Electrotechnical Commission Publications 61672:2002 (Type 1), 60651:1979 (Type 1) and 60804:1985 (Type 1) Specifications as referred to the Technical Memorandum to the Noise Control Ordinance. The equipment was calibrated and verified by certified laboratory to ensure they can perform to the same level of accuracy as stated in the manufacturer's specification. Before and after the baseline measurement, the reading of sound level meter was checked with the acoustic calibrator

and the measurements were accepted as valid if the calibration levels before and after the noise measurement agreed to within 1.0 dB. The measurement equipment is listed in Table 3.3.1 and Calibration Certificates of the equipment are shown in **Appendix D**.

Table 3.3.1 Equipment List for Noise Monitoring

Equipment	Manufacturer & Model No.	Precision Grade	Serial No.	Latest Calibration Date	Next Calibration Date
Sound level meter	SVANTEK 958	IEC61672 Type 1	23432	14/11/2016	13/11/2017
	SVANTEK 971	IEC61672 Type 1	34350	30/12/2016	29/12/2017
Acoustical calibrator	SVANTEK SV30A	IEC 942 Type 1	29085	03/01/2017	02/01/2018
	BSWA CA111	IEC 942 Type 1	520309	01/08/2016	31/07/2017

3.4 Monitoring Methodology and Parameters

The construction noise level was measured in terms of the A-weighted equivalent continuous sound pressure level, L_{Aeq}. L_{Aeq} (30minutes) was used as the monitoring parameter for the impact monitoring in the time period between 0700 to 1900 hours on normal weekdays.

In case of non-compliance with the construction noise criteria, more frequent monitoring, as specified in the Action plan in Table 3.6.2, shall be carried out. This additional monitoring shall be carried out until the recorded noise levels are rectified or proved to be irrelevant to the construction activities.

Field monitoring procedures are as follows:

- The monitoring station was set at a point 1m from the exterior of the sensitive receivers building façade and set at a position 1.2m above the ground.
- The battery condition was checked to ensure good functioning of the meter.
- Parameters such as frequency weighting, the time weighting and the measurement time will set as follows:
  - frequency weighting : A
  - time weighting : Fast

- Prior to and after noise measurement, the meter shall be calibrated using the calibrator for 94.0 dB at 1000 Hz. If the difference in the calibration level before and after measurement is more than 1.0 dB, the measurement will considered invalid and repeat of noise measurement is required after re-calibration or repair of the equipment.
- The wind speed at the monitoring station shall be checked with the portable wind meter.
- Noise monitoring should be cancelled in the presence of fog, rain, and wind with a steady speed exceeding 5 m/s, or wind with gusts exceeding 10 m/s. Noise measurement should be paused during periods of high intrusive noise if possible and observation shall be recorded when intrusive noise is not avoided.
- At the end of the monitoring period, the Leq, L_{10} and L_{90} shall be recorded. In addition, site conditions and noise sources should be recorded on a standard record sheet.

3.5 Maintenance and Calibration

Monitoring equipment was calibrated by the HOKLAS Laboratory for every year and on-site calibrated before and after every monitoring.

3.6 Quality Assurance / Quality Control Results and Detection Limits

The sound level meter and calibrator were calibrated annually by the HOKLAS laboratory. The detection limits of the sound level meter meet with the prescribed standard. Calibration details and current Calibration Certificates are shown in **Appendix D**.

3.7 Action and Limit Level for Construction Noise

The Action and Limit levels for construction noise are defined in Table 3.7.1. Should exceedance of the criteria occur, action in accordance with the Action Plan in Table 3.7.2 shall be carried out.

Table 3.7.1 Action and Limit Levels for Construction Noise at all Sensitive Receivers

Monitoring Locations	Building Type	Time Period	Action Level	Limit Level
NM1	Residential	Daytime 0700 – 1900 hrs on normal weekdays	When one documented complaint is received	75 dB(A)
NM2	Education			70 dB(A) / 65dB(A)*
NM3	Residential			75 dB(A)
NM4	Education			70 dB(A) / 65dB(A)*
NM5	Residential			75 dB(A)

*Remark: 70dB(A) and 65dB(A) for schools during normal teaching periods and school examination periods, respectively.

Table 3.7.2 Event / Action Plan for Construction Noise

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Action Level	1. Notify IEC, ER and Contractor of exceedance; 2. Identify source 3. Investigate the causes of exceedance and propose remedial measures; 4. Report the results of investigation to the IEC, ER and Contractor; 5. Discuss with the IEC, ER and Contractor and formulate remedial measures; 6. Increase monitoring frequency to check mitigation effectiveness.	1. Review the analysed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures are properly implemented	1. Submit noise mitigation proposals to ER with copy to ET and IEC; 2. Implement noise mitigation proposals.
Limit Level	1. Inform IEC, ER, EPD and Contractor; 2. Identify source; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Inform IEC, ER and EPD the causes and actions taken for the exceedances; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures are properly implemented; 5. If exceedance continues, investigate what portion of the work is responsible and instruct the Contractor to terminate that portion of work until the exceedance ceases.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to ER with copy to ET and IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Terminate the relevant portion of works as determined by the ER until the exceedance ceases.

3.8 Monitoring Results and Observations

Noise impact monitoring was conducted at five monitoring locations. The monitoring results are summarized in Table 3.8.1. Detailed impact monitoring data of noise are shown in **Appendix F1**.

Table 3.8.1 Summary of average noise monitoring data

Monitoring Locations	Monitoring Date	Baseline Level (dB(A))	L_{Aeq}*[1] (dB(A))	Re-M*[2] L_{Aeq} (dB(A))	Action Level (dB(A))	Limit Level (dB(A))
NM1	5/4/2017	75.1	66.7	N/A	When one documented complaint is received	75 dB(A)
	10/4/2017		61.3	N/A		
	13/4/2017		65.9	N/A		
	19/4/2017		66.9	N/A		
	22/4/2017		66.8	N/A		
	28/4/2017		67.3	N/A		
NM2	5/4/2017	66.5	65.9	N/A	When one documented complaint is received	70 dB(A) *[3]
	10/4/2017		65.8	N/A		70 dB(A) *[3]
	13/4/2017		66.3	N/A		70 dB(A) *[3]
	19/4/2017		65.0	N/A		70 dB(A) *[3]
	22/4/2017		65.2	N/A		70 dB(A) *[3]
	28/4/2017		64.8	N/A		70 dB(A) *[3]
NM3	5/4/2017	74.5	74.0	N/A	When one documented complaint is received	75 dB(A)
	10/4/2017		74.5	N/A		
	13/4/2017		72.7	N/A		
	19/4/2017		73.8	N/A		
	22/4/2017		72.8	N/A		
	28/4/2017		74.8	N/A		
NM4	5/4/2017	73.3	74.9	74.3	When one documented complaint is received	70 dB(A) *[3]
	10/4/2017		74.3	74.9		70 dB(A) *[3]
	13/4/2017		74.6	75.1		70 dB(A) *[3]
	19/4/2017		75.0	74.7		70 dB(A) *[3]
	22/4/2017		74.7	73.6		70 dB(A) *[3]
	28/4/2017		74.1	75.6		70 dB(A) *[3]
NM5	5/4/2017	71.8	70.8	N/A	When one documented complaint is	75 dB(A)
	10/4/2017		71.5	N/A		
	13/4/2017		71.3	N/A		

	19/4/2017		71.0	N/A	received	
	22/4/2017		72.1	N/A		
	28/4/2017		70.8	N/A		

Remark:

[*1] Measured result would be rounded down before comparison with the limit level

[*2] Repeat noise measurement when exceedance is recorded

[*3] 70dB(A) for schools during normal teaching periods. School schedule is shown in **Appendix F2**

[*4] 65dB(A) for schools examination periods. School schedule is shown in **Appendix F2**

In accordance with the established action and limited levels for impact monitoring, six exceedances were recorded at NM4 on 5, 10, 13, 19, 22 and 28 April 2017. Noise measurement was repeated for confirming the findings and identifying the noise source for each exceedance according to the event and action plan.

The noise source for causing exceedances at NM4 was from the traffic of Canton Road. The NM4 was directly affected by the noise generated from the traffic. The recorded monitoring results at the NM4 were near the baseline noise level. The exceedances were not caused by the construction works of this project.

During the monitoring period, traffic noise was identified as one of the noise source for NM1, NM2, NM3, NM4 and NM5. Noise levels of NM1 and NM3 may be influenced by the construction activities from other construction sites near Nga Cheung Road. Noise level of NM2 may be influenced by construction activities from other construction sites near Hoi Ting Road. Noise levels of NM4 and NM5 may be influenced by the construction activities from other construction sites near Canton Road.

3.9 Monitoring Schedule for Next Reporting Month

The monitoring schedule for next reporting month is scheduled on 4, 10, 16, 22 and 27 May 2017.

4 Solid and Liquid Waste Management Status

With reference to relevant handling records and trip tickets of this Project, the quantities of different types of waste generated in the reporting month are summarised in Table 4.1. During this reporting month, inert C&D materials and general refuse were generated and disposed. No mixed waste was generated. No chemical waste was generated and collected by licensed collector. No paper, plastic and metal was recycled. Detail of waste management data is presented in **Appendix G**.

Table 4.1 Quantities of Waste Disposed from the Project

Reporting Month	Quantity						
	C&D Materials (inert) [a]	C&D Materials (non-inert) [b]					
		General Refuse	Mixed Waste	Chemical Waste	Recycled materials		
					Paper/ cardboard	Plastics	Metals
	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)
Apr 2017	2006.4	10.43	0	0	0	0	0

Notes:

(a) Inert C&D materials include bricks, concrete, building debris, rubble and excavated soil.

(b) Non-inert C&D materials include steel, paper/cardboard packaging waste, plastics and other wastes such as general refuse and vegetative wastes. Steel metal generated from the Project are grouped into non-inert C&D materials as the materials were not disposed of with other inert C&D materials.

Waste materials were generated during this reporting period, such as excavated waste, demolition waste and general refuse. Contractor handled, stored and disposed in accordance with good waste management practice and EPD's regulation and requirements.

5 Landscape and Visual Impact

In accordance with the EM&A Manual, the landscape and visual mitigation measures shall be implemented to minimize the landscape and visual impacts during the construction works. The proposed monitoring program for landscape and visual impact is detailed in Table 5.1.

Table 5.1 Proposed Monitoring Program

Stage	Monitoring Task	Frequency	Report	Approval
Construction stage	Mitigation measures implementation	Bi-weekly	Landscape and Visual Impact Assessment Checklist	Registered Landscape Architect & ET Leader

Bi-weekly site inspections were conducted by representatives of the Engineer, Contractor and ET on 7 and 21 April 2017. The observations, reminders and recommendations made during the site inspections are summarized in Section 6, Table 6.1.

The implementation status of the proposed mitigation measures for landscape and visual impacts is given in **Appendix H**. Should non-conformity on one occur, action in accordance with the Action Plan in Table 5.2 shall be carried out.

Table 5.2 Event / Action Plan for Landsscape and Visual Impact

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Non-conformity on one occasion	1. Identify Source 2. Inform IEC and ER 3. Discuss remedial actions with IEC, 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 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 ER 3. Increase monitoring frequency 4. Discuss remedial actions with IEC, 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 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

6 Environmental Site Inspection

6.1 Site Audit

Site audit was carried out by ET on weekly basis to monitor the timely implementation of proper environmental management practices and mitigation measures in the Project site.

Joint weekly inspections were conducted by representatives of the Contract Administrator, Engineer, Contractor and ET on 3, 10, 19 and 24 April 2017. The representative of the IEC conducted the site inspection on 19 April 2017. Observations were recorded and summarized in Table 6.1.

During site inspection in the reporting month, no non-compliance was identified.

6.2 Implementation Status of Environmental Mitigation Measures

According to the EM&A Manual of the Project, the mitigation measures detailed in the documents shall be implemented during the construction phase. Updated status summary of the Environmental Mitigation Implementation Schedule is provided in **Appendix H**.

The observations, reminders and recommendations made during the audit sessions are summarized in Table 6.1.

Table 6.1 Summary results of site inspections findings.

Date	Findings	Identification	Advice from ET	Action taken	Closing date
6 Mar 17 13 Mar 17	Containers allocated for storage of sediment were not labelled. (Scheme HA)	Observation	Contractor was advised to provide labels for identification of sediment storage areas.	Containers for storage of sediment were labelled	3 Apr 17
13 Mar 17	Container for marine sediment storage was not covered. (Scheme HA)	Observation	Contractor was advised to cover the container for maintain proper storage.	Container for marine sediment storage was covered.	3 Apr 17
27 Mar 17	C&D waste and general refuse were not properly stored/ disposed of in the site. (Scheme I)	Observation	Contractor was advised to allocate waste storage areas and regularly collect/ dispose the waste for keeping the site clean and tidy.	C&D waste and general refuse were cleared and disposed of in the site.	3 Apr 17
27 Mar 17	Construction debris were not properly covered and stored. (Scheme J)	Observation	Contractor was advised to properly store the debris in designated area as construction materials and remove the unusable debris.	Construction debris / C&D waste were cleared.	3 Apr 17
27 Mar 17	Water spraying was not implemented for the exposed surface. (Scheme J)	Observation	Contractor was advised to implement frequently water spraying for dust control.	Water spraying was implemented for the exposed surface.	3 Apr 17
27 Mar 17	Exposed slope surface was not covered and protected. (Scheme J)	Observation	Contractor was advised to properly cover and protect the exposed slope.	Exposed slope surface was properly covered and protected.	3 Apr 17
27 Mar 17	Muddy water/ stagnant water were not collected and some of the pumps were not operated. (Scheme HA)	Observation	Contractor was advised to collect/ direct the waste water to the treatment facilities and properly maintain the drainage system.	Muddy water/ stagnant water were directed and collected to further treatment.	3 Apr 17
3 Apr 17	Channels for site water collection were not properly maintained.	Observation	Contractor was advised to frequently remove the silt from the channels.	Channels for site water collection were not properly maintained.	10 Apr 17
10 Apr 17	Construction debris were not properly covered and stored. (Scheme I)	Observation	Contractor was advised to cover and properly store the debris or remove the debris from site for preventing dust pollution.	The construction debris was removed.	19 Apr 17
10 Apr 17	Dusty materials were not properly cover and stored. (Scheme I)	Observation	Contractor was advised to cover and properly store the dusty materials for preventing dust pollution.	Dusty materials were removed.	19 Apr 17
10 Apr 17	Construction works will be commenced in Scheme I (near Western Harbour Crossing)	Reminder	Contractor was reminded to properly set up the wastewater collection system and temporary drainage system	N/A	N/A
19 Apr 17 24 Apr 17	Water spraying was not implemented for the exposed surface. (Scheme HA & Scheme J)	Observation	Contractor was advised to frequently implemented water spring to the exposed areas for dust control.	The follow-up status will be reported in the next reporting period.	N/A

Date	Findings	Identification	Advice from ET	Action taken	Closing date
19 Apr 17 24 Apr 17	Dusty materials were not properly covered. (Scheme HA)	Observation	Contractor was advised to properly cover the dusty materials for preventing air pollution.	The follow-up status will be reported in the next reporting period.	N/A
19 Apr 17 24 Apr 17	EP was not posted/ displayed at the site entrance. (Scheme I)	Observation	Contractor was advised to properly display the EP at the site entrance.	The follow-up status will be reported in the next reporting period.	N/A
19 Apr 17 24 Apr 17	Original copy of the noise label and QPME label for the air compressor were not displayed. (Scheme I)	Observation	Contractor was advised to properly display the original copy of noise label and QPME label for the air compressor.	The follow-up status will be reported in the next reporting period.	N/A
19 Apr 17	General refuse and C&D waste were stored in the containers.	Reminder	Contractor was reminded to frequently remove the waste for enhancing the housekeep and keeping the site clean and tidy.	N/A	N/A
19 Apr 17	Chemical waste was stored inside the designated containers.	Reminder	Contractor was reminded to review the design of the container and make sure the ventilation conditions of the containers are fulfilled the requirements under EPD'S guideline.	N/A	N/A
19 Apr 17 24 Apr 17	Wet season will be started in May.	Reminder	Contractor was reminded to review the site drainage system before wet season.	N/A	N/A
24 Apr 17	General refuse was observed. (Scheme I)	Observation	Contractor was advised to remove the general waste for keeping the site clean and tidy.	The follow-up status will be reported in the next reporting period.	N/A
24 Apr 17	Exposed slope was not properly covered. (Scheme J)	Observation	Contractor was advised to properly cover the slope.	The follow-up status will be reported in the next reporting period.	N/A
Landscape and Visual Impact					
9 Sep 16 23 Sep 16 7 Oct 16 25 Oct 16 4 Nov 16 18 Nov 16 2 Dec 16 17 Dec 16 31 Dec 16 12 Jan 17 25 Jan 17 10 Feb 17 23 Feb 17 10 Mar 17 24 Mar 17 7 Apr 17 21 Apr 17	Construction materials were piled within TPZ (Scheme HA)	Observation	Contractor was reminded to relocate the construction materials which were piled within the TPZ	The follow-up status will be reported in the next reporting period.	N/A
12 Jul 16 29 Jul 16 26 Aug 16 9 Sep 16	Tree crown of some of transplanted trees was tied.	Observation	Contractor was advised to remove the ties.	The follow-up status will be reported in the next reporting period.	N/A

Date	Findings	Identification	Advice from ET	Action taken	Closing date
23 Sep 16 7 Oct 16 25 Oct 16 4 Nov 16 18 Nov 16 2 Dec 16 17 Dec 16 31 Dec 16 12 Jan 17 25 Jan 17 10 Feb 17 23 Feb 17 10 Mar 17 24 Mar 17 7 Apr 17 21 Apr 17					
12 Jul 16 29 Jul 16 26 Aug 16 9 Sep 16 23 Sep 16 7 Oct 16 25 Oct 16 4 Nov 16 18 Nov 16 2 Dec 16 17 Dec 16 31 Dec 16 12 Jan 17 25 Jan 17 10 Feb 17 23 Feb 17 10 Mar 17 24 Mar 17 7 Apr 17 21 Apr 17	Tree crown of T24 was conflicted with existing trees.	Observation	Contractor was advised to conduct crown pruning for the existing tree which next to T24.	The follow-up status will be reported in the next reporting period.	N/A
10 Feb 17 23 Feb 17 10 Mar 17 24 Mar 17 7 Apr 17 21 Apr 17	Excess soil was piled within root zone of B37(R) and B39(R).	Observation	Contractor was advised to remove the excess soil around B39	The follow-up status will be reported in the next reporting period.	N/A

7 Environmental Non-Conformance

7.1 Summary of Environmental Exceedances

No exceedance of action level and limit level was recorded for TSP. Six exceedances were recorded at NM4 on 5, 10, 13, 19, 22 and 28 April 2017 for Noise

7.2 Summary of Environmental Non-Compliance

No environmental non-compliance was recorded in the reporting month.

7.3 Summary of Environmental Complaint

EPD received a complaint by a driver referred from 1823 about muddy water from construction work near West Kowloon Highway (towards the direction of Olympic City) which flowed to the area of 3-way interchange junction of West Kowloon Highway and would endanger the road users and contaminate the vehicles passing by. Letter from EPD by fax was received on 11 April 2017. On the other hand, HyD/Works, the Employer of this contract, informed PB and VC on 23 March 2017 that a 1823 complaint regarding the captioned issue was received by HyD/Region on 23 March 2017.

ET had conducted a site investigation with the representatives of the Engineer and the Contractor on 27 March 2017 to resolve the concern and review the follow up actions and mitigation measures. The environmental complaint was concluded to be caused by an unexpected incident. The Complaint Investigation Report had been done and submitted to EPD on 27 April 2017. The details of the investigation report and complaint log are shown in **Appendix I**.

7.4 Summary of Notification of Summons and Successful Prosecution

There was no successful environmental prosecution or notification of summons received since the Project commencement.

The cumulative log for environmental exceedance, non-compliance, complaint and summon and successful prosecution since the commencement of the Project is presented in **Appendix I**.

8 Future Key Issues

The major construction activities in the coming month will include:

- Portion I – Underground Investigation Works
- Portion I – Utilities Diversion Works
- Portion I – Piling Works
- Portion HA – Underground Investigation Works
- Portion HA – Utilities Diversion Works
- Portion HA – Piling Works
- Portion J – Utilities Diversion Works
- Portion J – Construction of Retaining Walls
- Portion Q – Road Works (excavation and utilities diversion)

Potential environmental impacts arising from the above construction activities are mainly associated with dust, construction noise, water quality and waste management. The Contractor has been reminded to properly implement dust, construction noise and water quality control measures as well as proper waste management in order to minimize the potential environmental impacts due to the construction works of the Project.

9 Comment, Recommendations and Conclusions

9.1 Comment

The recommended mitigation measures accordance with the EM&A Manual had been effectively implemented to minimize the environmental impacts due to the construction. The contractor had implemented the mitigation measures to control the dust and noise impacts. No dust and noise impacts obviously affected to the environment and sensitive receivers. The follow up actions were not quickly implemented for environmental observations made during the site inspections. The environmental performance during the reporting period was considered satisfactory.

9.2 Recommendations

According to the environmental audit performed in the reporting month, the following recommendation was made:

- To frequently remove the silt from the channels.
- To cover and properly store the debris or remove the debris from site for preventing dust pollution.
- To cover and properly store the dusty materials for preventing dust pollution.
- To properly set up the wastewater collection system and temporary drainage system.
- To frequently implemented water spring to the exposed areas for dust control.
- To properly cover the dusty materials for preventing air pollution.
- To properly display the EP at the site entrance.
- To properly display the original copy of noise label and QPME label for the air compressor.
- To frequently remove the waste for enhancing the housekeep and keeping the site clean and tidy.
- To review the design of the container and make sure the ventilation conditions of the containers are fulfilled the requirements under EPD’S guideline.
- To review the site drainage system before wet season.
- To properly cover the slope.
- To relocate the construction materials which were piled within the TPZ.
- To remove the ties
- To conduct crown pruning for the existing tree which next to T24.
- To remove the excess soil around B37 and B39.

9.3 Conclusions

This is the monthly Environmental Monitoring and Audit (EM&A) Report presenting the EM&A works undertaken during 1 March 2017 to 31 March 2017 in accordance with the EM&A Manual.

No exceedance of action level and limit level was recorded for TSP. Six exceedances were recorded at NM4 on 5, 10, 13, 19, 22 and 28 April 2017 for Noise. No Non-compliance event, notification of summons and successful prosecution against the Project were received in this reporting month.

EPD received a complaint by a driver referred from 1823 about muddy water from construction work near West Kowloon Highway (towards the direction of Olympic City) which flowed to the area of 3-way interchange junction of West Kowloon Highway and would endanger the road users and contaminate the vehicles passing by. Letter from EPD by fax was received on 11 April 2017. On the other hand, HyD/Works, the Employer of this contract, informed PB and VC on 23 March 2017 that a 1823 complaint regarding the captioned issue was received by HyD/Region on 23 March 2017.

ET had conducted a site investigation with the representatives of the Engineer and the Contractor on 27 March 2017 to resolve the concern and review the follow up actions and mitigation measures. The environmental complaint was concluded to be caused by an unexpected incident. The Complaint Investigation Report had been done and submitted to EPD on 27 April 2017.

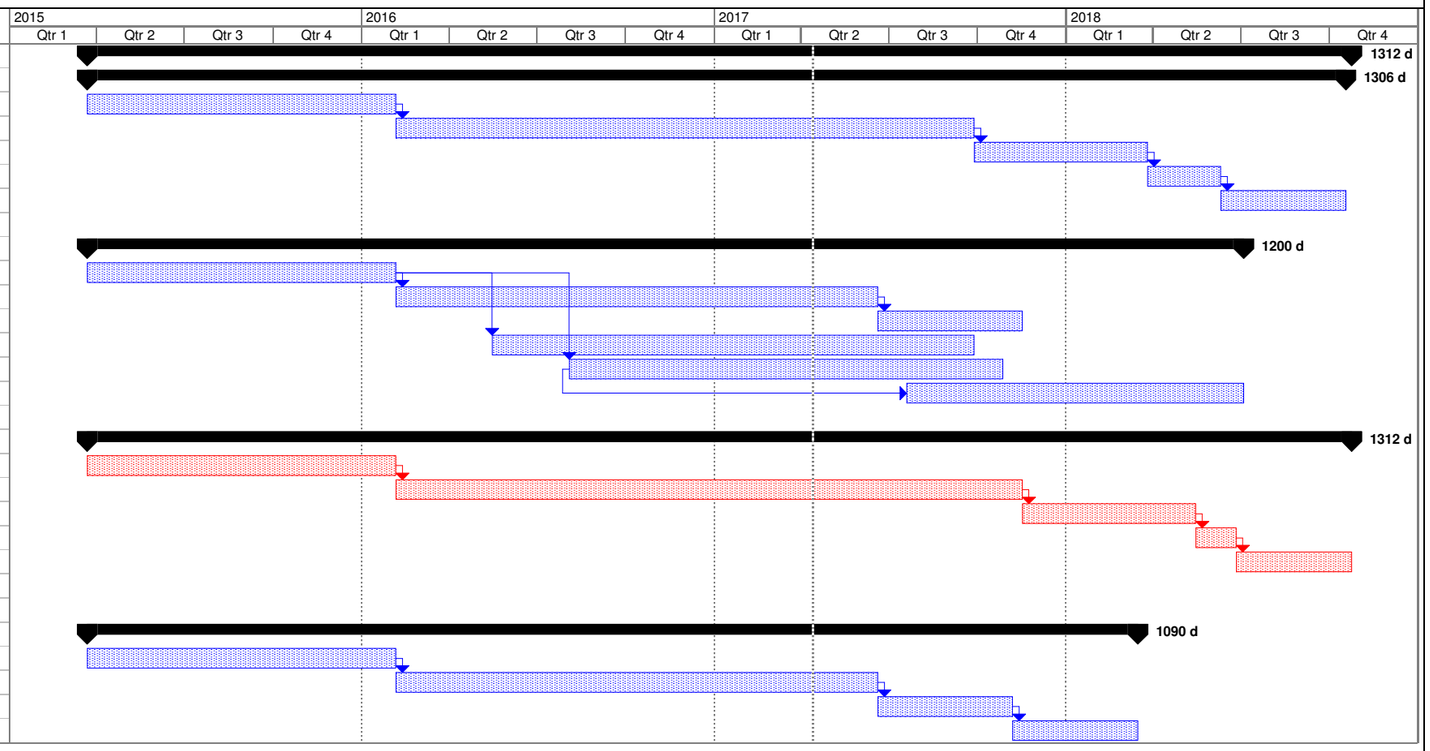
4 nos. of environmental site inspections and 2 nos. of landscape and visual inspections were carried out in this reporting month. Recommendations on remedial actions were given to the Contractor for the deficiencies identified during the site audit.

ET has reminded the contractor to provided environmental pollution control measures, waste management measures and good site practice

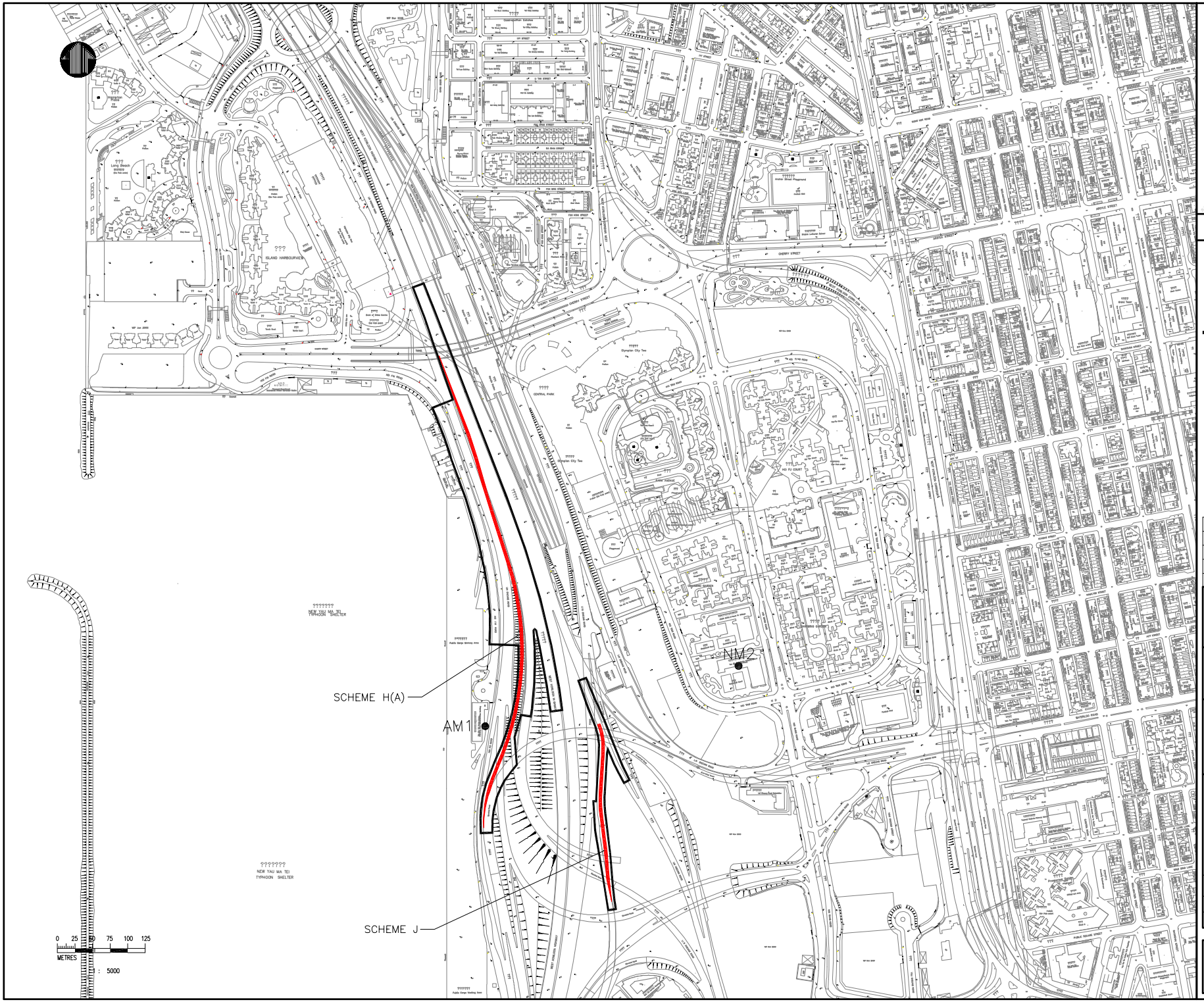
The ET will keep tracking of the EM&A programme to ensure compliance of environmental requirements and the proper implementation of all the necessary mitigation measures.

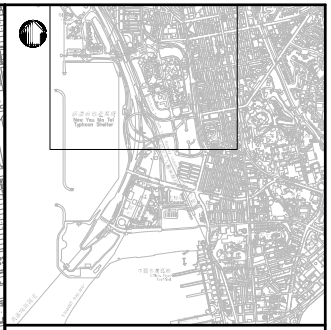
Appendix A: Construction Programme and Project Layout Plan

ID	Task Name	Duration	Start	Finish
1	**Road Improvement Works in West Kowloon Reclamation Development**	**1312 d**	**Mon 23/3/15**	**Wed 24/10/18**
2	**West Kowloon Highway South Bound near Western Harbour Tunnel at Portio**	**1306 d**	**Mon 23/3/15**	**Thu 18/10/18**
3	Site Clearance, tree felling	320 d	Mon 23/3/15	Fri 5/2/16
4	Underground investigation, utilities diversion and piling construction	600 d	Sat 6/2/16	Wed 27/9/17
5	Pile cap, Pier and Bridge Deck construction	180 d	Thu 28/9/17	Mon 26/3/18
6	E&M installation and roadworks	76 d	Tue 27/3/18	Sun 10/6/18
7	Street furniture installation	130 d	Mon 11/6/18	Thu 18/10/18
8				
9	**Canton road at Portion Q**	**1200 d**	**Mon 23/3/15**	**Wed 4/7/18**
10	Site Clearance, tree felling	320 d	Mon 23/3/15	Fri 5/2/16
11	Road works at Canton road footpath and utilities diversion	500 d	Sat 6/2/16	Mon 19/6/17
12	Construction of sign gantry	150 d	Tue 20/6/17	Thu 16/11/17
13	Road works at Ferry Street and Jordan road	500 d	Mon 16/5/16	Wed 27/9/17
14	Road works at Wui Cheung road	450 d	Thu 4/8/16	Fri 27/10/17
15	Road Works at Austin Road junction	350 d	Thu 20/7/17	Wed 4/7/18
16				
17	**Lin Cheung Road North Bound at Portion HA**	**1312 d**	**Mon 23/3/15**	**Wed 24/10/18**
18	Site Clearance, tree felling	320 d	Mon 23/3/15	Fri 5/2/16
19	Underground investigation, utilities diversion and piling construction	650 d	Sat 6/2/16	Thu 16/11/17
20	Pile cap, Pier and Bridge Deck construction	180 d	Fri 17/11/17	Tue 15/5/18
21	E&M installation and roadworks	42 d	Wed 16/5/18	Tue 26/6/18
22	Street furniture installation	120 d	Wed 27/6/18	Wed 24/10/18
23				
24				
25	**Lin Cheung Road South Bound at Portion J**	**1090 d**	**Mon 23/3/15**	**Fri 16/3/18**
26	Site Clearance, tree felling	320 d	Mon 23/3/15	Fri 5/2/16
27	Construction of retaining walls and utilities diversion	500 d	Sat 6/2/16	Mon 19/6/17
28	Site formation and roadworks	140 d	Tue 20/6/17	Mon 6/11/17
29	Street furniture installation	130 d	Tue 7/11/17	Fri 16/3/18



Task | Critical Task | Progress | Milestone | Summary





LOCATION PLAN

LEGEND:

- AM1/NM1 (AIR MONITORING STATION/NOISE MONITORING STATION)
- WORKS BOUNDARY

Rev	Description	By	Date

Consultant

PARSONS BRINCKERHOFF

CINOTECH

Project title

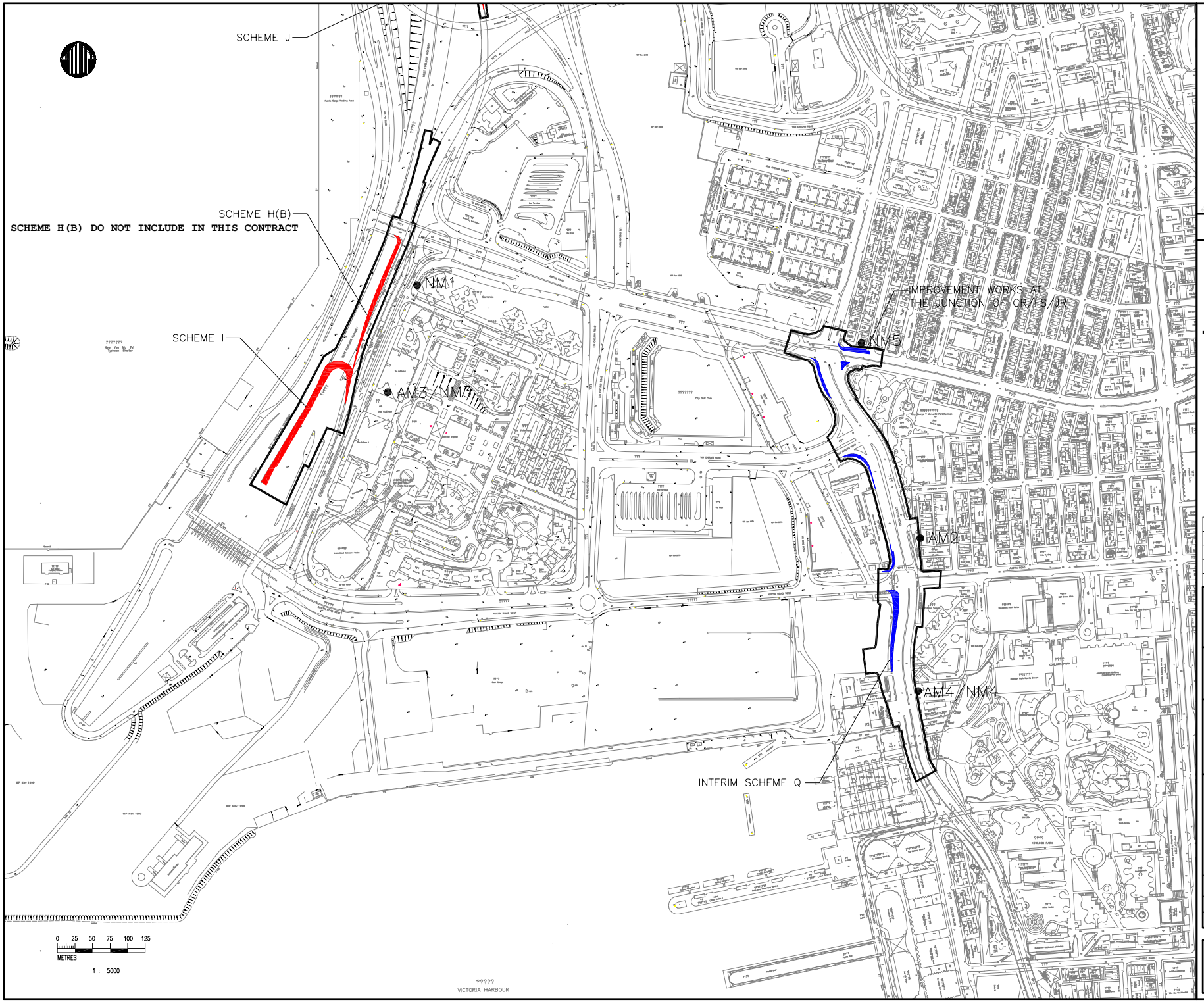
AGREEMENT NO. CE 44/2011 (HY)
PROPOSED ROAD IMPROVEMENT WORKS IN WEST KOWLOON RECLAMATION DEVELOPMENT – PHASE 1 INVESTIGATION, DESIGN AND CONSTRUCTION

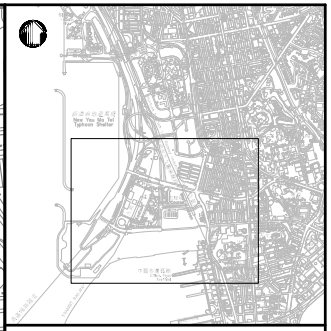
Drawing title

LOCATION OF MONITORING STATIONS (PAGE 1 OF 2)

Drawing no.		Rev.
CE44/T/ST/EM03		2
Drawn: MC	Date: AUG13	Checked: KS	Approved: LC
Scale: A3 1:5000	Status: PRELIMINARY	

路政署
HIGHWAYS DEPARTMENT
主要工務管理處
MAJOR WORKS PROJECT MANAGEMENT OFFICE





LOCATION PLAN

LEGEND:

- AM1/NM1 (AIR MONITORING STATION/NOISE MONITORING STATION)
- WORKS BOUNDARY

Rev	Description	By	Date

Consultant

PARSONS BRINCKERHOFF

CINOTECH

Project title

AGREEMENT NO. CE 44/2011 (HY)
PROPOSED ROAD IMPROVEMENT WORKS IN WEST KOWLOON RECLAMATION DEVELOPMENT – PHASE 1 INVESTIGATION, DESIGN AND CONSTRUCTION

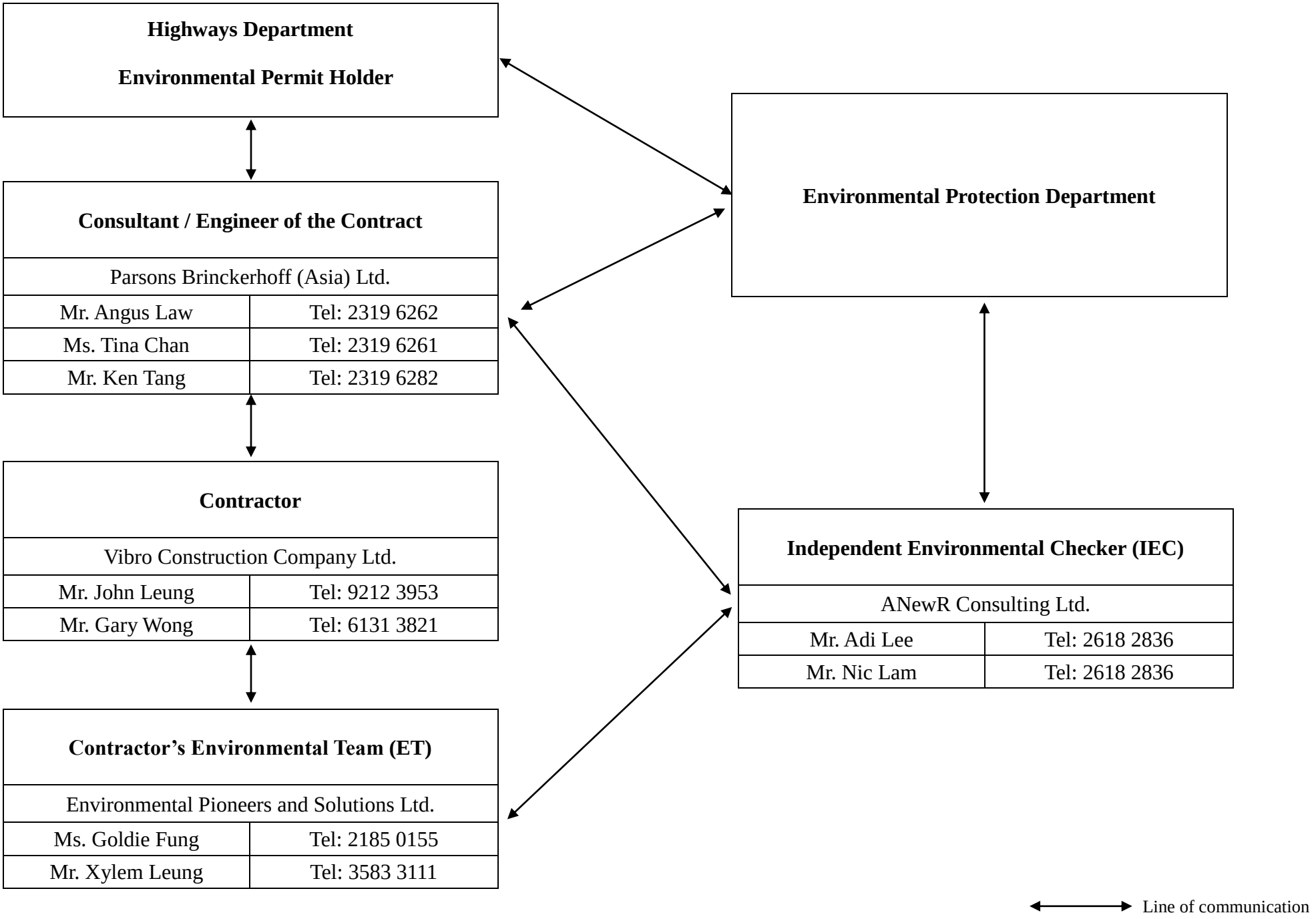
Drawing title

LOCATION OF MONITORING STATIONS (PAGE 2 OF 2)

Drawing no.		Rev.
CE44/T/ST/EM04		2
Drawn MC	Date AUG13	Checked KS	Approved LC
Scale A3 1:5000	Status PRELIMINARY	

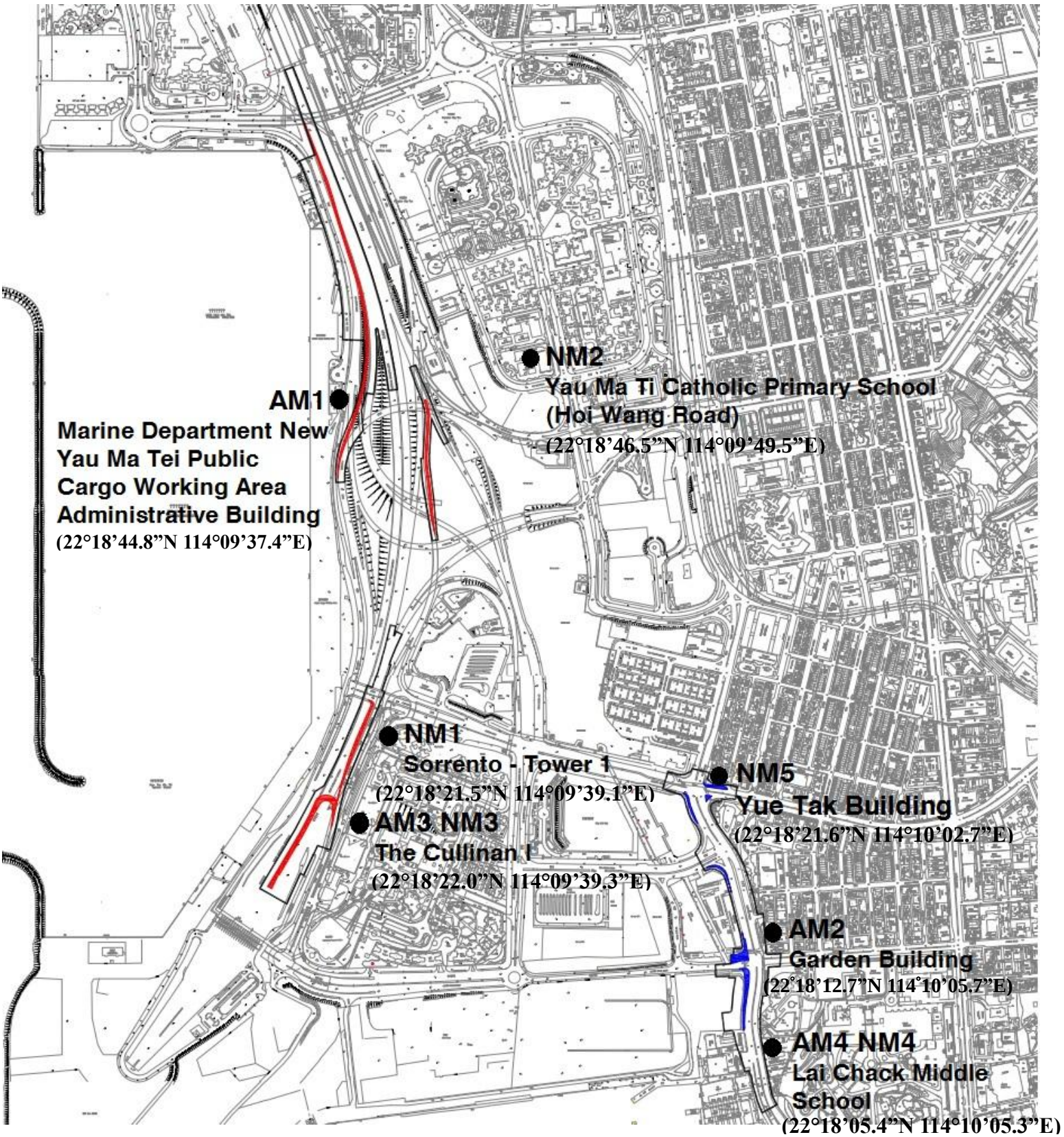
路政署
HIGHWAYS DEPARTMENT
主要工務管理處
MAJOR WORKS PROJECT MANAGEMENT OFFICE

Appendix B: Project Organization Chart

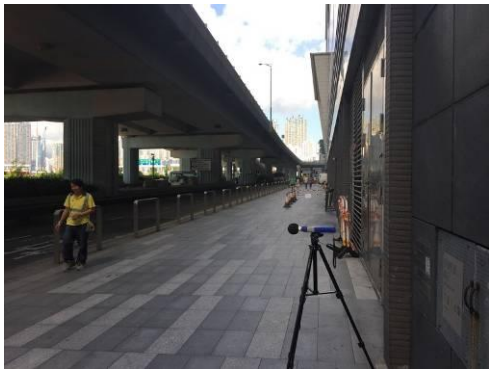

Highways Department
Environmental Permit Holder
Environmental Protection Department
Consultant / Engineer of the Contract
Parsons Brinckerhoff (Asia) Ltd.
Mr. Angus Law
Tel: 2319 6262
Ms. Tina Chan
Tel: 2319 6261
Mr. Ken Tang
Tel: 2319 6282
Contractor
Vibro Construction Company Ltd.
Mr. John Leung
Tel: 9212 3953
Mr. Gary Wong
Tel: 6131 3821
Independent Environmental Checker (IEC)
ANewR Consulting Ltd.
Mr. Adi Lee
Tel: 2618 2836
Mr. Nic Lam
Tel: 2618 2836
Contractor's Environmental Team (ET)
Environmental Pioneers and Solutions Ltd.
Ms. Goldie Fung
Tel: 2185 0155
Mr. Xylem Leung
Tel: 3583 3111
Line of communication

Appendix C: Monitoring Locations

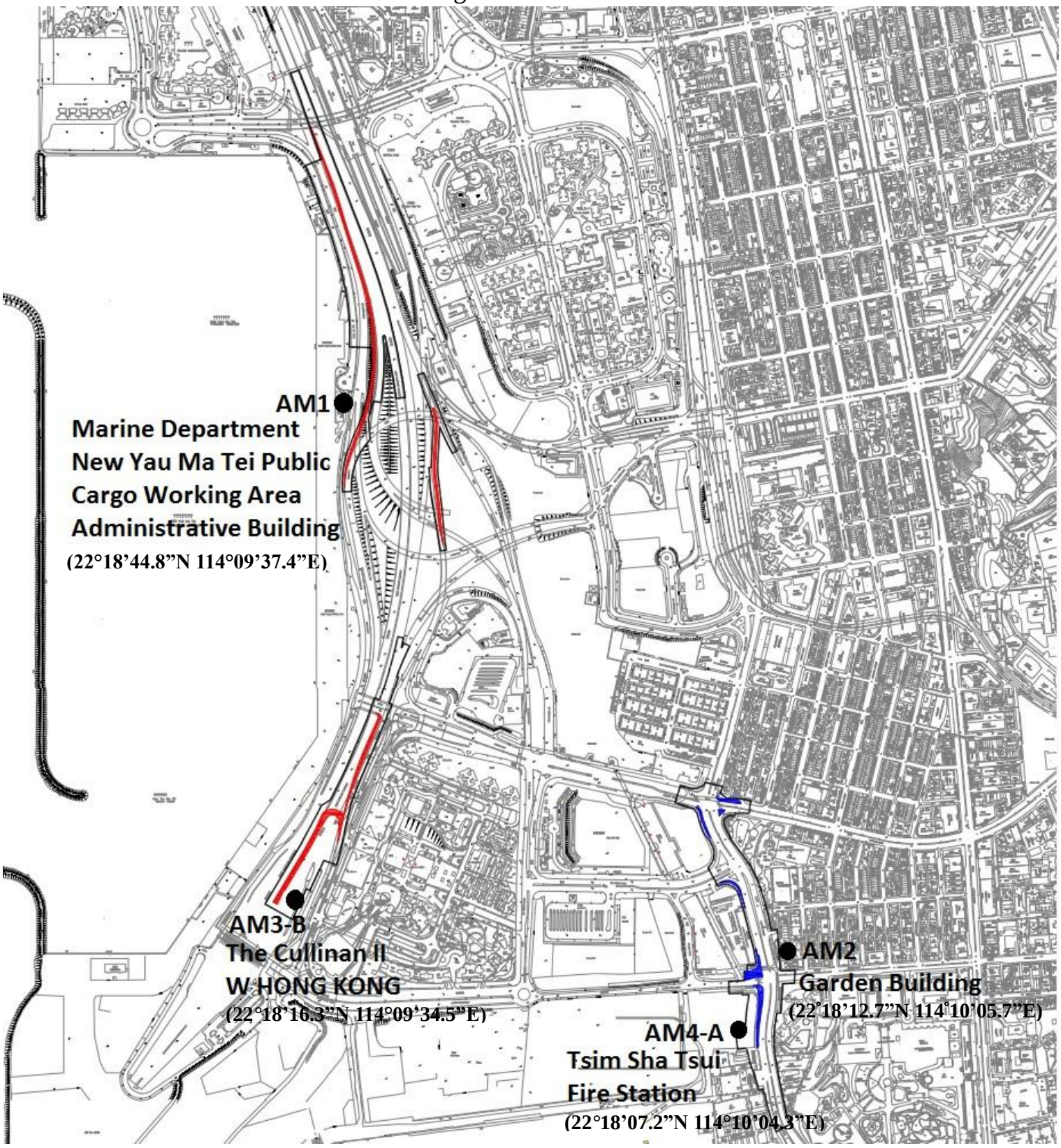
Locations for 1-hr TSP and Noise monitoring



Monitoring Location	Photo Record
AM1 Marine Department New Yau Ma Tei Public Cargo Working Area Administrative Building	
AM2 Garden Building	
AM3 The Cullinan I	
AM4 Lai Chack Middle School	

Monitoring Location	Photo Record
NM1 Sorrento - Tower 1	
NM2 Yau Ma Ti Catholic Primary School (Hoi Wang Road)	
NM3 The Cullinan I	
NM4 Lai Chack Middle School	
NM5 Yue Tak Building	

Locations for 24-hr TSP monitoring



Monitoring Location	Photo Record
AM1 Marine Department New Yau Ma Tei Public Cargo Working Area Administrative Building	
AM2 Garden Building	
AM3-B The Cullinan II (W Hong Kong)	
AM4-A Tsim Sha Tsui Fire Station	

Appendix D: Calibration Certification

TSI P/N 2300157

CERTIFICATE OF CALIBRATION AND TESTING

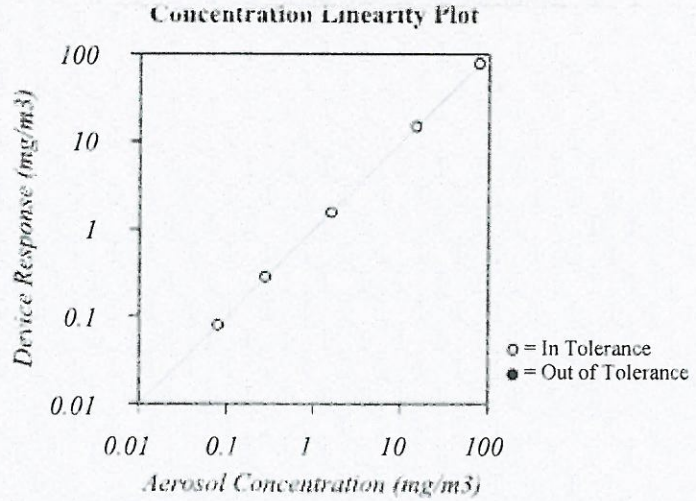
TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA
Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

Environment Conditions		
Temperature	74.9 (23.8)	°F (°C)
Relative Humidity	25	%RH
Barometric Pressure	28.92 (979.3)	inHg (hPa)

Model	**AM520**
Serial Number	**5201707001**

☒ As Left ☐ As Found

☒ In Tolerance ☐ Out of Tolerance



System ID: DTII01-01

CONCENTRATION *Unit: mg/m3*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	0.079	0.078	0.055~0.103	4	14.873	14.787	13.386~16.360
2	0.279	0.277	0.237~0.321	5	77.785	77.124	70.006~85.564
3	1.583	1.535	1.425~1.741				

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Measurement Variable	System ID	Last Cal.	Cal. Due
Photometer	E003433	09-06-16	03-06-17
DC Voltage(Keithley)	E002859	11-04-16	11-30-17
Temp/Humidity	E005656	03-08-16	03-08-17
Pressure	E003440	08-02-16	08-02-17

Measurement Variable	System ID	Last Cal.	Cal. Due
Flowmeter	E004570	06-29-16	06-29-17
Microbalance	M001324	11-02-16	11-30-18
Temp/Humidity	E005657	03-16-16	03-16-17

Linda Hillheimer
Calibrated

February 13, 2017
Date

大成環境科技拓展有限公司
ENVIRONMENTAL PIONEERS & SOLUTIONS LIMITED
Member of FSE Engineering Holdings (Stock Code: 331)

REPORT OF EQUIPMENT CALIBRATION

INSTRUMENT DESCRIPTION

It is certified that the calibrated dust meter has been calibrated by the calibrated High Volume Sampler.

Dust Meter

Manufacturer & Model No.: TSI AM520	Date of Calibration: 24/02/2017
Serial No.: 5201707001	Date of Next Calibration: 23/02/2018

High Volume Sampler

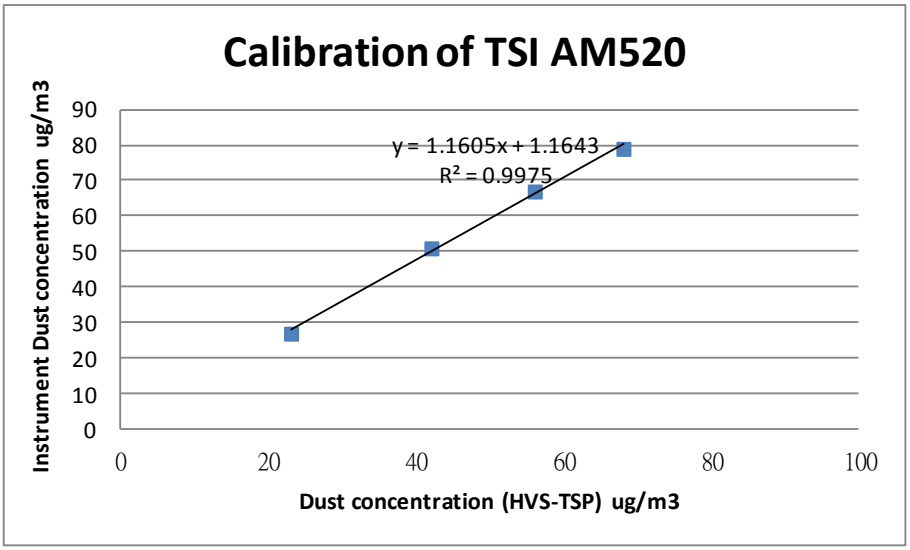
Manufacturer & Model No.: TE-5170 MFC	Date of Calibration: 06/02/2017
Serial No.: 0005	

Calibration Orifice

Manufacturer & Model No.: TE-5028A	Date of Calibration: 01/02/2017
Serial No.: 2137	

Calibration Record

HVS - TSP	23	42	56	68
TSI AM510	27	51	67	79



ISSUING ORGANISATION

Environmental Pioneers & Solutions Limited

Flat A 19/F. Chaiwan Industrial Centre
20 Lee Chung Street
Chai Wan, Hong Kong

Phone: 852 - 2556 9172
Fax: 852 - 2856 2010

Date of Issue: 28/02/2017

Mr. Ip Wing Hong, John
Manager

TSI P/N 2300157

CERTIFICATE OF CALIBRATION AND TESTING

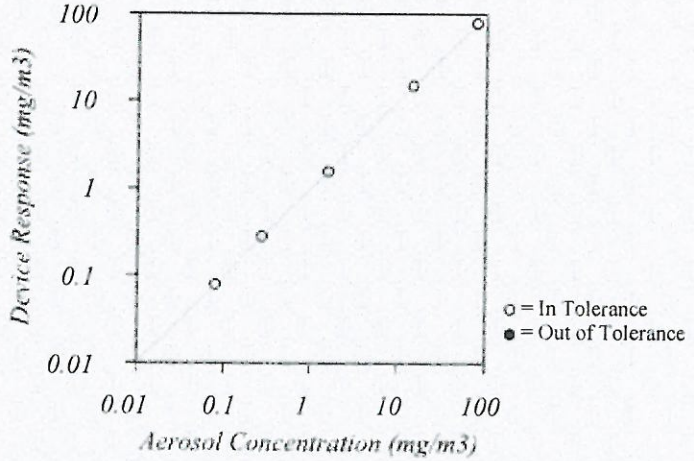
TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA
Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

Environment Conditions		
Temperature	74.9 (23.8)	°F (°C)
Relative Humidity	25	%RH
Barometric Pressure	28.92 (979.3)	inHg (hPa)

Model	**AM520**
Serial Number	**5201707002**

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

Concentration Linearity Plot



System ID: DTII01-01

CONCENTRATION *Unit: mg/m3*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	0.079	0.079	0.055~0.103	4	14.873	14.698	13.386~16.360
2	0.279	0.278	0.237~0.321	5	77.785	77.642	70.006~85.564
3	1.583	1.542	1.425~1.741				

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Measurement Variable	System ID	Last Cal.	Cal. Due
Photometer	E003433	09-06-16	03-06-17
DC Voltage(Keithley)	E002859	11-04-16	11-30-17
Temp/Humidity	E005656	03-08-16	03-08-17
Pressure	E003440	08-02-16	08-02-17

Measurement Variable	System ID	Last Cal.	Cal. Due
Flowmeter	E004570	06-29-16	06-29-17
Microbalance	M001324	11-02-16	11-30-18
Temp/Humidity	E005657	03-16-16	03-16-17

Linda Hillheimer
Calibrated

February 13, 2017
Date

大成環境科技拓展有限公司
ENVIRONMENTAL PIONEERS & SOLUTIONS LIMITED
Member of FSE Engineering Holdings (Stock Code: 331)

REPORT OF EQUIPMENT CALIBRATION

INSTRUMENT DESCRIPTION

It is certified that the calibrated dust meter has been calibrated by the calibrated High Volume Sampler.

Dust Meter

Manufacturer & Model No.: TSI AM520	Date of Calibration: 24/02/2017
Serial No.: 5201707002	Date of Next Calibration: 23/02/2018

High Volume Sampler

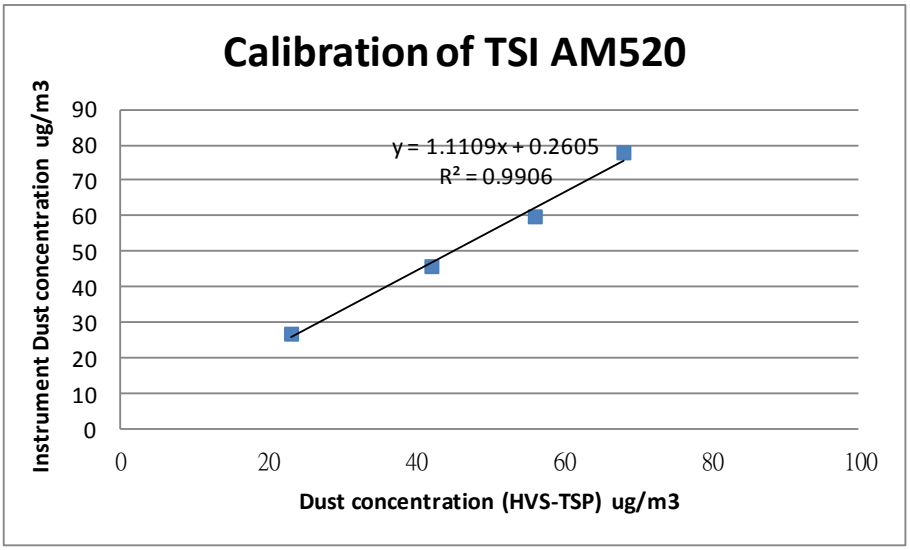
Manufacturer & Model No.: TE-5170 MFC	Date of Calibration: 06/02/2017
Serial No.: 0005	

Calibration Orifice

Manufacturer & Model No.: TE-5028A	Date of Calibration: 01/02/2017
Serial No.: 2137	

Calibration Record

HVS - TSP	25	42	56	68
TSI AM510	27	46	60	78



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Manager

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

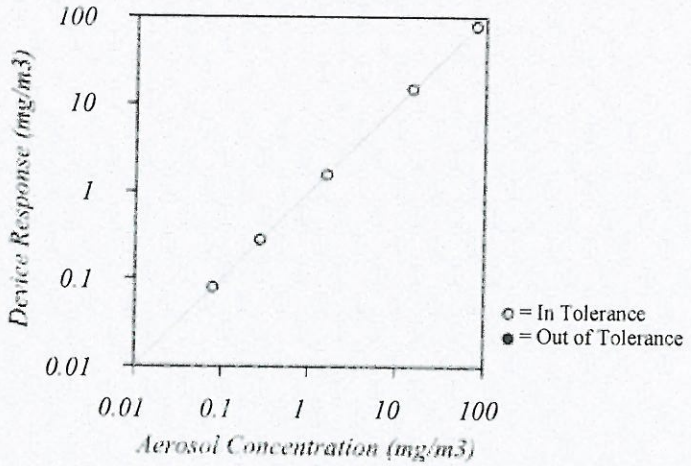
Environment Conditions		
Temperature	74.9 (23.8)	°F (°C)
Relative Humidity	25	%RH
Barometric Pressure	28.92 (979.3)	inHg (hPa)

Model	**AM520**
Serial Number	**5201707003**

☒ As Left ☐ As Found

☒ In Tolerance ☐ Out of Tolerance

Concentration Linearity Plot



System ID: DTII01-01

CONCENTRATION *Unit: mg/m3*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	0.079	0.078	0.055~0.103	4	14.873	14.779	13.386~16.360
2	0.279	0.276	0.237~0.321	5	77.785	77.680	70.006~85.564
3	1.583	1.556	1.425~1.741				

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Measurement Variable	System ID	Last Cal.	Cal. Due
Photometer	E003433	09-06-16	03-06-17
DC Voltage(Keithley)	E002859	11-04-16	11-30-17
Temp/Humidity	E005656	03-08-16	03-08-17
Pressure	E003440	08-02-16	08-02-17

Measurement Variable	System ID	Last Cal.	Cal. Due
Flowmeter	E004570	06-29-16	06-29-17
Microbalance	M001324	11-02-16	11-30-18
Temp/Humidity	E005657	03-16-16	03-16-17

Linda Hillheimer
Calibrated

February 13, 2017
Date

大成環境科技拓展有限公司
ENVIRONMENTAL PIONEERS & SOLUTIONS LIMITED
Member of FSE Engineering Holdings (Stock Code: 331)

REPORT OF EQUIPMENT CALIBRATION

INSTRUMENT DESCRIPTION

It is certified that the calibrated dust meter has been calibrated by the calibrated High Volume Sampler.

Dust Meter

Manufacturer & Model No.: TSI AM520	Date of Calibration: 24/02/2017
Serial No.: 5201707003	Date of Next Calibration: 23/02/2018

High Volume Sampler

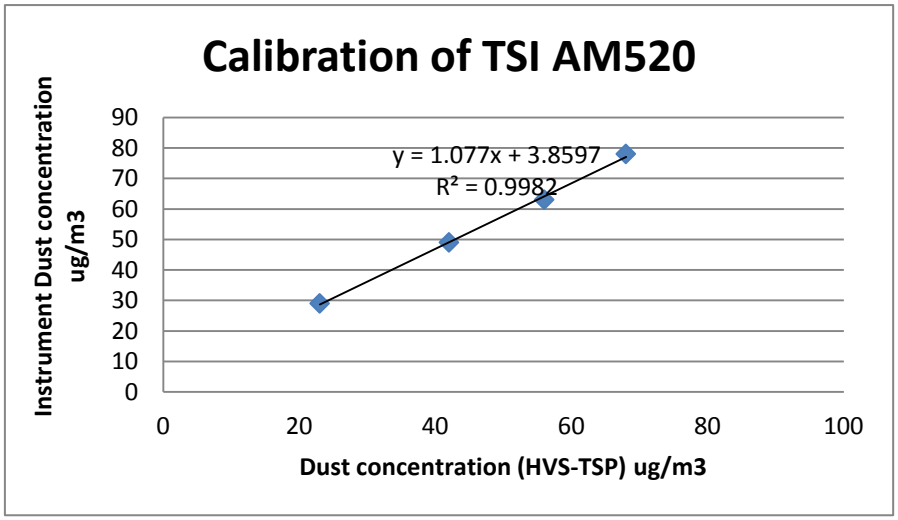
Manufacturer & Model No.: TE-5170 MFC	Date of Calibration: 06/02/2017
Serial No.: 0005	

Calibration Orifice

Manufacturer & Model No.: TE-5028A	Date of Calibration: 01/02/2017
Serial No.: 2137	

Calibration Record

HVS - TSP	25	42	56	68
TSI AM510	29	49	63	78



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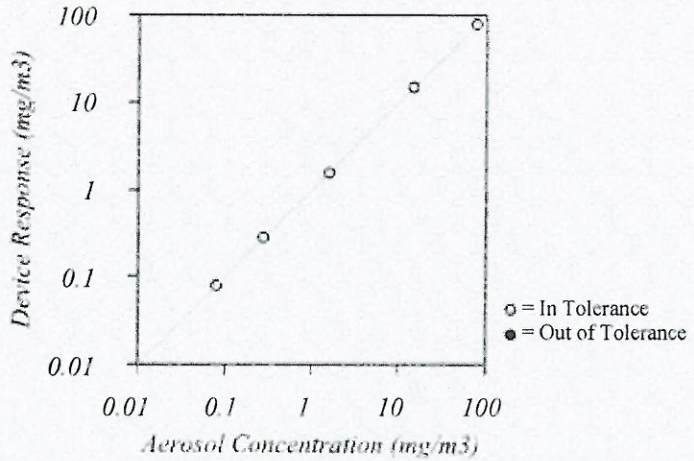
TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA
Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

Environment Conditions		
Temperature	74.9 (23.8)	°F (°C)
Relative Humidity	25	%RH
Barometric Pressure	28.92 (979.3)	inHg (hPa)

Model	AM520
Serial Number	5201707004

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

Concentration Linearity Plot



System ID: DTII01-01

CONCENTRATION *Unit: mg/m3*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	0.079	0.078	0.055~0.103	4	14.873	14.790	13.386~16.360
2	0.279	0.282	0.237~0.321	5	77.785	77.399	70.006~85.564
3	1.583	1.553	1.425~1.741				

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Measurement Variable	System ID	Last Cal	Cal. Due
Photometer	E003433	09-06-16	03-06-17
DC Voltage(Keithley)	E002859	11-04-16	11-30-17
Temp/Humidity	E005656	03-08-16	03-08-17
Pressure	E003440	08-02-16	08-02-17

Measurement Variable	System ID	Last Cal	Cal. Due
Flowmeter	E004570	06-29-16	06-29-17
Microbalance	M001324	11-02-16	11-30-18
Temp/Humidity	E005657	03-16-16	03-16-17

Linda Hillebrenner
Calibrated

February 13, 2017
Date

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ENVIRONMENTAL PIONEERS & SOLUTIONS LIMITED
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REPORT OF EQUIPMENT CALIBRATION

INSTRUMENT DESCRIPTION

It is certified that the calibrated dust meter has been calibrated by the calibrated High Volume Sampler.

Dust Meter

Manufacturer & Model No.: TSI AM520	Date of Calibration: 24/02/2017
Serial No.: 5201707004	Date of Next Calibration: 23/02/2018

High Volume Sampler

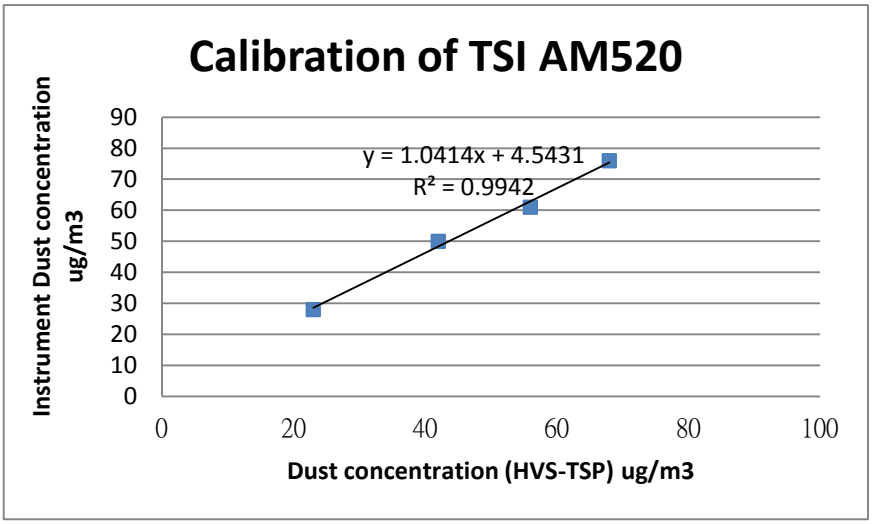
Manufacturer & Model No.: TE-5170 MFC	Date of Calibration: 06/02/2017
Serial No.: 0005	

Calibration Orifice

Manufacturer & Model No.: TE-5028A	Date of Calibration: 01/02/2017
Serial No.: 2137	

Calibration Record

HVS - TSP	25	42	56	68
TSI AM510	28	50	61	76



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Date of Issue: 28/02/2017

Mr. Ip Wing Hong, John
Manager

TISCH ENVIRONMENTAL, INC.
145 SOUTH MIAMI AVE
VILLAGE OF CLEVES, OH
45002
513.467.9000
877.263.7610 TOLL FREE
513.467.9009 FAX

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5028A

Date - Feb 01, 2017 Rootsmeter S/N 0438320 Ta (K) - 293
Operator Tisch Orifice I.D. - 2137 Pa (mm) - 753.11

PLATE OR VDC #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORFICE DIFF H2O (in.)
1	NA	NA	1.00	1.3510	4.1	1.50
2	NA	NA	1.00	1.0400	6.9	2.50
3	NA	NA	1.00	0.9450	8.3	3.00
4	NA	NA	1.00	0.8780	9.5	3.50
5	NA	NA	1.00	0.6630	16.6	6.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)		Va	(x axis) Qa	(y axis)
1.0023	0.7419	1.2295		0.9945	0.7361	0.7639
0.9985	0.9601	1.5873		0.9908	0.9527	0.9862
0.9967	1.0547	1.7388		0.9889	1.0465	1.0804
0.9950	1.1333	1.8782		0.9873	1.1245	1.1669
0.9855	1.4865	2.4591		0.9779	1.4750	1.5278
Qstd slope (m) =		1.65312		Qa slope (m) =		1.03516
intercept (b) =		0.00089		intercept (b) =		0.00055
coefficient (r) =		0.99994		coefficient (r) =		0.99994
y axis = SQRT[H2O(Pa/760)(298/Ta)]				y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

Vstd = Diff. Vol[(Pa-Diff. Hg)/760](298/Ta)
Qstd = Vstd/Time

Va = Diff Vol [(Pa-Diff Hg)/Pa]
Qa = Va/Time

For subsequent flow rate calculations:

Qstd = 1/m{[SQRT(H2O(Pa/760)(298/Ta))]- b}
Qa = 1/m{[SQRT H2O(Ta/Pa)]- b}

TE-5170 Calibration Worksheet

Site Information

Location:	YMT Public Cargo Working Area		
Location ID:	AM1	Date:	5-Apr-17
Sampler:	TE-5170 MFC	Tech:	Andy Tsang

Site Conditions

Barometric Pressure (in Hg):	29.50	Corrected Pressure (mm Hg):	749
Temperature (deg F):	60	Temperature (deg K):	289
Average Press. (in Hg):	29.65	Corrected Average (mm Hg):	753
Average Temp. (deg F):	60	Average Temp. (deg K):	289

Calibration Orifice

Make:	Tisch	Qstd Slope:	1.65312
Model:	TE-5028A	Qstd Intercept:	0.00089
Serial#:	2137	Date Certified:	1-Feb-17

Calibration Information

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)
1	1.60	0.772	22.0	22.20
2	2.40	0.945	32.0	32.29
3	3.80	1.189	40.0	40.36
4	6.00	1.495	48.0	48.43
5	8.00	1.726	58.0	58.53

Linear Regression

Slope: 35.7563

Intercept: -3.4500

Corr. Coeff: 0.9926

# of Observations: 5

Calculations

Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]

IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

Tstd = 298 deg K

Pstd = 760 mm Hg

For subsequent calculation of sampler flow:

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

m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

Average I (chart): 56.0

Average Flow Calculation m3/min

1.680839213

Average Flow Calculation in CFM

59.35043262

Sample Time (Hrs): 24.0

Total Flow/Volume in m3

2420.408467

Total Flow in CFM

85464.62297

TE-5170 Calibration Worksheet

Site Information

Location:	Canton Road Garden Building		
Location ID:	AM2	Date:	5-Apr-17
Sampler:	TE-5170 MFC	Tech:	Andy Tsang

Site Conditions

Barometric Pressure (in Hg):	29.50	Corrected Pressure (mm Hg):	749
Temperature (deg F):	60	Temperature (deg K):	289
Average Press. (in Hg):	29.65	Corrected Average (mm Hg):	753
Average Temp. (deg F):	60	Average Temp. (deg K):	289

Calibration Orifice

Make:	Tisch	Qstd Slope:	1.65312
Model:	TE-5028A	Qstd Intercept:	0.00089
Serial#:	2137	Date Certified:	1-Feb-17

Calibration Information

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)
1	3.40	1.125	18.0	18.16
2	5.60	1.444	30.0	30.27
3	7.40	1.660	42.0	42.38
4	7.60	1.682	46.0	46.42
5	8.90	1.820	52.0	52.47

Linear Regression

Slope: 50.1058

Intercept: -39.5376

Corr. Coeff: 0.9912

# of Observations: 5

Calculations

Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]

IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart response
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pa = actual pressure during calibration (mm Hg)
Tstd = 298 deg K
Pstd = 760 mm Hg
For subsequent calculation of sampler flow:
1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

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

Average I (chart): 58.0

Average Flow Calculation m3/min

1.960079227

Average Flow Calculation in CFM

69.21039752

Sample Time (Hrs): 24.0

Total Flow/Volume in m3

2822.514087

Total Flow in CFM

99662.97242

TE-5170 Calibration Worksheet

Site Information

Location:	Nga Cheung Road Portion I		
Location ID:	AM3-B	Date:	5-Apr-17
Sampler:	TE-5170 MFC	Tech:	Andy Tsang

Site Conditions

Barometric Pressure (in Hg):	29.50	Corrected Pressure (mm Hg):	749
Temperature (deg F):	60	Temperature (deg K):	289
Average Press. (in Hg):	29.65	Corrected Average (mm Hg):	753
Average Temp. (deg F):	60	Average Temp. (deg K):	289

Calibration Orifice

Make:	Tisch	Qstd Slope:	1.65312
Model:	TE-5028A	Qstd Intercept:	0.00089
Serial#:	2137	Date Certified:	1-Feb-17

Calibration Information

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)
1	1.40	0.722	26.0	26.24
2	2.60	0.984	36.0	36.33
3	3.80	1.189	42.0	42.38
4	5.60	1.444	52.0	52.47
5	7.20	1.637	56.0	56.51

Linear Regression

Slope: 33.5936

Intercept: 2.6331

Corr. Coeff: 0.9967

# of Observations: 5

Calculations

Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]

IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

Tstd = 298 deg K

Pstd = 760 mm Hg

For subsequent calculation of sampler flow:

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

m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

Average I (chart): 56.0

Average Flow Calculation m3/min

1.607966853

Average Flow Calculation in CFM

56.77730959

Sample Time (Hrs): 24.0

Total Flow/Volume in m3

2315.472269

Total Flow in CFM

81759.32581

TE-5170 Calibration Worksheet

Site Information

Location:	Tsim Sha Tsui Fire Station		
Location ID:	AM4-A	Date:	1-Mar-17
Sampler:	TE-5170 MFC	Tech:	Andy Tsang

Site Conditions

Barometric Pressure (in Hg):	29.50	Corrected Pressure (mm Hg):	749
Temperature (deg F):	59	Temperature (deg K):	288
Average Press. (in Hg):	29.65	Corrected Average (mm Hg):	753
Average Temp. (deg F):	59	Average Temp. (deg K):	288

Calibration Orifice

Make:	Tisch	Qstd Slope:	1.65312
Model:	TE-5028A	Qstd Intercept:	0.00089
Serial#:	2137	Date Certified:	1-Feb-17

Calibration Information

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)
1	2.80	1.022	18.0	18.18
2	4.40	1.281	28.0	28.28
3	6.00	1.496	38.0	38.38
4	7.00	1.616	46.0	46.46
5	8.80	1.812	56.0	56.56

Linear Regression

Slope:	49.0252
Intercept:	-33.2866
Corr. Coeff:	0.9958
# of Observations:	5

Calculations

Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart response
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pa = actual pressure during calibration (mm Hg)
Tstd = 298 deg K
Pstd = 760 mm Hg
For subsequent calculation of sampler flow:
1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

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

Average I (chart): 60.0
Average Flow Calculation m3/min
1.918239082
Average Flow Calculation in CFM
67.73302198
Sample Time (Hrs): 24.0
Total Flow/Volume in m3
2762.264278
Total Flow in CFM
97535.55165

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CERTIFICATE OF CALIBRATION

Certificate No.: 16CA1110 02 Page 1 of 2

Item tested

Description:	Sound Level Meter (Type 1)	Microphone	Preamplifier
Manufacturer:	SVANTEK Sp. z o.o	-	-
Type/Model No.:	SVAN958	-	MA231T
Serial/Equipment No.:	23432	510725	530504
Adaptors used:	-	-	-

Item submitted by

Customer Name:	Environmental Pioneers & Solutions Limited
Address of Customer:	Flat A, 19/F, Chaiwan Industrial Centre, 20 Lee Chung Street, Chai Wan, Hong Kong
Request No.:	-
Date of request:	10-Nov-2016

Date of test: 14-Nov-2016

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	18-Jun-2017	CIGISMEC
Signal generator	DS 360	33873	18-Apr-2017	CEPREI
Signal generator	DS 360	61227	18-Apr-2017	CEPREI

Ambient conditions

Temperature:	21 ± 1 °C
Relative humidity:	55 ± 10 %
Air pressure:	1005 ± 5 hPa

Test specifications

1, The Sound Level Meter has been calibrated in accordance with the requirements as specified in BS 7580: Part 1: 1997 and the lab calibration procedure SMTP004-CA-152.
2, The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of ±20%.
3, The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responsess of the Sound Level Meter.

Test results

This is to certify that the Sound Level Meter conforms to BS 7580: Part 1: 1997 for the conditions under which the test was performed.

Details of the performed measurements are presented on page 2 of this certificate.

Actual Measurement data are documented on worksheets.

Approved Signatory: Huang Jian Min/Feng Jun Qi **Date:** 16-Nov-2016 **Company Chop:**

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Comments: The results 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.

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CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 16CA1110 02 **Page** 2 **of** 2

1, Electrical Tests

The electrical tests were perfomed using an equivalent capacitance substituted for the microphone. The results are given in below with test status and the estimated uncertainties. The "Pass" means the result of the test is inside the tolerances stated in the test specifications. The "-" means the result of test is outside these tolerances.

Test:	Subtest:	Status:	Expanded Uncertainty (dB)	Coverage Factor
Self-generated noise	A	Pass	0.3	
	C	Pass	0.8	2.1
	Lin	Pass	1.6	2.2
Linearity range for Leq	At reference range , Step 5 dB at 4 kHz	Pass	0.3	
	Reference SPL on all other ranges	Pass	0.3	
	2 dB below upper limit of each range	Pass	0.3	
	2 dB above lower limit of each range	Pass	0.3	
Linearity range for SPL	At reference range , Step 5 dB at 4 kHz	Pass	0.3	
Frequency weightings	A	Pass	0.3	
	C	Pass	0.3	
	Lin	Pass	0.3	
Time weightings	Single Burst Fast	Pass	0.3	
	Single Burst Slow	Pass	0.3	
Peak response	Single 100μs rectangular pulse	Pass	0.3	
R.M.S. accuracy	Crest factor of 3	Pass	0.3	
Time weighting I	Single burst 5 ms at 2000 Hz	Pass	0.3	
	Repeated at frequency of 100 Hz	Pass	0.3	
Time averaging	1 ms burst duty factor $1/10^3$ at 4kHz	Pass	0.3	
	1 ms burst duty factor $1/10^4$ at 4kHz	Pass	0.3	
Pulse range	Single burst 10 ms at 4 kHz	Pass	0.4	
Sound exposure level	Single burst 10 ms at 4 kHz	Pass	0.4	
Overload indication	SPL	Pass	0.3	
	Leq	Pass	0.4	

2, Acoustic tests

The complete sound level meter was calibrated on the reference range using a B&K 4226 acoustic calibrator with 1000Hz and SPL 94 dB. The sensitivity of the sound level meter was adjusted. The test result at 125 Hz and 8000 Hz are given in below with test status and the estimated uncertainties.

Test:	Subtest	Status	Expanded Uncertainty (dB)	Coverage Factor
Acoustic response	Weighting A at 125 Hz	Pass	0.3	
	Weighting A at 8000 Hz	Pass	0.5	

3, Response to associated sound calibrator

N/A

The expanded uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95%. A coverage factor of 2 is assumed unless explicitly stated.

- End -

Calibrated by: Fung Chi Yip **Date:** 14-Nov-2016

Checked by: Lai Sheng Jie **Date:** 16-Nov-2016

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

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SMECLab

Sound level meter type:	SVAN958	Serial No.	23432	Date	14-Nov-2016
Microphone type:	-	Serial No.	510725		
Preamp type:	MA231T	Serial No.	530504	Report:	16CA1110 02

SELF GENERATED NOISE TEST

The noise test is performed in the most sensitive range of the SLM with the microphone replaced by an equivalent impedance.

Noise level in A weighting	16.3	dB
Noise level in C weighting	18.2	dB
Noise level in Lin	22.9	dB

LINEARITY TEST

The linearity is tested relative to the reference sound pressure level using a continuous sinusoidal signal of frequency 4 kHz. The measurement is made on the reference range for indications at 5 dB intervals starting from the 94 dB reference sound pressure level. And until within 5 dB of the upper and lower limits of the reference range, the measurements shall be made at 1 dB intervals.(SLM set to LEQ/SPL)

Reference/Expected level	Actual level		Tolerance	Deviation	
	non-integrated	integrated		non-integrated	integrated
dB	dB	dB	+/- dB	dB	dB
94.0	94.0	94.0	0.7	0.0	0.0
99.0	99.0	99.0	0.7	0.0	0.0
104.0	104.0	104.0	0.7	0.0	0.0
109.0	109.0	109.0	0.7	0.0	0.0
114.0	114.0	114.0	0.7	0.0	0.0
115.0	115.0	115.0	0.7	0.0	0.0
116.0	116.0	116.0	0.7	0.0	0.0
117.0	117.0	117.0	0.7	0.0	0.0
89.0	89.0	89.0	0.7	0.0	0.0
84.0	84.0	84.0	0.7	0.0	0.0
79.0	79.0	79.0	0.7	0.0	0.0
74.0	74.0	74.0	0.7	0.0	0.0
69.0	69.0	69.0	0.7	0.0	0.0
64.0	64.0	64.0	0.7	0.0	0.0
59.0	59.0	59.0	0.7	0.0	0.0
54.0	54.0	54.0	0.7	0.0	0.0
49.0	49.1	49.1	0.7	0.1	0.1
44.0	44.0	43.9	0.7	0.0	-0.1
39.0	39.0	38.9	0.7	0.0	-0.1
34.0	33.9	33.9	0.7	-0.1	-0.1
33.0	33.0	32.9	0.7	0.0	-0.1
32.0	31.9	32.0	0.7	-0.1	0.0
31.0	31.0	30.9	0.7	0.0	-0.1
30.0	30.2	30.1	0.7	0.2	0.1

Measurements for an indication of the reference SPL on all other ranges which include it

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SMECLab

Sound level meter type:	SVAN958		Serial No.	23432	Date 14-Nov-2016
Microphone type:	-		Serial No.	510725	
Preamp type:	MA231T		Serial No.	530504	Report: 16CA1110 02

Other ranges	Expected level	Actual level	Tolerance	Deviation
dB	dB	dB	+/- dB	dB
50-140	94.0	94.0	0.7	0.0
17-117	94.0	94.0	0.7	0.0

Measurements on all level ranges for indications 2 dB below the upper limit and 2 dB above the lower limit

Ranges	Reference/Expected level	Actual level	Tolerance	Deviation
dB	dB	dB	+/- dB	dB
50-140	52.0	52.0	0.7	0.0
	138.0	138.0	0.7	0.0
17-117	32.0	31.9	0.7	-0.1
	115.0	115.0	0.7	0.0

FREQUENCY WEIGHTING TEST

The frequency response of the weighting netwoks are tested at octave intervals over the frequency ranges 31.5 Hz to 12500 Hz. The signal level at 1000 Hz is set to give an indication of the reference SPL.

Frequency weighting A:

Frequency	Ref. level	Expected level	Actual level	Tolerance(dB)		Deviation
Hz	dB	dB	dB	+	-	dB
1000.0	94.0	94.0	94.0	0.0	0.0	0.0
31.6	94.0	54.6	54.5	1.5	1.5	-0.1
63.1	94.0	67.8	67.7	1.5	1.5	-0.1
125.9	94.0	77.9	77.8	1.0	1.0	-0.1
251.2	94.0	85.4	85.2	1.0	1.0	-0.2
501.2	94.0	90.8	90.7	1.0	1.0	-0.1
1995.0	94.0	95.2	95.4	1.0	1.0	0.2
3981.0	94.0	95.0	95.0	1.0	1.0	0.0
7943.0	94.0	92.9	93.0	1.5	3.0	0.1
12590.0	94.0	89.7	89.6	3.0	6.0	-0.1

Frequency weighting C:

Frequency	Ref. level	Expected level	Actual level	Tolerance(dB)		Deviation
Hz	dB	dB	dB	+	-	dB
1000.0	94.0	94.0	94.0	0.0	0.0	0.0
31.6	94.0	91.0	91.0	1.5	1.5	0.0
63.1	94.0	93.2	93.1	1.5	1.5	-0.1
125.9	94.0	93.8	93.7	1.0	1.0	-0.1
251.2	94.0	94.0	93.9	1.0	1.0	-0.1
501.2	94.0	94.0	93.9	1.0	1.0	-0.1
1995.0	94.0	93.8	94.0	1.0	1.0	0.2
3981.0	94.0	93.2	93.2	1.0	1.0	0.0
7943.0	94.0	91.0	91.1	1.5	3.0	0.1
12590.0	94.0	87.8	87.7	3.0	6.0	-0.1

Frequency weighting Lin:

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SMECLab

Sound level meter type:	SVAN958	Serial No.	23432	Date	14-Nov-2016
Microphone type:	-	Serial No.	510725		
Preamp type:	MA231T	Serial No.	530504	Report:	16CA1110 02

Frequency	Ref. level	Expected level	Actual level	Tolerance(dB)		Deviation
Hz	dB	dB	dB	+	-	dB
1000.0	94.0	94.0	94.0	0.0	0.0	0.0
31.6	94.0	94.0	94.0	1.5	1.5	0.0
63.1	94.0	94.0	93.9	1.5	1.5	-0.1
125.9	94.0	94.0	93.9	1.0	1.0	-0.1
251.2	94.0	94.0	93.9	1.0	1.0	-0.1
501.2	94.0	94.0	93.9	1.0	1.0	-0.1
1995.0	94.0	94.0	94.1	1.0	1.0	0.1
3981.0	94.0	94.0	94.0	1.0	1.0	0.0
7943.0	94.0	94.0	94.0	1.5	3.0	0.0
12590.0	94.0	94.0	94.0	3.0	6.0	0.0

TIME WEIGHTING FAST TEST

Time weighting F is tested on the reference range with a single sinusoidal burst of duration 200 ms at a frequency 2000 Hz and an amplitude which produces an indication 4 dB below the upper limit of the primary indicator range when the signal is continuous. (Weight A, Maximum hold)

Ref. level	Expected level	Actual level	Tolerance(dB)		Deviation
dB	dB	dB	+	-	dB
113.0	112.0	112.2	1.0	1.0	0.2

TIME WEIGHTING SLOW TEST

Time weighting S is tested on the reference range with a single sinusoidal burst of duration 500 ms at a frequency 2000 Hz and an amplitude which produces an indication 4 dB below the upper limit of the primary indicator range when the signal is continuous. (Weight A, Maximum hold)

Ref. level	Expected level	Actual level	Tolerance(dB)		Deviation
dB	dB	dB	+	-	dB
113.0	108.9	108.9	1.0	1.0	0.0

PEAK RESPONSE TEST

The onset time of the peak detector is tested on the reference range by comparing the response to a 100 us rectangular test pulse with the response to a 10 ms reference pulse of the same amplitude. The amplitude of the 10 ms reference pulse is such as to produce an indication 1 dB below the upper limit of the primary indicator range.

Positive polarities: (Weighting Z, set the generator signal to single, Lzpeak)

Ref. level	Response to 10 ms	Response to 100 us	Tolerance	Deviation
dB	dB	dB	+/- dB	dB
116.0	116.0	115.8	2.0	-0.2

Negative polarities:

Ref. level	Response to 10 ms	Response to 100 us	Tolerance	Deviation
dB	dB	dB	+/- dB	dB
116.0	116.0	116.0	2.0	0.0

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SMECLab

Sound level meter type:	SVAN958	Serial No.	23432	Date	14-Nov-2016
Microphone type:	-	Serial No.	510725		
Preamp type:	MA231T	Serial No.	530504	Report:	16CA1110 02

RMS ACCURACY TEST

The RMS detector accuracy is tested on the reference range for a crest factor of 3.

Test frequency: 2000 Hz
Amplitude: 2 dB below the upper limit of the primary indicator range.
Burst repetition frequency: 40 Hz
Tone burst signal: 11 cycles of a sine wave of frequency 2000 Hz. (Set to INT)

	Ref. Level	Expected level	Tone burst signal	Tolerance	Deviation
Time wighting	dB	dB	indication(dB)	+/- dB	dB
Slow	88.0+6.6	88.0	87.9	0.5	-0.1

TIME WEIGHTING IMPULSE TEST

Time weighting I is tested on the reference range (Set the SLM to LAImax)
Test frequency: 2000 Hz
Amplitude: The upper limit of the primary indicator range.

Single sinusoidal burst of duration 5 ms:

Ref. Level	Single burst indication		Tolerance	Deviation
dB	Expected (dB)	Actual (dB)	+/- dB	dB
117.0	108.2	108.2	2.0	0.0

Repeated at 100 Hz

Ref. Level	Repeated burst indication		Tolerance	Deviation
dB	Expected (dB)	Actual (dB)	+/- dB	dB
117.0	114.3	114.3	1.0	0.0

TIME AVERAGING TEST

This test compares the SLM reading for continuous sine signals with readings obtained from a sine tone burst sequence having the same RMS level. The test level is 30 dB below the upper limit of the linearity range and repeated for Type 1 SLM with 40 dB below the upper limit of the linearity.

Frequency of tone burst: 4000 Hz
Duration of tone burst: 1 ms

Repetition Time	Level of tone burst	Expected Leq	Actual Leq	Tolerance	Deviation	Remarks
msec	dB	dB	dB	+/- dB	dB	
1000	87.0	87.0	86.8	1.0	-0.2	60s integ.
10000	77.0	77.0	76.8	1.0	-0.2	6min. integ.

PULSE RANGE AND SOUND EXPOSURE LEVEL TEST

The test tone burst signal is superimposed on a baseline signal corresponding to the lower limit of reference rar

Test frequency: 4000 Hz
Integration time: 10 sec
The integrating sound level meter set to Leq:

Duration	Peak level of	Expected	Actual	Tolerance	Deviation
msec	tone burst (dB)	dB	dB	+/- dB	dB

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SMECLab

Sound level meter type:	SVAN958	Serial No.	23432	Date	14-Nov-2016
Microphone type:	-	Serial No.	510725		
Preamp type:	MA231T	Serial No.	530504	Report:	16CA1110 02

10	117.0	87.0	87.0	1.7	0.0

The integrating sound level meter set to SEL:

Duration	Peak level of	Expected	Actual	Tolerance	Deviation
msec	tone burst (dB)	dB	dB	+/- dB	dB
10.0	117.0	97.0	97.0	1.7	0.0

OVERLOAD INDICATION TEST

For SLM capable of operating in a non-integrating mode.

Test frequency: 2000 Hz
Amplitude: 2 dB below the upper limit of the primary indicator range.
Burst repetition frequency: 40 Hz
Tone burst signal: 11 cycles of a sine wave of frequency 2000 Hz.

Level	Level reduced by	Further reduced	Difference	Tolerance	Deviation
at overload (dB)	1 dB	3 dB	dB	+/- dB	dB
110.2	109.2	106.2	3.0	1.0	0.0

For integrating SLM, with the instrument indicating Leq.

For integrating SLM, with the instrument indicating Leq and set to the reference range. The test signal as follow
The test tone burst signal is superimposed on a baseline signal corresponding to the lower limit of reference rar

Test frequency: 4000 Hz
Integration time: 10 sec
Single burst duration: 1 msec

Level	Level reduced by	Expected level	Actual level	Tolerance	Deviation
at overload (dB)	1 dB	dB	dB	+/- dB	dB
117.2	116.2	76.2	76.1	2.2	-0.1

ACOUSTIC TEST

The acoustic test of the complete SLM is tested at the frequency 125 Hz and 8000 Hz using a B&K type 4226 Multifunction Acoustic Calibrator. The test is performed in A weighting.

Frequency	Expected level	Actual level	Tolerance (dB)		Deviation
Hz	dB	Measured (dB)	+	-	dB
1000	94.0	94.0	0.0	0.0	0.0
125	77.9	77.9	1.0	1.0	0.0
8000	92.9	93.7	1.5	3.0	0.8

---------END---------

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HOKLAS 028 CAL

CERTIFICATE OF CALIBRATION

Certificate No.: 16CA1228 01-01

Item tested

Description:	Sound Level Meter (Type 1)	,	Microphone
Manufacturer:	SVANTEK, Poland	,	ACO, Japan
Type/Model No.:	971	,	7052E
Serial/Equipment No.:	34350	,	54635
Adaptors used:	-	,	-

Item submitted by

Customer Name:	Environmental Pioneers & Solutions Limited
Address of Customer:	Flat A, 19/F, Chaiwan Industrial Centre, 20 Lee Chung Street, Chai Wan, Hong Kong
Request No.:	-
Date of receipt:	28-Dec-2016

Date of test: 30-Dec-2016

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	18-Jun-2017	CIGISMEC
Signal generator	DS 360	33873	18-Apr-2017	CEPREI
Signal generator	DS 360	61227	18-Apr-2017	CEPREI

Ambient conditions

Temperature:	22 ± 1 °C
Relative humidity:	50 ± 10 %
Air pressure:	1010 ± 10 hPa

Test specifications

1, The Sound Level Meter has been calibrated in accordance with the requirements as specified in BS 7580: Part 1: 1997 and the lab calibration procedure SMTP004-CA-152.
2, The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of ±20%.
3, The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responsess of the Sound Level Meter.

Test results

This is to certify that the Sound Level Meter conforms to BS 7580: Part 1: 1997 for the conditions under which the test was performed.

Details of the performed measurements are presented on page 2 of this certificate.

Actual Measurement data are documented on worksheets.

Approved Signatory: Huang Jian Min/Feng Jun Qi **Date:** 05-Jan-2017 **Company Chop:** SOILS & MATERIALS ENGINEERING COMPANY LTD. 綜合試驗有限公司

Comments: The results 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.

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CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 16CA1228 01-01 **Page** 2 **of** 2

1, Electrical Tests

The electrical tests were perfomed using an equivalent capacitance substituted for the microphone. The results are given in below with test status and the estimated uncertainties. The "Pass" means the result of the test is inside the tolerances stated in the test specifications. The "-" means the result of test is outside these tolerances.

Test:	Subtest:	Status:	Expanded Uncertainty (dB)	Coverage Factor
Self-generated noise	A	Pass	0.3	
	C	Pass	0.8	2.1
	Lin	Pass	1.6	2.2
Linearity range for Leq	At reference range , Step 5 dB at 4 kHz	Pass	0.3	
	Reference SPL on all other ranges	Pass	0.3	
	2 dB below upper limit of each range	Pass	0.3	
	2 dB above lower limit of each range	Pass	0.3	
Linearity range for SPL	At reference range , Step 5 dB at 4 kHz	Pass	0.3	
Frequency weightings	A	Pass	0.3	
	C	Pass	0.3	
	Lin	Pass	0.3	
Time weightings	Single Burst Fast	Pass	0.3	
	Single Burst Slow	Pass	0.3	
Peak response	Single 100μs rectangular pulse	Pass	0.3	
R.M.S. accuracy	Crest factor of 3	Pass	0.3	
Time weighting I	Single burst 5 ms at 2000 Hz	Pass	0.3	
	Repeated at frequency of 100 Hz	Pass	0.3	
Time averaging	1 ms burst duty factor $1/10^3$ at 4kHz	Pass	0.3	
	1 ms burst duty factor $1/10^4$ at 4kHz	Pass	0.3	
Pulse range	Single burst 10 ms at 4 kHz	Pass	0.4	
Sound exposure level	Single burst 10 ms at 4 kHz	Pass	0.4	
Overload indication	SPL	Pass	0.3	
	Leq	Pass	0.4	

2, Acoustic tests

The complete sound level meter was calibrated on the reference range using a B&K 4226 acoustic calibrator with 1000Hz and SPL 94 dB. The sensitivity of the sound level meter was adjusted. The test result at 125 Hz and 8000 Hz are given in below with test status and the estimated uncertainties.

Test:	Subtest	Status	Expanded Uncertainty (dB)	Coverage Factor
Acoustic response	Weighting A at 125 Hz	Pass	0.3	
	Weighting A at 8000 Hz	Pass	0.5	

3, Response to associated sound calibrator

N/A

The expanded uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95%. A coverage factor of 2 is assumed unless explicitly stated.

- End -

Calibrated by: Fung Chi Yip **Date:** 30-Dec-2016

Checked by: Lam Tze Wai **Date:** 05-Jan-2017

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

綜合試驗有限公司
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SMECLab

Test Data for Sound Level Meter

Sound level meter type:	971	Serial No.	34350	Date	30-Dec-2016
Microphone type:	7052E	Serial No.	54635		

Report: 16CA1228 01-01

SELF GENERATED NOISE TEST

The noise test is performed in the most sensitive range of the SLM with the microphone replaced by an equivalent impedance.

Noise level in A weighting	12.9	dB
Noise level in C weighting	12.9	dB
Noise level in Lin (Z)	17.9	dB

LINEARITY TEST

The linearity is tested relative to the reference sound pressure level using a continuous sinusoidal signal of frequency 4 kHz. The measurement is made on the reference range for indications at 5 dB intervals starting from the 94 dB reference sound pressure level. And until within 5 dB of the upper and lower limits of the reference range, the measurements shall be made at 1 dB intervals.(SLM set to LEQ/SPL)

Reference/Expected level	Actual level		Tolerance	Deviation	
	non-integrated	integrated		non-integrated	integrated
dB	dB	dB	+/- dB	dB	dB
94.0	94.0	94.0	0.7	0.0	0.0
99.0	99.0	99.0	0.7	0.0	0.0
104.0	104.0	104.0	0.7	0.0	0.0
109.0	109.1	109.1	0.7	0.1	0.1
114.0	114.0	114.0	0.7	0.0	0.0
119.0	119.0	119.0	0.7	0.0	0.0
120.0	120.0	120.0	0.7	0.0	0.0
121.0	121.0	121.0	0.7	0.0	0.0
122.0	122.0	122.0	0.7	0.0	0.0
123.0	123.0	123.0	0.7	0.0	0.0
89.0	89.0	89.0	0.7	0.0	0.0
84.0	84.0	84.0	0.7	0.0	0.0
79.0	79.0	79.0	0.7	0.0	0.0
74.0	74.0	74.0	0.7	0.0	0.0
69.0	69.0	69.0	0.7	0.0	0.0
64.0	64.0	64.0	0.7	0.0	0.0
59.0	59.0	59.0	0.7	0.0	0.0
54.0	54.0	54.0	0.7	0.0	0.0
49.0	49.1	49.1	0.7	0.1	0.1
44.0	44.0	44.0	0.7	0.0	0.0
39.0	38.9	38.9	0.7	-0.1	-0.1
34.0	33.9	33.9	0.7	-0.1	-0.1
33.0	32.8	32.9	0.7	-0.2	-0.1
32.0	31.7	31.7	0.7	-0.3	-0.3
31.0	30.6	30.6	0.7	-0.4	-0.4
30.0	29.6	29.6	0.7	-0.4	-0.4

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SMECLab

Sound level meter type: 971 Serial No. 34350 Date 30-Dec-2016

Microphone type: 7052E Serial No. 54635

Report: 16CA1228 01-01

29.0	28.5	28.5	0.7	-0.5	-0.5
28.0	27.5	27.4	0.7	-0.5	-0.6

Measurements for an indication of the reference SPL on all other ranges which include it

Other ranges	Expected level	Actual level	Tolerance	Deviation
dB	dB	dB	+/- dB	dB
35.8-137.8	94.0	94.0	0.7	0.0
25.8-123.8	94.0	94.0	0.7	0.0

Measurements on all level ranges for indications 2 dB below the upper limit and 2 dB above the lower limit

Ranges	Reference/Expected level	Actual level	Tolerance	Deviation
dB	dB	dB	+/- dB	dB
35.8-137.8	38.0	37.9	0.7	-0.1
	136.0	136.0	0.7	0.0
25.8-123.8	28.0	27.5	0.7	-0.5
	122.0	122.0	0.7	0.0

FREQUENCY WEIGHTING TEST

The frequency response of the weighting netwoks are tested at octave intervals over the frequency ranges 31.5 Hz to 12500 Hz. The signal level at 1000 Hz is set to give an indication of the reference SPL.

Frequency weighting A:

Frequency	Ref. level	Expected level	Actual level	Tolerance(dB)		Deviation
Hz	dB	dB	dB	+	-	dB
1000.0	94.0	94.0	94.0	0.0	0.0	0.0
31.6	94.0	54.6	54.7	1.5	1.5	0.1
63.1	94.0	67.8	67.9	1.5	1.5	0.1
125.9	94.0	77.9	77.9	1.0	1.0	0.0
251.2	94.0	85.4	85.4	1.0	1.0	0.0
501.2	94.0	90.8	90.8	1.0	1.0	0.0
1995.0	94.0	95.2	95.2	1.0	1.0	0.0
3981.0	94.0	95.0	95.1	1.0	1.0	0.1
7943.0	94.0	92.9	93.4	1.5	3.0	0.5
12590.0	94.0	89.7	89.6	3.0	6.0	-0.1

Frequency weighting C:

Frequency	Ref. level	Expected level	Actual level	Tolerance(dB)		Deviation
Hz	dB	dB	dB	+	-	dB
1000.0	94.0	94.0	94.0	0.0	0.0	0.0
31.6	94.0	91.0	91.1	1.5	1.5	0.1
63.1	94.0	93.2	93.2	1.5	1.5	0.0
125.9	94.0	93.8	93.9	1.0	1.0	0.1
251.2	94.0	94.0	94.0	1.0	1.0	0.0
501.2	94.0	94.0	94.0	1.0	1.0	0.0
1995.0	94.0	93.8	93.9	1.0	1.0	0.1

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SMECLab

Sound level meter type: 971 Serial No. 34350 Date 30-Dec-2016
Microphone type: 7052E Serial No. 54635
Report: 16CA1228 01-01

3981.0	94.0	93.2	93.3	1.0	1.0	0.1
7943.0	94.0	91.0	91.2	1.5	3.0	0.2
12590.0	94.0	87.8	87.7	3.0	6.0	-0.1

Frequency weighting Z:

Frequency	Ref. level	Expected level	Actual level	Tolerance(dB)		Deviation
Hz	dB	dB	dB	+	-	dB
1000.0	94.0	94.0	94.0	0.0	0.0	0.0
31.6	94.0	94.0	94.2	1.5	1.5	0.2
63.1	94.0	94.0	94.0	1.5	1.5	0.0
125.9	94.0	94.0	94.0	1.0	1.0	0.0
251.2	94.0	94.0	94.0	1.0	1.0	0.0
501.2	94.0	94.0	94.0	1.0	1.0	0.0
1995.0	94.0	94.0	94.0	1.0	1.0	0.0
3981.0	94.0	94.0	94.0	1.0	1.0	0.0
7943.0	94.0	94.0	94.0	1.5	3.0	0.0
12590.0	94.0	94.0	94.0	3.0	6.0	0.0

TIME WEIGHTING FAST TEST

Time weighting F is tested on the reference range with a single sinusoidal burst of duration 200 ms at a frequency 2000 Hz and an amplitude which produces an indication 4 dB below the upper limit of the primary indicator range when the signal is continuous. (Weight A, Maximum hold)

Ref. level	Expected level	Actual level	Tolerance(dB)		Deviation
dB	dB	dB	+	-	dB
120.0	119.0	119.0	1.0	1.0	0.0

TIME WEIGHTING SLOW TEST

Time weighting S is tested on the reference range with a single sinusoidal burst of duration 500 ms at a frequency 2000 Hz and an amplitude which produces an indication 4 dB below the upper limit of the primary indicator range when the signal is continuous. (Weight A, Maximum hold)

Ref. level	Expected level	Actual level	Tolerance(dB)		Deviation
dB	dB	dB	+	-	dB
120.0	115.9	115.8	1.0	1.0	-0.1

PEAK RESPONSE TEST

The onset time of the peak detector is tested on the reference range by comparing the response to a 100 us rectangular test pulse with the response to a 10 ms reference pulse of the same amplitude. The amplitude of the 10 ms reference pulse is such as to produce an indication 1 dB below the upper limit of the primary indicator range.

Positive polarities: (Weighting Z, set the generator signal to single, Lzpeak)

Ref. level	Response to 10 ms	Response to 100 us	Tolerance	Deviation
dB	dB	dB	+/- dB	dB
123.0	123.0	122.8	2.0	-0.2

Negative polarities:

Ref. level	Response to 10 ms	Response to 100 us	Tolerance	Deviation

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SMECLab

Sound level meter type: 971 Serial No. 34350 Date 30-Dec-2016

Microphone type: 7052E Serial No. 54635

Report: 16CA1228 01-01

dB	dB	dB	+/- dB	dB
123.0	123.0	123.0	2.0	0.0

RMS ACCURACY TEST

The RMS detector accuracy is tested on the reference range for a crest factor of 3.

Test frequency: 2000 Hz
Amplitude: 2 dB below the upper limit of the primary indicator range.
Burst repetition frequency: 40 Hz
Tone burst signal: 11 cycles of a sine wave of frequency 2000 Hz. (Set to INT)

	Ref. Level	Expected level	Tone burst signal	Tolerance	Deviation
Time wighting	dB	dB	indication(dB)	+/- dB	dB
Slow	84.0+6.6	84.0	84.0	0.5	0.0

TIME WEIGHTING IMPULSE TEST

Time weighting I is tested on the reference range (Set the SLM to LAImax)
Test frequency: 2000 Hz
Amplitude: The upper limit of the primary indicator range.

Single sinusoidal burst of duration 5 ms:

Ref. Level	Single burst indication		Tolerance	Deviation
dB	Expected (dB)	Actual (dB)	+/- dB	dB
124.0	115.2	115.1	2.0	-0.1

Repeated at 100 Hz

Ref. Level	Repeated burst indication		Tolerance	Deviation
dB	Expected (dB)	Actual (dB)	+/- dB	dB
124.0	121.3	121.2	1.0	-0.1

TIME AVERAGING TEST

This test compares the SLM reading for continuous sine signals with readings obtained from a sine tone burst sequence having the same RMS level. The test level is 30 dB below the upper limit of the linearity range and repeated for Type 1 SLM with 40 dB below the upper limit of the linearity.

Frequency of tone burst: 4000 Hz

Duration of tone burst: 1 ms

Repetition Time	Level of tone burst	Expected Leq	Actual Leq	Tolerance	Deviation	Remarks
msec	dB	dB	dB	+/- dB	dB	
1000	94.0	94.0	93.9	1.0	-0.1	60s integ.
10000	84.0	84.0	83.9	1.0	-0.1	6min. integ.

PULSE RANGE AND SOUND EXPOSURE LEVEL TEST

The test tone burst signal is superimposed on a baseline signal corresponding to the lower limit of reference rar

Test frequency: 4000 Hz

Integration time: 10 sec

The integrating sound level meter set to Leq:

Duration	Rms level of	Expected	Actual	Tolerance	Deviation
msec	tone burst (dB)	dB	dB	+/- dB	dB

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SMECLab

Sound level meter type: 971 Serial No. 34350 Date 30-Dec-2016
Microphone type: 7052E Serial No. 54635
Report: 16CA1228 01-01

10	84.0	54.0	54.0	1.7	0.0

The integrating sound level meter set to SEL:

Duration	Rms level of	Expected	Actual	Tolerance	Deviation
msec	tone burst (dB)	dB	dB	+/- dB	dB
10.0	84.0	64.0	64.0	1.7	0.0

OVERLOAD INDICATION TEST

For SLM capable of operating in a non-integrating mode.

Test frequency: 2000 Hz
Amplitude: 2 dB below the upper limit of the primary indicator range.
Burst repetition frequency: 40 Hz
Tone burst signal: 11 cycles of a sine wave of frequency 2000 Hz.

Level	Level reduced by	Further reduced	Difference	Tolerance	Deviation
at overload (dB)	1 dB	3 dB	dB	dB	dB
119.0	118.1	115.1	3.0	1.0	0.0

For integrating SLM, with the instrument indicating Leq.

For integrating SLM, with the instrument indicating Leq and set to the reference range. The test signal as follow
The test tone burst signal is superimposed on a baseline signal corresponding to the lower limit of reference rar

Test frequency: 4000 Hz
Integration time: 10 sec
Single burst duration: 1 msec

Rms level	Level reduced by	Expected level	Actual level	Tolerance	Deviation
at overload (dB)	1 dB	dB	dB	dB	dB
125.4	124.4	84.4	84.4	2.2	0.0

ACOUSTIC TEST

The acoustic test of the complete SLM is tested at the frequency 125 Hz and 8000 Hz using a B&K type 4226 Multifunction Acoustic Calibrator. The test is performed in A weighting.

Frequency	Expected level	Actual level	Tolerance (dB)		Deviation
Hz	dB	Measured (dB)	+	-	dB
1000	94.0	94.0	0.0	0.0	0.0
125	77.9	78.0	1.0	1.0	0.1
8000	92.9	90.4	1.5	3.0	-2.5

----------END---------

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HOKLAS 028 CAL

CERTIFICATE OF CALIBRATION

Certificate No.: 16CA1228 01-02 **Page:** 1 **of** 2

Item tested

Description:	Acoustical Calibrator (Type 1)
Manufacturer:	SVANTEK
Type/Model No.:	SV30A
Serial/Equipment No.:	29085
Adaptors used:	-

Item submitted by

Curstomer:	Environmental Pioneers & Solutions Limited
Address of Customer:	Flat A, 19/F, Chaiwan Industrial Centre, 20 Lee Chung Street, Chai Wan, Hong Kong
Request No.:	-
Date of receipt:	28-Dec-2016

Date of test: 03-Jan-2017

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2412857	14-Apr-2017	SCL
Preamplifier	B&K 2673	2239857	28-Apr-2017	CEPREI
Measuring amplifier	B&K 2610	2346941	26-Apr-2017	CEPREI
Signal generator	DS 360	61227	18-Apr-2017	CEPREI
Digital multi-meter	34401A	US36087050	18-Apr-2017	CEPREI
Audio analyzer	8903B	GB41300350	19-Apr-2017	CEPREI
Universal counter	53132A	MY40003662	19-Apr-2017	CEPREI

Ambient conditions

Temperature:	22 ± 1 °C
Relative humidity:	50 ± 10 %
Air pressure:	1010 ± 5 hPa

Test specifications

1, The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B and the lab calibration procedure SMTP004-CA-156.

2, The calibrator was tested with its axis vertical facing downwards at the specific frequency using insert voltage technique.

3, The results are rounded to the nearest 0.01 dB and 0.1 Hz and have not been corrected for variations from a reference pressure of 1013.25 hectoPascals as the maker's information indicates that the instrument is insensitive to pressure changes.

Test results

This is to certify that the sound calibrator conforms to the requirements of annex B of IEC 60942: 1997 for the conditions under which the test was performed. This does not imply that the sound calibrator meets IEC 60942 under any other conditions.

Details of the performed measurements are presented on **page 2** of this certificate.

Approved Signatory: Huang Jian Min/Feng Jun Qi **Date:** 05-Jan-2017 **Company Chop:**

SOILS & MATERIALS ENGINEERING COMPANY LTD. 綜合試驗有限公司

Comments: The results reported in this certificate refer to the conditon of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.

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HOKLAS 028 CAL

CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 16CA1228 01-02 **Page:** 2 **of** 2

1, Measured Sound Pressure Level

The output Sound Pressure Level in the calibrator head was measured at the setting and frequency shown using a calibrated laboratory standard microphone and insert voltage technique. The results are given in below with the estimated uncertainties.

(Output level in dB re 20 μPa)

Frequency Shown Hz	Output Sound Pressure Level Setting dB	Measured Output Sound Pressure Level dB	Estimated Expanded Uncertainty dB
1000	94.00	93.75	0.10

2, Sound Pressure Level Stability - Short Term Fluctuations

The Short Term Fluctuations was determined by measuring the maximum and minimum of the fast weighted DC output of the B&K 2610 measuring amplifier over a 20 second time interval as required in the standard. The Short Term Fluctuation was found to be:

At 1000 Hz **STF = 0.003 dB**

Estimated expanded uncertainty 0.005 dB

3, Actual Output Frequency

The determination of actual output frequency was made using a B&K 4180 microphone together with a B&K 2673 preamplifier connected to a B&K 2610 measuring amplifier. The AC output of the B&K 2610 was taken to an universal counter which was used to determine the frequency averaged over 20 second of operation as required by the standard. The actual output frequency at 1 KHz was:

At 1000 Hz **Actual Frequency = 1000.3 Hz**

Estimated expanded uncertainty 0.1 Hz Coverage factor k = 2.2

4, Total Noise and Distortion

For the Total Noise and Distortion measurement, the unfiltered AC output of the B&K 2610 measuring amplifier was connected to an Agilent Type 8903 B distortion analyser. The TND result at 1 KHz was:

At 1000 Hz **TND = 0.5 %**

Estimated expanded uncertainty 0.7 %

The expanded uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95%. A coverage factor of 2 is assumed unless explicitly stated.

- End -

Calibrated by: Fung Chi Yip **Date:** 03-Jan-2017

Checked by: Lam Tze Wai **Date:** 05-Jan-2017

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

Calibration Chart

BSWA TECH

BSWA-IV-C021-03-0048A

Sound Calibrator model	CA111
Serial Number	520309
Appearance	OK
Power Supply	1.5V LR6 (AA battery) x2
Sound Pressure Level	93.95 / 113.95 dB
Frequency	999.9 / 999.9 Hz
THD (@1000Hz)	0.18 / 0.59 %

BSWA Technology Ltd.

www.bswa-tech.com

This equipment was calibrated at the following ambient conditions:

Temperature:	25 °C
Humidity:	60 %RH
Pressure:	1025 hPa

This equipment is qualified!

Calibrated

2016-8-1

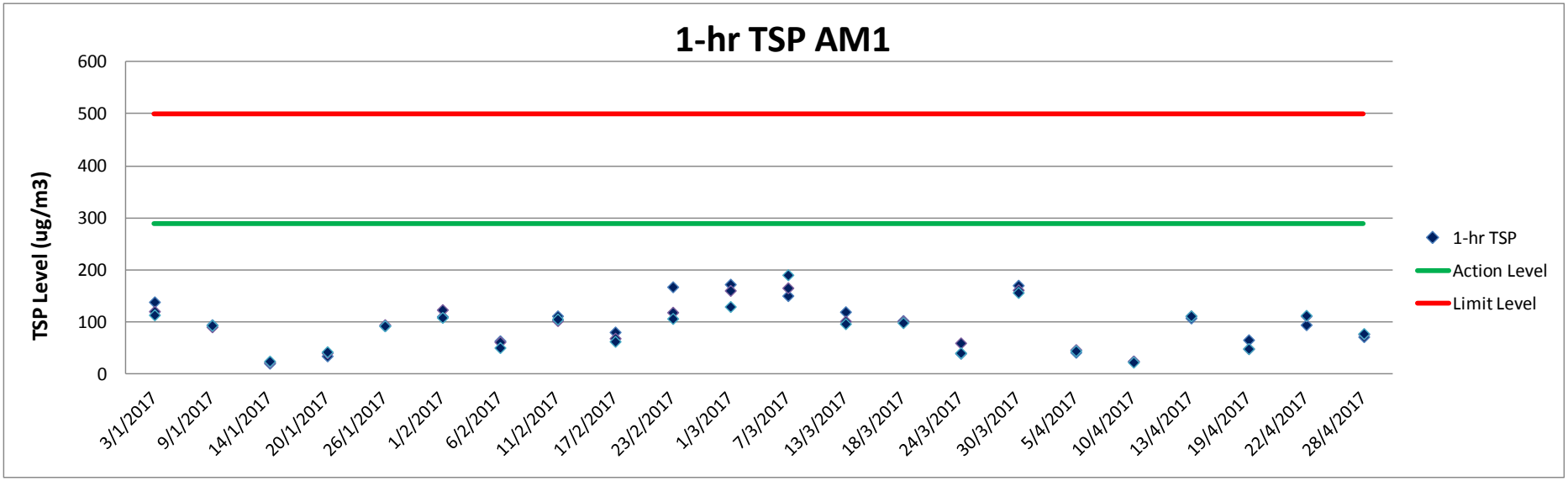
Date

Appendix E: TSP Monitoring Data

1-hr TSP Monitoring Result for AM1

Date	Weather	Temperature (℃) *	Wind Direction *	Wind Speed (m/s) *	Sampling Time			Reading (μg/m^3)			
					1	2	3	1	2	3	Average
5/4/2017	Sunny	26.3	SE	<5m/s	14:04	15:05	16:06	41	46	44	44
10/4/2017	Overcast	27.3	SW	<5m/s	15:10	16:11	17:12	24	24	22	23
13/4/2017	Overcast	20.5	SE	<5m/s	15:46	16:47	17:48	107	111	111	110
19/4/2017	Sunny	28.0	NW	<5m/s	9:26	10:27	11:28	65	48	48	54
22/4/2017	Overcast	18.8	NE	<5m/s	15:18	16:19	17:20	94	111	112	106
28/4/2017	Overcast	24.4	SE	<5m/s	10:20	11:21	12:22	71	76	77	75

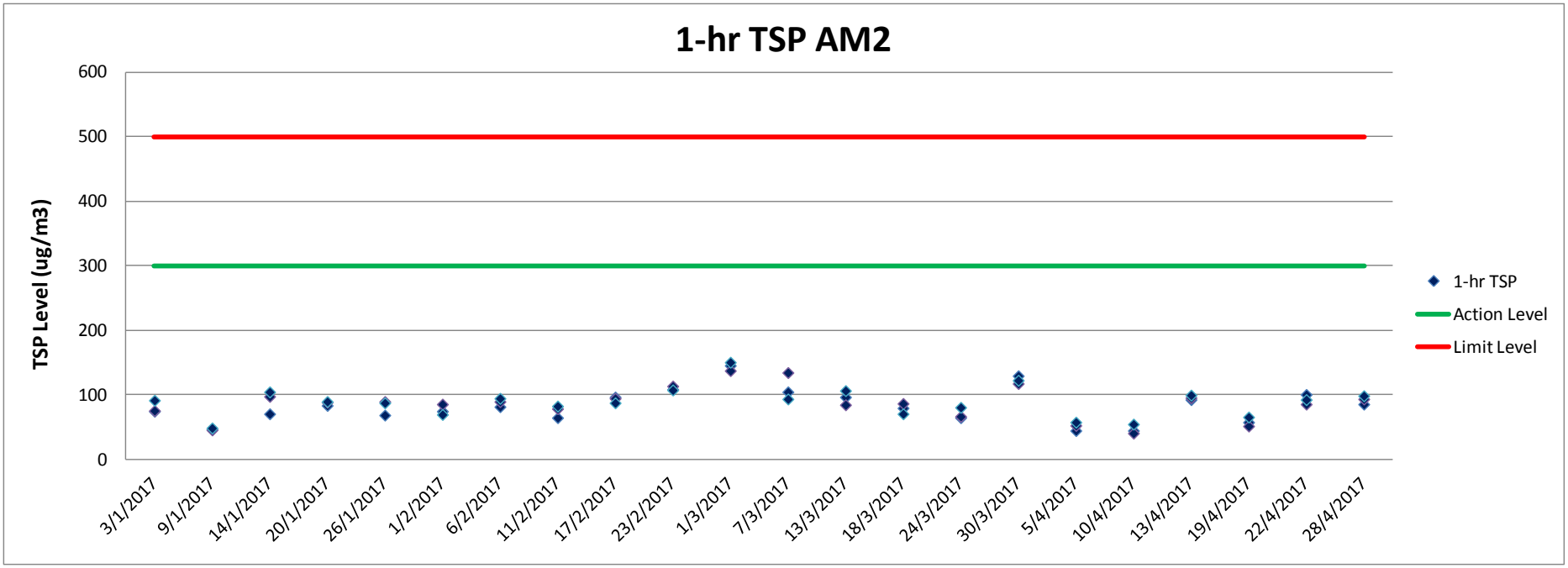
*Remark: Data of temperature, wind direction and wind speed was extracted from King's Park Meteorological Station of HKO



1-hr TSP Monitoring Result for AM2

Date	Weather	Temperature (℃) *	Wind Direction *	Wind Speed (m/s) *	Sampling Time			Reading (μg/m^3)			
					1	2	3	1	2	3	Average
5/4/2017	Sunny	26.3	SE	<5m/s	10:58	11:59	13:00	45	53	58	52
10/4/2017	Overcast	27.3	SW	<5m/s	10:55	11:56	12:57	45	41	55	47
13/4/2017	Overcast	20.5	SE	<5m/s	10:47	11:48	12:49	93	96	100	96
19/4/2017	Sunny	28.0	NW	<5m/s	10:53	11:54	12:55	58	52	66	59
22/4/2017	Overcast	18.8	NE	<5m/s	10:50	11:51	12:52	101	86	93	93
28/4/2017	Overcast	24.4	SE	<5m/s	10:30	11:31	12:32	86	94	99	93

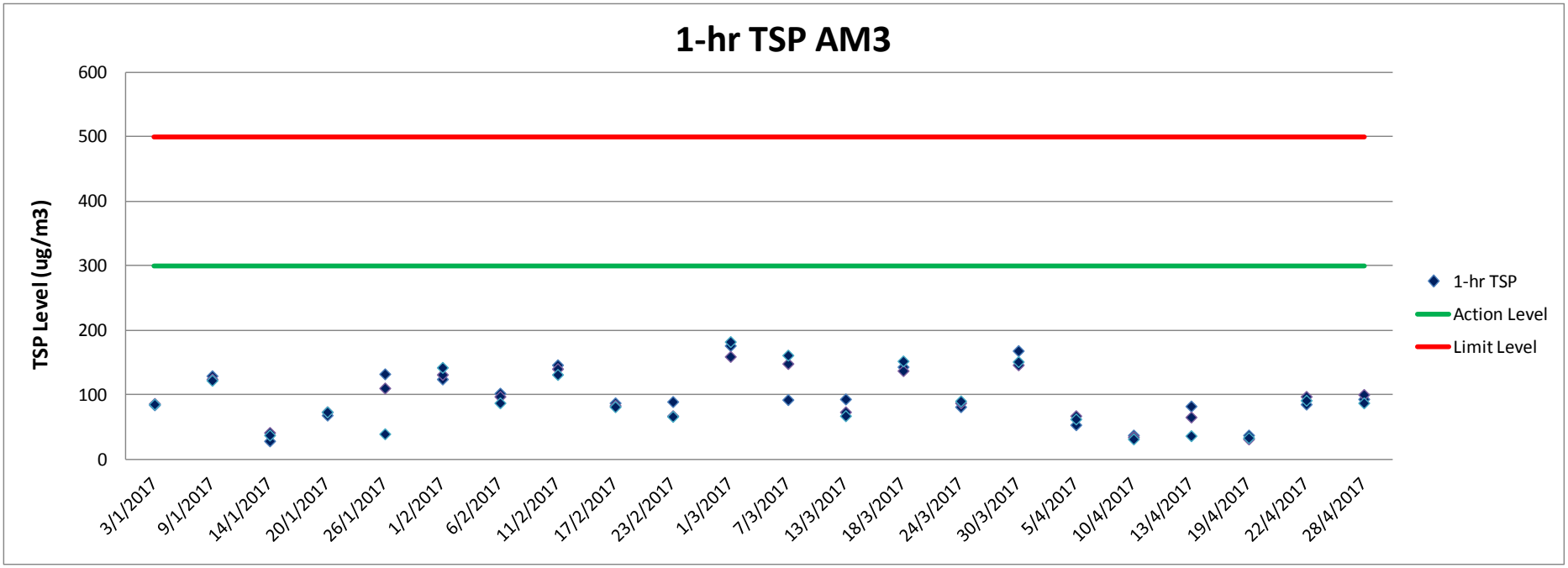
*Remark: Data of temperature, wind direction and wind speed was extracted from King's Park Meteorological Station of HKO



1-hr TSP Monitoring Result for AM3

Date	Weather	Temperature (℃) *	Wind Direction *	Wind Speed (m/s) *	Sampling Time			Reading (μg/m^3)			
					1	2	3	1	2	3	Average
5/4/2017	Sunny	26.3	SE	<5m/s	14:14	15:15	16:16	54	68	63	62
10/4/2017	Overcast	27.3	SW	<5m/s	15:53	16:54	17:55	38	35	32	35
13/4/2017	Overcast	20.5	SE	<5m/s	16:24	17:25	18:26	83	66	37	62
19/4/2017	Sunny	28.0	NW	<5m/s	9:58	10:59	12:00	38	32	34	35
22/4/2017	Overcast	18.8	NE	<5m/s	15:35	16:36	17:37	86	98	92	92
28/4/2017	Overcast	24.4	SE	<5m/s	11:00	12:01	13:02	94	101	88	94

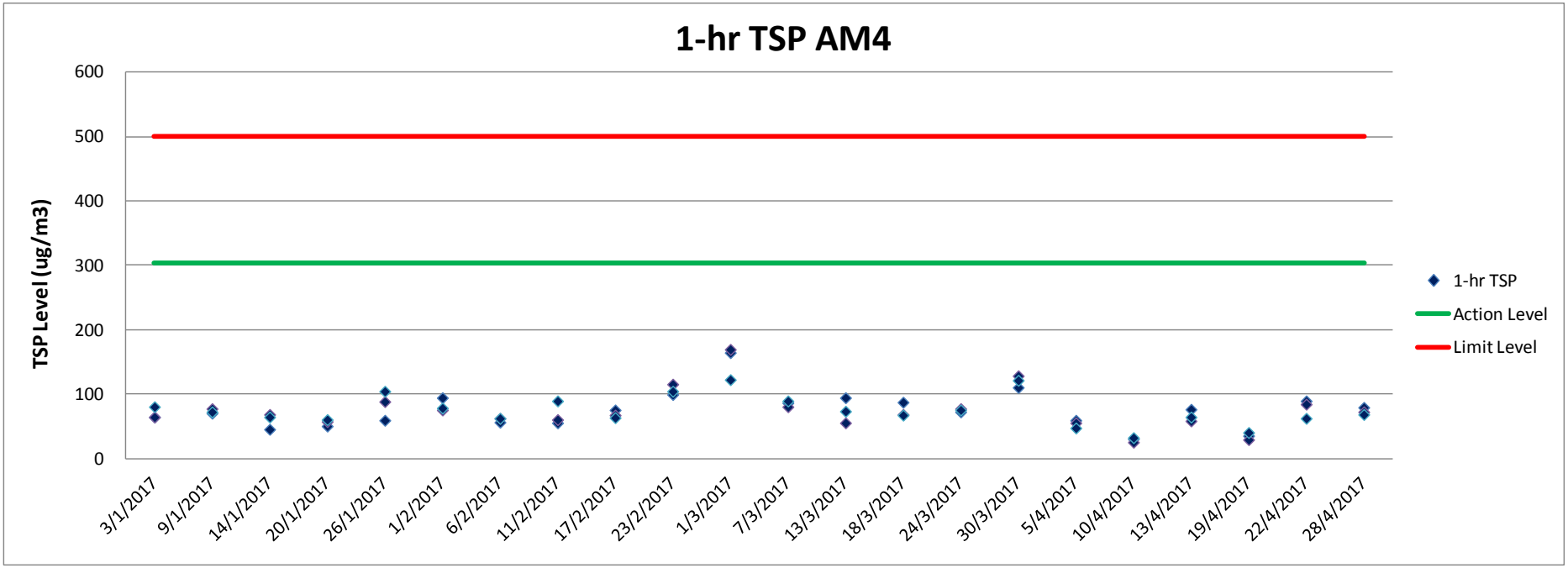
*Remark: Data of temperature, wind direction and wind speed was extracted from King's Park Meteorological Station of HKO



1-hr TSP Monitoring Result for AM4

Date	Weather	Temperature (℃) *	Wind Direction *	Wind Speed (m/s) *	Sampling Time			Reading (μg/m^3)			
					1	2	3	1	2	3	Average
5/4/2017	Sunny	26.3	SE	<5m/s	10:53	11:54	12:55	60	56	48	55
10/4/2017	Overcast	27.3	SW	<5m/s	10:50	11:51	12:52	31	26	33	30
13/4/2017	Overcast	20.5	SE	<5m/s	10:43	11:44	12:45	77	59	65	67
19/4/2017	Sunny	28.0	NW	<5m/s	10:50	11:51	12:52	36	30	41	36
22/4/2017	Overcast	18.8	NE	<5m/s	10:46	11:47	12:48	90	85	63	79
28/4/2017	Overcast	24.4	SE	<5m/s	10:26	11:27	12:28	80	73	69	74

*Remark: Data of temperature, wind direction and wind speed was extracted from King's Park Meteorological Station of HKO

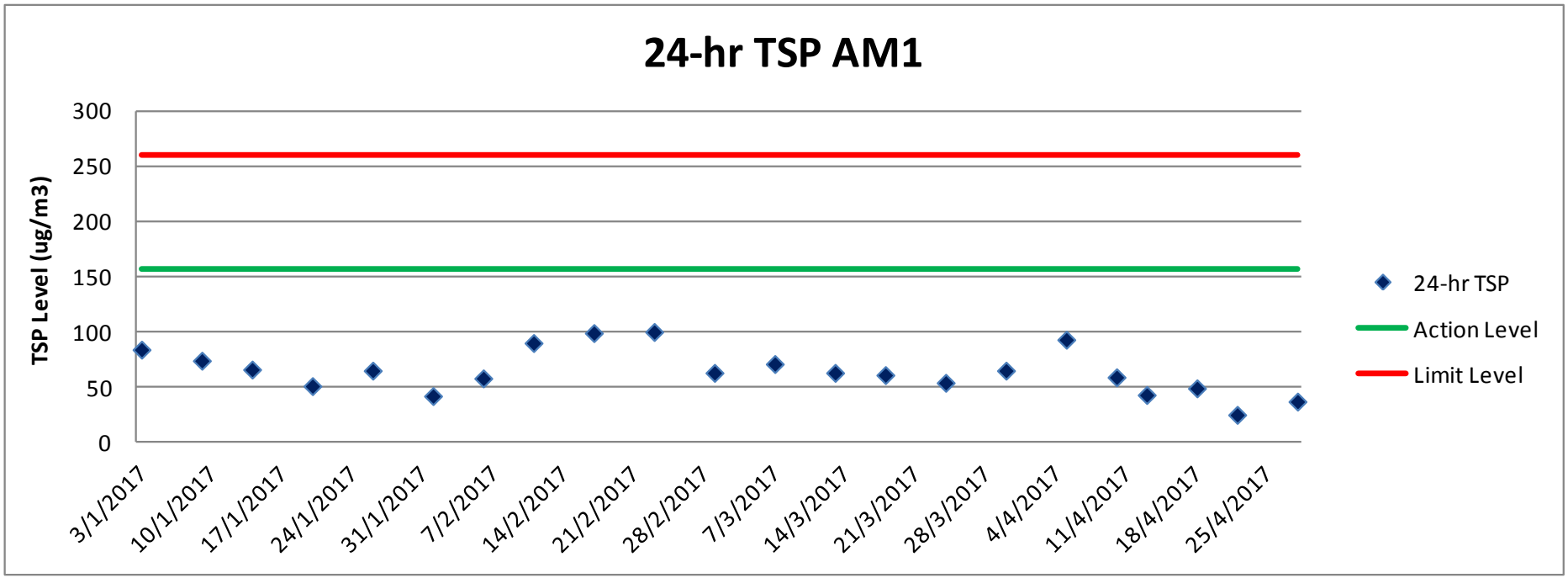


24-hr TSP Monitoring Result for AM1

Sampling ID & Paper No.	Temperature (℃) *1	Wind Direction *1	Wind Speed (m/s) *1	Sampling Date	Wt. of paper (g)			Flow Rate (CFM)	Total Volume *2 (m^3)	TSP Concentration (μg/m3)
					Initial Wt.	Final Wt.	Wt. of dust			
AM10405 202601	20.2 - 26.9	SE	0 - 3.8	5/4/2017	2.8125	3.0373	0.2248	56.0	2420.41	93
AM10410 202600	26.0 - 27.4	SW	0.8 - 5	10/4/2017	2.8238	2.9658	0.1420	56.0	2420.41	59
AM10413 202604	18.3 - 21.2	SE	0 - 3.1	13/4/2017	2.8138	2.9185	0.1047	56.0	2420.41	43
AM10419 202624	24.2 - 29.2	NW	0 - 5	19/4/2017	2.7837	2.9033	0.1196	56.0	2420.41	49
AM10422 202623	17.9 - 24.2	NE	0 - 4.2	22/4/2017	2.7913	2.8512	0.0599	56.0	2420.41	25
AM10428 202622	20.0 - 24.3	SE	0 - 3.8	28/4/2017	2.7983	2.8870	0.0887	56.0	2420.41	37

*1 Remark: Data of temperature, wind direction and wind speed was extracted from King's Park Meteorological Station of HKO

*2 Remark: Total volume of the 24 hrs sampling was calculated from the Calibration worksheet (refer to Appendix D)

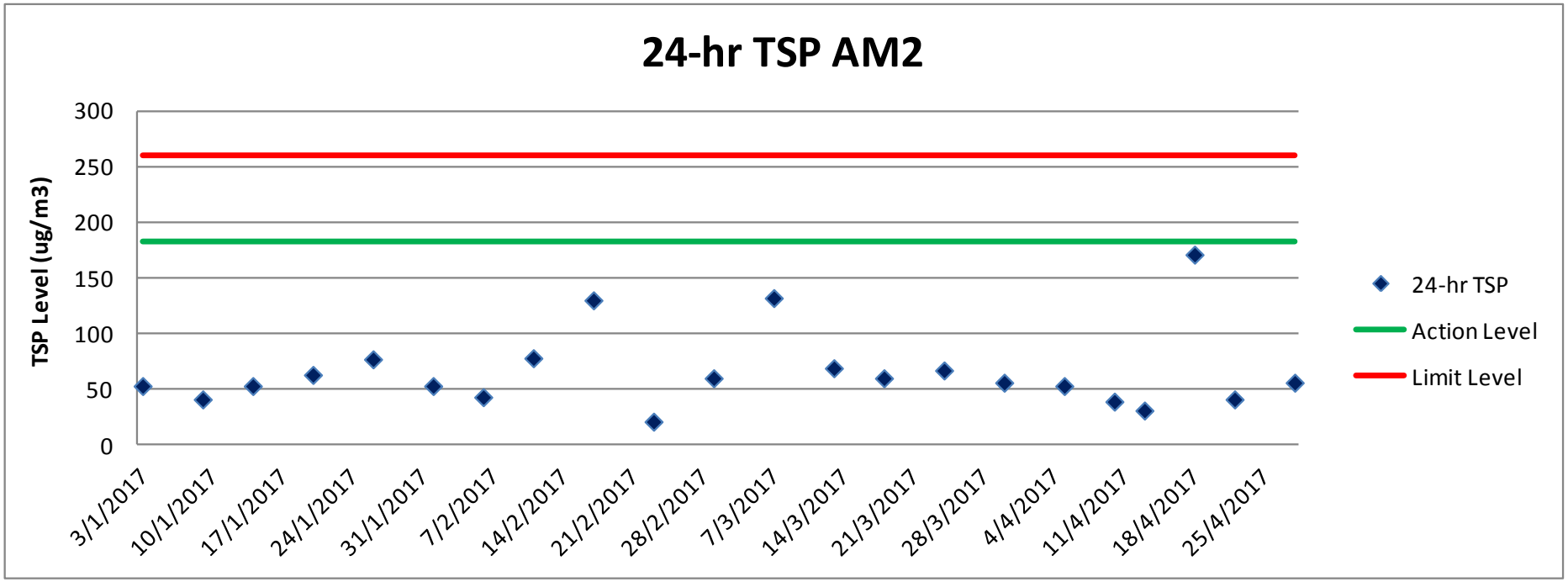


24-hr TSP Monitoring Result for AM2

Sampling ID & Paper No.	Temperature (℃) *1	Wind Direction *1	Wind Speed (m/s) *1	Sampling Date	Wt. of paper (g)			Flow Rate (CFM)	Total Volume *2 (m^3)	TSP Concentration (µg/m3)
					Initial Wt.	Final Wt.	Wt. of dust			
AM20405 202606	20.2 - 26.9	SE	0 - 3.8	5/4/2017	2.8078	2.9568	0.1490	58.0	2822.51	53
AM20410 202613	26.0 - 27.4	SW	0.8 - 5	10/4/2017	2.8036	2.9150	0.1114	58.0	2822.51	39
AM20413 202610	18.3 - 21.2	SE	0 - 3.1	13/4/2017	2.8000	2.8887	0.0887	58.0	2822.51	31
AM20419 202620	24.2 - 29.2	NW	0 - 5	19/4/2017	2.7830	3.2667	0.4837	58.0	2822.51	171
AM20422 202619	17.9 - 24.2	NE	0 - 4.2	22/4/2017	2.7743	2.8903	0.1160	58.0	2822.51	41
AM20428 202618	20.0 - 24.3	SE	0 - 3.8	28/4/2017	2.7890	2.9457	0.1567	58.0	2822.51	56

*1 Remark: Data of temperature, wind direction and wind speed was extracted from King's Park Meteorological Station of HKO

*2 Remark: Total volume of the 24 hrs sampling was calculated from the Calibration worksheet (refer to Appendix D)

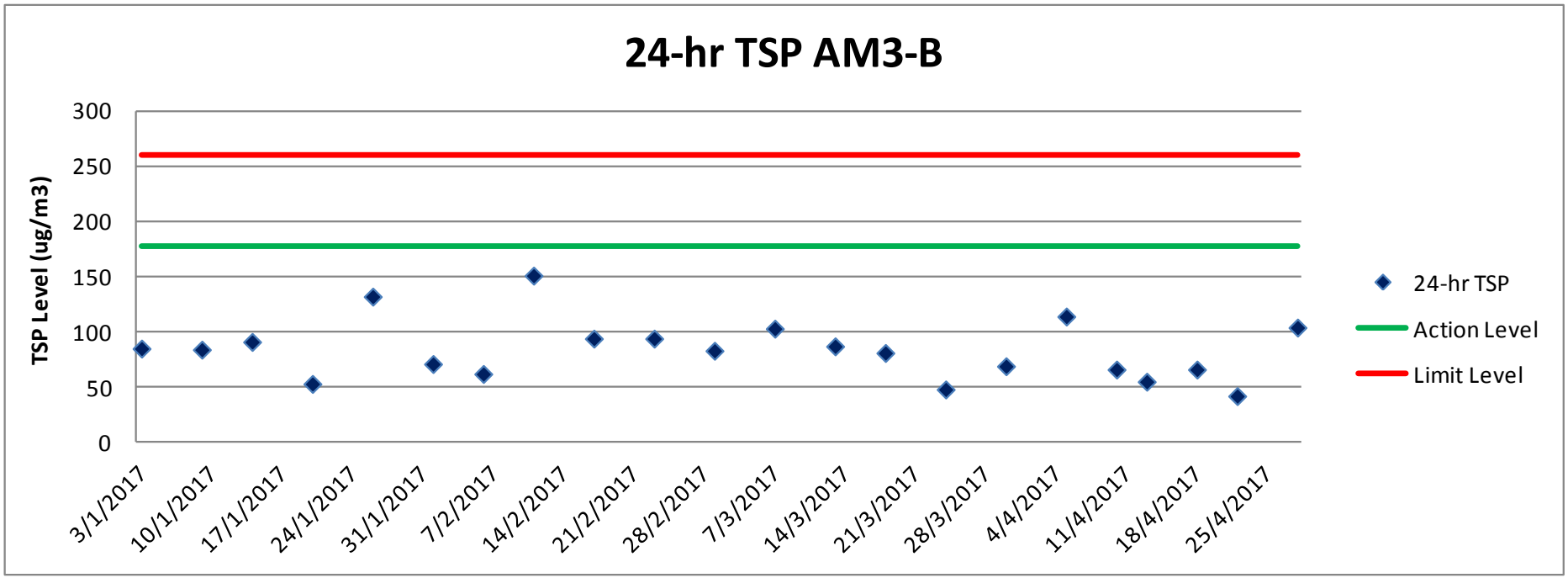


24-hr TSP Monitoring Result for AM3-B

Sampling ID & Paper No.	Temperature (℃) *[1]	Wind Direction *[1]	Wind Speed (m/s) *[1]	Sampling Date	Wt. of paper (g)			Flow Rate (CFM)	Total Volume *[2] (m^3)	TSP Concentration (μg/m3)
					Initial Wt.	Final Wt.	Wt. of dust			
AM3-B0405 202603	20.2 - 26.9	SE	0 - 3.8	5/4/2017	2.8316	3.0966	0.2650	56.0	2315.47	114
AM3-B0410 202602	26.0 - 27.4	SW	0.8 - 5	10/4/2017	2.8272	2.9808	0.1536	56.0	2315.47	66
AM3-B0413 202605	18.3 - 21.2	SE	0 - 3.1	13/4/2017	2.8093	2.9358	0.1265	56.0	2315.47	55
AM3-B0419 202625	24.2 - 29.2	NW	0 - 5	19/4/2017	2.7845	2.9383	0.1538	56.0	2315.47	66
AM3-B0422 202627	17.9 - 24.2	NE	0 - 4.2	22/4/2017	2.7932	2.8913	0.0981	56.0	2315.47	42
AM3-B0428 202626	20.0 - 24.3	SE	0 - 3.8	28/4/2017	2.8025	3.0435	0.2410	56.0	2315.47	104

*[1] Remark: Data of temperature, wind direction and wind speed was extracted from King's Park Meteorological Station of HKO

*[2] Remark: Total volume of the 24 hrs sampling was calculated from the Calibration worksheet (refer to Appendix D)

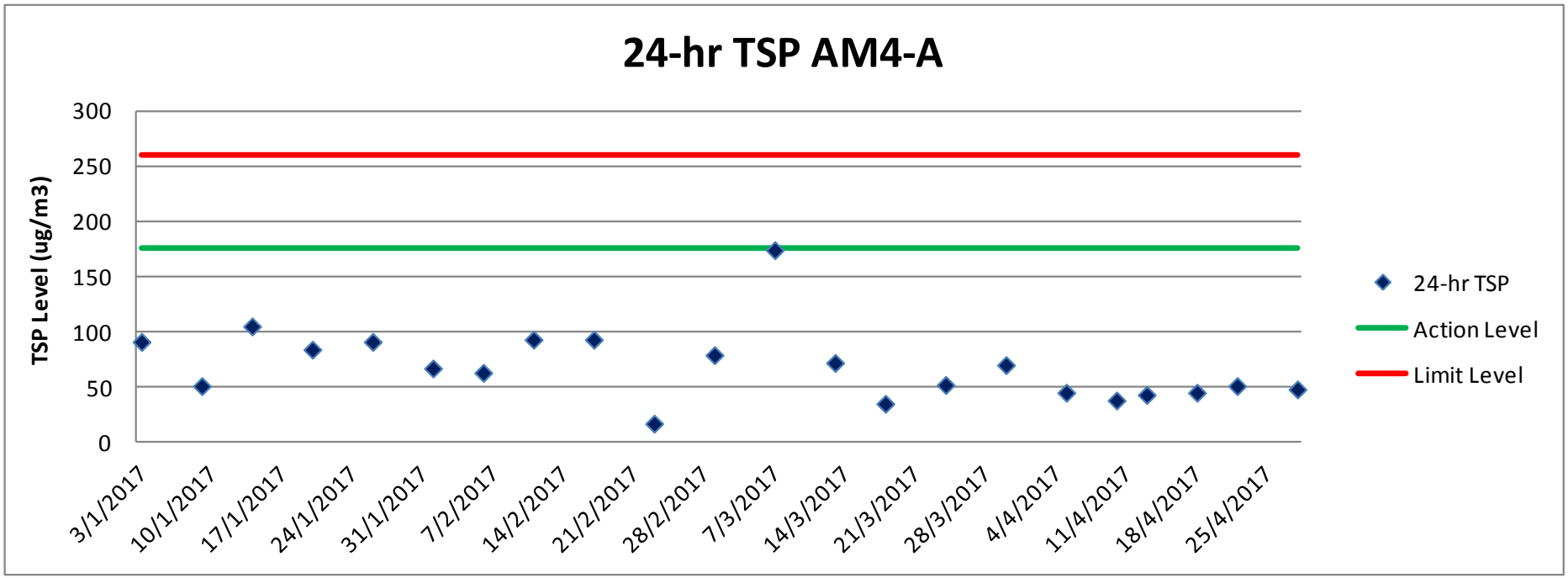


24-hr TSP Monitoring Result for AM4-A

Sampling ID & Paper No.	Temperature (℃) *[1]	Wind Direction *[1]	Wind Speed (m/s) *[1]	Sampling Date	Wt. of paper (g)			Flow Rate (CFM)	Total Volume *[2] (m^3)	TSP Concentration (μg/m3)
					Initial Wt.	Final Wt.	Wt. of dust			
AM4-A0405 202611	20.2 - 26.9	SE	0 - 3.8	5/4/2017	2.8019	2.9263	0.1244	60.0	2762.26	45
AM4-A0410 202567	26.0 - 27.4	SW	0.8 - 5	10/4/2017	2.8005	2.9061	0.1056	60.0	2762.26	38
AM4-A0413 202621	18.3 - 21.2	SE	0 - 3.1	13/4/2017	2.7841	2.9036	0.1195	60.0	2762.26	43
AM4-A0419 202588	24.2 - 29.2	NW	0 - 5	19/4/2017	2.7991	2.9242	0.1251	60.0	2762.26	45
AM4-A0422 202589	17.9 - 24.2	NE	0 - 4.2	22/4/2017	2.8009	2.9431	0.1422	60.0	2762.26	51
AM4-A0428 202591	20.0 - 24.3	SE	0 - 3.8	28/4/2017	2.8220	2.9554	0.1334	60.0	2762.26	48

*[1] Remark: Data of temperature, wind direction and wind speed was extracted from King's Park Meteorological Station of HKO

*[2] Remark: Total volume of the 24 hrs sampling was calculated from the Calibration worksheet (refer to Appendix D)



CERTIFICATE OF ANALYSIS

Client	:	**ENVIRONMENTAL PIONEERS & SOLUTION LTD**	*Laboratory*	:	**ALS Technichem (HK) Pty Ltd**	*Page*	: **1 of 3**
Contact	:	**MR ANDY TSANG**	*Contact*	:	**Fung Lim Chee, Richard**	*Work Order*	: **HK1717659**
Address	:	**FLAT A, 8/F, CHAI WAN INDUSTRIAL CENTRE, 20 LEE CHUNG STREET, CHAI WAN HONG KONG**	*Address*	:	**11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong**		
E-mail	:	**kytsang@fsenv.com.hk**	*E-mail*	:	**Richard.Fung@alsglobal.com**		
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Facsimile	:	**+852 2258 0568**	*Facsimile*	:	**+852 2610 2021**		
Project	:	**PROPOSED ROAD IMPROVEMENT WORKS IN WEST KOWLOON RECLAMATION DEVELOPMENT - PHASE 1**	*Quote number*	:	**HK/5373b/16**	*Date received*	: **28-APR-2017**
Order number	:	**----**				*Date of issue*	: **05-MAY-2017**
C-O-C number	:	**----**				*No. of samples*	- *Received* : **6**
Site	:	**----**					- *Analysed* : **6**

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatory	*Position*	*Authorised results for:*
Fung Lim Chee, Richard	**General Manager**	**Inorganics**

Report Comments

This report for ALS Technichem (HK) Pty Ltd work order reference HK1717659 supersedes any previous reports with this reference. Testing period is from 28-APR-2017 to 02-MAY-2017. Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release. When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes. Abbreviations: CAS number = Chemical Abstract Services number. LOR = Limit of reporting.

Specific Comments for Work Order HK1717659 :

Sample(s) were received in ambient condition.

Sample(s) analysed and reported on an as received basis.

Analytical Results

Sub-Matrix: **FILTER (TSP/RSP)**

Client sample ID	*Client sampling date / time*	*Laboratory sample ID*	*Compound*	**HK-TSP: Total Suspended Particulates**	**HK-TSP: Initial Weight**	**HK-TSP: Final Weight**		
			LOR Unit	0.0010 g	0.0010 g	0.0010 g		
				EA/ED: Physical and Aggregate Properties	EA/ED: Physical and Aggregate Properties	EA/ED: Physical and Aggregate Properties		
AM10405 202601	[05-APR-2017]	HK1717659-001		**0.2248**	**2.8125**	**3.0373**		
AM10410 202600	[10-APR-2017]	HK1717659-002		**0.1420**	**2.8238**	**2.9658**		
AM10413 202604	[13-APR-2017]	HK1717659-003		**0.1047**	**2.8138**	**2.9185**		
AM10419 202624	[19-APR-2017]	HK1717659-004		**0.1196**	**2.7837**	**2.9033**		
AM10422 202623	[22-APR-2017]	HK1717659-005		**0.0599**	**2.7913**	**2.8512**		
AM10428 202622	[28-APR-2017]	HK1717659-006		**0.0887**	**2.7983**	**2.8870**		

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Client	:	**ENVIRONMENTAL PIONEERS & SOLUTION LTD**	*Laboratory*	:	**ALS Technichem (HK) Pty Ltd**	*Page*	: **1 of 3**
Contact	:	**MR ANDY TSANG**	*Contact*	:	**Fung Lim Chee, Richard**	*Work Order*	: **HK1717657**
Address	:	**FLAT A, 8/F, CHAI WAN INDUSTRIAL CENTRE, 20 LEE CHUNG STREET, CHAI WAN HONG KONG**	*Address*	:	**11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong**		
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Facsimile	:	**+852 2258 0568**	*Facsimile*	:	**+852 2610 2021**		
Project	:	**PROPOSED ROAD IMPROVEMENT WORKS IN WEST KOWLOON RECLAMATION DEVELOPMENT - PHASE 1**	*Quote number*	:	**HK/5373b/16**	*Date received*	: **28-APR-2017**
Order number	:	**----**				*Date of issue*	: **05-MAY-2017**
C-O-C number	:	**----**				*No. of samples*	- *Received* : **6**
Site	:	**----**					- *Analysed* : **6**

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatory	*Position*	*Authorised results for:*
Fung Lim Chee, Richard	**General Manager**	**Inorganics**

Report Comments

This report for ALS Technichem (HK) Pty Ltd work order reference HK1717657 supersedes any previous reports with this reference. Testing period is from 28-APR-2017 to 02-MAY-2017. Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release. When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes. Abbreviations: CAS number = Chemical Abstract Services number. LOR = Limit of reporting.

Specific Comments for Work Order HK1717657 :

Sample(s) were received in ambient condition.

Sample(s) analysed and reported on an as received basis.

Analytical Results

Sub-Matrix: **FILTER (TSP/RSP)**

Client sample ID	*Client sampling date / time*	*Laboratory sample ID*	*Compound*	**HK-TSP: Total Suspended Particulates**	**HK-TSP: Initial Weight**	**HK-TSP: Final Weight**		
			LOR Unit	0.0010 g	0.0010 g	0.0010 g		
				EA/ED: Physical and Aggregate Properties	EA/ED: Physical and Aggregate Properties	EA/ED: Physical and Aggregate Properties		
AM20405 202606	[05-APR-2017]	HK1717657-001		**0.1490**	**2.8078**	**2.9568**		
AM20410 202613	[10-APR-2017]	HK1717657-002		**0.1114**	**2.8036**	**2.9150**		
AM20413 202610	[13-APR-2017]	HK1717657-003		**0.0887**	**2.8000**	**2.8887**		
AM20419 202620	[19-APR-2017]	HK1717657-004		**0.4837**	**2.7830**	**3.2667**		
AM20422 202619	[22-APR-2017]	HK1717657-005		**0.1160**	**2.7743**	**2.8903**		
AM20428 202618	[28-APR-2017]	HK1717657-006		**0.1567**	**2.7890**	**2.9457**		

CERTIFICATE OF ANALYSIS

Client	:	**ENVIRONMENTAL PIONEERS & SOLUTION LTD**	*Laboratory*	:	**ALS Technichem (HK) Pty Ltd**	*Page*	: **1 of 3**
Contact	:	**MR ANDY TSANG**	*Contact*	:	**Fung Lim Chee, Richard**	*Work Order*	: **HK1717656**
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E-mail	:	**kytsang@fsenv.com.hk**	*E-mail*	:	**Richard.Fung@alsglobal.com**		
Telephone	:	**+852 2185 0159**	*Telephone*	:	**+852 2610 1044**		
Facsimile	:	**+852 2258 0568**	*Facsimile*	:	**+852 2610 2021**		
Project	:	**PROPOSED ROAD IMPROVEMENT WORKS IN WEST KOWLOON RECLAMATION DEVELOPMENT - PHASE 1**	*Quote number*	:	**HK/5373b/16**	*Date received*	: **28-APR-2017**
Order number	:	**----**				*Date of issue*	: **05-MAY-2017**
C-O-C number	:	**----**				*No. of samples*	- *Received* : **6**
Site	:	**----**					- *Analysed* : **6**

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatory	*Position*	*Authorised results for:*
Fung Lim Chee, Richard	**General Manager**	**Inorganics**

Report Comments

This report for ALS Technichem (HK) Pty Ltd work order reference HK1717656 supersedes any previous reports with this reference. Testing period is from 28-APR-2017 to 02-MAY-2017. Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release. When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes. Abbreviations: CAS number = Chemical Abstract Services number. LOR = Limit of reporting.

Specific Comments for Work Order HK1717656 :

Sample(s) were received in ambient condition.

Sample(s) analysed and reported on an as received basis.

Analytical Results

Sub-Matrix: **FILTER (TSP/RSP)**

Client sample ID	*Client sampling date / time*	*Laboratory sample ID*	*Compound*	**HK-TSP: Total Suspended Particulates**	**HK-TSP: Initial Weight**	**HK-TSP: Final Weight**		
			LOR Unit	0.0010 g	0.0010 g	0.0010 g		
				EA/ED: Physical and Aggregate Properties	EA/ED: Physical and Aggregate Properties	EA/ED: Physical and Aggregate Properties		
AM3-B0405 202603	[05-APR-2017]	HK1717656-001		**0.2650**	**2.8316**	**3.0966**		
AM3-B0410 202602	[10-APR-2017]	HK1717656-002		**0.1536**	**2.8272**	**2.9808**		
AM3-B0413 202605	[13-APR-2017]	HK1717656-003		**0.1265**	**2.8093**	**2.9358**		
AM3-B0419 202625	[19-APR-2017]	HK1717656-004		**0.1538**	**2.7845**	**2.9383**		
AM3-B0422 202627	[22-APR-2017]	HK1717656-005		**0.0981**	**2.7932**	**2.8913**		
AM3-B0428 202626	[28-APR-2017]	HK1717656-006		**0.2410**	**2.8025**	**3.0435**		

CERTIFICATE OF ANALYSIS

Client	:	**ENVIRONMENTAL PIONEERS & SOLUTION LTD**	*Laboratory*	:	**ALS Technichem (HK) Pty Ltd**	*Page*	: **1 of 3**
Contact	:	**MR ANDY TSANG**	*Contact*	:	**Fung Lim Chee, Richard**	*Work Order*	: **HK1717654**
Address	:	**FLAT A, 8/F, CHAI WAN INDUSTRIAL CENTRE, 20 LEE CHUNG STREET, CHAI WAN HONG KONG**	*Address*	:	**11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong**		
E-mail	:	**kytsang@fsenv.com.hk**	*E-mail*	:	**Richard.Fung@alsglobal.com**		
Telephone	:	**+852 2185 0159**	*Telephone*	:	**+852 2610 1044**		
Facsimile	:	**+852 2258 0568**	*Facsimile*	:	**+852 2610 2021**		
Project	:	**PROPOSED ROAD IMPROVEMENT WORKS IN WEST KOWLOON RECLAMATION DEVELOPMENT - PHASE 1**	*Quote number*	:	**HK/5373b/16**	*Date received*	: **28-APR-2017**
Order number	:	**----**				*Date of issue*	: **05-MAY-2017**
C-O-C number	:	**----**				*No. of samples*	- *Received* : **6**
Site	:	**----**					- *Analysed* : **6**

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatory	*Position*	*Authorised results for:*
Fung Lim Chee, Richard	**General Manager**	**Inorganics**

Report Comments

This report for ALS Technichem (HK) Pty Ltd work order reference HK1717654 supersedes any previous reports with this reference. Testing period is from 28-APR-2017 to 02-MAY-2017. Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release. When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes. Abbreviations: CAS number = Chemical Abstract Services number. LOR = Limit of reporting.

Specific Comments for Work Order HK1717654 :

Sample(s) were received in ambient condition.

Sample(s) analysed and reported on an as received basis.

Analytical Results

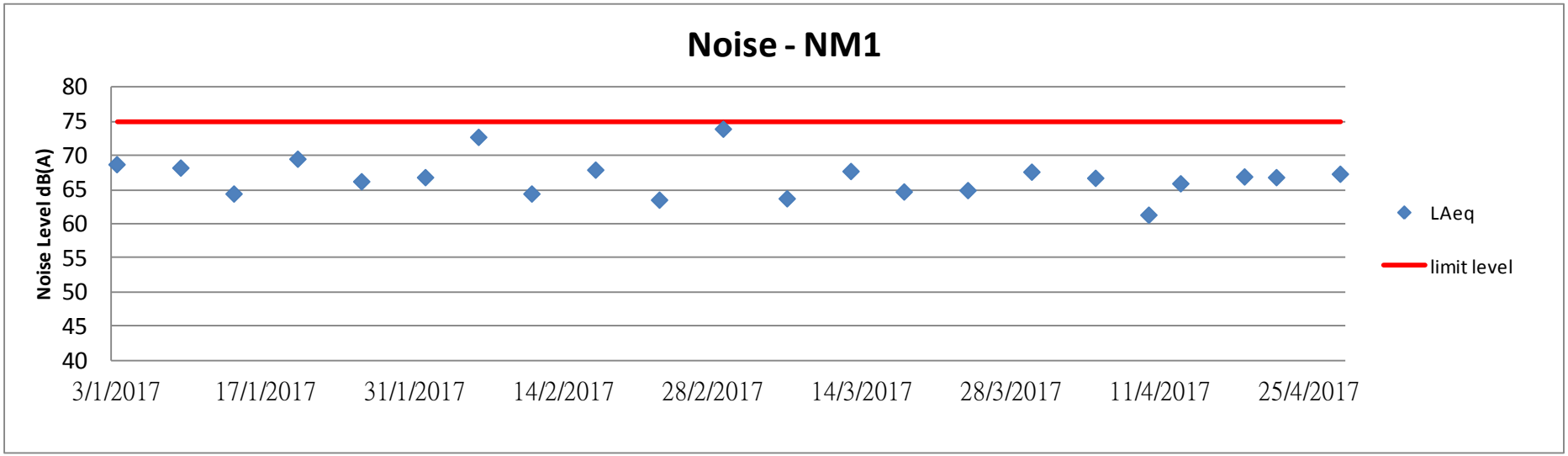
Sub-Matrix: **FILTER (TSP/RSP)**

Client sample ID	*Client sampling date / time*	*Laboratory sample ID*	*Compound*	**HK-TSP: Total Suspended Particulates**	**HK-TSP: Initial Weight**	**HK-TSP: Final Weight**		
			LOR Unit	0.0010 g	0.0010 g	0.0010 g		
				EA/ED: Physical and Aggregate Properties	EA/ED: Physical and Aggregate Properties	EA/ED: Physical and Aggregate Properties		
AM4-A0405 202611	[05-APR-2017]	HK1717654-001		**0.1244**	**2.8019**	**2.9263**		
AM4-A0410 202567	[10-APR-2017]	HK1717654-002		**0.1056**	**2.8005**	**2.9061**		
AM4-A0413 202621	[13-APR-2017]	HK1717654-003		**0.1195**	**2.7841**	**2.9036**		
AM4-A0419 202588	[19-APR-2017]	HK1717654-004		**0.1251**	**2.7991**	**2.9242**		
AM4-A0422 202589	[22-APR-2017]	HK1717654-005		**0.1422**	**2.8009**	**2.9431**		
AM4-A0428 202591	[28-APR-2017]	HK1717654-006		**0.1334**	**2.8220**	**2.9554**		

Appendix F1: Noise Monitoring Data

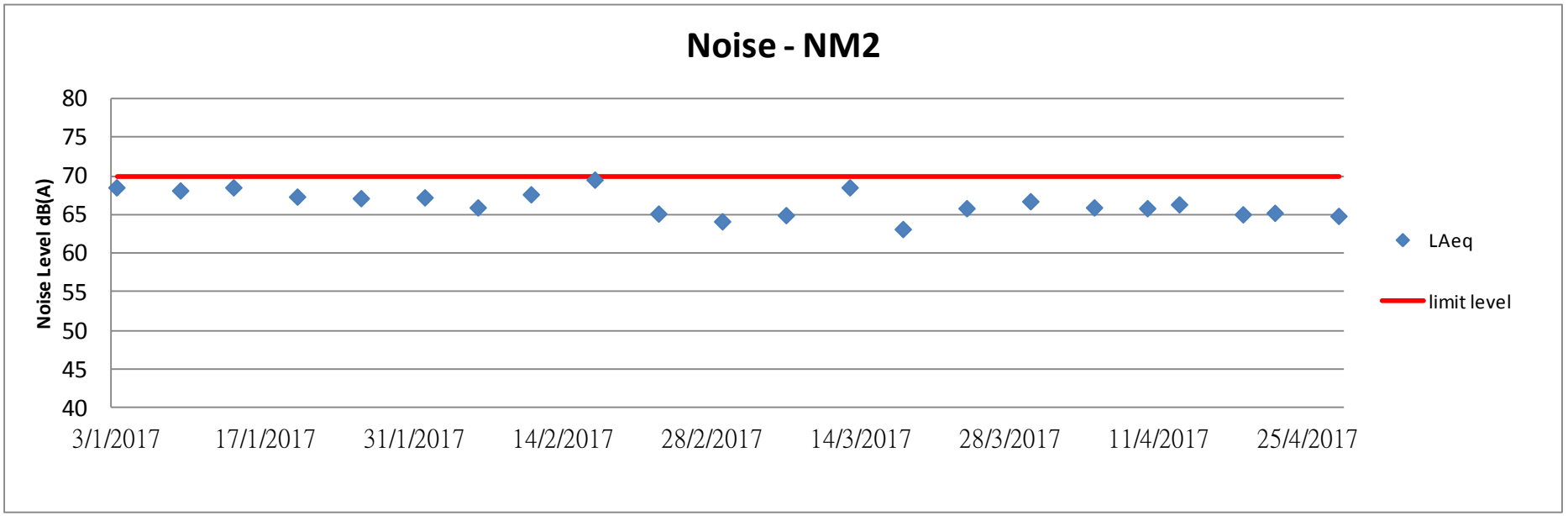
Noise Monitoring Result for NM1

Location	NM1					
Date	5/4/2017	10/4/2017	13/4/2017	19/4/2017	22/4/2017	28/4/2017
Weather Condition	Sunny	Overcast	Overcast	Sunny	Overcast	Overcast
Start Time	16:10	16:46	17:05	11:04	16:46	11:30
Measurement Period	30min	30min	30min	30min	30min	30min
Baseline Level	75.1					
L_{Aeq}	66.7	61.3	65.9	66.9	66.8	67.3
L_{10}	68.4	62.3	67.4	67.0	68.5	68.4
L_{90}	64.2	59.1	63.5	62.7	64.5	64.0



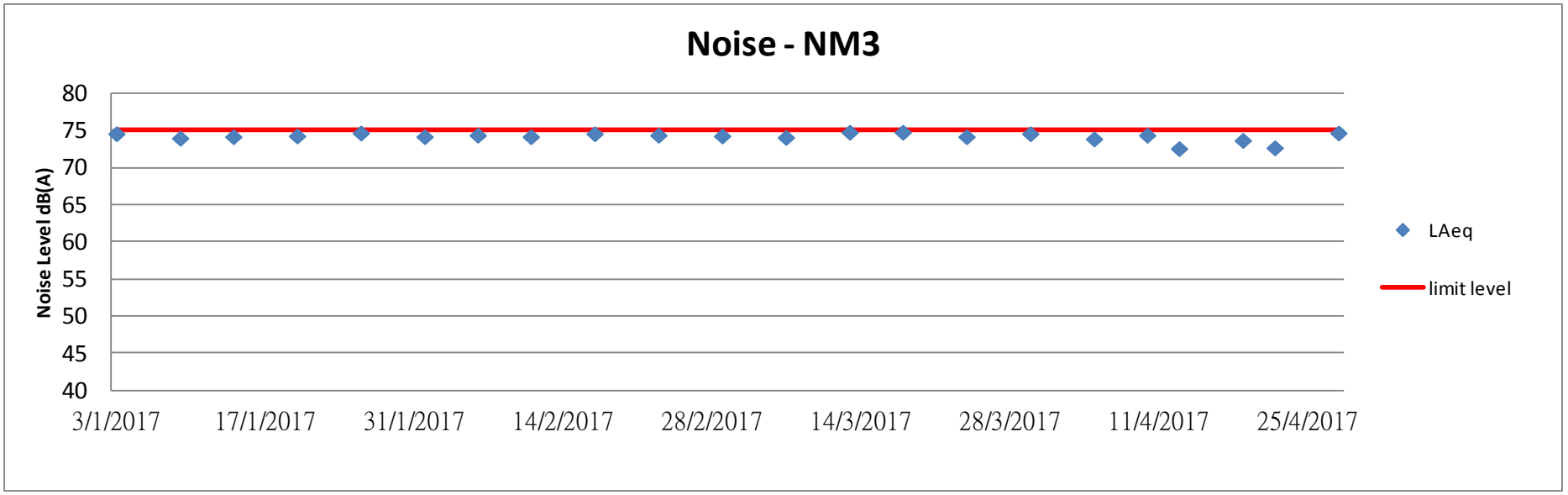
Noise Monitoring Result for NM2

Location	NM2					
Date	5/4/2017	10/4/2017	13/4/2017	19/4/2017	22/4/2017	28/4/2017
Weather Condition	Sunny	Overcast	Overcast	Sunny	Overcast	Overcast
Start Time	9:35	9:40	9:35	9:35	9:35	
Measurement Period	30min	30min	30min	30min	30min	30min
Baseline Level	66.5					
L_{Aeq}	65.9	65.8	66.3	65.0	65.2	64.8
L_{10}	66.8	66.9	67.5	66.2	66.7	66.7
L_{90}	62.9	62.5	62.3	63.3	62.1	61.9



Noise Monitoring Result for NM3

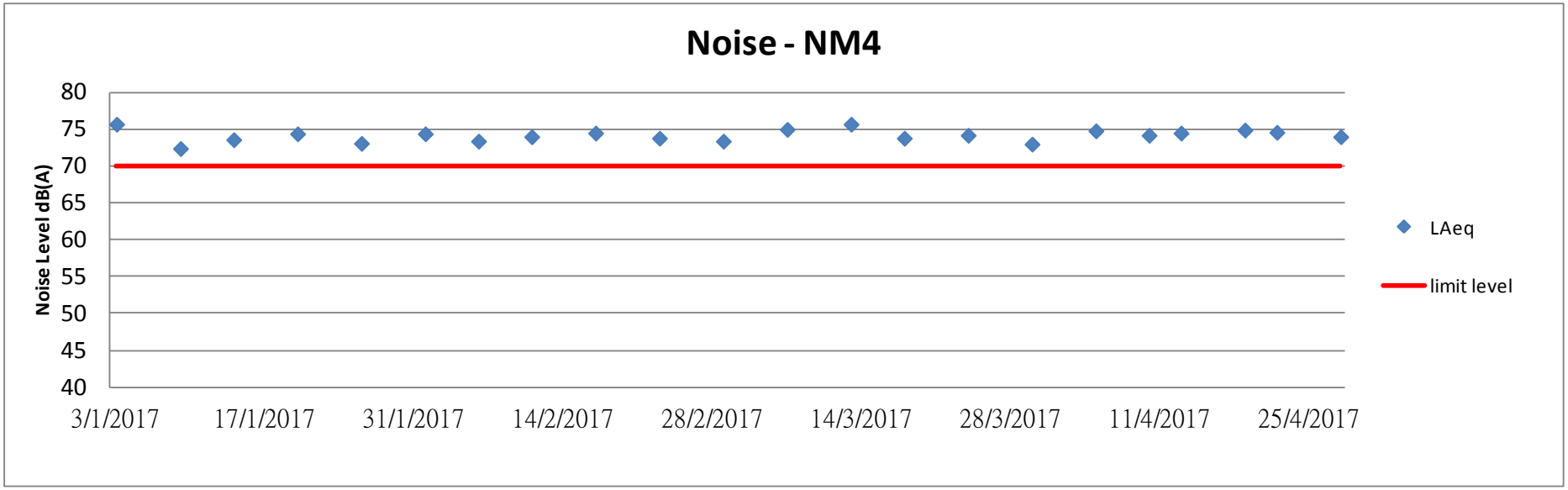
Location	NM3					
Date	5/4/2017	10/4/2017	13/4/2017	19/4/2017	22/4/2017	28/4/2017
Weather Condition	Sunny	Overcast	Overcast	Sunny	Overcast	Overcast
Start Time	15:37	15:58	16:25	10:14	16:04	10:38
Measurement Period	30min	30min	30min	30min	30min	30min
Baseline Level	74.5					
L_{Aeq}	74.0	74.5	72.7	73.8	72.8	74.8
L_{10}	75.0	77.1	75.6	76.3	75.6	77.7
L_{90}	71.8	69.6	68.1	68.6	68.6	69.9



Noise Monitoring Result for NM4

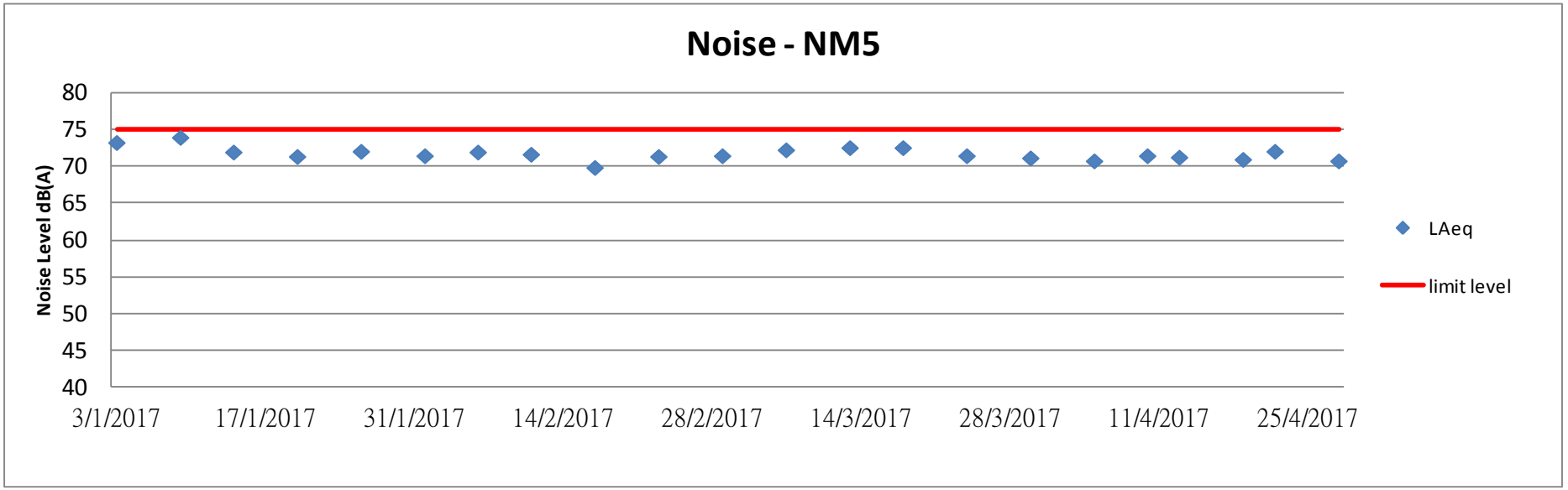
Location	NM4						NM4 (Re-measurement) *					
Date	5/4/2017	10/4/2017	13/4/2017	19/4/2017	22/4/2017	28/4/2017	5/4/2017	10/4/2017	13/4/2017	19/4/2017	22/4/2017	28/4/2017
Weather Condition	Sunny	Overcast	Overcast	Sunny	Overcast	Overcast	Sunny	Overcast	Overcast	Sunny	Overcast	Overcast
Start Time	13:00	13:00	13:00	13:00	13:00	13:00	13:31	13:31	13:31	13:31	13:31	13:31
Measurement Period	30min	30min	30min	30min	30min	30min	30min	30min	30min	30min	30min	30min
Baseline Level	73.3						73.3					
L_{Aeq}	74.9	74.3	74.6	75.0	74.7	74.1	74.3	74.9	75.1	74.7	73.6	75.6
L_{10}	78.0	77.6	77.8	78.2	78.0	76.3	77.8	78.0	78.3	77.9	76.5	77.9
L_{90}	67.5	68.0	67.7	67.7	67.5	67.3	66.9	67.3	67.5	67.6	68.1	68.0

* Repeat noise measurement when exceedance is recorded. The result is used to confirm the findings and it would not be showed on the graph plot



Noise Monitoring Result for NM5

Location	NM5					
Date	5/4/2017	10/4/2017	13/4/2017	19/4/2017	22/4/2017	28/4/2017
Weather Condition	Sunny	Overcast	Overcast	Sunny	Overcast	Overcast
Start Time	14:20	14:15	15:00	14:30	15:00	14:30
Measurement Period	30min	30min	30min	30min	30min	30min
Baseline Level	71.8					
L_{Aeq}	70.8	71.5	71.3	71.0	72.1	70.8
L_{10}	73.9	74.5	74.1	73.9	75.0	73.5
L_{90}	65.9	66.4	65.9	65.5	65.9	64.2



Appendix F2: School Schedule

油蘇地天主教小學（海泓道）
二零一六至二零一七年度校曆表（三月至八月）

月份	周次	日	一	二	三	四	五	六	行事曆
三月					1 S	2 S	3 S	4	2/3-7/3 J.1-5第二段考（J.6呈分試）
	廿五	5	6 S	7 S	8 A	9 B	10 C	11	8/3-17/3 全方位學習周　10/3 教區聯校陸運會
	廿六	12	13 D	14 E	15 F	16 A	17 B	18	
	廿七	19	20 C	21 D	22 E	23 F	24 A	25	
	廿八	26	27 B	28 C	29 D	30 E	31 F		27/3-29/3 J.5 教育營
四月								1	
	廿九	2	3 A	4	5 B	6 C	7 D	(8)	4/4 清明節　8/4 成長見證日及J.6升中座談會(2)
	卅十	9	10 S	11 E	12 F	13	14	15	10/4陸運會　14/4 耶穌受難節　13/4-23/4 復活節假期
		16	17	18	19	20	21	22	16/4 復活主日
	卅一	23	24 S	25 S	26	27 A	28 B	29	24/4 學藝薈萃耀油天綵排　25/4 學藝薈萃耀油天 26/4 學藝薈萃耀油天翌日假期
五月	卅二	30	1	2 C	3	4 D	5 E	6	1/5 勞動節　3/5 佛誕 4/5或5/5 J.3TSA說話及視訊評估(待教育局核實)
	卅三	7	8 F	9 A	10 B	11 C	12 D	13	12/5 J.5升中座談會 11/5或12/5 J.6TSA說話及視訊評估(待教育局核實)
	卅四	14	15 E	16 F	17 A	18 B	19 C	20	
	卅五	21	22 D	23 E	24 F	25 A	26 B	27	
	卅六	28	29 C	30	31 S				30/5 端午節
六月						1 S	2 S	3	1/6-6/6 J.1-4期終考/J.5呈分試/J.6畢業試
	卅七	4	5 S	6 S	7 D	8 E	9 F	10	
	卅八	11	12 A	13 B	14 C	15 D	16 E	17	13/6-14/6 J.3、J.6 TSA紙筆評估(待教育局核實)
	卅九	18	19 F	20 A	21 B	22 C	23 D	(24)	24/6 聖保祿堂主保瞻禮
	四十	25	26	27 E	28 F	29 S	30 S		26/6 主保瞻禮假期　29/6 畢業禮綵排　30/6 畢業禮
七月								1	1/7 特別行政區成立日
	四一	2	3 S	4 S	5 S	6 S	7 S	8	7/7 數學感恩禮
	四二	9	10 S	11 S	12 S	13 S	14 S	15	10/7 頒獎禮　11/7 升中派位 13/7-14/7 中學註冊
		16	17	18	19	20	21	22	17/7-31/8 暑假 (2017年9月1日開課) 18/7 中一入學前測驗
		23	24	25	26	27	28	29	
		30	31						
八月				1	2	3	4	5	
		6	7	8	9	10	11	12	
		13	14	15	16	17	18	19	
		20	21	22	23	24	25	26	
		27	28	29	30	31			

2017 年 4 月

	周次	日	一	二	三	四	五	六
								1
B	32	2	3	4	5	6	7	8
	33	9	10	11	12	13	14	15
	34	16	17	18	19	20	21	22
A	35	23	24	25	26	27	28	29
B	36	30						

全校活動及考試：	學校假期：
6/4 宗教日	4/4 清明節假期
7/4 復活節崇拜(下午)	10/4 - 21/4 復活節假期
24/4 - 5/5 自由換穿夏季校服	
26/4 第 5 次教師會議	
28/4 中三級選科講座	

備註： 學校活動 學校考試 公眾假期 學校假期 學校自訂假期

Appendix G: Waste Management Record

Monthly Summary Waste Flow Table for _2016__ (year)

Month	**Actual Quantities of Inert C&D Materials Generated Monthly**					**Actual Quantities of Non-inert C&D Wastes Generated Monthly**					
	Total Quantity Generated	Hard Rocks & Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Mixed Waste Disposal at Sorting Facility	Metals	Paper / cardboard packaging	Plastics	Chemical Waste	Others (general refuse)
	(in ‘000kg)	(in ‘000kg)	(in ‘000kg)	(in ‘000kg)	(in ‘000kg)	(in ‘000kg)	(in ‘000kg)	(in ‘000kg)	(in ‘000kg)	(in ‘000kg)	(in ‘000kg)
Jan	--	--	--	--	--	--	--	--	--	--	--
Feb	521.76	0	0	0	521.76	0	0	0	0	0	38.34
Mar	1527.37	0	0	0	1527.37	0	0	0	0	0	188.63
Apr	2676.73	0	0	0	2676.73	0	0	0	0	0	87.72
May	2028.43	0	0	0	2028.43	0	0	0	0	0	47.78
Jun	2058.16	0	0	0	2058.16	0	0	0	0	0	81.13
Sub-total	8812.45	0	0	0	8812.45	0	0	0	0	0	443.6
Jul	5031.54	0	0	0	5031.54	0	0	0	0	0	17.12
Aug	1026.39	0	0	0	1026.39	0	0	0	0	0	52.44
Sep	1833.94	0	0	0	1833.94	0	0	0	0	0	7.14
Oct	785.58	0	0	0	785.58	0	0	0	0	0	16.77
Nov	832.23	0	0	0	832.23	0	0	0	0	0	48.09
Dec	2183.48	0	0	0	2183.48	0	0	0	0	0	19.96
Total	20505.61	0	0	0	20505.61	0	0	0	0	0	605.12

Monthly Summary Waste Flow Table for _2017__ (year)

Month	Actual Quantities of Inert C&D Materials Generated Monthly					Actual Quantities of Non-inert C&D Wastes Generated Monthly					
	Total Quantity Generated	Hard Rocks & Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Mixed Waste Disposal at Sorting Facility	Metals	Paper / cardboard packaging	Plastics	Chemical Waste	Others (general refuse)
	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)
Jan	717.69	0	0	0	717.69	0	0	0	0	0	7.57
Feb	2721.53	0	0	0	2721.53	0	0	0	0	0	13.08
Mar	2504.26	0	0	0	2504.26	0	0	0	0	0	5.55
Apr	2006.4	0	0	0	2006.4	0	0	0	0	0	10.43
May	--	--	--	--	--	--	--	--	--	--	--
Jun	--	--	--	--	--	--	--	--	--	--	--
Sub-total	7949.88	0	0	0	7949.88	0	0	0	0	0	36.63
Jul	--	--	--	--	--	--	--	--	--	--	--
Aug	--	--	--	--	--	--	--	--	--	--	--
Sep	--	--	--	--	--	--	--	--	--	--	--
Oct	--	--	--	--	--	--	--	--	--	--	--
Nov	--	--	--	--	--	--	--	--	--	--	--
Dec	--	--	--	--	--	--	--	--	--	--	--
Total	7949.88	0	0	0	7949.88	0	0	0	0	0	36.63
Grand Total (2016&2017)	28455.49	0	0	0	28455.49	0	0	0	0	0	641.75

Appendix H: Environmental Mitigation Implementation Schedule

Implementation Schedule for Environmental Mitigation Measures

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to Implement the measure	Location of the measure	When to implement the measure	What requirements or standard for the measure to achieve	Implementation Status
Air Quality Impact (Construction Phase)								
4.8	A1	housekeeping to minimize dust generation, e.g. by properly handling and storing dusty materials	To minimize dust generation	HyD's Contractor	Whole construction site	Throughout construction phase	EIAO-TM, APCO	*
4.8	A2	Adopt dust control measures, such as dust suppression using water spray on exposed soil (at least 8 times per day), in areas with dusty construction activities and during material handling	To minimize dust generation due to erosion	HyD's Contractor	Whole construction site	Throughout construction phase	EIAO-TM, APCO	*
4.8	A3	Store cement bags in shelter with 3 sides and the top covered by impervious materials if the stack exceeds 20 bags	To prevent leakage of cement	HyD's Contractor	Whole construction site	Throughout construction phase	EIAO-TM, APCO	N/A
4.8	A4	Maintain a reasonable height when dropping excavated materials to limit dust generation	To minimize dust generation during movement of excavated materials	HyD's Contractor	Whole construction site	Throughout construction phase	EIAO-TM, APCO	✔
4.8	A5	Limit vehicle speed within site to 10km/hr and confine vehicle movement in haul road	To minimize dust generation due to traffic movement	HyD's Contractor	Whole construction site	Throughout construction phase	EIAO-TM, APCO	✔

4.8	A6	Minimize exposed earth after completion of work in a certain area by hydroseeding, vegetating, soil compacting or covering with bitumen	To minimize dust generation due to erosion	HyD's Contractor	Whole construction site	Throughout construction phase	EIAO-TM, APCO	✔
4.8	A7	Provide wheel washing at site exit to clean the vehicle body and wheel	To prevent dust from being brought offsite	HyD's Contractor	Whole construction site	Throughout construction phase	EIAO-TM, APCO	✔
4.8	A8	Hard pave the area at site exit with concrete, bitumen or hardcores	To prevent dust from being brought offsite	HyD's Contractor	Whole construction site	Throughout construction phase	EIAO-TM, APCO	✔
4.8	A9	Cover materials on trucks before leaving the site to prevent debris from dropping during traffic movement or being blown away by wind	To prevent falling of debris during traffic movement and by wind	HyD's Contractor	Whole construction site	Throughout construction phase	EIAO-TM, APCO	✔
4.8	A11	Regular maintenance of plant equipment to prevent black smoke emission	To minimize black smoke emission	HyD's Contractor	Whole construction site	Throughout construction phase	EIAO-TM, APCO	✔
4.8	A12	Throttle down or switch off unused machines or machine in intermittent use	To minimize unnecessary emission	HyD's Contractor	Whole construction site	Throughout construction phase	EIAO-TM, APCO	✔
4.8	A13	Carry out regular site inspection to audit the implementation of mitigation measures	To check the implemenation status and effectiveness of mitigation measures	HyD's Contractor	Whole construction site	Throughout construction phase	EIAO-TM, APCO	✔

4.8	A14	Carry out air quality monitoring throughout the construction period	To monitor construction dust level	HyD's Contractor	At representative ASRs	Prior to and throughout construction phase	EIAO-TM	✔
Noise Impact (Construction Phase)								
3.8	N1	Adopt good site practice, such as regular maintenance of plant equipment, throttle down unused machines	To minimize construction noise level	HyD's Contractor	Whole construction site	Throughout construction phase	NCO,EIAO-TM	✔
3.8	N2	Use Quality Powered Mechanical Equipment (QPME) which produces lower noise level (e.g. Excavator/Loader (EPD-01431), Asphalt Paver (EPD-01226), Road Roller (EPD-00244) and Mobile Crane (EPD-01477))	To minimize construction noise level	HyD's Contractor	Whole construction site	Throughout construction phase	NCO,EIAO-TM	✔
3.8	N3	Erect movable noise barrier at significant noise source(e.g. Concrete Pump, Concrete Lorry Mixer, Excavator/Loader, Road Sweeper, Asphalt Paver, Road Roller, Lorry, Breaker and Poker)	To lower noise transmission	HyD's Contractor	Whole construction site	Throughout construction phase	NCO,EIAO-TM	✔
3.8	N5	Regular maintenance of plant equipment to prevent noise emission due to impair	To prevent noise emission due to impair	HyD's Contractor	Whole construction site	Throughout construction phase	NCO,EIAO-TM	✔
3.8	N6	Position mobile noisy equipment in location and direction away from NSR	To minimize noise transmission to NSR	HyD's Contractor	Whole construction site	Throughout construction phase	NCO,EIAO-TM	N/A

3.8	N7	Use silencer or muffler on plant equipment and should be properly maintained	To minimize noise transmission	HyD's Contractor	Whole construction site	Throughout construction phase	NCO,EIAO-TM	✔
3.8	N8	Throttle down or switch off unused machines or machine in intermittent use between work	To mimize noise production	HyD's Contractor	Whole construction site	Throughout construction phase	NCO,EIAO-TM	✔
3.8	N9	Make good use of stockpiles or other structures for noise screening	To minimize noise transmission	HyD's Contractor	Whole construction site	Throughout construction phase	NCO,EIAO-TM	✔
3.8	N10	Avoid carrying out noisy activities at the same time	To mimize noise production	HyD's Contractor	Whole construction site	Throughout construction phase	NCO,EIAO-TM	✔
3.8	N11	Reduce the percentage on-time for some noisy PMEs	To mimize noise production	HyD's Contractor	Whole construction site	Throughout construction phase	NCO,EIAO-TM	✔
3.8	N12	Carry out noise monitoring	To monitor construction noise level	HyD's Contractor	At representative NSRs	Prior to and throughout construction phase	EIAO-TM	✔
Water Impact (Construction Phase)								
5.8	W1	Recirculate settled water for ground boring and drilling during site investigation or rock/soil anchoring.	To minimize wastewater generation	HyD's Contractor	Whole construction site	Throughout construction phase	ProPECC PN 1/94, EIAO-TM	✔
5.8	W2	Set up sedimentation tank for settling suspended solids in wastewater before discharge into storm drains. Sand/silt	To reduce the amount of suspended solid in wastewater	HyD's Contractor	Whole construction site	Throughout construction phase	ProPECC PN 1/94, EIAO-TM	✔

		removal facilities such as sand traps, silt traps and sedimentation basin should be provided with adequate capacity.						
5.8	W3	Pave the construction road between the wheel washing bay and the public road with backfall	To prevent soil and site runoff from leaving the site	HyD's Contractor	Whole construction site	Throughout construction phase	ProPECC PN 1/94, EIAO-TM	✔
5.8	W4	Follow ProPECC PN 1/94 "Construction Site Drainage" as far as practicable	To minimize surface runoff and chance of erosion	HyD's Contractor	Whole construction site	Throughout construction phase	ProPECC PN 1/94, EIAO-TM	✔
5.8	W5	Provide perimeter channels at site boundaries.	To stop offsite storm runoff from entering the site	HyD's Contractor	Whole construction site	Throughout construction phase	ProPECC PN 1/94, EIAO-TM	✔
5.8	W6	Construct catchpits and perimeter channels prior to commencement of site formation works and earthworks.	To stop runoff from flowing across the site	HyD's Contractor	Whole construction site	Throughout construction phase	ProPECC PN 1/94, EIAO-TM	✔
5.8	W7	Maintain silt removal facilities, channels, manholes before and after rainstorm.	To prevent failure that may lead to flooding	HyD's Contractor	Whole construction site	Throughout construction phase	ProPECC PN 1/94, EIAO-TM	*
5.8	W8	Remove sediment from silt and grit at regular interval.	To prevent blockage the may lead to flooding	HyD's Contractor	Whole construction site	Throughout construction phase	ProPECC PN 1/94, EIAO-TM	*
5.8	W9	Consider environmental requirements when diverting or realigning drainage.	To ensure adequate hydraulic capacity of all drains	HyD's Contractor	Whole construction site	Throughout construction phase	ProPECC PN 1/94, EIAO-TM	✔

5.8	W10	Maintain a minimum distance of 100m between discharge point of construction site runoff and the existing saltwater intakes. No effluent will be discharged into typhoon shelter. (for loations of seawater intakes, please refer to Figure 5.1 in EIA Report)	To prevent mixing	HyD's Contractor	Whole construction site	Throughout construction phase	ProPECC PN 1/94, EIAO-TM	✔
5.8	W11	Arrange soil excavation works outside rainy seasons (April to September) as far as possible. If this cannot beachieved, the following measures should be implemented:	To minimize surface runoff and chance of erosion	HyD's Contractor	Whole construction site	Throughout construction phase	ProPECC PN 1/94, EIAO-TM	
		-Cover temporary exposed slope surfaces with impermeable materials, e.g. tarpaulin						#
		- Protect temporary access roads by crushed stone or gravel						✔
		- Proved intercepting channels along crest/edge of excavation						✔
		- Carry out adequate surface protection measures well before the arrival of a rainstorm						✔
5.8	W12	Compact soil after earthwork. Provide permanent work or surface protection with appropriate drainage channels immediately after forming the final surfaces.	To prevent soil erosion under rainstorm	HyD's Contractor	Whole construction site	Throughout construction phase	ProPECC PN 1/94, EIAO-TM	✔
5.8	W13	Prevent rainwater from entering trenches. Excavation of trenches should be dug and backfilled in short sections during rainy	To prevent soil erosion under rainstorm	HyD's Contractor	Whole Construction site	Throughout construction phase	ProPECC PN 1/94, EIAO-TM	✔

		seasons. Remove silt in rainwater collected from the trenches or foundation excavations prior to discharge to storm drains.						
5.8	W14	Cover open stockpiles of construction materials (e.g. aggregates, sand and fill materials) with impermeable materials such as tarpaulin during rainstorms.	To prevent soil erosion under rainstorm	HyD's Contractor	Whole construction site	Throughout construction phase	ProPECC PN 1/94, EIAO-TM	✔
5.8	W15	Cover and temporary seal manholes (including newly constructed ones) to prevent silt, construction materials or debris and surface runoff from entering foul sewers.	To prevent overloading of foul sewers	HyD's Contractor	Whole construction site	Throughout construction phase	ProPECC PN 1/94, EIAO-TM	✔
5.8	W16	Remove waste from the site regularly.	To prevent waste accumulation	HyD's Contractor	Whole construction site	Throughout construction phase	ProPECC PN 1/94, EIAO-TM	#
5.8	W17	Apply discharge license for effluent discharge. Treat the discharge to comply with the requirement in TM-DSS.	To ensure compliance with effluent discharge requirement	HyD's Contractor	Whole construction site	Throughout construction phase	WPCO,TM-DSS, EIAO-TM	✔
5.8	W18	Reuse treated effluent onsite, e.g. dust suppression, wheel washing and general cleaning.	To minimize wastewater generation	HyD's Contractor	Whole construction site	Throughout construction phase	Waste Disposal Ordinance, EIAO-TM	✔
5.8	W19	Monitor effluent water quality.	To ensure compliance with effluent discharge requirement	HyD's Contractor	Whole construction site	Throughout construction phase	WPCO, EIAO-TM	✔
5.8	W20	Register as chemical waste producer if chemical waste will be generated.	To control chemical waste	HyD's Contractor	Whole construction site	Throughout construction phase	Waste Disposal (Chemical Waste) (General)	✔

							Regulation, EIAO-TM	
5.8	W21	Perform maintenance of vehicles and equipment that have oil leakage and spillage potential on hard standings within a bunded area with sumps and oil interceptors.	To prevent oil leakage or spillage	HyD's Contractor	Whole construction site	Throughout construction phase	Waste Disposal (Chemical Waste) (General) Regulation, EIAO-TM	✔
5.8	W22	Dispose chemical waste in accordance to Waste Disposal Ordinance. Follow the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes* ,examples as follows: - Store chemical wastes with suitable containers to avoid leakage or spillage during storage, handling and transport - Label chemical waste containers according to the CoP to notify and warn the waste handlers - Store chemical wastes at designated safe location with adequate space	To avoid accident in waste storage and handling	HyD's Contractor	Whole construction site	Throughout construction phase	Waste Disposal Ordinance, EIAO-TM	✔

5.8	W23	Provide sufficient chemical toilets with regular maintenance by licensed chemical waste collector	To proper collection of taskforce waste	HyD's Contractor	Whole construction site	Throughout construction phase	Waste Disposal Ordinance, EIAO-TM	✔
Water Impact (Operational Phase)								
5.8	W24	Direct surface runoff for silt removal through silt trap before flowing to public storm water drainage system	To remove silt in surface runoff	HyD	Whole construction site	Throughout construction phase	WPCO, EIAO-TM	✔
5.8	W25	Regularly maintain the silt traps	To prevent blockage	HyD	Whole construction site	Throughout construction phase	WPCO, EIAO-TM	✔
Waste Management (Construction Phase)								
6.5	WM1	Allocate an area for waste sorting and storage of C&D materials into the following categories for reuse, recycle or disposal: - excavated material suitable for reuse - inert C&D material for disposal offsite - non-inert C&D materials for disposal at landfills - chemical waste - general refuse	To minimize waste generation	HyD's Contractor	Whole construction site	Throughout construction phase	Waste Disposal Ordinance, EIAO-TM	#
6.5	WM2	Adopt good site practice as follows: - Provide training to workers on site cleanliness, waste management (waste	To proper handling of waste	HyD's Contractor	Whole construction site	Throughout construction phase	Waste Disposal Ordinance, EIAO-TM	✔

		reduction, reuse and recycle) and chemical handling procedures - Provide sufficient waste collection points and regular removal - Cover waste materials with tarpaulin or in enclosure during transportation - Maintain drainage systems, sumps and oil interceptors - Sort out chemical waste for proper handling and treatment						
6.5	WM3	Adopt waste reduction measures as follows: - Allocate area/containers for sorting, recovering and storing waste for reuse, recycle or disposal (e.g. demolition debris and excavated materials, general refuse like aluminium cans) - Allocate area for proper storage of construction materials to prevent contamination - Minimize wastage through careful planning and avoiding over-purchase of construction materials	To minimize waste generation	HyD's Contractor	Whole construction site	Throughout construction phase	Waste Disposal Ordinance, EIAO-TM	✔
6.5	WM4	Prepare and implement a site specific Waste Management Plan (WMP) as part of Environmental Management Plan (EMP) in accordance with ETWB TCW No. 19/25. Detail waste management method in the form of avoidance, reuse, recoverery,	To provide guidance to waste management	HyD's Contractor	Whole construction site	Throughout construction phase	ETWB TCW No. 19/2005, EIAO-TM	✔

		recycling, storage, collection, treatment and disposal according to the recommendations on the EIA and EM&A Manual. It should be approved by the ER and						
6.5	WM5	Store waste materials properly as follows: - Avoid contamination by proper handling and storing waste - Prevent erosion by covering waste or applying water spray - Maintain and clean storage area regularly - Sort and stockpile different materials at designated location to enhance reuse	To properly store waste	HyD's Contractor	Whole construction site	Throughout construction phase	ProPECC PN 1/94, EIAO-TM	✔
6.5	WM6	Apply for relevant waste disposal permits in accordance with the Waste Disposal Ordinance (Cap. 354), Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 345) and the Land (Miscellaneous Provisions) Ordinance (Cap. 28).	To properly dispose waste	HyD's Contractor	Whole construction site	Throughout construction phase	Waste Disposal Ordinance (Cap. 354), Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 345) and the Land (Miscellaneous Provisions) Ordinance (Cap. 28), EIAO-TM	✔

6.5	WM7	Hire licensed waste disposal contractors for waste collection and removal. Dispose waste at licensed waste disposal facilities	To properly dispose waste	HyD's Contractor	Whole construction site	Throughout construction phase	Waste Disposal Ordinance, EIAO-TM	✔
6.5	WM8	Implement trip-ticket system for recording the amount of waste generated, recycled and disposed, including chemical wastes	To monitor movement of waste	HyD's Contractor	Whole construction site	Throughout construction phase	Waste Disposal (Chemical Waste) (General) Regulation, Waste Disposal Ordinance, EIAO-TM	✔
6.5	WM9	Provide wheel washing bay at site exit to clean the vehicle body and wheel	To prevent dust from being brought offsite	HyD's Contractor	Whole construction site	Throughout construction phase	ProPECC PN 1/94, EIAO-TM	✔
6.5	WM10	Reduce water content in wet spoil generated from piling work by mixing with dry materials. Only dispose treated spoil with less than 25% dry density to Public Fill Reception Facilities	To minimize load to reception facilities	HyD's Contractor	Whole construction site	Throughout construction phase	Waste Disposal Ordinance, EIAO-TM	✔
6.5	WM11	Dispose dry waste or waste with less than 70% water content by weight to landfill	To minimize load to reception facilities	HyD's Contractor	Whole construction site	Throughout construction phase	Waste Disposal Ordinance, EIAO-TM	✔
6.5	WM12	Follow the *Code of Practice on the Packaging, Labelling and Storage of Chemical Waste* as follows: - Store chemical wastes with suitable	To avoid accident in waste storage and handling	HyD's Contractor	Whole construction site	Throughout construction phase	Waste Disposal Ordinance, EIAO-TM	✔

		containers. Seal and maintain the container to avoid leakage or spillage during storage, handling and transport - Label chemical waste containers in both English and Chinese with instructions in accordance to Schedule 2 of the Waste Disposal (Chemical Waste) (General) Regulation - The container capacity should be smaller than 450 litres unless agreed by the EPD						
6.5	WM13	Comply with the requirement of the chemical storage area: - Store only chemical waste and label clearly the chemical characters of the waste - Have at least 3 sides enclosed and protected from rainfall with cover - Provide sufficient ventilation - Have impermeable floor and has bunds to contain 110% of the capacity of the largest container or 20% of the total volume of the stored waste in the area, whichever is larger - Adequately spaced incompatible materials	To ensure proper storage of chemical waste	HyD's Contractor	Whole construction site	Throughout construction phase	Waste Disposal Ordinance, EIAO-TM	✔
6.5	WM14	Transfer used lubricants, waste oils and other chemicals to oil recycling companies, if possible, and empty oil drums for reuse or refill. No direct or indirect discharge is permitted	To ensure proper disposal of chemical waste	HyD's Contractor	Whole construction site	Throughout construction phase	Waste Disposal (Chemical Waste) (General) Regulation, EIAO-TM	N/A

6.5	WM15	Hire licensed chemical waste disposal contractors for waste collection and removal. Dispose chemical waste at the approved CWTC at Tsing Yi or other licensed facility	To ensure proper disposal of chemical waste	HyD's Contractor	Whole construction site	Throughout construction phase	Waste Disposal (Chemical Waste) (General) Regulation, EIAO-TM	N/A
6.5	WM16	Hire reputable waste collector to separately collect and dispose general refuse from other wastes. Cover the waste to prevent being blown away	To ensure proper disposal of general refuse	HyD's Contractor	Whole construction site	Throughout construction phase	Waste Disposal (Chemical Waste) (General) Regulation, EIAO-TM	✔
6.5	WM17	Provide recycling bins for sorting out recyclables for collection by recycling companies. Non-recyclables should be removed to designated landfills every day by licensed collectors to prevent environmental and health nuisance.	To ensure proper recycling and disposal of general refuse	HyD's Contractor	Whole construction site	Throughout construction phase	Waste Disposal Ordinance, EIAO-TM	✔
6.5	WM18	Organize training and reminders to site staff on waste minimization through avoidance and reduction, reusing and recycling	To ensure proper management of general refuse	HyD's Contractor	Whole construction site	Throughout construction phase	EIAO-TM	✔
6.5	WM19	Carry out testing to verify sediment quantity and quality	To verify the categories of sediment to be disposed in accordance with ETWB TC(W) No. 34/2002	HyD's GI Contractor	Drillholes CB1 to 5 as shown in Sediment Sampling and Testing Plan	Throughout construction phase	ETWB TC(W) No. 34/2002	✔

Landscape and Visual								
7.9.3	CM1	Shorten the construction period	To minimize duration of landscape and visual impact	HyD's Contractor	Whole construction site	Throughout construction phase	EIAO-TM	N/A
7.9.3	CM2	Limit work within site area without encroaching into the landscape resources offsite.	To minimize landscape and visual impact	HyD's Contractor	Whole construction site	Throughout construction phase	EIAO-TM	✔
7.9.3	CM3	Protect retained trees from damage during construction work according to the recommended in the detailed tree assessment report and the approval of Tree Removal Application under ETWB TCW No. 3/2006 Tree Preservation	To maintain and minimize damage to existing greenery	HyD's Contractor	Whole construction site	Throughout construction phase	ETWB TCW 3/2006, EIAOTM	✔
7.9.3	CM4	Transplant unavoidably affected trees wherever possible in accordance with ETWB TCW No. 3/2006 Tree Preservation. Maintain transplanted trees to ensure healthy development during the establishment period	To minimize tree loss and ensure survival of transplanted trees	HyD's Contractor	Whole construction site	Throughout construction phase	ETWB TCW 3/2006, EIAOTM	N/A
7.9.2.6	OM1	Carry out compensatory planting in areas proposed in the Tree Survey and Landscape and Greening Study Report in accordance to ETWB TCW 3/2006, which will be subjected to refinement in detailed design stage. Compensatory planting of a ratio no less than 1:1 in terms of quality and quantity will be provided for any potential tree	To compensate for loss greenery	HyD's Contractor	Whole construction site/Offsite	Construction phase	ETWB TCW 3/2006, EIAOTM	N/A

		felling within the site. Offsite planting may be required due to land constraint. 410 nos. of compensatory trees have been proposed						
7.9.2.6	OM2	Provide vertical greening at piers of elevated roads and shrub planting near amenity planting strips to soften the hard landscape (e.g. climber and shrub for hiding central divider and enclosures). Early comments from the ACABAS and relevant departments, implementation and maintenance agents shall be sought at the earlier stage.	To soften hard landscape	HyD's Contractor	Whole construction site	Construction phase	ETWB TCW 36/2004	N/A
7.9.2.6	OM3	Match the design and materials of road structure with the surrounding environment and with the schematic theme paving of the future West Kowloon Reclamation Development and the Advisory Committee on the Appearance of Bridges and Associated Structures (ACABAS)	To match with existing landscape character	HyD's Contractor	Whole construction site	Construction phase	ETWB TCW 36/2004	N/A

Remarks:

✔	Compliance of mitigation measure
X	Non-compliance of mitigation measure
•	Non-compliance but rectified by the contractor
*	Recommendation was made during site audit but improved/rectified by the contractor
#	Waiting for improving/rectifying by the contractor
N/A	Not Applicable

Appendix I: Cumulative Log for Environmental Exceedance, Complaints, Notification of Summons and Successful Prosecutions

Cumulative Log for Environmental Exceedance, Non-Compliance, Complaints, Notification of Summons and Successful Prosecution

Reporting Month	Number of Exceedance	Number of Non-Compliance	Number of Environmental Complaints	Number of Notification of Summons	Number of Successful Prosecutions
February 2016	0	0	0	0	0
March 2016	0	0	0	0	0
April 2016	0	0	2	0	0
May 2016	7	0	0	0	0
June 2016	11	0	0	0	0
July 2016	6	0	0	0	0
August 2016	6	0	0	0	0
September 2016	5	0	0	0	0
October 2016	6	1	0	0	0
November 2016	5	0	0	0	0
December 2016	5	0	0	0	0
January 2017	5	0	0	0	0
February 2017	5	0	0	0	0
March 2017	6	0	0	0	0
April 2017	6	0	1	0	0
Grand Total	73	1	3	0	0

大成環境科技拓展有限公司
ENVIRONMENTAL PIONEERS & SOLUTIONS LIMITED
Member of FSE Engineering Holdings (Stock Code: 331)

Our ref.: KFMF0165-WKRI-20170323

26th April 2017

Dear Sirs/Madams,

Contract No. HY/2013/17 –
Road Improvement Works in West Kowloon Reclamation Development

Complaint Investigation Report and Log

Based on the complaint incident received with details of:

EPD complaint ref.:	(6) in EP3/K03/RE/00009515-17
Date received:	23rd April 2017
Incident location:	Lin Cheung Road Northbound
Description:	EPD received a complaint by a driver referred from 1823 about muddy water from construction work near West Kowloon Highway (towards the direction of Olympic City) which flowed to the area of 3-way interchange junction of West Kowloon Highway and would endanger the road users and contaminate the vehicles passing by. Letter from EPD by fax was received on 11th April 2017. On the other hand, HyD/Works, the Employer of this contract, informed PB and VC on 23rd March 2017 that a 1823 complaint regarding the captioned issue was received by HyD/Region on 23rd March 2017.

Enclosed please find the complaint investigation report and log sheets of the incident as for your record.

Yours faithfully,

Goldie Fung
ET leader

Environmental Pioneers and Solutions Limited

Flat A, 19/F, Chaiwan Industrial Centre, 20 Lee Chung Street, Chai Wan, Hong Kong Tel: (852) 2556 9172 Fax: (852) 2856 2010
香港柴灣利眾街 20 號柴灣中心工業大廈 19 字樓 A 座 電話: (852) 2556 9172 傳真: (852) 2856 2010 http://www.epsl.com.hk

Contract No. HY/2013/17 Road Improvement Works in West Kowloon Reclamation Development

Report for Complaint / Concern
EPD complaint ref.: (6) in EP3/K03/RE/00009515-17

RECIPIENT

Name: Vibro Construction Company Limited

Details: EPD received a complaint by a driver referred from 1823 about muddy water from construction work near West Kowloon Highway (towards the direction of Olympic City) which flowed to the area of 3-way interchange junction of West Kowloon Highway and would endanger the road users and contaminate the vehicles passing by. Letter from EPD by fax was received on 11th April 2017. On the other hand, HyD/Works, the Employer of this contract, informed PB and VC on 23rd March 2017 that a 1823 complaint regarding the captioned issue was received by HyD/Region on 23rd March 2017.

Received Date: 23rd March 2017 Received Time: N/A

COMPLAINANT

Name: N/A Tel: N/A
Address: N/A

COMPLAINT

☐Noise ☐Air quality/Dust ☑Water ☐Odour ☐Environment ☐Traffic/Pedestrian

☐Safety ☐Others

Event Date and Time: Morning (09:30 – 10:30) of 23rd March 2017

Location: Lin Cheung Road Northbound (Scheme HA of the Project)

INVESTIGATION RESULTS AND EVENT DESCRIPTION

1. Drilling operation for piling works were carried out near the roadside of Lin Cheung Road on 23rd March 2017.

2. During drilling operation, sheet-pile barriers had been erected at boundary of the drilling works area to prevent any underground water flowing away from the works area. (Figure 1.1)

3. At around 9:30am, drilling works passed the layer of existing rubble mound/ rockfill materials (at 35m below ground level). At that time, an unexpected large amount of underground water was suddenly spilled out. Then overflowed from the sheet-pile barriers to Lin Cheung Road Northbound.

4. Drilling works were suspended immediately.

5. The spilled out underground water was promptly pumped into the water treatment plant and water on the carriageway of Lin Cheung Road was cleared immediately.

6. The representatives of the Engineer and the Contractor had conducted a joint site investigation on 23rd March 2017 to review the cause of the incident and identify the follow up actions.

7. ET had conducted a site investigation with the representatives of the Engineer and the Contractor on 27th March 2017 to resolve the concern and review the follow up actions and mitigation measures. Details of the recommended enhancement for the mitigation measures are listed to Section of "Mitigation Measures and Recommendations" below.

8. Routine weekly site inspections were conducted on 3rd and 10th April 2017, observation of wastewater leakage was not noted during the site inspections.

9. The environmental complain was concluded to be caused by an unexpected incident.

MITIGATION MEASURES AND RECOMMENDATIONS

1. The following mitigation measures were implemented by the Contractor to enhance the prevention of water spilling out of site area.

   - Proper seal up of sheet-pile barriers were provided at piling area to collect the water. (Figure 2.1)
   - Additional cemented earthfill bunds were provided to seal up the gaps between sheet-pile barriers around the piling area to prevent leakage of water. (Figure 2.1)
   - Sandbags were used to encircle the pilling areas as a second protection after sheet-pile barriers. (Figure 2.2)
   - Sump pumps were provided to direct the water and underground water to water treatment facilities and decrease the retention time of underground water storing inside the drilling/ piling areas.
   - Site drainage system was properly maintained to collect and direct water to water treatment facilities and to prevent surface run-off. (Figure 2.3)
   - Sand bags were placed around the gullies along West Kowloon Highway to avoid surface runoff draining into the public drainage system. (Figure 2.4)

2. The Contractor was reminded to enhance the environmental control measures and effectively implement the mitigation measures to avoid any leakage and surface run-off of wastewater.

   - Maintain sump pumps in operation for the collection of stagnant wastewater.
   - Provide sufficient sump pumps in operation and spare sump pumps for emergent use.
   - Provide spare sandbags for emergent use.
   - Check the sheet-pile barriers of the drilling/ piling areas for preventing leakage and crack.
   - Maintain the water treatment facilities.

Signature: 

Goldie Fung, ET Leader

Date: 26th April 2017

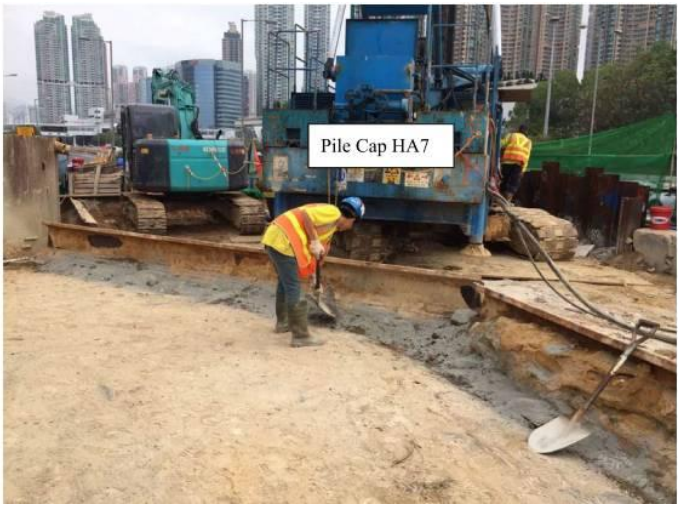
Photo records	
Figure 1.1 During drilling operation, sheet-pile barriers had been erected at boundary of the drilling works area to prevent any underground water flowing away from the works area.	
Figure 2.1 Proper seal up of sheet-pile barriers were provided at piling area to collect the water. Additional cemented earthfill bunds were provided to seal up the gaps between sheet-pile barriers around the piling area to prevent leakage of water.	
Figure 2.2 Sandbags were used to encircle the pilling areas as a second protection after sheet-pile barriers.	

	
Figure 2.3 Site drainage system was properly maintained to collect and direct water to water treatment facilities and to prevent surface run-off.	

Figure 2.4 Sand bags were placed around the gullies along West Kowloon Highway to avoid surface runoff draining into the public drainage system.	 

COMPLAINT / CONCERN LOG

Ref: KFMF0165-WKRI-20170323

Log Ref	Event Date/Location	Complainant/ Date of Contact	Details of Complaint	Investigation/Mitigation Action	File Closed
Ref no.: KFMF0165-WKRI-20170323 EPD complaint ref.: (6) in EP3/K03/RE/0 0009515-17	Lin Cheung Road (Scheme HA of the Project)	A complaint received on 23rd April 2017.	EPD received a complaint by a driver referred from 1823 about muddy water from construction work near West Kowloon Highway (towards the direction of Olympic City) which flowed to the area of 3-way interchange junction of West Kowloon Highway and would endanger the road users and contaminate the vehicles passing by. Letter from EPD by fax was received on 11th April 2017. On the other hand, HyD/Works, the Employer of this contract, informed PB and VC on 23rd March 2017 that a 1823 complaint regarding the captioned issue was received by HyD/Region on 23rd March 2017.	Investigation Result: 1. Drilling operation for piling works were carried out near the roadside of Lin Cheung Road on 23rd March 2017. 2. During drilling operation, sheet-pile barriers had been erected at boundary of the drilling works area to prevent any underground water flowing away from the works area. 3. At around 9:30am, drilling works passed the layer of existing rubble mound/ rockfill materials (at 35m below ground level). At that time, an unexpected large amount of underground water was suddenly spilled out. Then overflowed from the sheet-pile barriers to Lin Cheung Road Northbound. 4. Drilling works were suspended immediately. 5. The spilled out underground water was promptly pumped into the water treatment plant and water on the carriageway of Lin Cheung Road was cleared immediately. 6. The representatives of the Engineer and the Contractor had conducted a joint site investigation on 23rd March 2017 to review the cause of the incident and identify the follow up actions. 7. ET had conducted a site investigation with the representatives of the Engineer and the Contractor on 27th March 2017 to resolve the concern and review the follow up actions and mitigation measures. Details of the recommended enhancement for the mitigation measures are listed to Section of "Mitigation Measures and Recommendations" below.	Yes

				8. Routine weekly site inspections were conducted on 3rd and 10th April 2017, observation of wastewater leakage was not noted during the site inspections. 9. The environmental complain was concluded to be caused by an unexpected incident. Mitigation Measures: 1. The following mitigation measures were implemented by the Contractor to enhance the prevention of water spilling out of site area. - Proper seal up of sheet-pile barriers were provided at piling area to collect the water. (Figure 2.1) - Additional cemented earthfill bunds were provided to seal up the gaps between sheet-pile barriers around the piling area to prevent leakage of water. (Figure 2.1) - Sandbags were used to encircle the pilling areas as a second protection after sheet-pile barriers. (Figure 2.2) - Sump pumps were provided to direct the water and underground water to water treatment facilities and decrease the retention time of underground water storing inside the drilling/ piling areas. - Site drainage system was properly maintained to collect and direct water to water treatment facilities and to prevent surface run-off. (Figure 2.3) - Sand bags were placed around the gullies along West Kowloon Highway to avoid surface runoff draining into the public drainage system. 2. The Contractor was reminded to enhance the environmental control measures and effectively implement the mitigation measures to avoid any leakage and surface run-off of wastewater. - Maintain sump pumps in operation for the collection of stagnant wastewater.	

				- Provide sufficient sump pumps in operation and spare sump pumps for emergent use. - Provide spare sandbags for emergent use. - Check the sheet-pile barriers of the drilling/ piling areas for preventing leakage and crack. - Maintain the water treatment facilities.	

Filed by Environmental Team Leader:_____ _____ Date: 26th April 2017