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ENVIRONMENTAL PIONEERS & SOLUTIONS LIMITED
豐盛創建環保科技集團附屬公司 Subsidiary of FSE Environmental Technologies Group
豐盛創建成員 Member of FSE Holdings

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

Environmental Monitoring & Audit Report

01/07/2016 – 31/07/2016

The Contents of this report have been certified by:

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Executive Summary

This is the sixth monthly Environmental Monitoring and Audit (EM&A) Report for Proposed Road Improvement Works in West Kowloon Reclamation Development – Phase 1. The project commenced on 6th February 2016. This report documents the finding of EM&A Works conducted from 1st July 2016 to 31st July 2016.

Environmental Monitoring and Audit Progress

Air Quality Monitoring

1-hr Total Suspended Particulates (TSP) monitoring and 24-hr TSP monitoring were carried out on 5th, 11th, 15th, 21st, and 27th July 2016.

Noise Monitoring

30-min LEQ noise monitoring was carried out on 5th, 11th, 15th, 21st, and 27th July 2016.

Waste Management

According to Contractor's waste flow data, 5031.54 tonnes of inert C&D materials and 17.12 tonnes of general refuse were generated and disposed of.

Landscape and Visual Impact

Bi-weekly inspections were conducted on 12th and 29th July 2016. 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 4th, 11th, 20th and 25th July 2016. The representative of the IEC joined the site inspection on 20th July 2016. Details of the audit findings and implementation status are presented in Section 6.

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

No exceedance of action level and limit level was recorded for TSP. Six exceedances were recorded at NM2 on 21st July 2016 and NM4 on 5th, 11th, 15th, 21st and 27th July

2016 for Noise. No Non-compliance event, environmental complaint, notification of summons and successful prosecution against the Project were received in this reporting month.

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 HA – Underground Investigation Works
- Portion HA – Utilities Diversion Works
- Portion J – Utilities Diversion Works
- Portion J – Construction of Retaining Walls
- Portion Q – Road Works (excavation, drainage construction 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 6th 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 J – Utilities Diversion Works
- Portion J – Construction of Retaining Walls
- Portion Q – Road Works (excavation, drainage construction 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 1.5.1.

Table 1.5.1 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	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-A and AM4-A are proposed accordingly. Installation of high volume sampler at AM4-A is completed after the coordination with the representatives of premises. 24-hr TSP monitoring at AM4-A will be started in August 2016. 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	22°18'12.7"N 114°10'05.7"E	1-hr TSP

		Road		
AM3	The Cullinan I	Ground Floor Face to Nga Cheung Road	22°18'22.0"N 114°09'39.3"E	1-hr TSP
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-A	International Commerce Centre (Works Area 4)	Ground Floor Near to International Commerce Centre Roundabout on Nga Cheung Road and	22°18'10.5"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: 24-hr TSP monitoring at AM4-A will be started in August 2016.

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 5th, 11th, 15th, 21st, and 27th July 2016.

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 AM510	11510002	02/10/2015	01/10/2016
		11510003	02/10/2015	01/10/2016
		11510004	02/10/2015	01/10/2016
		11510005	02/10/2015	01/10/2016
High Volume Sampler	Tisch TE-5170	0001	15/07/2016	14/09/2016
		0002	15/07/2016	14/09/2016
		0003	15/07/2016	14/09/2016
Calibration Kit	Tisch TE-5028A	2137	11/02/2016	10/02/2017

2.4 Monitoring Methodology and Parameters

1-hr TSP and 24-hr TSP air quality monitoring has been carried out during the reporting period.

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: 10μ (PM_{10})
- 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-A		177	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 problem 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

24-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	44	27 – 62	288	500
AM2	32	16 – 62	299	500
AM3	39	28 – 57	299	500
AM4	43	17 – 67	303	500

Table 2.8.2 Summary of average 24-hr TSP monitoring data

Monitoring Locations	Average 24-hr TSP ($\mu g/m^3$)	Range 24-hr TSP ($\mu g/m^3$)	Action Level ($\mu g/m^3$)	Limit Level ($\mu g/m^3$)
AM1	28	15 – 42	157	260
AM2	81	36 – 152	183	260
AM3-A	61	40 – 90	177	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 and AM3-A. TSP levels of AM2 and AM4 may be affected by the construction activities from other construction sites near Canton Road. TSP level of AM3-A may be affected by construction activities from other construction sites near Nga Cheung Road.

2.9 Monitoring Schedule for Next Reporting Month

The monitoring schedule for next reporting month is scheduled on 2nd, 8th, 13th, 19th, 25th and 31st August 2016.

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 5th, 11th, 15th, 21st, and 27th July 2016.

3.3 Monitoring Equipment

Noise monitoring was conducted by using BSWA 806 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 971	IEC61672 Type 1	34350	28/12/2015	27/12/2016
Acoustical calibrator	SVANTEK SV30A	IEC 942 Type 1	29085	28/12/2015	27/12/2016

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 HOKAS 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	When one documented complaint is	75 dB(A)
NM2	Education			70 dB(A) / 65dB(A)*

NM3	Residential	weekdays	received	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	5/7/2016	75.1	65.8	N/A	When one documented complaint is received	75 dB(A)
	11/7/2016		66.1	N/A		
	15/7/2016		66.1	N/A		
	21/7/2016		65.7	N/A		
	27/7/2016		66.2	N/A		
NM2	5/7/2016	66.5	65.5	N/A	When one documented complaint is received	70 dB(A) *[3]
	11/7/2016		66.9	N/A		70 dB(A) *[3]
	15/7/2016		67.7	N/A		70 dB(A) *[3]
	21/7/2016		74.0	74.6		70 dB(A) *[3]
	27/7/2016		67.8	N/A		70 dB(A) *[3]
NM3	5/7/2016	74.5	74.1	N/A	When one documented complaint is received	75 dB(A)
	11/7/2016		73.5	N/A		
	15/7/2016		74.1	N/A		
	21/7/2016		73.4	N/A		
	27/7/2016		74.1	N/A		
NM4	5/7/2016	73.3	73.6	74.1	When one documented complaint is received	70 dB(A) *[3]
	11/7/2016		73.3	73.9		70 dB(A) *[3]
	15/7/2016		74.4	74.1		70 dB(A) *[3]
	21/7/2016		74.0	73.4		70 dB(A) *[3]
	27/7/2016		75.1	74.4		70 dB(A) *[3]
NM5	5/7/2016	71.8	69.4	N/A	When one documented complaint is received	75 dB(A)
	11/7/2016		72.6	N/A		
	15/7/2016		71.1	N/A		
	21/7/2016		72.3	N/A		
	27/7/2016		71.0	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 NM2 on 21st July 2016 and NM4 on 5th, 11th, 15th, 21st and 27th July 2016. 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 NM2 was from other construction site, Design and Construction of West Kowloon Government Offices (DCWKGO), which located at No.11 Hoi Ting Road. The construction site of DCWKGO is located between Portion J and the NM2 and close to the NM2. The NM2 was directly affected by the noise generated from the construction site of DCWKGO. The exceedances were not caused by this project construction works.

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 this project construction works.

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 2nd, 8th, 13th, 19th, 25th and 31st August 2016.

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)
July 2016	5031.54	17.12	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 12th and 29th July 2016. 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 4th, 11th, 20th and 25th July 2016. The representative of the IEC joined the site inspection on 20th July 2016. 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
22 Jun 16	Exposed surface and unpaved areas appeared dry. (Scheme I & Scheme J)	Observation	Contractor was advised to frequently implement the water spraying and cover the exposed surface as possible.	Exposed areas were sprayed with water for dust control or cover with tarpaulin as possible.	4 Jul 16
22 Jun 16 4 Jul 16	Stagnant water was accumulated in areas of underground works (Scheme J).	Observation	Contractor was advised to set up the pumps and drainage system for collecting and directing the water from the underground areas.	Pumps were set up for collecting and directing the water from underground areas.	11 Jul 16
22 Jun 16	Sand and silt were accumulated in the drip tray of the generator near the slope (Scheme J)	Observation	Contractor was advised to remove the sand and silt from the drip tray and also relocate the generator for preventing close to the slope.	The generator was relocated. The sand and silt from the drip tray was removed.	4 Jul 16
27 Jun 16	A bag of cement was exposed (Scheme Q)	Observation	Contractor was advised to remove the cement and properly store the dusty materials.	The exposed cement was removed.	4 Jul 16
11 Jul 16	Wet season was being started.	Reminder	Contractor was reminded to frequently remove the stagnant water during wet season for prevention and control of mosquito and keeping the site clean and tidy.	N/A	N/A
20 Jul 16	The tarpaulin sheets covering the exposed slope were eroded. (Scheme J)	Observation	Contractor was advised to replace the tarpaulin sheets and properly protect the slope.	Exposed slope were properly covered.	25 Jul 16
20 Jul 16	There is inadequate interception along the edge of excavation. (Scheme Q)	Observation	Contractor was advised to provide sandbags along the edge of the excavation area such to prevent the dust from entering the neighbouring roads.	The edge of the excavated area was properly intercepted by using the sandbags.	25 Jul 16
20 Jul 16	A stockpile of waste materials due to illegal dumping from others was observed near out of the site boundary.	Reminder	Contractor was reminded to remove the waste materials as these materials fall within the site area.	N/A	N/A
Landscape and Visual Impact					
27 May 16 10 Jun 16 24 Jun 16 12 Jul 16 29 Jul 16	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
24 Jun 16	TPZ was collapsed (Scheme J)	Observation	Contractor was reminded to properly maintain the TPZ.	TPZ was proved for the retained trees.	12 Jul 16
12 Jul 16 29 Jul 16	Construction works were being started within Scheme J and Scheme HA	Reminder	Contractor was reminded to provide TPZ with robust fence at the dripline of all	N/A	N/A

Date	Findings	Identification	Advice from ET	Action taken	Closing date
			retained and to-be-transplanted trees. No works were allowed to undertake within the TPZ		
12 Jul 16 29 Jul 16	Transplanting works were being started with Scheme J and Scheme HA	Reminder	Contractor was reminded to provide sufficient stabilization system and mulching to the transplanted trees.	N/A	N/A
12 Jul 16 29 Jul 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
12 Jul 16 29 Jul 16	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

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 NM2 on 21st July 2016 and NM4 on 5th, 11th, 15th, 21st and 27th July 2016 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

No environment project-related complaint was received in the reporting period.

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 HA – Underground Investigation Works
- Portion HA – Utilities Diversion Works
- Portion J – Utilities Diversion Works
- Portion J – Construction of Retaining Walls
- Portion Q – Road Works (excavation, drainage construction 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 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 implement the water spraying and cover the exposed surface as possible;
- To set up the pumps and drainage system for collecting and directing the water from the underground areas;
- To remove the sand and silt from the drip tray and also relocate the generator for preventing close to the slope;
- To remove the cement and properly store the dusty materials;
- To frequently remove the stagnant water during wet season for prevention and control of mosquito and keeping the site clean and tidy;
- To replace the tarpaulin sheets and properly protect the slope;
- To provide sandbags along the edge of the excavation area such to prevent the dust from entering the neighbouring roads;
- To remove the waste materials as these materials fall within the site area;
- To relocate the construction materials which were piled within the TPZ;
- No properly maintain the TPZ;
- To provide TPZ with robust fence at the dripline of all retained and to-be-transplanted trees;
- To provide sufficient stabilization system and mulching to the transplanted trees.
- To remove the ties;
- To conduct crown pruning for the existing tree which next to T24.

9.3 Conclusions

This is the monthly Environmental Monitoring and Audit (EM&A) Report presenting the EM&A works undertaken during 1st July 2016 to 31st July 2016 in accordance with the EM&A Manual.

No exceedance of action level and limit level was recorded for TSP. Six exceedances were recorded at NM2 on 21st July 2016 and NM4 on 5th, 11th, 15th, 21st and 27th July 2016 for Noise. No Non-compliance event, environmental complaint, notification of summons and successful prosecution against the Project were received in this reporting month.

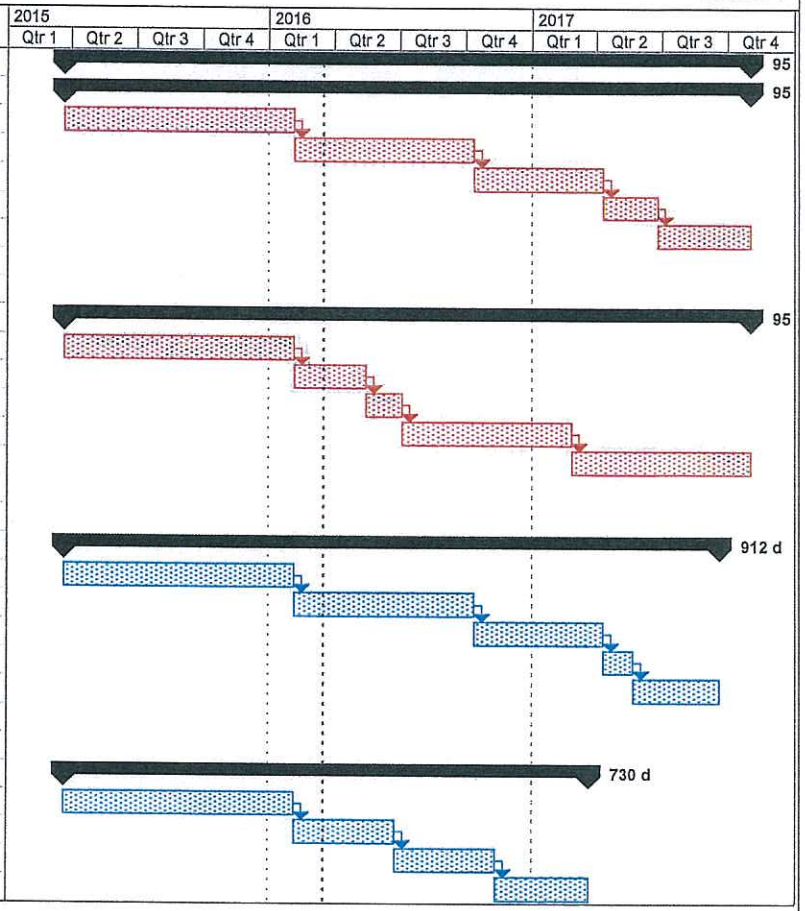
4 nos. of environmental site inspections and 2 nos. of landscape and visual inspections were carried out in this reporting month. Recommendations on remedial actions were given to the Contractor for the deficiencies identified during the site audit.

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

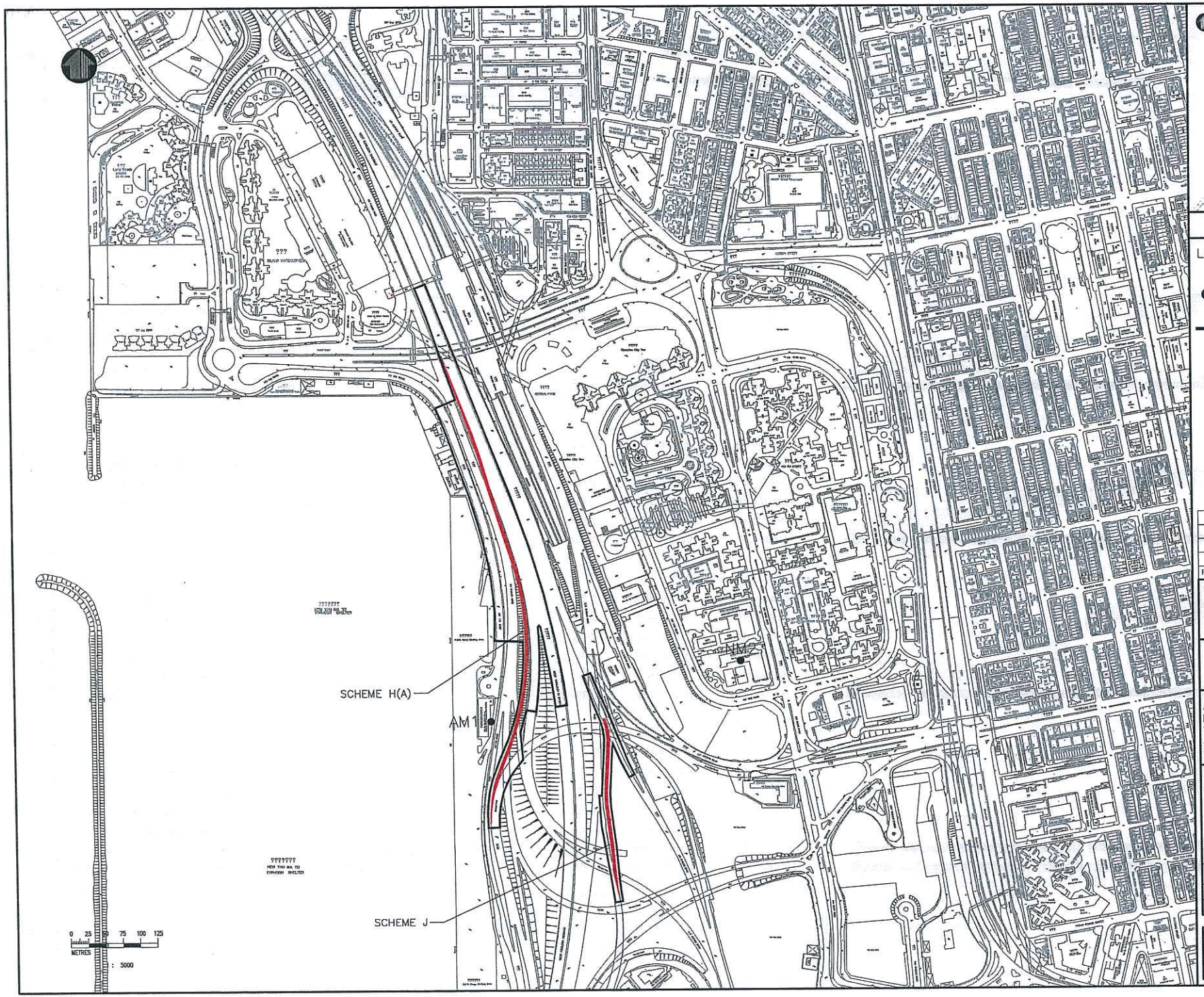
The ET will keep tracking of the EM&A programme to ensure compliance of environmental requirements and the proper implementation of all the necessary mitigation measures.

Appendix A: Construction Programme and Project Layout Plan

Task Name	Duration	Start	Finish
Road Improvement Works in West Kowloon Reclamation Development	**956 d**	**Mon 23/3/15**	**Thu 2/11/17**
West Kowloon Highway South Bound near Western Harbour Tunnel at Portion I	**956 d**	**Mon 23/3/15**	**Thu 2/11/17**
Site Clearance, tree felling	320 d	Mon 23/3/15	Fri 5/2/16
Underground investigation, utilities diversion and piling construction	250 d	Sat 6/2/16	Wed 12/10/16
Pile cap, Pier and Bridge Deck construction	180 d	Thu 13/10/16	Mon 10/4/17
E&M installation and roadworks	76 d	Tue 11/4/17	Sun 25/6/17
Street furniture installation	130 d	Mon 26/6/17	Thu 2/11/17
Canton road at Portion Q	**956 d**	**Mon 23/3/15**	**Thu 2/11/17**
Site Clearance, tree felling	320 d	Mon 23/3/15	Fri 5/2/16
Road works at Canton road footpath and utilities diversion	100 d	Sat 6/2/16	Sun 15/5/16
Construction of sign gantry	50 d	Mon 16/5/16	Mon 4/7/16
Road works at Ferry Street and Jordan road	236 d	Tue 5/7/16	Sat 25/2/17
Road works at Wui Cheung road	250 d	Sun 26/2/17	Thu 2/11/17
Lin Cheung Road North Bound at Portion HA	**912 d**	**Mon 23/3/15**	**Tue 19/9/17**
Site Clearance, tree felling	320 d	Mon 23/3/15	Fri 5/2/16
Underground investigation, utilities diversion and piling construction	250 d	Sat 6/2/16	Wed 12/10/16
Pile cap, Pier and Bridge Deck construction	180 d	Thu 13/10/16	Mon 10/4/17
E&M installation and roadworks	42 d	Tue 11/4/17	Mon 22/5/17
Street furniture installation	120 d	Tue 23/5/17	Tue 19/9/17
Lin Cheung Road South Bound at Portion J	**730 d**	**Mon 23/3/15**	**Tue 21/3/17**
Site Clearance, tree felling	320 d	Mon 23/3/15	Fri 5/2/16
Construction of retaining walls and utilities diversion	140 d	Sat 6/2/16	Fri 24/6/16
Site formation and roadworks	140 d	Sat 25/6/16	Fri 11/11/16
Street furniture installation	130 d	Sat 12/11/16	Tue 21/3/17



Task | Critical Task | Progress | Milestone | Summary



LOCATION PLAN

LEGEND:

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

Rev	Description	By

Consultant

PARSONS BRINCKERHOFF

CINOTECH

Project title

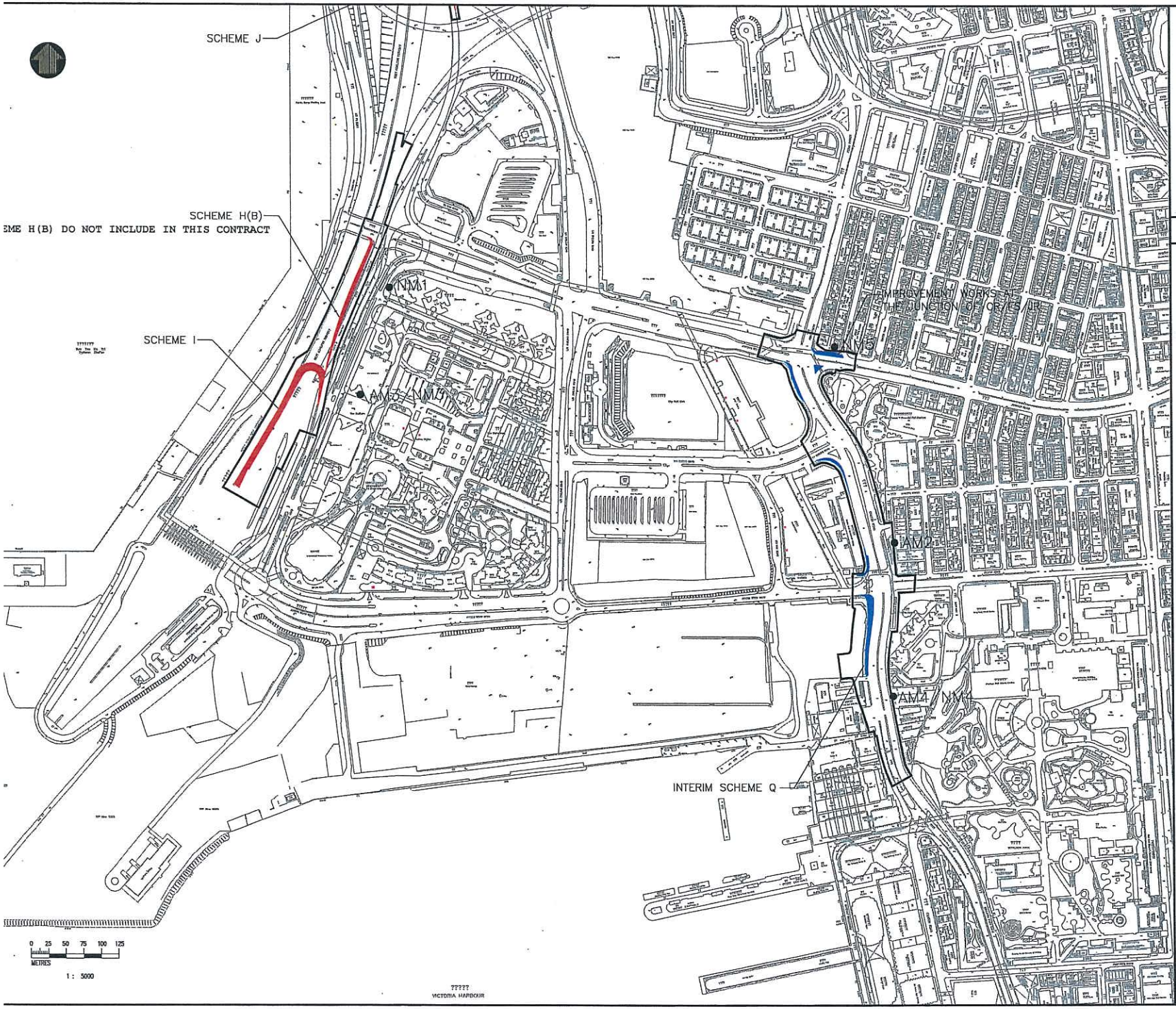
AGREEMENT NO. CE 44/2011 (HY)
PROPOSED ROAD IMPROVEMENT WO
WEST KOWLOON RECLAMATION DEVE
– PHASE 1 INVESTIGATION,
DESIGN AND CONSTRUCTION

Drawing title

LOCATION OF MONITORING STATIONS (PAGE 1 OF 2)

Drawing no.	CE44/T/ST/EM03		
Drawn	MC	Date AUG13	Checked KS
Scale	A3 1:5000	Status	PRELIMIN

路政署
HIGHWAYS DEPARTMEN
主要工程管理處
MAJOR WORKS PROJECT MANAGEM



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

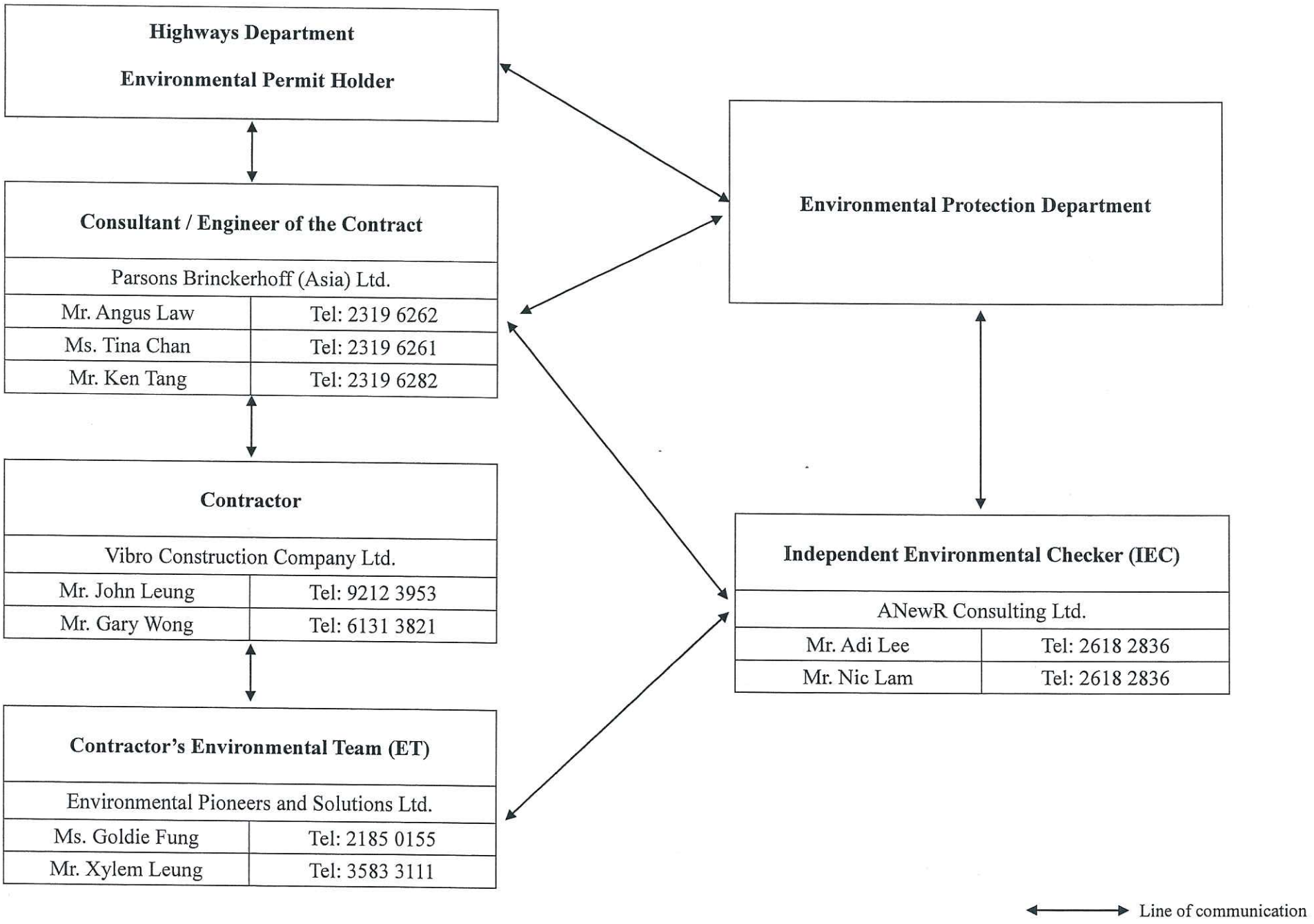
Drawing title

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		

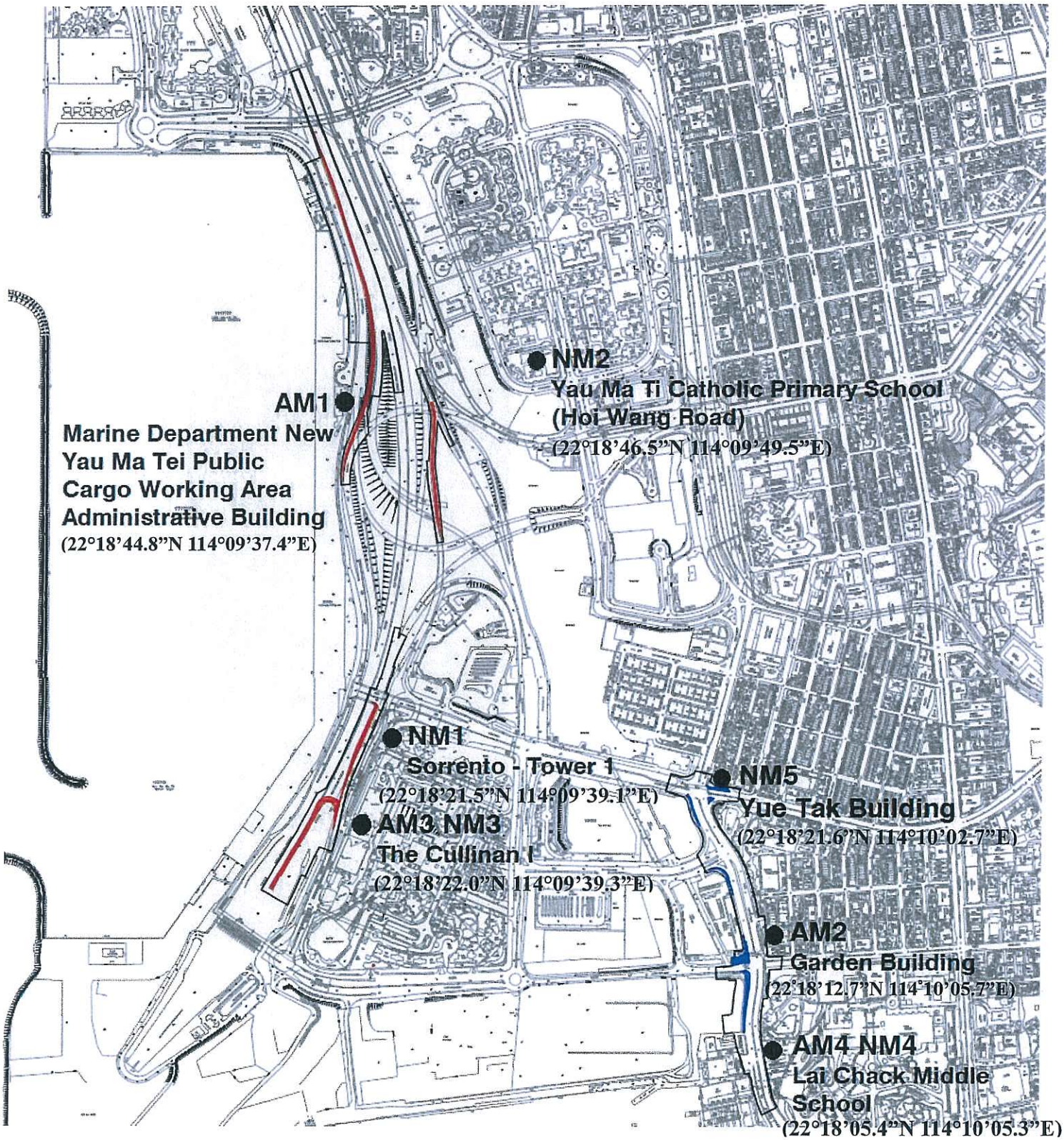
路政署
HIGHWAYS DEPARTMENT
主要工程管理處
MAJOR WORKS PROJECT MANAGEMENT OFFICE

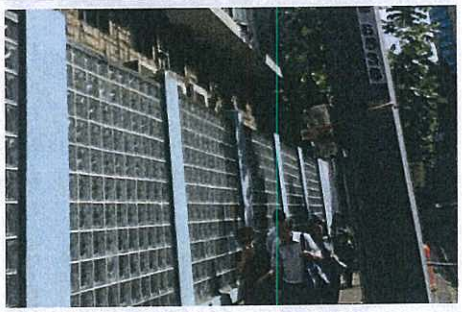
Appendix B: Project Organization Chart


Highways Department
Environmental Permit Holder
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
Contractor's Environmental Team (ET)
Environmental Pioneers and Solutions Ltd.
Ms. Goldie Fung Tel: 2185 0155
Mr. Xylem Leung Tel: 3583 3111
Environmental Protection Department
Independent Environmental Checker (IEC)
ANewR Consulting Ltd.
Mr. Adi Lee Tel: 2618 2836
Mr. Nic Lam Tel: 2618 2836
Line of communication

Appendix C: Monitoring Locations

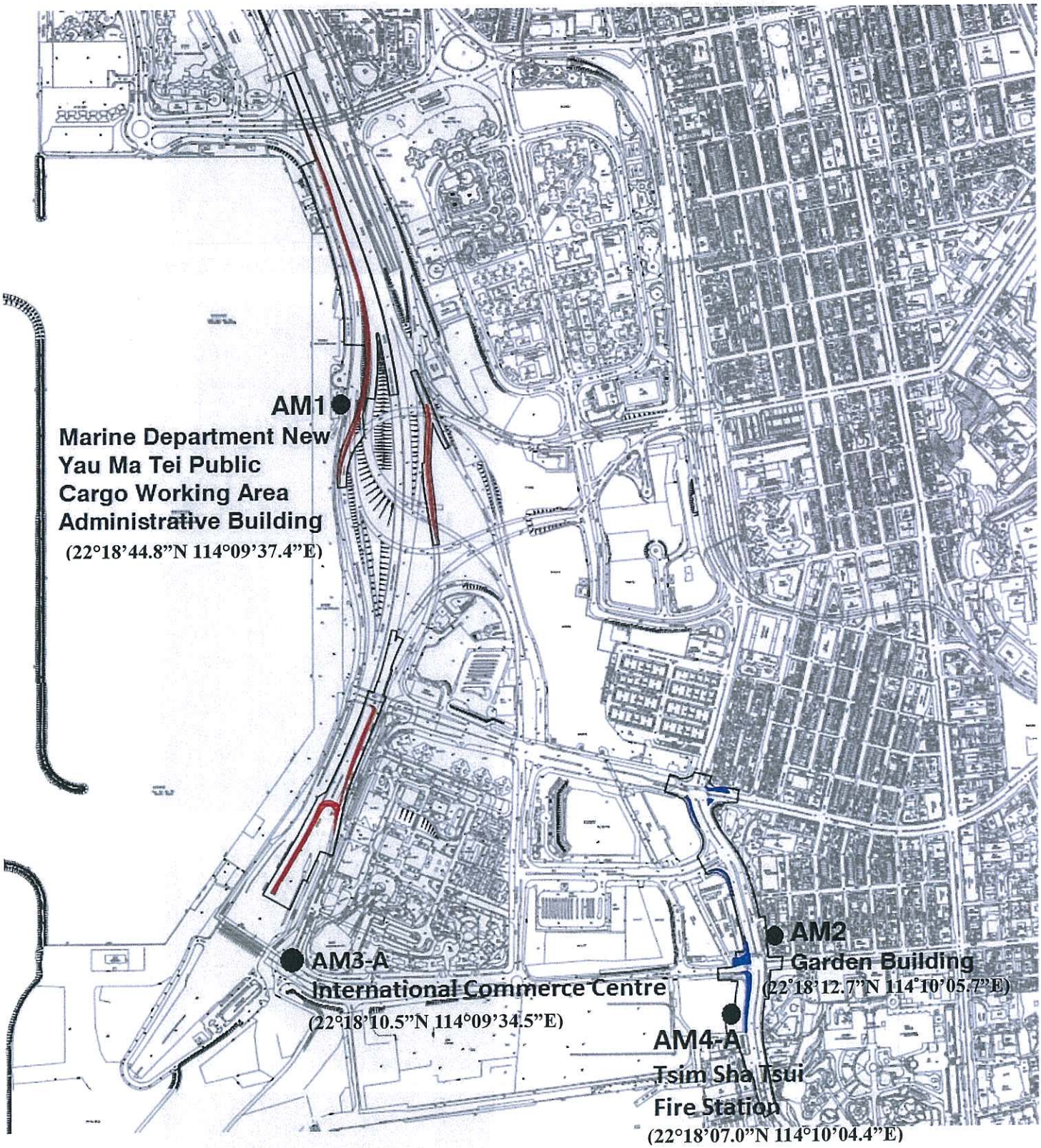
Locations for 1-hr TSP and Noise monitoring



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-A International Commerce Centre (Contractor Work Area 4)	

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

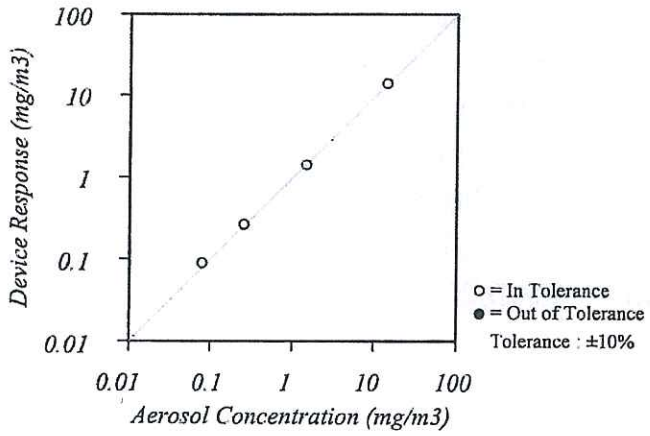
Environment Condition		
Temperature	74.2 (23.4)	°F (°C)
Relative Humidity	29	%RH
Barometric Pressure	29.45 (997.3)	inHg (hPa)

Model	**AM510**
Serial Number	**11510002**

☒ As Left ☐ As Found

☒ In Tolerance ☐ Out of Tolerance

Concentration Linearity Plot



System ID: DTII01-01

TSI Incorporated does hereby certify that all materials, components, and workmanship used in the manufacture of this equipment are in strict accordance with the applicable specifications agreed upon by TSI and the customer and with all published specifications. All performance and acceptance tests required under this contract were successfully conducted according to required specifications. There is no NIST standard for optical mass measurements. Calibration of this instrument performed by TSI has been done using emery oil and has been nominally adjusted to respirable mass of standard ISO 12103-1, A1 test dust (Arizona dust). Our calibration ratio is greater than 1.2:1

Measurement Variable	System ID	Last Cal.	Cal. Due
Photometer	E003433	09-09-15	03-09-16
DC Voltage(Keithley)	E002859	06-18-15	06-18-16
Temp/Humidity	E005409	04-16-15	04-16-16
Pressure	E003440	08-04-15	08-04-16

Measurement Variable	System ID	Last Cal.	Cal. Due
Flowmeter	E002371	03-02-15	03-02-16
Microbalance	M001324	01-05-15	01-05-17
Temp/Humidity	E005410	04-17-15	04-17-16

Linda Hultgren — Calibrated

☒ Final Function Check

October 2, 2015 — Date

大成環境科技拓展有限公司
ENVIRONMENTAL PIONEERS & SOLUTIONS LIMITED
豐盛創建環保科技集團附屬公司 Subsidiary of FSE Environmental Technologies Group
豐盛創建成員 Member of FSE Holdings

REPORT OF EQUIPMENT CALIBRATION

INSTRUMENT DESCRIPTION

It is certified that the item under calibration has been calibrated by corresponding calibrated High Volume Sampler.

Instrument:	TSP meter
Brand Name:	TSI
Model No.:	AM510
Serial No.:	11510002
Date of Issue:	27/10/2015
Date of Calibration:	12/10/2015
Date of Next Calibration:	11/10/2016

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

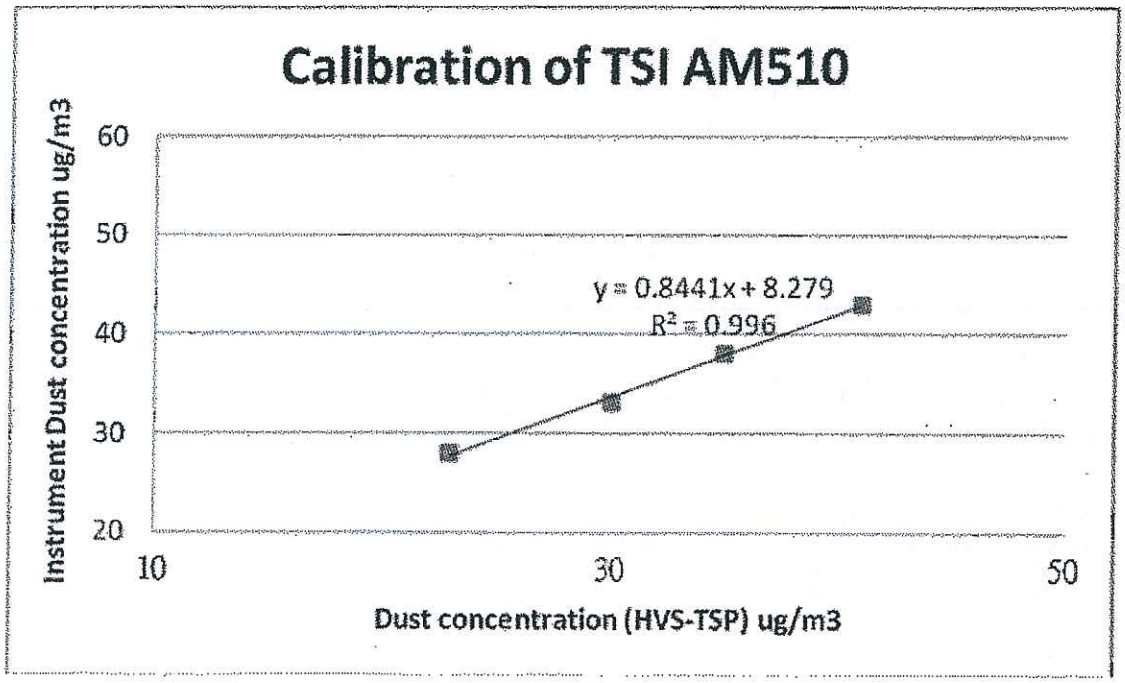
Mr. Ip Wing Hong, John
Manager

大成環境科技拓展有限公司
ENVIRONMENTAL PIONEERS & SOLUTIONS LIMITED
豐盛創建環保科技集團附屬公司 Subsidiary of FSE Environmental Technologies Group
豐盛創建成員 Member of FSE Holdings

Brand Name:	TSI
Model No.:	AM510
Serial No.:	11510002
HVS No.:	TE-5028A
HVS Calibration Kit No.:	TISCH 2137
Date of Calibration:	12/10/2015
Date of next Calibration:	11/10/2016

Calibration Record

HVS - TSP	23	30	35	41
TSI AM510	28	33	38	43



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

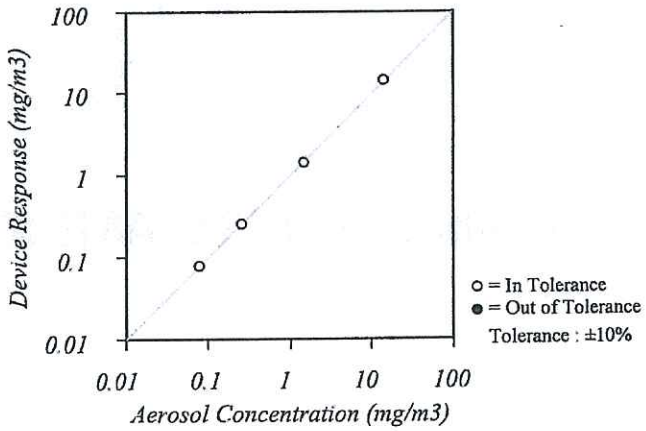
Environment Condition		
Temperature	74.2 (23.4)	°F (°C)
Relative Humidity	29	%RH
Barometric Pressure	29.45 (997.3)	inHg (hPa)

Model	AM510
Serial Number	11510003

☒ As Left ☐ As Found

☒ In Tolerance ☐ Out of Tolerance

Concentration Linearity Plot



System ID: DTII01-01

TSI Incorporated does hereby certify that all materials, components, and workmanship used in the manufacture of this equipment are in strict accordance with the applicable specifications agreed upon by TSI and the customer and with all published specifications. All performance and acceptance tests required under this contract were successfully conducted according to required specifications. There is no NIST standard for optical mass measurements. Calibration of this instrument performed by TSI has been done using emery oil and has been nominally adjusted to respirable mass of standard ISO 12103-1, A1 test dust (Arizona dust). Our calibration ratio is greater than 1.2:1

Measurement Variable	System ID	Last Cal	Cal. Due
Photometer	E003433	09-09-15	03-09-16
DC Voltage(Keithley)	E002859	06-18-15	06-18-16
Temp/Humidity	E005409	04-16-15	04-16-16
Pressure	E003440	08-04-15	08-04-16

Measurement Variable	System ID	Last Cal.	Cal. Due
Flowmeter	E002371	03-02-15	03-02-16
Microbalance	M001324	01-05-15	01-05-17
Temp/Humidity	E005410	04-17-15	04-17-16

Linda Hill Kremer
Calibrated

☒ Final Function Check

October 2, 2015
Date

大成環境科技拓展有限公司
ENVIRONMENTAL PIONEERS & SOLUTIONS LIMITED
豐盛創建環保科技集團附屬公司 Subsidiary of FSE Environmental Technologies Group
豐盛創建成員 Member of FSE Holdings

REPORT OF EQUIPMENT CALIBRATION

INSTRUMENT DESCRIPTION

It is certified that the item under calibration has been calibrated by corresponding calibrated High Volume Sampler.

Instrument:	TSP meter
Brand Name:	TSI
Model No.:	AM510
Serial No.:	11510003
Date of Issue:	27/10/2015
Date of Calibration:	12/10/2015
Date of Next Calibration:	11/10/2016

ISSUING ORGANISATION

Environmental Pioneers & Solutions Limited

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

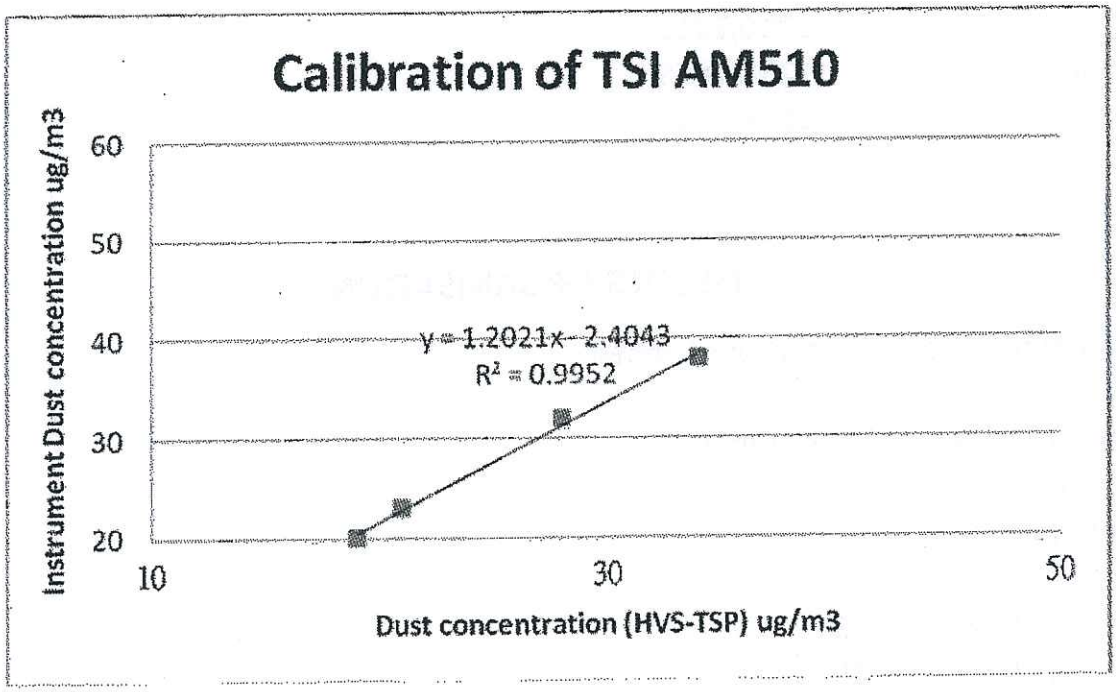
Phone: 852 - 2556 9172
Fax: 852 - 2856 2010

Mr. Ip Wing Hong, John
Manager

Brand Name:	TSI
Model No.:	AM510
Serial No.:	11510003
HVS No.:	TE-5028A
HVS Calibration Kit No.:	TISCH 2137
Date of Calibration:	12/10/2015
Date of next Calibration:	11/10/2016

Calibration Record

HVS - TSP	19	21	28	34
TSI AM510	20	23	32	38



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

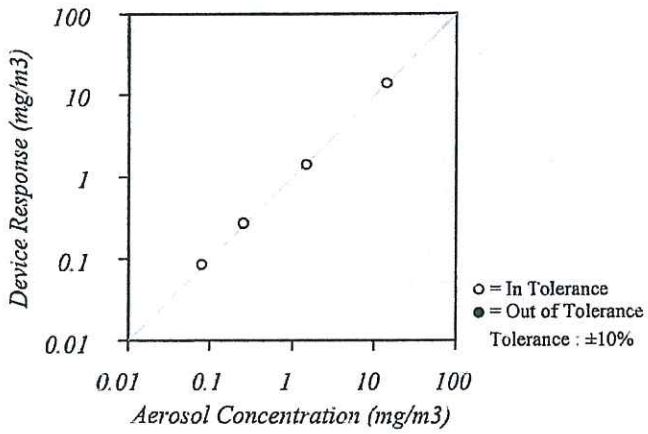
Environment Condition		
Temperature	74.2 (23.4)	°F (°C)
Relative Humidity	29	%RH
Barometric Pressure	29.45 (997.3)	inHg (hPa)

Model	**AM510**
Serial Number	**11510004**

☒ As Left ☐ As Found

☒ In Tolerance ☐ Out of Tolerance

Concentration Linearity Plot



System ID: DTII01-01

TSI Incorporated does hereby certify that all materials, components, and workmanship used in the manufacture of this equipment are in strict accordance with the applicable specifications agreed upon by TSI and the customer and with all published specifications. All performance and acceptance tests required under this contract were successfully conducted according to required specifications. There is no NIST standard for optical mass measurements. Calibration of this instrument performed by TSI has been done using emery oil and has been nominally adjusted to respirable mass of standard ISO 12103-1, A1 test dust (Arizona dust). Our calibration ratio is greater than 1.2:1

Measurement Variable	System ID	Last Cal.	Cal. Due	Measurement Variable	System ID	Last Cal.	Cal. Due
Photometer	E003433	09-09-15	03-09-16	Flowmeter	E002371	03-02-15	03-02-16
DC Voltage(Keithley)	E002859	06-18-15	06-18-16	Microbalance	M001324	01-05-15	01-05-17
Temp/Humidity	E005409	04-16-15	04-16-16	Temp/Humidity	E005410	04-17-15	04-17-16
Pressure	E003440	08-04-15	08-04-16				

Calibrated

☒ Final Function Check

October 2, 2015
Date

大成環境科技拓展有限公司
ENVIRONMENTAL PIONEERS & SOLUTIONS LIMITED
豐盛創建環保科技集團附屬公司 Subsidiary of FSE Environmental Technologies Group
豐盛創建成員 Member of FSE Holdings

REPORT OF EQUIPMENT CALIBRATION

INSTRUMENT DESCRIPTION

It is certified that the item under calibration has been calibrated by corresponding calibrated High Volume Sampler.

Instrument:	TSP meter
Brand Name:	TSI
Model No.:	AM510
Serial No.:	11510004
Date of Issue:	27/10/2015
Date of Calibration:	13/10/2015
Date of Next Calibration:	12/10/2016

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

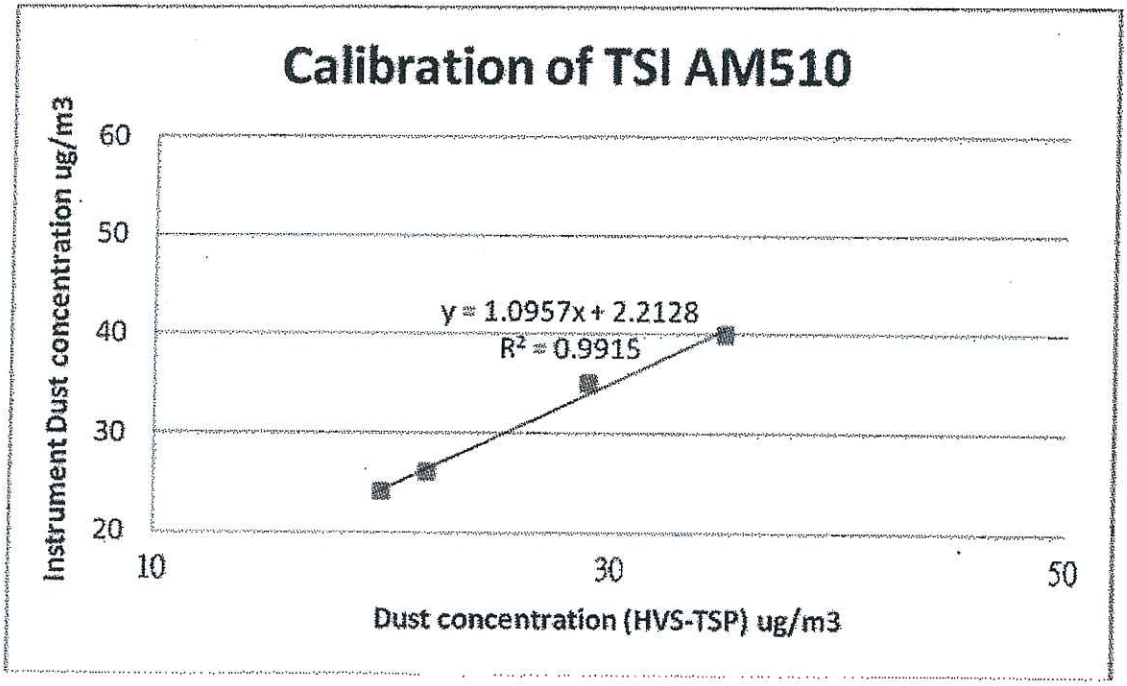
Mr. Ip Wing Hong, John
Manager

大成環境科技拓展有限公司
ENVIRONMENTAL PIONEERS & SOLUTIONS LIMITED
豐盛創建環保科技集團附屬公司 Subsidiary of FSE Environmental Technologies Group
豐盛創建成員 Member of FSE Holdings

Brand Name:	TSI
Model No.:	AM510
Serial No.:	11510004
HVS No.:	TE-5028A
HVS Calibration Kit No.:	TISCH 2137
Date of Calibration:	13/10/2015
Date of next Calibration:	12/10/2016

Calibration Record

HVS - TSP	20	22	29	35
TSI AM510	24	26	35	40



Mr. Ip Wing Hong, John
Manager

TSI P/N 2900157

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

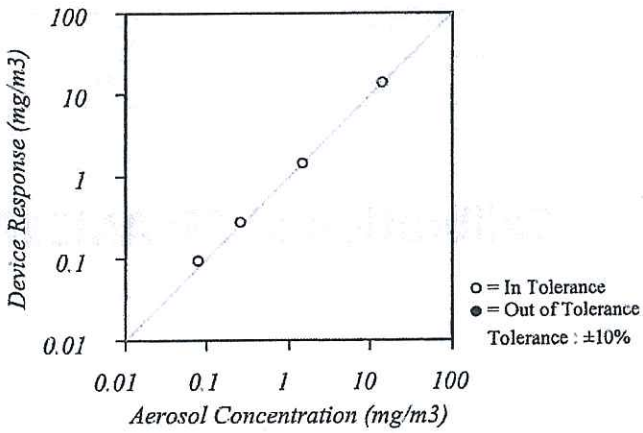
Environment Condition		
Temperature	74.2 (23.4)	°F (°C)
Relative Humidity	29	%RH
Barometric Pressure	29.45 (997.3)	inHg (hPa)

Model	AM510
Serial Number	11510005

☒ As Left ☐ As Found

☒ In Tolerance ☐ Out of Tolerance

Concentration Linearity Plot



System ID: DTII01-01

TSI Incorporated does hereby certify that all materials, components, and workmanship used in the manufacture of this equipment are in strict accordance with the applicable specifications agreed upon by TSI and the customer and with all published specifications. All performance and acceptance tests required under this contract were successfully conducted according to required specifications. There is no NIST standard for optical mass measurements. Calibration of this instrument performed by TSI has been done using emery oil and has been nominally adjusted to respirable mass of standard ISO 12103-1, A1 test dust (Arizona dust). Our calibration ratio is greater than 1.2:1

Measurement Variable	System ID	Last Cal.	Cal. Due
Photometer	E003433	09-09-15	03-09-16
DC Voltage(Keithley)	E002859	06-18-15	06-18-16
Temp/Humidity	E005409	04-16-15	04-16-16
Pressure	E003440	08-04-15	08-04-16

Measurement Variable	System ID	Last Cal.	Cal. Due
Flowmeter	E002371	03-02-15	03-02-16
Microbalance	M001324	01-05-15	01-05-17
Temp/Humidity	E005410	04-17-15	04-17-16

Calibrated

☒ Final Function Check

October 2, 2015
Date

大成環境科技拓展有限公司
ENVIRONMENTAL PIONEERS & SOLUTIONS LIMITED
豐盛創建環保科技集團附屬公司 Subsidiary of FSE Environmental Technologies Group
豐盛創建成員 Member of FSE Holdings

REPORT OF EQUIPMENT CALIBRATION

INSTRUMENT DESCRIPTION

It is certified that the item under calibration has been calibrated by corresponding calibrated High Volume Sampler.

Instrument:	TSP meter
Brand Name:	TSI
Model No.:	AM510
Serial No.:	11510005
Date of Issue:	27/10/2015
Date of Calibration:	13/10/2015
Date of Next Calibration:	12/10/2016

ISSUING ORGANISATION

Environmental Pioneers & Solutions Limited

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20 Lee Chung Street
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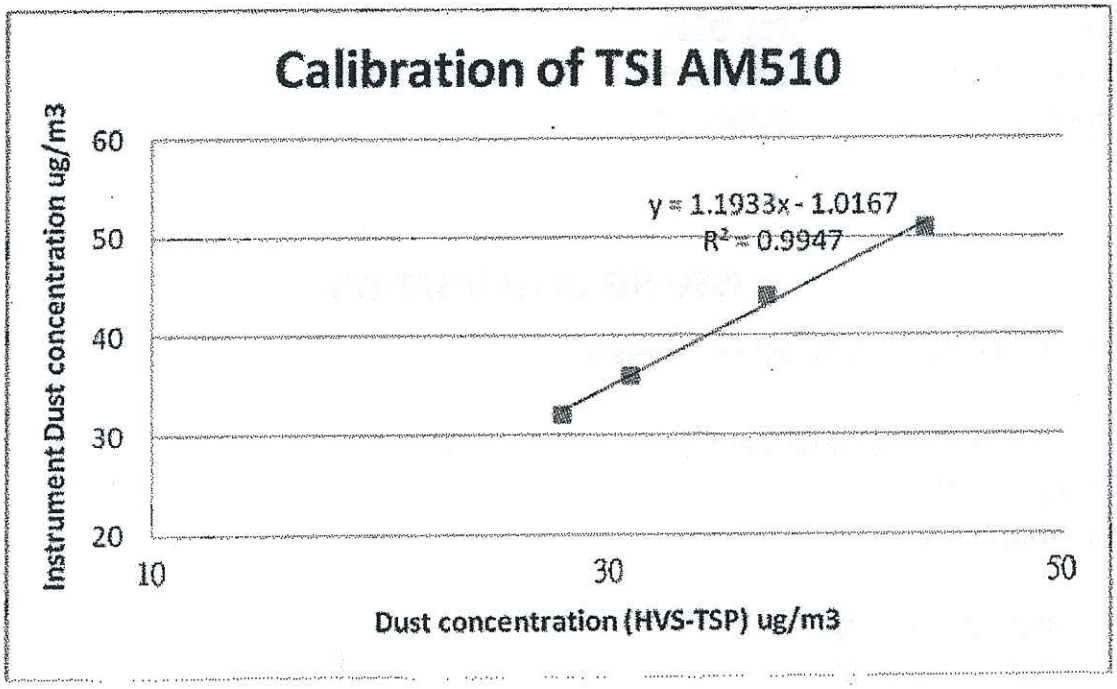
Mr. Ip Wing Hong, John
Manager

Brand Name:	TSI
Model No.:	AM510
Serial No.:	11510005
HVS No.:	TE-5028A
HVS Calibration Kit No.:	TISCH 2137
Date of Calibration:	13/10/2015
Date of next Calibration:	12/10/2016

Calibration Record

HVS - TSP	28	31	37	44
TSI AM510	32	36	44	51



Mr. Ip Wing Hong, John
Manager

TISCH Environmental

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 11, 2016 Rootsmeter S/N 0438320 Ta (K) - 294
Operator Tisch Orifice I.D. - 2137 Pa (mm) - 758.19

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	1.3380	4.2	1.50
2	NA	NA	1.00	1.0270	6.9	2.50
3	NA	NA	1.00	0.9420	8.2	3.00
4	NA	NA	1.00	0.8730	9.6	3.50
5	NA	NA	1.00	0.6630	16.5	6.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)		Va	(x axis) Qa	(y axis)
1.0055	0.7515	1.2316		0.9944	0.7432	0.7627
1.0019	0.9756	1.5900		0.9908	0.9648	0.9846
1.0002	1.0618	1.7417		0.9891	1.0500	1.0786
0.9983	1.1436	1.8813		0.9873	1.1309	1.1650
0.9891	1.4919	2.4632		0.9781	1.4754	1.5253
Qstd slope (m) =		1.66881		Qa slope (m) =		1.04498
intercept (b) =		-0.02897		intercept (b) =		-0.01794
coefficient (r) =		0.99983		coefficient (r) =		0.99983
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}

Tisch Environmental, Inc.
TSP Sampler Calibration
(Dickson recorder)

SITE

Location: YMT Public Cargo Working Area
Sampler: TE-5170 MFC
Date: 15-Jul-16
Tech: Andy Tsang

CONDITIONS

Barometric Pressure (in Hg):	26.00	Corrected Pressure (mm Hg):	660
Temperature (deg F):	79	Temperature (deg K):	299
Average Press. (in Hg):	26.00	Corrected Average (mm Hg):	660
Average Temp. (deg F):	79	Average Temp. (deg K):	299

CALIBRATION ORIFICE

Make: Tisch
Model: TE-5028A
Serial#: 2137
Qstd Slope: 2.01000
Qstd Intercept: -0.02003
Date Certified: 11-Feb-16

CALIBRATIONS

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)
1	0.40	0.303	18.0	16.75
2	0.50	0.337	22.0	20.47
3	0.80	0.424	34.0	31.63
4	1.00	0.473	42.0	39.08
5	1.40	0.558	56.0	52.10

LINEAR REGRESSION

Slope =	138.9017
Intercept =	-26.1809
Corr. coeff.=	0.9983
# 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

Tisch Environmental, Inc.
TSP Sampler Calibration
(Dickson recorder)

SITE

Location: Canton Road
Sampler: TE-5170 MFC
Date: 15-Jul-16
Tech: Andy Tsang

CONDITIONS

Barometric Pressure (in Hg):	26.00	Corrected Pressure (mm Hg):	660
Temperature (deg F):	79	Temperature (deg K):	299
Average Press. (in Hg):	26.00	Corrected Average (mm Hg):	660
Average Temp. (deg F):	79	Average Temp. (deg K):	299

CALIBRATION ORIFICE

Make: Tisch
Model: TE-5028A
Serial#: 2137
Qstd Slope: 2.01000
Qstd Intercept: -0.02003
Date Certified: 11-Feb-16

CALIBRATIONS

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)
1	0.30	0.264	16.0	14.89
2	0.60	0.369	26.0	24.19
3	1.50	0.577	42.0	39.08
4	1.80	0.631	48.0	44.66
5	2.00	0.665	56.0	52.10

LINEAR REGRESSION

Slope =	85.6881
Intercept =	-7.9379
Corr. coeff.=	0.9902
# 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

Tisch Environmental, Inc.
TSP Sampler Calibration
(Dickson recorder)

SITE

Location: Nga Cheung Road
Sampler: TE-5170 MFC
Date: 15-Jul-16
Tech: Andy Tsang

CONDITIONS

Barometric Pressure (in Hg):	26.00	Corrected Pressure (mm Hg):	660
Temperature (deg F):	79	Temperature (deg K):	299
Average Press. (in Hg):	26.00	Corrected Average (mm Hg):	660
Average Temp. (deg F):	79	Average Temp. (deg K):	299

CALIBRATION ORIFICE

Make: Tisch
Model: TE-5028A
Serial#: 2137
Qstd Slope: 2.01000
Qstd Intercept: -0.02003
Date Certified: 11-Feb-16

CALIBRATIONS

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)
1	0.40	0.303	20.0	18.61
2	0.80	0.424	30.0	27.91
3	1.00	0.473	40.0	37.22
4	1.40	0.558	50.0	46.52
5	1.80	0.631	60.0	55.83

LINEAR REGRESSION

Slope =	115.9310
Intercept =	-18.1581
Corr. coeff.=	0.9923
# 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

綜合試驗有限公司
SOILS & MATERIALS ENGINEERING CO., LTD.
G/F., 9/F., 12/F., 13/F. & 20/F., Leader Centre, 37 Wong Chuk Hang Road, Aberdeen, Hong Kong.
香港黃竹坑道37號利達中心地下，9樓，12樓，13樓及20樓
E-mail: smec@cigismec.com Website: www.cigismec.com
Tel : (852) 2873 6860
Fax : (852) 2555 7533

CERTIFICATE OF CALIBRATION

Certificate No.: 15CA1228 01-01 Page 1 of 2

Item tested

Description:	Sound Level Meter (Type 1)	,	Microphone
Manufacturer:	SVANTEK, Poland	,	ACO, Japan
Type/Model No.:	971	,	7052E
Serial/Equipment No.:	34350 / EPS OE0032	,	54635
Adaptors used:	-	,	-

Item submitted by

Customer Name:	Environmental Pioneers & Solutions Ltd.
Address of Customer:	Flat A, 8/F., Chai Wan Industrial Centre., 20 Lee Chung Street, Chaiwan, Hong Kong
Request No.:	-
Date of receipt:	28-Dec-2015

Date of test: 28-Dec-2015

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	19-Jun-2016	CIGISMEC
Signal generator	DS 360	33873	16-Apr-2016	CEPREI
Signal generator	DS 360	61227	16-Apr-2016	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:** 04-Jan-2016 **Company Chop:** SOILS AND 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.

G/F., 9/F., 12/F., 13/F. & 20/F., Leader Centre, 37 Wong Chuk Hang Road, Aberdeen, Hong Kong.
香港黃竹坑道37號利達中心地下，9樓，12樓，13樓及20樓
E-mail: smec@cigismec.com Website: www.cigismec.com
Tel : (852) 2873 6860
Fax : (852) 2555 7533

CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 15CA1228 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 Uncertanity (dB)	Coverage Factor
Self-generated noise	A	Pass	0.3	
	C	Pass	0.6	
	Lin	Pass	1.0	
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 Uncertanity (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: 23-Dec-2015

Checked by: Lam Tze Wai Date: 04-Jan-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.

綜合試驗有限公司
SOILS & MATERIALS ENGINEERING CO., LTD.
G/F., 9/F., 12/F., 13/F. & 20/F., Leader Centre, 37 Wong Chuk Hang Road, Aberdeen, Hong Kong.
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E-mail: smec@cigismec.com Website: www.cigismec.com
Tel : (852) 2873 6860
Fax : (852) 2555 7533
CIGISMEC
A CIGIS GROUP COMPANY

Sound level meter type:	971	Serial No.	34350 / EPS OE0032	Date	28-Dec-2015
Microphone type:	7052E	Serial No.	54635		
				Report:	15CA1228 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	11.9	dB
Noise level in C weighting	11.9	dB
Noise level in Lin (Z)	16.9	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
118.0	118.0	118.0	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
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	49.0	49.0	0.7	0.0	0.0
44.0	43.9	43.9	0.7	-0.1	-0.1
39.0	38.9	38.9	0.7	-0.1	-0.1
34.0	33.7	33.7	0.7	-0.3	-0.3
33.0	32.7	32.7	0.7	-0.3	-0.3

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Sound level meter type: 971 Serial No. 34350 / EPS OE0032 Date 28-Dec-2015
Microphone type: 7052E Serial No. 54635
Report: 15CA1228 01-01

32.0	31.6	31.6	0.7	-0.4	-0.4
31.0	30.5	30.5	0.7	-0.5	-0.5
30.0	29.6	29.6	0.7	-0.4	-0.4
29.0	28.5	28.5	0.7	-0.5	-0.5
28.0	27.3	27.3	0.7	-0.7	-0.7

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
40-140	94.0	94.0	0.7	0.0
25-120	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
40-140	42.0	42.0	0.7	0.0
	138.0	138.0	0.7	0.0
25-120	28.0	27.3	0.7	-0.7
	118.0	118.0	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	93.0	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	91.1	1.5	1.5	0.1
63.1	94.0	93.2	93.1	1.5	1.5	-0.1

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Sound level meter type: 971 Serial No. 34350 / EPS OE0032 Date 28-Dec-2015
Microphone type: 7052E Serial No. 54635
Report: 15CA1228 01-01

125.9	94.0	93.8	93.8	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	93.8	93.8	1.0	1.0	0.0
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 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	94.0	1.5	1.5	0.0
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	93.9	3.0	6.0	-0.1

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
81.0	80.0	80.0	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
81.0	76.9	76.9	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)

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Sound level meter type: 971 Serial No. 34350 / EPS OE0032 Date 28-Dec-2015
Microphone type: 7052E Serial No. 54635
Report: 15CA1228 01-01

Ref. level	Response to 10 ms	Response to 100 us	Tolerance	Deviation
dB	dB	dB	+/- dB	dB
84.0	84.0	84.0	2.0	0.0

Negative polarities:

Ref. level	Response to 10 ms	Response to 100 us	Tolerance	Deviation
dB	dB	dB	+/- dB	dB
84.0	84.0	84.0	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	83.0+6.6	83.0	83.0	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
85.0	76.2	76.1	2.0	-0.1

Repeated at 100 Hz

Ref. Level	Repeated burst indication		Tolerance	Deviation
dB	Expected (dB)	Actual (dB)	+/- dB	dB
85.0	82.3	82.2	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	90.0	90.0	89.9	1.0	-0.1	60s integ.
10000	80.0	80.0	79.9	1.0	-0.1	6min. integ.

PULSE RANGE AND SOUND EXPOSURE LEVEL TEST

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Microphone type: 7052E Serial No. 54635
Report: 15CA1228 01-01

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
10	88.0	58.0	57.9	1.7	-0.1

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	88.0	68.0	68.0	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
117.9	116.9	113.9	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
124.5	123.5	83.5	83.4	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	78.0	1.0	1.0	0.1
8000	92.9	92.6	1.5	3.0	-0.3

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

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CERTIFICATE OF CALIBRATION

Certificate No.: 15CA1228 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 Ltd.
Address of Customer:	Flat A, 8/F., Chai Wan Industrial Centre., 20 Lee Chung Street, Chaiwan, Hong Kong
Request No.:	-
Date of receipt:	28-Dec-2015

Date of test: 28-Dec-2015

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2341427	15-Apr-2016	SCL
Preamplifier	B&K 2673	2239857	22-Apr-2016	CEPREI
Measuring amplifier	B&K 2610	2346941	22-Apr-2016	CEPREI
Signal generator	DS 360	61227	16-Apr-2016	CEPREI
Digital multi-meter	34401A	US36087050	17-Apr-2016	CEPREI
Audio analyzer	8903B	GB41300350	17-Apr-2016	CEPREI
Universal counter	53132A	MY40003662	16-Apr-2016	CEPREI

Ambient conditions

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

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

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

Approved Signatory: Huang Jian Min/Feng Jun Qi **Date:** 04-Jan-2016 **Company Chop:**

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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CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 15CA1228 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.

Frequency Shown	Output Sound Pressure Level Setting	Measured Output Sound Pressure Level	(Output level in dB re 20 μPa) Estimated Expanded Uncertainty
Hz	dB	dB	dB
1000	94.00	93.67	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 = 0.001 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 = 1000.0 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 = 0.4 %

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	**Checked by:**	Lam Tze Wai
Date:	28-Dec-2015	**Date:**	04-Jan-2016

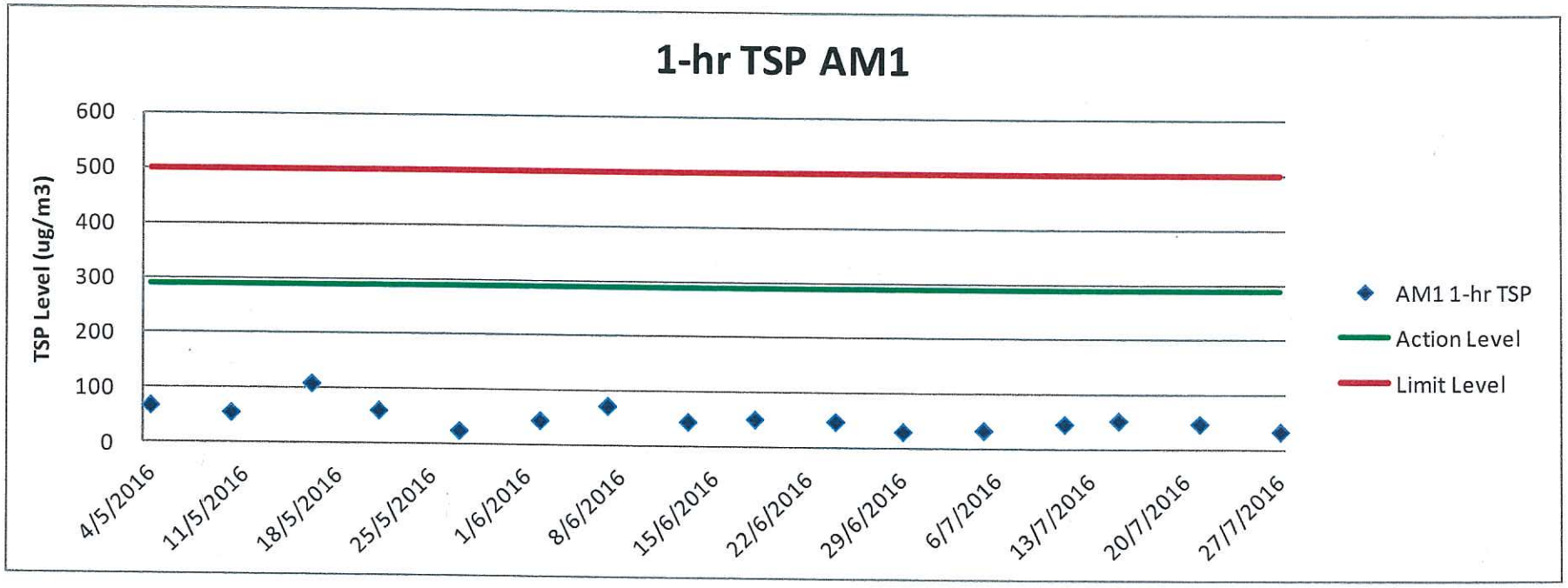
The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

Appendix E: TSP Monitoring Data

1-hr TSP Monitoring Result for AM1

Date	Weather	Temperature (°C) *	Wind Direction *	Wind Speed (m/s) *	Sampling Time			Reading (μ g/m³)			
					1	2	3	1	2	3	Average
5/7/2016	Sunny	25.3 - 31.0	SE	0.0 - 5.8	14:14	15:15	16:16	33	32	39	35
11/7/2016	Cloudy	25.3 - 31.0	W	0.0 - 5.0	13:50	14:51	15:52	47	47	47	47
15/7/2016	Sunny	28.0 - 32.1	W	0.0 - 5.0	9:17	10:18	11:19	62	52	47	54
21/7/2016	Sunny	27.3 - 32.3	W	0.0 - 4.4	15:06	16:07	17:08	32	55	58	48
27/7/2016	Sunny	27.3 - 32.8	SW	0.0 - 4.2	13:06	14:07	15:08	27	33	44	35

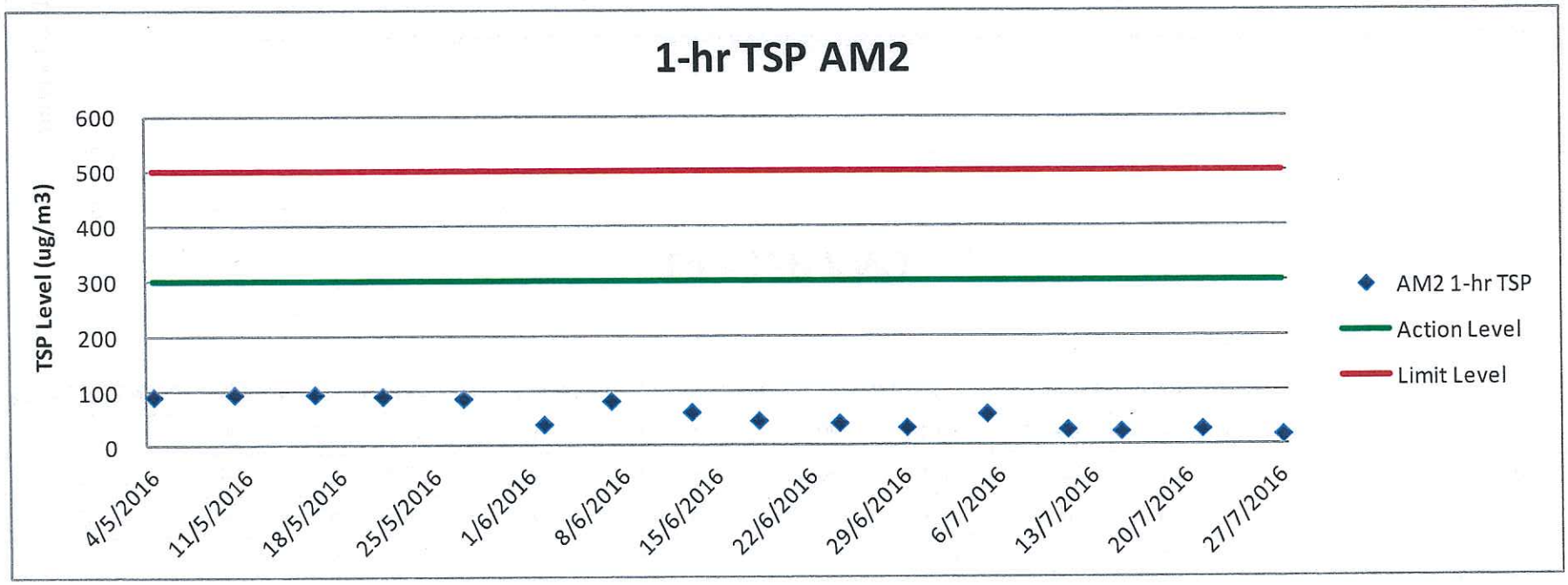
*Remark: Data of temperature, wind direction and wind speed was extracted from King's Park Meteorological Station of HKO



1-hr TSP Monitoring Result for AM2

Date	Weather	Temperature (°C) *	Wind Direction *	Wind Speed (m/s) *	Sampling Time			Reading (μ g/m³)			
					1	2	3	1	2	3	Average
5/7/2016	Sunny	25.3 - 31.0	SE	0.0 - 5.8	9:23	10:24	11:25	62	54	56	57
11/7/2016	Cloudy	25.3 - 31.0	W	0.0 - 5.0	9:38	10:39	11:40	30	26	29	28
15/7/2016	Sunny	28.0 - 32.1	W	0.0 - 5.0	9:40	10:41	11:42	26	27	21	25
21/7/2016	Sunny	27.3 - 32.3	W	0.0 - 4.4	9:56	10:57	11:58	34	28	25	29
27/7/2016	Sunny	27.3 - 32.8	SW	0.0 - 4.2	10:30	11:31	12:32	20	20	16	19

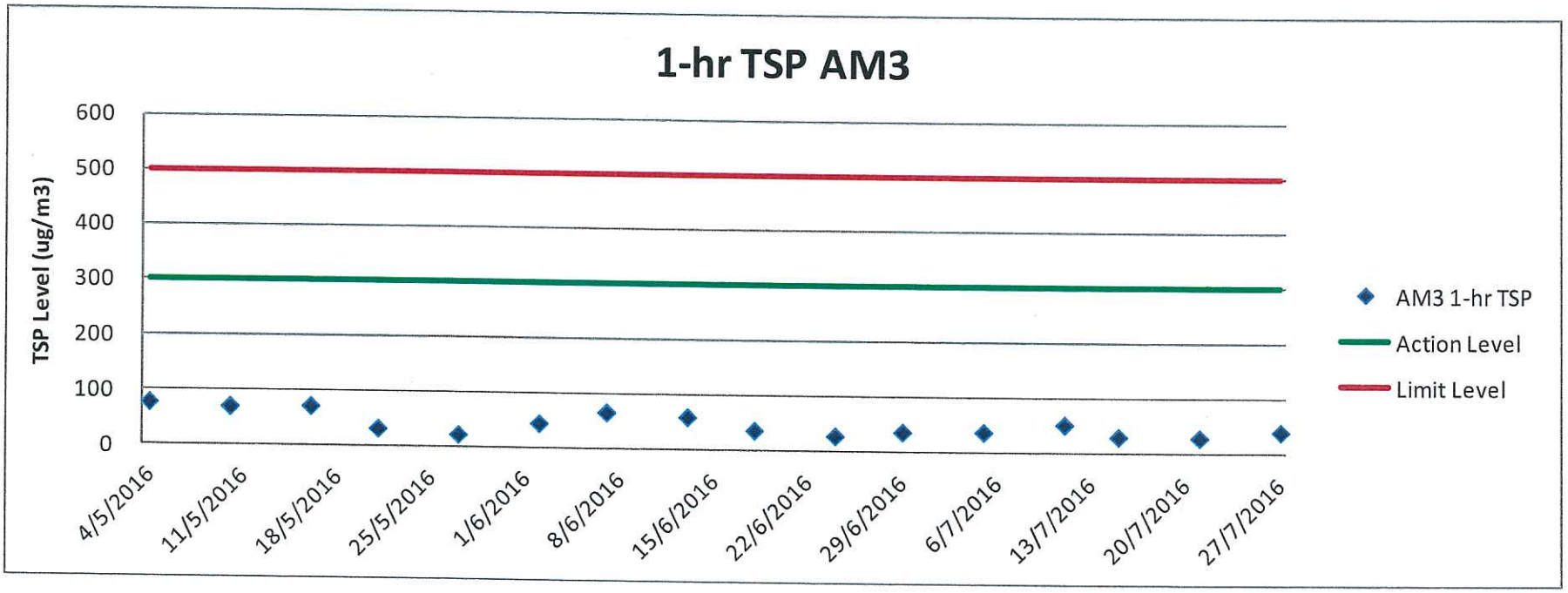
*Remark: Data of temperature, wind direction and wind speed was extracted from King's Park Meteorological Station of HKO



1-hr TSP Monitoring Result for AM3

Date	Weather	Temperature (℃) *	Wind Direction *	Wind Speed (m/s) *	Sampling Time			Reading (μ g/m³)			
					1	2	3	1	2	3	Average
5/7/2016	Sunny	25.3 - 31.0	SE	0.0 - 5.8	14:50	15:51	16:52	36	39	40	38
11/7/2016	Cloudy	25.3 - 31.0	W	0.0 - 5.0	14:34	15:35	16:36	50	52	57	53
15/7/2016	Sunny	28.0 - 32.1	W	0.0 - 5.0	10:04	11:05	12:06	33	30	31	31
21/7/2016	Sunny	27.3 - 32.3	W	0.0 - 4.4	15:40	16:41	17:42	30	28	32	30
27/7/2016	Sunny	27.3 - 32.8	SW	0.0 - 4.2	13:36	14:37	15:38	48	41	34	41

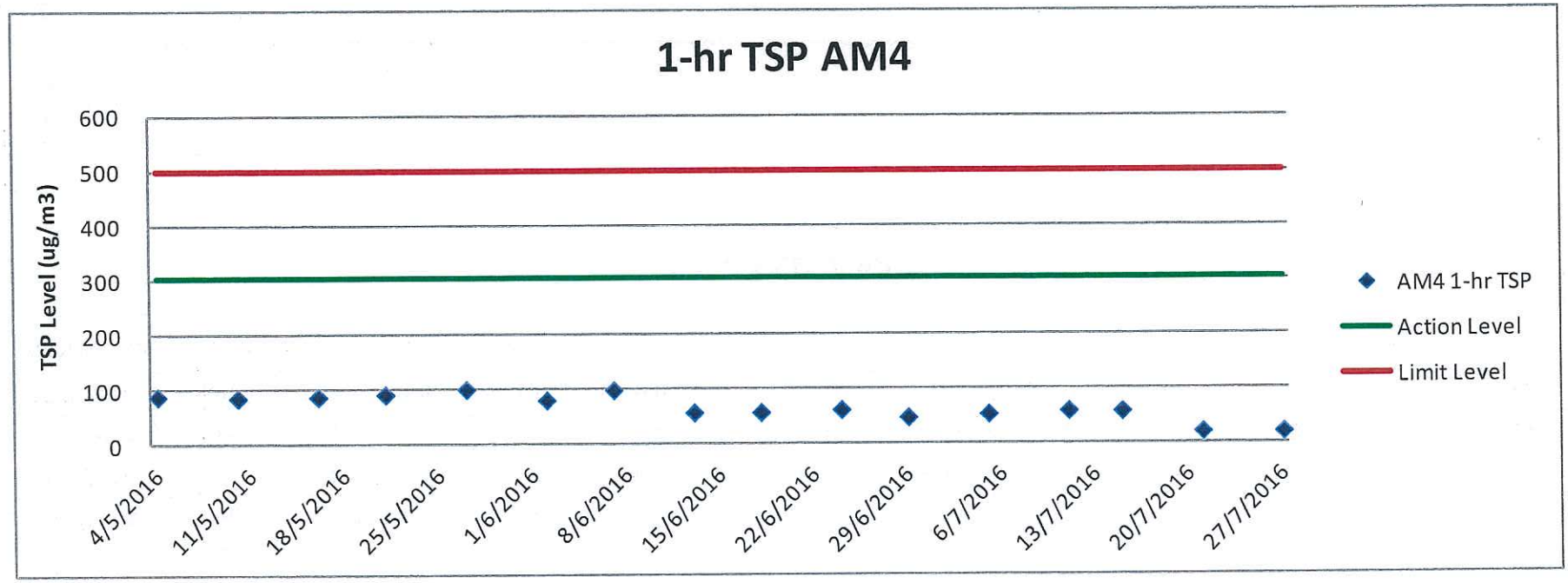
*Remark: Data of temperature, wind direction and wind speed was extracted from King's Park Meteorological Station of HKO



1-hr TSP Monitoring Result for AM4

Date	Weather	Temperature (°C) *	Wind Direction *	Wind Speed (m/s) *	Sampling Time			Reading (μ g/m³)			
					1	2	3	1	2	3	Average
5/7/2016	Sunny	25.3 - 31.0	SE	0.0 - 5.8	9:25	10:26	11:27	51	48	62	54
11/7/2016	Cloudy	25.3 - 31.0	W	0.0 - 5.0	13:57	14:58	15:59	58	67	53	59
15/7/2016	Sunny	28.0 - 32.1	W	0.0 - 5.0	14:01	15:02	16:03	60	59	57	59
21/7/2016	Sunny	27.3 - 32.3	W	0.0 - 4.4	13:53	14:54	15:55	22	25	17	21
27/7/2016	Sunny	27.3 - 32.8	SW	0.0 - 4.2	13:51	14:52	15:53	18	18	27	21

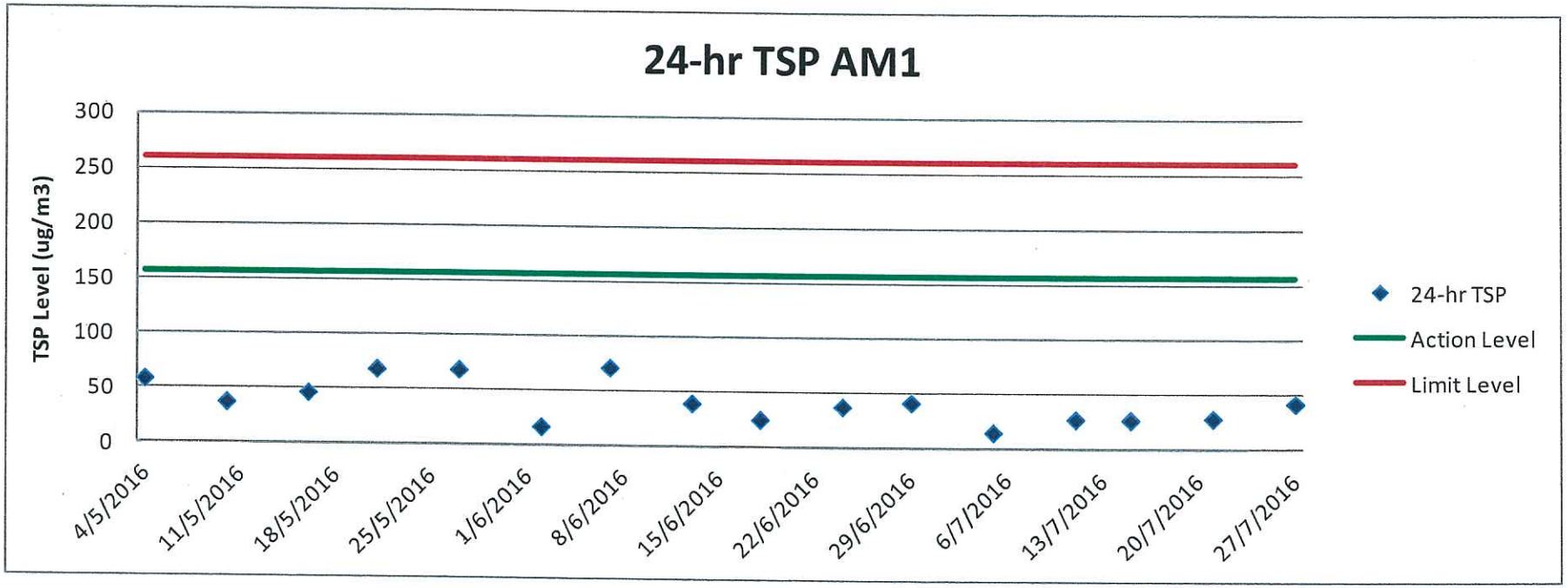
*Remark: Data of temperature, wind direction and wind speed was extracted from King's Park Meteorological Station of HKO



24-hr TSP Monitoring Result for AM1

Sampling ID & Paper No.	Temperature (℃) *	Wind Diection *	Wind Speed (m/s) *	Sampling Date	Wt. of paper (g)			Flow Rate (CFM)			Total Volume (m^3)	TSP Concentration (μg/m3)
					Initial Wt.	Final Wt.	Wt. of dust	Initial	Final	Avg Flow Rate		
AM10705 201062	25.3 - 31.0	SE	0.0 - 5.8	05/07/16	2.8095	2.8430	0.0335	55	55	55.0	2242.69	15
AM10711 201059	25.3 - 31.0	W	0.0 - 5.0	11/07/16	2.8193	2.8801	0.0608	55	55	55.0	2242.69	27
AM10715 201060	28.0 - 32.1	W	0.0 - 5.0	15/07/16	2.8160	2.8757	0.0597	55	55	55.0	2242.69	27
AM10721 201063	27.3 - 32.3	W	0.0 - 4.4	21/07/16	2.7963	2.8592	0.0629	55	55	55.0	2242.69	28
AM10727 201292	27.3 - 32.8	SW	0.0 - 4.2	27/07/16	2.7414	2.8349	0.0935	55	55	55.0	2242.69	42

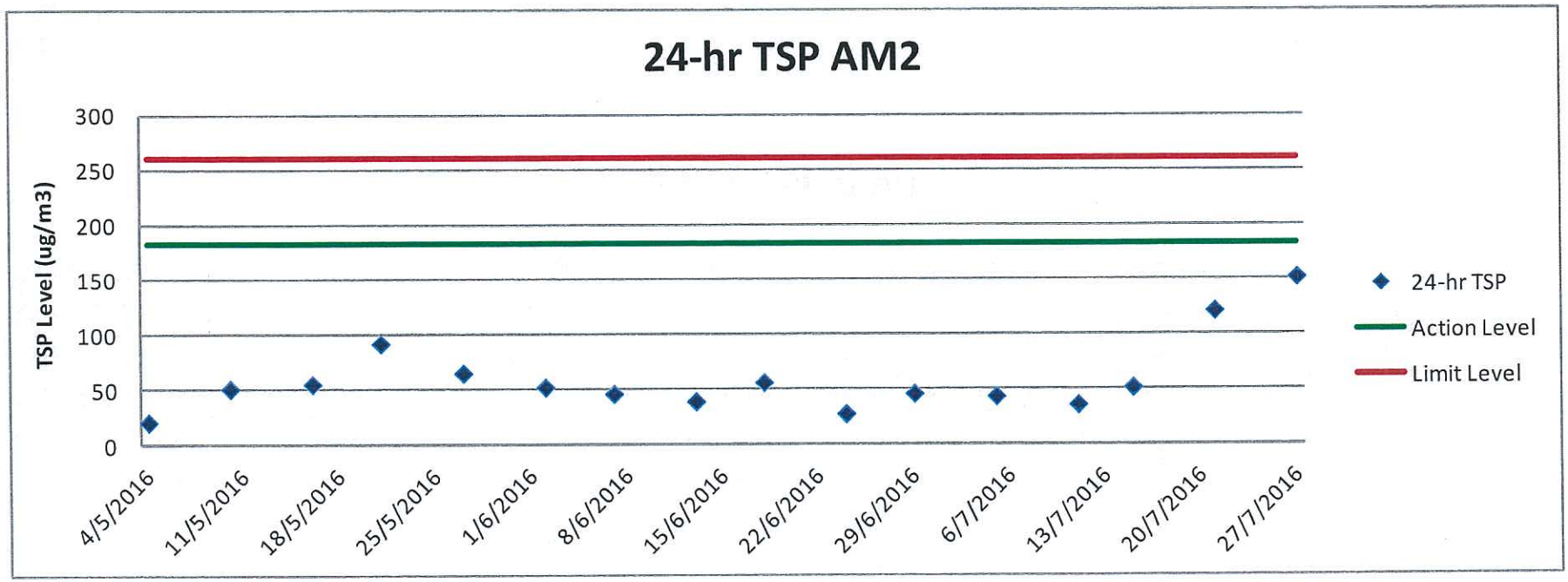
*Remark: Data of temperature, wind direction and wind speed was extracted from King's Park Meteorological Station of HKO



24-hr TSP Monitoring Result for AM2

Sampling ID & Paper No.	Temperature (°C) *	Wind Diection *	Wind Speed (m/s) *	Sampling Date	Wt. of paper (g)			Flow Rate (CFM)			Total Volume (m^3)	TSP Concentration (μg/m3)
					Initial Wt.	Final Wt.	Wt. of dust	Initial	Final	Avg Flow Rate		
AM20705 201055	25.3 - 31.0	SE	0.0 - 5.8	05/07/16	2.8309	2.9373	0.1064	60	60	60.0	2446.58	43
AM20711 201066	25.3 - 31.0	W	0.0 - 5.0	11/07/16	2.7955	2.8836	0.0881	60	60	60.0	2446.58	36
AM20715 201065	28.0 - 32.1	W	0.0 - 5.0	15/07/16	2.7915	2.9174	0.1259	60	60	60.0	2446.58	51
AM20721 201068	27.3 - 32.3	W	0.0 - 4.4	21/07/16	2.7949	3.0911	0.2962	60	60	60.0	2446.58	121
AM20727 201052	27.3 - 32.8	SW	0.0 - 4.2	27/07/16	2.8134	3.1841	0.3707	60	60	60.0	2446.58	152

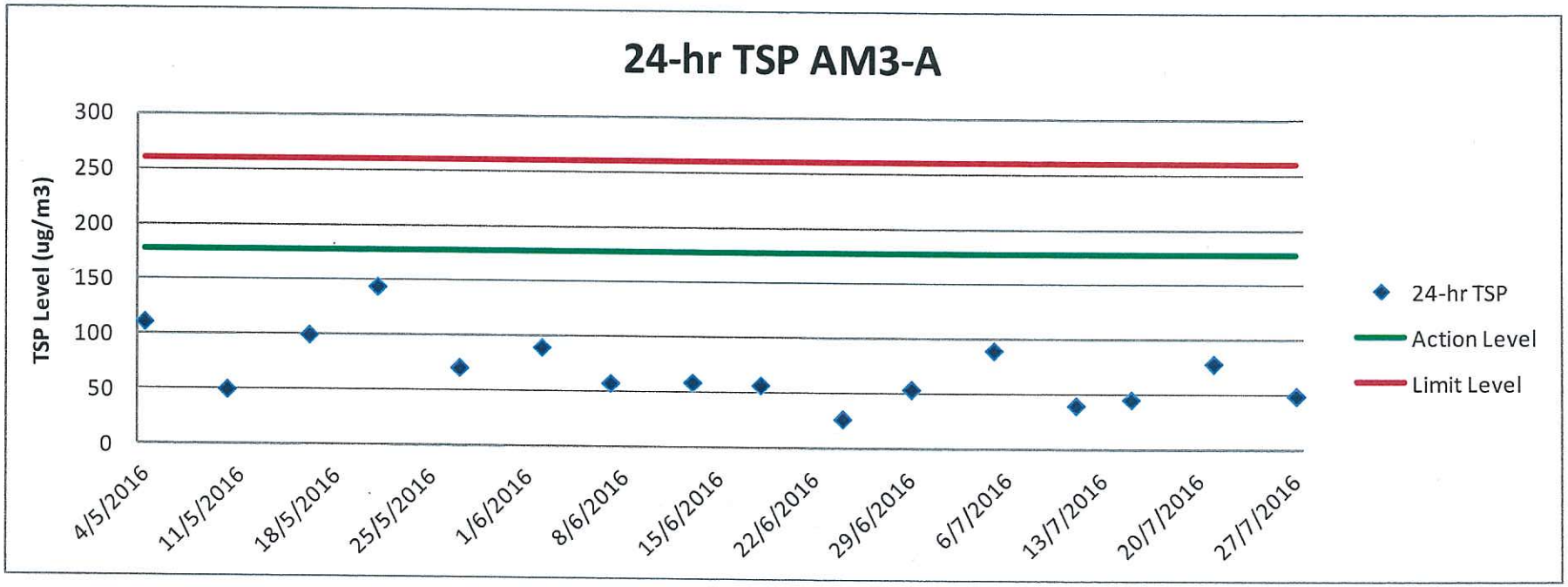
*Remark: Data of temperature, wind direction and wind speed was extracted from King's Park Meteorological Station of HKO



24-hr TSP Monitoring Result for AM3-A

Sampling ID & Paper No.	Temperature (℃) *	Wind Diection *	Wind Speed (m/s) *	Sampling Date	Wt. of paper (g)			Flow Rate (CFM)			Total Volume (m^3)	TSP Concentration (μg/m3)
					Initial Wt.	Final Wt.	Wt. of dust	Initial	Final	Avg Flow Rate		
AM3-A0705 201061	25.3 - 31.0	SE	0.0 - 5.8	05/07/16	2.7982	3.0000	0.2018	55	55	55.0	2242.69	90
AM3-A0711 201057	25.3 - 31.0	W	0.0 - 5.0	11/07/16	2.8313	2.9212	0.0899	55	55	55.0	2242.69	40
AM3-A0715 201058	28.0 - 32.1	W	0.0 - 5.0	15/07/16	2.8120	2.9146	0.1026	55	55	55.0	2242.69	46
AM3-A0721 201064	27.3 - 32.3	W	0.0 - 4.4	21/07/16	2.7961	2.9723	0.1762	55	55	55.0	2242.69	79
AM3-A0727 201291	27.3 - 32.8	SW	0.0 - 4.2	27/07/16	2.7549	2.8656	0.1107	55	55	55.0	2242.69	49

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



ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: ENVIRONMENTAL PIONEERS & SOLUTION LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 2
Contact	: ANDY TSANG	Contact	: Fung Lim Chee, Richard	Work Order	: HK1625964
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	: ----	Date Samples Received	: 27-JUL-2016
Order number	: ----			Issue Date	: 01-AUG-2016
C-O-C number	: ----			No. of samples received	: 5
Site	: ----			No. of samples analysed	: 5

General Comments

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. The completion date of analysis is: 28-JUL-2016

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK1625964

Sample(s) were received in an ambient condition.

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

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

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

'umber : 2 of 2
: ENVIRONMENTAL PIONEERS & SOLUTION LTD
'rder HK1625964

'alytical Results

)-Matrix: FILTER (TSP/RSP)

npound	CAS Number	LOR	Unit	Client sample ID	AM10705 201062	AM10711 201059	AM10715 201060	AM10721 201063	AM10727 201292
				Client sampling date / time	[05-JUL-2016]	[11-JUL-2016]	[15-JUL-2016]	[21-JUL-2016]	[27-JUL-2016]
					HK1625964-001	HK1625964-002	HK1625964-003	HK1625964-004	HK1625964-005
ED: Physical and Aggregate Properties									
K-TSP: Total Suspended Particulates	----	0.0010	g		0.0335	0.0608	0.0597	0.0629	0.0935
K-TSP: Initial Weight	----	0.0010	g		2.8095	2.8193	2.8160	2.7963	2.7414
K-TSP: Final Weight	----	0.0010	g		2.8430	2.8801	2.8757	2.8592	2.8349

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ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: ENVIRONMENTAL PIONEERS & SOLUTION LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 2
Contact	: ANDY TSANG	Contact	: Fung Lim Chee, Richard	Work Order	: HK1630454
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	: ----	Date Samples Received	: 28-JUL-2016
Order number	: ----			Issue Date	: 01-AUG-2016
C-O-C number	: ----			No. of samples received	: 5
Site	: ----			No. of samples analysed	: 5

General Comments

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. The completion date of analysis is: 28-JUL-2016

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK1630454

Sample(s) were received in an ambient condition.

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

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

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

: ENVIRONMENTAL PIONEERS & SOLUTION LTD

)rder HK1630454

ıalytical Results

b-Matrix: FILTER (TSP/RSP)

mpound	CAS Number	LOR	Unit	Client sample ID	AM20705 201055	AM20711 201066	AM20715 201065	AM20721 201068	AM20727 201052
				Client sampling date / time	[05-JUL-2016]	[11-JUL-2016]	[15-JUL-2016]	[21-JUL-2016]	[27-JUL-2016]
					HK1630454-001	HK1630454-002	HK1630454-003	HK1630454-004	HK1630454-005
/ED: Physical and Aggregate Properties									
HK-TSP: Total Suspended Particulates	----	0.0010	g		0.1064	0.0881	0.1259	0.2962	0.3707
HK-TSP: Initial Weight	----	0.0010	g		2.8309	2.7955	2.7915	2.7949	2.8134
HK-TSP: Final Weight	----	0.0010	g		2.9373	2.8836	2.9174	3.0911	3.1841

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: ENVIRONMENTAL PIONEERS & SOLUTION LTD	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 2
Contact	: ANDY TSANG	Contact	: Fung Lim Chee, Richard	Work Order	: HK1630462
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	: ----	Date Samples Received	: 27-JUL-2016
Order number	: ----			Issue Date	: 01-AUG-2016
C-O-C number	: ----			No. of samples received	: 5
Site	: ----			No. of samples analysed	: 5

General Comments

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. The completion date of analysis is: 28-JUL-2016

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK1630462

Sample(s) were received in an ambient condition.

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

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

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

lumber : 2 of 2
: ENVIRONMENTAL PIONEERS & SOLUTION LTD
)rder HK1630462

alytical Results

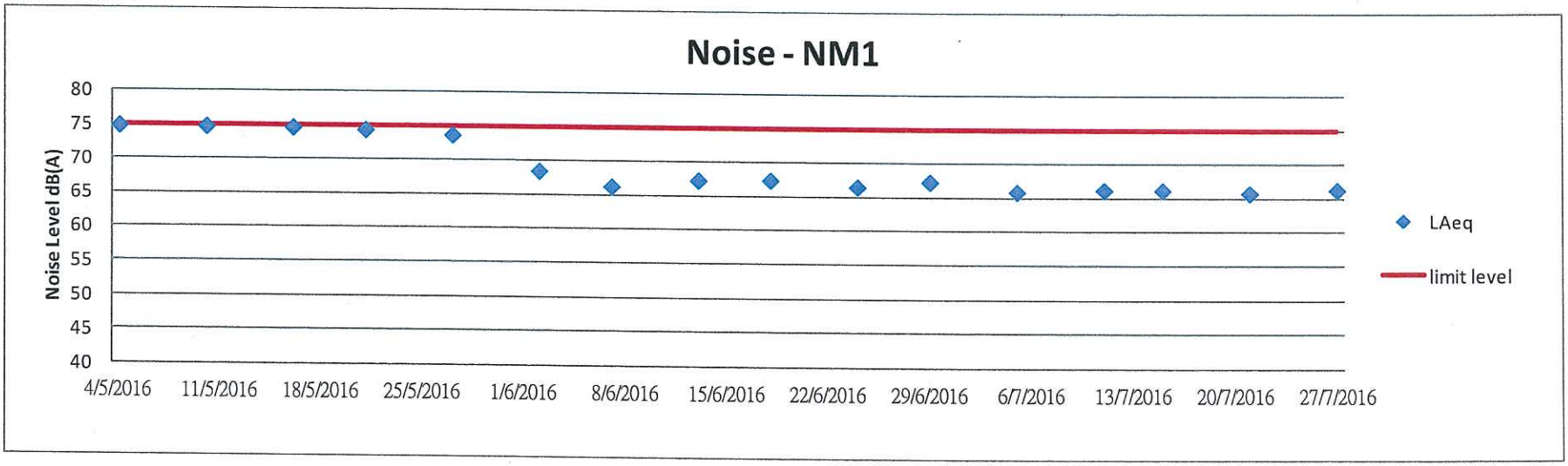
)-Matrix: FILTER (TSP/RSP)

			Client sample ID	AM3-A0705 201061	AM3-A0711 201057	AM3-A0715 201058	AM3-A0721 201064	AM3-A0727 201291
			Client sampling date / time	[05-JUL-2016]	[11-JUL-2016]	[15-JUL-2016]	[21-JUL-2016]	[27-JUL-2016]
npound	CAS Number	LOR	Unit	HK1630462-001	HK1630462-002	HK1630462-003	HK1630462-004	HK1630462-005
ED: Physical and Aggregate Properties								
K-TSP: Total Suspended Particulates	----	0.0010	g	0.2018	0.0899	0.1026	0.1762	0.1107
K-TSP: Initial Weight	----	0.0010	g	2.7982	2.8313	2.8120	2.7961	2.7549
K-TSP: Final Weight	----	0.0010	g	3.0000	2.9212	2.9146	2.9723	2.8656

Appendix F1: Noise Monitoring Data

Noise Monitoring Result for NM1

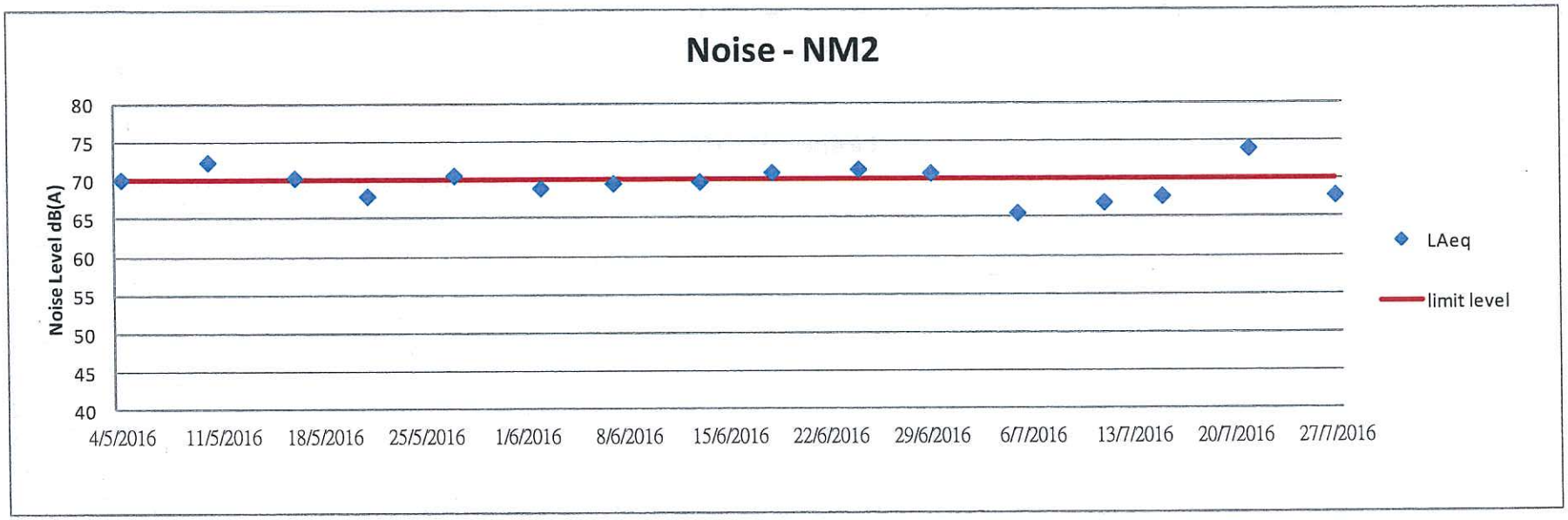
Location	NM1				
Date	5/7/2016	11/7/2016	15/7/2016	21/7/2016	27/7/2016
Weather Condition	Sunny	Cloudy	Sunny	Sunny	Sunny
Start Time	15:33	15:39	11:07	16:59	15:18
Measurement Period	30min	30min	30min	30min	30min
Baseline Level	75.1				
L_{Aeq}	65.8	66.1	66.1	65.7	66.2
L_{10}	67.3	67.6	67.6	66.9	67.8
L_{90}	63.8	63.3	63.5	63.6	63.7



Noise Monitoring Result for NM2

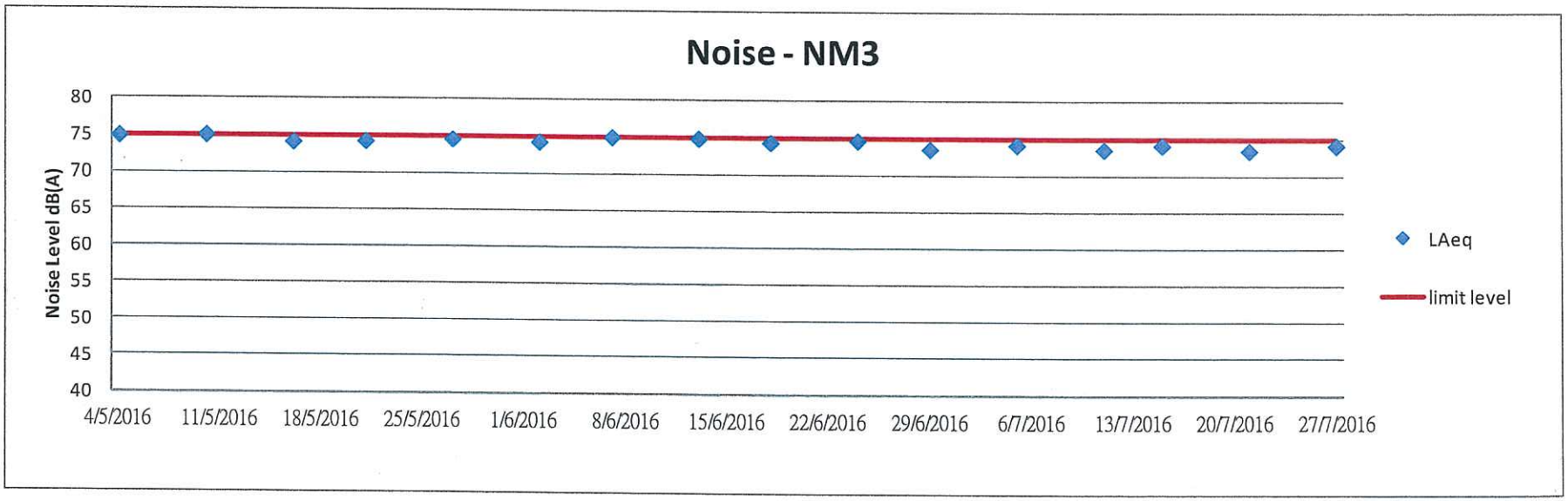
Location	NM2					NM2 (Re-measurement)*
Date	5/7/2016	11/7/2016	15/7/2016	21/7/2016	27/7/2016	21/7/2016
Weather Condition	Sunny	Cloudy	Sunny	Sunny	Sunny	Sunny
Start Time	15:24	9:01	10:26	10:33	13:47	11:15
Measurement Period	30min	30min	30min	30min	30min	30min
Baseline Level	66.5					66.5
L_{Aeq}	65.5	66.9	67.7	74.0	67.8	74.6
L_{10}	66.2	68.3	69.3	77.7	67.2	78.1
L_{90}	61.8	63.5	63.4	65.0	62.2	64.7

* 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 NM3

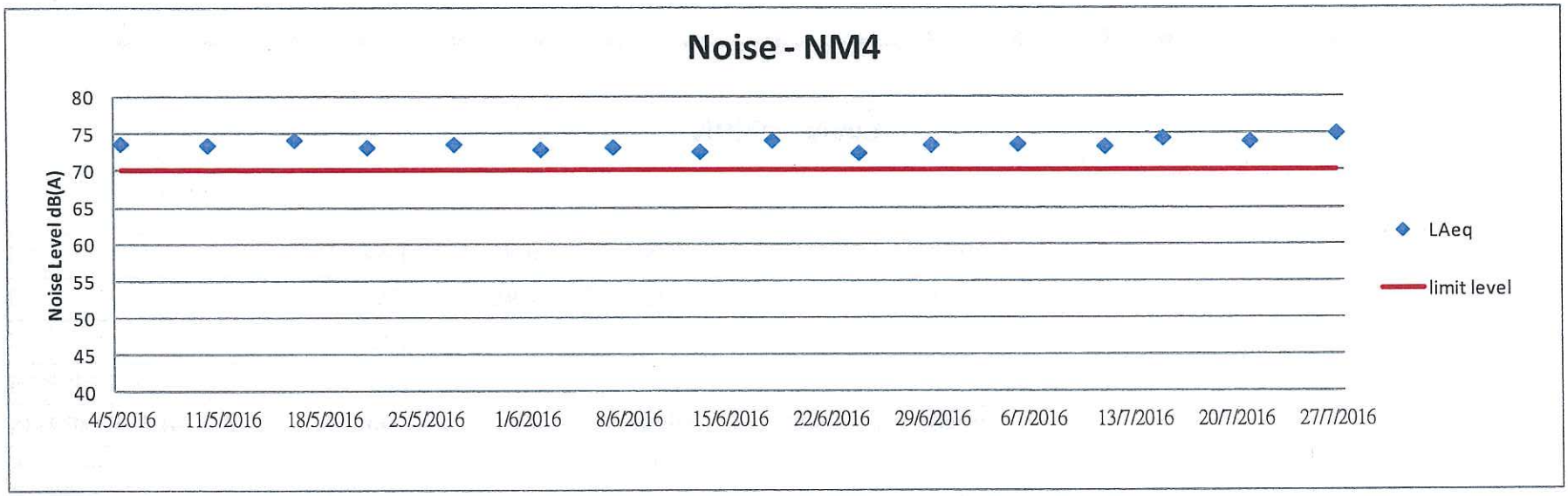
Location	NM3				
Date	5/7/2016	11/7/2016	15/7/2016	21/7/2016	27/7/2016
Weather Condition	Sunny	Cloudy	Sunny	Sunny	Sunny
Start Time	15:06	14:51	10:16	16:08	14:30
Measurement Period	30min	30min	30min	30min	30min
Baseline Level	74.5				
L_{Aeq}	74.1	73.5	74.1	73.4	74.1
L_{10}	77.2	76.1	76.8	75.8	75.4
L_{90}	69.1	70.0	70.4	70.4	73.0



Noise Monitoring Result for NM4

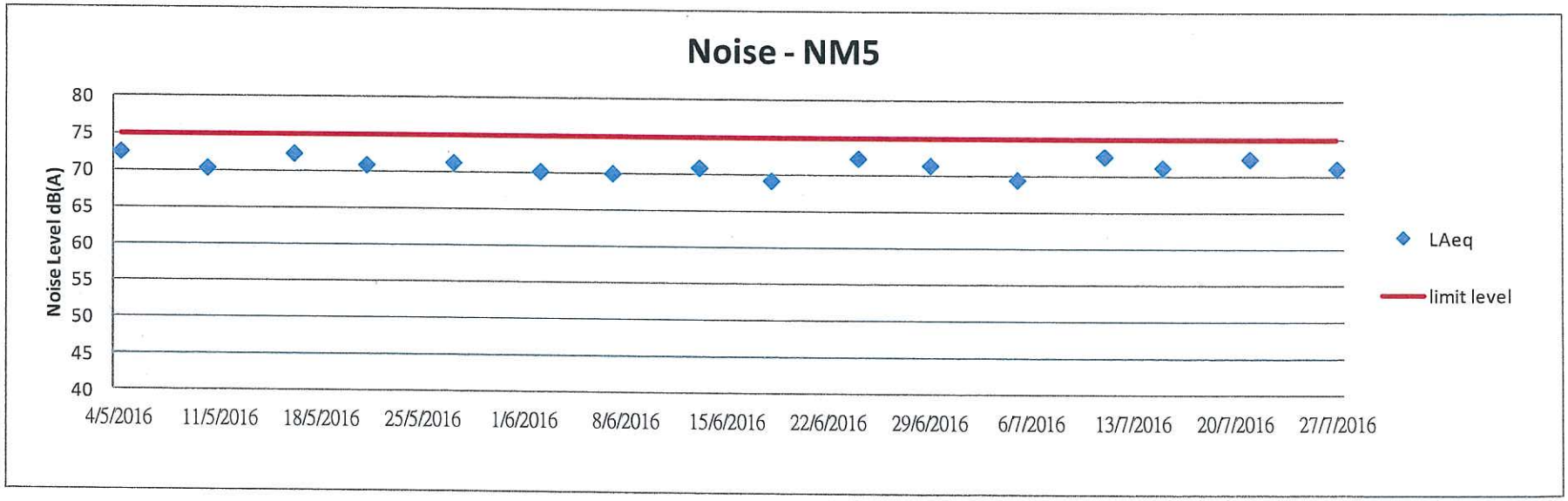
Location	NM4					NM4 (Re-measurement) *				
Date	5/7/2016	11/7/2016	15/7/2016	21/7/2016	27/7/2016	5/7/2016	11/7/2016	15/7/2016	21/7/2016	27/7/2016
Weather Condition	Sunny	Cloudy	Sunny	Sunny	Sunny	Sunny	Cloudy	Sunny	Sunny	Sunny
Start Time	9:43	13:03	14:25	14:03	11:29	9:43	14:41	16:16	10:31	13:31
Measurement Period	30min	30min	30min	30min	30min	30min	30min	30min	30min	30min
Baseline Level	73.3					73.3				
L_{Aeq}	73.6	73.3	74.4	74.0	75.1	74.1	73.9	74.1	73.4	74.4
L_{10}	78.2	77.0	77.1	76.7	79.0	77.9	77.7	78.2	77.1	78.3
L_{90}	66.2	66.9	68.4	70.4	70.8	67.0	65.2	67.9	68.4	68.7

* 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	5/7/2016	11/7/2016	15/7/2016	21/7/2016	27/7/2016
Weather Condition	Sunny	Cloudy	Sunny	Sunny	Sunny
Start Time		13:42	15:45	15:09	10:23
Measurement Period	30min	30min	30min	30min	30min
Baseline Level	71.8				
L_{Aeq}	69.4	72.6	71.1	72.3	71.0
L_{10}	74.1	75.8	74.3	76.9	74.1
L_{90}	66.1	64.1	66.9	68.2	65.3



Appendix F2: School Schedule

油蘇地天主教小學(海泓道)
二零一五至二零一六年度校曆表(九月至二月)

周次	日	一	二	三	四	五	六	行事曆
一			1 S	2 S	3	4 S	5	1/9 開學　3/9 額外公眾假期
二	6	7 S	8 S	9 A	10 B	11 C	12	11/9 求恩禮
三	13	14 D	15 E	16 F	17 A	18 B	19	
四	20	21 C	22 D	23 E	24 F	25 A	26	
五	27	28	29 B	30 C				27/9 教育日　28/9 中秋節翌日
					1	2 D	③	1/10 國慶　3/10 我和班主任有個約會/J6 升中面試講座
六	4	5 E	6 F	7 A	8 B	9 C	10	
七	11	12 D	13 E	14 F	15 A	16 B	17	
八	18	19 S	20 C	21	22 D	23 E	24	19/10 水運會　21/10 重陽節　23/10 J6 升中座談會(1)
九	25	26 F	27 A	28 B	29 C	30 D	31	30/10 九西水運會　第九周英文串字(J1 - J6)
十	1	2 E	3 F	4 S	5 S	6 S	7	5/11 - 10/11 J1 評估、J2 - 6 第一段考(J6 呈分試)
十一	8	9 S	10 S	11 S	12 S	13 A	14	11/11 綠色旅行(J1 - 3)　12/11 綠色旅行(J4 - 6)
十二	15	16 B	17 C	18 D	19 E	20 F	21	
十三	22	23 A	24 B	25 C	26 D	27 E	28	
十四	29	30 F						30/11 - 11/12 全方位學習周
			1 A	2 B	3 C	4 D	5	3/12 九西陸運會
十五	6	7 E	8 F	9 A	10 B	11 C	12	
十六	13	14 D	15 E	16 F	17 A	18 S	⑲	18/12 聖誕祈禱禮　19/12 家長日
	20	21	22	23	24	25	26	21/12/15 - 3/1/16 聖誕及新年假期　21/12 教師發展日(1)
	27	28	29	30	31			
						1	2	1/1 元旦
十七	3	4 B	5 C	6 D	7 E	8 F	9	
十八	10	11 A	12 B	13 C	14 D	15 E	16	
十九	17	18 F	19 A	20 B	21 C	22 D	㉓	18/1 下學期開始　23/1 家教會周年大會暨頒獎禮
二十	24	25 E	26 F	27 A	28 S	29 B	30	28/1 陸運會
	31							
廿一		1 C	2 D	3 S	4	5	6	3/2 送舊迎新大掃除　4/2 - 17/2 農曆新年假期
	7	8	9	10	11	12	13	8/2 - 10/2 初一至初三
廿二	14	15	16	17	18 E	19 F	⑳	20/2 新春團拜
廿三	21	22 A	23 B	24 C	25 D	26 E	27	25/2 畢業照及班照　第廿三周英文串字(J1 - J6)
廿四	28	29 F						

油蘇地天主教小學(海泓道)
二零一五至二零一六年度校曆表(三月至八月)

月份	周次	日	一	二	三	四	五	六	行事曆
三月	廿四			1 A	2 S	3 S	4 S	5	3/3 - 8/3 J1 - 6 第二段考(J6 呈分試)
	廿五	6	7 S	8 S	9 B	10 C	11 D	12	9/3 - 18/3 全方位學習周
	廿六	13	14 E	15 F	16 A	17 B	18 C	19	16/3 - 18/3 J5 教育營
	廿七	20	21 D	22 E	23 F	24	25	26	22/3 復活節祈禱聚會　24/3 - 4/4 復活節假期
		27	28	29	30	31			27/3 復活主日
四月							1	2	
	廿八	3	4	5 A	6 B	7 C	8 D	9	4/4 清明節
	廿九	10	11 E	12 F	13 A	14 B	15 C	⑯	16/4 J6 升中座談會(2)
	三十	17	18 D	19 E	20 F	21 A	22 B	㉓	23/4 成長見證日
	卅一	24	25 C	26 D	27 E	28 F	29 A	30	
五月	卅二	1	2	3 B	4 C	5 D	6 E	7	2/5 勞動節翌日　3/5 - 4/5 J3 TSA說話及視讀評估　6/5 J5 升中座談會
	卅三	8	9 F	10 A	11 B	12 S	13 S	14	12/5 學藝薈萃耀油天綵排　13/5 學藝薈萃耀油天　14/5 佛誕
	卅四	15	16 C	17	18 D	19 E	20 F	21	17/5 天主教學校教師日
	卅五	22	23 A	24 B	25 C	26 D	27 E	28	第卅五周英文串字(J1 - J6)
	卅六	29	30 F	31 A					
六月					1 S	2 S	3 S	4	2/6 - 7/6 J1 - 6 期終考(J5 呈分試、J6 畢業試)
	卅七	5	6 S	7 S	8 B	9	10 C	11	9/6 端午節
	卅八	12	13 D	14 E	15 F	16 A	17 B	18	15/6 - 16/6 J3 TSA紙筆評估
	卅九	19	20 C	21 D	22 E	23 F	24 A	25	25/6 聖保祿堂主保瞻禮
	四十	26	27	28 B	29 S	30 S			27/6 主保瞻禮假期　29/6 畢業禮綵排　30/6 畢業禮
七月							1	2	1/7 特別行政區成立日
	四一	3	4 S	5 S	6 S	7 S	8 S	9	5/7 升中派位　7/7 - 8/7 升中派位註冊　8/7 感恩禮
	四二	10	11 S	12 S	13 S	14	15	16	11/7 頒獎禮　12/7 J6 中一入學前測驗　14/7 教師發展日(2)
		17	18	19	20	21	22	23	14/7 - 31/8 暑假(2016年9月1日開課)
		24	25	26	27	28	29	30	
		31							
八月			1	2	3	4	5	6	備註：
		7	8	9	10	11	12	13	考試前夕(4/11，2/3，1/6)半天上課
		14	15	16	17	18	19	20	12/5 - 13/5 學藝薈萃耀油天(半天上課)
		21	22	23	24	25	26	27	
		28	29	30	31				

2016 年 7 月

	周次	日	一	二	三	四	五	六
							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						

全校活動及考試：	學校假期：
5/7 歌唱比賽	1/7 香港特別行政區成立紀念日 11/7 - 23/8 暑假

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
June	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
July	5031.54	0	0	0	5031.54	0	0	0	0	0	17.12
Aug	--	--	--	--	--	--	--	--	--	--	--
Sept	--	--	--	--	--	--	--	--	--	--	--
Oct	--	--	--	--	--	--	--	--	--	--	--
Nov	--	--	--	--	--	--	--	--	--	--	--
Dec	--	--	--	--	--	--	--	--	--	--	--
Total	13843.99	0	0	0	13843.99	0	0	0	0	0	460.72
Grand Total	13843.99	0	0	0	13843.99	0	0	0	0	0	460.72

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	Implementa 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	✔

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	*
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	✔
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	✔
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	✔
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	✔
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	✔
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	N/A
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	N/A
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

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	✔
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	✔
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	N/A
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	✔
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	✔
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	✔
ater Impact (Construction Phase)								
3	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	✔
3	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	✔

3	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	✔
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						N/A
		- Proved intercepting channels along crest/edge of excavation						N/A
		- Carry out adequate surface protection measures well before the arrival of a rainstorm						N/A
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	✔
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	N/A

		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	
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	✔
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						
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	✔
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	✔

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	✔
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	✔
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	✔
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	✔
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	✔
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

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
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	✔
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	✔
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	✔
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	N/A

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						
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
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, Complaints, Notification of Summons and Successful Prosecution

Reporting Month	Number of Exceedance	Number of Environmental Complaints	Number of Notification of Summons	Number of Successful Prosecutions
February 2016	0	0	0	0
March 2016	0	0	0	0
April 2016	0	2	0	0
May 2016	7	0	0	0
June 2016	11	0	0	0
July 2016	6	0	0	0
Grand Total	24	2	0	0