



大成環境科技拓展有限公司

**ENVIRONMENTAL PIONEERS & SOLUTIONS LIMITED**

A Member of FSE Lifestyle

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

## **Environmental Monitoring & Audit Report**

**01/06/2021 – 30/06/2021**

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## **Executive Summary**

This is the sixty-fifth monthly Environmental Monitoring and Audit (EM&A) Report for Proposed Road Improvement Works in West Kowloon Reclamation Development – Phase 1. The project commenced on 6 February 2016. This report documents the finding of EM&A Works conducted from 1 June 2021 to 30 June 2021.

### **Environmental Monitoring and Audit Progress**

#### *Air Quality Monitoring*

1-hr Total Suspended Particulates (TSP) monitoring and 24-hr TSP monitoring were carried out on 1, 7, 11, 17, 23 and 29 June 2021.

#### *Noise Monitoring*

30-min LAeq noise monitoring was carried out on 1, 7, 11, 17, 23 and 29 June 2021.

#### *Waste Management*

According to Contractor's waste flow data, 66.59 tonnes of inert C&D materials and 6.29 tonnes of general refuse were generated and disposed.

#### *Landscape and Visual Impact*

Bi-weekly inspections were conducted on 10 and 24 June 2021. 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 2, 9, 16, 23 and 30 June 2021. The representative of the IEC conducted the site inspection on 30 June 2021. Details of the audit findings and implementation status are presented in Section 6.

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

No exceedance of action level and limit level was recorded for TSP and Noise. No Non-compliance event, compliant, 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 – Road Pavement, Street Furniture Installation

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 this Project.

## **1 Introduction**

### **1.1 The Project**

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

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

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

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

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

## 1.2 Construction Programme and Activities

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

- Portion I – Road Pavement, Street Furniture Installation

## 1.3 Project Organization

The project organization chart and contact details are shown in [Appendix B](#).

## 1.4 Status of Environmental Licences, Notification and Permits

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

Table 1.4.1 Summary of the Status of Environmental Licences 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 | Expired | Portion I    |
| WT00021822-2015   | 18/06/2015   | 30/06/2020 | Expired | Portion HA   |
| WT00021825-2015   | 18/06/2015   | 30/06/2020 | Expired | Portion J    |
| WT00021826-2015   | 18/06/2015   | 30/06/2020 | Expired | Portion Q    |
| WT00021903-2015   | 26/06/2015   | 30/06/2020 | Expired | 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 | Expired | Portion HA   |
| GW-RE0469-16  | 04/06/2016   | 03/12/2016 | Expired | Portion HA   |
| GW-RE1072-16  | 13/11/2016   | 04/12/2016 | Expired | Portion I    |
| GW-RE0330-17  | 25/04/2017   | 23/10/2017 | Expired | Portion HA   |

|              |             |            |         |            |
|--------------|-------------|------------|---------|------------|
| PP-RE0030-17 | 16/10/2017  | 16/04/2018 | Expired | Portion I  |
| PP-RE0029-17 | 18/10/2017  | 16/04/2018 | Expired | Portion HA |
| GW-RE0844-17 | 06/11/2017  | 05/05/2018 | Expired | Portion HA |
| GW-RE0056-18 | 25/01/2018  | 28/02/2018 | Expired | Portion Q  |
| GW-RE0135-18 | 13/03/2018  | 28/04/2018 | Expired | Portion Q  |
| GW-RE0134-18 | 08/03/2018  | 21/04/2018 | Expired | Portion HA |
| GW-RE0235-18 | 01/04/2018  | 27/05/2018 | Expired | Portion Q  |
| GW-RE0267-18 | 17/04/2018  | 15/06/2018 | Expired | Portion Q  |
| GW-RE0409-18 | 02/06/2018  | 02/06/2018 | Expired | Portion Q  |
| GW-RE0676-18 | 02/10/2018  | 31/10/2018 | Expired | Portion I  |
| GW-RE0764-18 | 07/11/2018  | 05/05/2019 | Expired | Portion HA |
| GW-RE0786-18 | 23/11/2018  | 15/01/2019 | Expired | Portion HA |
| GW-RE0826-18 | 08/12/2018  | 27/01/2019 | Expired | Portion HA |
| GW-RE0837-18 | 09/12/2018  | 10/02/2019 | Expired | Portion I  |
| GW-RE0850-18 | 11/12/2019  | 09/02/2019 | Expired | Portion HA |
| PP-RE0001-19 | 17/01/2019  | 16/09/2019 | Expired | Portion I  |
| GW-RE0087-19 | 24/02/2019  | 14/04/2019 | Expired | Portion I  |
| GW-RE0239-19 | 05/04/2019  | 26/05/2019 | Expired | Portion Q  |
| GW-RE0302-19 | 19/04//2019 | 22/04/2019 | Expired | Portion Q  |
| GW-RE0264-19 | 02/05/2019  | 29/06/2019 | Expired | Portion Q  |
| GW-RE0407-19 | 02/06/2019  | 21/07/2019 | Expired | Portion Q  |
| GW-RE0456-19 | 29/06/2019  | 25/08/2019 | Expired | Portion HA |
| GW-RE0531-19 | 05/07/2019  | 04/01/2020 | Expired | Portion HA |
| GW-RE0636-19 | 13/08/2019  | 12/02/2020 | Expired | Portion I  |
| PP-RE0044-19 | 26/09/2019  | 16/05/2020 | Expired | Portion I  |
| GW-RE0823-19 | 29/10/2019  | 24/01/2020 | Expired | Portion HA |
| GW-RE0993-19 | 08/12/2019  | 19/01/2020 | Expired | Portion I  |
| GW-RE1066-19 | 30/12/2019  | 28/02/2020 | Expired | Portion HA |
| GW-RE1080-19 | 12/01/2020  | 12/03/2020 | Expired | Portion I  |
| GW-RE0376-20 | 14/05/2020  | 13/11/2020 | Expired | Portion I  |
| GW-RE0407-20 | 22/05/2020  | 21/11/2020 | Expired | Portion HA |
| GW-RE0539-20 | 16/08/2020  | 12/02/2021 | Expired | 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<br>Face to Hoi Po Road     | 1-hr TSP<br>24-hr TSP |
| AM2                | Garden Building  | Ground Floor<br>Face to Canton Road     | 1-hr TSP<br>24-hr TSP |
| AM3                | The Cullinan I   | Ground Floor<br>Face to Nga Cheung Road | 1-hr TSP<br>24-hr TSP |
| AM4                | Lai Chack Middle School  | Ground Floor<br>Face to Canton Road     | 1-hr TSP<br>24-hr TSP |

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

Construction works, defects and outstanding works in Portion Q (Section 4 and 4A of the Works) have been completed. Maintenance period for Portion Q was finished. No environmental impact will be potentially caused from this project in Portion Q. The TSP monitoring stations at Portion Q (AM2 and AM4/AM4-A) were terminated from August 2020.

Construction works, defects and outstanding works in Portion HA (Section 1 of the Works) have been completed. No environmental impact will be potentially caused from this project in Portion HA. The TSP monitoring station at Portion HA (AM1) was terminated from December 2020.

Table 2.1.2 Air Quality Monitoring Locations

| ID No.              | Monitoring Location  | Description                          | Coordinates                   | Parameter |
|---------------------|--|--------------------------------------|-------------------------------|-----------|
| AM1 <sup>*3</sup>   | Marine Department New Yau Ma Tei Public Cargo Working Area Administrative Building | Ground Floor Face to Hoi Po Road     | 22°18'44.8"N<br>114°09'37.4"E | 1-hr TSP  |
| AM2 <sup>*2</sup>   | Garden Building  | Ground Floor Face to Canton Road     | 22°18'12.7"N<br>114°10'05.7"E | 1-hr TSP  |
| AM3                 | The Cullinan I   | Ground Floor Face to Nga Cheung Road | 22°18'22.0"N<br>114°09'39.3"E | 1-hr TSP  |
| AM4 <sup>*2</sup>   | Lai Chack Middle School  | Ground Floor Face to Canton Road     | 22°18'05.4"N<br>114°10'05.3"E | 1-hr TSP  |
| AM1 <sup>*3</sup>   | Marine Department New Yau Ma Tei Public Cargo Working Area Administrative Building | Rooftop Face to Hoi Po Road          | 22°18'44.8"N<br>114°09'37.4"E | 24-hr TSP |
| AM2 <sup>*2</sup>   | Garden Building  | Ground Floor Face to Canton Road     | 22°18'12.7"N<br>114°10'05.7"E | 24-hr TSP |
| AM3-B <sup>*1</sup> | The Cullinan II (W Hong Kong)  | Ground Floor Face to The Cullinan II | 22°18'16.3"N<br>114°09'34.5"E | 24-hr TSP |
| AM4-A <sup>*2</sup> | Tsim Sha Tsui Fire Station   | Ground Floor Face to Canton Road     | 22°18'05.5"N<br>114°10'04.0"E | 24-hr TSP |

Remark:

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

<sup>\*2</sup> Monitoring station AM2 and AM4/AM4-A were terminated from August 2020 due to the completion of works.

<sup>\*3</sup> Monitoring station AM1 was terminated from December 2020 due to the completion of works.

## 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 1, 7, 11, 17, 23 and 29 June 2021.

## 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<br>&<br>Model No. | Serial No. | Latest<br>Calibration<br>Date | Next<br>Calibration<br>Date |
|------------------------|--------------------------------|------------|-------------------------------|-----------------------------|
| Portable Dust<br>Meter | TSI AM520                      | 5201932016 | 26/02/2021                    | 25/02/2022                  |
| High Volume<br>Sampler | Tisch TE-5170                  | 0001       | 05/05/2021                    | 30/06/2021                  |

## 2.4 Monitoring Methodology and Parameters

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

Field monitoring procedures are as follows:

- The monitoring station was set at a point 1m from the exterior of the sensitive receivers building façade and set at a position 1.2m above the ground.
- The battery condition was checked to ensure good functioning of the dust monitor.
- Zero Cal was conducted to the dust monitor to each test for ensuring more accurate data.
- Logging setup and Instrument setup such as log interval, test length, number of test and impactor adaptor will set as follows:
  - log interval : 1min
  - test length : 60mins
  - number of test : 3
  - Impactor adaptor: 100μ
- Start the monitoring lasting 3 hours for each monitoring location
- At the end of the monitoring period, the Average, Maximum and Minimum of each TSP test shall be recorded. In addition on a standard record sheet.

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

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

Installation of HVSs:

- A horizontal platform with appropriate support to secure the samplers against gusty wind should be provided;
- No two samplers should be placed less than 2 meters apart;
- The distance between the sampler and an obstacle, such as buildings, must be at least twice the height that the obstacle protrudes above the sampler;
- A minimum of 2 meters of separation from walls, parapets and penthouses is required for rooftop samplers;
- A minimum of 2 meters separation from any supporting structure, measured horizontally is required;
- No furnace or incinerator flue is nearby;
- Airflow around the sampler is unrestricted;
- The sampler is more than 20 meters from the dripline;

- Any wire fence and gate, to protect the sampler, should not cause any obstruction during monitoring;
- Permission must be obtained to set up the samplers and to obtain access to the monitoring stations; and
- A secured supply of electricity is needed to operate the samplers.

Data of wind speed and wind direction was extracted from King's Park Meteorological Station of Hong Kong Observatory. The collection of wind data meets the prescribed criteria in S.3.4.3 of the EM&A Manual.

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

## **2.5 Maintenance and Calibration**

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

## **2.6 Quality Assurance / Quality Control Results and Detection Limits**

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

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

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

Table 2.7.1 Established TSP Actions and Limit Level

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

Table 2.7.2 Event and action Plan for Air Quality

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

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

## 2.8 Monitoring Results and Observations

The monitoring results of 1-hr TSP are summarized in [Table 2.8.1](#). The monitoring results of 24-hr TSP 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 ( $\mu\text{g}/\text{m}^3$ ) | Range 1-hr TSP ( $\mu\text{g}/\text{m}^3$ ) | Action Level ( $\mu\text{g}/\text{m}^3$ ) | Limit Level ( $\mu\text{g}/\text{m}^3$ ) |
|----------------------|---|---|---|--|
| AM3                  | 30 – 55                                       | 41  | 303                                       | 500                                      |

Table 2.8.2 Summary of average 24-hr TSP monitoring data

| Monitoring Locations | Average 24-hr TSP ( $\mu\text{g}/\text{m}^3$ ) | Range 24-hr TSP ( $\mu\text{g}/\text{m}^3$ ) | Action Level ( $\mu\text{g}/\text{m}^3$ ) | Limit Level ( $\mu\text{g}/\text{m}^3$ ) |
|----------------------|--|--|---|--|
| AM3-B                | 21 – 50  | 34   | 183                                       | 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 AM3/ AM3-B.

## **2.9 Monitoring Schedule for Next Reporting Month**

TSP monitoring for next reporting month is scheduled on 5, 10, 16, 22 and 28 July 2021.



### 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](#).

Construction works, defects and outstanding works in Portion Q (Section 4 and 4A of the Works) have been completed. Maintenance period for Portion Q was finished. No environmental impact will be potentially caused from this project in Portion Q. The noise monitoring stations at Portion Q (NM4 and NM5) were terminated from August 2020.

Construction works, defects and outstanding works in Portion HA (Section 1 of the Works) have been completed. No environmental impact will be potentially caused from this project in Portion HA. The noise monitoring station at Portion HA (NM2) was terminated from December 2020. Change of Environmental Status for Impact Monitoring is shown in [Appendix C](#).

Table 3.1.1 Noise Monitoring Locations

| Identification No. | Noise Monitoring Location                         | Description   | Measurement Type |
|--------------------|---|---|------------------|
| NM1 <sup>*1</sup>  | Sorrento - Tower 1 <sup>*1</sup>                  | Podium Level <sup>*1</sup><br>Face to Nga Cheung Road | Façade           |
| NM2 <sup>*3</sup>  | Yau Ma Ti Catholic Primary School (Hoi Wang Road) | Ground Floor<br>Face to Hoi Ting Road                 | Façade           |
| NM3                | The Cullinan I                                    | Ground Floor<br>Face to Nga Cheung Road               | Façade           |
| NM4 <sup>*2</sup>  | Lai Chack Middle School                           | Ground Floor<br>Face to Canton Road                   | Façade           |
| NM5 <sup>*2</sup>  | Yue Tak Building                                  | Ground Floor<br>Face to Jordan Road                   | Façade           |

Remark:

<sup>\*1</sup> According to EPD's comment and requirement for EM&A Report (February 2016) on 7 April 2016, noise measurement at NM1 was relocated from the ground level (roadside) of Nga Cheung Road to podium level of the Sorrento Tower 1 starting from June 2016.

\*2 Monitoring station NM4 and NM5 were terminated from August 2020 due to the completion of works.

\*3 Monitoring station NM2 was terminated from December 2020 due to the completion of works.

### 3.2 Monitoring Frequency

The regular monitoring for each location was performed on a weekly basis. The monitoring was carried out on 1, 7, 11, 17, 23 and 29 June 2021.

### 3.3 Monitoring Equipment

Noise monitoring was conducted by using BSWA 806 / SVANTEK 971 which complied with the International Electrotechnical Commission Publications 61672:2002 (Type 1), 60651:1979 (Type 1) and 60804:1985 (Type 1) Specifications as referred to the Technical Memorandum to the Noise Control Ordinance. The equipment was calibrated and verified by certified laboratory to ensure they can perform to the same level of accuracy as stated in the manufacturer's specification. Before and after the baseline measurement, the reading of sound level meter was checked with the acoustic calibrator and the measurements were accepted as valid if the calibration levels before and after the noise measurement agreed to within 1.0 dB. The measurement equipment is listed in [Table 3.3.1](#) and Calibration Certificates of the equipment are shown in [Appendix D](#).

Table 3.3.1 Equipment List for Noise Monitoring

| Equipment             | Manufacturer & Model No. | Precision Grade | Serial No. | Latest Calibration Date | Next Calibration Date |
|-----------------------|--------------------------|-----------------|------------|-------------------------|-----------------------|
| Sound level meter     | SVANTEK 971              | IEC61672 Type 1 | 87094      | 24/01/2021              | 23/01/2022            |
| Acoustical calibrator | SVANTEK SV35A            | IEC 942 Type 1  | 64263      | 30/10/2020              | 29/10/2021            |

### 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 be 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  $L_{eq}$ ,  $L_{10}$  and  $L_{90}$  shall be recorded. In addition, site conditions and noise sources should be recorded on a standard record sheet.

### **3.5 Maintenance and Calibration**

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

### **3.6 Quality Assurance / Quality Control Results and Detection Limits**

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

## Appendix D.

### 3.7 Action and Limit Level for Construction Noise

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

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

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

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

Table 3.7.2 Event / Action Plan for Construction Noise

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

### 3.8 Monitoring Results and Observations

The noise 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 <sub>Aeq</sub> (dB(A)) | Re-M L <sub>Aeq</sub> (dB(A)) | Action Level (dB(A))                      | Limit Level (dB(A)) |
|----------------------|-----------------|------------------------|--------------------------|-------------------------------|---|---------------------|
| NM1                  | 1/6/2021        | 75.1                   | 65.3                     | N/A                           | When one documented complaint is received | 75 dB(A)            |
|                      | 7/6/2021        |                        | 64.2                     | N/A                           |   |                     |
|                      | 11/6/2021       |                        | 66.4                     | N/A                           |   |                     |
|                      | 17/6/2021       |                        | 65.8                     | N/A                           |   |                     |
|                      | 23/6/2021       |                        | 66.4                     | N/A                           |   |                     |
|                      | 29/6/2021       |                        | 64.4                     | N/A                           |   |                     |
| NM3                  | 1/6/2021        | 74.5                   | 74.1                     | N/A                           | When one documented complaint is received | 75 dB(A)            |
|                      | 7/6/2021        |                        | 73.8                     | N/A                           |   |                     |
|                      | 11/6/2021       |                        | 74.0                     | N/A                           |   |                     |
|                      | 17/6/2021       |                        | 72.9                     | N/A                           |   |                     |
|                      | 23/6/2021       |                        | 73.7                     | N/A                           |   |                     |
|                      | 29/6/2021       |                        | 73.2                     | N/A                           |   |                     |

In accordance with the established action and limited levels for impact monitoring, no exceedances was recorded. Noise measurement was repeated for confirming the findings and identifying the noise source for each exceedance according to the event and action plan.

During the monitoring period, traffic noise was identified as one of the noise source for NM3.

### 3.9 Monitoring Schedule for Next Reporting Month

Noise monitoring for next reporting month is scheduled on 5, 10, 16, 22 and 28 July 2021.

#### 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) <sup>(a)</sup> | C&D Materials (non-inert) <sup>(b)</sup> |             |                |                    |             |             |
|   |                                      | 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) |
| Jun 2021  | 66.59                                | 6.29                                     | 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 Landscape Architect on 10 and 24 June 2021. 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<br>2. Inform IEC and ER<br>3. Discuss remedial actions with IEC, ER and Contractor<br>4. Monitor remedial actions until rectification has been completed  | 1. Check report<br>2. Check Contractor's working method<br>3. Discuss with ET and Contractor on possible remedial measures<br>4. Advise ER on effectiveness of proposed remedial measures.<br>5. Check implementation of remedial measures.               | 1. Notify Contractor<br>2. Ensure remedial measures are properly implemented | 1. Amend working methods<br>2. Rectify damage and undertake any necessary replacement |
| Repeated Non-conformity        | 1. Identify Source<br>2. Inform IEC and ER<br>3. Increase monitoring frequency<br>4. Discuss remedial actions with IEC, ER and Contractor<br>5. Monitor remedial actions until rectification has been completed<br>6. If non-conformity stops, cease additional monitoring | 1. Check monitoring report<br>2. Check Contractor's working method<br>3. Discuss with ET and Contractor on possible remedial measures<br>4. Advise ER on effectiveness of proposed remedial measures<br>5. Supervise implementation of remedial measures. | 1. Notify Contractor<br>2. Ensure remedial measures are properly implemented | 1. Amend working methods<br>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 2, 9, 16, 23 and 30 June 2021. The representative of the IEC conducted the site inspection on 30 June 2021. 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 |
|-----------|--|----------------|---|---|--------------|
| 23 Jun 21 | Soil and mud were observed on the surface area near the planter. | Observation    | Contractor was advised to clean up the dusty materials for keeping the site clean and tidy. | Soil and mud were removed to keep the road surface clean. | 23 Jun 21    |
| 30 Jun 21 | Oil was observed in the drip tray.                               | Observation    | Contractor was advised to remove the oil and maintain cleanliness to prevent leakage.       | Oil leakage was cleaned up.                               | 30 Jun 21    |



## **7 Environmental Non-Conformance**

### **7.1 Summary of Environmental Exceedances**

No exceedance of action level and limit level was recorded for TSP and Nosie.

### **7.2 Summary of Environmental Non-Compliance**

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

### **7.3 Summary of Environmental Complaint**

No environmental complaint was recorded in the reporting month.

### **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 – Road Pavement, Street Furniture Installation

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 this Project.

## **9 Comment, Recommendations and Conclusions**

### **9.1 Comment**

The recommended mitigation measures accordance with the EM&A Manual had been effectively implemented to minimize the environmental impacts due to the construction. The contractor had implemented the mitigation measures to control the dust and noise impacts. No dust and noise impacts obviously affected to the environment and sensitive receivers. The follow up actions were implemented for environmental observations made during the site inspections. The environmental performance during the reporting period was considered satisfactory.

### **9.2 Recommendations**

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

- To clean up the dusty materials for keeping the site clean and tidy.
- To remove the oil and maintain cleanliness to prevent leakage.

### **9.3 Conclusions**

This is the monthly Environmental Monitoring and Audit (EM&A) Report presenting the EM&A works undertaken from 1 June 2021 to 30 June 2021 in accordance with the EM&A Manual.

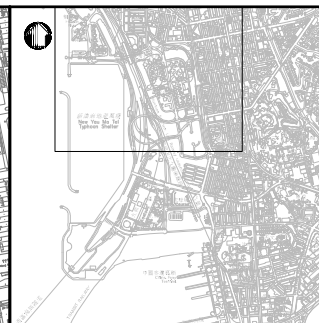
No exceedance of action level and limit level was recorded for TSP and Noise. No Non-compliance event, complaint, notification of summons and successful prosecution against the Project were received in this reporting month.

5 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. 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





LOCATION PLAN

LEGEND:

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

| Rev | Description | By | Date |
|-----|-------------|----|------|
|     |             |    |      |
|     |             |    |      |

Consultant  
**PARSONS  
BRINCKERHOFF**

漢  
綠 **CINOTECH**

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

Drawing title  
**LOCATION OF MONITORING  
STATIONS (PAGE 1 OF 2)**

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

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





LOCATION PLAN

LEGEND:

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

| Rev | Description | By | Date |
|-----|-------------|----|------|
|     |             |    |      |
|     |             |    |      |
|     |             |    |      |

Consultant  
**PARSONS BRINCKERHOFF**

漢綠 CINOTECH

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

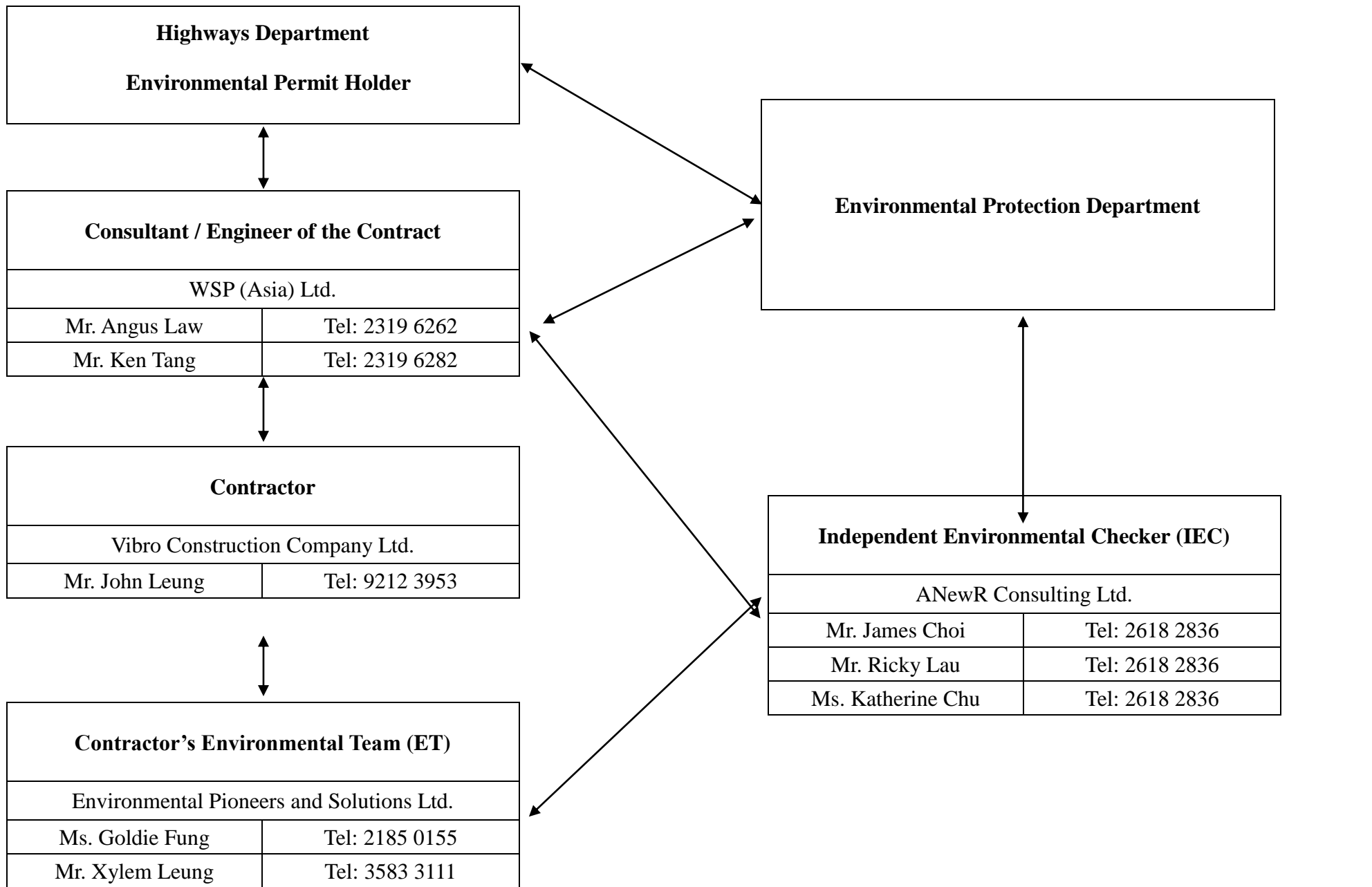
Drawing title  
LOCATION OF MONITORING STATIONS (PAGE 2 OF 2)

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

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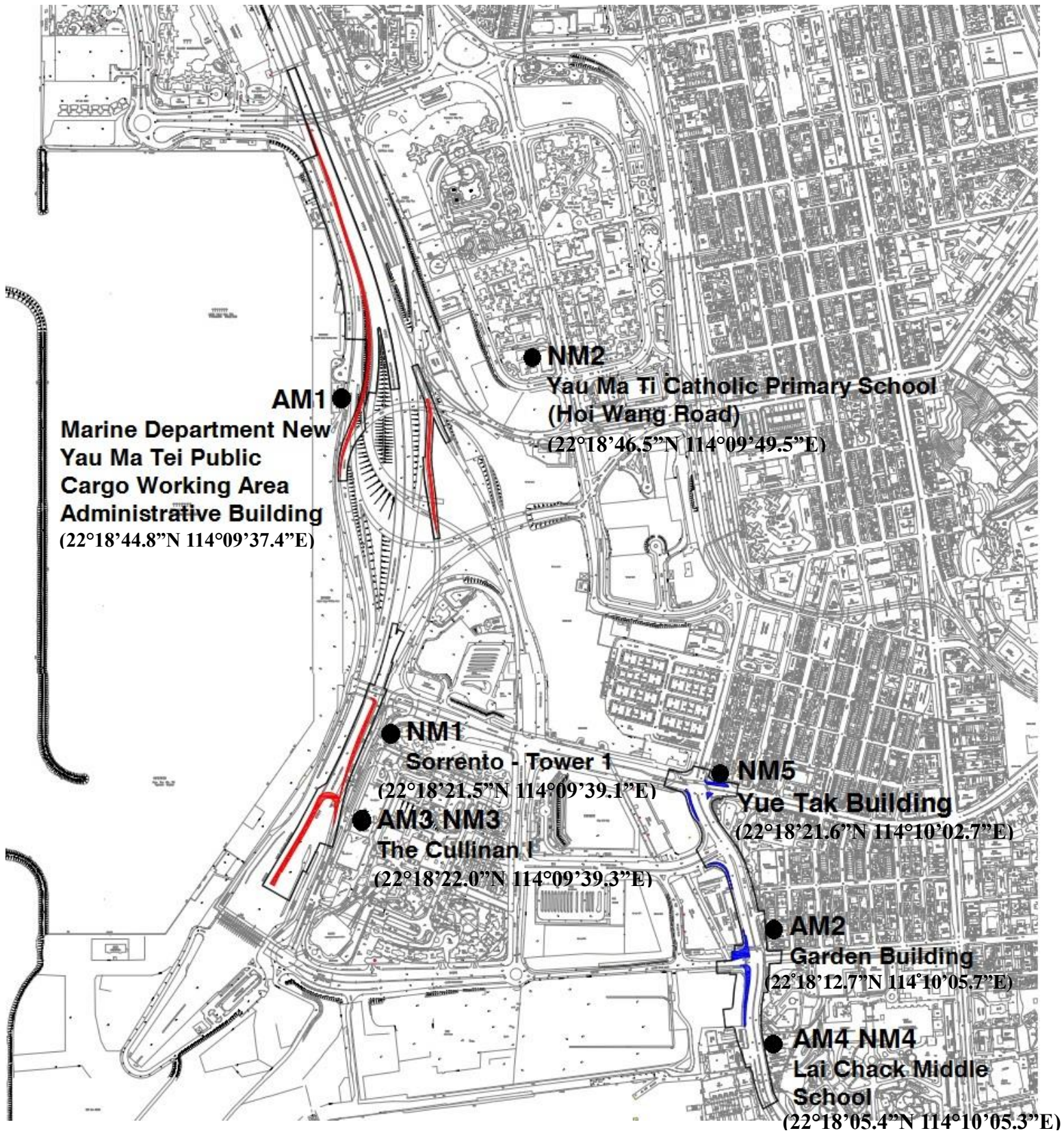
## Appendix B: Project Organization Chart







## Appendix C: Monitoring Locations

## Locations for 1-hr TSP and Noise monitoring

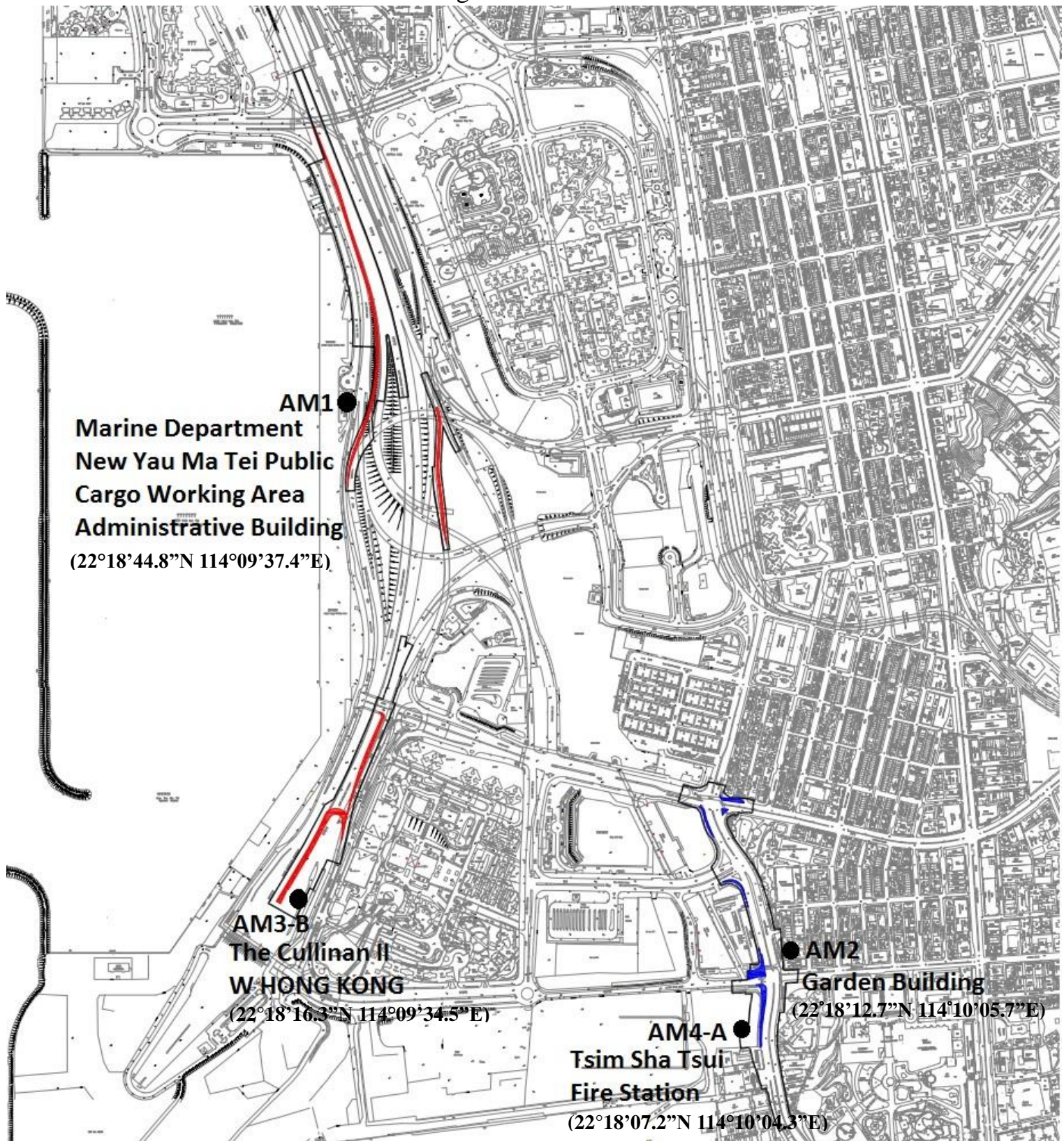


| Monitoring Location                                       | Photo Record  |
|---|---|
| <p data-bbox="226 163 391 241">AM3<br/>The Cullinan I</p> |  A photograph showing a black tripod with a blue camera mounted on it, positioned on a grey paved sidewalk. To the right of the tripod is a dark, textured wall of a building. A small white sign with orange text is visible on the wall. In the background, a few people can be seen walking on the sidewalk. |

| Monitoring Location                  | Photo Record   |
|--------------------------------------|--|
| <p>NM1</p> <p>Sorrento - Tower 1</p> |  |
| <p>NM3</p> <p>The Cullinan I</p>     |  |



## Locations for 24-hr TSP monitoring



| Monitoring Location                                      | Photo Record   |
|--|--|
| <p>AM3-B</p> <p>The Cullinan II</p> <p>(W Hong Kong)</p> |  |

## Appendix D: Calibration Certification





# CERTIFICATE OF CALIBRATION AND TESTING

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

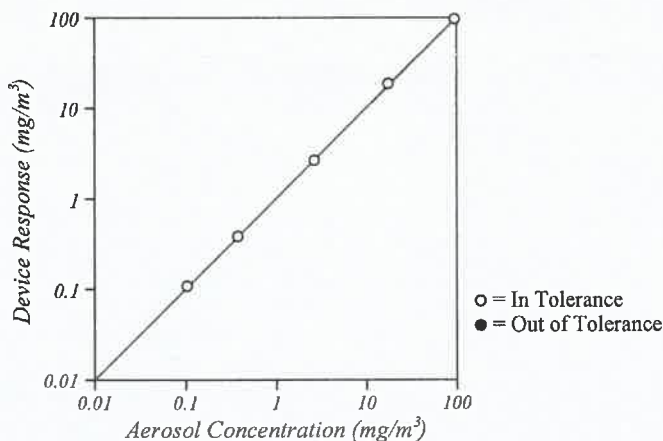
|                        |               |            |               |            |
|------------------------|---------------|------------|---------------|------------|
| Environment Conditions |               |            | Model         | AM520      |
| Temperature            | 73.13 (22.9)  | °F (°C)    | Serial Number | 5201932016 |
| Relative Humidity      | 25.2          | %RH        |               |            |
| Barometric Pressure    | 28.86 (977.3) | inHg (hPa) |               |            |

☒ As Left  
☐ As Found

☒ In Tolerance  
☐ Out of Tolerance



### Concentration Linearity Plot



System ID: DTII01-02

### CONCENTRATION

Unit: mg/m<sup>3</sup>

| # | STANDARD | MEASURED | ALLOWABLE RANGE | # | STANDARD | MEASURED | ALLOWABLE RANGE |
|---|----------|----------|-----------------|---|----------|----------|-----------------|
| 1 | 0.102    | 0.102    | 0.071~0.133     | 4 | 17.282   | 17.359   | 15.554~19.010   |
| 2 | 0.369    | 0.360    | 0.314~0.424     | 5 | 93.701   | 91.226   | 84.331~103.071  |
| 3 | 2.606    | 2.474    | 2.345~2.867     |   |          |          |                 |

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

| Measurement Variable | System ID | Last Cal. | Cal. Due | Measurement Variable | System ID | Last Cal. | Cal. Due |
|----------------------|-----------|-----------|----------|----------------------|-----------|-----------|----------|
| DC Voltage           | E003314   | 01-11-21  | 01-31-22 | Photometer           | E003319   | 02-15-21  | 08-31-21 |
| Microbalance         | M001324   | 10-16-20  | 10-31-22 | Pressure             | E003511   | 10-26-20  | 10-31-21 |
| Flowmeter            | E005570   | 09-09-20  | 03-31-21 | DC Voltage           | E003315   | 01-11-21  | 01-31-22 |

*Touling*

Calibrated

February 26, 2021

Date





## TE-5170 Calibration Worksheet

### Site Information

Location: **Nga Cheung Road Portion I**  
Location ID: **AM3-B**  
Sampler: **TE-5170 MFC (0003)**

Date: **5-May-21**  
Tech: **Eric Lai**

### Site Conditions

Barometric Pressure (in Hg): **29.80**  
Temperature (deg F): **70**  
Average Press. (in Hg): **29.70**  
Average Temp. (deg F): **70**

Corrected Pressure (mm Hg): **757**  
Temperature (deg K): **294**  
Corrected Average (mm Hg): **754**  
Average Temp. (deg K): **294**

### Calibration Orifice

Make: **Tisch**  
Model: **TE-5028A**  
Serial#: **3371**

Qstd Slope: **1.56573**  
Qstd Intercept: **-0.02228**  
Date Certified: **30-Mar-20**

### Calibration Information

| Plate or<br>Test # | H2O<br>(in) | Qstd<br>(m3/min) | I<br>(chart) | IC<br>(corrected) | Linear Regression    |
|--------------------|-------------|------------------|--------------|-------------------|----------------------|
| 1                  | 1.60        | 0.826            | 20.0         | 20.09             | Slope: 40.2626       |
| 2                  | 3.20        | 1.162            | 32.0         | 32.15             | Intercept: -13.9642  |
| 3                  | 4.80        | 1.420            | 42.0         | 42.19             | Corr. Coeff: 0.9987  |
| 4                  | 6.40        | 1.637            | 52.0         | 52.24             |                      |
| 5                  | 8.00        | 1.829            | 60.0         | 60.27             | # of Observations: 5 |

### Calculations

$$Qstd = 1/m[\text{Sqrt}(H_2O(P_a/P_{std})(T_{std}/T_a))-b]$$
$$IC = I[\text{Sqrt}(P_a/P_{std})(T_{std}/T_a)]$$

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:

$$1/m((I)[\text{Sqrt}(298/T_{av})(P_{av}/760)]-b)$$

m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

**Average I (chart): 50.0**

**Average Flow Calculation m3/min**

1.592225294

**Average Flow Calculation in CFM**

56.22147512

**Sample Time (Hrs): 24.0**

**Total Flow/Volume in m3**

2292.804423

**Total Flow in CFM**

80958.92417



## CERTIFICATE OF CALIBRATION

Certificate No.: 21CA0118 02-01

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.: | 87094                      | 73398      |
| Adaptors used:        | -                          | -          |

### Item submitted by

|                      |  |
|----------------------|--|
| Customer Name:       | Environmental Pioneers & Solutions Limited |
| Address of Customer: | -  |
| Request No.:         | -  |
| Date of receipt:     | 18-Jan-2021                                |

Date of test: 24-Jan-2021

### Reference equipment used in the calibration

| Description:                    | Model:   | Serial No. | Expiry Date: | Traceable to: |
|---------------------------------|----------|------------|--------------|---------------|
| Multi function sound calibrator | B&K 4226 | 2288444    | 23-Aug-2021  | CIGISMEC      |
| Signal generator                | DS 360   | 33873      | 19-May-2021  | CEPREI        |

### Ambient conditions

|                    |              |
|--------------------|--------------|
| Temperature:       | 21 ± 1 °C    |
| Relative humidity: | 55 ± 10 %    |
| Air pressure:      | 1000 ± 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 responsiveness 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.

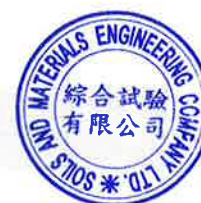
Actual Measurement data are documented on worksheets.

Approved Signatory:

  
Feng Junqi

Date: 25-Jan-2021

Company Chop:



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. The results apply to the item as received.



## CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.:

21CA0118 02-01

Page 2 of 2

### 1, Electrical Tests

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

| Test:                   | Subtest:   | Status: | Expanded Uncertainty (dB) | Coverage Factor |
|-------------------------|--|---------|---------------------------|-----------------|
| Self-generated noise    | A  | Pass    | 0.3                       |                 |
|                         | C  | Pass    | 0.8                       | 2.1             |
|                         | Lin  | Pass    | 1.6                       | 2.2             |
| Linearity range for Leq | At reference range, Step 5 dB at 4 kHz           | Pass    | 0.3                       |                 |
|                         | Reference SPL on all other ranges                | Pass    | 0.3                       |                 |
|                         | 2 dB below upper limit of each range             | Pass    | 0.3                       |                 |
|                         | 2 dB above lower limit of each range             | Pass    | 0.3                       |                 |
| Linearity range for SPL | At reference range, Step 5 dB at 4 kHz           | Pass    | 0.3                       |                 |
|                         | 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 <sup>3</sup> at 4kHz | Pass    | 0.3                       |                 |
|                         | 1 ms burst duty factor 1/10 <sup>4</sup> at 4kHz | Pass    | 0.3                       |                 |
| Pulse range             | Single burst 10 ms at 4 kHz                      | Pass    | 0.4                       |                 |
| Sound exposure level    | Single burst 10 ms at 4 kHz                      | Pass    | 0.4                       |                 |
| Overload indication     | SPL  | Pass    | 0.3                       |                 |
|                         | Leq  | Pass    | 0.4                       |                 |

### 2, Acoustic tests

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

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

### 3, Response to associated sound calibrator

N/A

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

- End -

Calibrated by:

Date:

Fung Chi Yip  
24-Jan-2021

Checked by:

Date:

Feng Junqi  
25-Jan-2021

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.



Test Data for Sound Level Meter

Page 1 of 5

Sound level meter type: 971  
Microphone type: 7052E

Serial No. 87094  
Serial No. 73398

Date 24-Jan-2021

Report: 21CA0118 02-01

## 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 | 13.1 | dB |
| Noise level in C weighting | 13.1 | dB |
| Noise level in Lin (Z)     | 18.1 | 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        |
| 119.0                    | 119.0          | 119.0      | 0.7       | 0.0            | 0.0        |
| 120.0                    | 120.0          | 120.0      | 0.7       | 0.0            | 0.0        |
| 121.0                    | 121.0          | 121.0      | 0.7       | 0.0            | 0.0        |
| 122.0                    | 122.0          | 122.0      | 0.7       | 0.0            | 0.0        |
| 123.0                    | 123.0          | 123.0      | 0.7       | 0.0            | 0.0        |
| 124.0                    | 124.0          | 124.0      | 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                     | 48.9           | 48.9       | 0.7       | -0.1           | -0.1       |
| 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                     | 33.8           | 33.8       | 0.7       | -0.2           | -0.2       |
| 29.0                     | 28.7           | 28.7       | 0.7       | -0.3           | -0.3       |
| 28.0                     | 27.5           | 27.5       | 0.7       | -0.5           | -0.5       |
| 27.0                     | 26.3           | 26.3       | 0.7       | -0.7           | -0.7       |



Test Data for Sound Level Meter

Page 2 of 5

Sound level meter type: 971  
Microphone type: 7052E

Serial No. 87094  
Serial No. 73398

Date 24-Jan-2021

Report: 21CA0118 02-01

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        |
| 26-124       | 94.0           | 94.0         | 0.7       | 0.0       |
| 36-138       | 94.0           | 94.1         | 0.7       | 0.1       |

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        |
| 26-124 | 28.0                     | 27.5         | 0.7       | -0.5      |
|        | 122.0                    | 122.0        | 0.7       | 0.0       |
| 36-138 | 38.0                     | 38.0         | 0.7       | 0.0       |
|        | 136.0                    | 136.0        | 0.7       | 0.0       |

## FREQUENCY WEIGHTING TEST

The frequency response of the weighting networks 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           | 93.1         | 1.5           | 3.0 | 0.2       |
| 12590.0   | 94.0       | 89.7           | 89.7         | 3.0           | 6.0 | 0.0       |

Frequency weighting C:

| Frequency | Ref. level | Expected level | Actual level | Tolerance(dB) |     | Deviation |
|-----------|------------|----------------|--------------|---------------|-----|-----------|
| Hz        | dB         | dB             | dB           | +             | -   | dB        |
| 1000.0    | 94.0       | 94.0           | 94.0         | 0.0           | 0.0 | 0.0       |
| 31.6      | 94.0       | 91.0           | 91.1         | 1.5           | 1.5 | 0.1       |
| 63.1      | 94.0       | 93.2           | 93.2         | 1.5           | 1.5 | 0.0       |
| 125.9     | 94.0       | 93.8           | 93.8         | 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           | 93.3         | 1.0           | 1.0 | 0.1       |
| 7943.0    | 94.0       | 91.0           | 91.1         | 1.5           | 3.0 | 0.1       |





Test Data for Sound Level Meter

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Sound level meter type: 971 Serial No. 87094 Date 24-Jan-2021  
Microphone type: 7052E Serial No. 73398  
Report: 21CA0118 02-01

|         |      |      |      |     |     |      |
|---------|------|------|------|-----|-----|------|
| 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           | 94.1         | 1.5           | 1.5 | 0.1       |
| 63.1      | 94.0       | 94.0           | 94.0         | 1.5           | 1.5 | 0.0       |
| 125.9     | 94.0       | 94.0           | 94.0         | 1.0           | 1.0 | 0.0       |
| 251.2     | 94.0       | 94.0           | 94.0         | 1.0           | 1.0 | 0.0       |
| 501.2     | 94.0       | 94.0           | 94.0         | 1.0           | 1.0 | 0.0       |
| 1995.0    | 94.0       | 94.0           | 94.0         | 1.0           | 1.0 | 0.0       |
| 3981.0    | 94.0       | 94.0           | 94.0         | 1.0           | 1.0 | 0.0       |
| 7943.0    | 94.0       | 94.0           | 94.0         | 1.5           | 3.0 | 0.0       |
| 12590.0   | 94.0       | 94.0           | 94.0         | 3.0           | 6.0 | 0.0       |

TIME WEIGHTING FAST TEST

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

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

TIME WEIGHTING SLOW TEST

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

| Ref. level | Expected level | Actual level | Tolerance(dB) |     | Deviation |
|------------|----------------|--------------|---------------|-----|-----------|
| dB         | dB             | dB           | +             | -   | dB        |
| 120.0      | 115.9          | 115.9        | 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 C, set the generator signal to single, Lcpeak)

| Ref. level | Response to 10 ms | Response to 100 us | Tolerance | Deviation |
|------------|-------------------|--------------------|-----------|-----------|
| dB         | dB                | dB                 | +/- dB    | dB        |
| 123.0      | 123.0             | 123.6              | 2.0       | 0.6       |

Negative polarities:

| Ref. level | Response to 10 ms | Response to 100 us | Tolerance | Deviation |
|------------|-------------------|--------------------|-----------|-----------|
| dB         | dB                | dB                 | +/- dB    | dB        |
| 123.0      | 123.0             | 123.6              | 2.0       | 0.6       |



Test Data for Sound Level Meter

Page 4 of 5

Sound level meter type: 971  
Microphone type: 7052E

Serial No. 87094  
Serial No. 73398

Date 24-Jan-2021

Report: 21CA0118 02-01

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 weighting | dB         | dB             | indication(dB)    | +/- dB    | dB        |
| Slow           | 120.0+6.6  | 120.0          | 119.9             | 0.5       | -0.1      |

TIME WEIGHTING IMPULSE TEST

Time weighting I is tested on the reference range (Set the SLM to LAImax)

Test frequency: 2000 Hz  
Amplitude: The upper limit of the primary indicator range.

Single sinusoidal burst of duration 5 ms:

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

Repeated at 100 Hz

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

TIME AVERAGING TEST

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

Frequency of tone burst: 4000 Hz

Duration of tone burst: 1 ms

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

PULSE RANGE AND SOUND EXPOSURE LEVEL TEST

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

Test frequency: 4000 Hz

Integration time: 10 sec

The integrating sound level meter set to Leq:

| Duration | Rms level of tone burst (dB) | Expected | Actual | Tolerance | Deviation |
|----------|------------------------------|----------|--------|-----------|-----------|
| msec     | dB                           | dB       | dB     | +/- dB    | dB        |
| 10       | 94.0                         | 64.0     | 63.9   | 1.7       | -0.1      |



Test Data for Sound Level Meter

Page 5 of 5

Sound level meter type: 971  
Microphone type: 7052E

Serial No. 87094  
Serial No. 73398

Date 24-Jan-2021

Report: 21CA0118 02-01

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     | 94.0            | 74.0     | 73.9   | 1.7       | -0.1      |

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        |
| 118.6            | 117.6            | 114.6           | 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 following:  
The test tone burst signal is superimposed on a baseline signal corresponding to the lower limit of reference range

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

| Rms level        | Level reduced by | Expected level | Actual level | Tolerance | Deviation |
|------------------|------------------|----------------|--------------|-----------|-----------|
| at overload (dB) | 1 dB             | dB             | dB           | dB        | dB        |
| 125.2            | 124.2            | 84.2           | 84.1         | 2.2       | -0.1      |

ACOUSTIC TEST

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

| Frequency | Expected level | Actual level  | Tolerance (dB) |     | Deviation |
|-----------|----------------|---------------|----------------|-----|-----------|
| Hz        | dB             | Measured (dB) | +              | -   | dB        |
| 1000      | 94.0           | 94.0          | 0.0            | 0.0 | 0.0       |
| 125       | 77.9           | 78.0          | 1.0            | 1.0 | 0.1       |
| 8000      | 92.9           | 93.1          | 1.5            | 3.0 | 0.2       |

-----END-----





## CERTIFICATE OF CALIBRATION

Certificate No.: 20CA1022 01-03

Page: 1 of 2

### Item tested

Description: Acoustical Calibrator (Class 1)  
Manufacturer: SVANTEK  
Type/Model No.: SV35A  
Serial/Equipment No.: 64263  
Adaptors used: -

### Item submitted by

Customer: Environmental Pioneers & Solutions Limited  
Address of Customer: -  
Request No.: -  
Date of receipt: 22-Oct-2020

Date of test: 30-Oct-2020

### Reference equipment used in the calibration

| Description:            | Model:   | Serial No. | Expiry Date: | Traceable to: |
|-------------------------|----------|------------|--------------|---------------|
| Lab standard microphone | B&K 4180 | 2341427    | 11-May-2021  | SCL           |
| Preamplifier            | B&K 2673 | 2743150    | 03-Jun-2021  | CEPREI        |
| Measuring amplifier     | B&K 2610 | 2346941    | 03-Jun-2021  | CEPREI        |
| Signal generator        | DS 360   | 33873      | 19-May-2021  | CEPREI        |
| Digital multi-meter     | 34401A   | US36087050 | 19-May-2021  | CEPREI        |
| Audio analyzer          | 8903B    | GB41300350 | 18-May-2021  | CEPREI        |
| Universal counter       | 53132A   | MY40003662 | 18-May-2021  | CEPREI        |

### Ambient conditions

Temperature:  $22 \pm 1$  °C  
Relative humidity:  $55 \pm 10$  %  
Air pressure:  $1005 \pm 5$  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.

Approved Signatory:

  
Feng Junqi

Date: 31-Oct-2020

Company Chop:



**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. The results apply to the item as received.

**CERTIFICATE OF CALIBRATION**

(Continuation Page)

Certificate No.:

20CA1022 01-03

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<br>Shown<br>Hz | Output Sound Pressure<br>Level Setting<br>dB | Measured Output<br>Sound Pressure Level<br>dB | (Output level in dB re 20 µPa)          |
|--------------------------|--|---|---|
|                          |  |   | Estimated Expanded<br>Uncertainty<br>dB |
| 1000                     | 94.00  | 93.65   | 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 = 0.010 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 = 0.5%

Estimated expanded uncertainty

0.7 %

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

- End -

Calibrated by:

Date:

Fung Chi Yip  
30-Oct-2020

Checked by:

Date:

Feng Junqi  
31-Oct-2020

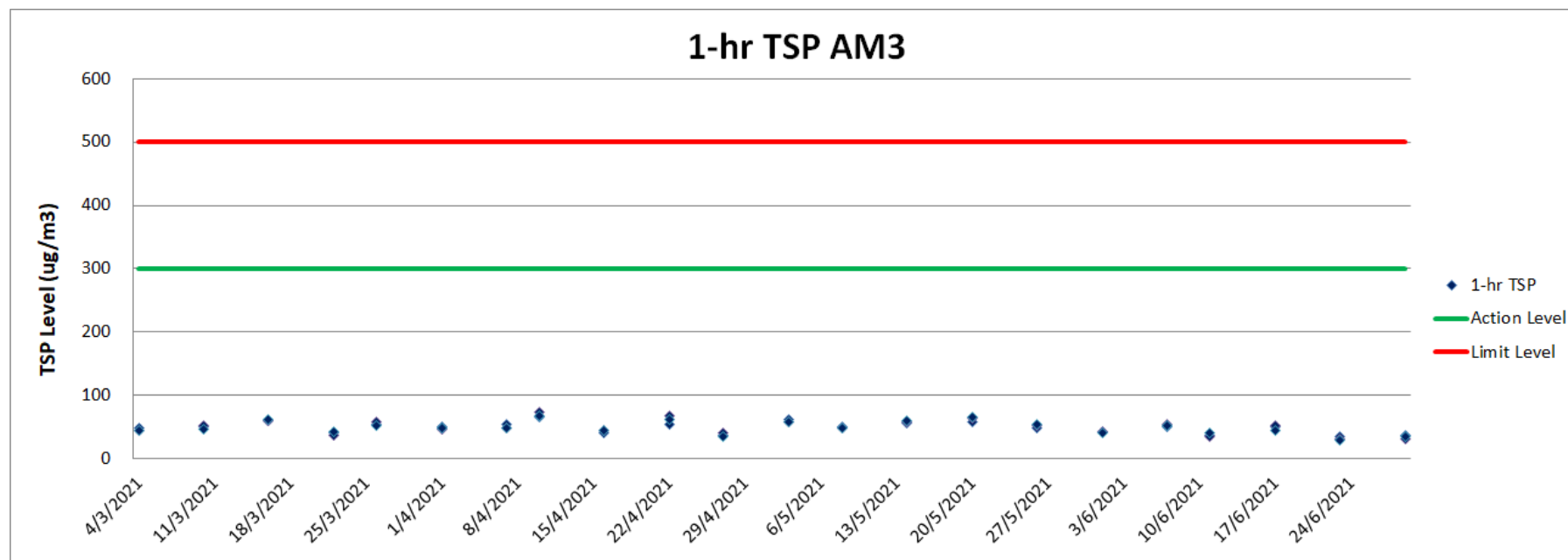
The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

## Appendix E: TSP Monitoring Data

### 1-hr TSP Monitoring Result for AM3

| Date      | Weather  | Temperature (°C) * | Wind Direction * | Wind Speed (m/s) * | Sampling Time |       |       | Reading (µg/m³) |    |    |         |
|-----------|----------|--------------------|------------------|--------------------|---------------|-------|-------|-----------------|----|----|---------|
|           |          |                    |                  |                    | 1             | 2     | 3     | 1               | 2  | 3  | Average |
| 1/6/2021  | Sunny    | 25.2 - 29.4        | NE               | <5m/s              | 9:00          | 10:01 | 11:02 | 42              | 43 | 40 | 42      |
| 7/6/2021  | Sunny    | 21.8 - 26.0        | NE               | <5m/s              | 9:00          | 10:01 | 11:02 | 50              | 55 | 52 | 52      |
| 11/6/2021 | Overcast | 20.9 - 27.0        | NE               | <5m/s              | 9:00          | 10:01 | 11:02 | 37              | 36 | 40 | 38      |
| 17/6/2021 | Overcast | 22.3 - 23.1        | E                | <5m/s              | 9:00          | 10:01 | 11:02 | 51              | 52 | 44 | 49      |
| 23/6/2021 | Overcast | 23.9 - 32.6        | NE               | <5m/s              | 9:00          | 10:01 | 11:02 | 35              | 31 | 30 | 32      |
| 29/6/2021 | Overcast | 21.7 - 28.2        | NE               | <5m/s              | 9:00          | 10:01 | 11:02 | 38              | 32 | 35 | 35      |

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

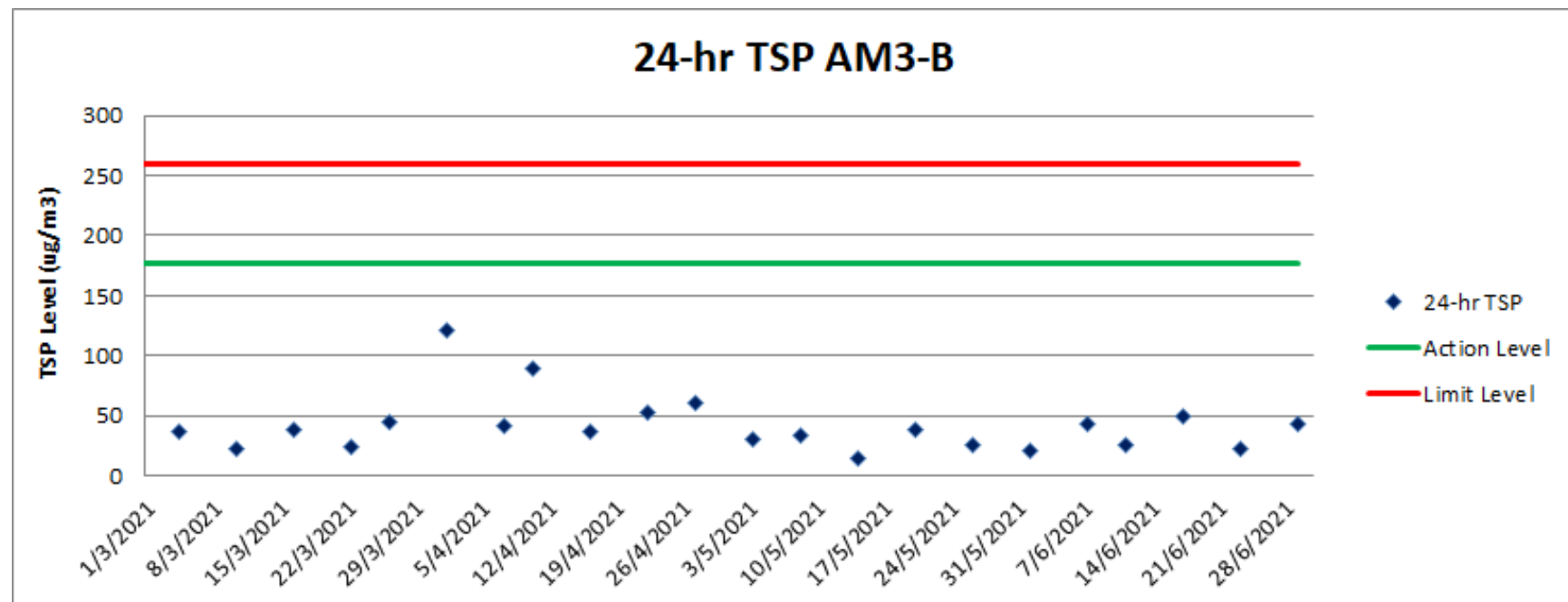


## 24-hr TSP Monitoring Result for AM3-B

| Sampling ID & Paper No. | Temperature (°C) *1 | Wind Direction *1 | Wind Speed (m/s) *1 | Sampling Date | Wt. of paper (g) |           |             | Flow Rate (CFM) | Total Volume *2 (m³) | TSP Concentration (µg/m³) |
|-------------------------|---------------------|-------------------|---------------------|---------------|------------------|-----------|-------------|-----------------|----------------------|---------------------------|
|                         |                     |                   |                     |               | Initial Wt.      | Final Wt. | Wt. of dust |                 |                      |                           |
| AM3-B0601(208116)       | 25.2 - 29.4         | NE                | <5m/s               | 1/6/2021      | 2.6431           | 2.6910    | 0.0479      | 60.0            | 2292.80              | 21                        |
| AM3-B0607(208114)       | 21.8 - 26.0         | NE                | <5m/s               | 7/6/2021      | 2.6600           | 2.7592    | 0.0992      | 60.0            | 2292.80              | 43                        |
| AM3-B0611(208123)       | 20.9 - 27.0         | NE                | <5m/s               | 11/6/2021     | 2.6625           | 2.7213    | 0.0588      | 60.0            | 2293.80              | 26                        |
| AM3-B0617(208490)       | 22.3 - 23.1         | E                 | <5m/s               | 17/6/2021     | 2.6262           | 2.7414    | 0.1152      | 60.0            | 2292.80              | 50                        |
| AM3-B0623(208458)       | 23.9 - 32.6         | NE                | <5m/s               | 23/6/2021     | 2.6475           | 2.7007    | 0.0532      | 60.0            | 2292.80              | 23                        |
| AM3-B0629(208460)       | 21.7 - 28.2         | NE                | <5m/s               | 29/6/2021     | 2.6431           | 2.7415    | 0.0984      | 60.0            | 2292.80              | 43                        |

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

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





### CERTIFICATE OF ANALYSIS

|                     |   |                     |   |                       |                |
|---------------------|---|---------------------|---|-----------------------|----------------|
| <i>Client</i>       | : ENVIRONMENTAL PIONEERS & SOLUTION LTD   | <i>Laboratory</i>   | : ALS Technichem (HK) Pty Ltd   | <i>Page</i>           | : 1 of 3       |
| <i>Contact</i>      | : ANDY TSANG  | <i>Contact</i>      | : Richard Fung  | <i>Work Order</i>     | : HK2125861    |
| <i>Address</i>      | : FLAT A, 8/F, CHAI WAN INDUSTRIAL CENTRE, 20<br>LEE CHUNG STREET, CHAI WAN, HONG KONG<br>HONG KONG | <i>Address</i>      | : 11/F., Chung Shun Knitting Centre, 1 - 3<br>Wing Yip Street, Kwai Chung, N.T.,<br>Hong Kong |                       |                |
| <i>E-mail</i>       | : Kytsang@fsenv.com.hk  | <i>E-mail</i>       | : richard.fung@alsglobal.com  |                       |                |
| <i>Telephone</i>    | : ----  | <i>Telephone</i>    | : +852 2610 1044  |                       |                |
| <i>Facsimile</i>    | : ----  | <i>Facsimile</i>    | : +852 2610 2021  |                       |                |
| <i>Project</i>      | : PROPOSED ROAD IMPROVEMENT WORKS IN WEST KOWLOON RECLAMATION DEVELOPMENT - PHASE 1                 |                     |   | <i>Date received</i>  | : 29-Jun-2021  |
| <i>Order number</i> | : —   | <i>Quote number</i> | : HKE/3415a/2018_V2   | <i>Date of issue</i>  | : 30-Jun-2021  |
| <i>C-O-C number</i> | : —   |                     |   | <i>No. of samples</i> | - Received : 6 |
| <i>Site</i>         | : —   |                     |   |                       | - Analysed : 6 |

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

| <i>Signatory</i>  | <i>Position</i>   | <i>Authorised results for:</i> |
|---|-------------------|--------------------------------|
| <br>Fung Lim Chee, Richard | Managing Director | Inorganics                     |



### **General Comments**

This report supersedes any previous report(s) with this reference. 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. Testing period is from 29-Jun-2021 to 30-Jun-2021.

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 HK2125861 :**

Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in ambient condition. The result(s) related only to the item(s) tested.

Sample information (Project name, Sample ID, Sampling date/time, etc., if any) is provided by client.

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## Analytical Results

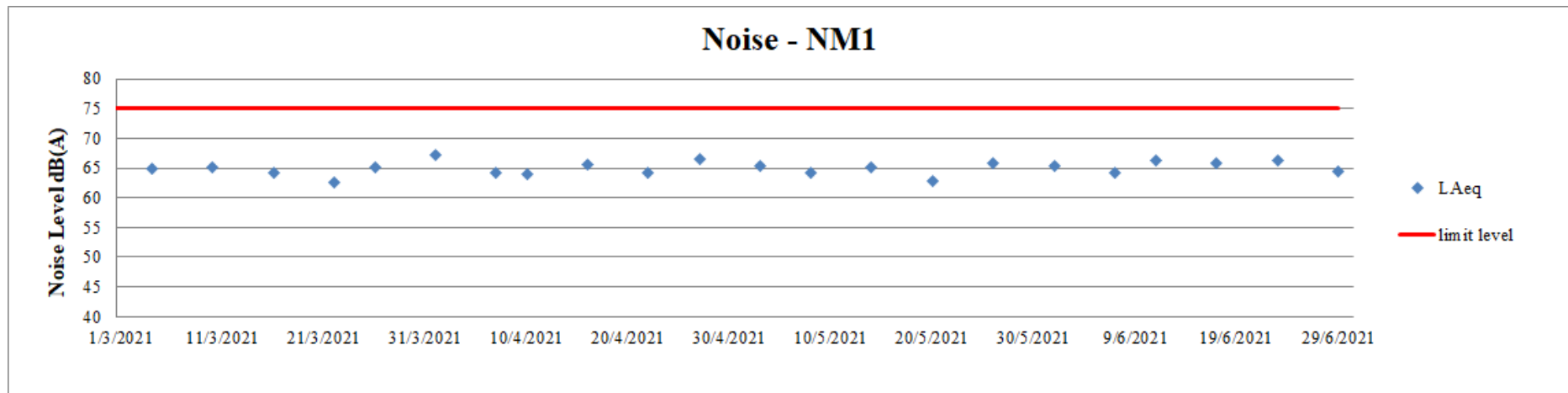
| Sub-Matrix: FILTER (TSP/RSP) |                      |                      | Compound | HK-TSP: Final Weight                     | HK-TSP: Initial Weight                   | HK-TSP: Total Suspended Particulates     | HK-TSP: Total Suspended Particulates     | ---- |
|------------------------------|----------------------|----------------------|----------|--|--|--|--|------|
|                              |                      |                      | LOR Unit | 0.0010 g                                 | 0.0010 g                                 | 0.0010 g                                 | 0.0010 g                                 | ---- |
| Sample ID                    | Sampling date / time | Laboratory sample ID |          | EA/ED: Physical and Aggregate Properties | EA/ED: Physical and Aggregate Properties | EA/ED: Physical and Aggregate Properties | EA/ED: Physical and Aggregate Properties | ---- |
| AM3-B0601(208116)            | 01-Jun-2021          | HK2125861-001        |          | 2.6910                                   | 2.6431                                   | 0.0479                                   | ----                                     | ---- |
| AM3-B0607(208114)            | 07-Jun-2021          | HK2125861-002        |          | 2.7592                                   | 2.6600                                   | 0.0992                                   | ----                                     | ---- |
| AM3-B0611(208123)            | 11-Jun-2021          | HK2125861-003        |          | 2.7213                                   | 2.6625                                   | 0.0588                                   | ----                                     | ---- |
| AM3-B0617(208490)            | 17-Jun-2021          | HK2125861-004        |          | 2.7414                                   | 2.6262                                   | ----                                     | 0.1152                                   | ---- |
| AM3-B0623(208458)            | 23-Jun-2021          | HK2125861-005        |          | 2.7007                                   | 2.6475                                   | 0.0532                                   | ----                                     | ---- |
| AM3-B0629(208460)            | 29-Jun-2021          | HK2125861-006        |          | 2.7415                                   | 2.6431                                   | 0.0984                                   | ----                                     | ---- |



## Appendix F1: Noise Monitoring Data

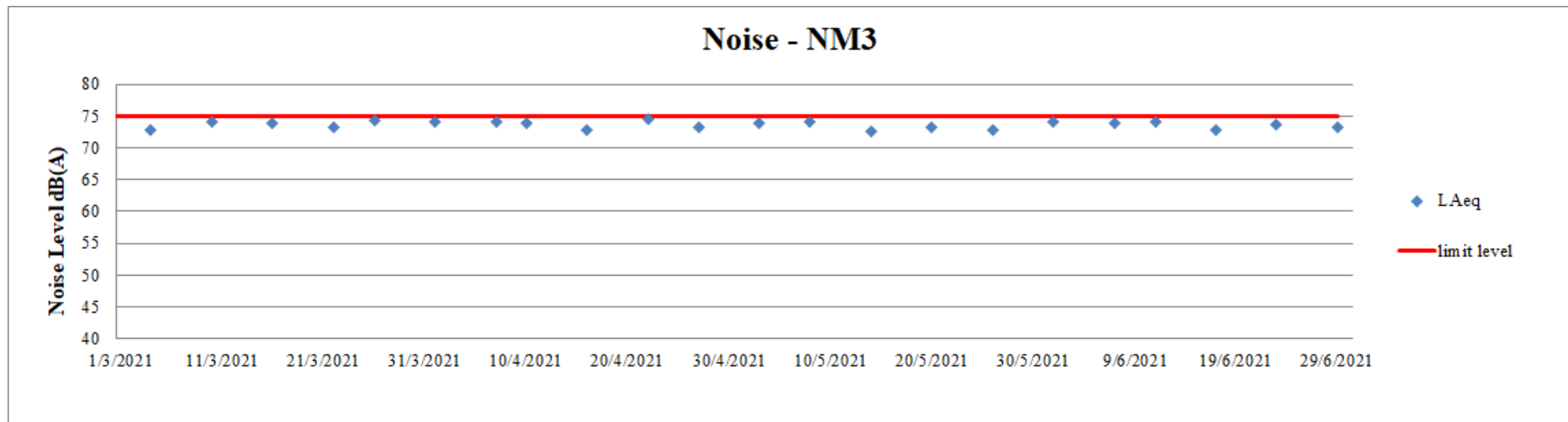
# Noise Monitoring Result for NM1

| Location           | NM1      |          |           |           |           |           |
|--------------------|----------|----------|-----------|-----------|-----------|-----------|
| Date               | 1/6/2021 | 7/6/2021 | 11/6/2021 | 17/6/2021 | 23/6/2021 | 29/6/2021 |
| Weather Condition  | Sunny    | Sunny    | Overcast  | Overcast  | Overcast  | Overcast  |
| Start Time         | 10:00    | 10:00    | 10:00     | 10:00     | 10:00     | 10:00     |
| Measurement Period | 30min    | 30min    | 30min     | 30min     | 30min     | 30min     |
| Baseline Level     | 75.1     |          |           |           |           |           |
| L <sub>Aeq</sub>   | 65.3     | 64.2     | 66.4      | 65.8      | 66.4      | 64.4      |
| L <sub>10</sub>    | 67.5     | 66.9     | 68.1      | 68.4      | 68.9      | 67.2      |
| L <sub>90</sub>    | 59.8     | 60.1     | 60.7      | 61.3      | 62.3      | 60.2      |



### Noise Monitoring Result for NM3

| Location           | NM3      |          |           |           |           |           |
|--------------------|----------|----------|-----------|-----------|-----------|-----------|
| Date               | 1/6/2021 | 7/6/2021 | 11/6/2021 | 17/6/2021 | 23/6/2021 | 29/6/2021 |
| Weather Condition  | Sunny    | Sunny    | Overcast  | Overcast  | Overcast  | Overcast  |
| Start Time         | 9:05     | 9:05     | 9:05      | 9:05      | 9:05      | 9:05      |
| Measurement Period | 30min    | 30min    | 30min     | 30min     | 30min     | 30min     |
| Baseline Level     | 74.5     |          |           |           |           |           |
| L <sub>Aeq</sub>   | 74.1     | 73.8     | 74.0      | 72.9      | 73.7      | 73.2      |
| L <sub>10</sub>    | 76.8     | 76.1     | 76.5      | 74.7      | 75.9      | 76.8      |
| L <sub>90</sub>    | 68.2     | 68.1     | 67.5      | 66.3      | 67.1      | 67.9      |



## Appendix G: Waste Management Record

**Monthly Summary Waste Flow Table for 2016 (year)**

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

**Monthly Summary Waste Flow Table for 2017 (year)**

| Month                   | <b><u>Actual Quantities of Inert C&amp;D Materials Generated Monthly</u></b> |                              |                        |                          |                         | <b><u>Actual Quantities of Non-inert C&amp;D Wastes Generated Monthly</u></b> |             |                             |             |                |                         |
|-------------------------|--|------------------------------|------------------------|--------------------------|-------------------------|---|-------------|-----------------------------|-------------|----------------|-------------------------|
|                         | Total Quantity Generated   | Hard Rocks & Broken Concrete | Reused in the Contract | Reused in other Projects | Disposed as Public Fill | Mixed Waste Disposal at Sorting Facility                                      | Metals      | Paper / cardboard packaging | Plastics    | Chemical Waste | Others (general refuse) |
|                         | (in '000kg)  | (in '000kg)                  | (in '000kg)            | (in '000kg)              | (in '000kg)             | (in '000kg)   | (in '000kg) | (in '000kg)                 | (in '000kg) | (in '000kg)    | (in '000kg)             |
| Jan                     | 717.69   | 0                            | 0                      | 0                        | 717.69                  | 0   | 0           | 0                           | 0           | 0              | 7.57                    |
| Feb                     | 2721.53  | 0                            | 0                      | 0                        | 2721.53                 | 0   | 0           | 0                           | 0           | 0              | 13.08                   |
| Mar                     | 2504.26  | 0                            | 0                      | 0                        | 2504.26                 | 0   | 0           | 0                           | 0           | 0              | 5.55                    |
| Apr                     | 2006.4   | 0                            | 0                      | 0                        | 2006.4                  | 0   | 0           | 0                           | 0           | 0              | 10.43                   |
| May                     | 1083.4   | 0                            | 0                      | 0                        | 1083.4                  | 0   | 0           | 0                           | 0           | 0              | 10.04                   |
| Jun                     | 840.63   | 0                            | 0                      | 0                        | 840.63                  | 0   | 0           | 0                           | 0           | 0              | 12.53                   |
| Sub-total               | 9873.91  | 0                            | 0                      | 0                        | 9873.91                 | 0   | 0           | 0                           | 0           | 0              | 59.2                    |
| Jul                     | 1115.46  | 0                            | 0                      | 0                        | 1115.46                 | 0   | 0           | 0                           | 0           | 0              | 19.58                   |
| Aug                     | 1061.18  | 0                            | 0                      | 0                        | 1061.18                 | 0   | 0           | 0                           | 0           | 0              | 25.19                   |
| Sep                     | 3410.43  | 0                            | 0                      | 0                        | 3410.43                 | 0   | 0           | 0                           | 0           | 0              | 30.62                   |
| Oct                     | 2213.94  | 0                            | 0                      | 0                        | 2213.94                 | 0   | 0           | 0                           | 0           | 0              | 30.56                   |
| Nov                     | 2961.95  | 0                            | 0                      | 0                        | 2961.95                 | 0   | 0           | 0                           | 0           | 0              | 26.85                   |
| Dec                     | 3174.36  | 0                            | 0                      | 0                        | 3174.36                 | 0   | 0           | 0                           | 0           | 0              | 35.72                   |
| Total                   | 23811.23   | 0                            | 0                      | 0                        | 23811.23                | 0   | 0           | 0                           | 0           | 0              | 227.72                  |
| Grand Total (2016-2017) | 44316.84   | 0                            | 0                      | 0                        | 44316.84                | 0   | 0           | 0                           | 0           | 0              | 832.84                  |



**Monthly Summary Waste Flow Table for 2018 (year)**

| Month                   | <b><u>Actual Quantities of Inert C&amp;D Materials Generated Monthly</u></b> |                              |                        |                          |                         | <b><u>Actual Quantities of Non-inert C&amp;D Wastes Generated Monthly</u></b> |             |                             |             |                |                         |
|-------------------------|--|------------------------------|------------------------|--------------------------|-------------------------|---|-------------|-----------------------------|-------------|----------------|-------------------------|
|                         | 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                     | 3371.25  | 0                            | 0                      | 0                        | 3371.25                 | 0   | 0           | 0                           | 0           | 0              | 31.67                   |
| Feb                     | 1886.48  | 0                            | 0                      | 0                        | 1886.48                 | 0   | 0           | 0                           | 0           | 0              | 11.76                   |
| Mar                     | 2844.68  | 0                            | 0                      | 0                        | 2844.68                 | 0   | 0           | 0                           | 0           | 0              | 14.42                   |
| Apr                     | 3279.44  | 0                            | 0                      | 0                        | 3279.44                 | 0   | 0           | 0                           | 0           | 0              | 23.84                   |
| May                     | 2375.34  | 0                            | 0                      | 0                        | 2375.34                 | 0   | 0           | 0                           | 0           | 0              | 26.76                   |
| Jun                     | 2833.19  | 0                            | 0                      | 0                        | 2833.19                 | 0   | 0           | 0                           | 0           | 0              | 20.63                   |
| Sub-total               | 16590.38   | 0                            | 0                      | 0                        | 16590.38                | 0   | 0           | 0                           | 0           | 0              | 129.08                  |
| Jul                     | 2986.5   | 0                            | 0                      | 0                        | 2986.5                  | 0   | 0           | 0                           | 0           | 0              | 50.88                   |
| Aug                     | 1489.6   | 0                            | 0                      | 0                        | 1489.6                  | 0   | 0           | 0                           | 0           | 0              | 55.64                   |
| Sep                     | 1380.82  | 0                            | 0                      | 0                        | 1380.82                 | 0   | 0           | 0                           | 0           | 0              | 75.78                   |
| Oct                     | 1729.76  | 0                            | 0                      | 0                        | 1729.76                 | 0   | 0           | 0                           | 0           | 0              | 41.18                   |
| Nov                     | 1389.54  | 0                            | 0                      | 0                        | 1389.54                 | 0   | 0           | 0                           | 0           | 0              | 36.60                   |
| Dec                     | 1396.37  | 0                            | 0                      | 0                        | 1396.37                 | 0   | 0           | 0                           | 0           | 0              | 25.37                   |
| Total                   | 26962.97   | 0                            | 0                      | 0                        | 26962.97                | 0   | 0           | 0                           | 0           | 0              | 414.53                  |
| Grand Total (2016-2018) | 71249.81   | 0                            | 0                      | 0                        | 71249.81                | 0   | 0           | 0                           | 0           | 0              | 1245.37                 |

**Monthly Summary Waste Flow Table for 2019 (year)**

| Month                   | <b><u>Actual Quantities of Inert C&amp;D Materials Generated</u></b> |             |             |             |             | <b><u>Actual Quantities of Non-inert C&amp;D Wastes Generated Monthly</u></b> |             |                             |             |                |                         |
|-------------------------|--|-------------|-------------|-------------|-------------|---|-------------|-----------------------------|-------------|----------------|-------------------------|
|                         | <b><u>Monthly</u></b>  |             |             |             |             | 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                     | 1359.4   | 0           | 0           | 0           | 1359.4      | 0   | 0           | 0                           | 0           | 0              | 29.60                   |
| Feb                     | 742.02   | 0           | 0           | 0           | 742.02      | 0   | 0           | 0                           | 0           | 0              | 15.93                   |
| Mar                     | 1450.48  | 0           | 0           | 0           | 1450.48     | 0   | 0           | 0                           | 0           | 0              | 30.17                   |
| Apr                     | 2217.11  | 0           | 0           | 0           | 2217.11     | 0   | 0           | 0                           | 0           | 0              | 18.31                   |
| May                     | 1198.66  | 0           | 0           | 0           | 1198.66     | 0   | 0           | 0                           | 0           | 0              | 33.77                   |
| Jun                     | 1452.4   | 0           | 0           | 0           | 1452.4      | 0   | 0           | 0                           | 0           | 0              | 39.61                   |
| Sub-total               | 8420.07  | 0           | 0           | 0           | 8420.07     | 0   | 0           | 0                           | 0           | 0              | 167.39                  |
| Jul                     | 1519.91  | 0           | 0           | 0           | 1519.91     | 0   | 0           | 0                           | 0           | 0              | 49.44                   |
| Aug                     | 1645.58  | 0           | 0           | 0           | 1645.58     | 0   | 0           | 0                           | 0           | 0              | 35.87                   |
| Sep                     | 3910.94  | 0           | 0           | 0           | 3910.94     | 0   | 0           | 0                           | 0           | 0              | 40.42                   |
| Oct                     | 2454.92  | 0           | 0           | 0           | 2454.92     | 0   | 0           | 0                           | 0           | 0              | 36.64                   |
| Nov                     | 1613.72  | 0           | 0           | 0           | 1613.72     | 0   | 0           | 0                           | 0           | 0              | 64.64                   |
| Dec                     | 1432.23  | 0           | 0           | 0           | 1432.23     | 0   | 0           | 0                           | 0           | 0              | 59.93                   |
| Total                   | 20997.37   | 0           | 0           | 0           | 20997.37    | 0   | 0           | 0                           | 0           | 0              | 454.33                  |
| Grand Total (2016-2019) | 92277.18   | 0           | 0           | 0           | 92277.18    | 0   | 0           | 0                           | 0           | 0              | 1701.7                  |

**Monthly Summary Waste Flow Table for 2020 (year)**

| Month                   | <b><u>Actual Quantities of Inert C&amp;D Materials Generated</u></b> |             |             |             |             | <b><u>Actual Quantities of Non-inert C&amp;D Wastes Generated Monthly</u></b> |             |                             |             |                |                         |
|-------------------------|--|-------------|-------------|-------------|-------------|---|-------------|-----------------------------|-------------|----------------|-------------------------|
|                         | <b><u>Monthly</u></b>  |             |             |             |             | 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                     | 1270.01  | 0           | 0           | 0           | 1270.01     | 0   | 0           | 0                           | 0           | 0              | 22.44                   |
| Feb                     | 1087.08  | 0           | 0           | 0           | 1087.08     | 0   | 0           | 0                           | 0           | 0              | 25.23                   |
| Mar                     | 1693.27  | 0           | 0           | 0           | 1693.27     | 0   | 0           | 0                           | 0           | 0              | 21.17                   |
| Apr                     | 991.52   | 0           | 0           | 0           | 991.52      | 0   | 0           | 0                           | 0           | 0              | 25.11                   |
| May                     | 1038.1   | 0           | 0           | 0           | 1038.1      | 0   | 0           | 0                           | 0           | 0              | 37.39                   |
| Jun                     | 2229.84  | 0           | 0           | 0           | 2229.84     | 0   | 0           | 0                           | 0           | 0              | 36.84                   |
| Sub-total               | 8309.82  | 0           | 0           | 0           | 8309.82     | 0   | 0           | 0                           | 0           | 0              | 168.18                  |
| Jul                     | 1342.24  | 0           | 0           | 0           | 1342.24     | 0   | 0           | 0                           | 0           | 0              | 20.86                   |
| Aug                     | 799.03   | 0           | 0           | 0           | 799.03      | 0   | 0           | 0                           | 0           | 0              | 43.19                   |
| Sep                     | 611.19   | 0           | 0           | 0           | 611.19      | 0   | 0           | 0                           | 0           | 0              | 27.87                   |
| Oct                     | 267.11   | 0           | 0           | 0           | 267.11      | 0   | 0           | 0                           | 0           | 0              | 25.94                   |
| Nov                     | 764.09   | 0           | 0           | 0           | 764.09      | 0   | 0           | 0                           | 0           | 0              | 18.62                   |
| Dec                     | 259.14   | 0           | 0           | 0           | 259.14      | 0   | 0           | 0                           | 0           | 0              | 8.29                    |
| Total                   | 12352.62   | 0           | 0           | 0           | 12352.62    | 0   | 0           | 0                           | 0           | 0              | 312.95                  |
| Grand Total (2016-2020) | 104629.74  | 0           | 0           | 0           | 104629.74   | 0   | 0           | 0                           | 0           | 0              | 2014.65                 |

**Monthly Summary Waste Flow Table for 2021 (year)**

| Month                   | <b><u>Actual Quantities of Inert C&amp;D Materials Generated</u></b> |             |             |             |             | <b><u>Actual Quantities of Non-inert C&amp;D Wastes Generated Monthly</u></b> |             |                             |             |                |                         |
|-------------------------|--|-------------|-------------|-------------|-------------|---|-------------|-----------------------------|-------------|----------------|-------------------------|
|                         | <b><u>Monthly</u></b>  |             |             |             |             | 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                     | 345.54   | 0           | 0           | 0           | 345.54      | 0   | 0           | 0                           | 0           | 0              | 9.15                    |
| Feb                     | 34.47  | 0           | 0           | 0           | 34.47       | 0   | 0           | 0                           | 0           | 0              | 9.08                    |
| Mar                     | 1082   | 0           | 0           | 0           | 1082        | 0   | 25.92       | 0                           | 0           | 0              | 93.44                   |
| Apr                     | 290.05   | 0           | 0           | 0           | 290.05      | 12.08   | 0           | 0                           | 0           | 0              | 9.69                    |
| May                     | 18.56  | 0           | 0           | 0           | 18.56       | 0   | 0           | 0                           | 0           | 0              | 9.81                    |
| Jun                     | 66.59  | 0           | 0           | 0           | 66.59       | 0   | 0           | 0                           | 0           | 0              | 6.29                    |
| Sub-total               | 1837.21  | 0           | 0           | 0           | 1837.21     | 12.08   | 25.92       | 0                           | 0           | 0              | 137.46                  |
| Jul                     |  |             |             |             |             |   |             |                             |             |                |                         |
| Aug                     |  |             |             |             |             |   |             |                             |             |                |                         |
| Sep                     |  |             |             |             |             |   |             |                             |             |                |                         |
| Oct                     |  |             |             |             |             |   |             |                             |             |                |                         |
| Nov                     |  |             |             |             |             |   |             |                             |             |                |                         |
| Dec                     |  |             |             |             |             |   |             |                             |             |                |                         |
| Total                   | 1837.21  | 0           | 0           | 0           | 1837.21     | 12.08   | 25.92       | 0                           | 0           | 0              | 137.46                  |
| Grand Total (2016-2021) | 106466.99  | 0           | 0           | 0           | 106466.99   | 12.08   | 25.92       | 0                           | 0           | 0              | 2152.11                 |

## Appendix H: Environmental Mitigation Implementation Schedule

## Implementation Schedule for Environmental Mitigation Measures

| <b>EIA Ref.</b>                         | <b>EM&amp;A Ref.</b> | <b>Recommended Mitigation Measures</b>   | <b>Objectives of the Recommended Measure &amp; Main Concerns to address</b> | <b>Who to Implement the measure</b> | <b>Location of the measure</b> | <b>When to implement the measure</b> | <b>What requirements or standard for the measure to achieve</b> | <b>Implementation Status</b> |
|---|----------------------|--|---|-------------------------------------|--------------------------------|--------------------------------------|---|------------------------------|
| Air Quality Impact (Construction Phase) |                      |  |   |                                     |                                |                                      |   |                              |
| 4.8                                     | A1                   | Good 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   | ✓                            |
| 4.8                                     | A4                   | Maintain a reasonable height when dropping excavated materials to limit dust generation  | To minimize dust generation during movement of excavated materials          | HyD's Contractor                    | Whole construction site        | Throughout construction phase        | EIAO-TM, APCO   | ✓                            |
| 4.8                                     | A5                   | Limit vehicle speed within site to 10km/hr and confine vehicle movement in haul road   | To minimize dust generation due to traffic movement                         | HyD's Contractor                    | Whole construction site        | Throughout construction phase        | EIAO-TM, APCO   | ✓                            |



|     |     |   |   |                  |                         |                               |               |   |
|-----|-----|---|---|------------------|-------------------------|-------------------------------|---------------|---|
| 4.8 | A6  | Minimize exposed earth after completion of work in a certain area by hydroseeding, vegetating, soil compacting or covering with bitumen | To minimize dust generation due to erosion                                  | HyD's Contractor | Whole construction site | Throughout construction phase | EIAO-TM, APCO | ✓ |
| 4.8 | A7  | Provide wheel washing at site exit to clean the vehicle body and wheel  | To prevent dust from being brought offsite                                  | HyD's Contractor | Whole construction site | Throughout construction phase | EIAO-TM, APCO | ✓ |
| 4.8 | A8  | Hard pave the area at site exit with concrete, bitumen or hardcores   | To prevent dust from being brought offsite                                  | HyD's Contractor | Whole construction site | Throughout construction phase | EIAO-TM, APCO | ✓ |
| 4.8 | A9  | Cover materials on trucks before leaving the site to prevent debris from dropping during traffic movement or being blown away by wind   | To prevent falling of debris during traffic movement and by wind            | HyD's Contractor | Whole construction site | Throughout construction phase | EIAO-TM, APCO | ✓ |
| 4.8 | A10 | Regular maintenance of plant equipment to prevent black smoke emission  | To minimize black smoke emission  | HyD's Contractor | Whole construction site | Throughout construction phase | EIAO-TM, APCO | ✓ |
| 4.8 | A11 | Throttle down or switch off unused machines or machine in intermittent use  | To minimize unnecessary emission  | HyD's Contractor | Whole construction site | Throughout construction phase | EIAO-TM, APCO | ✓ |
| 4.8 | A12 | Carry out regular site inspection to audit the implementation of mitigation measures  | To check the implementation status and effectiveness of mitigation measures | HyD's Contractor | Whole construction site | Throughout construction phase | EIAO-TM, APCO | ✓ |

|                                   |     |   |   |                  |                         |  |             |     |
|-----------------------------------|-----|---|---|------------------|-------------------------|--|-------------|-----|
| 4.8                               | A13 | Carry out air quality monitoring throughout the construction period   | To monitor construction dust level      | HyD's Contractor | At representative ASRs  | Prior to and throughout construction phase | EIAO-TM     | ✓   |
| Noise Impact (Construction Phase) |     |   |   |                  |                         |  |             |     |
| 3.8                               | N1  | Adopt good site practice, such as regular maintenance of plant equipment, throttle down unused machines   | To minimize construction noise level    | HyD's Contractor | Whole construction site | Throughout construction phase              | NCO,EIAO-TM | ✓   |
| 3.8                               | N2  | Use Quality Powered Mechanical Equipment (QPME) which produces lower noise level (e.g. Excavator/Loader (EPD-01431), Asphalt Paver (EPD-01226), Road Roller (EPD-00244) and Mobile Crane (EPD-01477)) | To minimize construction noise level    | HyD's Contractor | Whole construction site | Throughout construction phase              | NCO,EIAO-TM | ✓   |
| 3.8                               | N3  | Erect movable noise barrier at significant noise source(e.g. Concrete Pump, Concrete Lorry Mixer, Excavator/Loader, Road Sweeper, Asphalt Paver, Road Roller, Lorry, Breaker and Poker)               | To lower noise transmission             | HyD's Contractor | Whole construction site | Throughout construction phase              | NCO,EIAO-TM | ✓   |
| 3.8                               | N5  | Regular maintenance of plant equipment to prevent noise emission due to impair  | To prevent noise emission due to impair | HyD's Contractor | Whole construction site | Throughout construction phase              | NCO,EIAO-TM | ✓   |
| 3.8                               | N6  | Position mobile noisy equipment in location and direction away from NSR   | To minimize noise transmission to NSR   | HyD's Contractor | Whole construction site | Throughout construction phase              | NCO,EIAO-TM | N/A |

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

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

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

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

|     |     |  |   |                  |                         |                               |   |   |
|-----|-----|--|---|------------------|-------------------------|-------------------------------|---|---|
|     |     |  |   |                  |                         |                               | Regulation,<br>EIAO-TM  |   |
| 5.8 | W21 | Perform maintenance of vehicles and equipment that have oil leakage and spillage potential on hard standings within a bunded area with sumps and oil interceptors.   | To prevent oil leakage or spillage              | HyD's Contractor | Whole construction site | Throughout construction phase | Waste Disposal (Chemical Waste) (General) Regulation, EIAO-TM | * |
| 5.8 | W22 | <p>Dispose chemical waste in accordance to Waste Disposal Ordinance. Follow the <i>Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes</i>, examples as follows:</p> <ul style="list-style-type: none"> <li>- Store chemical wastes with suitable containers to avoid leakage or spillage during storage, handling and transport</li> <li>- Label chemical waste containers according to the CoP to notify and warn the waste handlers</li> <li>- Store chemical wastes at designated safe location with adequate space</li> </ul> | 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:<br>- excavated material suitable for reuse<br>- inert C&D material for disposal offsite<br>- non-inert C&D materials for disposal at landfills<br>- chemical waste<br>- 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:<br>- 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<br>- Provide sufficient waste collection points and regular removal<br>- Cover waste materials with tarpaulin or in enclosure during transportation<br>- Maintain drainage systems, sumps and oil interceptors<br>- Sort out chemical waste for proper handling and treatment  |   |                  |                         |                               |                                   |   |
| 6.5 | WM3 | Adopt waste reduction measures as follows:<br>- 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)<br>- Allocate area for proper storage of construction materials to prevent contamination<br>- Minimize wastage through careful planning and avoiding over-purchase of construction materials | To minimize waste generation            | HyD's Contractor | Whole construction site | Throughout construction phase | Waste Disposal Ordinance, EIAO-TM | ✓ |
| 6.5 | WM4 | Prepare and implement a site specific Waste Management Plan (WMP) as part of Environmental Management Plan (EMP) in accordance with ETWB TCW No. 19/25. Detail waste management method in the form of avoidance, reuse, recovery,   | 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:<br>- Avoid contamination by proper handling and storing waste<br>- Prevent erosion by covering waste or applying water spray<br>- Maintain and clean storage area regularly<br>- Sort and stockpile different materials at designated location to enhance reuse | To properly store waste   | HyD's Contractor | Whole construction site | Throughout construction phase | ProPECC PN 1/94, EIAO-TM  | ✓ |
| 6.5 | WM6 | Apply for relevant waste disposal permits in accordance with the Waste Disposal Ordinance (Cap. 354), Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 345) and the Land (Miscellaneous Provisions) Ordinance (Cap. 28).   | To properly dispose waste | HyD's Contractor | Whole construction site | Throughout construction phase | Waste Disposal Ordinance (Cap. 354), Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 345) and the Land (Miscellaneous Provisions) Ordinance (Cap. 28), EIAO-TM | ✓ |

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

|     |      |   |   |                  |                         |                               |   |     |
|-----|------|---|---|------------------|-------------------------|-------------------------------|---|-----|
|     |      | <p>containers. Seal and maintain the container to avoid leakage or spillage during storage, handling and transport</p> <ul style="list-style-type: none"> <li>- Label chemical waste containers in both English and Chinese with instructions in accordance to Schedule 2 of the Waste Disposal (Chemical Waste) (General) Regulation</li> <li>- The container capacity should be smaller than 450 litres unless agreed by the EPD</li> </ul>   |   |                  |                         |                               |   |     |
| 6.5 | WM13 | <p>Comply with the requirement of the chemical storage area:</p> <ul style="list-style-type: none"> <li>- Store only chemical waste and label clearly the chemical characters of the waste</li> <li>- Have at least 3 sides enclosed and protected from rainfall with cover</li> <li>- Provide sufficient ventilation</li> <li>- 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</li> <li>- Adequately spaced incompatible materials</li> </ul> | To ensure proper storage of chemical waste  | HyD's Contractor | Whole construction site | Throughout construction phase | Waste Disposal Ordinance, EIAO-TM                             | ✓   |
| 6.5 | WM14 | <p>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</p>  | To ensure proper disposal of chemical waste | HyD's Contractor | Whole construction site | Throughout construction phase | Waste Disposal (Chemical Waste) (General) Regulation, EIAO-TM | N/A |

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

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

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

Remarks:

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

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



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

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

|                |   |   |   |   |   |
|----------------|---|---|---|---|---|
| October 2017   | 5 | 0 | 0 | 0 | 0 |
| November 2017  | 6 | 0 | 0 | 0 | 0 |
| December 2017  | 5 | 0 | 0 | 0 | 0 |
| January 2018   | 5 | 0 | 0 | 0 | 0 |
| February 2018  | 5 | 0 | 0 | 0 | 0 |
| March 2018     | 6 | 0 | 0 | 0 | 0 |
| April 2018     | 5 | 0 | 0 | 0 | 0 |
| May 2018       | 7 | 0 | 1 | 0 | 0 |
| June 2018      | 5 | 0 | 0 | 0 | 0 |
| July 2018      | 5 | 0 | 0 | 0 | 0 |
| August 2018    | 7 | 0 | 0 | 0 | 0 |
| September 2018 | 5 | 0 | 0 | 0 | 0 |
| October 2018   | 5 | 0 | 0 | 0 | 0 |
| November 2018  | 7 | 0 | 0 | 0 | 0 |
| December 2018  | 5 | 0 | 0 | 0 | 0 |
| January 2019   | 5 | 0 | 0 | 0 | 0 |
| February 2019  | 0 | 0 | 0 | 0 | 0 |
| March 2019     | 5 | 0 | 0 | 0 | 0 |
| April 2019     | 6 | 0 | 0 | 0 | 0 |
| May 2019       | 6 | 0 | 4 | 0 | 0 |
| June 2019      | 5 | 0 | 0 | 0 | 0 |
| July 2019      | 5 | 0 | 0 | 0 | 0 |
| August 2019    | 5 | 0 | 0 | 0 | 0 |
| September 2019 | 6 | 0 | 0 | 0 | 0 |

|                |     |   |   |   |   |
|----------------|-----|---|---|---|---|
| October 2019   | 5   | 0 | 0 | 0 | 0 |
| November 2019  | 5   | 0 | 0 | 0 | 0 |
| December 2019  | 6   | 0 | 0 | 0 | 0 |
| January 2020   | 6   | 0 | 0 | 0 | 0 |
| February 2020  | 6   | 0 | 0 | 0 | 0 |
| March 2020     | 5   | 0 | 0 | 0 | 0 |
| April 2020     | 6   | 0 | 0 | 0 | 0 |
| May 2020       | 5   | 0 | 0 | 0 | 0 |
| June 2020      | 6   | 0 | 0 | 0 | 0 |
| July 2020      | 5   | 0 | 0 | 0 | 0 |
| August 2020    | 0   | 0 | 0 | 0 | 0 |
| September 2020 | 0   | 0 | 0 | 0 | 0 |
| October 2020   | 0   | 0 | 0 | 0 | 0 |
| November 2020  | 0   | 0 | 0 | 0 | 0 |
| December 2020  | 0   | 0 | 0 | 0 | 0 |
| January 2021   | 0   | 0 | 0 | 0 | 0 |
| February 2021  | 0   | 0 | 0 | 0 | 0 |
| March 2021     | 0   | 0 | 0 | 0 | 0 |
| April 2021     | 0   | 0 | 0 | 0 | 0 |
| May 2021       | 0   | 0 | 0 | 0 | 0 |
| June 2021      | 0   | 0 | 0 | 0 | 0 |
| Grand Total    | 281 | 1 | 8 | 0 | 0 |