



CONTRACT NO. SPW 25/2018

**ENVIRONMENTAL TEAM FOR
RELOCATION OF SHA TIN SEWAGE TREATMENT
WORKS TO CAVERNS – SITE PREPARATION
AND ACCESS TUNNEL CONSTRUCTION**

UNDER ENVIRONMENTAL PERMIT NO. EP-533/2017

**MONTHLY ENVIRONMENTAL MONITORING & AUDIT
REPORT**

APRIL 2019

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16 May 2019

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Your Reference

Sha Tin Cavern Sewage Treatment Works

Our Reference

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Environmental Permit No. EP-533/2017

Contract No. DC/2018/05 Relocation of Sha Tin Sewage Treatment Works to Caverns – Site Preparation and Access Tunnel Construction

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16 May 2019

By Email

Dear Sir,

I refer to the letter dated 16 May 2019 (ref: LES/J2019-02/CS/L017) from the Environmental Team Leader certifying the captioned Monthly EM&A Report for April 2019.

I have no comment on the captioned report and hereby verify it as having complied with the requirements as set out in the EM&A Manual for the captioned project, in accordance with Condition 3.5 of Environmental Permit No. EP-533/2017.

Should you have any queries regarding the captioned or require any further information, please contact the undersigned at 2828 5875.

Yours faithfully

for MOTT MACDONALD HONG KONG LIMITED

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Lam Environmental Services Limited
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By Email
By Email
By Email



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EXECUTIVE SUMMARY

- i. This is the Environmental Monitoring and Audit (EM&A) Monthly Report – April 2019 of Relocation of Sha Tin Sewage Treatment Works to Caverns – Site Preparation and Access Tunnel Construction under Environmental Permit no. EP-533/2017 (Hereafter as “the Project”). The main construction works of the Project is scheduled to commence on 18 May 2019 and the tentative completion date is May of 2021. This is the 2nd EM&A report presenting the environmental monitoring findings and information recorded during the period of 1 April 2019 to 30 April 2019. The cut-off date of reporting is at the end of each reporting month.
- ii. In the reporting month, the principal work activities conducted are as follow:
Contract no. DC/2018/05 - Relocation of Sha Tin Sewage Treatment Works to Caverns – Site Preparation and Access Tunnel Construction
 - Site clearance;
 - Hand dig trial pit excavation

Air Quality Monitoring

- iii. 1-hour Total Suspended Particulates (TSP) monitoring would be conducted at five monitoring stations. The sampling frequency is 3 times in every 6 days.
- iv. Air quality monitoring for the stations AM1 and AM2 were commenced on 12 April 2019 while station AM5 was commenced on 18 April 2019 in the reporting period. Other concerned stakeholders of ASRs are under liaison for approval.
- v. No action or limit level exceedance was determined in the reporting period for the stations of AM1, AM2 and AM5.

Noise Monitoring

- vi. Noise monitoring would be conducted at five noise monitoring stations once per week.
- vii. Noise monitoring for stations CM4 and CM5 were commenced on 13 April 2019 and 18 April 2019 respectively in the reporting period. Other concerned stakeholders of NSRs are under liaison for approval.
- viii. No action or limit level exceedance was determined in the reporting period for the stations of CM4 and CM5.

Site Inspections and Audit

- ix. The Environmental Team (ET) conducted weekly site inspections for the Contract on 3, 10, 17 and 25 April 2019. IEC attended the joint site inspection on 25 April 2019. No non-compliance was found during the site inspection.



Complaints, Notifications of Summons and Successful Prosecutions

- x. No environmental complaint was received in the reporting period.

Reporting Changes

- xi. Based on the Project baseline report, the air quality monitoring station AM3 and noise monitoring station CM2, Ma On Shan Tsung Tsin Secondary School were relocated to AM3(A) and CM2(A), Kowloon City Baptist Church Hay Nien Primary School.
- xii. Air quality monitoring station AM6 will commence at a later stage upon the commencement of the decommissioning and demolition of the existing Shatin Sewage Treatment Works. The proposal was verified by IEC and submitted to EPD in the reporting month and attached in the **Appendix 1.1**.

Future Key Issues

- xiii. In coming reporting months, the scheduled construction activities and the recommended mitigation measures are listed as follows:

| Key Construction Works | Recommended Mitigation Measures |
|--|---|
| <ul style="list-style-type: none"> • Site clearance • Hand dig trial pit excavation • Hoarding and site office erection | <ul style="list-style-type: none"> • Dust control during dust generating works; • Implementation of proper noise pollution control; and • Provision of protection to ensure no runoff out of site area or direct discharge into public drainage system. • Direct impact to plant species of conservation importance recorded in the vicinity of the construction sites shall be avoided • Excavation materials shall be well covered • Mitigation measures to dust and noise control should be provided to erection of hoarding and site office |

1 Introduction

1.1 Scope of the Report

1.1.1. Lam Environmental Services Limited (LES) has been appointed to work as the Environmental Team (ET) under Environmental Permit (EP) no. EP-533/2017 to implement the Environmental Monitoring and Audit (EM&A) programme as stipulated in the EM&A Manual of the approved Environmental Impact Assessment (EIA) Report for Relocation of Sha Tin Sewage Treatment Works to Caverns – Site Preparation and Access Tunnel Construction (Register No.: AEIAR-202/2016).

1.1.2. In accordance with Clause 3.5 stated in EP-533/2017, 4 hard copies and 3 electronic copies of the Monthly EM&A Report shall be submitted to the Director within 2 weeks after the end of each reporting month throughout the entire construction period.

1.1.3. In accordance with Section 13.4.1.1 of the Project EM&A Manual, the Monthly EM&A Report should be prepared and submitted to the Contractor, the IEC, the ER and EPD within 10 working days at the end of each reporting month, with the first report due the month after construction commences.

1.2 Structure of the Report

Section 1 *Introduction* – details the scope and structure of the report.

Section 2 *Project Background* – summarizes background and scope of the project, site description, project organization and contact details of key personnel during the reporting period.

Section 3 *Status of Regulatory Compliance* – summarizes the status of valid Environmental Permits / Licenses during the reporting period.

Section 4 *Monitoring Requirements* – summarizes all monitoring parameters, monitoring methodology and equipment, monitoring locations, monitoring frequency, criteria and respective event and action plan and monitoring programmes.

Section 5 *Monitoring Results* – summarizes the monitoring results obtained in the reporting period.

Section 6 *Compliance Audit* – summarizes the auditing of monitoring results, all exceedances environmental parameters.



- Section 7** **Environmental Site Audit** – summarizes the findings of weekly site inspections undertaken within the reporting period, with a review of any relevant follow-up actions within the reporting period.
- Section 8** ***Complaints, Notification of summons and Prosecution*** – summarizes the cumulative statistics on complaints, notification of summons and prosecution
- Section 9** ***Conclusion***

2 Project Background

2.1 Background

- 2.1.1. The Relocation of Sha Tin Sewage Treatment Works (STSTW) to Caverns (the Project) is implemented so as to release the existing site, of a size about 28 hectares, for other uses.
- 2.1.2. In May 2012, Drainage Services Department (DSD), the Project Proponent commenced a detailed feasibility study on “Relocation of Sha Tin Sewage Treatment Works to Caverns” (the Feasibility Study). The findings of Feasibility Study affirmed that relocating the STSTW to caverns to be constructed at Nui Po Shan of A Kung Kok is technically feasible and financially viable.
- 2.1.3. The Project is a Designated Project (DP) under the Environmental Impact Assessment Ordinance (EIAO). An application for an Environmental Impact Assessment (EIA) Study Brief under section 5(1)(a) of the EIAO was submitted on 12 May 2014 with a Project Profile (No. PP-508/2014) for the Project. An EIA Study Brief (No. ESB-273/2014) was issued in June 2014. An EIA for the Project was then undertaken, as part of the Assignment, in accordance with this EIA Study Brief and the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM). The location of the Project is shown [Figure 2.1](#).

2.2 Scope of the Project and Site Description

- 2.2.1. The Project covers the following DP elements as specified in Schedule 2 of the EIAO (Cap.499), **Table 2.1** summarises the DPs under this Project.

Table 2.1 Schedule 2 Designated Projects under this Project

| Item | Designated Project | EIAO Reference |
|------|---|---------------------|
| DP1 | Sewage treatment works with an installed capacity of more than 15,000 m3 per day under Item F.1 | Schedule 2, Part I, |
| DP2 | Sewage treatment works under Item F.2 <ul style="list-style-type: none"> • With an installed capacity of more than 5,000 m3 per day; and • A boundary of which is less than 200m from the nearest boundary of an existing or planned residential area, educational institution and health care institution. | Schedule 2 Part I |
| DP3 | An activity for the reuse of treated sewage effluent from a treatment plant under Item F.4 | Schedule 2 Part I |

| | | |
|-----|--|--------------------|
| DP4 | Underground rock caverns under Item Q.2 | Schedule 2 Part I |
| DP5 | An explosives depot in a stand-alone, purpose built building under Item K.10 | Schedule 2 Part I; |
| DP6 | Decommissioning of an explosives depot under Item 11 | Schedule 2 Part II |

2.3 Project Organization and Contact Personnel

2.3.1 Drainage Services Department is the overall project controllers for the Project. For the construction phase of the Project, Project Engineer, Contractor(s), Environmental Team and Independent Environmental Checker are appointed to manage and control environmental issues.

2.3.2 The proposed project organization and lines of communication with respect to environmental protection works are shown in [Figure 2.2](#). Key personnel and contact particulars are summarized in **Table 2.2**:

Table 2.2 Contact Details of Key Personnel

| Party | Role | Post | Name | Contact No. | Contact Fax |
|------------------------------------|---|---|--------------------------|-------------|-------------|
| AECOM | Engineer's Representative | Chief Resident Engineer | Mr .Leung Chi Man, Simon | 6393 8645 | 3914 5888 |
| China State Joint Venture | Contractor | Site Agent | Mr. KONG Ming, Elvis | 9186 2081 | 2672 2501 |
| | | Environmental Officer | Ms. CHIU Mei Yu, Gloria | 9224 2413 | |
| Mott MacDonald Hong Kong Limited | Independent Environmental Checker (IEC) | Independent Environmental Checker (IEC) | Mr. Brandon Wong | 2828 5875 | 2827 1823 |
| Lam Environmental Services Limited | Environmental Team (ET) | Environmental Team Leader (ETL) | Mr. Derek Lo | 2882 3939 | 2882 3331 |

2.4 Construction Activities

2.4.1 In the reporting month, the principal work activities conducted are as follow.

- Site clearance;
- Hand dig trial pit excavation



2.4.2 In coming reporting months, the scheduled construction activities are listed as follows:

- Site clearance;
- Hand dig trial pit excavation
- Hoarding erection
- Site office erection

3 Status of Regulatory Compliance

3.1 Status of Environmental Licensing and Permitting under the Project

3.1.1. A summary of the current status on licences and/or permits on environmental protection pertinent to the Project is shown in **Table 3.1**.

Table 3.1 Summary of the current status on licences and/or permits on environmental protection pertinent to the Project

| Permits and/or Licences | Reference No. | Issued Date | Valid Period & Expiry Date (dd-MM-yyyy to dd-MM-yyyy) | Status |
|--|---------------|-------------|--|--|
| Notification of Works Under APCO | 442872 | 7/3/2019 | N.A. | Valid |
| Discharge Licence | 444024 | | | Acknowledge receipt from EPD on 8 Apr 2019 |
| Billing account under Waste Disposal Ordinance | 7033825 | 17/4/2019 | N/A | Valid |
| Registration as a Chemical Waste Producer | 444026 | | | Acknowledge receipt from EPD on 8 Apr 2019 |
| Asbestos Abatement Licence | | | | Nil |
| Construction Noise Permit | | | | Nil |

3.2 Status of Submission under the EP- 533/2017

3.2.1. A summary of the current status on submission for Contract no. DC/2018/05 under EP-533/2017 is shown in **Table 3.2**.

Table 3.2 Summary of submission status for Contract no. DC2018/05 under EP-533/2017

| EP Condition | Submission | Date of Submission |
|----------------|---|--------------------|
| Condition 1.12 | Notification of Commencement Date of Works | 18 Feb 2019 |
| Condition 2.12 | Management Organization of Main Construction Companies | 18 April 2019 |
| Condition 2.14 | Submission of Detailed Vegetation Survey Report and Protection and Transplantation Proposal | 18 April 2019 |



| EP Condition | Submission | Date of Submission |
|---------------------|---|---------------------------|
| Condition 2.15 | Submission of Detailed Woodland Compensation Plan | TBC |
| Condition 2.18 | Submission of Landscape & Visual Mitigation and Tree Preservation Plan(s) | 18 April 2019 |
| Condition 2.22 | Submission of Measures to Mitigate Traffic Noise from Ma On Shan Road | 18 April 2019 |

4 Monitoring Requirements

4.1 Air Monitoring

AIR QUALITY MONITORING STATIONS

4.1.1. Air monitoring stations AM1 and AM2 were setup and commencement of monitoring on 12 April 2019 while AM5 was setup and commencement of monitoring on 18 April 2019. AM3(A) and AM4 are under liaison for approval, no monitoring for AM3(A) and AM4 were conducted in the reporting period.

4.1.2. The air monitoring stations for the Project are listed and shown in **Table 4.1** and [Figure 4.1 & 4.2](#).

Table 4.1 Air Monitoring Station

| Monitoring Station ID | Monitoring Location | Level (in terms of no. of floor) |
|-----------------------|---|----------------------------------|
| AM1 | Ah Kung Kok Fishermen Village | G/F |
| AM2 | Block H, Kam Tai Court | Roof |
| AM3(A) | Kowloon City Baptist Church Hay Nien Primary School | G/F (tentative) |
| AM4 | Wellborn Kindergarten | G/F (tentative) |
| AM5 | The Neighbourhood Advice-Action Council Harmony Manor | Roof |

AIR MONITORING PARAMETERS, FREQUENCY AND DURATION

4.1.3. One-hour TSP levels should be measured to indicate the impacts of construction dust on air quality.

4.1.4. The sampling frequency of at least three times in every six-days should be undertaken when the highest dust impact occurs.

SAMPLING PROCEDURE AND MONITORING EQUIPMENT

4.1.5. Monitoring Procedures

- (a) Check the calibration period of portable direct reading dust meter prior to monitoring (The direct reading dust meter was calibrated at 2-years interval and checked with High Volume Sampler (HVS) yearly.)
- (b) Record the site condition near / around the monitoring stations.
- (c) Install the portable direct reading dust meter to the monitoring location.
- (d) Slide the power switch to turn the power on.
- (e) Check of portable direct reading dust meter to ensure the equipment operation in

normal condition.

- (f) Select the period of measurement to 60mins.
- (g) Check and set the correct time.
- (h) Select the appropriate unit display for the equipment.
- (i) Slide the power switch to turn the power off when the monitoring period ended (3 times 1 hour TSP monitoring per day).
- (j) Uninstall the portable direct reading dust meter
- (k) Collected the sampled data for analysis.
- (l) Remark: Procedures (c) to (h) may be different subject to the brands and models of portable direct reading dust meter

4.1.6. Maintenance and Calibration

- (a) The direct reading dust meter was calibrated at 2-years interval and checked with High Volume Sampler (HVS) yearly to determine the accuracy and validity of the results measured.
- (b) Checking of direct reading dust meter will be carried out in order to determine the conversion factor between the direct reading dust meter and the standard equipment, HVS. The comparison check is to be considered valid based on correlation coefficient checked by HOKLAS laboratory.

4.1.7. The 1-hour TSP air quality monitoring was performed by using portable direct reading dust meters at each designated monitoring station. The brand and model of the equipment are given in **Table 4.2**.

Table 4.2 Air Quality Monitoring Equipment

| Equipment | Brand and model |
|------------------------------------|---------------------|
| Portable direct reading dust meter | Met One BT- 645 |
| | Met One AEROCET 831 |

4.1.8. The calibration certificates of the air quality monitoring equipment are attached in [Appendix 4.2](#).

WIND DATA

4.1.9. The representative wind data from Sha Tin HKO Automatic Weather Station was obtained covering the 1-hr TSP monitoring periods. The wind data were extracted and shown in [Appendix 4.3](#).

EVENT AND ACTION PLAN

4.1.10. The Action and Limit levels for construction air quality are defined in **Table 4.3** and [Appendix 4.1](#). Should non-compliance of the air quality criteria occur, action in accordance with the Event and Action Plan in [Appendix 6.1](#) shall be carried out.

Table 4.3 Action and Limit Level for Air Quality Monitoring

| Monitoring Locations | 1-hour TSP Level in µg/m3 | |
|----------------------|---------------------------|-------------|
| | Action Level | Limit Level |
| AM1 | 294 | 500 |
| AM2 | 325 | 500 |
| AM3(A) | 360 | 500 |
| AM4 | 297 | 500 |
| AM5 | 349 | 500 |

4.2 Noise Monitoring

NOISE MONITORING STATIONS

- 4.2.1. Noise monitoring stations CM4 and CM5 were setup and commencement of monitoring on 13 April 2019 and 18 April 2019 respectively. CM1, CM2(A) and CM3 are under liaison for approval, no monitoring for CM1, CM2(A) and CM3 were conducted in the reporting period.
- 4.2.2. The noise monitoring stations for the Project are listed and shown in **Table 4.4** and **Figure 4.3 & 4.4.**

Table 4.4 Noise Monitoring Station

| Monitoring Station ID | Monitoring Location | Measurement Type | Level (in terms of no. of floor) |
|-----------------------|---|------------------------|----------------------------------|
| CM1 | Wellborn Kindergarten | Free field (tentative) | G/F (tentative) |
| CM2(A) | Kowloon City Baptist Church Hay Nien Primary School | Façade (tentative) | Roof (tentative) |
| CM3 | S.K.H. Ma On Shan Holy Spirit Primary School | Façade (tentative) | Roof (tentative) |
| CM4 | Ah Kung Kok Fishermen Village | Free field | G/F |
| CM5 | The Neighbourhood Advice-Action Council Harmony Manor | Façade | Roof |

NOISE MONITORING PARAMETERS, FREQUENCY AND DURATION

- 4.2.3. Noise monitoring shall be carried out at all the designated monitoring stations. The monitoring frequency shall depend on the scale of the construction activities. The following is an initial

guide on the regular monitoring frequency for each station on a weekly basis when noise generating activities are underway:

- One set of measurements between 0700-1900 hours on normal weekdays;
- One set of measurements between 1900-2300 hours;
- One set of measurements between 2300-0700 hours of next day; and
- One set of measurements between 0700-2300 hours on holidays (three consecutive Leq/5min readings).

4.2.4. If construction works are extended to include works during the hours of 1900-0700, additional weekly impact monitoring shall be carried out during evening and night-time works for the latter 3 sets of measurements specified in Section 4.1.2 above, one set of measurements shall at least include 3 consecutive Leq (5min) results.

4.2.5. Supplementary information for data auditing, statistical results such as L10 and L90 shall also be obtained for reference.

4.2.6. If a school exists near the construction activity, noise monitoring shall be carried out at the monitoring stations for the schools during the examination periods. The ET leader shall liaise with the school's personnel and the examination authority to ascertain the exact dates and times of all examination periods during the course of the contract.

MONITORING EQUIPMENT

4.2.7. Noise monitoring was performed using sound level meter at the designated monitoring locations. The sound level meters shall comply with the International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1) specifications. Acoustic calibrator shall be deployed to check the sound level meters at a known sound pressure level. Brand and model of the equipment is given in **Table 4.5**.

Table 4.5 Noise Monitoring Equipment

| Equipment | Brand and Model |
|------------------------------|---------------------|
| Integrated Sound Level Meter | NTi XL2 |
| | B&K2236 |
| | HONGLIM HLES-01 |
| Acoustic Calibrator | Larson Davis CAL200 |

4.2.8. The calibration certificates of the noise monitoring equipment are attached in [Appendix 4.2](#).

SAMPLING PROCEDURE AND MONITORING EQUIPMENT

4.2.9. Monitoring Procedure

- (a) The monitoring station shall normally be at a point 1m from the exterior of the sensitive receiver’s building façade and be at a position 1.2m above the ground.
- (b) Façade measurements were made at the monitoring locations. For free-field measurement, a correction factor of +3 dB (A) would be applied.
- (c) The battery condition was checked to ensure the correct functioning of the meter.
- (d) Parameters such as frequency weighting, the time weighting and the measurement time were set as follows:
- (e) Frequency weighting: A, Time weighting: Fast, Measurement time set: continuous 5 mins
- (f) Prior and after to the noise measurement, the meter was checked using the acoustic calibrator for 94dB (A) at 1000 Hz. If the difference in the calibration level before and after measurement was more than ±1 dB (A), the measurement would be considered invalid and repeat of noise measurement would be required after re-calibration or repair of the equipment.
- (g) Noise measurements shall not be made in fog, rain, wind with a steady speed exceeding 5m/s or wind with gusts exceeding 10m/s. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in m/s.

4.2.10. Maintenance and Calibration

- (a) The microphone head of the sound level meter was cleaned with soft cloth at regular intervals.
- (b) The sound level meter and calibrator were calibrated at yearly intervals.

EVENT AND ACTION PLAN

4.2.11. Noise Standards for Daytime Construction Activities are specified under EIAO-TM. The Action and Limit levels for construction noise are defined in **Table 4.6** and [Appendix 4.1](#). Should non-compliance of the criteria occurs, action in accordance with the Event and Action Plan in [Appendix 6.1](#) shall be carried out.

Table 4.6 Action and Limit Level for Noise Monitoring

| Monitoring Station | Action Level | Limit Level (dB(A)) | | |
|--------------------|---|----------------------------------|---|--|
| | | 0700-1900 hrs on normal weekdays | 0700-2300 hrs on holidays (including Sundays); and 1900-2300 hrs on all days ² | 2300-0700 hrs of all days ² |
| CM1 | When one documented complaint is received | 65 / 70 ¹ | 60 / 65 / 70 ³ | 45 / 50 / 55 ³ |
| CM2(A) | | 65 / 70 ¹ | | |
| CM3 | | 65 / 70 ¹ | | |
| CM4 | | 75 | | |



| | | | | |
|-----|--|----|--|--|
| CM5 | | 75 | | |
|-----|--|----|--|--|

Remark 1: Limit level of CM1, CM2(A) and CM3 reduce to 65 dB (A) during examination periods if any.

Remark 2: Construction noise during restricted hours is under the control of Noise Control Ordinance Limit Level to be selected based on Area Sensitivity Rating.

Remark 3: Limit Level for restricted hour monitoring shall act as reference level only. Investigation would be conducted on CNP compliance if exceedance recorded during restricted hour noise monitoring period.

5. Monitoring Results

5.0.1 The environmental monitoring will be implemented based on the division of works areas of each designed projects. Overall layout showing work areas and monitoring stations is shown in [Figure 2.1](#) and [Figure 4.1 – 4.2](#) respectively.

5.0.2 The environment monitoring schedules for reporting month and coming month are presented in [Appendix 5.1](#).

5.1 Air Monitoring Results

5.1.1 1-hour TSP monitoring was conducted at AM1, AM2 and AM5 in the reporting month. No 1-hour TSP monitoring was scheduled at AM3(A) and AM4 due to approval of monitoring station is still under liaison.

5.1.2 No action or limit level exceedance was determined in the reporting period at stations of AM1, AM2 and AM5

5.1.3 Air quality monitoring results measured in this reporting period for AM1, AM2 and AM5 are reviewed and summarized. Details of air monitoring results and graphical presentation can be referred in [Appendix 5.2](#).

5.2 Noise Monitoring Results

5.2.1 Noise monitoring was conducted at CM4 and CM5 in the reporting month. No noise monitoring was scheduled at CM1, CM2(A) and CM3 due to approval of monitoring station is still under liaison.

5.2.2 No action or limit level exceedance was determined in the reporting period at stations of CM4 and CM5.

5.2.3 Noise monitoring results measured in this reporting period for CM4 and CM5 are reviewed and summarized. Details of noise monitoring results and graphical presentation can be referred in [Appendix 5.3](#).

5.3 Waste Management

5.3.1 The quantities of waste for disposal in the Reporting Period are summarized in **Table 5.1** and **Table 5.2**. The Monthly Summary Waste Flow Table is shown in [Appendix 5.4](#). Whenever possible, materials were reused on-site as far as practicable.

Table 5.1 Details of Waste Disposal for Contract no. DC/2018/05

| Waste Type | Quantity this month | Cumulative Quantity-to-Date | Disposal / Dumping Grounds |
|--|---------------------|-----------------------------|----------------------------|
| Inert C&D materials disposed, m ³ | 0 | 0 | |
| Inert C&D materials | 0 | 0 | |



| Waste Type | Quantity this month | Cumulative Quantity-to-Date | Disposal / Dumping Grounds |
|--|---------------------|-----------------------------|----------------------------|
| recycled, m ³ | | | |
| Non-inert C&D materials disposed, m ³ | 0 | 0 | |
| Non-inert C&D materials recycled, m ³ | 0 | 0 | |
| Chemical waste disposed, kg | 0 | 0 | |
| Asbestos waste disposed, Kg | 0 | 0 | |

6. Compliance Audit

6.0.1. The Event Action Plan for construction noise, air quality are presented in [Appendix 6.1.](#)

6.0.2. The summary of exceedance is presented in [Appendix 6.2.](#)

6.1 Air Monitoring

6.1.1 No action or limit level exceedance was determined in the reporting period at stations of AM1, AM2 and AM5. No 1hr TSP monitoring was scheduled at stations of AM3(A) and AM4 due to approval of monitoring station is still under liaison.

6.2 Noise Monitoring

6.2.1 No action or limit level exceedance was determined in the reporting period at stations of CM4 and CM5, No noise monitoring was scheduled at stations of CM1, CM2(A) and CM3 due to approval of monitoring station is still under liaison.

6.3 Review of the Reasons for and the Implications of Non-compliance

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

6.4 Summary of action taken in the event of and follow-up on non-compliance

6.4.1 There was no particular action taken since no non-compliance was recorded in the reporting period.

7. Environmental Site Audit

7.0.1. Within this reporting month, weekly environmental site audits were conducted on 3, 10, 17 and 25 April 2019. IEC attended the joint site inspection on 25 April 2019.

Table 7.1 Summary of Environmental Inspections for Contract no. SPW 25/2018

| Item | Date | Reminders/Observations | Action taken by Contractor | Outcome |
|----------------|-----------|--|---|---|
| 20190425_01Env | 25-4-2019 | Contractor is reminded to clean up the debris from site clearance regularly of cover with tarpaulin sheets | Pending for contractor's follow up action | Pending for contractor's follow up action |

7.0.2. Within this reporting month, bi-weekly landscape site audits were conducted on 10 and 25 April 2019. IEC attended the joint site inspection on 25 April 2019.

Table 7.2 Summary of Landscape Inspections for Contract no. SPW 25/2018

| Item | Date | Reminders/Observations | Action taken by Contractor | Outcome |
|------|------|------------------------|----------------------------|---------|
| N/A | N/A | N/A | N/A | N/A |

7.0.3. Within this reporting month, monthly ecology site audits were conducted on 25 April 2019. IEC attended the joint site inspection on 25 April 2019.

Table 7.3 Summary of Ecology Inspections for Contract no. SPW 25/2018

| Item | Date | Reminders/Observations | Action taken by Contractor | Outcome |
|----------------|-----------|--|---|---|
| 20190425_01Eco | 25-4-2019 | Contractor is reminded that alignment of any access should avoid impact on existing plant species of conservation importance | Pending for contractor's follow up action | Pending for contractor's follow up action |

8. Complaints, Notification of Summons and Prosecution

8.0.1. No environmental complaint was received in the reporting period.

8.0.2. The details of cumulative complaint log and updated summary of complaints are presented in [Appendix 8.1](#).

8.0.3. Cumulative statistic on complaints and successful prosecutions are summarized in **Table 8.1** and **Table 8.2** respectively.

Table 8.1 Cumulative Statistics on Complaints

| Reporting Period | No. of Complaints |
|------------------|-------------------|
| April 2019 | 0 |
| Total | 0 |

Table 8.2 Cumulative Statistics on Successful Prosecutions

| Environmental Parameters | Cumulative No. Brought Forward | No. of Successful Prosecutions this month (Offence Date) | Cumulative No. Project-to-Date |
|--------------------------|--------------------------------|--|--------------------------------|
| Air | - | 0 | 0 |
| Noise | - | 0 | 0 |
| Waste | - | 0 | 0 |
| Total | - | 0 | 0 |

9. Conclusion

9.0.1. The EM&A programme was carried out in accordance with the EM&A Manual requirements, minor alterations to the programme proposed were made in response to changing circumstances.

9.0.2. The scheduled construction activities and the recommended mitigation measures for the coming months are listed in **Table 9.1**. The construction programmes of the Project are provided in [Appendix 9.1](#).

Table 9.1 Construction Activities and Recommended Mitigation Measures in Coming Reporting Months

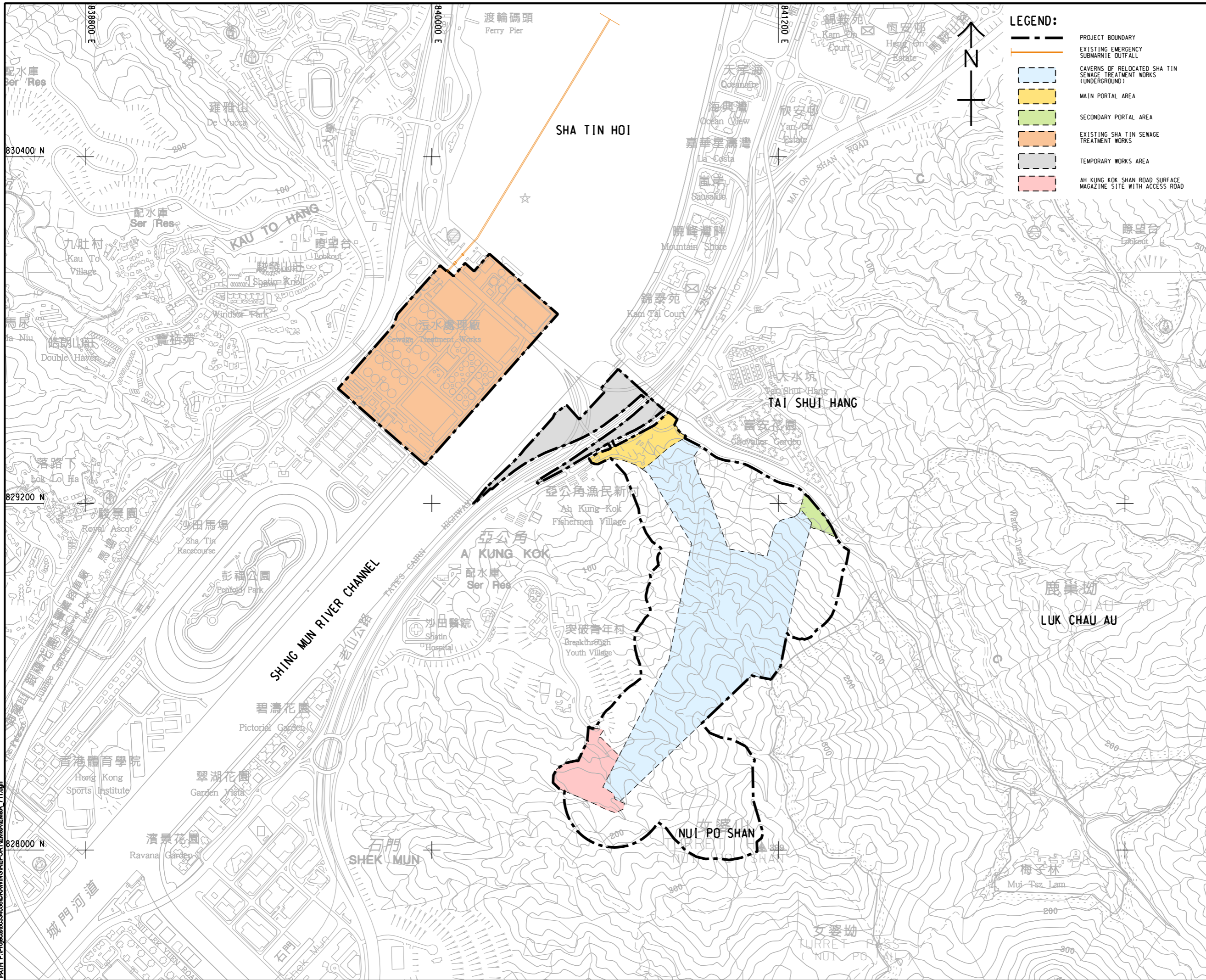
| Key Construction Works | Recommended Mitigation Measures |
|--|---|
| <ul style="list-style-type: none"> • Site clearance • Hand dig trial pit excavation • Hoarding and site office erection | <ul style="list-style-type: none"> • Dust control during dust generating works; • Implementation of proper noise pollution control; • Provision of protection to ensure no runoff out of site area or direct discharge into public drainage system, and • Direct impact to plant species of conservation importance recorded in the vicinity of the construction sites shall be avoided • Excavation materials shall be well covered • Mitigation measures to dust and noise control should be provided to erection of hoarding and site office |



Figure 2.1

Project Layout

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 ISO A1 594mm x 841mm
 Approved:
 Checked:
 Designer:
 Project Management Initials:



LEGEND:

- PROJECT BOUNDARY
- EXISTING EMERGENCY SUBMARINE OUTFALL
- CAVERNS OF RELOCATED SHA TIN SEWAGE TREATMENT WORKS (UNDERGROUND)
- MAIN PORTAL AREA
- SECONDARY PORTAL AREA
- EXISTING SHA TIN SEWAGE TREATMENT WORKS
- TEMPORARY WORKS AREA
- AH KUNG KOK SHAN ROAD SURFACE MAGAZINE SITE WITH ACCESS ROAD

AECOM

PROJECT
 項目
RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS: CAVERNS AND SEWAGE TREATMENT WORKS - INVESTIGATION, DESIGN AND CONSTRUCTION

CLIENT
 業主
 渠務署
 Drainage Services Department

CONSULTANT
 工程顧問公司
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 修訂

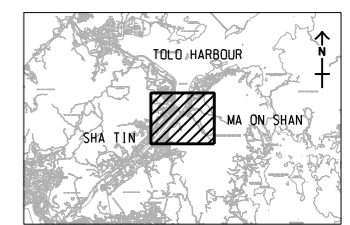
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STATUS
 階段

SCALE
 比例
 A3 1: 12000

DIMENSION UNIT
 尺寸單位
 METRES

KEY PLAN A3 1: 50000
 索引圖



PROJECT NO.
 項目編號
 60334056

CONTRACT NO.
 合約編號
 CE 30/2014 (DS)

SHEET TITLE
 圖名
 LOCATION PLAN OF THE PROJECT

SHEET NUMBER
 圖號
 60334056/EM&A/1.01

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Figure 2.2

Project Organization Chart



Project Organization Chart

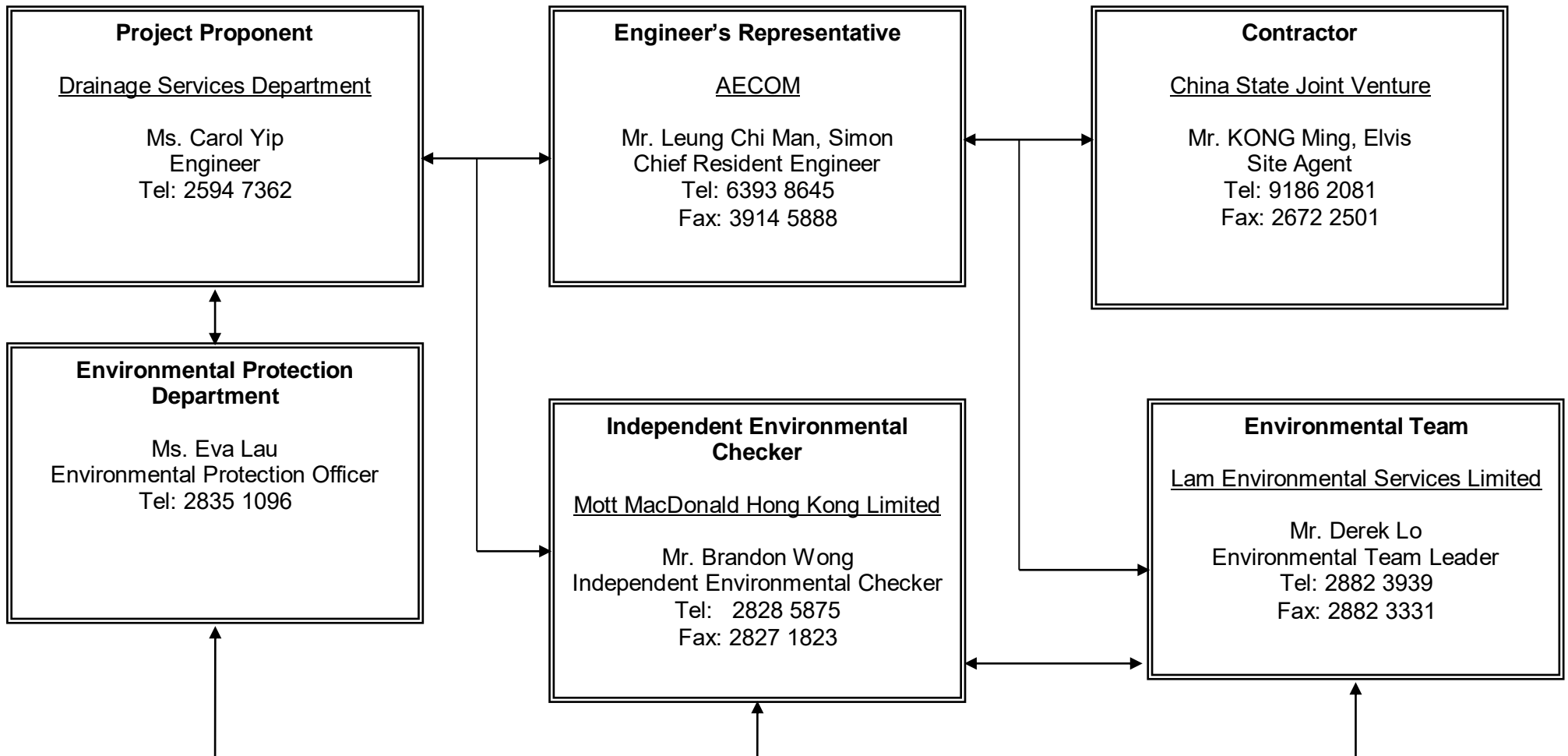


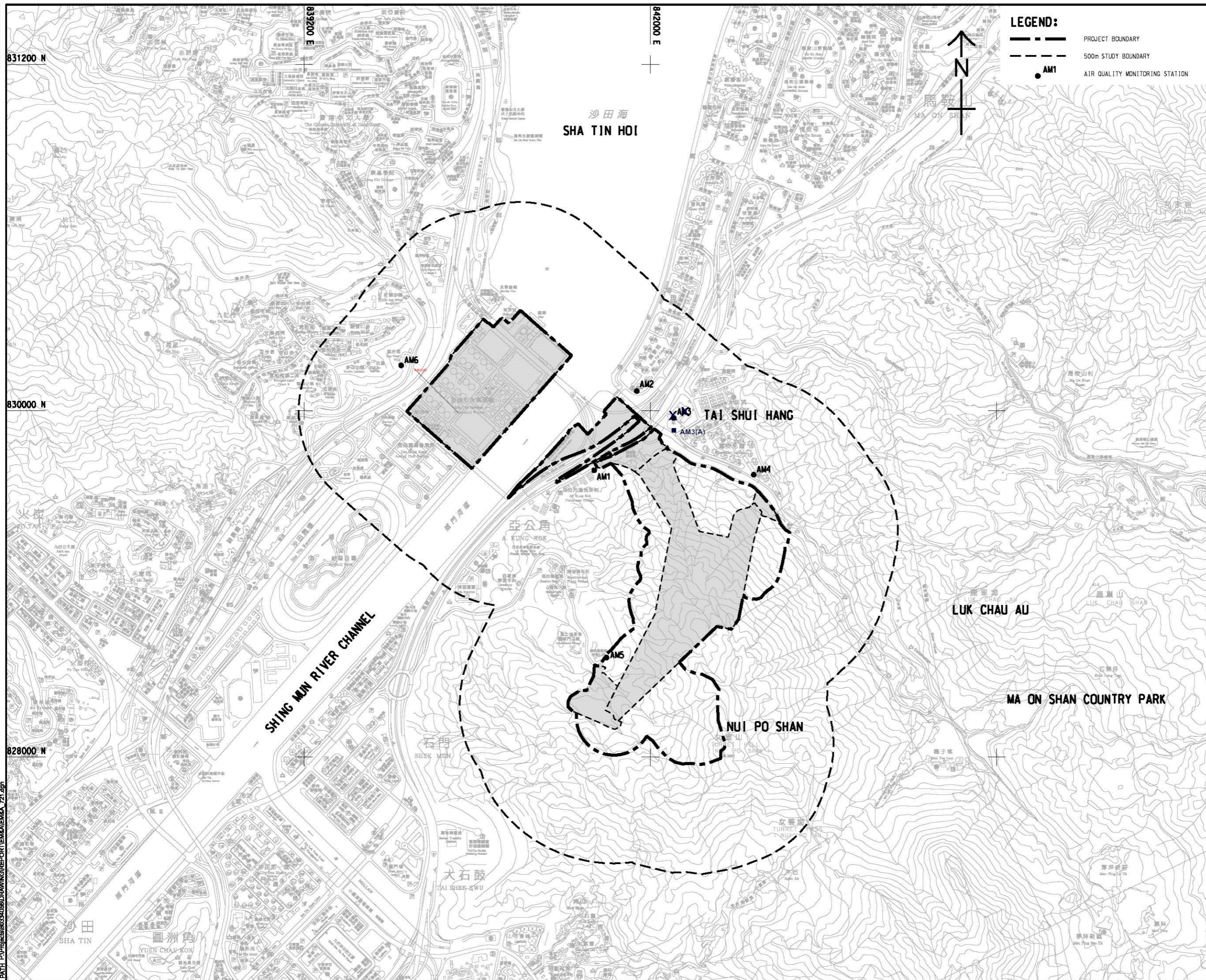
Figure 2.2



Figure 4.1 to Figure 4.2

Locations of Monitoring Stations

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 ISO A1 841mm x 594mm
 Approved:
 Checked:
 Designer:
 Project Management Initials:



LEGEND:

- PROJECT BOUNDARY
- 500m STUDY BOUNDARY
- AM1 AIR QUALITY MONITORING STATION

AECOM

PROJECT
 項目
RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS: CAVERNS AND SEWAGE TREATMENT WORKS - INVESTIGATION, DESIGN AND CONSTRUCTION

CLIENT
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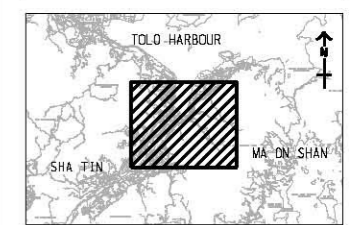
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STATUS
 階段

SCALE
 比例
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DIMENSION UNIT
 尺寸單位
 METRES

KEY PLAN A3 1: 40000
 索引圖



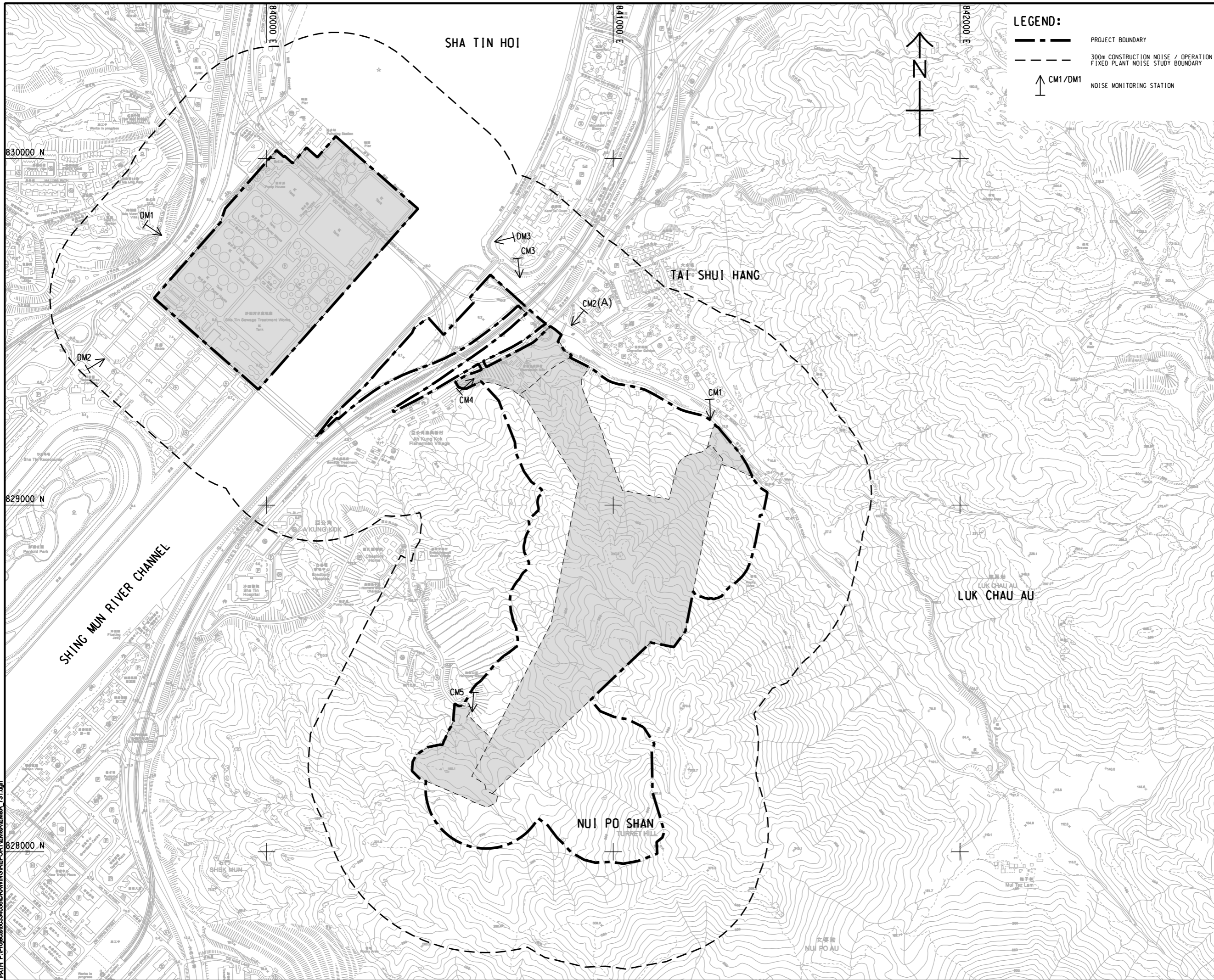
PROJECT NO.
 項目編號
 60334056

CONTRACT NO.
 合約編號
 CE 30/2014 (DS)

SHEET TITLE
 圖紙名稱
LOCATION OF AIR QUALITY MONITORING STATION DURING CONSTRUCTION PHASE

SHEET NUMBER
 圖紙編號
 60334056/EM&A/2.01

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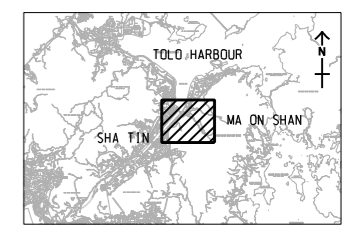
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STATUS
 現狀

SCALE
 比例: A3 1: 10000

DIMENSION UNIT
 尺寸單位: METRES

KEY PLAN A3 1: 50000



PROJECT NO.
 項目編號: 60334056

CONTRACT NO.
 合約編號: CE 30/2014 (DS)

SHEET TITLE
 圖號/名稱: LOCATION OF CONSTRUCTION PHASE TRAFFIC NOISE MONITORING STATION

SHEET NUMBER
 圖號/編號: 60334056/EM&A/3.01

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Lam Environmental Services Limited

Contract No. SPW 25/2018
Environmental Team for Relocation of Sha Tin Sewage
Treatment Works to Caverns –
Site Preparation and Access Tunnel Construction

Appendix 1.1
Proposal for Commencement of Construction Phase Air Quality Monitoring in Phases



Our ref.: LES/J2019-02/CS/L014
Date : 17 April 2019

Environmental Protection Department
Environmental Assessment Division
Metro Assessment Group (43)

By Hand

27th floor, Southorn Centre,
130 Hennessy Road,
Wan Chai, Hong Kong

Attn: Ms. Eva LAU (Env Protection Offr (Metro Assessment)43)

Dear Ms. LAU,

**Contract No. DC/2018/05
Relocation of Sha Tin Sewage Treatment Works to Caverns – Site Preparation and
Access Tunnel Construction**

Submission under the Requirement of EM&A Manual

Pursuant to Section 2.2.4.1 and 2.2.4.2 of the captioned Environmental Monitoring and Audit (EM&A) Manual, we submit herewith 4 hard copies and 3 electronic copies of proposal with the following items for your approval.

1. Proposal for commencement of construction phase AQM in phases;
2. Letter from the Independent Environmental Checker showing they have no further comment on this proposal.

Should you have any queries, please contact the undersigned at 9108 0531.

Yours faithfully,
For and On Behalf Of
Lam Environmental Services Limited

Derek Lo
Environmental Team Leader

Encl.

| | | | |
|------|----------------------------------|------------------|-----------|
| c.c. | DSD | Ms. Carol Yip | Email w/e |
| | AECOM (CRE Office) | Mr. Simon Leung | Email w/e |
| | Mott MacDonald Hong Kong Limited | Mr. Brandon Wong | Email w/e |

AECOM Asia Co. Ltd.
13/F Grand Central Plaza
Tower 2, 138 Shatin Rural Committee Road
Shatin, Hong Kong

Attn: Mr. Simon Leung

Your Reference

Sha Tin Cavern Sewage Treatment Works

Our Reference

EC/TC/BW/bw/T407129/
Correspondence/L012

Environmental Permit No. EP-533/2017

**Contract No. DC/2018/05 Relocation of Sha Tin Sewage Treatment Works to
Caverns – Site Preparation and Access Tunnel Construction**

3/F Mapletree Bay Point
348 Kwun Tong Road
Kowloon
Hong Kong

**Proposal for Commencement of Construction Phase Air Quality Monitoring in
Phases**

T +852 2828 5757
F +852 2827 1823
mottmac.hk

17 April 2019

By Email

Dear Sir,

I refer to the letter dated 17 April 2019 (ref: LES/J2019-02/CS/L014) from the Environmental Team Leader certifying his proposal to commence the construction phase impact air quality monitoring for the captioned Project in phases.

I have no comment on the captioned proposal and hereby verify it as conforming to the information and recommendations contained in the EM&A Manual, in accordance with Condition 3.1 of Environmental Permit No. EP-533/2017 and Section 2.2.4.2 of the EM&A Manual.

Should you have any queries regarding the captioned or require any further information, please contact the undersigned at 2828 5875.

Yours faithfully
for MOTT MACDONALD HONG KONG LIMITED

Brandon Wong
Independent Environmental Checker
T +852 2828 5875
Brandon.Wong@mottmac.com

Encl.

c.c. DSD
Lam Environmental Services Limited

Ms. Carol Yip
Mr. Derek Lo

By Email
By Email



CONTRACT NO. SPW 25/2018

**ENVIRONMENTAL TEAM FOR
RELOCATION OF SHA TIN SEWAGE TREATMENT
WORKS TO CAVERNS – SITE PREPARATION
AND ACCESS TUNNEL CONSTRUCTION**

UNDER ENVIRONMENTAL PERMIT NO. EP-533/2017

**PROPOSAL FOR COMMENCEMENT OF
CONSTRUCTION PHASE AIR QUALITY
MONITORING IN PHASES**

CLIENTS:

Drainage Services Department

PREPARED BY:

Lam Environmental Services Limited

11/F Centre Point
181-185 Gloucester Road
Wanchai, H.K.

Telephone: (852) 2882-3939
Facsimile: (852) 2882-3331
E-mail: info@lamenviro.com
Website: <http://www.lamenviro.com>

DATE: 17 April 2019



Table of Contents

1 Introduction 1
1.1 Background 1
1.2 Monitoring Locations 1
1.3 Justification and Conclusion 2

LIST OF APPENDIXES

- Appendix A Proposed Air Quality Monitoring Stations
- Appendix B Measure distance

1 Introduction

1.1 Background

1.1.1. Lam Environmental Services Limited has been commissioned by Drainage Services Department to undertake the Environmental Monitoring and Audit works for Contract No. SPW 25/2018 Environmental Team for Relocation of Sha Tin Sewage Treatment Works to Caverns – Site Preparation and Access Tunnel Construction, i.e. Contract No. DC/2018/05.

1.1.2. According to Section 2.2 of the EM&A manual under this Project, the major construction activities of the Project would likely be demolition of existing structures, drill & blasts for caverns and access tunnels by excavation and rock crushing, construction of temporary haul road/access road/explosive compound structures which would generate insignificant amount of small size particulates, hence, no significant Respirable Suspended Particulates (RSP) or Fine Suspended Particulates (FSP) impacts would be anticipated. Monitoring of 24-hour RSP and 24-hour FSP levels are not proposed. Therefore, only 1-hour Total Suspended Particulates (TSP) is required to be monitored and audited at the proposed monitoring locations.

1.1.3. This proposal provides a review of the work boundary of Contract No. DC/2018/05, Relocation of Sha Tin Sewage Treatment Works to Caverns – Site Preparation and Access Tunnel Construction, for proposing the commencement of air quality monitoring in phases.

1.2 Monitoring Locations

1.2.1. As referred to Section 2.2.4.1 of the EM&A manual, the dust monitoring locations will be determined when the engineering details for the dust modelling is available. The selected monitoring locations are the worst potentially affected air sensitive receivers located in the vicinity of construction sites of the Project. **Table 1** below presents the proposed air quality monitoring locations based on the overall project scope of Relocation of Sha Tin Sewage Treatment Works to Caverns.

Table 1 Proposed Air Quality Monitoring Stations

| Station ID | EIA ID | Location |
|------------|--------|---|
| AM1 | ASR 8 | Ah Kung Kok Fishermen Village |
| AM2 | ASR 6 | Block H, Kam Tai Court |
| AM3 (A)* | ASR 4 | Kowloon City Baptist Church Hay Nien Primary School |
| AM4 | ASR 2 | Wellborn Kindergarten |
| AM5 | ASR 12 | The Neighbourhood Advice-Action Council Harmony Manor |
| AM6 | ASR 21 | Seaview Villa |

* Remark: Updated based on baseline report submitted under Contract No. SPW 09/2018 as Environmental Team Baseline Environmental Monitoring for Sha Tin Cavern Sewage Treatment Works as compared with the original location is Ma On Shan Tsung Tsin Secondary School (AM3) as per the EM&A manual.

1.2.2. Geographical locations of the baseline air monitoring stations are presented in **Appendix A**.

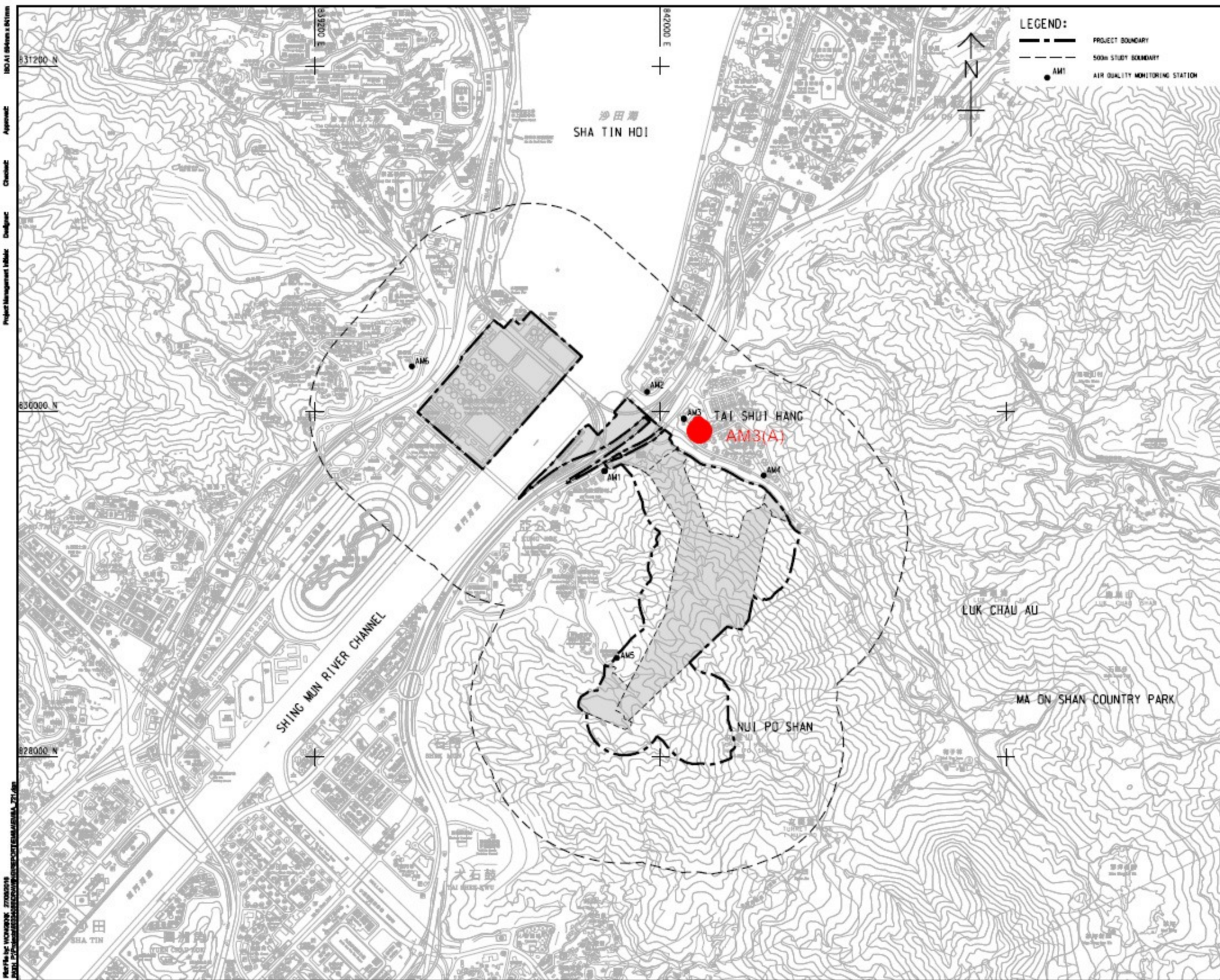
1.3 Justification and Conclusion

1.3.1. With respect to the work boundary of DC/2018/05, the horizontal distance from air quality monitoring station AM6 (Seaview Villa) to the nearest construction site Portion 2 is around 810m as shown in **Appendix B**. In view of impact air quality monitoring station AM6 is located outside the 500m boundary of the site area of Contract No. DC/2018/05.

1.3.2. Considering the principle underlined as per Section 2.2.4.1 of the EM&A manual that the selected monitoring locations shall be the worst potentially affected air sensitive receivers located in the vicinity of construction sites of the Project, the respective air quality monitoring station AM1 – AM5 is expected to be affected upon construction work commencement of DC/2018/05 whereas air quality monitoring station AM6 (Seaview Villa), located at around 810m away from the work boundary of DC/2018/05 is considered to be affected upon the commencement of the decommissioning and demolition of the existing Shatin Sewage Treatment Works at a later stage.

1.3.3. To conclude, the impact air quality monitoring for the Project is therefore proposed to be commenced in phases with impact air quality monitoring commence at station AM1 – AM5 for the Contract DC/2018/05 whereas impact air quality monitoring at station AM6 will commence air quality monitoring at a later stage upon the commencement of the decommissioning and demolition of the existing Shatin Sewage Treatment Works.

Appendix A
Proposed Air Quality Monitoring Stations



LEGEND:

- PROJECT BOUNDARY
- 500m STUDY BOUNDARY
- AIR QUALITY MONITORING STATION

AECOM

PROJECT
RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS: CAVERNS AND SEWAGE TREATMENT WORKS - INVESTIGATION, DESIGN AND CONSTRUCTION

CLIENT
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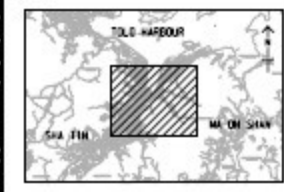
SUB-CONSULTANTS
 SXT20004

ISSUE/REVISION

| NO. | DATE | DESCRIPTION | CHK. |
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SCALE
 AS 1:10000 METRES

KEY PLAN AS 1:40000



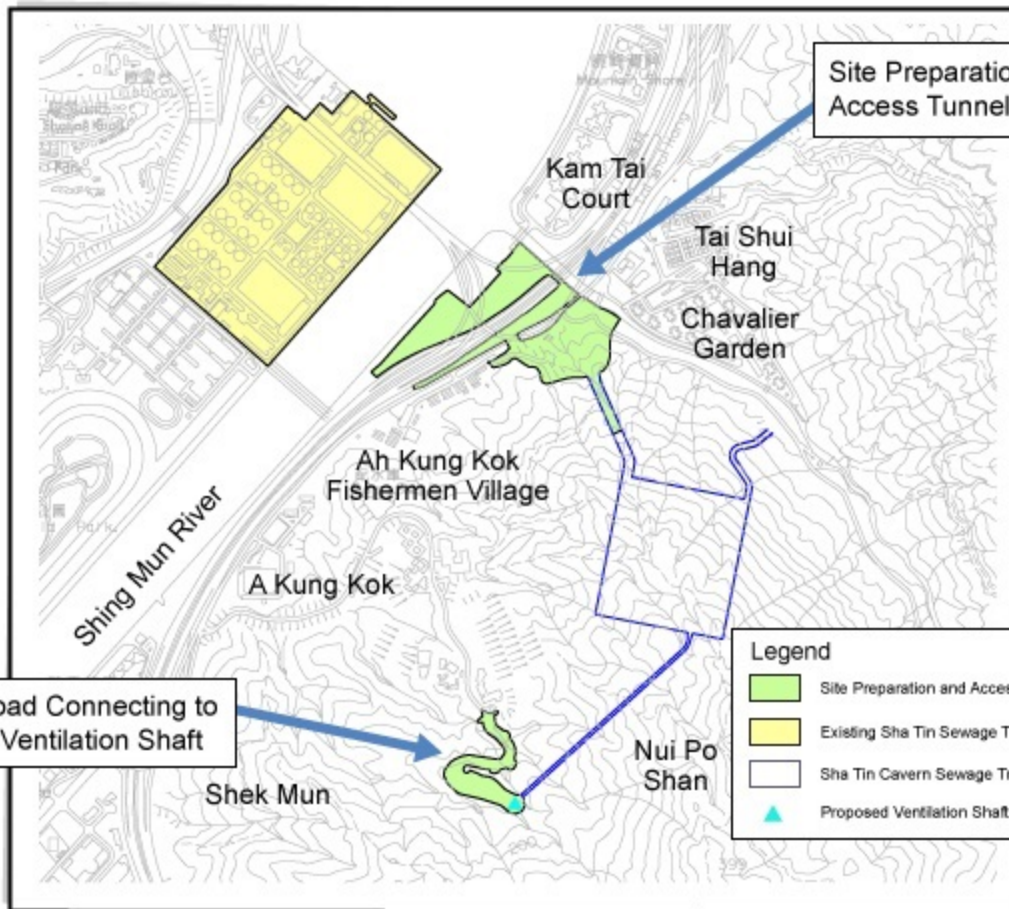
PROJECT NO. 60334056
CONTRACT NO. CE 30/2014 (DS)

SHEET TITLE
 LOCATION OF AIR QUALITY MONITORING STATION DURING CONSTRUCTION PHASE

SHEET NUMBER
 60334056/EMBA/2.01

Project Management Module: Design
 Checked: Approved: Issue Date: 27/03/2014
 Drawing No: SXT20004

Appendix B
Measure distance



Site Preparation and Access Tunnel

Kam Tai Court

Tai Shui Hang

Chavalier Garden

Ah Kung Kok Fishermen Village

Shing Mun River

A Kung Kok

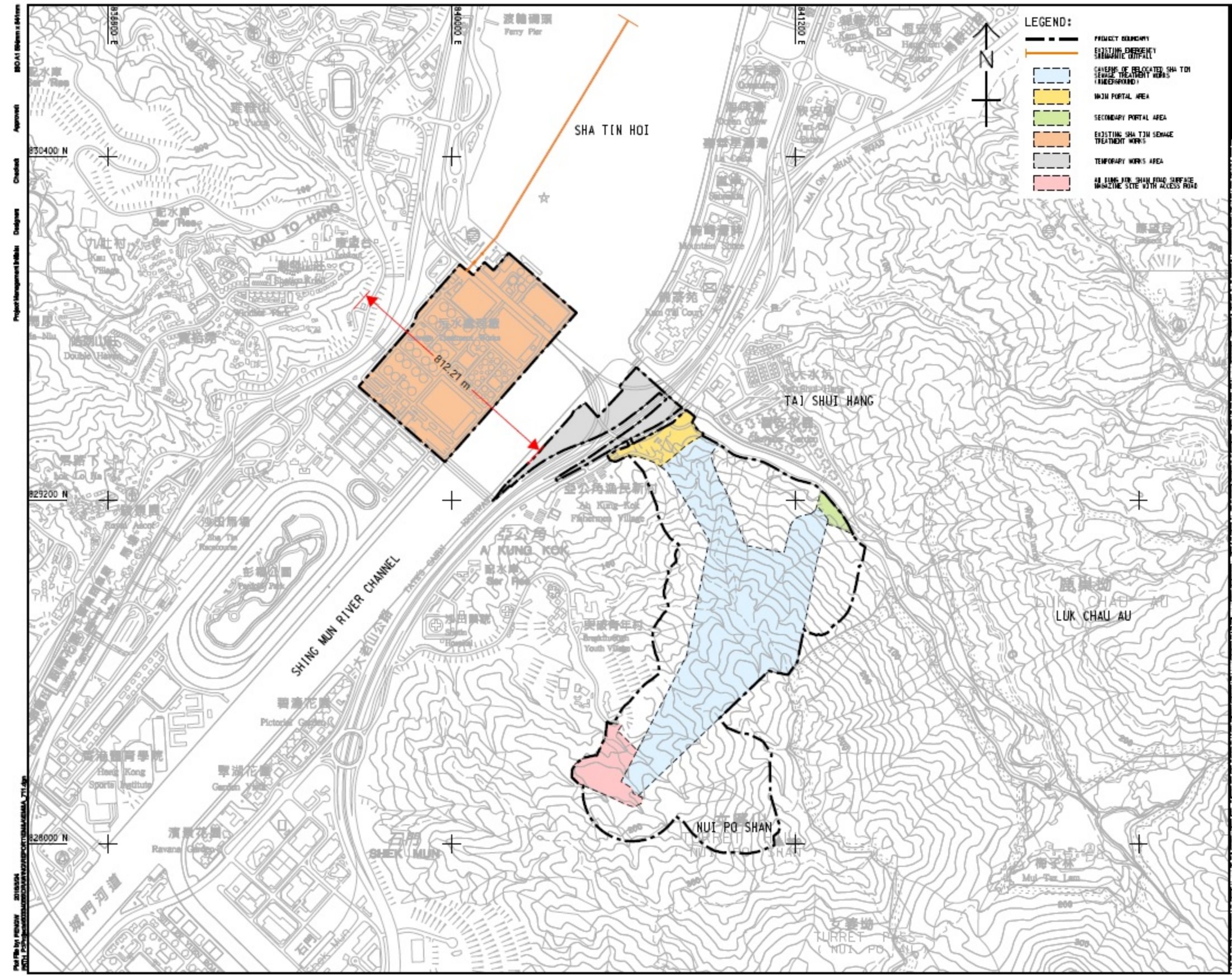
Nui Po Shan

Shek Mun

Access Road Connecting to Proposed Ventilation Shaft

Legend

- Site Preparation and Access Tunnel Construction (399DS-1)
- Existing Sha Tin Sewage Treatment Works
- Sha Tin Cavern Sewage Treatment Works - Main Works
- Proposed Ventilation Shaft



AECOM

PROJECT
 RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS: CAVERNS AND SEWAGE TREATMENT WORKS - INVESTIGATION, DESIGN AND CONSTRUCTION

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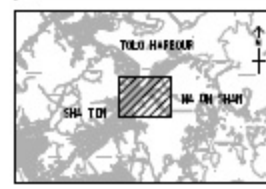
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| NO. | DATE | DESCRIPTION | CHK. |
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STATUS

SCALE
 AS 1 : 12000
GRAPHIC UNIT
 METRES

KEY PLAN AS 1 : 50000



PROJECT NO. 60334056
CONTRACT NO. CE 30/2014 (DB)

PROJECT TITLE
 LOCATION PLAN OF THE PROJECT

PROJECT NUMBER
 60334056/EM&A/1.01

Snap Types Measurement Types

Distance Tool
 Distance: 812.21 m
 Angle: 41.77
 $\Delta X: 605.79 \text{ m}$ $\Delta Y: 541.02 \text{ m}$
 Scale Ratio: 1 cm = 120 m



Appendix 3.1

Environmental Mitigation Implementation Schedule

APPENDIX C IMPLEMENTATION SCHEDULE OF RECOMMENDED MITIGATION MEASURES

C.1 Introduction

C.1.1 This section presents the implementation schedule of mitigation measures for the Project. **Table C.1** summarises the details of the recommended mitigation measures for all works areas. For each recommended mitigation measures, both the location and timing for the measure have clearly been identified as well as the parties responsible for implementing the measure and for maintenance (where applicable).

Table C.1 Implementation Schedule of Recommended Mitigation Measures

| EIA Ref. | EM&A Log Ref. | Environmental Protection Measures | Location / Duration of Measures / Timing of Completion of Measures | Implementation Agent | Implementation Stage ¹ | | | | Relevant Legislation & Guidelines |
|---------------------------|---------------|--|--|----------------------|-----------------------------------|---|---|-----|--|
| | | | | | Des | C | O | Dec | |
| Air Quality Impact | | | | | | | | | |
| Construction Phase | | | | | | | | | |
| Table 3.5 | 2.4.1 | The rock crushing plant is configured as an enclosed system. Dust collector with dust removal efficiency of 99% will be provided at the exhaust of the rock crusher during rock crushing. Watering will be provided to maintain material in wet condition. Vehicles would be required to pass through the wheel washing facilities provided at site exit. | Rock Crushing Plant / Construction Phase | Contractor | √ | √ | | √ | Air Pollution Control Ordinance (APCO) |
| 3.8.1 | 2.4.1 | Watering eight times a day on active works areas, exposed areas and unpaved haul roads to reduce dust emission by 87.5%. | All active works areas, exposed areas and unpaved haul roads | Contractor | | √ | | √ | APCO |

¹ Des = Design; C = Construction; O = Operation; Dec = Decommissioning

| EIA Ref. | EM&A Log Ref. | Environmental Protection Measures | Location / Duration of Measures / Timing of Completion of Measures | Implementation Agent | Implementation Stage ¹ | | | | Relevant Legislation & Guidelines |
|----------|---------------|---|--|----------------------|-----------------------------------|---|---|-----|---|
| | | | | | Des | C | O | Dec | |
| 3.8.1 | 2.4.1 | <p>Dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation and good site practices:</p> <ul style="list-style-type: none"> • Use of regular watering to reduce dust emissions from exposed site surfaces and unpaved roads, particularly during dry weather. • Use of frequent watering for particularly dusty construction areas and areas close to ASRs. • Side enclosure and covering of any aggregate or dusty material storage piles to reduce emissions. Where this is not practicable owing to frequent usage, watering shall be applied to aggregate fines. • Open stockpiles shall be avoided or covered. Where possible, prevent placing dusty material storage piles near ASRs. • Tarpaulin covering of all dusty vehicle loads transported to, from and between site locations. • Establishment and use of vehicle wheel and body washing facilities at the exit points of the site. • Provision of wind shield and dust extraction units or similar dust mitigation measures at the loading area of barging point, and use of water sprinklers at the loading area | Construction Sites | Contractor | | √ | | √ | APCO and Air Pollution Control (Construction Dust) Regulation |

| EIA Ref. | EM&A Log Ref. | Environmental Protection Measures | Location / Duration of Measures / Timing of Completion of Measures | Implementation Agent | Implementation Stage ¹ | | | | Relevant Legislation & Guidelines |
|----------|---------------|---|--|----------------------|-----------------------------------|---|---|-----|-----------------------------------|
| | | | | | Des | C | O | Dec | |
| | | <p>where dust generation is likely during the loading process of loose material, particularly in dry seasons/ periods.</p> <ul style="list-style-type: none"> • Provision of not less than 2.4m high hoarding from ground level along site boundary where adjoins a road, streets or other accessible to the public except for a site entrance or exit. • Imposition of speed controls for vehicles on site haul roads. • Where possible, routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs. • Every stock of more than 20 bags of cement or dry PFA should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides. • Instigation of an environmental monitoring and auditing program to monitor the construction process in order to enforce controls and modify method of work if dusty conditions arise. | | | | | | | |

| EIA Ref. | EM&A Log Ref. | Environmental Protection Measures | Location / Duration of Measures / Timing of Completion of Measures | Implementation Agent | Implementation Stage ¹ | | | | Relevant Legislation & Guidelines |
|--------------|-----------------|---|--|--|-----------------------------------|---|---|-----|-----------------------------------|
| | | | | | Des | C | O | Dec | |
| | Operation Phase | | | | | | | | |
| 3.5.2 | - | Sludge tanks with totally enclosed design proven by DSD should be deployed for transporting sludge. With thorough cleaning practice and regular condition test of the sludge tanks, odour emission and leachate leakage during storage and transportation are not anticipated. | Cavern Sewage Treatment Works (CSTW) / Operation Phase | Project Proponent / Operator | √ | | √ | | - |
| 3.6.2, 3.7.2 | 2.4.2 | All treatment units with potential odour emission will be covered and the exhausted air will be conveyed to the deodouriser (with 80 – 97% odour removal efficiency) for treatment before discharge to the environment. | CSTW / Operation Phase | Design team / Project Proponent / Operator | √ | | √ | | - |
| 3.7.2 | 2.4.2 | The following appropriate odour control measures would be implemented. (i) Adopting the advantage of caverns as natural barriers for odour control; (ii) Covering up of odour sources; (iii) Preventing odour leakage through the access tunnels by applying negative pressure inside caverns; (iv) Installing deodourizing units to clean up the collected foul air; (v) Discharging exhausted air at height to further enhance the dilution effect; and (vi) Enhancing the odour management of the sludge transportation. | CSTW / Operation Phase | Design team / Project Proponent / Operator | √ | | √ | | - |

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| 3.10.2 | 2.3.1 | Odour monitoring at the inlet and outlet of the deodourizing units is proposed to be conducted for first three years of the operation of CSTW, quarterly in the first year, and once every 6 months in the second and third years if monitoring results remain below the limit levels. | CSTW / Operation Phase | Project Proponent / Operator | √ | | √ | | - |
| 3.10.2 | 2.3.2 | An Odour Complaint Registration System is also proposed in the EM&A programme to check whether the deodorizing units can fulfill the recommended odour removal performance. | CSTW / Operation Phase | Operator | | | √ | | - |
| 3.10.2 | - | Any unexpected leakage from tanks could be observed with monitoring equipment. Monitoring equipment would be installed in the CSTW to monitor the concentration of H ₂ S, CO and CO ₂ and methane. Investigation and repair works would be carried out immediately if abrupt increase of these concentrations are reported. Emergency Plan would be established for these upset conditions. | CSTW / Operation Phase | Project Proponent / Operator | √ | | √ | | - |
| Noise Impact | | | | | | | | | |
| Construction Phase | | | | | | | | | |
| 4.5.1.6 | - | Re-provision of 220m length noise barrier with 10mPD on temporary access haul road to replace the existing 150m length noise barrier with 9.2mPD to 10mPD on Ma On Sha Road. The | Proposed temporary access / Construction Phase | Contractor | | √ | | | Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM), Noise Control Ordinance (NCO) |

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| | | location of the relocated noise barrier is shown in Figure No. 60334056/EIA/4.02 and Appendix 4.07 . Once the construction work for the CSTW is completed, the temporary access roads would be demolished and the relevant section of Ma On Shan Road and associated noise barrier would be recovered as before. | | | | | | | |
| 4.8.1 | 3.8.1 | The use of quiet plant associated with the construction works is prescribed in British Standard "Code of practice for noise and vibration control on construction and open sites, BS5228" which contains the SWLs for specific quiet PME. | All Construction Work Sites | Contractor | | √ | | √ | EIAO-TM, NCO |
| 4.8.1 | 3.8.1 | To alleviate the construction noise impact on the affected NSRs, movable noise barrier for Air Compressor, Bar Bender and Cutter, Breaker, Chisel, Saw, Compactor, Mixers, Pump, Crane, Desander, Drilling Rig, Dump Truck, Excavator, Generator, Grab, Lorry, Paver, Poker and Roller are proposed. | All Construction Work Sites | Contractor | | √ | | √ | EIAO-TM, NCO |
| 4.8.1 | 3.8.1 | Provision of noise barrier/acoustic mats for Drilling Jumbo so as to have screening effecting with 10 dB(A) noise attenuation | Drilling Jumbo operate outside the portal and within 20m inside the portal | Contractor | | √ | | | EIAO-TM, NCO |
| 4.8.1 | 3.8.1 | To further alleviate the construction noise impact on the Neighbourhood Advice-Action Council Harmony | Construction Site for access road for | Contractor | | √ | | √ | EIAO-TM, NCO |

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| | | Manor, it is proposed to limit the number of on-time operating PMEs within 120m of this NSR during construction of access road. | magazine at A Kung Kok Road | | | | | | |
| 4.9.1 | 3.8.1 | <p>In addition to the above-mentioned mitigation measures, good site practices listed below shall be adopted by all the contractors to further ameliorate the noise impacts.</p> <ul style="list-style-type: none"> • Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction program. • Silencers or mufflers on construction equipment should be utilised and should be properly maintained during the construction program. • Mobile plant, if any, should be sited as far away from NSRs as possible. • Machines and plant (such as trucks) that may be in intermittent use should be shut down between works periods or should be throttled down to a minimum. • Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs. | All Construction Work Sites | Contractor | | √ | | √ | EIAO-TM, NCO |

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| | | <ul style="list-style-type: none"> Material stockpiles and other structures should be effectively utilised, wherever practicable, in screening noise from on-site construction activities. | | | | | | | |
| | Operation Phase | | | | | | | | |
| 4.7.4 | 3.8.2 | The maximum allowable sound power levels for the ventilation shaft, ventilation buildings at main portal and emergency portal, ventilation fan for chiller plant room and cooling tower at the administration building as presented in Table 4.16 of the EIA Report should be achieved such that the nearest affected NSRs can be in compliance with the noise criteria | Ventilation Shaft, Administration Building and Ventilation Buildings/ Operation Phase | Project Proponent | √ | | √ | | EIAO-TM, NCO |
| 4.11.2 | 3.8.2 | Prior to the operational phase of the Project, a commissioning test for the ventilation buildings, the ventilation shaft, ventilation fan for chiller plant room at administration building and cooling tower at the administration building would be conducted to ensure compliance with the relevant allowable maximum sound power levels. | Ventilation Shaft, Administration Building and Ventilation Buildings/ Operation Phase | Contractor | | | √ | | EIAO-TM, NCO |

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| Water Quality Impact | | | | | | | | | |
| Construction Phase | | | | | | | | | |
| 5.7.2 | 4.10 | Water used in ground boring and drilling for site investigation or rock / soil anchoring should as far as practicable be re-circulated after sedimentation. When there is a need for final disposal, the wastewater should be discharged into storm drains via silt removal facilities. | Construction Sites / Construction Phase | Contractor | | √ | | | Water Pollution Control Ordinance (WPCO), EIAO-TM |
| 5.7.2 | 4.10 | All vehicles and plant should be cleaned before they leave a construction site to minimise the deposition of earth, mud, debris on roads. A wheel washing bay should be provided at every site exit if practicable and wash-water should have sand and silt settled out or removed before discharging into storm drains. The section of construction road between the wheel washing bay and the public road should be paved with backfill to reduce vehicle tracking of soil and to prevent site run-off from entering public road drains. | Construction Sites / Construction Phase | Contractor | | √ | | | Professional Persons Environmental Consultative Committee (ProPECC) Practice Note (PN) 1/94, WPCO, Waste Disposal Ordinance (WDO) |
| 5.7.2 | 4.10 | Good site practices should be adopted to remove rubbish and litter from construction sites so as to prevent the rubbish and litter from spreading from the site area. It is recommended to clean the construction sites on a regular basis. | Construction Sites / Construction Phase | Contractor | | √ | | | WPCO, EIAO-TM |

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| 5.7.2 | 4.10 | The site practices outlined in ProPECC PN 1/94 "Construction Site Drainage" should be followed where applicable to minimise surface run-off and the chance of erosion. | Construction Sites / Construction Phase | Contractor | | √ | | | WPCO, EIAO-TM, ProPECC PN 1/94 |
| 5.7.2 | 4.10 | There is a need to apply to EPD for a discharge licence for discharge of effluent from the construction site under the WPCO. The discharge quality must meet the requirements specified in the discharge licence. All the runoff and wastewater generated from the works areas should be treated so that it satisfies all the standards listed in the Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters (TM-DSS). The beneficial uses of the treated effluent for other on-site activities such as dust suppression, wheel washing and general cleaning etc., can minimise water consumption and reduce the effluent discharge volume. If monitoring of the treated effluent quality from the works areas is required during the construction phase of the Project, the monitoring should be carried out in accordance with the relevant WPCO licence which is under the ambit of RO of EPD. | Construction Sites / Construction Phase | Contractor | | √ | | | WPCO, EIAO-TM, (TM-DSS) |
| 5.7.2 | 4.10 | Contractor must register as a chemical waste producer if chemical wastes would be produced from the | Construction Sites / Construction Phase | Contractor | | √ | | | WPCO, EIAO-TM, WDO |

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| | | construction activities. The Waste Disposal Ordinance (Cap 354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation, should be observed and complied with for control of chemical wastes. | | | | | | | |
| 5.7.2 | 4.10 | Any service shop and maintenance facilities should be located on hard standings within a bonded area, and sumps and oil interceptors should be provided. Maintenance of vehicles and equipment involving activities with potential for leakage and spillage should only be undertaken within the areas appropriately equipped to control these discharges. | Construction Sites / Construction Phase | Contractor | | √ | | | WPCO, EIAO-TM |
| 5.7.2 | 4.10 | Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance. The Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes published under the Waste Disposal Ordinance should be followed to avoid leakage or spillage of chemicals. | Construction Sites / Construction Phase | Contractor | | √ | | | WPCO, EIAO-TM, WDO |
| 5.7.2 | 4.10 | Sufficient chemical toilets should be provided in the works areas. A licensed waste collector should be deployed to clean the chemical toilets on a regular basis. | Construction Sites / Construction Phase | Contractor | | √ | | | WPCO, EIAO-TM |

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| 5.7.2 | 4.10 | Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the surrounding environment. | Construction Sites / Construction Phase | Contractor | | √ | | | WPCO, EIAO-TM |
| 5.7.2 | 4.10 | The practices outlined in ETWB TC (Works) No. 5/2005 "Protection of natural streams/rivers from adverse impacts arising from construction works" should also be adopted where applicable to minimise the water quality impacts upon any natural streams or surface water systems. | Construction Sites / Construction Phase | Contractor | | √ | | | WPCO, EIAO-TM, ETWB TC (Works) No. 5/2005 |
| 5.7.2 | 4.10 | Appropriate measures during the construction of the cavern construction should be implemented to minimise the groundwater infiltration. | Construction Sites / Construction Phase | Contractor | | √ | | | WPCO, EIAO-TM |
| 5.7.2 | 4.10 | No directly discharge of groundwater from contaminated areas should be adopted. Prior to any excavation works within the potentially contaminated areas at the existing STSTW site, the baseline groundwater quality in these areas should be reviewed based on the relevant SI data and any additional groundwater quality measurements to be performed with reference to <i>Guidance Note for Contaminated Land Assessment and Remediation</i> and the review results should be submitted to EPD for examination. If the review results indicated that the groundwater to be generated from the excavation | Construction Sites / Construction Phase | Contractor | | √ | | | WPCO, EIAO-TM, Guidance Note for Contaminated Land Assessment and Remediation |

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| | | works would be contaminated, this contaminated groundwater should be either properly treated or properly recharged into the ground in compliance with the requirements of the TM-DSS. If wastewater treatment is to be deployed for treating the contaminated groundwater, the wastewater treatment unit shall deploy suitable treatment processes (e.g. oil interceptor / activated carbon) to reduce the pollution level to an acceptable standard and remove any prohibited substances (such as TPH) to an undetectable range. All treated effluent from the wastewater treatment plant shall meet the requirements as stated in TM-DSS and should be either discharged into the foul sewers or tankered away for proper disposal. | | | | | | | |
| 5.7.2 | 4.10 | If deployment of wastewater treatment is not feasible for handling the contaminated groundwater, groundwater recharging wells should be installed as appropriate for recharging the contaminated groundwater back into the ground. The recharging wells should be selected at places where the groundwater quality will not be affected by the recharge operation as indicated in section 2.3 of the TM-DSS. The baseline groundwater quality should be determined prior to the selection of the recharge wells, and submit a working plan to EPD for agreement. Pollution | Construction Sites / Construction Phase | Contractor | | √ | | | WPCO, EIAO-TM, TM-DSS |

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| | | levels of groundwater to be recharged shall not be higher than pollutant levels of ambient groundwater at the recharge well. Groundwater monitoring wells should be installed near the recharge points to monitor the effectiveness of the recharge wells and to ensure that no likelihood of increase of groundwater level and transfer of pollutants beyond the site boundary. Prior to recharge, free products should be removed as necessary by installing the petrol interceptor. The Contractor should apply for a discharge licence under the WPCO through the Regional Office of EPD for groundwater recharge operation or discharge of treated groundwater | | | | | | | |
| 5.7.2 | 4.10 | THEES connection works should be synchronized with the THEES maintenance, for a duration not longer than 4 weeks each outside the algae blooming season (January to May) and frequency of THEES maintenance shall be no more than once per year during the construction phase of the Project. | Tolo Harbour / Construction Phase | Project Proponent / Contractor | √ | √ | | | EIAO-TM |
| Construction and Operation Phases | | | | | | | | | |
| 5.10.2 | 4.10 | Shutdown of the THEES for maintenance should be shortened as far as possible. It is recommended that the maintenance of the THEES tunnel should be avoided during the algae blooming season (January to May). | Tolo Harbour / Construction and Operation Phase | Project Proponent | | √ | √ | | WPCO, EIAO-TM |

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| 5.10.2 | 4.10 | Relevant government departments including EPD, WSD, AFCD as well as the key stakeholders for mariculture and fisheries in Tolo Harbour should be informed of the maintenance event prior to any discharge. | Tolo Harbour / Construction and Operation Phase | Project Proponent | | √ | √ | | WPCO, EIAO-TM |
| 5.10.3 | 4.2-4.5 | An event and action plan and a water quality monitoring programme (as presented in the EM&A Manual) should be implemented for the THEES maintenance discharge | Tolo Harbour / Construction and Operation Phase | Project Proponent | | √ | √ | | WPCO, EIAO-TM |
| 5.10.1 | 4.10 | Silt screen may be installed at the flushing water intakes during the THEES maintenance discharge should it appear necessary. Close communication between DSD and WSD should be maintained to minimize any impact on the flushing water intakes due to THEES maintenance discharge. | WSD flushing water intakes / Construction and Operation Phase | WSD / Project Proponent | | √ | √ | | WPCO, EIAO-TM |
| Design and Operation Phases | | | | | | | | | |
| 5.8.3 | 4.6 | In case adverse impact on KTN is identified based on the result of the three-month monitoring programme after commissioning of the project, the operation conditions of the treatment and THEES system should be investigated, and corrective and remedial action should be implemented to improve the effluent discharge from the CSTW. Furthermore, DSD should extend the water quality monitoring | Project site / Design and Operation Phases | Project Proponent | | | √ | | WPCO, EIAO-TM |

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| | | programme for at least three months or as agreed by the Director of Environmental Protection. | | | | | | | |
| 5.11.2 | 4.10 | Dual power supply or ring main supply from CLP Power Hong Kong Ltd. CLP should be provided for the CSTW to prevent the occurrence of power failure. In addition, standby facilities for the main treatment units and standby equipment parts / accessories should also be provided in order to minimise the chance of emergency discharge. CLP should be consulted in order to ascertain the power supply for normal plant operation within the caverns. It is recommended that government departments including EPD, WSD and AFCD as well as the key stakeholders for mariculture and fisheries in Tolo Harbour should be informed as soon as possible in case of any emergency discharge so that appropriate actions can be taken. | Project site / Design and Operation Phases | Project Proponent | √ | | √ | | WPCO, EIAO-TM |
| 5.11.2 | 4.10 | In case of emergency discharge, the plant operators of CSTW should carry out necessary follow-up actions according to the procedures of the current contingency plan formulated for the existing STSTW to minimise the water quality impact. | Project site / Operation Phase | Project Proponent | | | √ | | WPCO, EIAO-TM |
| 5.11.2 | 4.10 | WSD may also consider, should it appear necessary, to shut down the Sha Tin seawater pumping station for a short period of time in case of | Sha Tin seawater pumping station / Operation Phase | WSD / Project Proponent | | | √ | | WPCO, EIAO-TM |

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| | | emergency discharge in order to minimize any adverse impacts. | | | | | | | |
| 5.13.2 | 4.10 | <p>Best Management Practices to reduce storm water and non-point source pollution are also proposed as follows:</p> <p><u>Design Measures</u></p> <ul style="list-style-type: none"> Exposed surface shall be avoided within the road and portal sites to minimise soil erosion. The access road and the portal areas shall be either hard paved or covered by landscaping area where appropriate. Streams near the Project site will be retained to maintain the original flow path. The drainage system will be designed to avoid flooding. Green areas / planting etc. should be introduced alongside the access road and within the portal areas, as far as possible, to minimise runoff pollution. <p><u>Devices/ Facilities to Control Pollution</u></p> <ul style="list-style-type: none"> Screening facilities such as standard gully grating and trash grille, with spacing which is capable of screening off large substances such as fallen leaves and rubbish should be provided at the inlet of drainage system. Road gullies with standard design and silt traps should be provided to | Project site / Design and Operation Phase | Project Proponent | √ | | √ | | WPCO, ProPECC PN 5/93 |

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| | | remove particles present in stormwater runoff, where appropriate. <u>Administrative Measures</u> <ul style="list-style-type: none"> • Good management measures such as regular cleaning and sweeping of road surface/ open areas are suggested. The road surface/ open area cleaning should also be carried out prior to occurrence rainstorm. • Manholes, as well as stormwater gullies, ditches provided at the Project site should be regularly inspected and cleaned (e.g. monthly). Additional inspection and cleansing should be carried out before forecast heavy rainfall. | | | | | | | |
| Land Contamination | | | | | | | | | |
| 6.7.1 | - | Further site walkover and/or detailed land contamination assessment will be required for sites that are inaccessible or currently in operation / yet to be constructed (i.e. existing STSTW, David Camp and part of existing Sha Tin VDC, and proposed A Kung Kok Shan Road surface magazine site within the Project boundary). The site walkover, detailed land contamination assessment and if necessary, remediation works should be carried out after decommissioning of the sites | Existing STSTW, David Camp and VDC / Construction Phase | Project Proponent / Contractor | | √ | | √ (for existing STS TW) | Guidance Note for Contaminated Land Assessment and Remediation, Practice Guide for Investigation and Remediation of Contaminated Land, Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management |

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| | | <p>but prior to re-development and should include the following:</p> <ul style="list-style-type: none"> • Prior to the commencement of the SI works, review the CAP to confirm whether the proposed SI works (e.g. sampling locations, testing parameters etc.) are still valid and to confirm the appropriate RBRGs land use scenario for the development; • Submit supplementary CAP(s), presenting the findings of the above review for EPD endorsement. If land contamination issues were identified within David Camp or part of existing VDC / proposed A Kung Kok Shan Road surface magazine site within the Project boundary in the further site walkover, findings of the site walkover and the proposal for SI works should also be presented in the supplementary CAP(s); • Carry out SI works according to the supplementary CAP endorsed by EPD; • Submit CAR(s), detailing findings of the SI works and nature/extent of any soil/groundwater contamination, and, if contaminated identified, RAP(s), discussing the appropriate remedial methods and mitigation | | | | | | | |

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| | | measures, for the identified contamination, for EPD agreement; and <ul style="list-style-type: none"> Carry out soil/groundwater remediation works according to EPD agreed RAP and submit RR(s) afterwards for EPD agreement. The remediation works and agreement of RR should be completed prior to re-development. | | | | | | | |
| 6.7.2 | - | If contamination were identified, mitigation measures as recommended in the RAP should be followed and should include the following: <ul style="list-style-type: none"> Excavation profiles must be properly designed and executed with attention to the relevant requirements for environment, health and safety; Excavation shall be carried out during dry season as far as possible to minimise contaminated runoff from contaminated soils; Supply of suitable clean backfill material (or treated soil) after excavation; Stockpiling site(s) shall be lined with impermeable sheeting and bunded. Stockpiles shall be fully covered by impermeable sheeting to reduce dust emission. If this is not practicable due to frequent | Project Site / Construction Phase | Contractor | | √ | | √ (for existing STS TW) | Guidance Note for Contaminated Land Assessment and Remediation, Practice Guide for Investigation and Remediation of Contaminated Land, Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management |

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| | | <p>usage, regular watering shall be applied. However, watering shall be avoided on stockpiles of contaminated soil to minimise contaminated runoff.</p> <ul style="list-style-type: none"> • Vehicles containing any excavated materials shall be suitably covered to limit potential dust emissions or contaminated wastewater run-off, and truck bodies and tailgates shall be sealed to prevent any discharge during transport or during wet conditions; • Speed control for the trucks carrying contaminated materials shall be enforced; • Vehicle wheel and body washing facilities at the site's exist points shall be established and used; and • Pollution control measures for air emissions (e.g. from biopile blower and handling of cement), noise emissions (e.g. from blower or earthmoving equipment), and water discharges (e.g. runoff control from treatment facility) shall be implemented and complied with relevant regulations and guidelines. | | | | | | | |

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| Hazard to Life | | | | | | | | | |
| Construction Phase | | | | | | | | | |
| 7.14.1 | 6.2.2 | <p>The following recommendations are justified to be implemented to meet the EIAO-TM requirements:</p> <ul style="list-style-type: none"> The truck should be designed to minimise the amount of combustible in the cabin. The fuel carried in the fuel tank should also be minimised to reduce the duration of any fire; The accident involvement frequency of the explosives delivery truck should be minimised through implementation of several administrative measures, such as providing training programme to the driver, regular "tool box" briefing session, implementing a defensive driving attitude, selecting driver with good safety record, and providing regular medical checks for the driver; Avoidance of returning unused explosives to the magazine, only the required quantity of explosives for a particular blast should be transported; Maintain a minimum headway of 10 minutes between two | Explosives delivery route / Construction Phase | Contractor | √ | √ | | | EIAO-TM |

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| | | consecutive truck convoys whenever practicable; and <ul style="list-style-type: none"> The fire involvement frequency should be minimised by carrying better types of fire extinguishers and with bigger capacity onboard of the explosives delivery truck. Emergency plans and trainings could also be provided to make sure that the fire extinguishers are used adequately. | | | | | | | |
| 7.14.2 | 6.2.3 | The magazine should be designed, built, operated and maintained in accordance with Mines Division's guidelines and appropriate industry best practice. In addition, the following recommendations should be implemented: <ul style="list-style-type: none"> The security plan should address different alert security level to reduce opportunity for arson or deliberate initiation of explosives; Emergency plan should be developed to address uncontrolled fire in magazine area, and drill of the emergency plan should be regularly carried out; Suitable work control system should be set-up, such as an operational manual including Permit-to-Work system, to ensure that work activities undertaken | Magazine Site/ Construction Phase | Contractor | √ | √ | | | - |

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| | | during operation of the magazine are properly controlled; <ul style="list-style-type: none"> • Good house-keeping within the magazine to ensure no combustible materials are accumulated; • Good house-keeping outside the magazine stores to ensure no combustible materials are accumulated; and • Regular checking of the magazine store to ensure no water seepage through the roof, walls or floor. | | | | | | | |
| 7.14.3 | 6.2.4 | The following recommendations should be implemented: <ul style="list-style-type: none"> • Emergency plan should be developed to address uncontrolled fire during transport. Case of fire near an explosive delivery truck in jammed traffic should be included in the plan. Activation of fuel and battery isolation switches on vehicle when fire breaks out should also be included in the emergency plan to reduce likelihood of prolonged fire leading to explosion; • Working guideline should be developed to define procedure for explosives transport during adverse weather such as thunderstorm; | To and from Magazine Site / Construction Phase | Contractor | √ | √ | | | - |

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| | | <ul style="list-style-type: none"> • Detonators should be transported separately from other Class 1 explosives. Separation of vehicles should also be maintained through the trip; • Develop procedure to ensure the availability of parking space on site for the explosives delivery truck. Delivery should not be commenced if parking space on site is not secured; • Hot work or other activities should be banned in the vicinity of the explosives offloading or charging activities; • Lining should be provided within the transportation box on the vehicle; • Fire screen should be used between cabin and the load on the vehicle; • Ensure packaging of detonators remains intact until handed over at blasting site; • Ensure that cartridged emulsion packages are not damaged before every trip; and • Use experienced driver with good safety record. | | | | | | | |

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| 7.14.4 | 6.2.5 | <p>The following recommendations should be implemented for the safe use of explosives:</p> <ul style="list-style-type: none"> • Blast Charge Weight should be within MIC as specified for the given blast face; • Temporary mitigation measures such as blast doors or heavy duty blast curtains should be installed at the portals or shafts and at suitable locations underground to prevent flyrock and control the air overpressure; • Multiple faces blasting will be carried out for the construction of cavern in this project. Good communication and control will need to be adopted in ensuring that the works are carried out safely; • It is not intended to carry out complete evacuation of the construction areas and secure refuge areas should be identified to workers in the areas; • A Chief Shotfirer and a Blasting Engineer shall be employed in addition to the normal blasting personnel to ensure that the works are safe and coordinated between blasting areas; • Shotfirer to be provided with a lightning detector, and appropriate | CSTW / Construction Phase | Contractor | √ | √ | | | - |

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| | | control measures should be in place; <ul style="list-style-type: none"> • Speed limit for the diesel vehicle truck and bulk emulsion truck in the access tunnel and cavern should be imposed. The truck may be escorted while underground to ensure route is clear from hazards and obstructions; and • Hot work should be suspended during passage of the diesel vehicle truck and bulk emulsion truck in the access tunnel and cavern. • A boulder survey should be undertaken based on the likely PPV values that would result from the blasting process. Those boulders subject to the vibration higher than the allowable limit should be strengthened, removed, or constructed with boulder fence, prior to the commencement of blasting. | | | | | | | |
| | Operation Phase | | | | | | | | |
| | | Nil | | | | | | | |

| EIA Ref. | EM&A Log Ref. | Environmental Protection Measures | Location / Duration of Measures / Timing of Completion of Measures | Implementation Agent | Implementation Stage ¹ | | | | Relevant Legislation & Guidelines |
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| Ecological Impact (Terrestrial and Marine) | | | | | | | | | |
| Construction Phase | | | | | | | | | |
| 8.8.2 | 7.2.1 | Construction of access roads and other temporary works should be carefully designed (e.g. elevated road for crossing streams) to avoid / minimise habitat loss and fragmentation. | Project site – areas access road / Pre-Construction Phase | Design team / Project Proponent | √ | | | | - |
| 8.8.3 | 7.2.2 | Minimise habitat loss to nearby habitats and associated wildlife by implementing the following mitigation measures: - <ul style="list-style-type: none"> • confining the works within the site boundary; • controlling access of site staff to avoid damage to the vegetation in surrounding areas; and • placement of equipment or stockpile in the existing disturbed / urbanised land within the site boundary of the Project to minimise disturbance to vegetated areas; | Project site / Construction Phase | Contractor | | √ | | | - |
| 8.8.3 | 7.2.2 | Reinstatement planting should be implemented upon the completion of construction works to minimise the ecological impact arising from the temporary habitat loss | Project Site (Main Portal Area / Secondary Portal Area / Access Road / Temporary Works Area) /Construction Phase | Project Proponent | √ | √ | | √ | |

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| 8.8.2, 8.8.3 & 8.10 | 7.2.2 | <p>Detailed Vegetation Survey shall be conducted by a suitably qualified botanist / ecologist within the works area requiring vegetation clearance prior to commencement of works to identify plant species of conservation importance.</p> <p>The potentially affected individuals shall be tagged and fenced off for preservation, and in the case of unavoidable loss, for transplantation to nearby suitable habitat(s).</p> | Proposed works areas (Main Portal, Secondary Portal, Access Road) / Pre-Construction Phase | Project Proponent / Qualified botanist or ecologist | | √ | | | |
| 8.8.2, 8.8.3 & 8.10 | 7.3.1 | <p>A Protection and Transplantation Proposal including the subsequent monitoring visit for the affected plant species should be prepared and conducted by a suitably qualified local ecologist. The Proposal should be submitted for approval at least one month before works commencement.</p> <p>To review the performance of the transplantation exercise, monitoring of transplanted flora should be conducted monthly after the transplantation throughout the construction phase. The parameters to be monitored should include the health condition and survival rate of the transplanted flora and presence of weedy species. Any observations and recommendations should be reported in monthly EM&A reports</p> | Recipient Site for transplanted species / Construction Phase | Project Proponent / Qualified botanist or ecologist | | √ | | | |

| EIA Ref. | EM&A Log Ref. | Environmental Protection Measures | Location / Duration of Measures / Timing of Completion of Measures | Implementation Agent | Implementation Stage ¹ | | | | Relevant Legislation & Guidelines |
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| 8.8.3 | 7.2.2 | <p>Mitigation measures should be implemented to control runoff from the construction site, as well as the adopting guidelines and good site practices for handling and disposal of construction discharges in order to minimise the potential indirect impact on the streams (particularly S2) resulting from site runoff.</p> <p>Precautionary measures should also be implemented to minimise indirect impacts to the streams, such as isolating the work site by placing sandbags and silt curtains, covering up construction materials, debris and spoil to avoid being washed into the stream, and properly collecting and treating construction effluent and sewage.</p> | Access Road on Nui Po Shan / Construction Phase | Contractor | | √ | | | ETWB TCW No. 5/2005 |
| 8.8.3 | 7.2.2 | <p>Implement good site practice to further minimise impacts from disturbance such as noise, air quality and water quality issues, such as: -</p> <ul style="list-style-type: none"> • the use of quiet plant and EPD's QPME and the availability of British Standards 5228 has been considered; • the use of movable noise barrier; • the use of temporary noise screening structures or purpose-built temporary noise barriers; | Project site / Construction Phase | Contractor | | √ | | | - |

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| | | <ul style="list-style-type: none"> install site hoarding as temporary noise barrier where construction works are undertaken; only well-maintained plant should be operated on site and plant should be serviced regularly during the construction programme; Mitigation measures stipulated in the ProPECC PN 1/94 "Construction Site Drainage" should be complied to minimise water quality impact; Installation of stand-by pump, emergency power supply and telemetry system to avoid sewage overflow and surcharge to sewerage system due to power/equipment failure. | | | | | | | |
| 8.8.3 | 7.2.2 | Minimise groundwater infiltration during cavern construction with the following water control strategies:- <ul style="list-style-type: none"> Probing Ahead: As a normal practice, the Contractor will undertake rigorous probing of the ground ahead of excavation works to identify zones of significant water inflow. The probe drilling results will be evaluated to determine specific grouting requirements in line with the tunnel / cavern advance. In such zones of significant water inflow that could occur as a result of discrete, permeable features, the intent | Project site / Construction Phase | Contractor | | √ | | | - |

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| | | <p>would be to reduce overall inflow by means of cut-off grouting executed ahead of the tunnel / cavern advance;</p> <ul style="list-style-type: none"> • Pre-grouting: Where water inflow quantities are excessive, pre-grouting will be required to reduce the water inflow into the tunnel / cavern. The pre-grouting will be achieved via a systematic and carefully specified protocol of grouting; • In principle, the grout pre-treatment would be designed on the basis of probe hole drilling ahead of the tunnel / cavern face; • The installation of waterproof lining would also be adopted after the formation of the tunnels and caverns. | | | | | | | |
| 8.8.3 | 7.2.2 | <p>In the event of excessive infiltration being observed as a result of the tunnelling or excavation works even after incorporation of the water control strategies, post-grouting should be applied as far as practicable as described below:</p> <ul style="list-style-type: none"> • Post-grouting: Groundwater drawdown will be most likely due to inflows of water into the tunnel / cavern that have not been sufficiently controlled by the pre-grouting measures in high permeability area. Where this | Project site / Construction Phase | Contractor | | √ | | | - |

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| | | <p>occurs post grouting will be undertaken before the lining is installed. Whilst unlikely to be required in significant measure, such a contingency should be allowed for reduction in permeability of the tunnel / cavern surround (by grouting) to limit inflow to acceptable levels.</p> <p>The practical groundwater control measures stated above are proven technologies and have been extensively applied in other past projects. These measures or other similar methods, as approved by the Engineer to suit the works condition shall be applied to minimise the groundwater infiltration.</p> | | | | | | | |
| 8.8.3 | 7.2.2 | <p>In case seepage of groundwater occurs, groundwater should be pumped out from works areas and discharged to the storm system via silt trap. Uncontaminated groundwater from dewatering process should also be discharged to the storm system via silt removal facilities.</p> | Project site / Construction Phase | Contractor | | √ | | | - |

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| 8.8.3 | 7.2.2 | <p>Mitigation measures recommended in the water quality impact assessment for controlling water quality impact will also serve to protect marine ecological resources from indirect impacts and ensure no unacceptable impact on marine ecological resources.</p> <p>Relevant government departments including EPD, WSD and AFCD as well as key stakeholders for mariculture and fisheries in Tolo Harbour should be informed of the THEES maintenance / emergency discharge event prior to any discharge.</p> <p>It is recommended that the temporary effluent bypass event and the THEES maintenance period should be shortened as far as possible.</p> | Tolo Harbour / Construction Phase | Contractor and Operator | | √ | | | - |
| Construction and Operation Phase | | | | | | | | | |
| 8.8.3 | 7.2.2 | <p>Overall reduction of glare during both construction and operation phase should be considered. A balance between lighting for safety, and avoiding excessive lighting can be achieved through the use of directional lighting to avoid light spill into sensitive areas, and control/timing of lighting periods of some facilities, particularly at the secondary portal which lies approximately 200 m northwest of Ma On Shan Country Park.</p> | Project site / Construction and Operation Phase | Contractor and Operator | | √ | √ | | - |

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| 8.8.3 | 7.2.2 | During the decommissioning and demolition of the existing STSTW, the direction and lighting periods should be controlled during ardeid breeding season (March to August) to minimise the potential indirect impact on Penfold Park Egretty and the ardeids flying over the existing STSTW. | Existing STSTW / Decommissioning / March to August | Contractor | | | | √ | - |
| 8.10 | 7.3 | It is anticipated that the construction of rock caverns would not have adverse impacts on groundwater in Nui Po Shan. Nonetheless, surface water level or groundwater level near the caverns will be closely monitored during the construction and operation stage. | Project site / Construction and Operation Phase | Contractor and Operator | | √ | √ | | - |
| Compensatory Planting | | | | | | | | | |
| 8.8.4& 8.10.1 | 7.2.3 | Compensatory planting would be provided at main and secondary portal areas, and along the access road. | Main portal, secondary portal, and along access road | Project Proponent | √ | √ | | | DEVB TC(W) No. 7/2015 |
| 8.8.4 & 8.10.1 | 7.2.3 | To facilitate successful planting, a detailed Woodland Compensation Plan should be prepared by local ecologists with at least 10 years relevant experience to form the basis of the proposed compensatory planting. The Woodland Compensation Plan should include implementation details, management requirement, as well as monitoring requirements (e.g. frequency and parameters) of the | Compensatory planting area (Main portal, secondary portal, and along access road) / pre-construction | Project Proponent | √ | √ | | | |

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| | | compensatory planting area. Approval of the Plan should be obtained from EPD at least three months before the prior to commencement of compensatory woodland planting. | | | | | | | |
| 8.8.4 & 8.10.1 | 7.2.3 | Upon the completion of planting, monitoring of the woodland compensation areas should be implemented, with maintenance works (e.g. irrigation, weeding, pruning, control of pests and diseases, replacement planting, repair of damage, etc.) conducted as necessary. | Compensatory planting area (Main portal, secondary portal, and along access road) / Operation | Project Proponent / CSTW Operator | | | √ | | |
| Fisheries Impact | | | | | | | | | |
| 9.6 | 8.2 | Potential impacts on fisheries resources and fishing operations arising from the Project have been avoided and minimised by construction of a connection pipes to the existing emergency outfall of STSTW by trenchless method underneath Shing Mun River with the least water quality impact. In addition, the temporary effluent bypass event for THEES connection work would be synchronized within regular THEES maintenance. Therefore, additional water quality impact and fisheries impact from changes of water quality have been avoided. Furthermore, the THEES maintenance discharge would avoid the blooming season of algae (i.e. January to May) to minimise the potential water quality impacts. It is | Tolo Harbour /Construction and Operation Phase | Project Proponent / Contractor | √ | √ | | | - |

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| | | recommended that any THEES maintenance period should be shortened as far as possible. | | | | | | | |
| 9.6 | 8.2 | Mitigation measures recommended in the water quality impact assessment for controlling water quality impact will also serve to protect fisheries from indirect impacts and ensure no unacceptable impact on fisheries resources and operations. For more detailed mitigation measures regarding water quality refer to Sections 5.7.2 and 5.13.2 of the EIA Report. | Construction and Operation Phase | Contractor and Operator | | √ | √ | | - |
| 9.6 | 8.2 | Relevant government departments including EPD, WSD and AFCD as well as key stakeholders for mariculture and fisheries in Tolo Harbour should be informed prior to the THEES maintenance / emergency discharge events. | Tolo Harbour / Construction and Operation Phase | Project Proponent | | √ | √ | | |
| Landscape and Visual Impact | | | | | | | | | |
| Table 10.10 | - | CM1 - Preservation of Existing Vegetation | Construction Sites/ Construction Phase | Project Proponent | √ | √ | | √ | DEVB TCW No. 7/2015 and latest Guidelines on Tree Preservation during Development issued by GLTM Section of DEVB |
| Table 10.10 | - | CM2 - Transplanting of Affected Trees | Construction Sites/ Construction Phase | Project Proponent | √ | √ | | √ | DEVB TCW No. 7/2015 and the latest Guidelines on Tree Transplanting issued by GLTM Section of DEVB |

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| Table 10.10 | - | CM3 - Compensatory Tree Planting | Construction Sites/ Construction Phase | Project Proponent | √ | √ | | √ | DEVB TCW No. 7/2015 |
| Table 10.10 | - | CM4 - Control of Night-time Lighting Glare | Construction Sites/ Construction Phase | Project Proponent | √ | √ | | √ | |
| Table 10.10 | - | CM5 - Erection of Decorative Screen Hoarding | Construction Sites/ Construction Phase | Project Proponent | √ | √ | | √ | |
| Table 10.10 | - | CM6 - Management of Construction Activities and Facilities | Construction Sites/ Construction Phase | Project Proponent | √ | √ | | √ | |
| Table 10.10 | - | CM7 - Reinstatement of Temporarily Disturbed Landscape Areas | Construction Sites/ Construction Phase | Project Proponent | √ | √ | | √ | |
| Table 10.11 | - | OM1 - Tree and Shrub Planting at the Temporary Project Magazine Site after Completion of Engineering Works | Temporary Project Magazine Site / Operation Phase | Project Proponent | √ | √ | √ | | |
| Table 10.11 | - | OM2 - Aesthetically pleasing design of Aboveground Structures | Tunnel Portals, Administration Building, Ventilation Buildings, Electrical Substations and Ventilation Shaft / Operation Phase | Project Proponent | √ | √ | √ | | |

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| Table 10.11 | - | OM3 - Aesthetically pleasing design of Highways Structures | Access Road to Ventilation Shaft / Operation Phase | Highways Department | √ | √ | √ | | |
| Table 10.11 | - | OM4 - Reprovision of Cycle Track | Cycle track / Operation Phase | Highways Department | √ | √ | √ | | |
| Table 10.11 | - | OM5 - Provision of Green Roof | Administration Building and Ventilation Buildings / Operation Phase | Project Proponent | √ | √ | √ | | |
| Table 10.11 | - | OM6 - Provision of Buffer Planting | Main and Secondary Portal Areas / Operation Phase | Project Proponent | √ | √ | √ | | |
| Table 10.11 | - | OM7 - Hydroseeding on the disturbed ground surface after demolition works prior to future redevelopment of the existing STSTW | Existing STSTW / Operation Phase | Lands Department (LandsD) or future development agent in existing STSTW | √ | √ | √ | | |
| Table 10.11 | - | OM8 - Woodland Mix Planting on Soil Slopes | Soil Slopes / Operation Phase | Project Proponent | √ | √ | √ | | |

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| Cultural Heritage Impact | | | | | | | | | |
| 11.5.1.1 | 10.1.1 | No potential direct or indirect impact to cultural heritage resource is anticipated, and therefore no mitigation measures are required. | N/A | N/A | | | | | EIAO EIAO-TM Antiquities and Monuments Ordinance Guidelines for Cultural Heritage Impact Assessment |
| Wastes Management Implications | | | | | | | | | |
| 12.6.2 | 11.2.2 | <p>Appropriate waste handling, transportation and disposal methods for all waste arising generated during the construction works for the Project should be implemented to ensure that construction wastes do not enter the nearby streams or drainage channel.</p> <p>It is anticipated that adverse impacts would not arise on the construction site, provided that good site practices are strictly followed. Recommendations for good site practices during the construction activities include:</p> <ul style="list-style-type: none"> Nomination of approved personnel, such as a site manager, to be responsible for good site practices, and making arrangements for collection of all wastes generated at the site and effective disposal to an appropriate facility. | Project Site Area / Construction Phase | Contractor | | √ | | √ | Waste Disposal Ordinance |

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| | | <ul style="list-style-type: none"> • Training of site personnel in proper waste management and chemical waste handling procedures. • Provision of sufficient waste reception/ disposal points, of a suitable vermin-proof design that minimises windblown litter. • Arrangement for regular collection of waste for transport off-site and final disposal. • Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers. • Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors. • A recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) should be proposed. • A Waste Management Plan should be prepared and should be submitted to the Engineer for approval. One may make reference to ETWB TCW No. 19/2005 for details. <p>In order to monitor the disposal of C&D material at landfills and public filling areas, as appropriate, and to control fly tipping, a trip-ticket system should be included as one of the contractual</p> | | | | | | | |

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| | | requirements to be implemented by an Environmental Team undertaking the Environmental Monitoring and Audit work. One may make reference to DEVB TCW No.6/2010 for details. | | | | | | | |
| 12.6.3 | 11.2.3 | <p>Good management and control of construction site activities / processes can minimise the generation of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction include:</p> <ul style="list-style-type: none"> • Segregate and store different types of construction related waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal. • Provide separate labelled bins to segregate recyclable waste such as aluminium cans from other general refuse generated by the work force, and to encourage collection by individual collectors. • Any unused chemicals or those with remaining functional capacity shall be recycled. • Maximising the use of reusable steel formwork to reduce the amount of C&D material. • Prior to disposal of C&D waste, it is recommended that wood, steel | Project Site Area / Construction Phase | Contractor | | √ | | √ | Waste Disposal Ordinance |

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| | | <p>and other metals shall be separated for re-use and / or recycling to minimise the quantity of waste to be disposed of to landfill.</p> <ul style="list-style-type: none"> • On-site crushing and sorting facilities are being considered to reduce the rock size to fulfill the size requirements from relevant waste collection / transfer / disposal facilities; • Adopt proper storage and site practices to minimise the potential for damage to, or contamination of, construction materials. • Plan the delivery and stock of construction materials carefully to minimise the amount of surplus waste generated. • Adopt pre-cast construction method instead of cast-in-situ method for construction of concrete structures as much as possible; and • Minimise over ordering of concrete, mortars and cement grout by doing careful check before ordering. <p>In addition to the above measures, other specific mitigation measures are recommended below to minimise environmental impacts during handling, transportation and disposal of wastes.</p> | | | | | | | |

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| 12.6.4 | 11.2.4 | <p>Storage of materials on site may induce adverse environmental impacts if not properly managed, recommendations to minimise the impacts include:</p> <ul style="list-style-type: none"> Waste, such as soil, should be handled and stored well to ensure secure containment, thus minimising the potential of pollution; Maintain and clean storage areas routinely; Stockpiling area should be provided with covers as much as practicable and water spraying system to prevent materials from wind-blown or being washed away; and Different locations should be designated to stockpile each material to enhance reuse. | Project Site Area / Construction Phase | Contractor | | √ | | √ | - |
| 12.6.4 | 11.2.4 | <p>Licensed waste haulers should be employed for the collection and transportation of waste generated. The following measures should be enforced to minimise the potential adverse impacts:</p> <ul style="list-style-type: none"> Remove waste in timely manner; Waste collectors should only collect wastes prescribed by their permits; Impacts during transportation, such as dust and odour, should be | Project Site Area / Construction Phase | Contractor | | √ | | √ | <p>Waste Disposal Ordinance</p> <p>Waste Disposal (Charges for Disposal of Construction Waste) Regulation</p> <p>Land (Miscellaneous Provisions) Ordinance</p> |

| EIA Ref. | EM&A Log Ref. | Environmental Protection Measures | Location / Duration of Measures / Timing of Completion of Measures | Implementation Agent | Implementation Stage ¹ | | | | Relevant Legislation & Guidelines |
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| | | | | | Des | C | O | Dec | |
| | | mitigated by the use of covered trucks or in enclosed containers; <ul style="list-style-type: none"> Obtain relevant waste disposal permits from the appropriate authorities, 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); Waste should be disposed of at licensed waste disposal facilities; and Maintain records of quantities of waste generated, recycled and disposed. | | | | | | | |
| 12.6.4 | 11.2.4 | Land transport will be used for transportation of excavated and stockpile materials. It is expected there will be 1260 vehicles per day for transporting waste during peak construction phase. The tentative transportation routings for the disposal of various types of wastes are shown in Table 12.4. The transportation routing may be changed subject to the traffic conditions. Nevertheless, it is anticipated that there is no adverse impact from the waste during transportation with the implementation of appropriated measures (e.g. using water-tight containers and covered trucks). | Transportation Route of Waste / Construction Phase | Contractor | | √ | | | - |

| EIA Ref. | EM&A Log Ref. | Environmental Protection Measures | Location / Duration of Measures / Timing of Completion of Measures | Implementation Agent | Implementation Stage ¹ | | | | Relevant Legislation & Guidelines |
|----------|---------------|--|--|----------------------|-----------------------------------|---|---|-----|---|
| | | | | | Des | C | O | Dec | |
| 12.6.4 | 11.2.4 | In order to monitor the disposal of C&D materials at PFRFs and landfills and to control fly-tipping, a trip-ticket system should be established in accordance with DEVB TCW No. 6/2010. A recording system for the amount of waste generated, recycled and disposed, including the disposal sites, should also be set up. Warning signs should be put up to remind the designated disposal sites. Close-circuited television should be installed at the vehicular entrance and exit of the site as additional measures to prevent fly-tipping. | Project Site Area / Construction Phase | Contractor | | √ | | √ | DEVB TCW No. 6/2010 |
| 12.6.4 | 11.2.5 | In addition to the above general measures, other specific mitigation measures on handling the C&D materials and materials generated from site formation and demolition work are recommended below, which should form the basis of the WMP to be prepared by the contractor(s) in construction phase. | Project Site Area / Construction Phase | Contractor | | √ | | √ | Technical Circular (Works) No. 19/2005 Environmental Management on Construction Site |
| 12.6.5 | 11.2.5 | In order to minimise the impact resulting from collection and transportation of C&D materials for off-site disposal, the excavated material arising from site formation and foundation works should be reused on-site as backfilling material and for landscaping works as far as practicable. Other mitigation requirements are listed below: | Project Site Area / Construction Phase | Contractor | | √ | | √ | Waste Disposal Ordinance ETWB TCW No.19/2005 DEVB TCW No. 6/2010 |

| EIA Ref. | EM&A Log Ref. | Environmental Protection Measures | Location / Duration of Measures / Timing of Completion of Measures | Implementation Agent | Implementation Stage ¹ | | | | Relevant Legislation & Guidelines |
|----------|---------------|---|--|----------------------|-----------------------------------|---|---|-----|-----------------------------------|
| | | | | | Des | C | O | Dec | |
| | | <ul style="list-style-type: none"> A WMP, which becomes part of the EMP, should be prepared in accordance with ETWB TCW No.19/2005; A recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) should be adopted for easy tracking; and In order to monitor the disposal of C&D materials at public filling facilities and landfills and to control fly-tipping, a trip-ticket system should be adopted (refer to DEVB TCW No. 6/2010). <p>It is recommended that specific areas should be provided by the Contractors for sorting and to provide temporary storage areas (if required) for the sorted materials.</p> | | | | | | | |
| 12.6.5 | 11.2.5 | The Contactor should prepare and implement an EMP in accordance with ETWB TCW No.19/2005, which describes the arrangements for avoidance, reuse, recovery, recycling, storage, collection, treatment and disposal of different categories of waste to be generated from construction activities. Such a management plan should incorporate site specific factors, such as the designation of areas for segregation and temporary storage of reusable and recyclable materials. The EMP should | Project Site Area / Construction Phase | Contractor | | √ | | | ETWB TCW No.19/2005 |

| EIA Ref. | EM&A Log Ref. | Environmental Protection Measures | Location / Duration of Measures / Timing of Completion of Measures | Implementation Agent | Implementation Stage ¹ | | | | Relevant Legislation & Guidelines |
|----------|---------------|---|--|----------------------|-----------------------------------|---|---|-----|-----------------------------------|
| | | | | | Des | C | O | Dec | |
| | | be submitted to the Engineer for approval. The Contractor should implement waste management practices in the EMP throughout the construction stage of the Project. The EMP should be reviewed regularly and updated by the Contractor, preferably on a monthly basis. | | | | | | | |
| 12.6.5 | 11.2.5 | All surplus C&D materials arising from or in connection with construction works should become the property of the Contractor when it is removed unless otherwise stated. The Contractor would be responsible for devising a system to work for on-site sorting of C&D materials and promptly removing all sorted and process materials arising from the construction activities to minimise temporary stockpiling on-site. The system should be included in the EMP identifying the source of generation, estimated quantity, arrangement for on-site sorting, collection, temporary storage areas and frequency of collection by recycling Contractors or frequency of removal off-site. | Project Site Area / Construction Phase | Contractor | | √ | | √ | - |
| 12.6.6 | 11.2.6 | The practices of good housekeeping for CSTW listed below should be followed to ameliorate any odour impact from handling, collection, transportation and disposal of sludge: | Operation Phases | Operator | | | √ | | Waste Disposal Ordinance |

| EIA Ref. | EM&A Log Ref. | Environmental Protection Measures | Location / Duration of Measures / Timing of Completion of Measures | Implementation Agent | Implementation Stage ¹ | | | | Relevant Legislation & Guidelines |
|----------|---------------|---|--|----------------------|-----------------------------------|---|---|-----|-----------------------------------|
| | | | | | Des | C | O | Dec | |
| | | <ul style="list-style-type: none"> • Screens should be cleaned regularly to remove any accumulated organic debris • Grit and screening transfer systems should be flushed regularly with water to remove organic debris and grit • Grit and screened materials should be transferred to closed containers • Scum and grease collection wells and troughs should be emptied and flushed regularly to prevent putrefaction of accumulated organics • Skim and remove floating solids and grease from primary clarifiers regularly • Frequent sludge withdrawal from tanks is necessary to prevent the production of gases • Sludge should be transported to the STF by water-tight containers to avoid Hydrogen Sulphide (H₂S)/odour emission and ingress of water into the containers which would lower the sludge dryness during transportation • Sludge cake should be transferred to closed containers • Sludge containers should be flushed with water regularly | | | | | | | |

| EIA Ref. | EM&A Log Ref. | Environmental Protection Measures | Location / Duration of Measures / Timing of Completion of Measures | Implementation Agent | Implementation Stage ¹ | | | | Relevant Legislation & Guidelines |
|----------|---------------|---|--|-----------------------|-----------------------------------|---|---|-----|---|
| | | | | | Des | C | O | Dec | |
| | | <ul style="list-style-type: none"> Sludge trucks and containers should be washed thoroughly before leaving the CSTW to avoid any odour nuisance during transportation | | | | | | | |
| 12.6.6 | 11.2.6 | In addition, all wastewater generated from the sludge dewatering process and all contaminated water from the cleaning operations recommended for odour control will be diverted to the relocated STSTW for proper treatment. | Operation Phases | Operator | | | √ | | Waste Disposal Ordinance |
| 12.6.7 | 11.2.7 | If chemical wastes are produced at the construction site or during operation, the Contractor during construction or the operator during operation will be required to register with the EPD as a chemical waste producer and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosive, flammable, oxidising, irritant, toxic, harmful, corrosive, etc. The Contractor shall use a licensed collector to transport and dispose of the chemical wastes, to the licensed Chemical Waste Treatment Centre, or other | Construction and Operation Phases | Contractor / Operator | | √ | √ | | Waste Disposal (Chemical Waste) (General) Regulation Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes |

| EIA Ref. | EM&A Log Ref. | Environmental Protection Measures | Location / Duration of Measures / Timing of Completion of Measures | Implementation Agent | Implementation Stage ¹ | | | | Relevant Legislation & Guidelines |
|----------------------|---------------|--|--|-----------------------|-----------------------------------|---|---|-----|---|
| | | | | | Des | C | O | Dec | |
| | | licensed facilities, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation. | | | | | | | |
| 12.6.8 | 11.2.8 | Recycling of waste paper, aluminium cans and plastic bottles should be encouraged, it is recommended to place clearly labelled recycling bins at designated locations which could be accessed conveniently. Other general refuse should be separated from chemical and industrial waste by providing separated bins for storage to maximise the recyclable volume. | Construction and Operation Phases | Contractor / Operator | | √ | √ | | Public Health and Municipal Services Ordinance (Cap.132) |
| 12.6.8 | 11.2.8 | A reputable licensed waste collector should be employed to remove general refuse on a daily basis to minimise odour, pest and litter impacts. | Construction and Operation Phases | Contractor / Operator | | √ | √ | | Public Health and Municipal Services Ordinance (Cap. 132) |
| Health Impact | | | | | | | | | |
| - | - | Not applicable. | | | | | | | |



Appendix 4.1

Action and Limit Level

**Action and Limit Level*****Action and Limit Level for Noise Monitoring***

| Monitoring Station | Action Level | Limit Level (dB(A)) | | |
|--------------------|---|----------------------------------|---|--|
| | | 0700-1900 hrs on normal weekdays | 0700-2300 hrs on holidays (including Sundays); and 1900-2300 hrs on all days ² | 2300-0700 hrs of all days ² |
| CM1 | When one documented complaint is received | 65 / 70 ¹ | 60 / 65 / 70 ³ | 45 / 50 / 55 ³ |
| CM2(A) | | 65 / 70 ¹ | | |
| CM3 | | 65 / 70 ¹ | | |
| CM4 | | 75 | | |
| CM5 | | 75 | | |

Remark 1: Limit level of CM1, CM2(A) and CM3 reduce to 65 dB (A) during examination periods if any.

Remark 2: Construction noise during restricted hours is under the control of Noise Control Ordinance Limit Level to be selected based on Area Sensitivity Rating.

Remark 3: Limit Level for restricted hour monitoring shall act as reference level only. Investigation would be conducted on CNP compliance if exceedance recorded during restricted hour noise monitoring period.

Action and Limit Level for Air Quality Monitoring

| Monitoring Locations | 1-hour TSP Level in µg/m ³ | |
|----------------------|---------------------------------------|-------------|
| | Action Level | Limit Level |
| AM1 | 294 | 500 |
| AM2 | 325 | 500 |
| AM3(A) | 360 | 500 |
| AM4 | 297 | 500 |
| AM5 | 349 | 500 |



Appendix 4.2

Copies of Calibration Certificates

Manufacturer Calibration Certificate

The following instrument has been tested and calibrated to the manufacturer specifications.
The calibration is traceable in accordance with ISO/IEC 17025 covering all instrument functions.

- Device Type: **XL2 Audio and Acoustic Analyzer**
- Serial Number: **A2A-15360-E0**

- Certificate Issued: **19 February 2019**
- Certificate Number: **43515-A2A-15360-E0**
- Results: **PASSED**
(for detailed report see next page)

Tested by: **M. Frick**

Signature:

Stamp:



NTi Audio AG
Im alten Riet 102
LI 9494 Schaan
www.nti-audio.com

Calibration of: XL2 Audio and Acoustic Analyzer
 Serial Number: A2A-15360-E0
 Date: 19 February 2019

• Detailed Calibration Test Results:

| | reference | actual | unit | actual error | XL2 tolerance | calibration uncertainty ² |
|----------------------------------|-----------|------------------|------|--------------|---------------|--------------------------------------|
| RMS Level @ 1kHz, XLR Input | 0.1 | 0.100 | V | ≤0.1% | ±0.5% | ±0.10% |
| | 1 | 1.000 | V | ≤0.1% | ±0.5% | ±0.09% |
| | 10 | 9.991 | V | -0.1% | ±0.5% | ±0.09% |
| Flatness, XLR Input ¹ | 20 Hz | 0.996 | V | -0.4% | ±1.1% | ±0.09% |
| | 20 kHz | 1.005 | V | 0.5% | ±1.1% | ±0.09% |
| Frequency | 1000 | 999.99 | Hz | ≤0.003% | ±0.003% | ±0.01% |
| Residual Noise | XLR | < 2 uV | | | <2 uV | ±0.50% |
| THD+N @ 0 dBu, 1 kHz, XLR Input | | -99.7 | dB | | typ. -100 dB | ±0.50% |

- Test Conditions: Temperature: **29.7** °C
 Relative Humidity: **21.7** %

• Calibration Equipment Used:

- Agilent Multimeter, Typ 34401A, Serial No. MY 5300 4607
 Last calibration: 15.08.2018, Next calibration: 15.08.2019
 Calibrated by ELCAL to the national standards maintained at Swiss Federal Office of Metrology. SCS 0002

- FX100 Audio Analyzer, Serial No. 10408
 Last Calibration: 27.04.2018, Next Calibration: 27.04.2019
 Manufacturer calibration based on Agilent 34410, Serial No. MY47014254,
 Last Calibration: 11.05.2018, Next Calibration: 11.05.2019
 which is calibrated by ELCAL to national standards maintained at Swiss Federal Office of Metrology. SCS 002

¹ The specified tolerance +/-0.1 dB @ 1V = +/- 1.1%

² The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with the regulations of the GUM.

Manufacturer Calibration Certificate

The following instrument has been tested and calibrated to the manufacturer specifications.
The calibration is traceable in accordance with ISO/IEC 17025 covering all instrument functions.

- Device Type: **M2230 Measurement Microphone**
consisting of
MA220 Serial Number: 8034
Capsule Serial Number: A16673

- Certificate Issued: 19 February 2019

- Certificate Number: 43515-8034-M2230

- Results: **PASSED**
(for detailed report see next page)

Tested by: M.Frick

Signature:

Stamp:

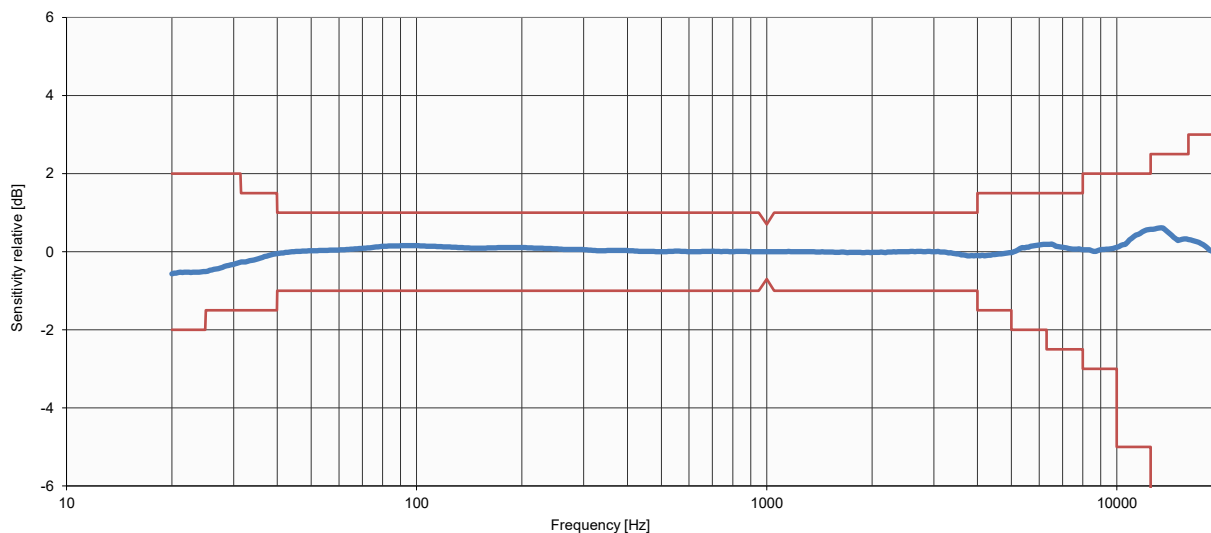


NTi Audio AG
Im alten Riet 102
LI 9494 Schaan
www.nti-audio.com

Date: 19 February 2019
 Calibration of: M2230 Measurement Microphone
 MA220 Serial Number: 8034
 Capsule Serial Number: A16673

• Detailed Calibration Test Results:

Frequency response: **Class 1 acc. IEC 61672**



| | actual | tolerance | calibration uncertainty ¹ |
|---------------------------------|-------------------|-------------|--------------------------------------|
| Sensitivity @ 1 kHz, 114 dB SPL | 45.5 mV/Pa | 34-53 mV/Pa | ±2.85% |

- Test Conditions:

| | | |
|--------------------|-----------|-----------|
| Temperature: | 21.8 °C | ±0.5 °C |
| Relative Humidity: | 35.9 % | ±2% |
| Air Pressure: | 96.56 kPa | ±0.25 kPa |

• Calibration Equipment Used:

- Norsonic Sound Calibrator, Type 1251, S/No. 30930
 Last Calibration: 05.12.2018, Next Calibration: 05.12.2020
 Calibrated by Metas, Switzerland
- NTi Audio FX100, S/No. 11094
 Last Calibration: 14.08.2018, Next Calibration: 14.08.2019
 Calibrated by NTi Audio meeting product specifications
- MTG MV203, S/No. 0630 / Mic Capsule, MK221 S./No. 16502
 Last Calibration: 08.12.2017, Next Calibration: 08.12.2019
 Calibrated by MTG, Germany

¹ The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with the regulations of the GUM.



CERTIFICATE OF CALIBRATION

Certificate No.: 18CA1114 02 Page 1 of 2

Item tested

| | | | |
|-----------------------|----------------------------|---|------------|
| Description: | Sound Level Meter (Type 1) | , | Microphone |
| Manufacturer: | B & K | , | B & K |
| Type/Model No.: | 2236 | , | 4188 |
| Serial/Equipment No.: | 2100736 | , | 2288941 |
| Adaptors used: | - | , | - |

Item submitted by

| | |
|----------------------|--------------------------------|
| Customer Name: | Lam Environmental Service Ltd. |
| Address of Customer: | - |
| Request No.: | - |
| Date of receipt: | 14-Nov-2018 |

Date of test: 15-Nov-2018

Reference equipment used in the calibration

| Description: | Model: | Serial No. | Expiry Date: | Traceable to: |
|---------------------------------|----------|------------|--------------|---------------|
| Multi function sound calibrator | B&K 4226 | 2288444 | 23-Aug-2019 | CIGISMEC |
| Signal generator | DS 360 | 33873 | 24-Apr-2019 | CEPREI |
| Signal generator | DS 360 | 61227 | 23-Apr-2019 | CEPREI |

Ambient conditions

| | |
|--------------------|--------------|
| Temperature: | 20 ± 1 °C |
| Relative humidity: | 50 ± 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 response of the Sound Level Meter.

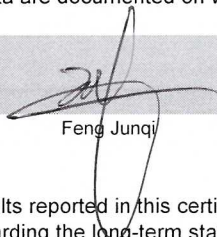
Test results

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: 15-Nov-2018

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.



CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 18CA1114 02 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 | 1.0 | 2.1 |
| | Lin | Pass | 2.0 | 2.2 |
| Linearity range for Leq | At reference range, Step 5 dB at 4 kHz | Pass | 0.3 | |
| | Reference SPL on all other ranges | Pass | 0.3 | |
| | 2 dB below upper limit of each range | Pass | 0.3 | |
| | 2 dB above lower limit of each range | Pass | 0.3 | |
| Linearity range for SPL | At reference range, Step 5 dB at 4 kHz | Pass | 0.3 | |
| | Frequency weightings | | | |
| Time weightings | A | Pass | 0.3 | |
| | C | Pass | 0.3 | |
| | Lin | Pass | 0.3 | |
| Peak response | Single Burst Fast | Pass | 0.3 | |
| | Single Burst Slow | Pass | 0.3 | |
| R.M.S. accuracy | Single 100µs rectangular pulse | Pass | 0.3 | |
| Time weighting I | Crest factor of 3 | Pass | 0.3 | |
| | Single burst 5 ms at 2000 Hz | Pass | 0.3 | |
| Time averaging | Repeated at frequency of 100 Hz | Pass | 0.3 | |
| | 1 ms burst duty factor 1/10 ³ at 4kHz | Pass | 0.3 | |
| Pulse range | 1 ms burst duty factor 1/10 ⁴ at 4kHz | Pass | 0.3 | |
| | Single burst 10 ms at 4 kHz | Pass | 0.4 | |
| Sound exposure level | Single burst 10 ms at 4 kHz | Pass | 0.4 | |
| Overload indication | SPL | Pass | 0.3 | |
| | Leq | Pass | 0.4 | |

2, Acoustic tests

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

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

3, Response to associated sound calibrator

N/A

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

- End -

Calibrated by:

Fung Chi Yip

Date:

15-Nov-2018

Checked by:

Shek Kwong Tat

Date:

15-Nov-2018

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.



CERTIFICATE OF CALIBRATION

Certificate No.: 19CA0329 01 Page 1 of 2

Item tested

| | | | |
|-----------------------|-----------------------------|---|------------|
| Description: | Sound Level Meter (Class 1) | , | Microphone |
| Manufacturer: | Honglim Co., Ltd. | , | - |
| Type/Model No.: | HLES-01 | , | CDM101 |
| Serial/Equipment No.: | 201692136 | , | 05866 |
| Adaptors used: | - | , | - |

Item submitted by

| | |
|----------------------|--------------------------------|
| Customer Name: | Lam Environmental Service Ltd. |
| Address of Customer: | - |
| Request No.: | - |
| Date of receipt: | 29-Mar-2019 |

Date of test: 02-Apr-2019

Reference equipment used in the calibration

| Description: | Model: | Serial No. | Expiry Date: | Traceable to: |
|---------------------------------|----------|------------|--------------|---------------|
| Multi function sound calibrator | B&K 4226 | 2288444 | 23-Aug-2019 | CIGISMEC |
| Signal generator | DS 360 | 33873 | 24-Apr-2019 | CEPREI |
| Signal generator | DS 360 | 61227 | 26-Dec-2019 | CEPREI |

Ambient conditions

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

Test specifications

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


Test results

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

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

Actual Measurement data are documented on worksheets.

Approved Signatory:


Feng Junqi

Date: 02-Apr-2019

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.



CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 19CA0329 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 | 2.1 |
| | C | Pass | 0.8 | |
| | Lin | N/A | N/A | |
| Linearity range for Leq | At reference range , Step 5 dB at 4 kHz | Pass | 0.3 | |
| | Reference SPL on all other ranges | Pass | 0.3 | |
| | 2 dB below upper limit of each range | Pass | 0.3 | |
| | 2 dB above lower limit of each range | Pass | 0.3 | |
| Linearity range for SPL | At reference range , Step 5 dB at 4 kHz | Pass | 0.3 | |
| | Frequency weightings | A | Pass | |
| Time weightings | C | Pass | 0.3 | |
| | Lin | N/A | N/A | |
| | Single Burst Fast | Pass | 0.3 | |
| Peak response | Single Burst Slow | Pass | 0.3 | |
| | Single 100µs rectangular pulse | N/A | N/A | |
| R.M.S. accuracy | Crest factor of 3 | Pass | 0.3 | |
| Time weighting I | Single burst 5 ms at 2000 Hz | N/A | N/A | |
| | Repeated at frequency of 100 Hz | N/A | N/A | |
| Time averaging | 1 ms burst duty factor 1/10 ³ at 4kHz | Pass | 0.3 | |
| | 1 ms burst duty factor 1/10 ⁴ at 4kHz | Pass | 0.3 | |
| Pulse range | Single burst 10 ms at 4 kHz | Pass | 0.4 | |
| Sound exposure level | Single burst 10 ms at 4 kHz | N/A | N/A | |
| 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: 02-Apr-2019

Checked by:

Date: 02-Apr-2019

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 4

Sound level meter type: HLES-01 Serial No. 201692136 Date 02-Apr-2019
Microphone type: CDM101 Serial No. 05866
Report: 19CA0329 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 17.7 dB
Noise level in C weighting 20.5 dB

LINEARITY TEST

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

| Reference/Expected level | Actual level | | Tolerance | Deviation | |
|--------------------------|----------------|------------|-----------|----------------|------------|
| | non-integrated | integrated | | non-integrated | integrated |
| dB | dB | dB | +/- dB | dB | dB |
| 94.0 | 94.0 | 94.0 | 0.7 | 0.0 | 0.0 |
| 99.0 | 99.0 | 99.0 | 0.7 | 0.0 | 0.0 |
| 104.0 | 104.0 | 104.0 | 0.7 | 0.0 | 0.0 |
| 109.0 | 109.1 | 109.1 | 0.7 | 0.1 | 0.1 |
| 110.0 | 110.1 | 110.1 | 0.7 | 0.1 | 0.1 |
| 111.0 | 111.1 | 111.1 | 0.7 | 0.1 | 0.1 |
| 112.0 | 112.1 | 112.1 | 0.7 | 0.1 | 0.1 |
| 113.0 | 113.1 | 113.1 | 0.7 | 0.1 | 0.1 |
| 114.0 | 113.9 | 113.9 | 0.7 | -0.1 | -0.1 |
| 115.0 | 114.4 | 114.4 | 0.7 | -0.6 | -0.6 |
| 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 | 73.9 | 73.9 | 0.7 | -0.1 | -0.1 |
| 69.0 | 68.9 | 68.9 | 0.7 | -0.1 | -0.1 |
| 64.0 | 63.9 | 63.9 | 0.7 | -0.1 | -0.1 |
| 59.0 | 58.9 | 58.9 | 0.7 | -0.1 | -0.1 |
| 54.0 | 53.9 | 53.9 | 0.7 | -0.1 | -0.1 |
| 49.0 | 49.0 | 49.0 | 0.7 | 0.0 | 0.0 |
| 48.0 | 48.0 | 48.0 | 0.7 | 0.0 | 0.0 |
| 47.0 | 46.8 | 46.8 | 0.7 | -0.2 | -0.2 |
| 46.0 | 45.8 | 45.8 | 0.7 | -0.2 | -0.2 |
| 45.0 | 44.9 | 44.9 | 0.7 | -0.1 | -0.1 |

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



Test Data for Sound Level Meter

Page 2 of 4

Sound level meter type: HLES-01 Serial No. 201692136 Date 02-Apr-2019
Microphone type: CDM101 Serial No. 05866
Report: 19CA0329 01

| Other ranges | Expected level | Actual level | Tolerance | Deviation |
|--------------|----------------|--------------|-----------|-----------|
| dB | dB | dB | +/- dB | dB |
| 65-135 | 94.0 | 94.0 | 0.7 | 0.0 |
| 45-115 | 94.0 | 94.0 | 0.7 | 0.0 |
| 25-95 | 94.0 | 94.0 | 0.7 | 0.0 |

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

| Ranges | Reference/Expected level | Actual level | Tolerance | Deviation |
|--------|--------------------------|--------------|-----------|-----------|
| dB | dB | dB | +/- dB | dB |
| 65-135 | 67.0 | 67.2 | 0.7 | 0.2 |
| | 133.0 | 133.3 | 0.7 | 0.3 |
| 45-115 | 47.0 | 46.8 | 0.7 | -0.2 |
| | 113.0 | 113.1 | 0.7 | 0.1 |
| 25-95 | 27.0 | 27.2 | 0.7 | 0.2 |
| | 93.0 | 93.2 | 0.7 | 0.2 |

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 | 54.1 | 1.5 | 1.5 | -0.5 |
| 63.1 | 94.0 | 67.8 | 67.3 | 1.5 | 1.5 | -0.5 |
| 125.9 | 94.0 | 77.9 | 77.6 | 1.0 | 1.0 | -0.3 |
| 251.2 | 94.0 | 85.4 | 85.1 | 1.0 | 1.0 | -0.3 |
| 501.2 | 94.0 | 90.8 | 90.6 | 1.0 | 1.0 | -0.2 |
| 1995.0 | 94.0 | 95.2 | 95.3 | 1.0 | 1.0 | 0.1 |
| 3981.0 | 94.0 | 95.0 | 95.2 | 1.0 | 1.0 | 0.2 |
| 7943.0 | 94.0 | 92.9 | 93.3 | 1.5 | 3.0 | 0.4 |
| 12590.0 | 94.0 | 89.7 | 90.8 | 3.0 | 6.0 | 1.1 |

Frequency weighting C:

| Frequency | Ref. level | Expected level | Actual level | Tolerance(dB) | | Deviation |
|-----------|------------|----------------|--------------|---------------|-----|-----------|
| | | | | + | - | |
| Hz | dB | dB | dB | | | dB |
| 1000.0 | 94.0 | 94.0 | 94.0 | 0.0 | 0.0 | 0.0 |
| 31.6 | 94.0 | 91.0 | 90.4 | 1.5 | 1.5 | -0.6 |
| 63.1 | 94.0 | 93.2 | 92.7 | 1.5 | 1.5 | -0.5 |
| 125.9 | 94.0 | 93.8 | 93.6 | 1.0 | 1.0 | -0.2 |
| 251.2 | 94.0 | 94.0 | 93.8 | 1.0 | 1.0 | -0.2 |



Test Data for Sound Level Meter

Page 3 of 4

Sound level meter type: HLES-01 Serial No. 201692136 Date 02-Apr-2019
Microphone type: CDM101 Serial No. 05866
Report: 19CA0329 01

| | | | | | | |
|---------|------|------|------|-----|-----|------|
| 501.2 | 94.0 | 94.0 | 93.9 | 1.0 | 1.0 | -0.1 |
| 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 | 91.3 | 1.5 | 3.0 | 0.3 |
| 12590.0 | 94.0 | 87.8 | 88.7 | 3.0 | 6.0 | 0.9 |

Note: No corrections for the frequency response of the microphone, instrument case and windshield are made to the sound level meter.

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 |
| 111.0 | 110.0 | 109.9 | 1.0 | 1.0 | -0.1 |

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 |
| 111.0 | 106.9 | 106.8 | 1.0 | 1.0 | -0.1 |

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)

| Time weighting | Ref. Level | Expected level | Tone burst signal | Tolerance | Deviation |
|----------------|------------|----------------|-------------------|-----------|-----------|
| | dB | dB | indication(dB) | +/- dB | dB |
| Slow | 107.0+6.6 | 108.0 | 106.9 | 0.5 | -1.1 |

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 | 85.0 | 85.0 | 84.8 | 1.0 | -0.2 | 60s integ. |
| 10000 | 75.0 | 75.0 | 74.6 | 1.0 | -0.4 | 6min. integ. |



Test Data for Sound Level Meter

Page 4 of 4

Sound level meter type: HLES-01 Serial No. 201692136 Date 02-Apr-2019
 Microphone type: CDM101 Serial No. 05866
 Report: 19CA0329 01

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 | Expected | Actual | Tolerance | Deviation |
|----------|-----------------|----------|--------|-----------|-----------|
| msec | tone burst (dB) | dB | dB | +/- dB | dB |
| 10 | 103.0 | 73.0 | 72.7 | 1.7 | -0.3 |

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 |
| 104.1 | 103.1 | 100.1 | 3.0 | 1.0 | 0.0 |

For integrating SLM, with the instrument indicating Leq.

For integrating SLM, with the instrument indicating Leq and set to the reference range. The test signal as 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 |
| 109.3 | 108.3 | 68.3 | 68.1 | 2.2 | -0.2 |

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) | + | | - |
| 1000 | 94.0 | | 94.0 | 94.0 | 0.0 | 0.0 | 0.0 |
| 125 | 77.9 | | 77.7 | 77.7 | 1.0 | 1.0 | -0.2 |
| 8000 | 92.9 | | 90.9 | 90.9 | 1.5 | 3.0 | -2.0 |

-----END-----



CERTIFICATE OF CALIBRATION

Certificate No.: 18CA1220 02

Page: 1 of 2

Item tested

Description: Acoustical Calibrator (Class 1)
Manufacturer: Larson Davis
Type/Model No.: CAL200
Serial/Equipment No.: 13128
Adaptors used: -

Item submitted by

Customer: Lam Environmental Service Ltd.
Address of Customer: -
Request No.: -
Date of receipt: 20-Dec-2018

Date of test: 28-Dec-2018

Reference equipment used in the calibration

| Description: | Model: | Serial No. | Expiry Date: | Traceable to: |
|-------------------------|----------|------------|--------------|---------------|
| Lab standard microphone | B&K 4180 | 2412857 | 20-Apr-2019 | SCL |
| Preamplifier | B&K 2673 | 2239857 | 27-Apr-2019 | CEPREI |
| Measuring amplifier | B&K 2610 | 2346941 | 08-May-2019 | CEPREI |
| Signal generator | DS 360 | 33873 | 24-Apr-2019 | CEPREI |
| Digital multi-meter | 34401A | US36087050 | 23-Apr-2019 | CEPREI |
| Audio analyzer | 8903B | GB41300350 | 23-Apr-2019 | CEPREI |
| Universal counter | 53132A | MY40003662 | 24-Apr-2019 | CEPREI |

Ambient conditions

Temperature: 20 ± 1 °C
Relative humidity: 50 ± 10 %
Air pressure: 1000 ± 5 hPa

Test specifications

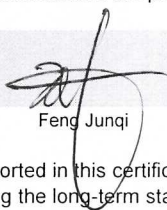
- The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B and the lab calibration procedure SMTP004-CA-156.
- The calibrator was tested with its axis vertical facing downwards at the specific frequency using insert voltage technique.
- The results are rounded to the nearest 0.01 dB and 0.1 Hz and have not been corrected for variations from a reference pressure of 1013.25 hectoPascals as the maker's information indicates that the instrument is insensitive to pressure changes.

Test results

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

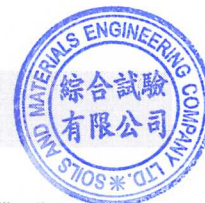
Details of the performed measurements are presented on page 2 of this certificate.

Approved Signatory:


Feng Junqi

Date: 29-Dec-2018

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.



CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 18CA1220 02

Page: 2 of 2

1, Measured Sound Pressure Level

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

| Frequency Shown Hz | Output Sound Pressure Level Setting dB | Measured Output Sound Pressure Level dB | (Output level in dB re 20 μ Pa) |
|-----------------------|---|--|--------------------------------------|
| | | | Estimated Expanded Uncertainty dB |
| 1000 | 94.00 | 93.84 | 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 = 0.006 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 = 999.4 Hz

Estimated expanded uncertainty 0.1 Hz Coverage factor k = 2.2

4, Total Noise and Distortion

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

At 1000 Hz TND = 0.4%

Estimated expanded uncertainty 0.7 %

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

- End -

Calibrated by:

Fung Chi Yip

Date: 28-Dec-2018

Checked by:

Shek Kwong Tat

Date: 29-Dec-2018

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.




1600 Washington Blvd
 Grants Pass, OR 97526
 (541) 471-7111
 (541) 471-7116 (Fax)
 Service@metone.com

Calibration Certificate

The calibration results on this report certify that this instrument complies with the product specifications at the time of calibration. Calibration was performed according to accepted industry methods using equipment, procedures, and standards that are traceable to NIST and ISO.

Recommended calibration interval is 12 months from the first day of use.

Instrument Model# Aerocet 831 Instrument Serial# W15448
 Date of Calibration 6/14/2018 Sensor # 16438
Darleen Best Calibration Technician  Quality Check

Temperature 23.5 °C Relative Humidity 38 %

Test Procedure: Aerocet 831-6100

| PSL Size (µm) | Test Results | Test Spec. | Lot# NIST | Expiration |
|---------------|--------------|------------|-----------|------------|
| 0.3 | Pass | ± 10% | 183039 | 03/31/2020 |
| 0.5 | Pass | ± 10% | 180556 | 02/28/2020 |
| 1.0 | Pass | ± 10% | 169240 | 5/31/2019 |
| 2.5 | Pass | ± 10% | REF | NA |
| 4.0 | Pass | ± 10% | REF | NA |
| 5.0 | Pass | ± 10% | REF | NA |
| 7.0 | Pass | ± 10% | REF | NA |
| 10.0 | Pass | ± 10% | REF | NA |

| Standards | Model | SN | Cal Due |
|------------------|----------|----------|-----------|
| Particle Counter | GT-526 | M1762 | 7/31/2018 |
| Flowmeter | DCL-M | 103751 | 1/29/2019 |
| DMM | 289 | 27720071 | 6/15/2018 |
| RH/TEMP SENSOR | 083E-1-6 | R20313 | 9/18/2018 |

This calibration certificate shall not be reproduced except in full, without the written approval of Met One Instruments Inc.



REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

REPORT NO. : HK1811049
 PROJECT NAME : PERFORMANCE CHECK / CALIBRATION OF DUST METER
 DATE OF ISSUE : 24/10/2018

CUSTOMER : LAM ENVIRONMENTAL SERVICES LTD
 ADDRESS : 11/F, CENTRE POINT, 181-185 GLOUCESTER ROAD, WAN CHAI, HONG KONG

REPORT NO. : HK1811049
 PROJECT ITEM NO. : HK1811049-01
 PERFORMANCE CHECK / CALIBRATED EQUIPMENT
 TYPE : AEROSOL MASS MONITOR
 MANUFACTURER : MET ONE INSTRUMENTS
 MODEL NO. : AEROCET - 831
 SERIAL NO. : W15448
 EQUIPMENT NO. : ---
 RECEIPT DATE : 18/10/2018
 PERFORMANCE CHECK / CALIBRATION DATE : 18/10/2018

PERFORMANCE CHECK / CALIBRATION Information

| CODE | Calibration Parameter | Method Procedure | Reference Method |
|----------------|---|------------------|--|
| Dust PC/CAL | Performance Check / Calibration of Dust Meter | CAL003 | General Technical Requirements of Environmental Monitoring, Environmental Monitoring & Audit Guidelines for Development Projects in HK |

- Notes : 1. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.
 2. Performance Check / Calibration result relates to performance check / calibration item(s) as received.

Approved Signatory

:

Issue Date:

24/10/2018

Wong Po Yan Pauline
 (Assistant Laboratory Manager)



REPORT OF PERFORMANCE CHECK / CALIBRATION

PROJECT NAME : PERFORMANCE CHECK / CALIBRATION OF DUST METER
 DATE OF ISSUE : 24/10/2018
 REPORT NO. : HK1811049

PERFORMANCE CHECK / CALIBRATED EQUIPMENT

TYPE : AEROSOL MASS MONITOR
 MANUFACTURER : MET ONE INSTRUMENTS
 MODEL NO. : AEROCET - 831
 SERIAL NO. : W15448
 EQUIPMENT NO. : ---
 PERFORMANCE CHECK / CALIBRATION DATE : 18/10/2018

STANDARD EQUIPMENT

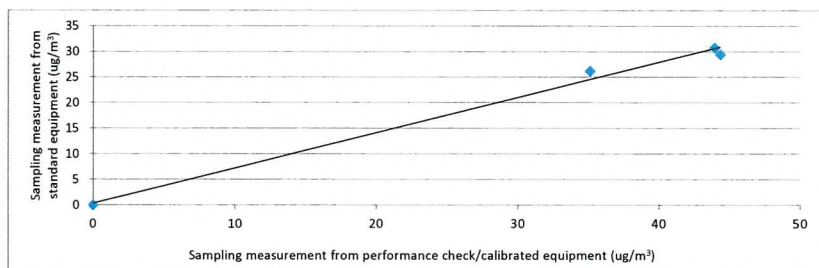
TYPE : HIGH VOLUME AIR SAMPLER
 MANUFACTURER : TISCH
 MODEL NO. : TE-5170
 EQUIPMENT REF NO. : PTL_HV002
 LAST CALIBRATION DATE : 25/7/2018

EQUIPMENT PERFORMANCE CHECK / CALIBRATION RESULTS:

| Trial no. in 1-hr period | Time | Mean Temp (°C) | Mean Pressure (hPa) | Concentration in ug/m ³ (Standard equipment) (Y - Axis) | Concentration in ug/m ³ (Performance Check / Calibrated equipment) (X - Axis) |
|--------------------------|-----------------------|----------------|---------------------|--|--|
| Zero Check ¹ | 18/10/2018,9:05:00 AM | 22.5 | 1015 | 0 | 0 |
| 1 | 18/10/2018,2:16:00 PM | 22.5 | 1015 | 31 | 44 |
| 2 | 18/10/2018,3:18:00 PM | 22.5 | 1015 | 30 | 44 |
| 3 | 18/10/2018,4:21:00 PM | 22.5 | 1015 | 26 | 35 |

Linear Regression of Y on X

Slope (K- factor) : 0.7000
 Correlation Coefficient : 0.9962
 Validity of Performance Check / Calibration Record : 18/10/2019



- Notes : 1. Zero check conducted as per CAL003 SOP and manufacturer's manual as appropriate.
 2. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.
 3. Performance Check / Calibration result relates to performance check / calibration item(s) as received.

Operator: Lau, Natalie Signature: *Natalie Lau* Date: 18/10/2018

Checked by: Wong Po Yan, Pauline Signature: *Pauline Wong* Date: 24/10/2018



1600 Washington Blvd
 Grants Pass, OR 97526
 (541) 471-7111
 (541) 471-7116 (Fax)
 Service@metone.com

Calibration Certificate

Met One
 Instruments

The calibration results on this report certify that this instrument complies with the product specifications at the time of calibration. Calibration was performed according to accepted industry methods using equipment, procedures, and standards that are traceable to NIST and ISO.

Recommended calibration interval is 12 months from the first day of use.

Instrument Model# Aerocet 831

Instrument Serial# W15449

Date of Calibration 10/4/2018

Sensor # 16439

Darleen Best *AT7*
 Calibration Technician

AT25
 Quality Check

Temperature 23 °C

Relative Humidity 36.5 %

Test Procedure: **Aerocet 831-6100**

| PSL Size (µm) | Test Results | Test Spec. | Lot# NIST | Expiration |
|---------------|--------------|------------|-----------|------------|
| 0.3 | Pass | ± 10% | 183039 | 03/31/2020 |
| 0.5 | Pass | ± 10% | 180556 | 02/28/2020 |
| 1.0 | Pass | ± 10% | 169240 | 5/31/2019 |
| 2.5 | Pass | ± 10% | REF | NA |
| 4.0 | Pass | ± 10% | REF | NA |
| 5.0 | Pass | ± 10% | REF | NA |
| 7.0 | Pass | ± 10% | REF | NA |
| 10.0 | Pass | ± 10% | REF | NA |
| | | | | |

| Standards | Model | SN | Cal Due |
|------------------|----------|----------|-----------|
| Particle Counter | GT-526 | M1760 | 10/9/2018 |
| Flowmeter | DCL-M | 103751 | 1/29/2019 |
| DMM | 289 | 27720071 | 6/29/2019 |
| RH/TEMP SENSOR | 083E-1-6 | R20313 | 9/18/2019 |
| | | | |

This calibration certificate shall not be reproduced except in full, without the written approval of Met One Instruments Inc.


REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

REPORT NO. : HK1811054
PROJECT NAME : PERFORMANCE CHECK / CALIBRATION OF DUST METER
DATE OF ISSUE : 24/10/2018
CUSTOMER : LAM ENVIRONMENTAL SERVICES LTD
ADDRESS : 11/F, CENTRE POINT, 181-185 GLOUCESTER ROAD, WAN CHAI, HONG KONG


REPORT NO. : HK1811054
PROJECT ITEM NO. : HK1811054-01
PERFORMANCE CHECK / CALIBRATED EQUIPMENT
TYPE : AEROSOL MASS MONITOR
MANUFACTURER : MET ONE INSTRUMENTS
MODEL NO. : AEROCET - 831
SERIAL NO. : W15449
EQUIPMENT NO. : ---
RECEIPT DATE : 18/10/2018
PERFORMANCE CHECK / CALIBRATION DATE : 23/10/2018

PERFORMANCE CHECK / CALIBRATION Information

| CODE | Calibration Parameter | Method Procedure | Reference Method |
|----------------|---|------------------|--|
| Dust PC/CAL | Performance Check / Calibration of Dust Meter | CAL003 | General Technical Requirements of Environmental Monitoring, Environmental Monitoring & Audit Guidelines for Development Projects in HK |

- Notes :
1. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.
 2. Performance Check / Calibration result relates to performance check / calibration item(s) as received.

Approved Signatory



 Wong Po Yan Pauline
 (Assistant Laboratory Manager)

Issue Date: 24/10/2018


REPORT OF PERFORMANCE CHECK / CALIBRATION

PROJECT NAME : PERFORMANCE CHECK / CALIBRATION OF DUST METER
 DATE OF ISSUE : 24/10/2018
 REPORT NO. : HK1811054

PERFORMANCE CHECK / CALIBRATED EQUIPMENT

TYPE : AEROSOL MASS MONITOR
 MANUFACTURER : MET ONE INSTRUMENTS
 MODEL NO. : AEROCET - 831
 SERIAL NO. : W15449
 EQUIPMENT NO. : ---
 PERFORMANCE CHECK / CALIBRATION DATE : 23/10/2018

STANDARD EQUIPMENT

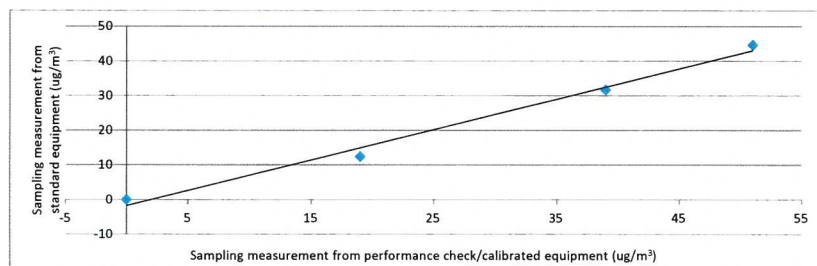
TYPE : HIGH VOLUME AIR SAMPLER
 MANUFACTURER : TISCH
 MODEL NO. : TE-5170
 EQUIPMENT REF NO. : PTL_HV002
 LAST CALIBRATION DATE : 25/7/2018

EQUIPMENT PERFORMANCE CHECK / CALIBRATION RESULTS:

| Trial no. in 1-hr period | Time | Mean Temp (°C) | Mean Pressure (hPa) | Concentration in ug/m ³ (Standard equipment) (Y - Axis) | Concentration in ug/m ³ (Performance Check / Calibrated equipment) (X - Axis) |
|--------------------------|------------------------|----------------|---------------------|--|--|
| Zero Check ¹ | 23/10/2018,9:05:00 AM | 25.3 | 1017 | 0 | 0 |
| 1 | 23/10/2018,10:20:00 AM | 25.3 | 1017 | 45 | 51 |
| 2 | 23/10/2018,11:22:00 AM | 25.3 | 1017 | 32 | 39 |
| 3 | 23/10/2018,12:29:00 PM | 25.3 | 1017 | 12 | 19 |

Linear Regression of Y on X

Slope (K- factor) : 0.8800
 Correlation Coefficient : 0.9945
 Validity of Performance Check / Calibration Record : 23/10/2019



- Notes : 1. Zero check conducted as per CAL003 SOP and manufacturer's manual as appropriate.
 2. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.
 3. Performance Check / Calibration result relates to performance check / calibration item(s) as received.

Operator: Lau, Natalie Signature: Date: 23/10/2018

Checked by: Wong Po Yan, Pauline Signature: Date: 24/10/2018



Met One Instruments, Inc.
 1600 NW Washington Blvd, Grants Pass, OR
 TEL (541) 471-7111 Fax (541) 471-7116

Certificate of Calibration

BT-645

Particulate Monitor

Recommended calibration interval is 24 months from first day of use.

| | | | | |
|------------------|--|--|----------------------------|--------------------|
| Unit Info | Model: | <u>BT-645</u> | 81865 Firmware Rev: | <u>1.1.0</u> |
| | Serial Number: | <u>R22584</u> | 81113 | <u>0.2.4</u> |
| | Calibrated By: | <u>Kevin Ricks</u> AT21 | Cal. Date: | <u>01/18/2019</u> |
| | Quality Inspector: | AT25 | Date: | <u>JAN 21 2019</u> |
| | Calibration Hz/μg/m³: | <u>9.50</u> | | |

| | | | | |
|-------------------|-----------------------|---------------|-----------------|---------------|
| Final Test | | | | |
| | Flow (2.0 L/M): | Pass | Ambient T (C) | <u>22</u> |
| | | | RH, % | <u>34</u> |
| | Serial Communication: | Pass | | |
| | BT-645 Conc.: | <u>350.93</u> | Standard Conc.: | <u>353.81</u> |

| Standards | Manufacturer | Model | SN | Cal Due |
|------------------------|---------------------|----------------|----------|-----------|
| RMS Multimeter | Fluke | 289 Multimeter | 23740018 | 5/03/2019 |
| RH & TEMPERATURE | Met One Instruments | 083E-1-6 | R20313 | 9/18/2019 |
| Primary Flow Meter | BIOS | Defender-510 | 1033419 | 3/28/2019 |
| Digital Dust Indicator | SIBATA | LD-3B | 476795 | 5/18/2019 |
| | | | | |
| | | | | |

The standards used for this calibration have accuracy equal to or greater than the instrument tested. These standards are on record and traceable to NIST to the extent allowed by the institute's calibration facility. Unless otherwise stated, all instruments are calibrated to meet the manufacturer's published specifications. The Calibration system complies with MIL-STD-45662A.



Portable Dust Meter Performance Check Record

Portable Dust Meter

Type : Particulate Monitor
Manufacturer : MET ONE INSTRUMENTS
Model Number : BT-645
Serial Number : R22584
Performance Check Date : 27-Feb-19

Standard Equipment

Type : High Volume Sampler
Manufacturer : TISCH
Model Number : TE-5170
Equipment Number : HVS018
Last Calibration Date : 4-Dec-18

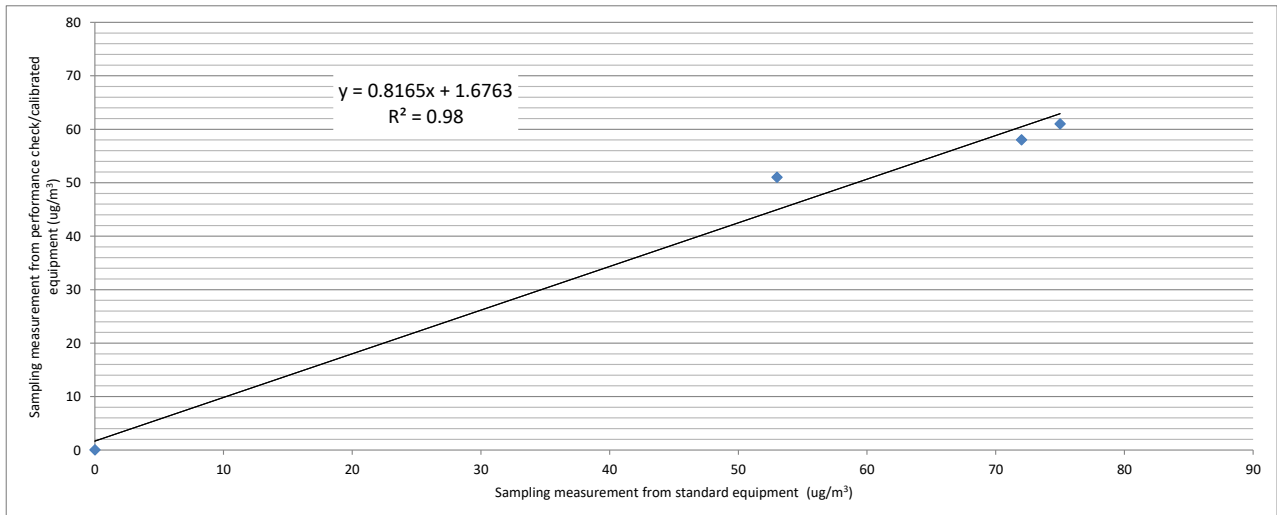
Portable Dust Meter Performance Check Results

Table with 6 columns: Trial no. in 1-hr period, Time, Mean Pressure (hPa), Mean Temp (°C), Concentration in ug/m³ (Standard equipment) (Y - Axis), Concentration in ug/m³ (Performance Check / Calibrated equipment) (X - Axis). Rows include Zero Check and three trials.

* Filter paper weighting was conducted by HOKLAS accredited laboratory.

Linear Regression of Y on X

Slope (K- factor) : 1.3000
Correlation Coefficient : 0.9900
Validity of Performance Check / Calibration Record : 27/2/2020



Operator: Henry Lau

Date: 27-Feb-19

Checked by: Chan Ka Chun

Date: 4-Mar-19




Met One Instruments, Inc.
 1600 NW Washington Blvd, Grants Pass, OR
 TEL (541) 471-7111 Fax (541) 471-7116

Certificate of Calibration

BT-645
 Particulate Monitor

Recommended calibration interval is 24 months from first day of use.

| | | | | | |
|------------------|--|--|---------|---------------|------------------|
| Unit Info | Model: | <u>BT-645</u> | 81865-1 | Firmware Rev: | <u>1.1.0</u> |
| | Serial Number: | <u>X19297</u> | | | <u>1.0.1</u> |
| | Calibrated By: | <u>R. von Krohn</u> | | Cal. Date: | <u>7/27/2018</u> |
| | Quality Inspector: | <u></u> | | Date: | <u>7-27-2018</u> |
| | Calibration Hz/ $\mu\text{g}/\text{m}^3$: | <u>5.8</u> | | | |

| | | |
|-----------------------|---------------|------------------------------|
| Final Test | | |
| Flow (2.0 L/M): | Pass | Ambient T (C) <u>24.8</u> |
| | | RH, % <u>39</u> |
| Serial Communication: | Pass | |
| BT-645 Conc.: | <u>421.14</u> | Standard Conc: <u>413.04</u> |

| Calibration Standards | | | | |
|------------------------------|---------------------|----------------|----------|---------------|
| Standards | Manufacturer | Model | SN | Cal Due |
| DMM Multimeter | Fluke | 189 Multimeter | 94060816 | 8/28/2018 |
| RH & TEMPERATURE | Met One Instruments | 083E-1-35 | R17149 | July 28, 2018 |
| BAROMETRIC PRESSURE | Met One Instruments | 092 | P22757 | April 2, 2019 |
| Primary Flow Meter | BIOS | DC-Lite | R537 | May 29, 2019 |
| LD-3B | SIBATA | LD-3B | 6X7759 | Nov 17, 2018 |
| | | | | |

The standards used for this calibration have accuracy equal to or greater than the instrument tested. These standards are on record and traceable to NIST to the extent allowed by the institute's calibration facility. Unless otherwise stated, all instruments are calibrated to meet the manufacturer's published specifications. The Calibration system complies with MIL-STD-45662A.


REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

REPORT NO. : HK1810828
PROJECT NAME : PERFORMANCE CHECK / CALIBRATION OF DUST METER
DATE OF ISSUE : 22/8/2018
CUSTOMER : LAM ENVIRONMENTAL SERVICES LTD
ADDRESS : 11/F, CENTRE POINT, 181-185 GLOUCESTER ROAD, WAN CHAI, HONG KONG

REPORT NO. : HK1810828
PROJECT ITEM NO. : HK1810828-01
PERFORMANCE CHECK / CALIBRATED EQUIPMENT TYPE : PARTICULATE MONITOR
MANUFACTURER : MET ONE INSTRUMENTS
MODEL NO. : BT 645
SERIAL NO. : X19297
EQUIPMENT NO. : ---
RECEIPT DATE : 16/8/2018
PERFORMANCE CHECK / CALIBRATION DATE : 17/8/2018

PERFORMANCE CHECK / CALIBRATION Information

| CODE | Calibration Parameter | Method Procedure | Reference Method |
|----------------|---|------------------|--|
| Dust PC/CAL | Performance Check / Calibration of Dust Meter | CAL003 | General Technical Requirements of Environmental Monitoring, Environmental Monitoring & Audit Guidelines for Development Projects in HK |

- Notes :
1. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.
 2. Performance Check / Calibration result relates to performance check / calibration item(s) as received.

Approved Signatory

:

 Wong Po Yan Pauline
 (Assistant Laboratory Manager)

Issue Date:

22/8/2018


REPORT OF PERFORMANCE CHECK / CALIBRATION

PROJECT NAME : PERFORMANCE CHECK / CALIBRATION OF DUST METER
 DATE OF ISSUE : 22/8/2018
 REPORT NO. : HK1810828

PERFORMANCE CHECK / CALIBRATED EQUIPMENT

TYPE : PARTICULATE MONITOR
 MANUFACTURER : MET ONE INSTRUMENTS
 MODEL NO. : BT 645
 SERIAL NO. : X19297
 EQUIPMENT NO. : ---
 PERFORMANCE CHECK / CALIBRATION DATE : 17/8/2018

STANDARD EQUIPMENT

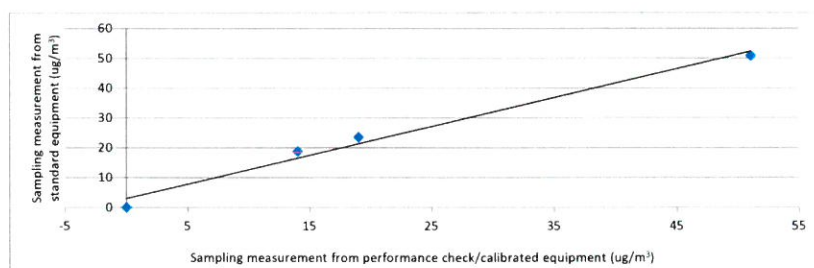
TYPE : HIGH VOLUME AIR SAMPLER
 MANUFACTURER : TISCH
 MODEL NO. : TE-5170
 EQUIPMENT REF NO. : PTL_HV002
 LAST CALIBRATION DATE : 25/7/2018

EQUIPMENT PERFORMANCE CHECK / CALIBRATION RESULTS:

| Trial no. in 1-hr period | Time | Mean Temp (°C) | Mean Pressure (hPa) | Concentration in ug/m ³ (Standard equipment) (Y - Axis) | Concentration in ug/m ³ (Performance Check / Calibrated equipment) (X - Axis) |
|--------------------------|------------------------|----------------|---------------------|--|--|
| Zero Check ¹ | 17/8/2018, 7:20:00 AM | 28 | 1005 | 0 | 0 |
| 1 | 17/8/2018, 8:24:00 PM | 28 | 1005 | 51 | 51 |
| 2 | 17/8/2018, 9:26:00 PM | 28 | 1005 | 24 | 19 |
| 3 | 17/8/2018, 10:28:00 PM | 28 | 1005 | 19 | 14 |

Linear Regression of Y on X

Slope (K- factor) : 1.0000
 Correlation Coefficient : 0.9921
 Validity of Performance Check / Calibration Record : 17/8/2019



- Notes : 1. Zero check conducted as per CAL003 SOP and manufacturer's manual as appropriate.
 2. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.
 3. Performance Check / Calibration result relates to performance check / calibration item(s) as received.

Operator: Lau, Natalie Signature: Date: 17/8/2018

Checked by: Wong Po Yan, Pauline Signature: Date: 22/8/2018



Met One Instruments, Inc.
 1600 NW Washington Blvd, Grants Pass, OR
 TEL (541) 471-7111 Fax (541) 471-7116

Certificate of Calibration

BT-645
 Particulate Monitor

Recommended calibration interval is 24 months from first day of use.

Unit Info

Model: BT-645 81865-1 Firmware Rev: 1.1.0

Serial Number: X19299 1.0.1

Calibrated By: R. von Krohn Cal. Date: 7/27/2018

Quality Inspector: *R. von Krohn* Date: 7-27-2018

Calibration Hz/ $\mu\text{g}/\text{m}^3$: 5.81

Final Test

Flow (2.0 L/M): Pass Ambient T (C) 24.8

RH, % 39

Serial Communication: Pass

BT-645 Conc.: 413.52 Standard Conc: 412.22

Calibration Standards

| Standards | Manufacturer | Model | SN | Cal Due |
|---------------------|---------------------|----------------|----------|---------------|
| DMM Multimeter | Fluke | 189 Multimeter | 94060816 | 8/28/2018 |
| RH & TEMPERATURE | Met One Instruments | 083E-1-35 | R17149 | July 28, 2018 |
| BAROMETRIC PRESSURE | Met One Instruments | 092 | P22757 | April 2, 2019 |
| Primary Flow Meter | BIOS | DC-Lite | R537 | May 29, 2019 |
| LD-3B | SIBATA | LD-3B | 6X7759 | Nov 17, 2018 |
| | | | | |

The standards used for this calibration have accuracy equal to or greater than the instrument tested. These standards are on record and traceable to NIST to the extent allowed by the institute's calibration facility. Unless otherwise stated, all instruments are calibrated to meet the manufacturer's published specifications. The Calibration system complies with MIL-STD-45662A.



Portable Dust Meter Performance Check Record

Portable Dust Meter

Type : Particulate Monitor
Manufacturer : MET ONE INSTRUMENTS
Model Number : BT-645
Serial Number : X19299
Performance Check Date : 10-Jan-19

Standard Equipment

Type : High Volume Sampler
Manufacturer : TISCH
Model Number : TE-5170
Equipment Number : HVS018
Last Calibration Date : 4-Dec-18

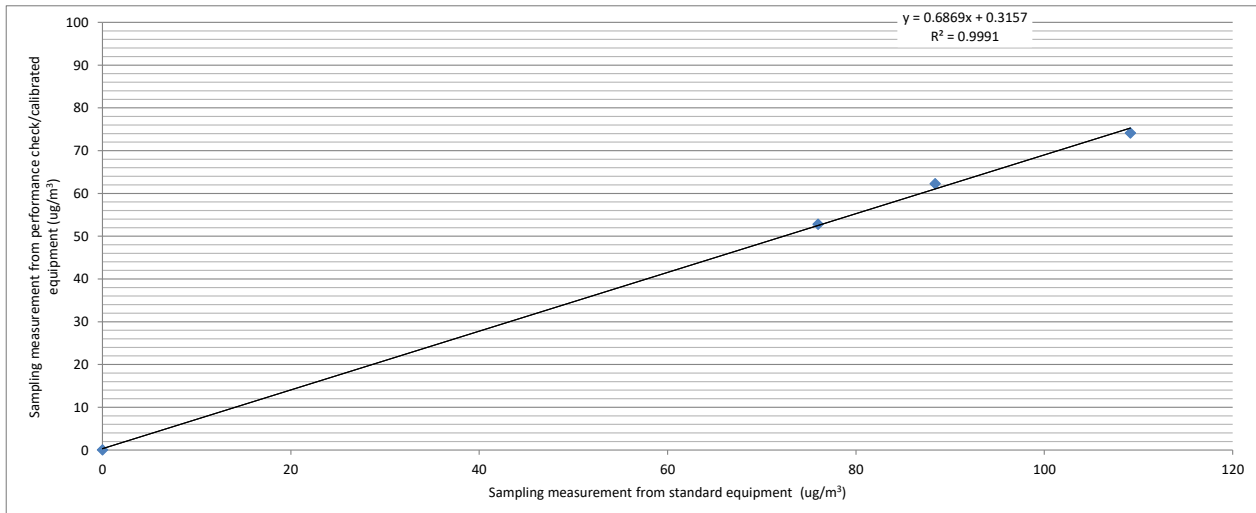
Portable Dust Meter Performance Check Results

Table with 6 columns: Trial no. in 1-hr period, Time, Mean Temp (°C), Mean Pressure (hPa), Concentration in ug/m³ (Standard equipment), Concentration in ug/m³ (Performance Check / Calibrated equipment). Rows include Zero Check and trials 1, 2, 3.

* Filter paper weighting was conducted by HOKLAS accredited laboratory.

Linear Regression of Y on X

Slope (K- factor) : 1.5000
Correlation Coefficient : 0.9995
Validity of Performance Check / Calibration Record : 10/1/2020



Operator: Henry Lau
Checked by: Chan Ka Chun

Date: 14/1/19
Date: 14/1/19



1600 Washington Blvd
 Grants Pass, OR 97526
 (541) 471-7111
 (541) 471-7116 (Fax)
 Service@metone.com

Met One
 Instruments

Calibration Certificate

The calibration results on this report certify that this instrument complies with the product specifications at the time of calibration. Calibration was performed according to accepted industry methods using equipment, procedures, and standards that are traceable to NIST and ISO.

Recommended calibration interval is 12 months from the first day of use.

Instrument Model# Aerocet 831 Instrument Serial# R14332
 Date of Calibration 1/10/2019 Sensor # 14332
 Calibration Technician Darleen Best AT₂₅ Quality Check

Temperature 23 °C Relative Humidity 38 %

Test Procedure: **Aerocet 831-6100**

| PSL Size (µm) | Test Results | Test Spec. | Lot# NIST | Expiration |
|---------------|--------------|------------|-----------|------------|
| 0.3 | Pass | ± 10% | 183039 | 03/31/2020 |
| 0.5 | Pass | ± 10% | 180556 | 02/28/2020 |
| 1.0 | Pass | ± 10% | 169240 | 5/31/2019 |
| 2.5 | Pass | ± 10% | REF | NA |
| 4.0 | Pass | ± 10% | REF | NA |
| 5.0 | Pass | ± 10% | REF | NA |
| 7.0 | Pass | ± 10% | REF | NA |
| 10.0 | Pass | ± 10% | REF | NA |

| Standards | Model | SN | Cal Due |
|------------------|----------|----------|-----------|
| Particle Counter | GT-526 | M1762 | 1/30/2019 |
| Flowmeter | DCL-M | 103751 | 1/29/2019 |
| DMM | 289 | 27720071 | 6/29/2019 |
| RH/TEMP SENSOR | 083E-1-6 | R20313 | 9/18/2019 |

This calibration certificate shall not be reproduced except in full, without the written approval of Met One Instruments Inc.



Portable Dust Meter Performance Check Record

Portable Dust Meter

Type : Particulate Monitor
 Manufacturer : MET ONE INSTRUMENTS
 Model Number : 831
 Serial Number : R14332
 Performance Check Date : 27-Feb-19, 14-Mar-19

Standard Equipment

Type : High Volume Sampler
 Manufacturer : TISCH
 Model Number : TE-5170
 Equipment Number : HVS018
 Last Calibration Date : 4-Feb-19

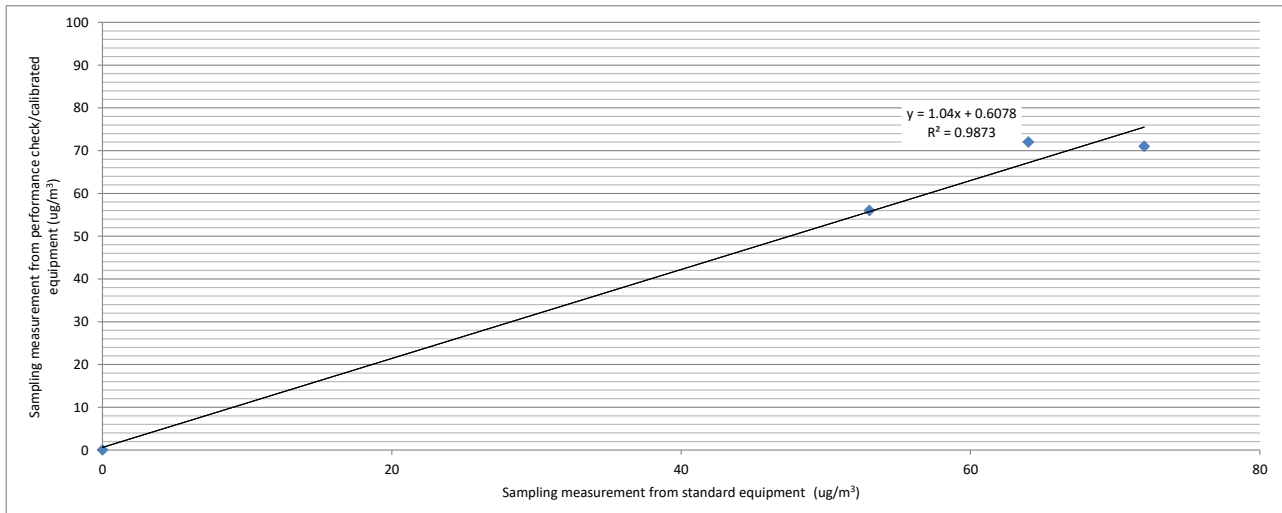
Portable Dust Meter Performance Check Results

| Trial no. in 1-hr period | Time | Mean Pressure (hPa) | Mean Temp (°C) | Concentration in ug/m ³ (Standard equipment) (Y - Axis) | Concentration in ug/m ³ (Performance Check / Calibrated equipment) (X - Axis) |
|--------------------------|---------------|---------------------|----------------|--|--|
| Zero Check | 27/2/19 | 1016 | 24 | 0 | 0 |
| 1 | 27/2/19 09:52 | 1016 | 24 | 53 | 56 |
| 2 | 14/3/19 09:32 | 1018 | 22 | 64 | 72 |
| 3 | 27/2/19 11:00 | 1016 | 24 | 72 | 71 |

* Filter paper weighting was conducted by HOKLAS accredited laboratory.

Linear Regression of Y on X

Slope (K- factor) : 1.0000
 Correlation Coefficient : 0.9936
 Validity of Performance Check / Calibration Record : 13/3/2020



Operator: Henry Lau Date: 14-Mar-19
 Checked by: Chan Ka Chun Date: 21-Mar-19

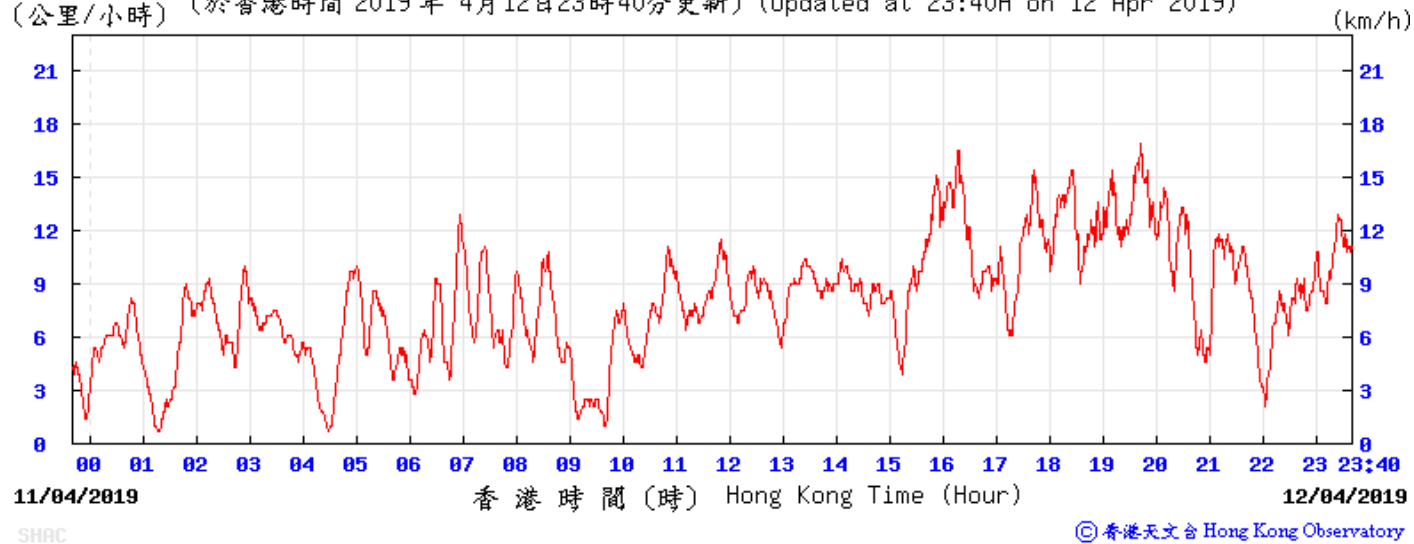


Appendix 4.3

Wind data extracted from Sha Tin HKO Automatic Weather Station

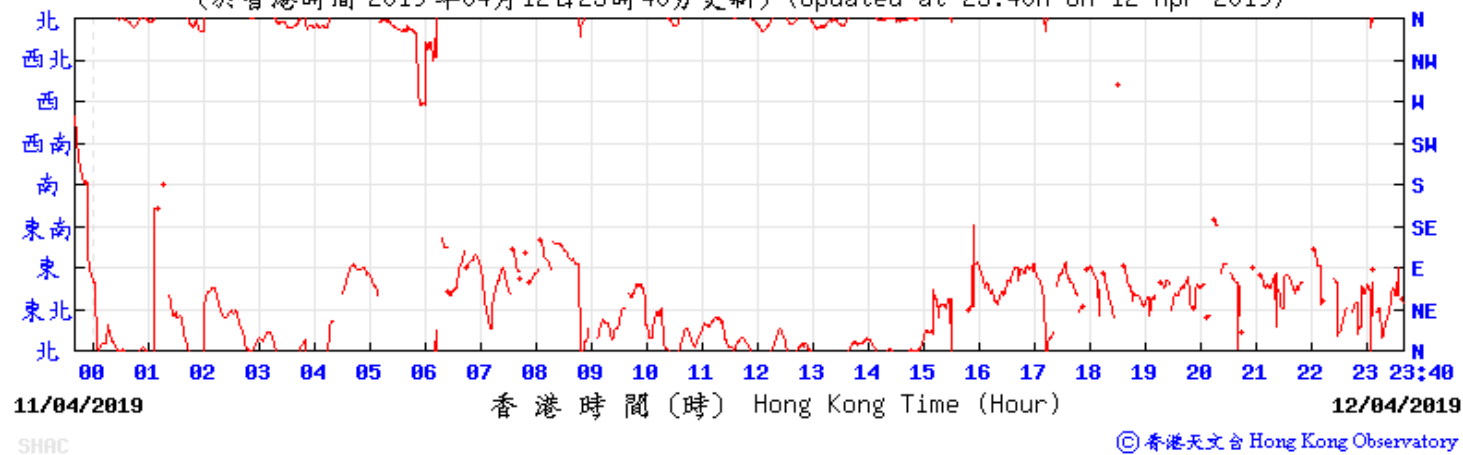
Wind Speed:

(公里/小時) (於香港時間 2019 年 4 月 12 日 23 時 40 分更新) (Updated at 23:40H on 12 Apr 2019)



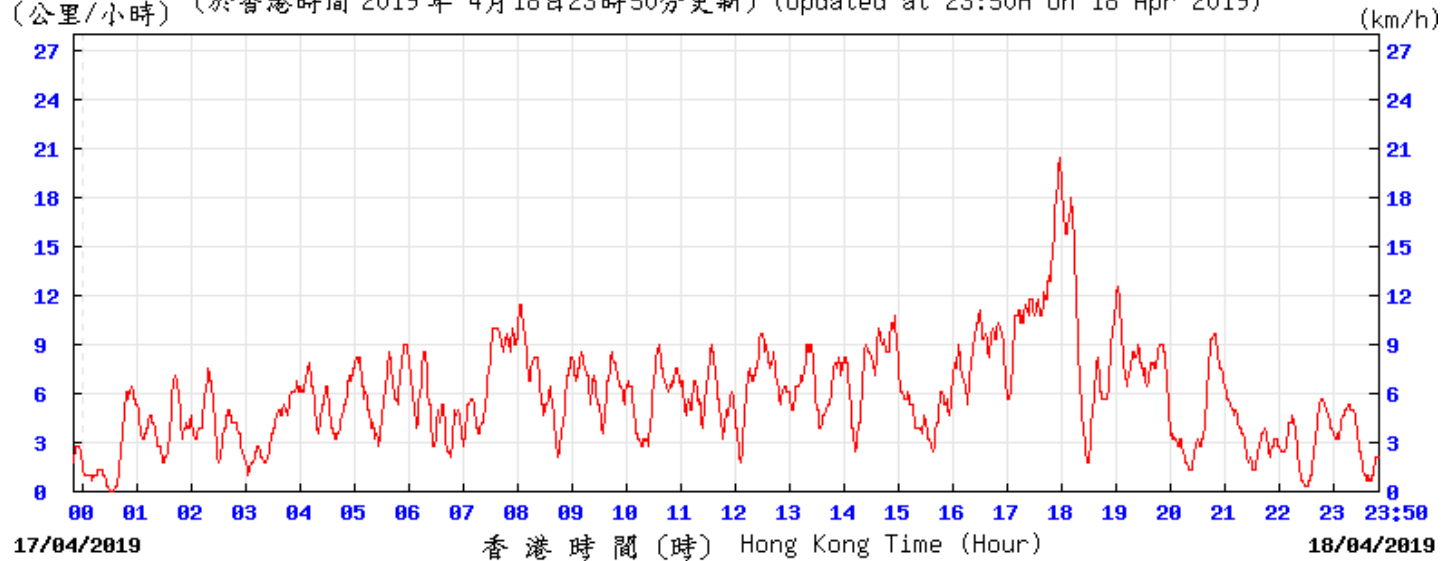
Wind Direction:

(於香港時間 2019 年 04 月 12 日 23 時 40 分更新) (Updated at 23:40H on 12 Apr 2019)



Wind Speed:

(公里/小時) (於香港時間 2019 年 4月18日23時50分更新) (Updated at 23:50H on 18 Apr 2019)

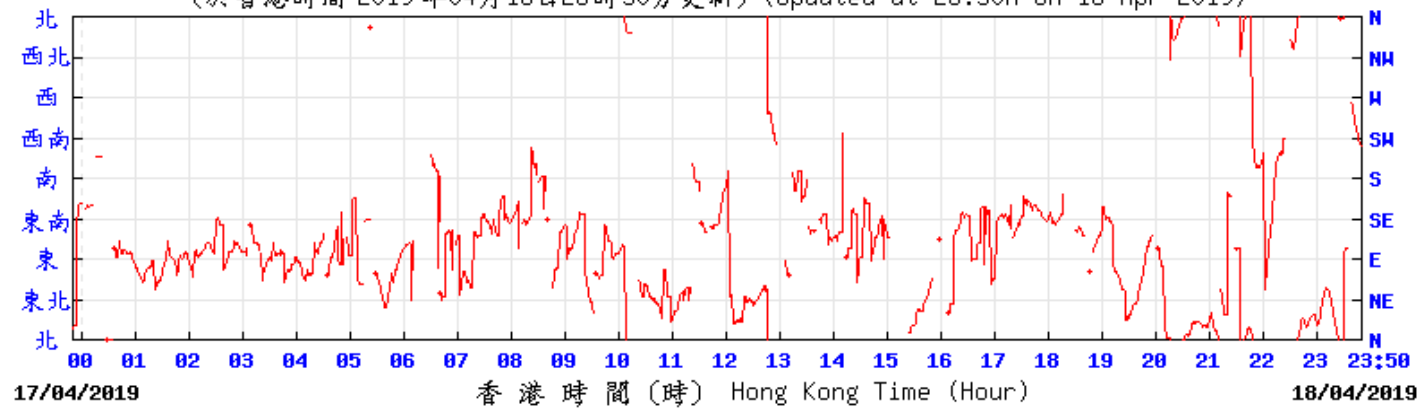


SHRC

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Wind Direction:

(於香港時間 2019 年04月18日23時50分更新) (Updated at 23:50H on 18 Apr 2019)

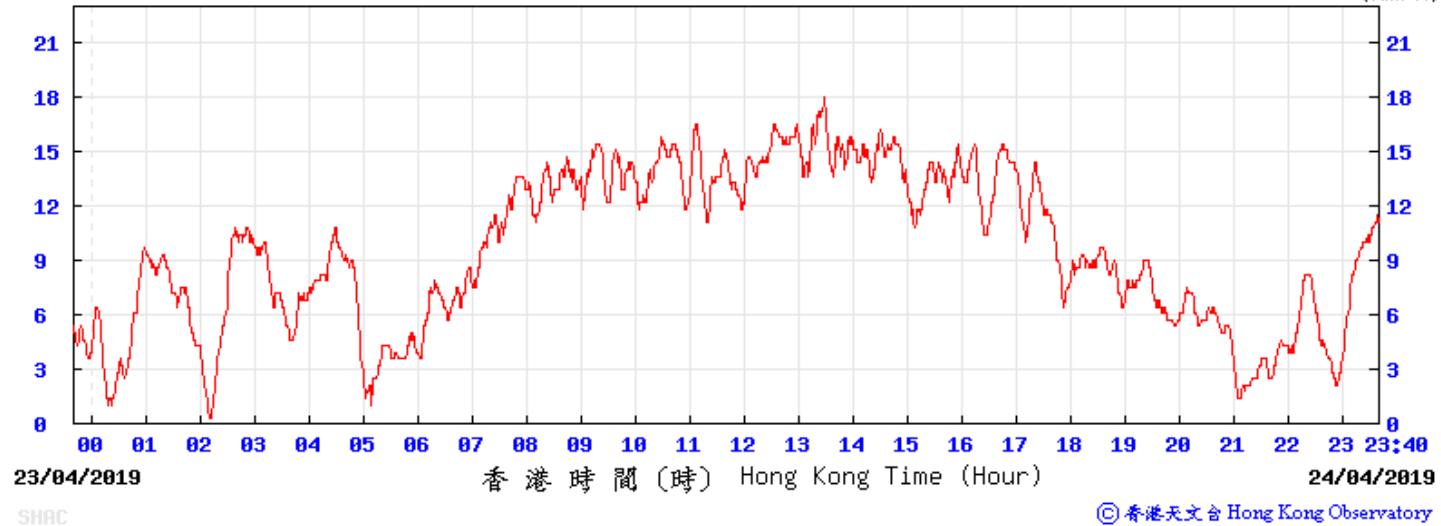


SHRC

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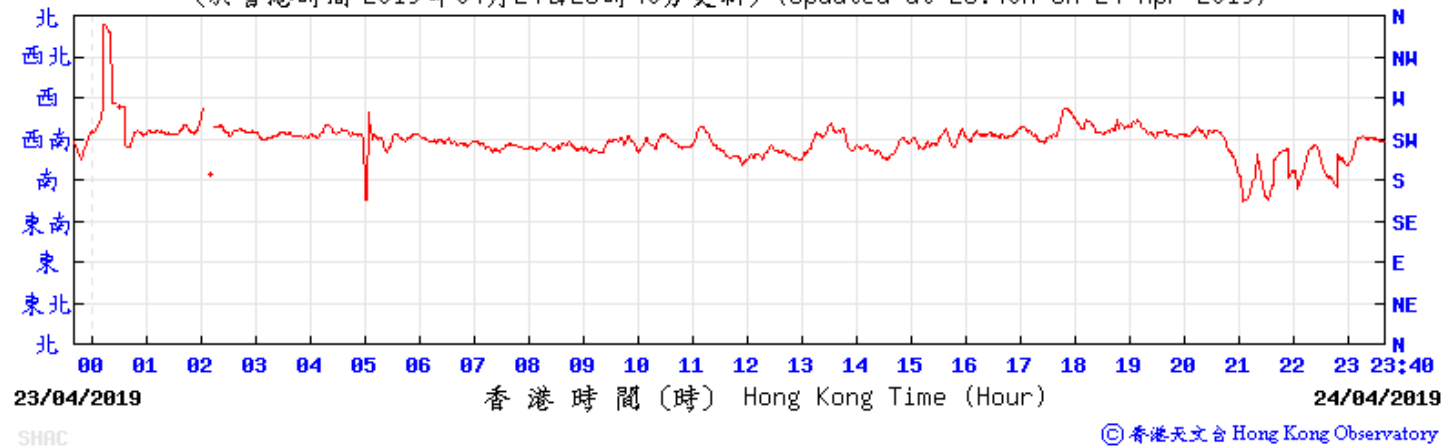
Wind Speed:

(公里/小時) (於香港時間 2019 年 4月24日23時40分更新) (Updated at 23:40H on 24 Apr 2019) (km/h)



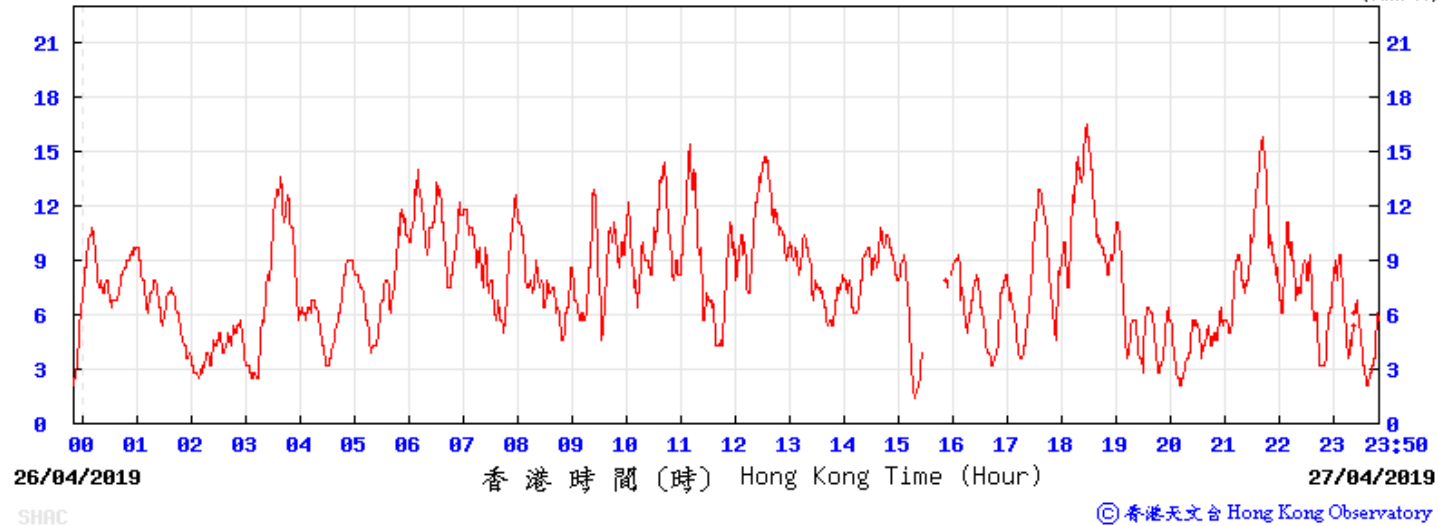
Wind Direction:

(於香港時間 2019 年04月24日23時40分更新) (Updated at 23:40H on 24 Apr 2019)



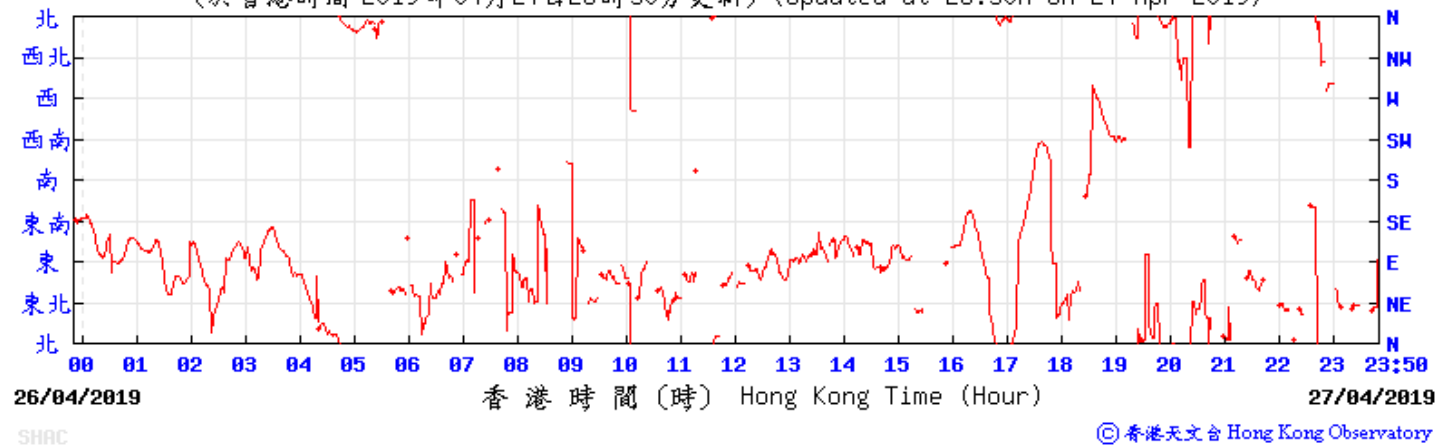
Wind Speed:

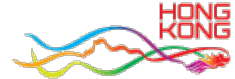
(公里/小時) (於香港時間 2019 年 4月27日23時50分更新) (Updated at 23:50H on 27 Apr 2019) (km/h)



Wind Direction:

(於香港時間 2019 年04月27日23時50分更新) (Updated at 23:50H on 27 Apr 2019)





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Daily Extract of Meteorological Observations , April 2019

Year Month Go

| Day | Hong Kong Observatory | | | | | | | |
|---------------------|-----------------------|-----------------------------|---------------|-----------------------------|-------------------------|----------------------------|--------------------------|---------------------|
| | Mean Pressure (hPa) | Air Temperature | | | Mean Dew Point (deg. C) | Mean Relative Humidity (%) | Mean Amount of Cloud (%) | Total Rainfall (mm) |
| | | Absolute Daily Max (deg. C) | Mean (deg. C) | Absolute Daily Min (deg. C) | | | | |
| 01 | 1019.3 | 21.6 | 20.3 | 19.7 | 16.8 | 81 | 91 | Trace |
| 02 | 1018.2 | 23.0 | 20.7 | 18.9 | 16.3 | 76 | 89 | Trace |
| 03 | 1016.9 | 25.7 | 22.8 | 20.7 | 19.0 | 80 | 85 | Trace |
| 04 | 1016.7 | 23.8 | 21.7 | 20.4 | 18.6 | 83 | 86 | Trace |
| 05 | 1014.5 | 27.4 | 24.0 | 20.9 | 19.5 | 76 | 37 | 0.0 |
| 06 | 1013.0 | 28.1 | 25.1 | 22.4 | 21.0 | 79 | 27 | 0.0 |
| 07 | 1012.5 | 28.0 | 25.7 | 23.7 | 21.9 | 80 | 48 | 0.0 |
| 08 | 1011.6 | 29.9 | 26.7 | 25.1 | 23.0 | 80 | 80 | 0.0 |
| 09 | 1011.1 | 28.9 | 26.6 | 25.5 | 23.1 | 81 | 79 | 0.0 |
| 10 | 1010.9 | 30.1 | 27.1 | 25.3 | 23.2 | 80 | 79 | 0.0 |
| 11 | 1010.0 | 29.9 | 27.3 | 25.3 | 23.7 | 81 | 84 | 0.7 |
| 12 | 1013.3 | 25.2 | 22.3 | 21.0 | 20.3 | 89 | 91 | 6.1 |
| 13 | 1014.3 | 22.3 | 21.2 | 20.3 | 19.9 | 92 | 98 | 3.8 |
| 14 | 1013.8 | 24.4 | 22.7 | 21.9 | 20.9 | 90 | 92 | 10.4 |
| 15 | 1014.4 | 23.1 | 22.1 | 20.9 | 19.4 | 85 | 91 | 1.1 |
| 16 | 1012.6 | 23.6 | 21.2 | 19.5 | 19.6 | 91 | 87 | 9.2 |
| 17 | 1012.2 | 26.1 | 23.5 | 21.5 | 20.7 | 85 | 77 | 0.0 |
| 18 | 1010.0 | 25.0 | 24.0 | 23.0 | 22.1 | 90 | 91 | 6.7 |
| 19 | 1007.7 | 28.6 | 23.7 | 21.3 | 22.3 | 93 | 90 | 75.8 |
| 20 | 1007.2 | 26.2 | 23.3 | 21.9 | 22.5 | 95 | 93 | 43.6 |
| 21 | 1008.0 | 30.1 | 26.2 | 23.2 | 24.0 | 88 | 81 | 0.3 |
| 22 | 1009.3 | 30.1 | 27.5 | 25.6 | 24.5 | 84 | 72 | 0.0 |
| 23 | 1010.4 | 31.0 | 28.0 | 26.0 | 24.3 | 81 | 58 | 0.0 |
| 24 | 1009.9 | 31.2 | 28.0 | 26.2 | 23.7 | 78 | 57 | 0.0 |
| 25 | 1009.3 | 31.1 | 28.5 | 26.4 | 24.0 | 77 | 39 | 0.0 |
| 26 | 1010.4 | 31.5 | 28.4 | 26.2 | 24.7 | 81 | 58 | 0.9 |
| 27 | 1012.8 | 26.4 | 24.9 | 22.3 | 22.4 | 86 | 91 | 16.6 |
| 28 | 1013.2 | 26.9 | 24.3 | 22.7 | 22.4 | 89 | 85 | 3.1 |
| 29 | 1010.9 | 29.2 | 26.4 | 24.7 | 23.8 | 86 | 71 | 0.0 |
| 30 | 1008.0 | 28.8 | 26.7 | 25.3 | 23.3 | 82 | 83 | 7.5 |
| Mean/Total | 1012.1 | 27.2 | 24.7 | 22.9 | 21.7 | 84 | 76 | 185.8 |
| Normal [§] | 1012.9 | 25.0 | 22.6 | 20.8 | 19.4 | 83 | 81 | 174.7 |

Trace means rainfall less than 0.05 mm

§ 1981-2010 Climatological Normal



Appendix 5.1

Monitoring Schedules for Reporting Month and Next Month



Contract No. SPW 25/2018
Environmental Team for Relocation of Sha Tin Sewage
Treatment Works to Caverns –Site Preparation and Access Tunnel Construction
Tentative Impact Air Quality and Noise Monitoring Schedule
April 2019

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--------|--------------------|---------|--|---|-----------------------------------|-------------------------------|
| 31-Mar | 1-Apr | 2-Apr | 3-Apr | 4-Apr | 5-Apr | 6-Apr |
| 7-Apr | 8-Apr | 9-Apr | 10-Apr | 11-Apr | 12-Apr AQM (AM1, AM2) | 13-Apr NM (CM4) |
| 14-Apr | 15-Apr NM (CM4) | 16-Apr | 17-Apr | 18-Apr AQM (AM1, AM2, AM5) NM (CM5) | 19-Apr | 20-Apr |
| 21-Apr | 22-Apr | 23-Apr | 24-Apr AQM (AM1, AM2, AM5) NM (CM4, CM5) | 25-Apr | 26-Apr | 27-Apr AQM (AM1, AM2, AM5) |
| 28-Apr | 29-Apr | 30-Apr | 1-May | 2-May NM (CM1, CM3, CM4, CM5) | 3-May AQM (AM1, AM2, AM4, AM5) | 4-May |

Remark:

1. AQM: Air Quality Monitoring

NM: Noise monitoring is scheduled at the beginning of each week



Contract No. SPW 25/2018
Environmental Team for Relocation of Sha Tin Sewage
Treatment Works to Caverns –Site Preparation and Access Tunnel Construction
Tentative Impact Air Quality and Noise Monitoring Schedule
May 2019

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--------|------------------------------------|------------------------------------|------------------------------------|-----------------------------------|-----------------------------------|----------|
| 26-Apr | 29-Apr | 30-Apr | 1-May | 2-May | 3-May AQM (AM1, AM2, AM4, AM5) | 4-May |
| | | | | NM (CM1, CM3, CM4, CM5) | | |
| 5-May | 6-May | 7-May | 8-May | 9-May AQM (AM1, AM2, AM4, AM5) | 10-May | 11-May |
| | NM (CM1, CM3, CM4, CM5) | | | | | |
| 12-May | 13-May | 14-May | 15-May AQM (AM1, AM2, AM4, AM5) | 16-May | 17-May | 18-May |
| | | | NM (CM1, CM3, CM4, CM5) | | | |
| 19-May | 20-May | 21-May AQM (AM1, AM2, AM4, AM5) | 22-May | 23-May | 24-May | 25-May |
| | | NM (CM1, CM3, CM4, CM5) | | | | |
| 26-May | 27-May AQM (AM1, AM2, AM4, AM5) | 28-May | 29-May | 30-May | 31-May | 1-Jun |
| | NM (CM1, CM3, CM4, CM5) | | | | | |

Remark:

1. AQM: Air Quality Monitoring

NM: Noise monitoring is scheduled at the beginning of each week



Appendix 5.2

Air Quality Monitoring Results and Graphical Presentations



Report on 1-hour TSP monitoring at AM1 - Ah Kung Kok Fishermen Village

Action Level ($\mu\text{g}/\text{m}^3$) - 294
Limit Level ($\mu\text{g}/\text{m}^3$) - 500

| Date | Weather Condition | Time | Mass Concentration ($\mu\text{g}/\text{m}^3$) |
|-----------|-------------------|-------|---|
| 12-Apr-19 | Cloudy | 09:52 | 19 |
| 12-Apr-19 | Cloudy | 10:53 | 20 |
| 12-Apr-19 | Cloudy | 13:00 | 30 |
| 18-Apr-19 | Cloudy | 07:55 | 26 |
| 18-Apr-19 | Cloudy | 08:56 | 24 |
| 18-Apr-19 | Cloudy | 09:57 | 34 |
| 24-Apr-19 | Cloudy | 08:35 | 12 |
| 24-Apr-19 | Cloudy | 09:36 | 7 |
| 24-Apr-19 | Cloudy | 10:37 | 7 |
| 27-Apr-19 | Cloudy | 08:00 | 29 |
| 27-Apr-19 | Cloudy | 09:01 | 30 |
| 27-Apr-19 | Cloudy | 10:02 | 29 |



Report on 1-hour TSP monitoring at AM2 - Block H, Kam Tai Court

Action Level ($\mu\text{g}/\text{m}^3$) - 325
Limit Level ($\mu\text{g}/\text{m}^3$) - 500

| Date | Weather Condition | Time | Mass Concentration ($\mu\text{g}/\text{m}^3$) |
|-----------|-------------------|-------|---|
| 12-Apr-19 | Cloudy | 09:23 | 7 |
| 12-Apr-19 | Cloudy | 10:24 | 8 |
| 12-Apr-19 | Cloudy | 13:00 | 12 |
| 18-Apr-19 | Cloudy | 13:00 | 46 |
| 18-Apr-19 | Cloudy | 14:01 | 43 |
| 18-Apr-19 | Cloudy | 15:02 | 44 |
| 24-Apr-19 | Cloudy | 13:00 | 6 |
| 24-Apr-19 | Cloudy | 14:01 | 7 |
| 24-Apr-19 | Cloudy | 15:02 | 6 |
| 27-Apr-19 | Cloudy | 08:22 | 65 |
| 27-Apr-19 | Cloudy | 09:23 | 102 |
| 27-Apr-19 | Cloudy | 10:24 | 103 |

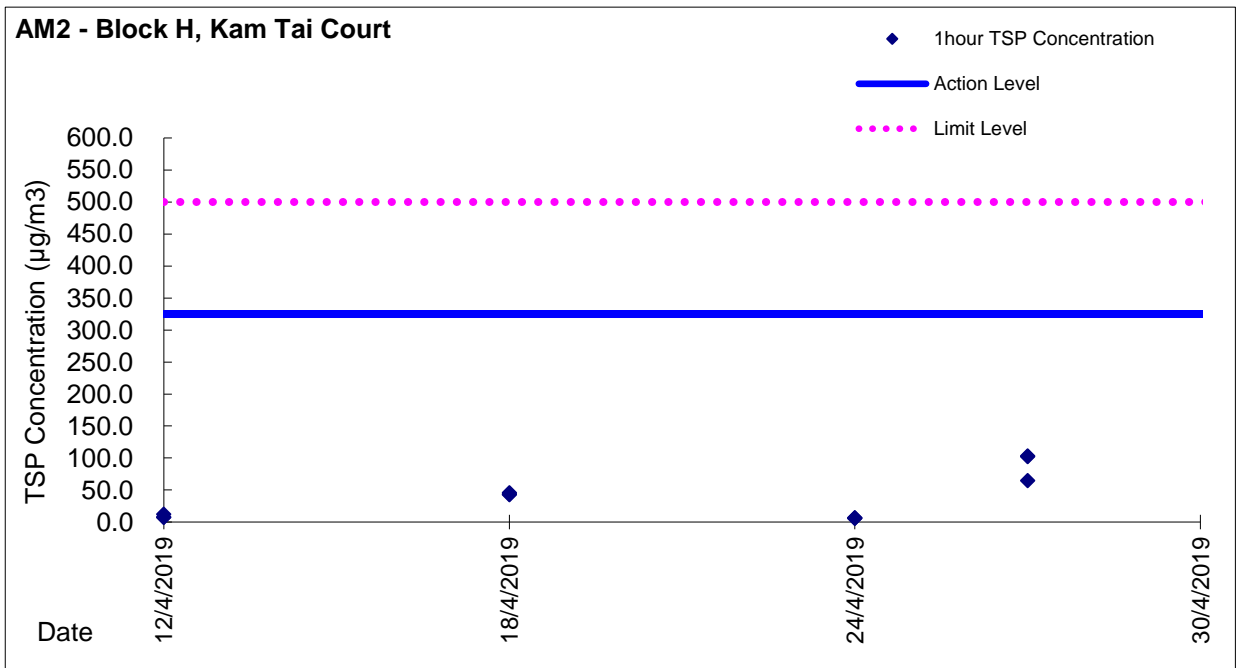
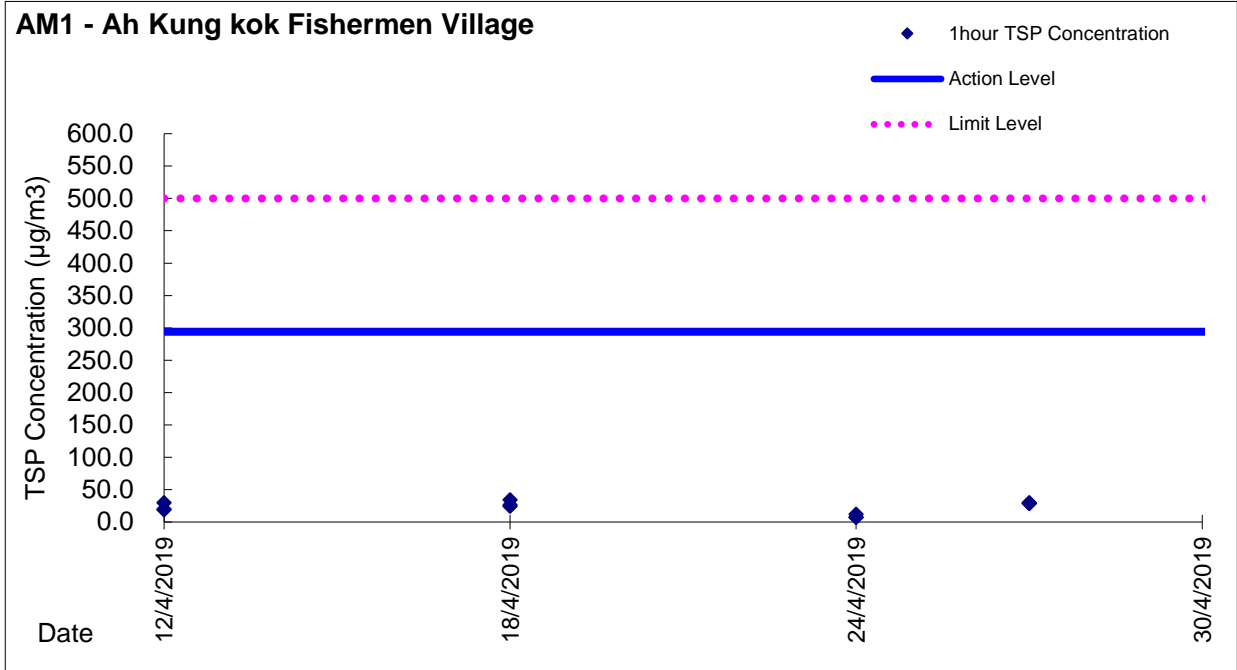
Report on 1-hour TSP monitoring at AM5 - The NAAC Harmony Manor

Action Level ($\mu\text{g}/\text{m}^3$) - 349
 Limit Level ($\mu\text{g}/\text{m}^3$) - 500

| Date | Weather Condition | Time | Mass Concentration ($\mu\text{g}/\text{m}^3$) |
|-----------|-------------------|-------|---|
| 18-Apr-19 | Cloudy | 08:07 | 26 |
| 18-Apr-19 | Cloudy | 09:08 | 28 |
| 18-Apr-19 | Cloudy | 10:09 | 39 |
| 24-Apr-19 | Cloudy | 08:31 | 14 |
| 24-Apr-19 | Cloudy | 09:32 | 11 |
| 24-Apr-19 | Cloudy | 10:33 | 11 |
| 27-Apr-19 | Cloudy | 08:00 | 30 |
| 27-Apr-19 | Cloudy | 09:01 | 28 |
| 27-Apr-19 | Cloudy | 10:02 | 27 |

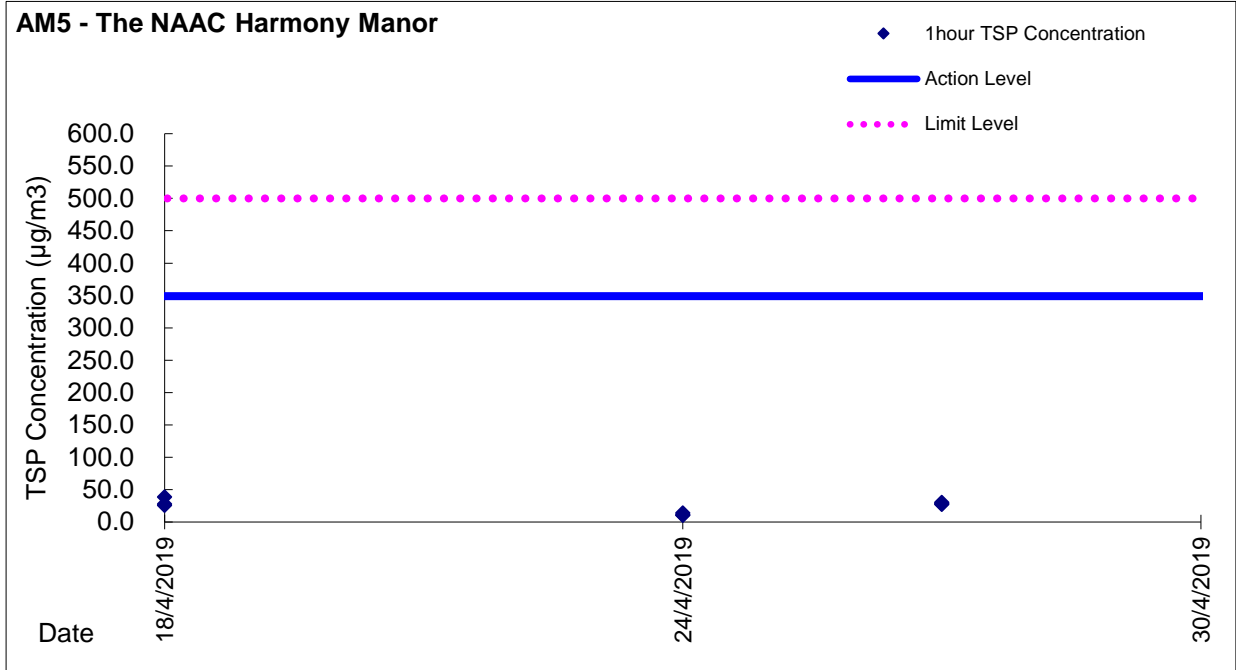


Graphic Presentation of TSP Result





Graphic Presentation of TSP Result





Appendix 5.3

Noise Monitoring Results and Graphical Presentations



Noise Monitoring Result

Day Time (0700 - 1900hrs on normal weekdays)

Location: CM4 - G/F, Ah Kung Kok Fishermen Village

| Date | Time | Weather | Wind Speed (m/s) | Measurement Noise Level | | | Limit Level |
|------------|-------|---------|---------------------|-------------------------|------|------|-------------|
| | | | | Leq | L10 | L90 | Leq |
| | | | | Unit: dB(A), (30min) | | | |
| 13/04/2019 | 09:16 | Fine | 0.4 | 62.4 | 64.0 | 60.4 | 75 |
| 15/04/2019 | 08:30 | Cloudy | 0.6 | 62.7 | 64.0 | 60.0 | 75 |
| 24/04/2019 | 10:36 | Cloudy | 0.2 | 61.2 | 63.1 | 58.0 | 75 |

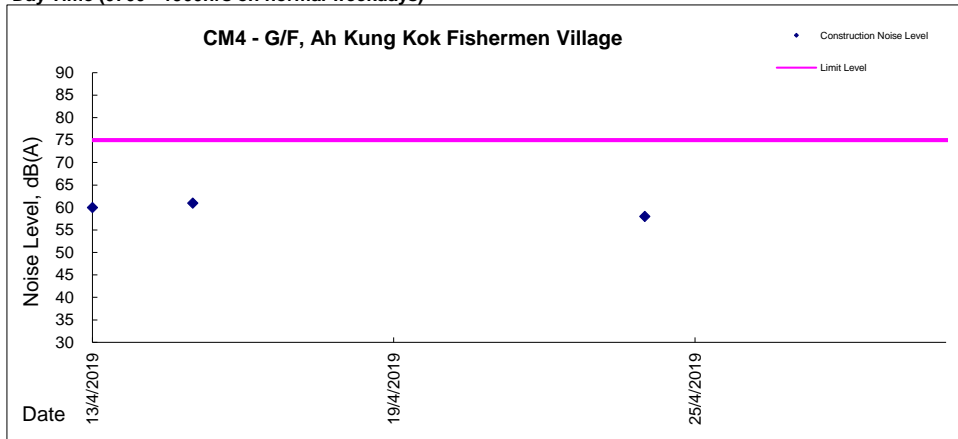
Location: CM5 - R/F, The Neighbourhood Advice-Action Council Harmony Manor

| Date | Time | Weather | Wind Speed (m/s) | Measurement Noise Level | | | Limit Level |
|------------|-------|---------|---------------------|-------------------------|------|------|-------------|
| | | | | Leq | L10 | L90 | Leq |
| | | | | Unit: dB(A), (30min) | | | |
| 18/04/2019 | 9:11 | Cloudy | 0.8 | 56.6 | 57.0 | 55.5 | 75 |
| 24/04/2019 | 09:42 | Cloudy | 0.5 | 58.1 | 59.3 | 56.4 | 75 |

* Free field correction (Additional 3dB(A)) was made on CM4 measurement result

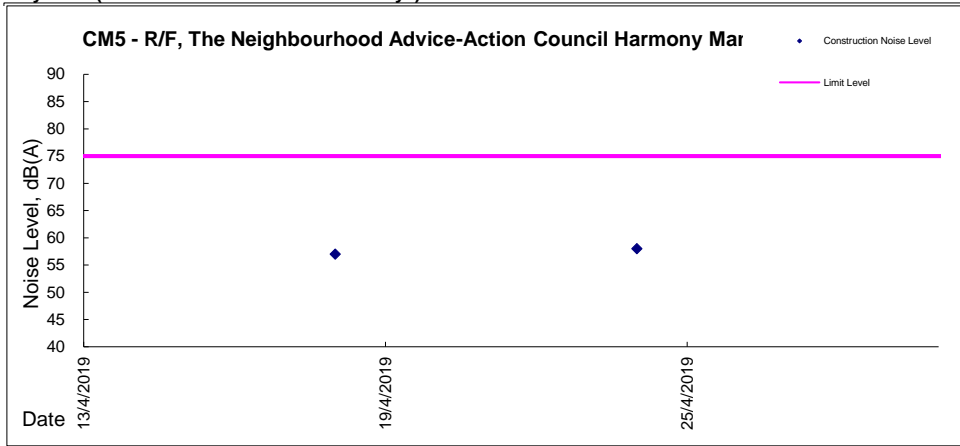


Graphic Presentation of Noise Monitoring Result
Day Time (0700 - 1900hrs on normal weekdays)





Graphic Presentation of Noise Monitoring Result
Day Time (0700 - 1900hrs on normal weekdays)





Appendix 5.4

Monthly Summary Waste Flow Table

Monthly Summary Waste Flow Table

Name of Department: Drainage Services Department

Contract No.: DC/2018/05

Monthly Summary Waste Flow Table for April 2019 [to be submitted not later than the 15th day of each month following reporting month]

(All quantities shall be rounded off to 3 decimal places.)

| Month | Actual Quantities of Inert C&D Materials Generated Monthly | | | | | Actual Quantities of C&D Wastes Generated Monthly | | | | |
|-----------|--|--|----------------------------------|------------------------------------|-----------------------------------|---|-------------------------------------|---------------------------------|-----------------------|---|
| | (a)=(b)+(c)+(d)+(e) Total Quantity Generated | (b) Broken Concrete (see Note 3) | (c) Reused in the Contract | (d) Reused in other Projects | (e) Disposed as Public Fill | (f) Metals | (g) Paper/cardboard packaging | (h) Plastics (see Note 2) | (i) Chemical Waste | (j) Others, e.g. general refuse disposed at Landfill |
| | (in '000m ³) | (in '000m ³) | (in '000m ³) | (in '000m ³) | (in '000m ³) | (in '000kg) | (in '000kg) | (in '000kg) | (in '000kg) | (in '000m ³) |
| Feb-19 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Mar-19 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Apr-19 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| Sub-total | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| Total | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

- Notes:
- (1) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.
 - (2) Plastics refer to plastics bottles/containers, plastic sheets/foam from packaging material.
 - (3) Broken concrete for recycling into aggregates.
 - (4) If necessary, use the conversion factor: 1 full load of dumping truck being equivalent to 5 m³ by volume.



Appendix 6.1

Event Action Plans



Event and Action Plan for Construction Air Quality

| EVENT | ACTION | | | |
|--|--|--|---|---|
| | ET | IEC | ER | CONTRACTOR |
| ACTION LEVEL | | | | |
| 1. Action level being exceedance by one sampling | 1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform Contractor, IEC and ER; 3. Repeat measurement to confirm finding; and 4. Increase monitoring frequency to daily. | 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; and 3. Review and advise the ET and ER on the effectiveness of the proposed remedial measures. | 1. Notify Contractor. | 1. Identify source(s), investigate the causes of exceedance and propose remedial measures; 2. Implement remedial measures; and 3. Amend working methods agreed with the ER as appropriate |
| 2. Action level being exceeded by two or more consecutive sampling | 1. Identify source; 2. Inform Contractor, IEC and ER; 3. Advise the Contractor and ER on the effectiveness of the proposed remedial measures; 4. Repeat measurements to confirm findings; 5. Increase monitoring frequency to daily; 6. Discuss with IEC and Contractor on remedial actions required; 7. If exceedance continues, arrange meeting with Contractor, IEC and ER; 8. If exceedance stops, cease additional monitoring. | 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET, ER and Contractor on possible remedial measures; 4. Advise the ET and ER on the effectiveness of the proposed remedial measures; and 5. Supervise Implementation of remedial measures. | 1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented. 4. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated. | 1. Identify source and investigate the causes of exceedance; 2. Submit proposals for remedial measures to the ER with a copy to ET and IEC within three working days of notification; 3. Implement the agreed proposals; and 4. Amend proposal as appropriate. |



Event and Action Plan for Construction Air Quality (Con't)

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



Event and Action Plan for Construction Noise

| EVENT | ACTION | | | |
|--------------|--|--|--|---|
| | ET | IEC | ER | CONTRACTOR |
| Action Level | <ol style="list-style-type: none"> 1. Notify IEC and Contractor; 2. Carry out investigation; 3. Report the results of investigation to the IEC, ER and Contractor; 4. Discuss with the Contractor and formulate remedial measures; and 5. Increase monitoring frequency to check mitigation effectiveness. | <ol style="list-style-type: none"> 1. Review the analysed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; and 3. Supervise the implementation of remedial measures | <ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analyzed noise problem; and 4. Ensure remedial measures are properly implemented. | <ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IEC; and 2. Implement noise mitigation proposals. |
| Limit Level | <ol style="list-style-type: none"> 1. Identify source; 2. Inform IEC, ER, EPD and Contractor; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Inform IEC, ER and EPD the causes and actions taken for the exceedances; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring. | <ol style="list-style-type: none"> 1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; and 3. Supervise the implementation of remedial measures. | <ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures properly implemented; and 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated. | <ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC and ER within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposal if problem still not under control; and 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated. |



Appendix 6.2

Summary for Notification of Exceedance



| Ref no. | Date | Location | Parameters (Unit) | Measured | Action Level | Limit Level | Follow-up action |
|---------|------|----------|-------------------|----------|--------------|-------------|------------------|
| - | - | - | - | - | - | - | - |



Appendix 8.1

Complaint Log



Environmental Complaints Log

| Complaint Log No. | Date of Complaint | Received From and Received By | Location of Complainant | Nature of Complaint | Outcome | Status |
|--------------------------|--------------------------|--------------------------------------|--------------------------------|----------------------------|----------------|---------------|
| -- | -- | -- | -- | -- | -- | -- |



Appendix 9.1

Construction Programme of Individual Contracts

| Activity ID | Activity Name | Original Duration | Start | Finish | Total Float | Late Start | Late Finish | Time Risk Allowances | 2019 | | | | | | |
|---|--|-------------------|-------------|-------------|-------------|------------|-------------|----------------------|---------------------------------------|-----|-----|-----|-----|-----|--|
| | | | | | | | | | Mar | Apr | May | Jun | Jul | Aug | |
| Relocation of Sha Tin Sewage Treatment Works to Caverns - Site Preparation & Access Tunnel | | | | | | | | | | | | | | | |
| Contract Particular | | | | | | | | | | | | | | | |
| General | | | | | | | | | | | | | | | |
| General | | | | | | | | | | | | | | | |
| A10000 | Contract Date | 0 | 18-Feb-19 A | | | 08-Apr-19 | | 0 | | | | | | | |
| A10010 | Start Date | 0 | 28-Feb-19 A | | | 08-Apr-19 | | 0 | | | | | | | |
| Access Date | | | | | | | | | | | | | | | |
| Access Date | | | | | | | | | | | | | | | |
| Acc010A | Portion 1A Access date (start date) | 0 | 28-Feb-19 A | | | 31-Aug-19 | | 0 | 1A Access date (start date) | | | | | | |
| Acc010B | Portion 1B Access date (start date) | 0 | 08-Apr-19 | | 145 | 31-Aug-19 | | 0 | ◆ Portion 1B Access date (start date) | | | | | | |
| Acc020 | Portion 2 Access date (start date) | 0 | 28-Feb-19 A | | | 28-Dec-19 | | 0 | 2 Access date (start date) | | | | | | |
| Acc030 | Portion 3 Access date (start date) | 0 | 28-Feb-19 A | | | 04-Mar-20 | | 0 | 3 Access date (start date) | | | | | | |
| Acc040 | Portion 4 Access date (start date) | 0 | 28-Feb-19 A | | | 13-Jul-19 | | 0 | 4 Access date (start date) | | | | | | |
| Acc050A | Portion 5A Access date (start date) | 0 | 03-Apr-19 A | | | 08-Aug-19 | | 0 | ◆ Portion 5A Access date (start date) | | | | | | |
| Acc050B | Portion 5B Access date (start date) | 0 | 03-Apr-19 A | | | 08-Aug-19 | | 0 | ◆ Portion 5B Access date (start date) | | | | | | |
| Acc050C | Portion 5C Access date (start date) | 0 | 03-Apr-19 A | | | 08-Aug-19 | | 0 | ◆ Portion 5C Access date (start date) | | | | | | |
| Acc060 | Portion 6 Access date (start date) | 0 | 28-Feb-19 A | | | 24-Jun-19 | | 0 | 6 Access date (start date) | | | | | | |
| Acc070 | Portion 7 Access date (start date) | 0 | 03-Apr-19 A | | | 26-Jul-19 | | 0 | ◆ Portion 7 Access date (start date) | | | | | | |
| Acc080 | Portion 8 Access date (start date) | 0 | 28-Feb-19 A | | | 02-Jul-19 | | 0 | 8 Access date (start date) | | | | | | |
| Acc090 | Portion 9 Access date (start date) | 0 | 28-Feb-19 A | | | 18-Apr-20 | | 0 | 9 Access date (start date) | | | | | | |
| Acc100 | Portion 10 Access date (start date) | 0 | 28-Feb-19 A | | | 27-Jun-20 | | 0 | 10 Access date (start date) | | | | | | |
| Acc110 | Portion 11 Access date (start date) | 0 | 28-Feb-19 A | | | 17-Jul-19 | | 0 | 11 Access date (start date) | | | | | | |
| Acc120 | Portion 12 Access date (start date) | 0 | 28-Feb-19 A | | | 13-Oct-20 | | 0 | 12 Access date (start date) | | | | | | |
| Acc130 | Works Area WA1 Access date (start date) | 0 | 28-Feb-19 A | | | 02-Jul-19 | | 0 | Area WA1 Access date (start date) | | | | | | |
| Preliminary Works | | | | | | | | | | | | | | | |
| Preliminary Works | | | | | | | | | | | | | | | |
| Preliminary Works | | | | | | | | | | | | | | | |
| A10015 | Contract information familiarisation | 27 | 28-Feb-19 A | 30-Mar-19 A | | 01-Jun-19 | 01-Jun-19 | 1 | | | | | | | |
| A10020 | Site office erection | 76 | 08-Apr-19 | 11-Jul-19* | 67 | 02-Jul-19 | 28-Sep-19 | 1 | | | | | | | |
| A10030 | Sub-letting & procurement for the 1st batch sub-contract | 90 | 28-Feb-19 A | 19-Jun-19 | 1 | 09-Apr-19 | 20-Jun-19 | 2 | | | | | | | |
| A11980 | Preservation and Protection of Existing Trees | 804 | 28-Feb-19 A | 28-Dec-21 | 0 | 28-Feb-19 | 28-Dec-21 | 0 | | | | | | | |
| A12440 | Prepare & submit Draft Construction Health and Safety Plan | 12 | 18-Feb-19 A | 02-Mar-19 A | | 01-Jun-19 | 01-Jun-19 | 1 | | | | | | | |
| A12450 | PM comment Draft Construction Health and Safety Plan | 12 | 04-Mar-19 A | 15-Mar-19 A | | 01-Jun-19 | 01-Jun-19 | 1 | | | | | | | |
| A12460 | Prepare & submit Construction Health and Safety Plan | 21 | 18-Mar-19 A | 11-Apr-19 | 43 | 01-Jun-19 | 05-Jun-19 | 1 | | | | | | | |
| A13920 | Construction Health and Safety Plan approval | 12 | 12-Apr-19 | 29-Apr-19 | 43 | 06-Jun-19 | 20-Jun-19 | 1 | | | | | | | |
| Access Road to Main Portal Area | | | | | | | | | | | | | | | |
| Hoarding | | | | | | | | | | | | | | | |
| Design | | | | | | | | | | | | | | | |
| A10040 | Hoarding Design preparation | 14 | 04-Mar-19 A | 13-Mar-19 A | | 25-Jun-19 | 25-Jun-19 | 2 | | | | | | | |
| A10050 | Hoarding Design approval | 13 | 14-Mar-19 A | 25-Mar-19 A | | 25-Jun-19 | 25-Jun-19 | 1 | | | | | | | |
| Hoarding | | | | | | | | | | | | | | | |
| A10070 | Hoarding erection along Ma On Shan Road (portion 4) | 32 | 20-Jun-19 | 27-Jul-19 | 19 | 13-Jul-19 | 19-Aug-19 | 6 | | | | | | | |

█ Remaining Level of Effort
█ Actual Level of Effort
█ Actual Work
█ Remaining Work
█ Critical Remaining Work
◆ Milestone
◆ Crit. Milestone

Project ID: MP002 (1904)
 Layout: 3 Month Rolling Programme
 Data Date: 08-Apr-19
 Page 1 of 3
 Primavera Systems, Inc.

Contract No. DC/2018/05
Relocation of Sha Tin Sewage Treatment Works to Caverns -
Site Preparation and Access Tunnel Construction
3 Month Rolling Programme



| Date | Revision | Chec... | Approved |
|-----------|-----------------|---------|----------|
| 25-Mar-19 | First Programme | | |

| Activity ID | Activity Name | Original Duration | Start | Finish | Total Float | Late Start | Late Finish | Time Risk Allowances | 2019 | | | | | | |
|---|---|-------------------|-------------|-----------|-------------|------------|-------------|----------------------|------|-----|-----|-----|-----|-----|--|
| | | | | | | | | | Mar | Apr | May | Jun | Jul | Aug | |
| A10080 | Hoarding erection along Mui Tsz Lam Road (portion 6) | 32 | 20-Jun-19 | 27-Jul-19 | 84 | 28-Sep-19 | 06-Nov-19 | 6 | | | | | | | |
| Tree Treatment | | | | | | | | | | | | | | | |
| Tree Treatment | | | | | | | | | | | | | | | |
| A11015 | Tree Survey | 60 | 01-Apr-19 A | 15-May-19 | 43 | 01-Jun-19 | 06-Jul-19 | | | | | | | | |
| A11020 | Tree felling & protection (Portion 1) | 18 | 20-Jun-19 | 11-Jul-19 | 43 | 10-Aug-19 | 30-Aug-19 | 6 | | | | | | | |
| A11030 | Tree felling & protection (Portion 4) | 27 | 20-Jun-19 | 22-Jul-19 | 14 | 08-Jul-19 | 07-Aug-19 | 6 | | | | | | | |
| A15290 | Tree felling & protection (Mui Tsz Lam Road realignment) | 27 | 20-Jun-19 | 22-Jul-19 | 89 | 05-Oct-19 | 06-Nov-19 | 6 | | | | | | | |
| A15300 | Tree transplant (Mui Tsz Lam Road realignment) | 96 | 16-May-19 | 06-Sep-19 | 49 | 15-Jul-19 | 06-Nov-19 | 6 | | | | | | | |
| Steel Bridge | | | | | | | | | | | | | | | |
| Design | | | | | | | | | | | | | | | |
| A10240 | Steel Bridge Design preparation | 26 | 20-Jun-19 | 20-Jul-19 | 3 | 24-Jun-19 | 24-Jul-19 | 0 | | | | | | | |
| North Tower of Steel Bridge | | | | | | | | | | | | | | | |
| A10265 | Pre-drilling Works | 21 | 20-Jun-19 | 15-Jul-19 | 770 | 27-Jan-22 | 26-Feb-22 | 3 | | | | | | | |
| Water Mains Diversion | | | | | | | | | | | | | | | |
| Preliminary Works | | | | | | | | | | | | | | | |
| A13110 | XP application for Water mains construction | 180 | 18-Feb-19 A | 16-Aug-19 | 409 | 20-May-20 | 28-Sep-20 | | | | | | | | |
| Noise Barrier | | | | | | | | | | | | | | | |
| Preliminary Works | | | | | | | | | | | | | | | |
| A14340 | TTA submission & approval | 18 | 20-Jun-19 | 11-Jul-19 | 23 | 18-Jul-19 | 07-Aug-19 | 3 | | | | | | | |
| A14400 | XP application for NB construction | 75 | 18-Feb-19 A | 13-Jun-19 | 55 | 02-Jun-19 | 07-Aug-19 | 15 | | | | | | | |
| Design | | | | | | | | | | | | | | | |
| A15010 | Noise Barrier Design preparation | 26 | 20-Jun-19 | 20-Jul-19 | 1 | 21-Jun-19 | 22-Jul-19 | 0 | | | | | | | |
| Demolition Works | | | | | | | | | | | | | | | |
| Demolition Works | | | | | | | | | | | | | | | |
| A12360 | Prepare & submit method statement | 32 | 20-Jun-19 | 27-Jul-19 | 24 | 19-Jul-19 | 24-Aug-19 | 2 | | | | | | | |
| A12372 | Initial Survey (including Asbestos survey) | 40 | 20-Jun-19 | 06-Aug-19 | 30 | 26-Jul-19 | 10-Sep-19 | 2 | | | | | | | |
| Road Works | | | | | | | | | | | | | | | |
| Mui Tsz Lam Road Realignment | | | | | | | | | | | | | | | |
| A10395 | XP application for Mui Tsz Lam Road realignment | 180 | 18-Feb-19 A | 16-Aug-19 | 202 | 27-Oct-19 | 05-Mar-20 | 17 | | | | | | | |
| Cycle Track and footpath | | | | | | | | | | | | | | | |
| A10452 | TTA submission & approval | 18 | 20-Jun-19 | 11-Jul-19 | 43 | 10-Aug-19 | 30-Aug-19 | 3 | | | | | | | |
| A10454 | XP application for portion 1 access | 75 | 18-Feb-19 A | 13-Jun-19 | 78 | 25-Jun-19 | 30-Aug-19 | 15 | | | | | | | |
| Haul Road Under Ma On Shan Road | | | | | | | | | | | | | | | |
| A11932 | XP application for portion 3 works | 75 | 18-Feb-19 A | 13-Jun-19 | 266 | 30-Dec-19 | 05-Mar-20 | 15 | | | | | | | |
| A11936 | Haul Road Design preparation | 60 | 20-Jun-19 | 29-Aug-19 | 132 | 26-Nov-19 | 13-Feb-20 | 2 | | | | | | | |
| Construction Access connecting Ma On Shan Road | | | | | | | | | | | | | | | |
| A12292 | XP application for construction access at portion 4 works | 200 | 18-Feb-19 A | 16-Aug-19 | 219 | 13-Nov-19 | 22-Mar-20 | 17 | | | | | | | |
| A12294 | XP application for construction access at portion 2 works | 200 | 18-Feb-19 A | 16-Aug-19 | 219 | 13-Nov-19 | 22-Mar-20 | 17 | | | | | | | |
| Main Portal Area | | | | | | | | | | | | | | | |
| Tree Treatment | | | | | | | | | | | | | | | |
| Tree Treatment | | | | | | | | | | | | | | | |
| A11040 | Tree felling & protection (Portion 6) | 32 | 20-Jun-19 | 27-Jul-19 | 4 | 24-Jun-19 | 01-Aug-19 | 2 | | | | | | | |
| Tunnel | | | | | | | | | | | | | | | |
| Preliminary Works | | | | | | | | | | | | | | | |
| A11810 | TTA submission and approval during blasting works | 75 | 20-Jun-19 | 17-Sep-19 | 202 | 25-Feb-20 | 29-May-20 | 3 | | | | | | | |

Remaining Level of Effort
 Actual Level of Effort
 Actual Work
 Remaining Work
 Critical Remaining Work
 Milestone
 Crit. Milestone

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 Primavera Systems, Inc.

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Relocation of Sha Tin Sewage Treatment Works to Caverns -
Site Preparation and Access Tunnel Construction
3 Month Rolling Programme



| Date | Revision | Chec... | Approved |
|-----------|-----------------|---------|----------|
| 25-Mar-19 | First Programme | | |

| Activity ID | Activity Name | Original Duration | Start | Finish | Total Float | Late Start | Late Finish | Time Risk Allowances | 2019 | | | | | | |
|----------------------------------|--|-------------------|-------------|-----------|-------------|------------|-------------|----------------------|------|-----|-----|-----|-----|-----|--|
| | | | | | | | | | Mar | Apr | May | Jun | Jul | Aug | |
| A11825 | Blasting door design | 32 | 20-Jun-19 | 27-Jul-19 | 320 | 21-Jul-20 | 27-Aug-20 | 2 | | | | | | | |
| A11840 | Method statement for tunnel works | 75 | 20-Jun-19 | 17-Sep-19 | 169 | 10-Jan-20 | 18-Apr-20 | 3 | | | | | | | |
| Access Road to Portion 12 | | | | | | | | | | | | | | | |
| Preliminary Works | | | | | | | | | | | | | | | |
| Hoarding | | | | | | | | | | | | | | | |
| A10090 | Hoarding erection at A Kung Kok Shan Road (portion 11) | 18 | 20-Jun-19 | 11-Jul-19 | 4 | 25-Jun-19 | 16-Jul-19 | 1 | | | | | | | |
| A10260 | TTA submission & approval | 18 | 20-Jun-19 | 11-Jul-19 | 4 | 25-Jun-19 | 16-Jul-19 | 3 | | | | | | | |
| Road Works | | | | | | | | | | | | | | | |
| Preliminary Works | | | | | | | | | | | | | | | |
| A15270 | TTA submission & approval | 35 | 20-Jun-19 | 31-Jul-19 | 480 | 01-Feb-21 | 19-Mar-21 | 5 | | | | | | | |
| A15280 | XP application for A Kung Kok Shan Road Roundabout | 75 | 18-Feb-19 A | 13-Jun-19 | 645 | 12-Jan-21 | 19-Mar-21 | 15 | | | | | | | |
| Other Works Area | | | | | | | | | | | | | | | |
| Tree Treatment | | | | | | | | | | | | | | | |
| Tree Treatment | | | | | | | | | | | | | | | |
| A11050 | Tree felling & protection (Portion 8) | 31 | 20-Jun-19 | 26-Jul-19 | 9 | 02-Jul-19 | 06-Aug-19 | 1 | | | | | | | |
| Community Liaison Centre | | | | | | | | | | | | | | | |
| Design | | | | | | | | | | | | | | | |
| A10100 | Community Liaison Centre Design Preparation | 26 | 20-Jun-19 | 20-Jul-19 | 2 | 22-Jun-19 | 23-Jul-19 | 1 | | | | | | | |
| Community Liaison Centre | | | | | | | | | | | | | | | |
| A10120 | Site Clearance | 18 | 20-Jun-19 | 11-Jul-19 | 22 | 17-Jul-19 | 06-Aug-19 | 1 | | | | | | | |

- Remaining Level of Effort
- Actual Level of Effort
- Actual Work
- Remaining Work
- Critical Remaining Work
- Milestone
- Crit. Milestone

Project ID: MP002 (1904)

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3 Month Rolling Programme**



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| Date | Revision | Chec... | Approved |
|-----------|-----------------|---------|----------|
| 25-Mar-19 | First Programme | | |