



**JOB No.: TCS01062/19**

**EPD CONTRACT NO. EP/SP/86/15  
ORGANIC WASTE TREATMENT FACILITIES PHASE 2**

**MONTHLY ENVIRONMENTAL MONITORING AND AUDIT  
REPORT (DECEMBER 2019)**

**PREPARED FOR  
AJA JOINT VENTURE**

| <b>Date</b>     | <b>Reference No.</b>    | <b>Prepared By</b>   | <b>Certified By</b>  |
|-----------------|-------------------------|--|--|
| 14 January 2020 | TCS01062/19/600/R0024v3 | <br>Martin Li<br>(Environmental Consultant) | <br>Tam Tak Wing<br>(Environmental Team Leader) |

| <b>Version</b> | <b>Date</b>     | <b>Remarks</b>                                   |
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| 1              | 7 January 2020  | First Submission                                 |
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|                |                 |  |

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14 January 2020

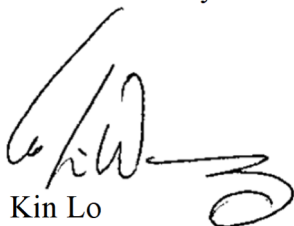
Dear Sir

**Contract No. EP/SP/86/15**  
**Organic Waste Treatment Facilities Phase 2**  
**Monthly Environmental Monitoring and Audit Report (December 2019)**

Referring to your letter referenced above dated 14<sup>th</sup> January 2019, pursuant to Permit Condition 3.3 of the Environmental Permit No. FEP-01/460/2013, we hereby verify that the captioned report complied in general with the requirements as set out in the EM&A Manual.

Should you have any queries, please contact the undersigned at 2268 3256.

Yours faithfully



Kin Lo  
Independent Environmental Checker

Encl.

cc EPD – Ms. Angel Wong, Mr. Sunny Chiu  
AECOM – Mr. Desmond Ng, Mr. Ben Tsang, Mr. Tony Lu  
AJA JV – Mr. CP Lam, Mr. Gabriel Wong, Ms. Tso So Fong, Ms. Cindy Kam

## EXECUTIVE SUMMARY

- ES01 Environmental Protection Department (hereafter referred as “EPD”) is the Project Proponent for the Project “*Organic Waste Treatment Facilities Phase 2*” (hereafter referred as “the Project”). The Project is a Designated Project to be implemented under Environmental Permit No. EP-460/2013 (hereafter referred as “the EP”). In accordance with the Works Contract requirements, the Contractor shall take over the responsibility of the EP. Based on the requirement, Further Environmental Permit FEP-01/460/2013 (hereafter referred as “the FEP”) was applied by AJA Joint Venture (hereafter referred as “AJAJV”) and was granted on 2 October 2019.
- ES02 Action-United Environmental Services & Consulting (hereinafter referred as “AUES”) was employed as Environmental Team (hereinafter referred as “ET”) to implement monitoring programmes and as well as the associated duties.
- ES03 This is the monthly EM&A report presenting the environmental monitoring results and inspection findings for the reporting period from **3 to 31 December 2019** (hereinafter ‘the Reporting Period’).

## ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

- ES04 Environmental monitoring activities under the EM&A program in this Reporting Period are summarized in the following table.

**Table ES-1 Summary Environmental Monitoring Activities Undertaken in the Reporting Period**

| Issues             | Environmental Monitoring Parameters / Inspection | Sessions |
|--------------------|--|----------|
| Construction Noise | Leq (30min) Daytime                              | 16       |
| Inspection / Audit | ET Regular Environmental Site Inspection         | 5        |

## BREACH OF ACTION AND LIMIT (A/L) LEVELS

- ES05 No daytime construction noise monitoring exceedance was recorded in this Reporting Period. The statistics of environmental exceedance and investigation of exceedance are summarized in the following table.

**Table ES-2 Summary Environmental Monitoring Parameter Exceedance in the Reporting Period**

| Environmental Issues | Monitoring Parameters        | Action Level | Limit Level | Event & Action        |                    |
|----------------------|------------------------------|--------------|-------------|-----------------------|--------------------|
|                      |                              |              |             | Investigation Results | Corrective Actions |
| Construction Noise   | Leq <sub>30min</sub> Daytime | 0            | 0           | NA                    | NA                 |

## SITE INSPECTION

- ES06 In the Reporting Month, weekly joint site inspections to evaluate the site environmental performance had been carried out by the representative of the Consultants, Independent Environmental Checker (IEC), ET and the Contractor on **3<sup>rd</sup>, 10<sup>th</sup>, 17<sup>th</sup>, 23<sup>rd</sup> and 30<sup>th</sup> December 2019**. No non-compliance was recorded during the site inspections.

## ENVIRONMENTAL COMPLAINT

- ES07 No environmental complaint was recorded in this Reporting Period for the Project. The statistics of environmental complaint are summarized in the following table.

**Table ES-3 Summary Environmental Complaint Records in the Reporting Period**

| Reporting Period     | Environmental Complaint Statistics |            |                  | Related with the Works Contract(s) |
|----------------------|------------------------------------|------------|------------------|------------------------------------|
|                      | Frequency                          | Cumulative | Complaint Nature |                                    |
| 3 – 31 December 2019 | 0                                  | 0          | NA               | NA                                 |

## NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

ES08 No environmental summons or prosecutions was received in this Reporting Period for the Project. The statistics of environmental summons or prosecutions are summarized in the following tables.

**Table ES-4 Summary Environmental Summons Records in the Reporting Period**

| Reporting Period     | Environmental Summons Statistics |            |                  | Related with the Works Contract(s) |
|----------------------|----------------------------------|------------|------------------|------------------------------------|
|                      | Frequency                        | Cumulative | Complaint Nature |                                    |
| 3 – 31 December 2019 | 0                                | 0          | NA               | NA                                 |

**Table ES-5 Summary Environmental Prosecutions Records in the Reporting Period**

| Reporting Period     | Environmental Prosecution Statistics |            |                  | Related with the Works Contract(s) |
|----------------------|--------------------------------------|------------|------------------|------------------------------------|
|                      | Frequency                            | Cumulative | Complaint Nature |                                    |
| 3 – 31 December 2019 | 0                                    | 0          | NA               | NA                                 |

**REPORTING CHANGE**

ES09 As this is the first Monthly EM&A Report, no reporting changes were made in the Reporting Period.

**FUTURE KEY ISSUES**

ES10 Construction noise would be a key environmental issue during construction work of the Project. Noise mitigation measures such as using quiet plants should be implemented in accordance with the EM&A requirement.

ES11 In addition, all effluent discharge shall be ensure to fulfill the discharge licence stipulation.

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## 1. INTRODUCTION

### 1.1 PROJECT BACKGROUND

1.1.1 Environmental Protection Department (hereafter referred as “EPD”) is the Project Proponent for the Project “*Organic Waste Treatment Facilities Phase 2*” (hereafter referred as “the Project”). The Project is a Designated Project to be implemented under Environmental Permit No. EP-460/2013 (hereafter referred as “the EP”). The major construction work of the Project included:

- (i) Demolition and removal of the existing above ground structures of the Sha Ling Livestock Waste Composting Plant (SLCP);
- (ii) Construction of superstructure for an administration building and enclosed waste reception area;
- (iii) Installation of treatment facilities including waste pre-treatment equipment, digesters, biogas holding tanks, composting, wastewater treatment, air treatment systems; and
- (iv) Facilities for biogas processing, utilization and transmission;

1.1.2 AJA Joint Venture (hereafter referred as “AJAJV”) has been awarded the *EPD Contract No. EP/SP/86/15 “Organic Waste Treatment Facilities Phase 2”*. In accordance with the Works Contract requirements, AJAJV shall take over the responsibility of the EP. Based on the requirement, Further Environmental Permit application was submitted by AJAJV to EPD on 10 September 2019 and granted on 2 October 2019. The Further Environmental Permit is named as FEP-01/460/2013 (hereafter referred as “the FEP”).

1.1.3 According the approved Environmental Monitoring and Audit Manual (hereafter referred as “the EM&A Manual”), AJAJV employed Action-United Environmental Services & Consulting (hereinafter referred as “AUES”) as Environmental Team (hereinafter referred as “ET”) to implement monitoring programme and as well as the associated duties.

1.1.4 According to the EM&A Manual, construction noise was identified as the key environmental issue during the construction phase of the Project and it is required to carry out construction noise monitoring throughout the construction phase. Furthermore, baseline monitoring as part of the EM&A programmes shall be conducted prior to the commencement of the construction works under the Project. Thus, baseline noise monitoring was conducted by ET from **25 September 2019 to 8 October 2019**. The baseline monitoring report was compiled by the ET and verified by Independent Environmental Checker (hereinafter the “IEC”) prior submitted to EPD on 19<sup>th</sup> November 2019 for endorsement.

1.1.5 The commencement date of the Project is **3<sup>rd</sup> December 2019**. This is the monthly EM&A report presenting the environmental monitoring results and inspection findings for the reporting period from **3<sup>rd</sup> to 31<sup>st</sup> December 2019** (hereinafter ‘the Reporting Period’).

### 1.2 REPORT STRUCTURE

1.1.1 The Monthly Environmental Monitoring and Audit (EM&A) Report is structured into the following sections:-

|                  |   |
|------------------|---|
| <b>Section 1</b> | <i>Introduction</i>                                   |
| <b>Section 2</b> | <i>Project Organization and Construction Progress</i> |
| <b>Section 3</b> | <i>Summary of Impact Monitoring Requirements</i>      |
| <b>Section 4</b> | <i>Construction Noise Monitoring</i>                  |
| <b>Section 5</b> | <i>Waste Management</i>                               |
| <b>Section 6</b> | <i>Site Inspections</i>                               |
| <b>Section 7</b> | <i>Environmental Complaints and Non-Compliance</i>    |
| <b>Section 8</b> | <i>Implementation Status of Mitigation Measures</i>   |
| <b>Section 9</b> | <i>Conclusions and Recommendations</i>                |

## 2. PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS

### 2.1 PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS

2.1.1 Organization structure and contact details of relevant parties with respect to on-site environmental management are shown in [Appendix B](#). The responsibilities of respective parties are:

#### Engineer or Engineers Representative (ER)

2.1.2 The ER is responsible for overseeing the construction works and for ensuring that the works are undertaken by the Contractor in accordance with the specification and contract requirements. The duties and responsibilities of the ER with respect to EM&A include:

- to monitor the Contractor's compliance with Contract Specifications, including the effective implementation and operation of the environmental mitigation measures;
- to employ an Independent Environmental Checker (IEC) to audit the results of the EM&A works carried out by the Environmental Team (ET);
- to monitor Contractors', ET's and IEC's compliance with the requirements in the Environmental Permit (EP) and EM&A Manual;
- to facilitate ET's implementation of the EM&A programme;
- participate in joint site inspection by the ET and IEC;
- to oversee the implementation of the agreed Event / Action Plan in the event of any exceedance; and,
- to adhere to the procedures for carrying out complaint investigation.

#### The Contractor

2.1.3 The Contractor should report to the ER. The duties and responsibilities of the Contractor include:

- to comply with the relevant contract conditions and specifications on environmental protection;
- to employ an ET to undertake monitoring, laboratory analysis and reporting of EM&A;
- to facilitate ET's monitoring and site inspection activities;
- to participate in the site inspections undertaken by the ET and IEC, and undertake any corrective actions;
- to provide information / advice to the ET regarding works programme and activities which may contribute to the generation of adverse environmental impacts;
- to submit proposals on mitigation measures in case of exceedance of Action and Limit levels in accordance with the Event / Action Plans;
- to implement measures to reduce impact where Action and Limit levels are exceeded; and,
- to adhere to the procedures for carrying out complaint investigation.

#### Environmental Team (ET)

2.1.4 The ET will be led and managed by the ET Leader. ET Leader should have relevant professional qualifications in environmental control and possess at least 7 years of experience in EM&A. Suitably qualified staff should be included in the ET, and resources for the implementation of the EM&A programme should be allocated in the time under the Contract, to enable fulfilment of the Project's EM&A requirements as specified in the EM&A Manual during construction of the Project. The ET should report to Project Proponent and the duties should include:

- to monitor and audit various environmental parameters as required in this EM&A Manual;
- to analyse the environmental monitoring and audit data, review the success of EM&A programme and the adequacy of mitigation measures implemented, confirm the validity of the EIA predictions and identify any adverse environmental impacts arising;
- to monitor compliance with conditions in the EP, environmental protection, pollution prevention and control regulations and contract specifications;
- to audit environmental conditions on site;



- to report on the environmental monitoring and audit results to EPD, the ER, the IEC and Contractor or their delegated representatives;
- to recommend suitable mitigation measures to the Contractor in the case of exceedance of Action and Limit levels in accordance with the Event and Action Plans;
- to liaise with the IEC on all environmental performance matters, and ensure timely submission of all relevant EM&A pro forma for IEC's approval;
- to provide advice to the Contractor on environmental improvement, awareness and enhancement matters, etc on site;
- to adhere to the procedures for carrying out complaint investigation;
- to prepare reports on the environmental monitoring data and the site environmental conditions;
- to submit the EM&A report to Director of Environmental Protection (DEP) timely;
- to review proposals of mitigation measures from the Contractor in case of exceedance of Action and Limit levels, in accordance with Event and Action Plan; and,
- to carry out site inspection to investigate and audit the Contractor's site practice, equipment and work methodologies with respect to pollution control and mitigation measures.

Independent Environmental Checker (IEC)

2.1.5 The IEC is empowered to audit the environmental performance of construction, but is independent from the management of construction works. As such, the IEC should not be in any way an associated body of the Contractor or the ET for the Project. The IEC should be a person who has relevant professional qualifications in environmental control and at least 7 years' experience in EM&A and environmental management. The duties and responsibilities of the IEC are:

- to provide proactive advice to the ER on EM&A matters related to the project;
- to review and verify the monitoring data and all submissions in connection with the EP and EM&A Manual submitted by the ET;
- to arrange and conduct regular, at least monthly site inspections of the works during the construction phase, and to carry out ad hoc inspections if significant environmental problems are identified;
- to check compliance with the agreed Event / Action Plan in the event of any exceedance;
- to check compliance with the procedures for carrying out complaint investigation;
- to check the effectiveness of corrective measures;
- to feedback audit results to the ET by signing off relevant EM&A pro forma;
- to check that mitigation measures are effectively implemented;
- to report the works conducted, and the findings, recommendations and improvements of the site inspections, after reviewing ET's and Contractor's works, to the ER on a monthly basis;
- to verify the investigation result of the environmental complaint cases and the effectiveness of corrective measures;
- to verify EM&A report that has been certified by ET leader; and,
- to audit EIA recommendations and requirements against the status of implementation of environmental mitigation measures on site.

## 2.2 CONSTRUCTION PROGRESS

2.2.1 3-month rolling construction program of the Project is enclosed in [Appendix D](#); and the major construction activities undertaken in the Reporting Period is presented as below:

- Sheet Piling Work
- Demolition work of existing buildings

**2.3 SUMMARY OF ENVIRONMENTAL SUBMISSIONS**

2.3.1 Summary of the relevant permits, licenses, and/or notifications on environmental protection for the Project of contract 1 are presented in *Tables 2-1*.

**Table 2-1 Status of Environmental Licenses and Permits of the Project**

| Item | Description  | License/Permit Status                   |              |             |                                 |
|------|--|---|--------------|-------------|---------------------------------|
|      |  | Permit no./<br>account no./<br>Ref. no. | Valid Period |             | Status                          |
|      |  |   | From         | To          |                                 |
| 1    | Notification pursuant to Air pollution Control (Construction Dust) Regulation  | 448863                                  | --           | --          | Notified on 9 September 2019    |
| 2    | Chemical Waste Producer Registration   | Account Number: 7035307                 | --           | --          | Issued on 2 Oct 2019            |
| 3    | Water Pollution Control Ordinance - Discharge License                          | Application No. 448913                  | --           | --          | Application made on 10 Sep 2019 |
| 4    | Waste Disposal Regulation - Billing Account for Disposal of Construction Waste | 7035307                                 | 2 Oct 2019   | NA          | Valid                           |
| 5    | Construction Noise Permit  | GW-RN0773-19                            | 30 Oct 2019  | 29 Dec 2019 | Valid until 29 Dec 2019         |
| 6    | Further Environmental Permit   | FEP-01/460/2019                         | 2 Oct 2019   | NA          | Valid                           |

### 3. SUMMARY OF IMPACT MONITORING REQUIREMENTS

#### 3.1 GENERAL

3.1.1 The Environmental Monitoring and Audit requirements are set out in the Approved EM&A manual. Environmental issues such as construction noise was identified as the only key issues during the construction phase of the Project.

#### 3.2 MONITORING PARAMETERS

3.2.1 A summary of the environmental monitoring requirement stated in the approved EM&A Manual is presented in *Table 3-1*.

**Table 3-1 Summary of EM&A Requirements**

| Environmental Issue | Parameters   |
|---------------------|--|
| Noise               | <ul style="list-style-type: none"> <li>Leq(30min) in normal working days (Monday to Saturday) 07:00-19:00 except public holiday</li> <li>Supplementary information for data auditing, statistical results such as L<sub>10</sub> and L<sub>90</sub> shall also be obtained for reference.</li> </ul> |

#### 3.3 MONITORING LOCATIONS

3.3.1 According to the EM&A Manual Section 4.2.3, four (4) designated noise sensitive receivers (NSR) were recommended as construction noise monitoring stations. Site visit was conducted by the ET on 23<sup>th</sup> September 2019 to review and study sensitive receivers at surrounding and adjacent to the Project. Since two of the designated monitoring location N2 and N3 were not accessible due to the presence of steel wire fencing and village dogs, two alternative locations N2a and N3a are proposed. They will be used as temporary noise monitoring locations for impact noise monitoring until the alternative locations are approved by EPD. The details of the locations for construction noise monitoring in this reporting month are listed in *Table 3-2* and illustrated in *Appendix C*.

**Table 3-2 Impact Monitoring Stations – Construction Noise**

| ID  | Location                        |
|-----|---------------------------------|
| N1  | Village House No. 308, Sha Ling |
| N2a | Village House No. 318, Sha Ling |
| N3a | Village House No. 261, Sha Ling |
| N4  | Village House in Sha Ling       |

Remark: N2a and N3a are temporary noise monitoring location. If there is any new alternative location(s) available in future, the impact monitoring will be resumed at the new alternative location(s) upon EPD agreement.

#### 3.4 MONITORING FREQUENCY AND PERIOD

3.4.1 The requirements of impact monitoring in the approved *EM&A Manual* and presented as follows.

##### Noise Monitoring

3.4.2 Noise monitoring will be to conduct at the all available 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 Leq(30min) measurements between 07:00 and 19:00 hours on normal weekdays

#### 3.5 MONITORING EQUIPMENT

##### Noise Monitoring

3.5.1 Sound level meter in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications shall be used for carrying out the noise monitoring. The sound level meter shall be checked using an acoustic calibrator. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in ms<sup>-1</sup>.

3.5.2 Equipment used for construction noise monitoring is listed in *Table 3-3*.

**Table 3-3 Construction Noise Monitoring Equipment**

| Equipment                     | Model  |
|-------------------------------|--|
| Integrating Sound Level Meter | B&K Type 2238 and Rion NL-52                       |
| Calibrator                    | B&K Type 4231 and Rion NC-74                       |
| Portable Wind Speed Indicator | Anemometer AZ Instrument 8908 Wind Speed Indicator |

### 3.6 MONITORING METHODOLOGY

#### Noise Monitoring

- 3.6.1 As referred to in the Technical Memorandum (TM) issued under the NCO, sound level meters in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804:1985 (Type 1) specifications shall be used for carrying out the noise monitoring. Immediately prior to and following each noise measurement the accuracy of the sound level meter shall be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements may be accepted as valid only if the calibration levels from before and after the noise measurement agree to within 1.0 dB.
- 3.6.2 All noise measurements will be performed with the meter set to FAST response and on the A-weighted equivalent continuous sound pressure level (Leq).  $Leq_{(30 \text{ min})}$  in six consecutive  $Leq_{(5 \text{ min})}$  measurements will be used as the monitoring parameter for the time period between 07:00-19:00 hours on weekdays throughout the construction period.
- 3.6.3 The sound level meter will be mounted on a tripod at a height of 1.2 m and placed at the assessment point and oriented such that the microphone is pointed to the site with the microphone facing perpendicular to the line of sight. The windshield will be fitted for all measurements. Where a measurement is to be carried out at a building, the assessment point would normally be at a position 1 m from the exterior of the building façade. Where a measurement is to be made for noise being received at a place other than a building, the assessment point would be at a position 1.2 m above the ground in a free-field situation, i.e. at least 3.5 m away from reflective surfaces such as adjacent buildings or walls.
- 3.6.4 Immediately prior to and following each noise measurement the accuracy of the sound level meter will be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements will be accepted as valid only if the calibration level from before and after the noise measurement agrees to within 1.0 dB.
- 3.6.5 Noise measurements will not be made in fog, rain, wind with a steady speed exceeding 5m/s or wind with gusts exceeding 10m/s. The wind speed will be checked with a portable wind speed meter capable of measuring the wind speed in m/s.
- 3.6.6 The sound level meter and calibrator are calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme at yearly basis. The calibration certificates of all monitoring equipment used for the impact monitoring program will be provided.

### 3.7 ACTION/LIMIT (A/L) LEVELS

- 3.7.1 Action and Limit levels for construction noise as stipulated in the approved Environmental Monitoring and Audit Manual is listed in *Tables 3-4*.

**Table 3-4 Action and Limit Levels for Construction Noise**

| Monitoring Location | Action Level  | Limit Level in dB(A) |
|---------------------|---|----------------------|
|                     | Time Period: 0700-1900 hours on normal weekdays     |                      |
| N1                  | When one or more documented complaints are received | 75 dB(A)             |
| N2a                 |   |                      |
| N3a                 |   |                      |
| N4                  |   |                      |

*Note: If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the Noise Control Authority have to be followed.*

3.7.2 Should non-compliance of the environmental quality criteria occurs, remedial actions will be triggered according to the Event and Action Plan which presented in [Appendix E](#).

**3.8 DATA MANAGEMENT AND DATA QA/QC CONTROL**

3.8.1 All monitoring data will be handled by the ET’s in-house data recording and management system. The monitoring data recorded in the equipment will be downloaded directly from the equipment at the end of each monitoring day. The downloaded monitoring data will input into a computerized database properly maintained by the ET.

**4. CONSTRUCTION NOISE MONITORING**

**4.1 GENERAL**

4.1.1 In the Reporting Period, construction noise quality monitoring was performed at monitoring location N1, N2a, N3a and N4. The noise quality monitoring schedule is presented in [Appendix F](#).

4.1.2 Valid calibration certificates of monitoring equipment is shown in [Appendix G](#) and the construction noise monitoring results are summarized in the following sub-sections.

**4.2 RESULTS OF NOISE MONITORING**

4.2.1 **16** sessions of daytime construction noise monitoring were performed at the agreed monitoring locations in the reporting period. Since the noise measurement was made under free field condition, a façade correction of +3dB(A) has been added according to acoustical principles and EPD guidelines. The daytime noise monitoring results are summarized in [Table 5-1](#). The detailed noise monitoring data are presented in [Appendix H](#) and the relevant graphical plots are shown in [Appendix I](#).

**Table 4-1 Daytime Construction Noise Impact Monitoring Results at N1**

| Date      | Time of Starting | Time of Finishing | Measurement Result (dB(A))* |
|-----------|------------------|-------------------|-----------------------------|
|           |                  |                   | L <sub>eq30min</sub>        |
| 4-Dec-19  | 13:41            | 14:11             | 64.4                        |
| 10-Dec-19 | 14:30            | 15:00             | 64.7                        |
| 16-Dec-19 | 14:16            | 14:46             | 62.4                        |
| 27-Dec-19 | 15:37            | 16:07             | 66.9                        |

**Table 4-2 Daytime Construction Noise Impact Monitoring Results at N2a**

| Date      | Time of Starting | Time of Finishing | Measurement Result (dB(A)) |
|-----------|------------------|-------------------|----------------------------|
|           |                  |                   | L <sub>eq30min</sub>       |
| 4-Dec-19  | 11:07            | 11:37             | 49.8                       |
| 10-Dec-19 | 15:08            | 15:38             | 51.1                       |
| 16-Dec-19 | 10:47            | 11:07             | 50.3                       |
| 27-Dec-19 | 16:42            | 17:12             | 50.8                       |

**Table 4-3 Daytime Construction Noise Impact Monitoring Results at N3a**

| Date      | Time of Starting | Time of Finishing | Measurement Result (dB(A)) |
|-----------|------------------|-------------------|----------------------------|
|           |                  |                   | L <sub>eq30min</sub>       |
| 4-Dec-19  | 14:22            | 14:52             | 53.9                       |
| 10-Dec-19 | 13:46            | 14:16             | 68.6                       |
| 16-Dec-19 | 13:28            | 13:58             | 74.3*                      |
| 27-Dec-19 | 14:56            | 15:26             | 66.3                       |

*\*High noise level recorded due to dog barking*

**Table 4-4 Daytime Construction Noise Impact Monitoring Results at N4**

| Date      | Time of Starting | Time of Finishing | Measurement Result (dB(A)) |
|-----------|------------------|-------------------|----------------------------|
|           |                  |                   | L <sub>eq30min</sub>       |
| 4-Dec-19  | 10:25            | 10:55             | 66.1                       |
| 10-Dec-19 | 15:49            | 16:19             | 57.5                       |
| 16-Dec-19 | 9:34             | 10:04             | 58.4                       |
| 27-Dec-19 | 11:01            | 11:32             | 74.4 *                     |

*\*High noise level recorded due to dog barking*

4.2.2 As shown in [Table 4-1 to 4-4](#), all the measured results were below 75dB(A) of the acceptance criteria. No adverse weather condition which may affect the monitoring result was encountered during the course of noise monitoring in the reporting period. Furthermore, no complaint on daytime construction noise was registered, indicating no exceedance of Action Level.

**5. WASTE MANAGEMENT**

**5.1 GENERAL WASTE MANAGEMENT**

5.1.1 Waste management was carried out by an on-site Environmental Officer or an Environmental Supervisor from time to time.

**5.2 RECORDS OF WASTE QUANTITIES**

5.2.1 All types of waste arising from the construction work are classified into the following:

- Construction & Demolition (C&D) Material;
- Chemical Waste;
- General Refuse; and
- Excavated Soil.

5.2.2 Since the construction work was not commenced, no waste disposal was made in the Reporting period. The quantities of waste for disposal in this Reporting Period are summarized in *Tables 5-1* and *5-2*.

**Table 5-1 Summary of Quantities of Inert C&D Materials**

| Type of Waste  | Quantity | Disposal Location |
|--|----------|-------------------|
| C&D Materials (Inert) ('000m <sup>3</sup> )            | 2.038    | -                 |
| Reused in this Contract (Inert) ('000m <sup>3</sup> )  | 0        | -                 |
| Reused in other Projects (Inert) ('000m <sup>3</sup> ) | 1.069    | -                 |
| Disposal as Public Fill (Inert) ('000m <sup>3</sup> )  | 0.969    | TM38              |

**Table 5-2 Summary of Quantities of C&D Wastes**

| Type of Waste                               | Quantity | Disposal Location                    |
|---|----------|--------------------------------------|
| Recycled Metal ('000kg)                     | 14.820   | Collected by metal recycling company |
| Recycled Paper / Cardboard Packing ('000kg) | 0        | -                                    |
| Recycled Plastic ('000kg)                   | 0        | -                                    |
| Chemical Wastes ('000kg)                    | 0        | -                                    |
| General Refuses ('000m <sup>3</sup> )       | 0.046    | NENT                                 |

**6. SITE INSPECTION**

**6.1 REQUIREMENTS**

6.1.1 According to the approved EM&A Manual, the environmental site inspection shall be formulation by ET Leader. Weekly environmental site inspections should be carried out to confirm the environmental performance.

**6.2 FINDINGS / DEFICIENCIES DURING THE REPORTING MONTH**

6.2.1 In the Reporting Period, joint site inspection for the Project to evaluate site environmental performance was carried out by the RE, IEC, ET and the Contractor on **3, 10, 17, 23 and 30 October 2019**. No non-compliance was noted.

6.2.2 The findings / deficiencies of the Project that observed during the weekly site inspection are listed in **Table 6-1**.

**Table 6-1 Site Observations during the Weekly Inspection**

| <b>Date</b>      | <b>Findings / Deficiencies</b>  | <b>Follow-Up Status</b>    |
|------------------|---|----------------------------|
| 3 December 2019  | <ul style="list-style-type: none"> <li>No adverse environmental issues were observed.</li> </ul>  | NA                         |
| 10 December 2019 | <p><u>Reminder:</u></p> <ul style="list-style-type: none"> <li>The Contractor was reminded to check and replace the NRMM label for vehicle on site if necessary.</li> </ul> | Not required for reminder. |
| 17 December 2019 | <ul style="list-style-type: none"> <li>No adverse environmental issues were observed.</li> </ul>  | NA                         |
| 23 December 2019 | <ul style="list-style-type: none"> <li>No adverse environmental issues were observed.</li> </ul>  | NA                         |
| 30 December 2019 | <ul style="list-style-type: none"> <li>No adverse environmental issues were observed.</li> </ul>  | NA                         |



**7. ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE**

**7.1 ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION**

7.1.1 In the Reporting Period, no environmental complaint, summons and prosecution under the EM&A Programme was lodged for the project. The statistical summary table of environmental complaint is presented in *Tables 7-1, 7-2 and 7-3*.

**Table 7-1 Statistical Summary of Environmental Complaints**

| Reporting Period     | Environmental Complaint Statistics |            |                  |
|----------------------|------------------------------------|------------|------------------|
|                      | Frequency                          | Cumulative | Complaint Nature |
| 3 – 31 December 2019 | 0                                  | 0          | NA               |

**Table 7-2 Statistical Summary of Environmental Summons**

| Reporting Period     | Environmental Summons Statistics |            |                |
|----------------------|----------------------------------|------------|----------------|
|                      | Frequency                        | Cumulative | Summons Nature |
| 3 – 31 December 2019 | 0                                | 0          | NA             |

**Table 7-3 Statistical Summary of Environmental Prosecution**

| Reporting Period     | Environmental Prosecution Statistics |            |                    |
|----------------------|--------------------------------------|------------|--------------------|
|                      | Frequency                            | Cumulative | Prosecution Nature |
| 3 – 31 December 2019 | 0                                    | 0          | NA                 |

**8. IMPLEMENTATION STATUS OF MITIGATION MEASURES**

**8.1 GENERAL REQUIREMENTS**

- 8.1.1 The environmental mitigation measures that recommended in the Implementation Schedule for Environmental Mitigation Measures (ISEMM) in the approved EM&A Manual covered the issues of dust, noise, water and waste and they are summarized presented in [Appendix K](#).
- 8.1.2 AJAJV had been implementing the required environmental mitigation measures according to the Environmental Monitoring and Audit Manual subject to the site condition. Environmental mitigation measures generally implemented by CRCPJV in this Reporting Month are summarized in [Table 8-1](#).

**Table 8-1 Environmental Mitigation Measures**

| Issues                        | Environmental Mitigation Measures   |
|-------------------------------|---|
| Water Quality                 | <ul style="list-style-type: none"> <li>• Any wastewater generated should be appropriately treated by treatment facilities;</li> <li>• Drainage channels were provided to convey run-off into the treatment facilities; and</li> <li>• Drainage systems were regularly and adequately maintained.</li> </ul>   |
| Air Quality                   | <ul style="list-style-type: none"> <li>• Regular watering to reduce dust emissions from all exposed site surface, particularly during dry weather;</li> <li>• Frequent watering for particularly dusty construction areas and areas close to air sensitive receivers;</li> <li>• Cover all excavated or stockpile of dusty material by impervious sheeting or sprayed with water to maintain the entire surface wet;</li> <li>• Public roads around the site entrance/exit had been kept clean and free from dust; and</li> <li>• Tarpaulin covering of any dusty materials on a vehicle leaving the site.</li> </ul>                           |
| Noise                         | <ul style="list-style-type: none"> <li>• Good site practices to limit noise emissions at the sources;</li> <li>• Use of quiet plant and working methods;</li> <li>• Use of site hoarding or other mass materials as noise barrier to screen noise at ground level of NSRs;</li> <li>• Use of shrouds/temporary noise barriers to screen noise from relatively static PMEs;</li> <li>• Alternative use of plant items within one worksite, where practicable.</li> </ul>   |
| Waste and Chemical Management | <ul style="list-style-type: none"> <li>• Any excavated material should be reused on site as far as possible to minimize off-site disposal. Scrap metals or abandoned equipment should be recycled if possible;</li> <li>• Waste arising should be kept to a minimum and be handled, transported and disposed of in a suitable manner;</li> <li>• Trip ticket system for the disposal of C&amp;D materials to any designed public filling facility and/or landfill was implemented; and</li> <li>• Chemical waste shall be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes.</li> </ul> |
| General                       | <ul style="list-style-type: none"> <li>• The site was generally kept tidy and clean.</li> </ul>   |

**8.2 TENTATIVE CONSTRUCTION ACTIVITIES IN THE COMING MONTH**

- 8.2.1 Tentative construction activities to be undertaken in **January 2020** should be included:-
  - Sheet Piling Work
  - Excavation of ELS

## **9. CONCLUSIONS AND RECOMMENDATIONS**

### **9.1 CONCLUSIONS**

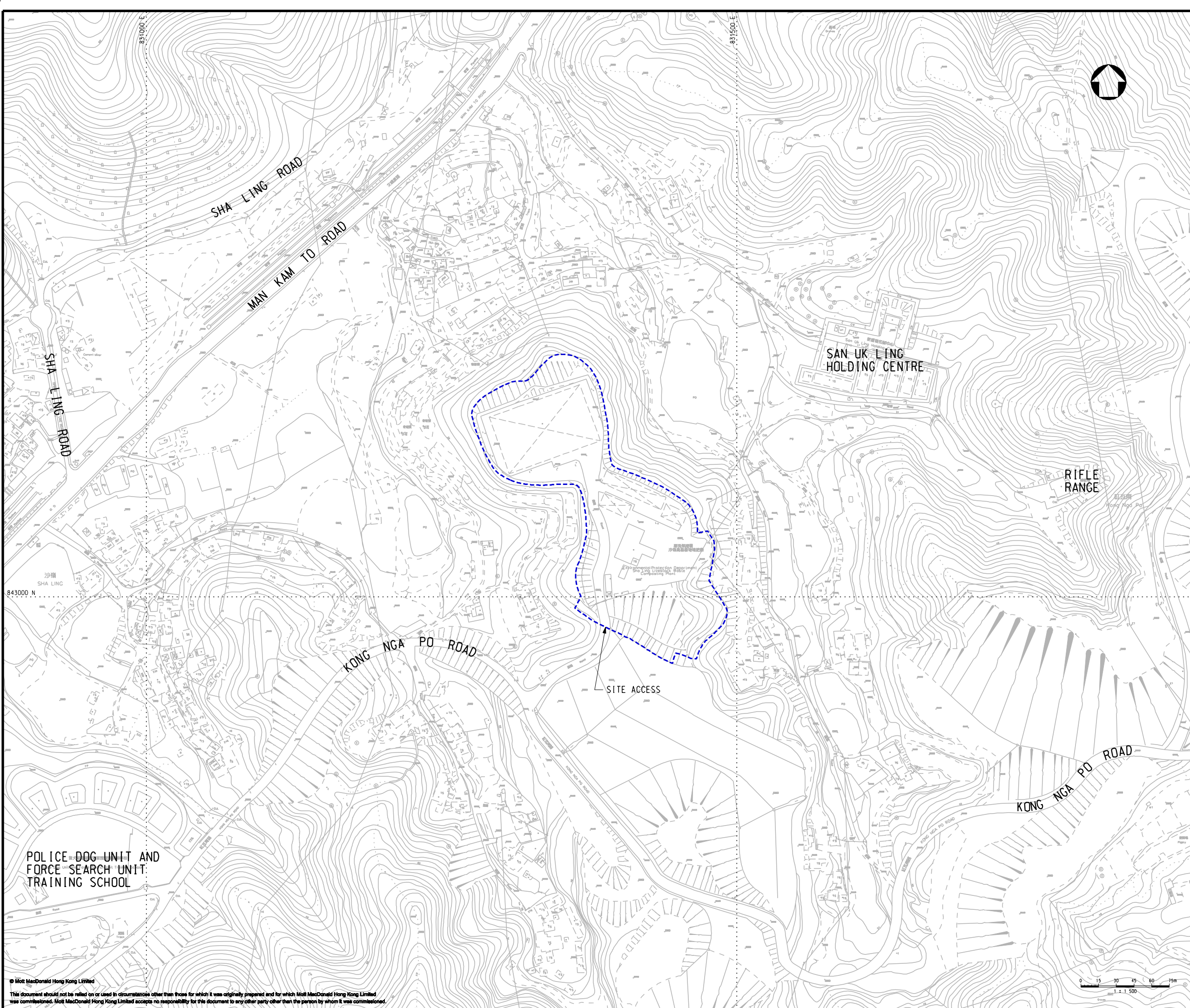
- 9.1.1 This is the monthly EM&A report presenting the monitoring results and inspection findings for the reporting period from **3 to 31 December 2019**.
- 9.1.2 In the Reporting Period, no daytime construction noise monitoring results that triggered the Limit Level was recorded and no noise complaint (which is an Action Level exceedance) was received by the Project Consultant, EPD and the Contractors.
- 9.1.3 In this Reporting Period, joint site inspection to evaluate the site environmental performance for the Project was carried out by the RE, IEC, ET and Contractor on **3, 10, 17, 23 and 30 December 2019**. No non-compliance was noted during the site inspection.
- 9.1.4 No documented complaint, notification of summons or successful prosecution was received under the Project.

### **9.2 RECOMMENDATIONS**

- 9.2.1 Construction noise should be a key environmental impact during the works. The noise mitigation measures such as use of quiet plants or temporary noise barrier installation at the construction noise predominate area should be implemented as accordance with the EM&A requirement.
- 9.2.2 In addition, all effluent discharge shall be ensure to fulfill the discharge licence stipulation.


**Appendix A**

**Layout plan of the Project**




Notes

Key to symbols

 PROPOSED SITE AREA

Reference drawings

| Rev | Date   | Drawn | Description      | Ch'k'd | App'd |
|-----|--------|-------|------------------|--------|-------|
| P2  | JUN 13 | MING  | GENERAL REVISION | MR     | AFK   |
| P1  | DEC 12 | MING  | FIRST ISSUE      | MR     | AFK   |



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Client



Environmental Protection Department  
The Government of the Hong Kong  
Special Administrative Region

Project

**AGREEMENT NO. CE34/2011(EP)  
DEVELOPMENT OF ORGANIC WASTE  
TREATMENT FACILITIES PHASE 2 -  
FEASIBILITY STUDY**

Title

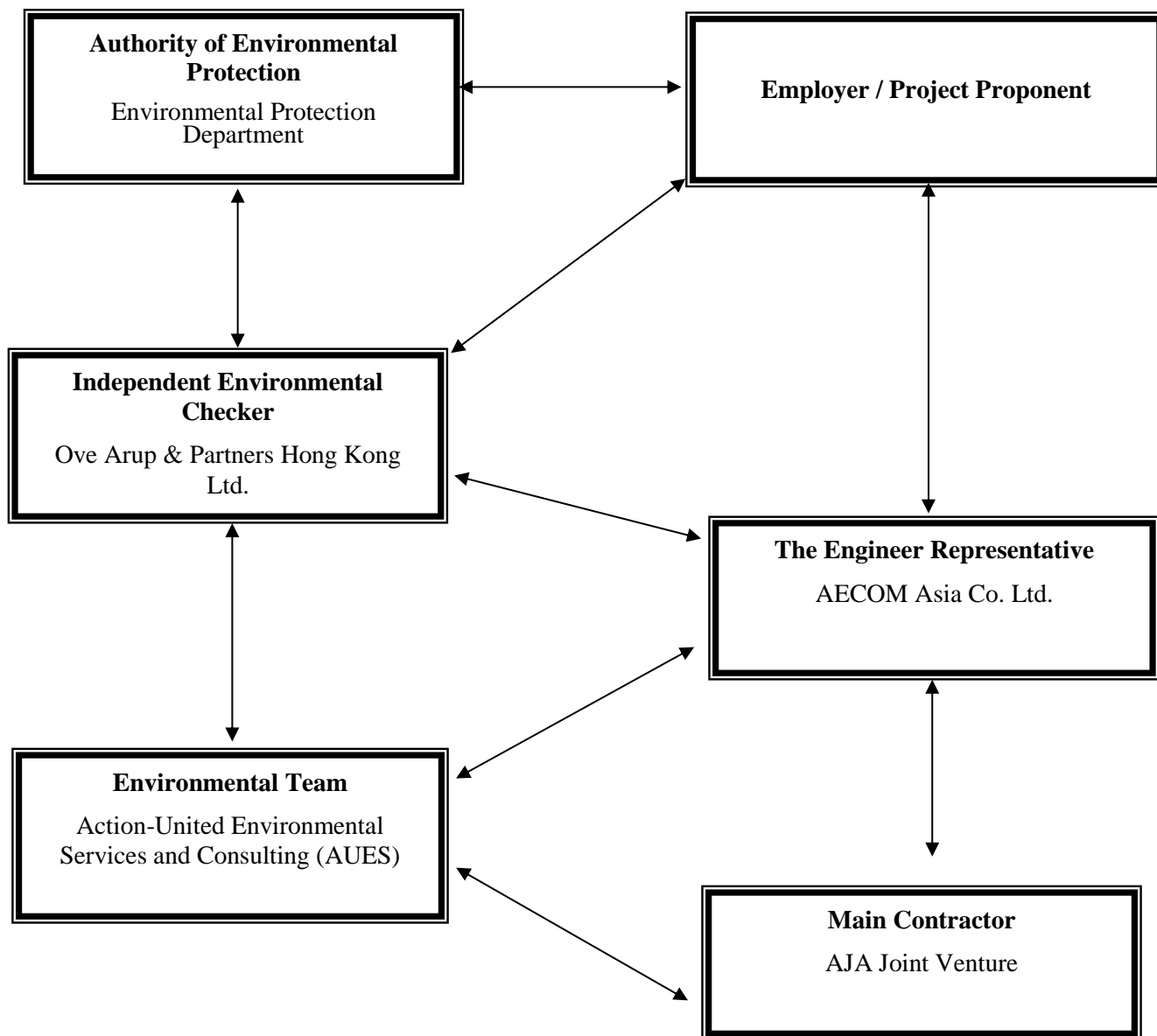
**LOCATION OF THE PROJECT**

|                |                   |              |           |
|----------------|-------------------|--------------|-----------|
| Designed       | HY                | Eng check    | AT        |
| Drawn          | MING              | Coordination | AT        |
| Dwg check      | HY                | Approved     | AFK       |
| Scale at A1    | Status            |              | Rev       |
| <b>1:1500</b>  | <b>PRE</b>        |              | <b>P2</b> |
| Drawing Number | <b>FIGURE 1.1</b> |              |           |

## **Appendix B**

### **Organization Chart**

Project Organization Chart



**Contact Details of Key Personnel for the Project**

| <b>Organization</b> | <b>Project Role</b>               | <b>Name of Key Staff</b> | <b>Tel No.</b> | <b>Fax No.</b> |
|---------------------|-----------------------------------|--------------------------|----------------|----------------|
| EPD                 | Project Proponent                 | Sunny Chiu               | 3151 7209      | 3528 0492      |
| AECOM               | Resident Engineer                 | Ben Tsang                | 9613 6376      | TBC            |
| ARUP                | Independent Environmental Checker | Kin Lo                   | 2268 3256      | 2268 3950      |
| ARUP                | Environmental Consultant          | F.N. Wong                | 2268 3307      | 2268 3950      |
| AJAJV               | Project Manager                   | Victor Wu                | 2862 5013      | TBC            |
| AJAJV               | Construction Manager              | CP Lam                   | 6370 7613      | TBC            |
| AJAJV               | Project Environmental Manager     | Gabriel Wong             | 6114 9590      | TBC            |
| AUES                | Environmental Team Leader         | T. W. Tam                | 2959 6059      | 2959 6079      |
| AUES                | Environmental Consultant          | Nicola Hon               | 2959 6059      | 2959 6079      |
| AUES                | Environmental Consultant          | Ben Tam                  | 2959 6059      | 2959 6079      |
| AUES                | Environmental Consultant          | Martin Li                | 2959 6059      | 2959 6079      |

**Legend:**

*EPD (Employer) – Environmental Protection Department*

*AECOM (Project Consultant) – AECOM Asia Co. Ltd.*

*AJAJV (Main Contractor) – AJA Joint Venture*

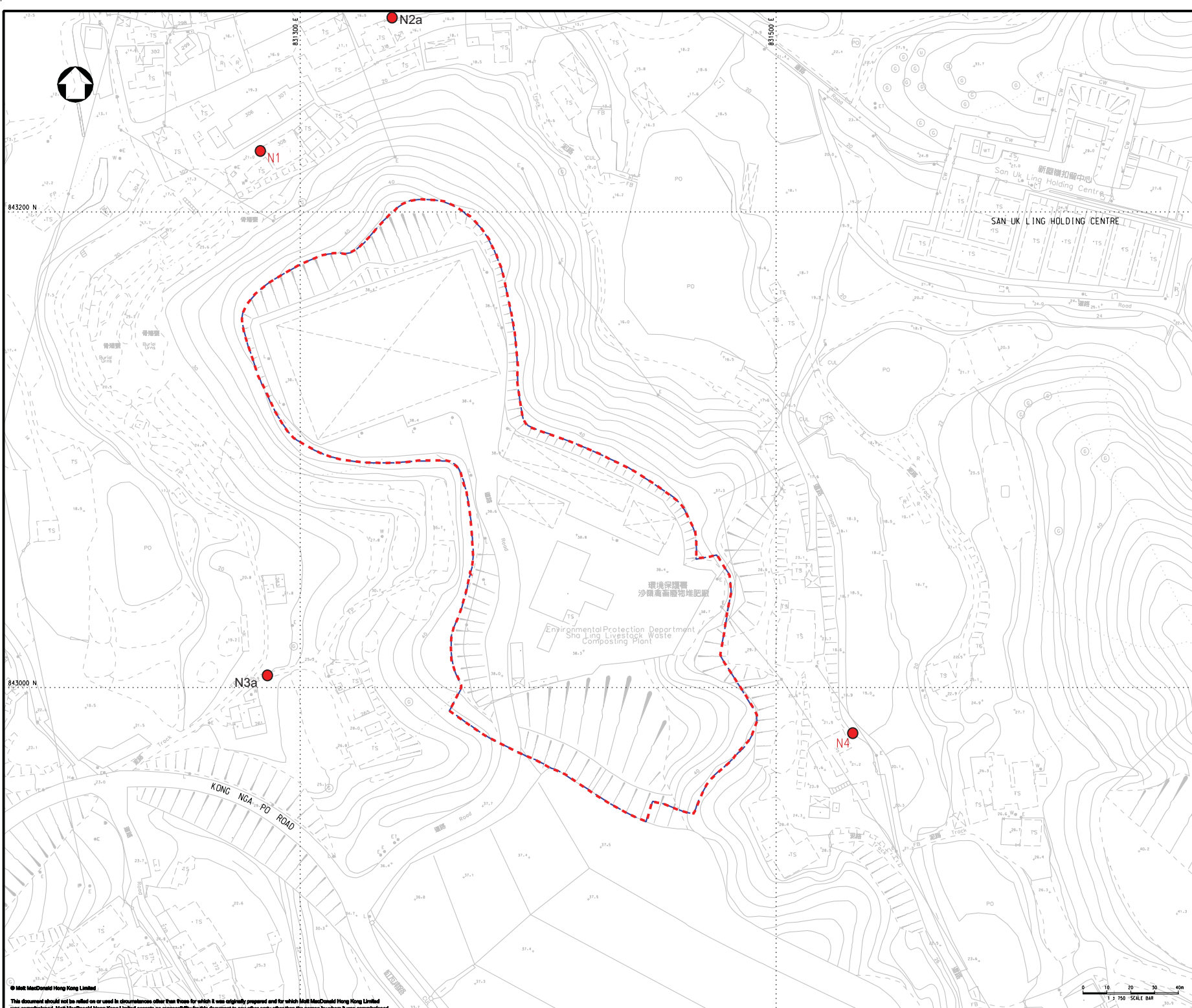
*ARUP (IEC) – Ove Arup & Partners Hong Kong Ltd.*

*AUES (ET) – Action-United Environmental Services & Consulting*



## **Appendix C**

### **Monitoring Locations for Impact Monitoring**



Notes

- Key to symbols
- Construction Site Boundary
  - Noise Monitoring Station

Reference drawings

|    |        |      |                  |    |     |
|----|--------|------|------------------|----|-----|
|    |        |      |                  |    |     |
| P2 | JUL 13 | MING | GENERAL REVISION | AM | AFK |
| P1 | DEC 12 | MING | FIRST ISSUE      | SC | AFK |

| Rev | Date | Drawn | Description | Chk'd | App'd |
|-----|------|-------|-------------|-------|-------|
|     |      |       |             |       |       |



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Environmental Protection Department  
The Government of the Hong Kong  
Special Administrative Region

Project  
**AGREEMENT NO. CE34/2011(EP)  
DEVELOPMENT OF ORGANIC WASTE  
TREATMENT FACILITIES PHASE 2 -  
FEASIBILITY STUDY**

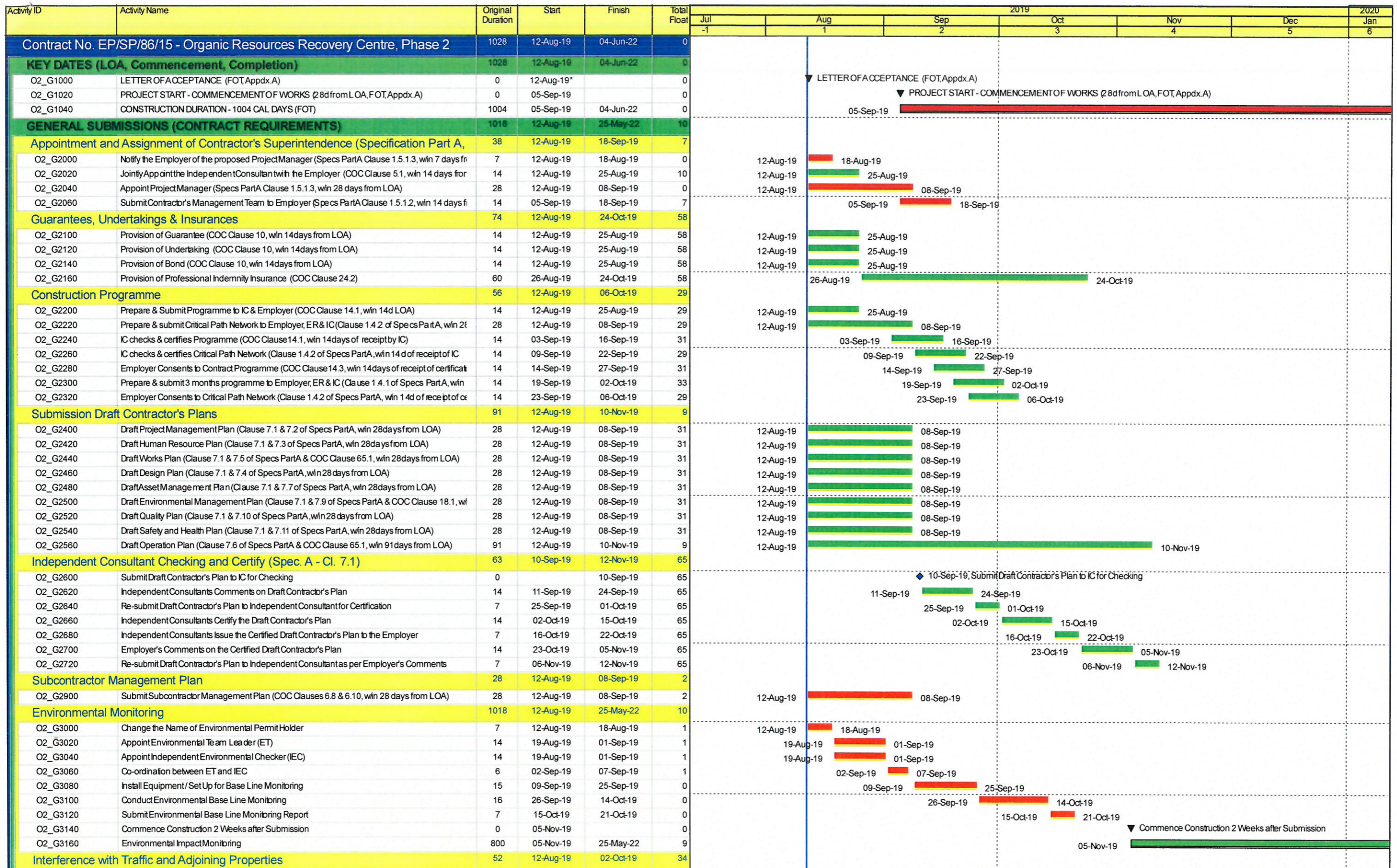
Title  
**PROPOSED LOCATIONS OF  
CONSTRUCTION NOISE  
MONITORING STATIONS**

|                |       |              |     |
|----------------|-------|--------------|-----|
| Designed       | SC    | Eng check    | AT  |
| Drawn          | MING  | Coordination | AT  |
| Dwg check      | EY    | Approved     | AFK |
| Scale at A1    | 1:750 | Status       | PRE |
| Drawing Number |       | Rev          | P2  |

**FIGURE 4.1**

## **Appendix D**

### **3-Month Rolling Construction Programme**



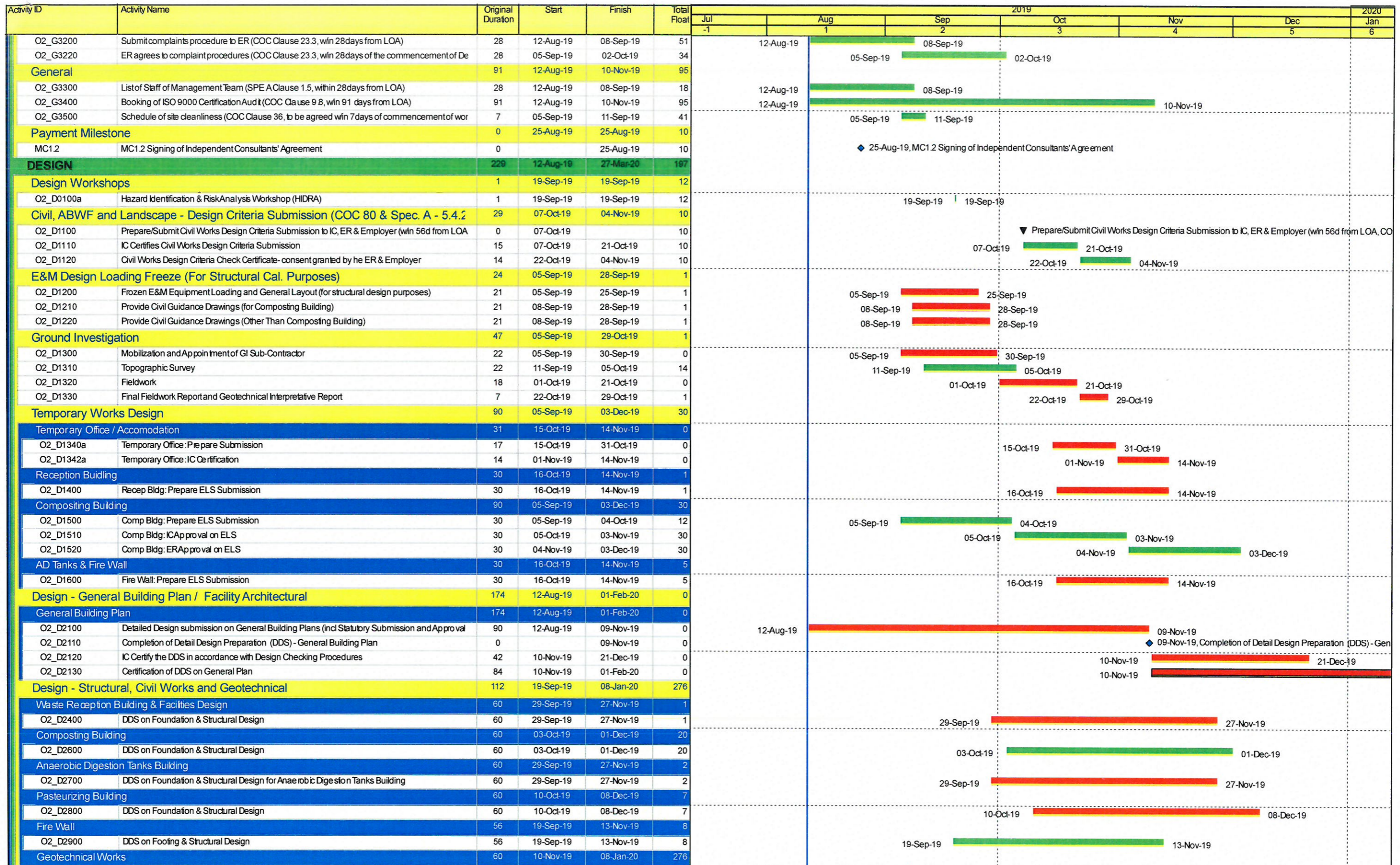
File Name: ORRC2\_R2  
 Layout: ORRC2 (3MRP)  
 Task filter: TASK filter: ORRC2 (3M).  
 Printed on: 27-Nov-19  
 Page 1 of 3

- Primary Baseline
- Remaining Work
- Critical Remaining Work
- Actual Work
- ▼ Start Milestone

1 of 3

**Contract No. EP/SP/86/15  
 Organic Waste Treatment Facilities, Phase 2  
 Initial Works Programme (Three-Month Rolling Programme)**

| Date      | Revision | Checked | Approv.. |
|-----------|----------|---------|----------|
| 26-Aug-19 | Rev.0    |         |          |
| 25-Nov-19 | Rev.1    |         |          |
|           |          |         |          |
|           |          |         |          |

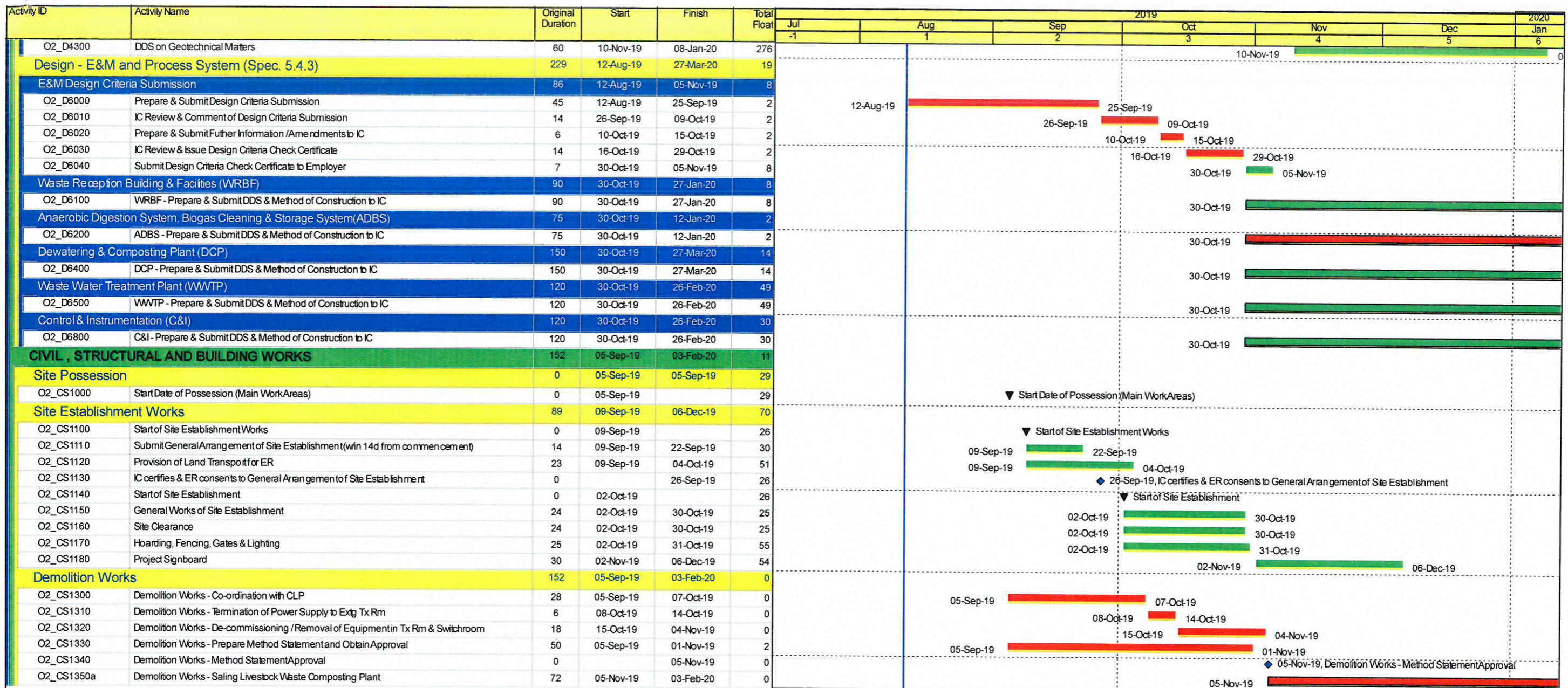


File Name: ORRC2\_R2  
 Layout: ORRC2 (3MRP)  
 Task filter: TASK filter: ORRC2 (3M).  
 Printed on: 27-Nov-19  
 Page 2 of 3

- Primary Baseline
- █ Remaining Work
- █ Critical Remaining Work
- █ Actual Work
- ▼ Start Milestone

**Contract No. EP/SP/86/15  
 Organic Waste Treatment Facilities, Phase 2  
 Initial Works Programme (Three-Month Rolling Programme)**

| Date      | Revision | Checked | Approv.. |
|-----------|----------|---------|----------|
| 26-Aug-19 | Rev. 0   |         |          |
| 25-Nov-19 | Rev. 1   |         |          |
|           |          |         |          |
|           |          |         |          |



File Name: ORRC2\_R2  
 Layout: ORRC2 (3MRP)  
 Task filter: TASK filter: ORRC2 (3M).  
 Printed on: 27-Nov-19  
 Page 3 of 3

- Primary Baseline
- Remaining Work
- Critical Remaining Work
- Actual Work
- ▼ Start Milestone

**Contract No. EP/SP/86/15  
 Organic Waste Treatment Facilities, Phase 2  
 Initial Works Programme (Three-Month Rolling Programme)**

| Date      | Revision | Checked | Approv... |
|-----------|----------|---------|-----------|
| 26-Aug-19 | Rev. 0   |         |           |
| 25-Nov-19 | Rev. 1   |         |           |
|           |          |         |           |
|           |          |         |           |

## **Appendix E**

### **Event and Action Plan**

### Event and Action Plan for Construction Noise

| Event                   | Action  |   |   |   |
|-------------------------|---|---|---|---|
|                         | ET  | IEC   | ER  | Contractor  |
| Action Level Exceedance | <ol style="list-style-type: none"> <li>1. Notify IEC and Contractor;</li> <li>2. Carry out investigation;</li> <li>3. Report the results of investigation to the IEC and Contractor;</li> <li>4. Discuss with the Contractor and formulate remedial measures;</li> <li>5. Increase monitoring frequency to check mitigation effectiveness.</li> </ol>   | <ol style="list-style-type: none"> <li>1. Review the investigation results submitted by the ET;</li> <li>2. Review the proposed remedial measures by the Contractor and advise the ER accordingly;</li> <li>3. Advise the ER on the effectiveness of the proposed remedial measures.</li> </ol> | <ol style="list-style-type: none"> <li>1. Confirm receipt of notification of exceedance in writing;</li> <li>2. Notify Contractor;</li> <li>3. In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented;</li> <li>4. Supervise the implementation of remedial measures</li> </ol>   | <ol style="list-style-type: none"> <li>1. Submit noise mitigation proposals to IEC;</li> <li>2. Implement noise mitigation proposals.</li> </ol>  |
| Limit Level Exceedance  | <ol style="list-style-type: none"> <li>1. Inform IEC, ER, EPD and Contractor;</li> <li>2. Repeat measurements to confirm findings;</li> <li>3. Increase monitoring frequency;</li> <li>4. Identify source and investigate the cause of exceedance;</li> <li>5. Carry out analysis of Contractor's working procedures;</li> <li>6. Discuss with IEC, Contractor and ER on remedial measures required;</li> <li>7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results;</li> <li>8. If exceedance stops, cease additional monitoring.</li> </ol> | <ol style="list-style-type: none"> <li>1. Discuss amongst ER, ET Leader and Contractor on the potential remedial actions;</li> <li>2. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly;</li> </ol>                            | <ol style="list-style-type: none"> <li>1. Confirm receipt of notification of exceedance in writing;</li> <li>2. Notify Contractor;</li> <li>3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented;</li> <li>4. Supervise the implementation of remedial measures;</li> <li>5. If exceedance continues, consider stopping the Contractor to continue working on that portion of work which causes exceedance until the exceedance is abated.</li> </ol> | <ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance;</li> <li>2. Submit proposals for remedial actions to IEC within 3 working days of notification;</li> <li>3. Implement the agreed proposals;</li> <li>4. Submit further proposals if problem still not under control;</li> <li>5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.</li> </ol> |



## **Appendix F**

### **Impact Monitoring Schedule of the Reporting Month and Coming Month**

**Impact Monitoring Schedule for reporting month – December 2019**

| Date |           | Noise Monitoring<br>(Leq30min) |
|------|-----------|--------------------------------|
| Sun  | 1-Dec-19  |                                |
| Mon  | 2-Dec-19  |                                |
| Tue  | 3-Dec-19  |                                |
| Wed  | 4-Dec-19  | ✓                              |
| Thu  | 5-Dec-19  |                                |
| Fri  | 6-Dec-19  |                                |
| Sat  | 7-Dec-19  |                                |
| Sun  | 8-Dec-19  |                                |
| Mon  | 9-Dec-19  |                                |
| Tue  | 10-Dec-19 | ✓                              |
| Wed  | 11-Dec-19 |                                |
| Thu  | 12-Dec-19 |                                |
| Fri  | 13-Dec-19 |                                |
| Sat  | 14-Dec-19 |                                |
| Sun  | 15-Dec-19 |                                |
| Mon  | 16-Dec-19 | ✓                              |
| Tue  | 17-Dec-19 |                                |
| Wed  | 18-Dec-19 |                                |
| Thu  | 19-Dec-19 |                                |
| Fri  | 20-Dec-19 |                                |
| Sat  | 21-Dec-19 |                                |
| Sun  | 22-Dec-19 |                                |
| Mon  | 23-Dec-19 |                                |
| Tue  | 24-Dec-19 |                                |
| Wed  | 25-Dec-19 |                                |
| Thu  | 26-Dec-19 |                                |
| Fri  | 27-Dec-19 | ✓                              |
| Sat  | 28-Dec-19 |                                |
| Sun  | 29-Dec-19 |                                |
| Mon  | 30-Dec-19 |                                |
| Tue  | 31-Dec-19 |                                |

**Remark:**

|  |                          |
|--|--------------------------|
|  | Public Holiday or Sunday |
|--|--------------------------|

**Impact Monitoring Schedule for coming month – January 2020**

| Date |           | Noise Monitoring<br>(Leq30min) |
|------|-----------|--------------------------------|
| Wed  | 1-Jan-20  |                                |
| Thu  | 2-Jan-20  | ✓                              |
| Fri  | 3-Jan-20  |                                |
| Sat  | 4-Jan-20  |                                |
| Sun  | 5-Jan-20  |                                |
| Mon  | 6-Jan-20  |                                |
| Tue  | 7-Jan-20  |                                |
| Wed  | 8-Jan-20  | ✓                              |
| Thu  | 9-Jan-20  |                                |
| Fri  | 10-Jan-20 |                                |
| Sat  | 11-Jan-20 |                                |
| Sun  | 12-Jan-20 |                                |
| Mon  | 13-Jan-20 |                                |
| Tue  | 14-Jan-20 | ✓                              |
| Wed  | 15-Jan-20 |                                |
| Thu  | 16-Jan-20 |                                |
| Fri  | 17-Jan-20 |                                |
| Sat  | 18-Jan-20 |                                |
| Sun  | 19-Jan-20 |                                |
| Mon  | 20-Jan-20 |                                |
| Tue  | 21-Jan-20 |                                |
| Wed  | 22-Jan-20 |                                |
| Thu  | 23-Jan-20 | ✓                              |
| Fri  | 24-Jan-20 |                                |
| Sat  | 25-Jan-20 |                                |
| Sun  | 26-Jan-20 |                                |
| Mon  | 27-Jan-20 |                                |
| Tue  | 28-Jan-20 |                                |
| Wed  | 29-Jan-20 | ✓                              |
| Thu  | 30-Jan-20 |                                |
| Fri  | 31-Jan-20 |                                |

**Remark:**

|  |                          |
|--|--------------------------|
|  | Public Holiday or Sunday |
|--|--------------------------|

## **Appendix G**

### **Calibration Certificates of Equipment**



輝創工程有限公司

Sun Creation Engineering Limited

Calibration & Testing Laboratory

# Certificate of Calibration

## 校正證書

Certificate No. : C193753

證書編號

ITEM TESTED / 送檢項目 ( Job No. / 序引編號 : IC19-1098 )

Date of Receipt / 收件日期 : 5 July 2019

Description / 儀器名稱 : Integrating Sound Level Meter (EQ006)

Manufacturer / 製造商 : Brüel & Kjær

Model No. / 型號 : 2238

Serial No. / 編號 : 2285762

Supplied By / 委託者 : Action-United Environmental Services and Consulting  
Unit A, 20/F., Gold King Industrial Building,  
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

### TEST CONDITIONS / 測試條件

Temperature / 溫度 :  $(23 \pm 2)^{\circ}\text{C}$

Relative Humidity / 相對濕度 :  $(50 \pm 25)\%$

Line Voltage / 電壓 : ---

### TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 16 July 2019

### TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.

The results do not exceed manufacturer's specification.

The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- The Bruel & Kjaer Calibration Laboratory, Denmark
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By

測試

:

K P Cheuk  
Assistant Engineer

Certified By

核證

:

K C Lee  
Engineer

Date of Issue

簽發日期

:

22 July 2019

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Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 — 校正及檢測實驗室

c/o 香港新界屯門興安里一號四樓

Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

# Certificate of Calibration

## 校正證書

Certificate No. : C193753  
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- Self-calibration using laboratory acoustic calibrator was performed before the test from 6.1.1.2 to 6.4.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

| <u>Equipment ID</u> | <u>Description</u>                  | <u>Certificate No.</u> |
|---------------------|-------------------------------------|------------------------|
| CL280               | 40 MHz Arbitrary Waveform Generator | C190176                |
| CL281               | Multifunction Acoustic Calibrator   | CDK1806821             |

- Test procedure : MA101N.

- Results :

### 6.1 Sound Pressure Level

#### 6.1.1 Reference Sound Pressure Level

##### 6.1.1.1 Before Self-calibration

| UUT Setting |                  |                     |                | Applied Value |             | UUT Reading (dB) |
|-------------|------------------|---------------------|----------------|---------------|-------------|------------------|
| Range (dB)  | Parameter        | Frequency Weighting | Time Weighting | Level (dB)    | Freq. (kHz) |                  |
| 50 - 130    | L <sub>AFP</sub> | A                   | F              | 94.00         | 1           | 94.4             |

##### 6.1.1.2 After Self-calibration

| UUT Setting |                  |                     |                | Applied Value |             | UUT Reading (dB) | IEC 60651 Type 1 Spec. (dB) |
|-------------|------------------|---------------------|----------------|---------------|-------------|------------------|-----------------------------|
| Range (dB)  | Parameter        | Frequency Weighting | Time Weighting | Level (dB)    | Freq. (kHz) |                  |                             |
| 50 - 130    | L <sub>AFP</sub> | A                   | F              | 94.00         | 1           | 94.1             | ± 0.7                       |

##### 6.1.2 Linearity

| UUT Setting |                  |                     |                | Applied Value |             | UUT Reading (dB) |
|-------------|------------------|---------------------|----------------|---------------|-------------|------------------|
| Range (dB)  | Parameter        | Frequency Weighting | Time Weighting | Level (dB)    | Freq. (kHz) |                  |
| 50 - 130    | L <sub>AFP</sub> | A                   | F              | 94.00         | 1           | 94.1 (Ref.)      |
|             |                  |                     |                | 104.00        |             | 104.1            |
|             |                  |                     |                | 114.00        |             | 114.0            |

IEC 60651 Type 1 Spec. : ± 0.4 dB per 10 dB step and ± 0.7 dB for overall different.

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

# Certificate of Calibration

## 校正證書

Certificate No. : C193753

證書編號

### 6.2 Time Weighting

#### 6.2.1 Continuous Signal

| UUT Setting |                  |                     |                | Applied Value |             | UUT Reading (dB) | IEC 60651 Type 1 Spec. (dB) |
|-------------|------------------|---------------------|----------------|---------------|-------------|------------------|-----------------------------|
| Range (dB)  | Parameter        | Frequency Weighting | Time Weighting | Level (dB)    | Freq. (kHz) |                  |                             |
| 50 - 130    | L <sub>AFP</sub> | A                   | F              | 94.00         | 1           | 94.1             | Ref.                        |
|             | L <sub>ASP</sub> |                     | S              |               |             | 94.1             | ± 0.1                       |
|             | L <sub>AIP</sub> |                     | I              |               |             | 94.2             | ± 0.1                       |

#### 6.2.2 Tone Burst Signal (2 kHz)

| UUT Setting |                    |                     |                | Applied Value |                | UUT Reading (dB) | IEC 60651 Type 1 Spec. (dB) |
|-------------|--------------------|---------------------|----------------|---------------|----------------|------------------|-----------------------------|
| Range (dB)  | Parameter          | Frequency Weighting | Time Weighting | Level (dB)    | Burst Duration |                  |                             |
| 30 - 110    | L <sub>AFP</sub>   | A                   | F              | 106.0         | Continuous     | 106.0            | Ref.                        |
|             | L <sub>AFMax</sub> |                     |                |               | 200 ms         | 104.9            | -1.0 ± 1.0                  |
|             | L <sub>ASP</sub>   |                     | S              |               | Continuous     | 106.0            | Ref.                        |
|             | L <sub>ASMax</sub> |                     |                |               | 500 ms         | 102.0            | -4.1 ± 1.0                  |

### 6.3 Frequency Weighting

#### 6.3.1 A-Weighting

| UUT Setting |                  |                     |                | Applied Value |          | UUT Reading (dB) | IEC 60651 Type 1 Spec. (dB) |
|-------------|------------------|---------------------|----------------|---------------|----------|------------------|-----------------------------|
| Range (dB)  | Parameter        | Frequency Weighting | Time Weighting | Level (dB)    | Freq.    |                  |                             |
| 50 - 130    | L <sub>AFP</sub> | A                   | F              | 94.00         | 31.5 Hz  | 55.2             | -39.4 ± 1.5                 |
|             |                  |                     |                |               | 63 Hz    | 68.1             | -26.2 ± 1.5                 |
|             |                  |                     |                |               | 125 Hz   | 78.0             | -16.1 ± 1.0                 |
|             |                  |                     |                |               | 250 Hz   | 85.4             | -8.6 ± 1.0                  |
|             |                  |                     |                |               | 500 Hz   | 90.8             | -3.2 ± 1.0                  |
|             |                  |                     |                |               | 1 kHz    | 94.1             | Ref.                        |
|             |                  |                     |                |               | 2 kHz    | 95.3             | +1.2 ± 1.0                  |
|             |                  |                     |                |               | 4 kHz    | 95.1             | +1.0 ± 1.0                  |
|             |                  |                     |                |               | 8 kHz    | 93.0             | -1.1 (+1.5 ; -3.0)          |
|             |                  |                     |                |               | 12.5 kHz | 89.9             | -4.3 (+3.0 ; -6.0)          |

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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# Certificate of Calibration

## 校正證書

Certificate No. : C193753

證書編號

### 6.3.2 C-Weighting

| UUT Setting |                  |                     |                | Applied Value |          | UUT Reading (dB) | IEC 60651 Type 1 Spec. (dB) |
|-------------|------------------|---------------------|----------------|---------------|----------|------------------|-----------------------------|
| Range (dB)  | Parameter        | Frequency Weighting | Time Weighting | Level (dB)    | Freq.    |                  |                             |
| 50 - 130    | L <sub>CFP</sub> | C                   | F              | 94.00         | 31.5 Hz  | 91.5             | -3.0 ± 1.5                  |
|             |                  |                     |                |               | 63 Hz    | 93.4             | -0.8 ± 1.5                  |
|             |                  |                     |                |               | 125 Hz   | 93.9             | -0.2 ± 1.0                  |
|             |                  |                     |                |               | 250 Hz   | 94.1             | 0.0 ± 1.0                   |
|             |                  |                     |                |               | 500 Hz   | 94.1             | 0.0 ± 1.0                   |
|             |                  |                     |                |               | 1 kHz    | 94.1             | Ref.                        |
|             |                  |                     |                |               | 2 kHz    | 93.9             | -0.2 ± 1.0                  |
|             |                  |                     |                |               | 4 kHz    | 93.3             | -0.8 ± 1.0                  |
|             |                  |                     |                |               | 8 kHz    | 91.1             | -3.0 (+1.5 ; -3.0)          |
|             |                  |                     |                |               | 12.5 kHz | 88.0             | -6.2 (+3.0 ; -6.0)          |

### 6.4 Time Averaging

| UUT Setting |                  |                     |                  | Applied Value   |                     |                   |                  |                       | UUT Reading (dB) | IEC 60804 Type 1 Spec. (dB) |
|-------------|------------------|---------------------|------------------|-----------------|---------------------|-------------------|------------------|-----------------------|------------------|-----------------------------|
| Range (dB)  | Parameter        | Frequency Weighting | Integrating Time | Frequency (kHz) | Burst Duration (ms) | Burst Duty Factor | Burst Level (dB) | Equivalent Level (dB) |                  |                             |
| 30 - 110    | L <sub>Aeq</sub> | A                   | 10 sec.          | 4               | 1                   | 1/10              | 110.0            | 100                   | 100.0            | ± 0.5                       |
|             |                  |                     | 60 sec.          |                 |                     | 1/10 <sup>2</sup> |                  | 90                    | 90.0             | ± 0.5                       |
|             |                  |                     | 5 min.           |                 |                     | 1/10 <sup>3</sup> |                  | 80                    | 79.2             | ± 1.0                       |
|             |                  |                     |                  |                 |                     | 1/10 <sup>4</sup> |                  | 70                    | 69.2             | ± 1.0                       |

Remarks : - UUT Microphone Model No. : 4188 & S/N : 2658547

- Mfr's Spec. : IEC 60651 Type 1 & IEC 60804 Type 1

- Uncertainties of Applied Value :

|       |                        |   |
|-------|------------------------|---|
| 94 dB | 31.5 Hz - 125 Hz       | : ± 0.35 dB                                     |
|       | 250 Hz - 500 Hz        | : ± 0.30 dB                                     |
|       | 1 kHz                  | : ± 0.20 dB                                     |
|       | 2 kHz - 4 kHz          | : ± 0.35 dB                                     |
|       | 8 kHz                  | : ± 0.45 dB                                     |
|       | 12.5 kHz               | : ± 0.70 dB                                     |
|       | 104 dB : 1 kHz         | : ± 0.10 dB (Ref. 94 dB)                        |
|       | 114 dB : 1 kHz         | : ± 0.10 dB (Ref. 94 dB)                        |
|       | Burst equivalent level | : ± 0.2 dB (Ref. 110 dB continuous sound level) |

- The uncertainties are for a confidence probability of not less than 95 %.

Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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輝創工程有限公司

Sun Creation Engineering Limited

Calibration & Testing Laboratory

# Certificate of Calibration

## 校正證書

Certificate No. : C194820

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC19-1098)      Date of Receipt / 收件日期 : 27 August 2019

Description / 儀器名稱 : Sound Level Meter (EQ015)

Manufacturer / 製造商 : Rion

Model No. / 型號 : NL-52

Serial No. / 編號 : 00142581

Supplied By / 委託者 : Action-United Environmental Services and Consulting  
Unit A, 20/F., Gold King Industrial Building,  
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

### TEST CONDITIONS / 測試條件

Temperature / 溫度 :  $(23 \pm 2)^{\circ}\text{C}$

Relative Humidity / 相對濕度 :  $(50 \pm 25)\%$

Line Voltage / 電壓 : ---

### TEST SPECIFICATIONS / 測試規範

Calibration

DATE OF TEST / 測試日期 : 7 September 2019

### TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.

The results do not exceed manufacturer's specification. (after adjustment)

The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- The Bruel & Kjaer Calibration Laboratory, Denmark
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By  
測試

H T Wong  
Technical Officer

Certified By  
核證

K C Lee  
Engineer

Date of Issue  
簽發日期

10 September 2019

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c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

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E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

# Certificate of Calibration

## 校正證書

Certificate No. : C194820  
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
2. Self-calibration using the internal standard (After Adjustment) was performed before the test 6.1.1.2 to 6.3.2.
3. The results presented are the mean of 3 measurements at each calibration point.
4. Test equipment :

| Equipment ID | Description                         | Certificate No. |
|--------------|-------------------------------------|-----------------|
| CL280        | 40 MHz Arbitrary Waveform Generator | C190176         |
| CL281        | Multifunction Acoustic Calibrator   | CDK1806821      |

5. Test procedure : MA101N.

6. Results :

### 6.1 Sound Pressure Level

#### 6.1.1 Reference Sound Pressure Level

##### 6.1.1.1 Before Adjustment

| UUT Setting |                |                     |                | Applied Value |             | UUT Reading (dB) | IEC 61672 Class 1 Spec. (dB) |
|-------------|----------------|---------------------|----------------|---------------|-------------|------------------|------------------------------|
| Range (dB)  | Function       | Frequency Weighting | Time Weighting | Level (dB)    | Freq. (kHz) |                  |                              |
| 30 - 130    | L <sub>A</sub> | A                   | Fast           | 94.00         | 1           | * 92.9           | ± 1.1                        |

\* Out of IEC 61672 Class 1 Spec.

##### 6.1.1.2 After Adjustment

| UUT Setting |                |                     |                | Applied Value |             | UUT Reading (dB) | IEC 61672 Class 1 Spec. (dB) |
|-------------|----------------|---------------------|----------------|---------------|-------------|------------------|------------------------------|
| Range (dB)  | Function       | Frequency Weighting | Time Weighting | Level (dB)    | Freq. (kHz) |                  |                              |
| 30 - 130    | L <sub>A</sub> | A                   | Fast           | 94.00         | 1           | 94.0             | ± 1.1                        |

##### 6.1.2 Linearity

| UUT Setting |                |                     |                | Applied Value |             | UUT Reading (dB) |
|-------------|----------------|---------------------|----------------|---------------|-------------|------------------|
| Range (dB)  | Function       | Frequency Weighting | Time Weighting | Level (dB)    | Freq. (kHz) |                  |
| 30 - 130    | L <sub>A</sub> | A                   | Fast           | 94.00         | 1           | 94.0 (Ref.)      |
|             |                |                     |                | 104.00        |             | 104.0            |
|             |                |                     |                | 114.00        |             | 114.0            |

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

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# Certificate of Calibration

## 校正證書

Certificate No. : C194820  
證書編號

### 6.2 Time Weighting

| UUT Setting |                |                     |                | Applied Value |             | UUT Reading (dB) | IEC 61672 Class 1 Spec. (dB) |
|-------------|----------------|---------------------|----------------|---------------|-------------|------------------|------------------------------|
| Range (dB)  | Function       | Frequency Weighting | Time Weighting | Level (dB)    | Freq. (kHz) |                  |                              |
| 30 - 130    | L <sub>A</sub> | A                   | Fast           | 94.00         | 1           | 94.0             | Ref.                         |
|             |                |                     | Slow           |               |             | 94.0             | ± 0.3                        |

### 6.3 Frequency Weighting

#### 6.3.1 A-Weighting

| UUT Setting |                |                     |                | Applied Value |          | UUT Reading (dB) | IEC 61672 Class 1 Spec. (dB) |
|-------------|----------------|---------------------|----------------|---------------|----------|------------------|------------------------------|
| Range (dB)  | Function       | Frequency Weighting | Time Weighting | Level (dB)    | Freq.    |                  |                              |
| 30 - 130    | L <sub>A</sub> | A                   | Fast           | 94.00         | 63 Hz    | 67.7             | -26.2 ± 1.5                  |
|             |                |                     |                |               | 125 Hz   | 77.8             | -16.1 ± 1.5                  |
|             |                |                     |                |               | 250 Hz   | 85.3             | -8.6 ± 1.4                   |
|             |                |                     |                |               | 500 Hz   | 90.8             | -3.2 ± 1.4                   |
|             |                |                     |                |               | 1 kHz    | 94.0             | Ref.                         |
|             |                |                     |                |               | 2 kHz    | 95.2             | +1.2 ± 1.6                   |
|             |                |                     |                |               | 4 kHz    | 95.0             | +1.0 ± 1.6                   |
|             |                |                     |                |               | 8 kHz    | 93.0             | -1.1 (+2.1 ; -3.1)           |
|             |                |                     |                |               | 12.5 kHz | 89.6             | -4.3 (+3.0 ; -6.0)           |

#### 6.3.2 C-Weighting

| UUT Setting |                |                     |                | Applied Value |          | UUT Reading (dB) | IEC 61672 Class 1 Spec. (dB) |
|-------------|----------------|---------------------|----------------|---------------|----------|------------------|------------------------------|
| Range (dB)  | Function       | Frequency Weighting | Time Weighting | Level (dB)    | Freq.    |                  |                              |
| 30 - 130    | L <sub>C</sub> | C                   | Fast           | 94.00         | 63 Hz    | 93.1             | -0.8 ± 1.5                   |
|             |                |                     |                |               | 125 Hz   | 93.8             | -0.2 ± 1.5                   |
|             |                |                     |                |               | 250 Hz   | 94.0             | 0.0 ± 1.4                    |
|             |                |                     |                |               | 500 Hz   | 94.0             | 0.0 ± 1.4                    |
|             |                |                     |                |               | 1 kHz    | 94.0             | Ref.                         |
|             |                |                     |                |               | 2 kHz    | 93.9             | -0.2 ± 1.6                   |
|             |                |                     |                |               | 4 kHz    | 93.2             | -0.8 ± 1.6                   |
|             |                |                     |                |               | 8 kHz    | 91.1             | -3.0 (+2.1 ; -3.1)           |
|             |                |                     |                |               | 12.5 kHz | 87.7             | -6.2 (+3.0 ; -6.0)           |

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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# Certificate of Calibration

## 校正證書

Certificate No. : C194820  
證書編號

- Remarks : - UUT Microphone Model No. : UC-59 & S/N : 15585
- Mfr's Spec. : IEC 61672 Class 1
- Uncertainties of Applied Value :
- |        |                  |                          |
|--------|------------------|--------------------------|
| 94 dB  | : 63 Hz - 125 Hz | : ± 0.35 dB              |
|        | 250 Hz - 500 Hz  | : ± 0.30 dB              |
|        | 1 kHz            | : ± 0.20 dB              |
|        | 2 kHz - 4 kHz    | : ± 0.35 dB              |
|        | 8 kHz            | : ± 0.45 dB              |
|        | 12.5 kHz         | : ± 0.70 dB              |
| 104 dB | : 1 kHz          | : ± 0.10 dB (Ref. 94 dB) |
| 114 dB | : 1 kHz          | : ± 0.10 dB (Ref. 94 dB) |
- The uncertainties are for a confidence probability of not less than 95 %.

Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

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輝創工程有限公司

Sun Creation Engineering Limited

Calibration & Testing Laboratory

# Certificate of Calibration

## 校正證書

Certificate No. : C192956

證書編號

ITEM TESTED / 送檢項目 ( Job No. / 序引編號 : IC19-1098 )

Date of Receipt / 收件日期 : 30 May 2019

Description / 儀器名稱 : Sound Calibrator (EQ082)  
Manufacturer / 製造商 : Brüel & Kjær  
Model No. / 型號 : 4231  
Serial No. / 編號 : 2713428  
Supplied By / 委託者 : Action-United Environmental Services and Consulting  
Unit A, 20/F., Gold King Industrial Building,  
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

### TEST CONDITIONS / 測試條件

Temperature / 溫度 :  $(23 \pm 2)^{\circ}\text{C}$   
Line Voltage / 電壓 : ---

Relative Humidity / 相對濕度 :  $(50 \pm 25)\%$

### TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 7 June 2019

### TEST RESULTS / 測試結果

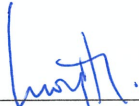
The results apply to the particular unit-under-test only.  
The results do not exceed manufacturer's specification.  
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- The Bruel & Kjaer Calibration Laboratory, Denmark
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By  
測試

:

  
H T Wong  
Technical Officer

Certified By  
核證

:

  
K C Lee  
Engineer

Date of Issue  
簽發日期

:

12 June 2019

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Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

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# Certificate of Calibration

## 校正證書

Certificate No. : C192956

證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

| <u>Equipment ID</u> | <u>Description</u>                | <u>Certificate No.</u> |
|---------------------|-----------------------------------|------------------------|
| CL130               | Universal Counter                 | C183775                |
| CL281               | Multifunction Acoustic Calibrator | CDK1806821             |
| TST150A             | Measuring Amplifier               | C181288                |

- Test procedure : MA100N.

- Results :

### 5.1 Sound Level Accuracy

| UUT<br>Nominal Value | Measured Value<br>(dB) | Mfr's Spec.<br>(dB) | Uncertainty of Measured Value<br>(dB) |
|----------------------|------------------------|---------------------|---------------------------------------|
| 94 dB, 1 kHz         | 94.0                   | ± 0.2               | ± 0.2                                 |
| 114 dB, 1 kHz        | 114.1                  |                     |                                       |

### 5.2 Frequency Accuracy

| UUT Nominal Value<br>(kHz) | Measured Value<br>(kHz) | Mfr's<br>Spec. | Uncertainty of Measured Value<br>(Hz) |
|----------------------------|-------------------------|----------------|---------------------------------------|
| 1                          | 1.000 0                 | 1 kHz ± 0.1 %  | ± 0.1                                 |

Remark : The uncertainties are for a confidence probability of not less than 95 %.

Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

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# Certificate of Calibration 校正證書

Certificate No. : C193752  
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC19-1098)      Date of Receipt / 收件日期 : 9 July 2019  
Description / 儀器名稱 : Sound Calibrator (EQ086)  
Manufacturer / 製造商 : Rion  
Model No. / 型號 : NC-74  
Serial No. / 編號 : 34657230  
Supplied By / 委託者 : Action-United Environmental Services and Consulting  
Unit A, 20/F., Gold King Industrial Building,  
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

## TEST CONDITIONS / 測試條件

Temperature / 溫度 :  $(23 \pm 2)^{\circ}\text{C}$       Relative Humidity / 相對濕度 :  $(50 \pm 25)\%$   
Line Voltage / 電壓 : ---

## TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 16 July 2019

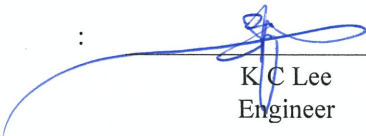
## TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.  
The results do not exceed manufacturer's specification.  
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- The Bruel & Kjaer Calibration Laboratory, Denmark
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By :   
測試 : \_\_\_\_\_  
K P Cheuk  
Assistant Engineer

Certified By :   
核證 : \_\_\_\_\_  
K C Lee  
Engineer

Date of Issue : 22 July 2019  
簽發日期

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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# Certificate of Calibration

## 校正證書

Certificate No. : C193752  
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

| <u>Equipment ID</u> | <u>Description</u>                | <u>Certificate No.</u> |
|---------------------|-----------------------------------|------------------------|
| CL130               | Universal Counter                 | C183775                |
| CL281               | Multifunction Acoustic Calibrator | CDK1806821             |
| TST150A             | Measuring Amplifier               | C181288                |

- Test procedure : MA100N.

- Results :

### 5.1 Sound Level Accuracy

| UUT<br>Nominal Value | Measured Value<br>(dB) | Mfr's Spec.<br>(dB) | Uncertainty of Measured Value<br>(dB) |
|----------------------|------------------------|---------------------|---------------------------------------|
| 94 dB, 1 kHz         | 94.1                   | ± 0.3               | ± 0.2                                 |

### 5.2 Frequency Accuracy

| UUT Nominal Value<br>(kHz) | Measured Value<br>(kHz) | Mfr's<br>Spec. | Uncertainty of Measured Value<br>(Hz) |
|----------------------------|-------------------------|----------------|---------------------------------------|
| 1                          | 1.002                   | 1 kHz ± 1 %    | ± 1                                   |

Remark : The uncertainties are for a confidence probability of not less than 95 %.

#### Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

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## **Appendix H**

### **Database of Monitoring Results**

| Daytime Noise Measurement Results (dB) of N1 |            |                |            |            |                |            |            |                |            |            |                |            |            |                |            |            |                |            |            |                 |                   |
|--|------------|----------------|------------|------------|----------------|------------|------------|----------------|------------|------------|----------------|------------|------------|----------------|------------|------------|----------------|------------|------------|-----------------|-------------------|
| Date   | Start Time | 1st Leq (5min) |            |            | 2nd Leq (5min) |            |            | 3rd Leq (5min) |            |            | 4th Leq (5min) |            |            | 5th Leq (5min) |            |            | 6th Leq (5min) |            |            | Leq30min, dB(A) | Façade Correction |
|  |            | Leq, dB(A)     | L10, dB(A) | L90, dB(A) | Leq, dB(A)     | L10, dB(A) | L90, dB(A) | Leq, dB(A)     | L10, dB(A) | L90, dB(A) | Leq, dB(A)     | L10, dB(A) | L90, dB(A) | Leq, dB(A)     | L10, dB(A) | L90, dB(A) | Leq, dB(A)     | L10, dB(A) | L90, dB(A) |                 |                   |
| 4-Dec-19                                     | 13:41      | 69.0           | 53.7       | 47.1       | 49.0           | 50.8       | 45.8       | 49.2           | 51.9       | 45.1       | 48.9           | 50.6       | 46.5       | 49.9           | 50.8       | 45.1       | 49.2           | 51.2       | 46.3       | 61.4            | 64.4              |
| 10-Dec-19                                    | 14:30      | 69.1           | 56.1       | 43.9       | 49.6           | 52.0       | 43.8       | 56.0           | 55.4       | 43.8       | 48.6           | 51.3       | 43.5       | 50.9           | 53.9       | 43.1       | 48.1           | 51.3       | 43.1       | 61.7            | 64.7              |
| 16-Dec-19                                    | 14:16      | 56.9           | 54.5       | 44.5       | 66.3           | 72.5       | 42.5       | 47.9           | 51.0       | 41.0       | 51.3           | 54.5       | 45.0       | 50.8           | 54.5       | 44.0       | 51.0           | 54.0       | 45.0       | 59.4            | 62.4              |
| 27-Dec-19                                    | 15:37      | 71.5           | 58.0       | 46.0       | 51.5           | 53.5       | 48.0       | 50.0           | 52.3       | 46.6       | 48.9           | 50.9       | 45.0       | 50.2           | 52.1       | 46.8       | 49.1           | 51.8       | 45.1       | 63.9            | 66.9              |

| Daytime Noise Measurement Results (dB) of N2a |            |                |            |            |                |            |            |                |            |            |                |            |            |                |            |            |                |            |            |                 |                   |
|---|------------|----------------|------------|------------|----------------|------------|------------|----------------|------------|------------|----------------|------------|------------|----------------|------------|------------|----------------|------------|------------|-----------------|-------------------|
| Date  | Start Time | 1st Leq (5min) |            |            | 2nd Leq (5min) |            |            | 3rd Leq (5min) |            |            | 4th Leq (5min) |            |            | 5th Leq (5min) |            |            | 6th Leq (5min) |            |            | Leq30min, dB(A) | Façade Correction |
|   |            | Leq, dB(A)     | L10, dB(A) | L90, dB(A) | Leq, dB(A)     | L10, dB(A) | L90, dB(A) | Leq, dB(A)     | L10, dB(A) | L90, dB(A) | Leq, dB(A)     | L10, dB(A) | L90, dB(A) | Leq, dB(A)     | L10, dB(A) | L90, dB(A) | Leq, dB(A)     | L10, dB(A) | L90, dB(A) |                 |                   |
| 4-Dec-19                                      | 11:07      | 47.6           | 50.0       | 42.6       | 46.7           | 48.3       | 42.4       | 46.2           | 48.2       | 43.3       | 46.7           | 48.6       | 43.2       | 47.4           | 49.1       | 43.9       | 46.3           | 48.1       | 43.0       | 46.8            | 49.8              |
| 10-Dec-19                                     | 15:08      | 47.2           | 49.3       | 39.1       | 46.4           | 49.1       | 39.7       | 52.5           | 50.2       | 37.5       | 42.3           | 45.2       | 37.7       | 45.6           | 47.2       | 38.7       | 47.5           | 49.7       | 39.0       | 48.1            | 51.1              |
| 16-Dec-19                                     | 10:47      | 43.3           | 46.5       | 37.5       | 39.7           | 42.5       | 34.5       | 51.0           | 43.5       | 36.0       | 50.5           | 52.0       | 37.5       | 44.7           | 48.5       | 37.0       | 44.3           | 48.5       | 36.0       | 47.3            | 50.3              |
| 27-Dec-19                                     | 16:42      | 47.4           | 50.5       | 41.6       | 46.3           | 48.8       | 42.3       | 49.0           | 49.0       | 42.9       | 47.6           | 48.8       | 42.3       | 48.5           | 49.1       | 42.0       | 47.4           | 48.0       | 42.0       | 47.8            | 50.8              |

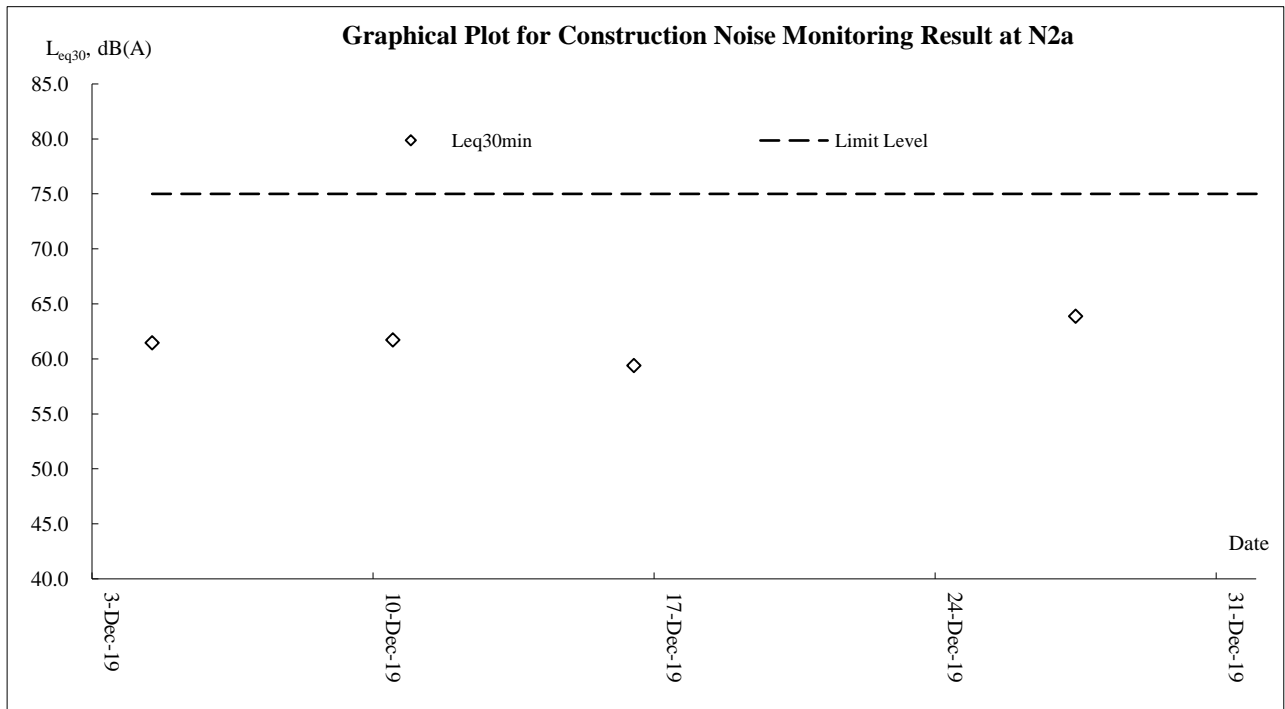
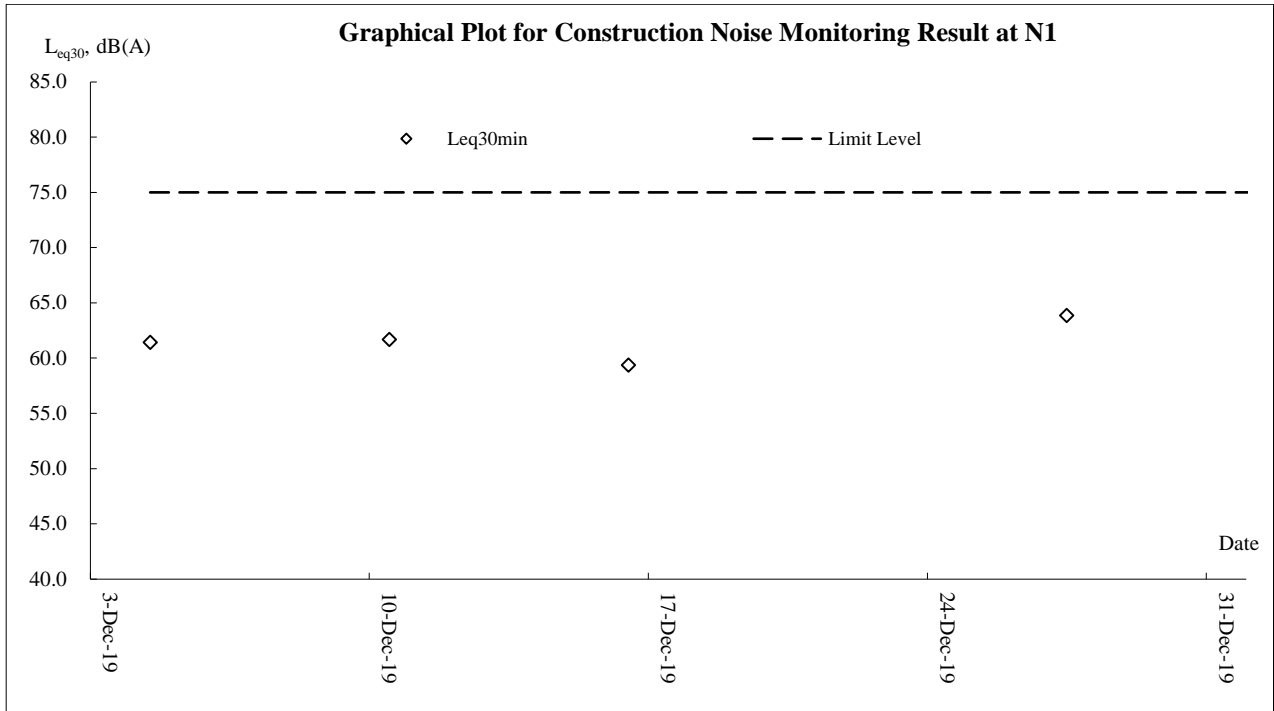
| Daytime Noise Measurement Results (dB) of N3a |            |                |            |            |                |            |            |                |            |            |                |            |            |                |            |            |                |            |            |                 |                   |
|---|------------|----------------|------------|------------|----------------|------------|------------|----------------|------------|------------|----------------|------------|------------|----------------|------------|------------|----------------|------------|------------|-----------------|-------------------|
| Date  | Start Time | 1st Leq (5min) |            |            | 2nd Leq (5min) |            |            | 3rd Leq (5min) |            |            | 4th Leq (5min) |            |            | 5th Leq (5min) |            |            | 6th Leq (5min) |            |            | Leq30min, dB(A) | Façade Correction |
|   |            | Leq, dB(A)     | L10, dB(A) | L90, dB(A) | Leq, dB(A)     | L10, dB(A) | L90, dB(A) | Leq, dB(A)     | L10, dB(A) | L90, dB(A) | Leq, dB(A)     | L10, dB(A) | L90, dB(A) | Leq, dB(A)     | L10, dB(A) | L90, dB(A) | Leq, dB(A)     | L10, dB(A) | L90, dB(A) |                 |                   |
| 4-Dec-19                                      | 14:22      | 51.8           | 56.5       | 43.2       | 53.8           | 53.6       | 42.7       | 50.6           | 54.5       | 42.0       | 46.9           | 53.5       | 42.6       | 48.5           | 53.7       | 43.5       | 50.7           | 54.7       | 45.5       | 50.9            | 53.9              |
| 10-Dec-19                                     | 13:46      | 73.2           | 57.4       | 45.7       | 53.2           | 57.0       | 42.4       | 49.4           | 52.0       | 42.6       | 51.8           | 55.2       | 43.5       | 50.6           | 53.5       | 42.9       | 51.3           | 54.9       | 42.0       | 65.6            | 68.6              |
| 16-Dec-19                                     | 13:28      | 76.5           | 81.5       | 48.5       | 67.9           | 72.0       | 35.0       | 62.1           | 62.0       | 35.0       | 70.7           | 73.0       | 43.0       | 71.4           | 74.0       | 34.5       | 65.4           | 59.0       | 43.5       | 71.3            | 74.3              |
| 27-Dec-19                                     | 14:56      | 70.5           | 60.1       | 47.4       | 55.5           | 58.5       | 47.9       | 54.9           | 57.9       | 47.4       | 54.3           | 58.5       | 44.2       | 55.3           | 58.3       | 45.5       | 54.8           | 57.0       | 44.7       | 63.3            | 66.3              |

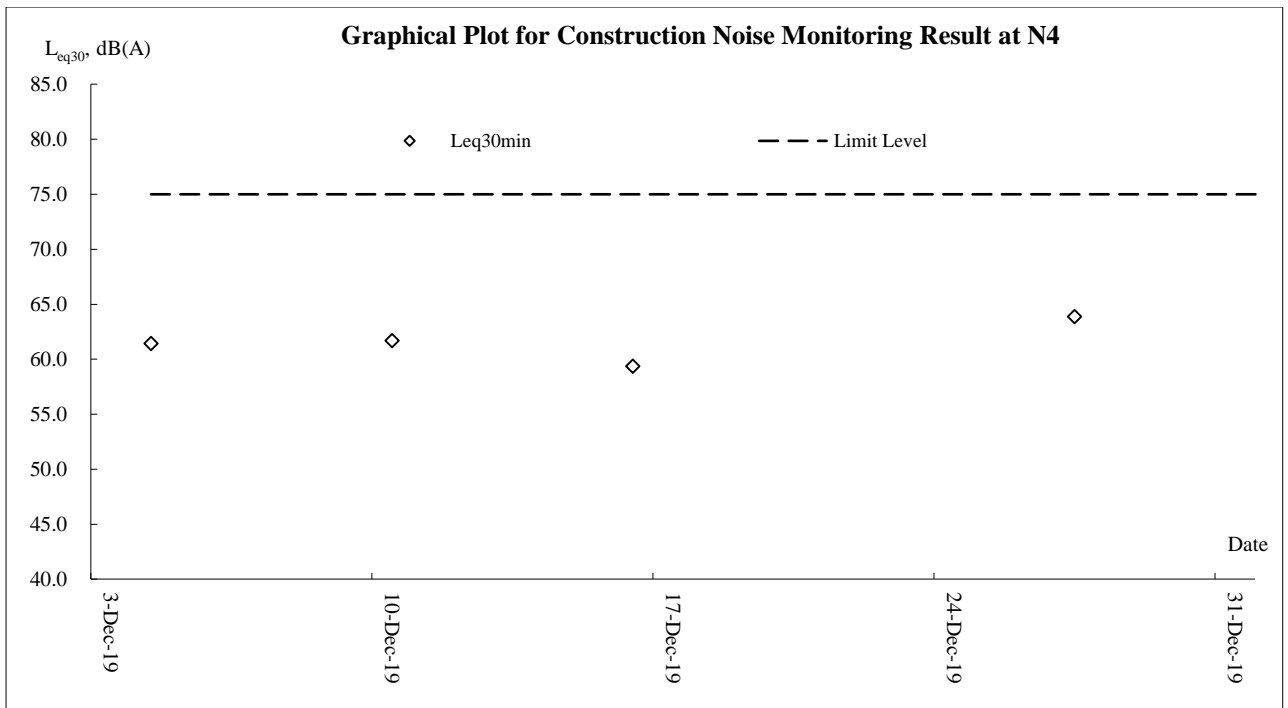
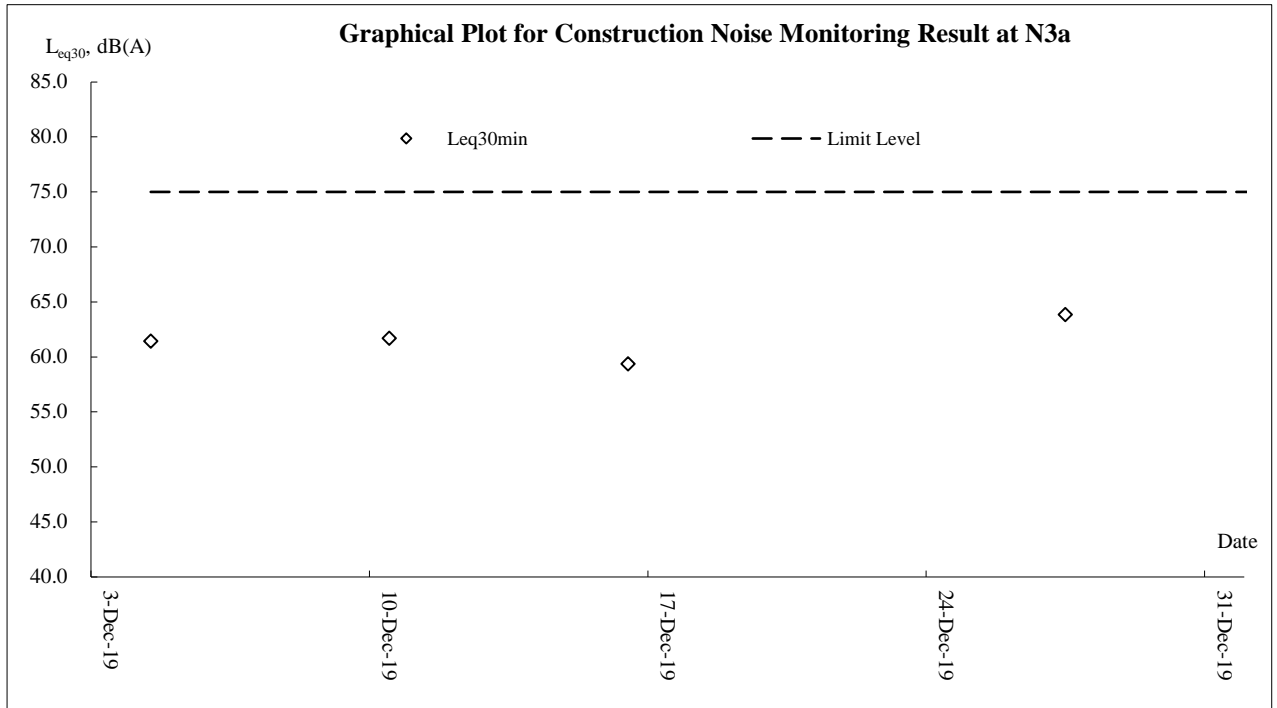
| Daytime Noise Measurement Results (dB) of N4 |            |                |            |            |                |            |            |                |            |            |                |            |            |                |            |            |                |            |            |                 |                   |
|--|------------|----------------|------------|------------|----------------|------------|------------|----------------|------------|------------|----------------|------------|------------|----------------|------------|------------|----------------|------------|------------|-----------------|-------------------|
| Date   | Start Time | 1st Leq (5min) |            |            | 2nd Leq (5min) |            |            | 3rd Leq (5min) |            |            | 4th Leq (5min) |            |            | 5th Leq (5min) |            |            | 6th Leq (5min) |            |            | Leq30min, dB(A) | Façade Correction |
|  |            | Leq, dB(A)     | L10, dB(A) | L90, dB(A) | Leq, dB(A)     | L10, dB(A) | L90, dB(A) | Leq, dB(A)     | L10, dB(A) | L90, dB(A) | Leq, dB(A)     | L10, dB(A) | L90, dB(A) | Leq, dB(A)     | L10, dB(A) | L90, dB(A) | Leq, dB(A)     | L10, dB(A) | L90, dB(A) |                 |                   |
| 4-Dec-19                                     | 10:25      | 70.7           | 58.6       | 41.6       | 49.6           | 57.9       | 41.2       | 48.8           | 54.5       | 41.3       | 48.7           | 54.6       | 41.4       | 49.5           | 56.3       | 41.2       | 49.1           | 56.0       | 41.5       | 63.1            | 66.1              |
| 10-Dec-19                                    | 15:49      | 61.9           | 49.6       | 38.4       | 43.9           | 47.4       | 37.7       | 44.2           | 47.6       | 38.0       | 45.6           | 48.4       | 38.0       | 44.1           | 47.1       | 37.8       | 45.7           | 48.1       | 38.5       | 54.5            | 57.5              |
| 16-Dec-19                                    | 9:34       | 62.9           | 55.0       | 38.5       | 46.7           | 51.5       | 37.0       | 42.5           | 45.0       | 39.0       | 42.0           | 44.0       | 39.5       | 43.5           | 46.5       | 36.5       | 42.2           | 45.0       | 35.5       | 55.4            | 58.4              |
| 27-Dec-19                                    | 11:01      | 70.2           | 53.7       | 40.8       | 48.9           | 51.6       | 42.7       | 50.7           | 53.9       | 40.6       | 55.8           | 53.6       | 41.1       | 78.5           | 55.7       | 42.7       | 50.2           | 53.5       | 40.9       | 71.4            | 74.4              |

## **Appendix I**

### **Graphical Plots of Monitoring Results**

**Construction Noise**





## **Appendix J**

### **Waste Flow Table**

## Monthly Summary Waste Flow Table for 2019

Version: 0

| Month                  | Actual Quantities of Inert C&D Materials Generated Monthly |                                     |                        |                          |                         |               | Actual Quantity of C&D Wastes Generated Monthly |                            |             |                |             |                            |
|------------------------|--|-------------------------------------|------------------------|--------------------------|-------------------------|---------------|---|----------------------------|-------------|----------------|-------------|----------------------------|
|                        | Total Quantity Generated                                   | Hard Rock and Large Broken Concrete | Reused in the Contract | Reused in other Projects | Disposed as Public Fill | Imported Fill | Metals  | Paper/ cardboard packaging | Plastics    | Chemical Waste | Timber      | Others, eg. general refuse |
|                        | (in '000m3)  | (in '000m3)                         | (in '000m3)            | (in '000m3)              | (in '000m3)             | (in '000m3)   | (in '000kg)                                     | (in '000kg)                | (in '000kg) | (in '000kg)    | (in '000m3) | (in '000m3)                |
| sub-total of 2019-2019 | 0.000  | 0.000                               | 0.000                  | 0.000                    | 0.000                   | 0.000         | 0.000   | 0.000                      | 0.000       | 0.000          | 0.000       | 0.000                      |
| Sep-19                 | 0.000  | 0.000                               | 0.000                  | 0.000                    | 0.000                   | 0.000         | 0.000   | 0.000                      | 0.000       | 0.000          | 0.000       | 0.000                      |
| Oct-19                 | 0.000  | 0.000                               | 0.000                  | 0.000                    | 0.000                   | 0.000         | 0.000   | 0.000                      | 0.000       | 0.000          | 0.000       | 0.017                      |
| Nov-19                 | 0.381  | 0.000                               | 0.000                  | 0.318                    | 0.063                   | 0.000         | 302.200   | 0.000                      | 0.000       | 0.000          | 0.000       | 0.007                      |
| Dec-19                 | 2.038  | 0.000                               | 0.000                  | 1.069                    | 0.969                   | 0.000         | 14.820  | 0.000                      | 0.000       | 0.000          | 0.000       | 0.046                      |
|                        |  |                                     |                        |                          |                         |               |   |                            |             |                |             |                            |
|                        |  |                                     |                        |                          |                         |               |   |                            |             |                |             |                            |
| Sub total (since 2019) | 2.419  | 0.000                               | 0.000                  | 1.387                    | 1.032                   | 0.000         | 317.020   | 0.000                      | 0.000       | 0.000          | 0.000       | 0.070                      |
|                        |  |                                     |                        |                          |                         |               |   |                            |             |                |             |                            |
|                        |  |                                     |                        |                          |                         |               |   |                            |             |                |             |                            |
|                        |  |                                     |                        |                          |                         |               |   |                            |             |                |             |                            |
|                        |  |                                     |                        |                          |                         |               |   |                            |             |                |             |                            |
|                        |  |                                     |                        |                          |                         |               |   |                            |             |                |             |                            |
|                        |  |                                     |                        |                          |                         |               |   |                            |             |                |             |                            |
| Total (since 2019)     | 2.419  | 0.000                               | 0.000                  | 1.387                    | 1.032                   | 0.000         | 317.020   | 0.000                      | 0.000       | 0.000          | 0.000       | 0.070                      |

## **Appendix K**

### **Implementation Schedule for Environmental Mitigation Measures (Extracted from EM&A Manual)**



| EIA Ref.                                 | EM&A Ref. | Environmental Protection Measures   | Location / Duration of measures / Timing of completion of measures | Implementation Agent | Implementation Stage <sup>1</sup> |     |    |     | Relevant Legislation & Guidelines   |
|--|-----------|---|--|----------------------|-----------------------------------|-----|----|-----|---|
|  |           |   |  |                      | Des                               | Con | Op | Dec |   |
| <b>Air Quality Impact (Construction)</b> |           |   |  |                      |                                   |     |    |     |   |
| 3.8.1.1                                  | 2.4       | <p><b>General Dust Control Measures</b></p> <p>Dust emissions could be suppressed by regular water spraying on site. In general, water spraying twice a day could reduce dust emission from active construction area by 50%. However, for the Project more frequent water spraying is proposed. Watering eight times per day, or once every 1.5 hours, is suggested at all active works areas in order to achieve a higher dust suppression efficiency of 87.5%.</p>  | Within construction site / Duration of the construction phase      | Contractor           |                                   | ✓   |    |     | EIA Recommendation and Air Pollution Control (Construction Dust) Regulation |
| 3.8.1.2                                  | 2.4       | <p><b>Best Practice For Dust Control</b></p> <p>The relevant best practices for dust control as stipulated in the <i>Air Pollution Control (construction Dust) Regulation</i> should be adopted to further reduce the construction dust impacts of the Project. These best practices include:</p> <p><i>Good Site Management</i></p> <ul style="list-style-type: none"> <li>▪ Good site management is important to help reducing potential air quality impact down to an acceptable level. As a general guide, the Contractor should maintain a high standard of housekeeping to prevent emissions of fugitive dust. Loading, unloading, handling and storage of raw materials, wastes or by-products should be carried out in a manner so as to minimise the release of visible dust emission. Any piles of materials accumulated on or around the work areas should be cleaned up regularly. Cleaning, repair and maintenance of all plant facilities within the work areas should be carried out in a manner minimising generation of fugitive dust emissions. The material should be handled properly to prevent fugitive dust emission before cleaning.</li> </ul> <p><i>Disturbed Parts of the Roads</i></p> <ul style="list-style-type: none"> <li>▪ Each and every main temporary access should be paved with concrete, bituminous hardcore materials or metal plates and kept clear of dusty materials; or</li> <li>▪ Unpaved parts of the road should be sprayed with water or a dust suppression chemical so as to keep the entire road</li> </ul> | Within construction site / Duration of the construction phase      | Contractor           |                                   | ✓   |    |     | EIA Recommendation and Air Pollution Control (Construction Dust) Regulation |

| EIA Ref. | EM&A Ref. | Environmental Protection Measures   | Location / Duration of measures / Timing of completion of measures | Implementation Agent | Implementation Stage <sup>1</sup> |     |    |     | Relevant Legislation & Guidelines |
|----------|-----------|---|--|----------------------|-----------------------------------|-----|----|-----|-----------------------------------|
|          |           |   |  |                      | Des                               | Con | Op | Dec |                                   |
|          |           | surface wet.<br><i>Exposed Earth</i> <ul style="list-style-type: none"> <li>Exposed earth should be properly treated by compaction, hydroseeding, vegetation planting or seeding with latex, vinyl, bitumen within six months after the last construction activity on the site or part of the site where the exposed earth lies.</li> </ul> <i>Loading, Unloading or Transfer of Dusty Materials</i> <ul style="list-style-type: none"> <li>All dusty materials should be sprayed with water immediately prior to any loading or transfer operation so as to keep the dusty material wet.</li> </ul> <i>Debris Handling</i> <ul style="list-style-type: none"> <li>Any debris should be covered entirely by impervious sheeting or stored in a debris collection area sheltered on the top and the three sides.</li> <li>Before debris is dumped into a chute, water should be sprayed so that it remains wet when it is dumped.</li> </ul> <i>Transport of Dusty Materials</i> <ul style="list-style-type: none"> <li>Vehicle used for transporting dusty materials/spoils should be covered with tarpaulin or similar material. The cover should extend over the edges of the sides and tailboards.</li> </ul> <i>Wheel washing</i> <ul style="list-style-type: none"> <li>Vehicle wheel washing facilities should be provided at each construction site exit. Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels.</li> </ul> <i>Use of vehicles</i> <ul style="list-style-type: none"> <li>The speed of the trucks within the site should be controlled to about 10km/hour in order to reduce adverse dust impacts and secure the safe movement around the site.</li> <li>Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels.</li> <li>Where a vehicle leaving the construction site is carrying a load of dusty materials, the load should be covered entirely</li> </ul> |  |                      |                                   |     |    |     |                                   |

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|   |           |   |  |                                   | Des                               | Con | Op | Dec |                                   |
|   |           | by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle.<br><i>Site hoarding</i> <ul style="list-style-type: none"> <li>Where a site boundary adjoins a road, street, service lane or other area accessible to the public, hoarding of not less than 2.4m high from ground level should be provided along the entire length of that portion of the site boundary except for a site entrance or exit.</li> </ul>  |  |                                   |                                   |     |    |     |                                   |
| <b>Air Quality Impact (Operation)</b>     |           |   |  |                                   |                                   |     |    |     |                                   |
| 3.8.2                                     | 2.3       | <b>Odour patrol at site boundary of the Project</b>   | Site boundary / During operation stage ( the need to continue the odour patrol after the end of the 2-year monitoring period would depend on the monitoring results and should be agreed with EPD) | OWTF Operator                     | ✓                                 |     | ✓  |     | EIAO-TM                           |
| 3.8.2                                     | 2.4       | <b>Install gas cleaning equipment and stack on the CHP and odour treatment unit</b> <ul style="list-style-type: none"> <li>The preliminary design suggests the use of a two stage process involving either a biofilter or Ultraviolet Light (UV-C) together with ozone treatment as the first stage, and an activated carbon filter as the second stage for the odour treatment unit. It is recommended to install the UV-C and ozone treatment system with second stage active carbon filters as this has a lower footprint requirement than the biofilter option. However, the actual unit installed depends on the final design by the contractor in the design phase.</li> <li>The preliminary design incorporates a combination of thermal and catalytic treatment processes to remove pollutants from the exhaust gasses from the CHP.</li> <li>Both the odour treatment unit and the CHP emissions are suggested to be directed to a flue to aid the dispersion and minimise effects on ASRs.</li> </ul> | CHP and odour treatment unit   | Design Consultant / OWTF Operator | ✓                                 |     | ✓  |     | EIA Recommendation                |
| <b>Hazard Risk Assessment (Operation)</b> |           |   |  |                                   |                                   |     |    |     |                                   |

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|          |           |   |  |                                   | Des                               | Con | Op | Dec |                                   |
| 4.9      | 3.2       | <p>The HA has assumed that the following “Good Practices” and “recommended design measures” for the safe operation of OWTF 2 shall be carried out as far as reasonably practicable:</p> <ul style="list-style-type: none"> <li>▪ The process plant building will be provided with adequate number of gas detectors distributed over the various areas of potential leak sources to provide adequate coverage.</li> <li>▪ All electrical equipment inside the building will be classified in accordance with the electrical area classification requirements. No unclassified electrical equipment will be used during operations or maintenance.</li> <li>▪ Reference can be made to Codes of Practice and guidance issued in Europe that applies to places where explosive atmospheres may occur (called ‘ATEX’ requirements). These are covered as part of the European Directive: the Explosive Atmospheres Directive (99/92/EC) and the UK regulations, Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR). Where potentially explosive atmospheres may occur in the workplace, the requirements include, identifying and classifying (zoning) areas where potentially explosive atmospheres may occur; avoiding ignition sources in zoned areas, in particular those from electrical and mechanical equipment; where necessary, identifying the entrances to zoned areas; providing appropriate anti-static clothing for employees; and before they come into operation, verifying the overall explosion protection safety of areas where explosive atmospheres may occur.</li> <li>▪ All safety valves design shall take into account discharging any released fluid to a safe location, or stopping misdirection of fluid flows in order to avoid hazardous outcome.</li> <li>▪ Safety markings and crash barriers will be provided to the aboveground piping, digesters and the gas holder near the entrance.</li> <li>▪ Lightning protection installations will be installed following IEC 62305, BS EN 62305, AS/NZS 1768, NFPA 780 or equivalent standards.</li> <li>▪ A 10m high boundary wall with fire resistance will be</li> </ul> | During design and operation phases                                 | Design Consultant / OWTF Operator | ✓                                 |     | ✓  |     | EIAO & EIAO TM Annex 4            |

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|                                    |           |  |  |                      | Des                               | Con | Op | Dec |   |
|                                    |           | <p>provided in the vicinity of the digester tanks, gasholders and gas purification equipment to protect the equipment against external fires, and to provide some protection to external areas from the effects of fire/explosion.</p> <ul style="list-style-type: none"> <li>▪ Suitable fire extinguishers will be provided within the site. An External Water Spray System (EWSS) will be installed in appropriate areas, such as around the gasholders, gas purification, desulphurisation units, and digester areas. The facilities will also be equipped with fire and gas detection system and fire suppression system. Stringent procedures are implemented to prohibit smoking or naked flames to be used on-site.</li> <li>▪ Fixed crash barriers will be provided in areas where process equipment is adjacent to the internal roadway to protect against vehicle collision. Adequate warning signage and lighting will also be provided and maximum speed limit will also be in place.</li> </ul> |  |                      |                                   |     |    |     |   |
| <b>Noise Impact (Construction)</b> |           |  |  |                      |                                   |     |    |     |   |
| 5.9.1                              | 4.2.7     | <p><b>Good Site Practice</b><br/>                     Good site practice and noise management can significantly reduce the impact of construction site activities on nearby NSRs. The following package of measures should be followed during each phase of construction:</p> <ul style="list-style-type: none"> <li>▪ only well-maintained plant to be operated on-site and plant should be serviced regularly during the construction works;</li> <li>▪ machines and plant that may be in intermittent use to be shut down between work periods or should be throttled down to a minimum;</li> <li>▪ plant known to emit noise strongly in one direction, should, where possible, be orientated to direct noise away from the NSRs;</li> <li>▪ mobile plant should be sited as far away from NSRs as possible; and</li> <li>▪ material stockpiles and other structures to be effectively utilised, where practicable, to screen noise from on-site</li> </ul>  | Within construction site / During construction phase               | Contractor           |                                   | ✓   |    |     | EIAO, EIAO-TM and Noise Control Ordinance |

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|                                 |           |  |  |                                | Des                               | Con | Op | Dec |   |
|                                 |           | construction activities.   |  |                                |                                   |     |    |     |   |
| 5.9.1                           | 4.2.7     | <b>Selection of Quieter PME</b><br>The recommended quieter PME adopted in the assessment were taken from the EPD's QPME Inventory and British Standard, namely <i>Noise Control on Construction and Open Sites, BS 5228: Part 1: 2009</i> . It should be noted that the silenced PME selected for assessment can be found in Hong Kong.  | Within construction site / During construction phase                           | Contractor                     |                                   | ✓   |    |     | EIAO, EIAO-TM and Noise Control Ordinance |
| 5.9.1                           | 4.2.7     | <b>Use of Movable Noise Barriers</b><br>Movable noise barriers can be very effective in screening noise from particular items of plant when constructing the Project. Noise barriers located along the active works area close to the noise generating component of a PME could produce at least 10 dB(A) screening for stationary plant and 5 dB(A) for mobile plant provided the direct line of sight between the PME and the NSRs is blocked. | Within construction site / During construction phase                           | Contractor                     |                                   | ✓   |    |     | EIAO, EIAO-TM and Noise Control Ordinance |
| 5.9.1                           | 4.2.7     | <b>Use of Noise Enclosure/ Acoustic Shed</b><br>The use of noise enclosure or acoustic shed is to cover stationary PME such as air compressor and generator. With the adoption of the noise enclosure, the PME could be completely screened, and noise reduction of 15 dB(A) can be achieved according to the EIAO Guidance Note No.9/2010.  | Within construction site / During construction phase                           | Contractor                     |                                   | ✓   |    |     | EIAO, EIAO-TM and Noise Control Ordinance |
| 5.9.1                           | 4.2.7     | <b>Use of Noise Insulating Fabric</b><br>Noise insulating fabric can also be adopted for certain PME (e.g. pilling machine etc). The fabric should be lapped such that there are no openings or gaps on the joints. According to the approved Tsim Sha Tsui Station Northern Subway EIA report (AEIAR-127/2008), a noise reduction of 10 dB(A) can be achieved for the PME lapped with the noise insulating fabric.                              | Within construction site / During construction phase                           | Contractor                     |                                   | ✓   |    |     | EIAO, EIAO-TM and Noise Control Ordinance |
| <b>Noise Impact (Operation)</b> |           |  |  |                                |                                   |     |    |     |   |
| 5.9.2                           | 4.2.7     | <b>Fixed Plant Noise</b><br>Specification of the maximum allowable sound power levels of the proposed fixed plants should be followed. The following noise reduction measures should be considered as far as practicable during operation:<br><ul style="list-style-type: none"> <li>▪ Choose quieter plant such as those which have been effectively silenced;</li> </ul>   | Within construction site / During operation phase / Throughout operation phase | Design Consultant / Contractor | ✓                                 |     | ✓  |     | EIAO, EIAO-TM and Noise Control Ordinance |

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|  |           |  |  |                      | Des                               | Con | Op | Dec |                                   |
|  |           | <ul style="list-style-type: none"> <li>▪ Include noise levels specification when ordering new plant (including chillier and E/M equipment);</li> <li>▪ Locate fixed plant/louver away from any NSRs as far as practicable;</li> <li>▪ Locate fixed plant in walled plant rooms or in specially designed enclosures;</li> <li>▪ Locate noisy machines in a completely separate building;</li> <li>▪ Install direct noise mitigation measures including silencers, acoustic louvers and acoustic enclosure where necessary; and</li> <li>▪ Develop and implement a regularly scheduled plant maintenance programme so that equipment is properly operated and serviced in order to maintain a controlled level of noise.</li> </ul>  |  |                      |                                   |     |    |     |                                   |
| <b>Water Quality Impact (Construction)</b> |           |  |  |                      |                                   |     |    |     |                                   |
| 6.8.1.1                                    | 5.3       | <p><b>Construction site runoff</b></p> <p>The site practices outlined in ProPECC Note PN 1/94 should be followed as far as practicable in order to minimise surface runoff and the chance of erosion. The following measures are recommended to protect water quality and sensitive uses of the coastal area, and when properly implemented should be sufficient to adequately control site discharges so as to avoid water quality impacts:</p> <ul style="list-style-type: none"> <li>▪ At the start of site establishment, perimeter cut-off drains to direct off-site water around the site should be constructed with internal drainage works and erosion and sedimentation control facilities implemented. Channels, earth bunds or sand bag barriers should be provided on site to direct storm water to silt removal facilities. The design of the temporary on-site drainage system should be undertaken by the Contractor prior to the commencement of construction;</li> <li>▪ Sand/silt removal facilities such as sand/silt traps and sediment basins should be provided to remove sand/silt particles from runoff to meet the requirements of the TM standards under the WPCO. The design of efficient silt</li> </ul> | Within construction site / Duration of the construction phase      | Contractor           |                                   | ✓   |    |     | ProPECC Note PN 1/94              |

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|          |           |  |  |                      | Des                               | Con | Op | Dec |                                   |
|          |           | <p>removal facilities should be based on the guidelines in Appendix A1 of ProPECC Note PN 1/94. Sizes may vary depending upon the flow rate. The detailed design of the sand/silt traps should be undertaken by the Contractors prior to the commencement of construction.</p> <ul style="list-style-type: none"> <li>▪ All drainage facilities and erosion and sediment control structures should be regularly inspected and maintained to ensure proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit should be regularly removed, at the onset of and after each rainstorm to ensure that these facilities are functioning properly at all times.</li> <li>▪ Measures should be taken to minimize the ingress of site drainage into excavations. If excavation of trenches in wet periods is necessary, they should be dug and backfilled in short sections wherever practicable. Water pumped out from foundation excavations should be discharged into storm drains via silt removal facilities.</li> <li>▪ All vehicles and plant should be cleaned before leaving a construction site to ensure no earth, mud, debris and the like is deposited by them on roads. An adequately designed and sited wheel washing facility should be provided at construction site exit where practicable. Wash-water should have sand and silt settled out and removed regularly to ensure the continued efficiency of the process. The section of access road leading to, and exiting from, the wheel-wash bay to the public road should be paved with sufficient backfall toward the wheel-wash bay to prevent vehicle tracking of soil and silty water to public roads and drains.</li> <li>▪ Open stockpiles of construction materials or construction wastes on-site should be covered with tarpaulin or similar fabric during rainstorms. Measures should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system.</li> <li>▪ Manholes (including newly constructed ones) should be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris being washed into the drainage system and stormwater runoff being directed into</li> </ul> |  |                      |                                   |     |    |     |                                   |



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|          |           |   |  |                      | Des                               | Con | Op | Dec |   |
|          |           | foul sewers. <ul style="list-style-type: none"> <li>Precautions should be taken at any time of the year when rainstorms are likely. Actions should be taken when a rainstorm is imminent or forecasted and actions to be taken during or after rainstorms are summarized in Appendix A2 of ProPECC Note PN 1/94. Particular attention should be paid to the control of silty surface runoff during storm events, especially for areas located near steep slopes.</li> <li>Bentonite slurries used in piling or slurry walling should be reconditioned and reused wherever practicable. Temporary enclosed storage locations should be provided on-site for any unused bentonite that needs to be transported away after all the related construction activities are completed. The requirements in ProPECC Note PN 1/94 should be adhered to in the handling and disposal of bentonite slurries.</li> </ul> |  |                      |                                   |     |    |     |   |
| 6.8.1.2  | 5.3       | <b>General construction activities</b><br>Construction solid waste, debris and refuse generated on-site should be collected, handled and disposed of properly to avoid entering any nearby storm water drain. Stockpiles of cement and other construction materials should be kept covered when not being used.   | Within construction site / During construction phase               | Contractor           |                                   | ✓   |    |     | ProPECC Note PN 1/94                    |
| 6.8.1.3  | 5.3       | <b>Excavation works</b><br>The construction programme should be properly planned to minimise excavation works during the wet season (April to September), temporarily exposed slope/soil surfaces should be covered by a tarpaulin or other means, as far as practicable. Interception channels should be provided (e.g. along the crest/edge of the excavation) to prevent storm runoff from washing across exposed soil surfaces. Arrangements should be in place to ensure that adequate surface protection measures can be safely carried out well before the arrival of a rainstorm. Other measures that need to be implemented before, during and after rainstorms are summarized in ProPECC PN 1/94.   | Within construction site / During construction phase               | Contractor           |                                   | ✓   |    |     | ProPECC Note PN 1/94                    |
| 6.8.1.4  | 5.3       | <b>Accidental spillage</b> <ul style="list-style-type: none"> <li>The Contractor should register as a chemical waste producer</li> </ul>  | Within construction site / During construction phase               | Contractor           |                                   | ✓   |    |     | ProPECC Note PN 1/94 and Waste Disposal |

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|          |           |  |  |                      | Des                               | Con | Op | Dec       |                                   |
|          |           | <p>if chemical wastes are produced from 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.</p> <ul style="list-style-type: none"> <li>▪ Maintenance of vehicles and equipment, involving activities with potential for leakage and spillage, should only be undertaken within areas appropriately equipped to control these discharges.</li> <li>▪ Oils and fuels should only be stored in designated areas which have pollution prevention facilities. To prevent spillage of fuels and solvents to any nearby storm water drain, all fuel tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. The bund should be drained of rainwater after a rain event.</li> <li>▪ 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 details the requirements to deal with chemical wastes. General requirements are given as follows:                             <ul style="list-style-type: none"> <li>– Suitable containers should be used to hold the chemical wastes to avoid leakage or spillage during storage, handling and transport.</li> <li>– Chemical waste containers should be suitably labelled, to notify and warn the personnel who are handling the wastes, to avoid accidents.</li> <li>– Storage area should be selected at a safe location on site and adequate space should be allocated to the storage area.</li> </ul> </li> </ul> |  |                      |                                   |     |    | Ordinance |                                   |
| 6.8.1.5  | 5.3       | <p><b>Sewage effluent from construction workforce</b></p> <p>Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site where necessary to handle sewage from the workforce. A licensed contractor should be employed to provide appropriate and adequate portable toilets and be</p>  | <p>Within construction site / During construction phase</p>        | Contractor           |                                   | ✓   |    |           | ProPECC Note PN 1/94              |

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|   |           |   |  |                                   | Des                               | Con | Op | Dec |   |
|   |           | responsible for appropriate disposal and maintenance.   |  |                                   |                                   |     |    |     |   |
| <b>Water Quality Impact (Operation)</b> |           |   |  |                                   |                                   |     |    |     |   |
| 6.8.2.1                                 | 5.3       | <p><b>Sewage effluent and sewerage impact</b></p> <p>In order to minimise the risk of exceeding capacity of the sewerage system, on-site underground storage of effluent is recommended for the OWTF 2, with a capacity of 6 hours of peak flow. Using the values presented in the preliminary design, the on-site storage required to buffer excess capacity would be equivalent to 30 m<sup>3</sup>. A below ground effluent retention tank would function to store effluent produced during peak periods when usage of the Sha Ling pumping station is high. Effluent stored during such periods could then be pumped out of the retention tank and discharged into the public sewer during off-peak times when capacity is sufficient.</p>  | Within construction site / During design and operation phase       | Design Consultant / OWTF Operator | ✓                                 |     | ✓  |     | EIA recommendations                       |
| 6.8.2.2                                 | 5.3       | <p><b>Wastewater generation from organic waste treatment processes</b></p> <p>Wastewater must be collected and diverted to the wastewater treatment plant (WWTP).</p> <p>An adequately sized WWTP with technologies such as membrane bioreactor, reverse osmosis or multi-phase separation process or system should be provided for the OWTF 2. Polluting parameters in the effluent should be in compliance with the requirements as specified in the TM-DSS.</p> <p><i>Leachate from the waste reception and composting process</i></p> <ul style="list-style-type: none"> <li>A drainage system will be provided at the reception area connecting to the proposed onsite WWTP. The leachate would be treated in the WWTP and there would be no direct discharge of leachate.</li> </ul> <p><i>Dewatering of the digestate from the separators</i></p> <ul style="list-style-type: none"> <li>The wastewater generated from the dewatering of digestate from the digesters is expected to be around 229.18 m<sup>3</sup>/day and a peak flow of 5.31L/s. The on-site WWTP will deploy suitable treatment process in order to reduce the pollution level to an acceptable standard. The effluent shall be treated according to the TM-DSS standard before discharging to foul sewers.</li> </ul> | Within construction site / During design and operation phase       | Design Consultant / OWTF Operator | ✓                                 |     | ✓  |     | TM-DSS, Water Pollution Control Ordinance |

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|   |           |  |   |                      | Des                               | Con | Op | Dec |   |
|   |           | <p><i>Condensate from biogas drying, odour treatment and ventilation system</i></p> <ul style="list-style-type: none"> <li>Condensate from biogas handling and wastewater from the odour treatment process would be collected and transferred to the WWTP. There is no direct discharge of wastewater to the sewer.</li> </ul> <p><i>Washing of waste delivery trucks</i></p> <ul style="list-style-type: none"> <li>Surplus wastewater generated from the vehicle washing facilities would be collected and transferred to the WWTP for further treatment before discharging to the foul sewer.</li> </ul> <p><i>Untreated wastewater from wastewater treatment plant</i></p> <ul style="list-style-type: none"> <li>Maintenance of the WWTP and its connection pipe work would be conducted regularly to confirm the condition of the holding tank and pipes. This will ensure early detection of any damage for repair or replacement.</li> </ul> <p><i>Leakage of materials from WWTP</i></p> <ul style="list-style-type: none"> <li>Regular scheduled maintenance of the WWTP will be carried out to confirm the condition of the facility and detect any damages at an early stage for repair or replacement.</li> </ul> |   |                      |                                   |     |    |     |   |
| 6.8.2.3   | 5.3       | <p><b>Contaminated stormwater runoff and accidental spillages</b></p> <p>Regular maintenance of plant facilities, as recommended in <b>Section 6.8.2.2</b> of the EIA report, will be performed to confirm the condition of plant facilities and detect any damage for repair or replacement. Training should be provided to the employees on handling accidental spillage, so that in such cases, actions can be carried out quickly to avoid runoff to nearby streams/drains.</p>  | Within construction site / During operation phase / Throughout operation phase                              | OWTF Operator        |                                   |     | ✓  |     | TM-DSS; Water Pollution Control Ordinance   |
| <b>Waste Management Implications (Construction)</b> |           |  |   |                      |                                   |     |    |     |   |
| 7.6.1.1   | 6.3       | <p><b>Good Site Practices</b></p> <p>Recommendations for good site practices during the construction activities include:</p> <ul style="list-style-type: none"> <li>Obtain the relevant waste disposal permits from appropriate authorities, in accordance with the Waste Disposal Ordinance (Cap. 354) and subsidiary Regulations and the Land (Miscellaneous Provisions) Ordinance (Cap. 28);</li> </ul>   | Project construction site / Throughout construction stage / Until completion of all construction activities | Contractor           |                                   |     | ✓  |     | Waste Disposal Ordinance; Regulation and the Land (Miscellaneous Provisions) Ordinance; |

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|          |           |  |   |                      | Des                               | Con | Op | Dec |   |
|          |           | <ul style="list-style-type: none"> <li>■ Provide staff training for proper waste management and chemical handling procedures;</li> <li>■ Provide sufficient waste disposal points and regular waste collection;</li> <li>■ Provide appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers;</li> <li>■ Carry out regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors;</li> <li>■ Separate chemical wastes for special handling and disposal to licensed facilities for treatment; and</li> <li>■ Employ licensed waste collectors to collect waste.</li> </ul>  |   |                      |                                   |     |    |     | Waste Disposal (Chemical Wastes) (General) Regulation;<br>Technical Circular (Works) No. 19/2005<br>Environmental Management on Construction Site |
| 7.6.1.2  | 6.3       | <p><b>Waste Reduction Measures</b></p> <p>Recommendations to achieve waste reduction include:</p> <ul style="list-style-type: none"> <li>■ Design foundation works to minimise the amount of excavated material to be generated;</li> <li>■ Provide training on the importance of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycling;</li> <li>■ Sort demolition debris and excavated materials from demolition works to recover reusable/recyclable portions</li> <li>■ Segregation and storage of different types of waste in different containers or skips to enhance reuse or recycling of materials and their proper disposal</li> <li>■ Encourage collection of recyclable waste such as waste paper and aluminium cans by providing separate labelled bins to enable such waste to be segregated from other general refuse generated by the work force</li> <li>■ Plan the use of construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste</li> </ul> | Project construction site / Throughout construction stage / Until completion of all construction activities | Contractor           | ✓                                 | ✓   |    |     | Waste Disposal Ordinance  |
| 7.6.1.3  | 6.3       | <p><b>Excavated and C&amp;D Materials</b></p> <p>In order to minimise impacts resulting from collection and transportation of C&amp;D material for off-site disposal, the</p>  | Project construction site / Throughout construction stage / Until completion                                | Contractor           | ✓                                 | ✓   |    |     | Waste Disposal Ordinance ;<br>DEVB Technical  |

| EIA Ref. | EM&A Ref. | Environmental Protection Measures  | Location / Duration of measures / Timing of completion of measures  | Implementation Agent | Implementation Stage <sup>1</sup> |     |    |   | Relevant Legislation & Guidelines  |
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|          |           |  |   |                      | Des                               | Con | Op | Dec   |  |
|          |           | <p>excavated materials should be reused on-site as fill material as backfilling material and for landscaping works far as practicable. Other mitigation requirements are:</p> <ul style="list-style-type: none"> <li>▪ A Waste Management Plan (WMP), which becomes part of the Environmental Management Plan (EMP), should be prepared in accordance with ETWB TC(W) No.19/2005;</li> <li>▪ A recording system for the amount of wastes generated, recycled and disposed of (including the disposal sites) should be adopted for easy tracking; and</li> <li>▪ In order to monitor the disposal of excavated and non-inert C&amp;D material at public filling facilities and landfills and to control fly-tipping, a trip-ticket system should be adopted (refer to DEVB TC(W) No. 6/2010).</li> </ul>  | of all construction activities  |                      |                                   |     |    | <p>Circular (Works) No.6/2010 for Trip Ticket System for Disposal of Construction &amp; Demolition Materials;</p> <p>Technical Circular (Works) No. 19/2005 Environmental Management on Construction Site</p> |  |
| 7.6.1.4  | 6.3       | <p><b>Chemical Waste</b></p> <p>Should chemical wastes be produced at the construction site, the Contractor would be required to register with 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, oxidizing, irritant, toxic, harmful, or corrosive). The Contractor should employ a licensed collector to transport and dispose of the chemical wastes, to either the CWTC in Tsing Yi, or any other licensed facilities, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.</p> | Project construction site / Throughout construction stage / Until completion of all construction activities | Contractor           |                                   | ✓   |    |   | <p>Code of Practice on the Packaging Labelling and Storage of Chemical Wastes;</p> <p>Waste Disposal (Chemical Waste) (General) Regulation</p> |
| 7.6.1.5  | 6.3       | <p><b>General Refuse</b></p> <p>General refuse should be stored in enclosed bins or compaction units separated from excavated and non-inert C&amp;D materials. A reputable waste collector should be employed by the Contractor to remove general refuse from the site, separately from inert C&amp;D materials. Preferably an enclosed and covered area should be provided to reduce the occurrence of 'wind blown' light material.</p>   | Project construction site / Throughout construction stage / Until completion of all construction activities | Contractor           |                                   | ✓   |    |   | <p>Waste Disposal Ordinance and Public Health and Municipal Services Ordinance - Public Cleansing and Prevention of Nuisances</p>              |

| EIA Ref.   | EM&A Ref. | Environmental Protection Measures   | Location / Duration of measures / Timing of completion of measures  | Implementation Agent | Implementation Stage <sup>1</sup> |     |    |     | Relevant Legislation & Guidelines  |
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|  |           |   |   |                      | Des                               | Con | Op | Dec |  |
| <b>Waste Management Implications (Operation)</b> |           |   |   |                      |                                   |     |    |     |  |
| 7.6.2.1  | 6.3       | <p><b>Good site practices</b></p> <p>Adoption of the following good operational practices should be recommended to minimise waste management impacts:</p> <ul style="list-style-type: none"> <li>▪ Obtain the necessary waste disposal permits from the appropriate authorities, in accordance with the Waste Disposal Ordinance (Cap. 354), Waste Disposal (Chemical Waste) (General) Regulation and the Land (Miscellaneous Provision) Ordinance (Cap. 28);</li> <li>▪ Nomination of an approved person to be responsible for good site practice, arrangements for collection and effective disposal to an appropriate facility of all wastes generated at the site;</li> <li>▪ Use of a waste haulier licensed to collect specific category of waste;</li> <li>▪ A trip-ticket system should be included as one of the contractual requirements and implemented by the Environmental Team to monitor the disposal of solid wastes at public filling facilities and landfills, and to control fly tipping. Reference should be made to DEVB TC(W) No. 6/2010.</li> <li>▪ Training of site personnel in proper waste management and chemical waste handling procedures;</li> <li>▪ Separation of chemical wastes for special handling and appropriate treatment at a licensed facility;</li> <li>▪ Routine cleaning and maintenance programme for drainage systems, sumps and oil interceptors;</li> <li>▪ Provision of sufficient waste disposal points and regular collection for disposal;</li> <li>▪ Adoption of appropriate measures to minimise windblown litter and dust during transportation of waste, such as covering trucks or transporting wastes in enclosed containers; and,</li> <li>▪ Implementation of a recording system for the amount of</li> </ul> | Construction site / On a regular basis / Throughout operation stage | OWTF Operator        |                                   |     | ✓  |     | Regulation<br><br>Waste Disposal Ordinance;<br>Waste Disposal (Chemical Waste) (General);<br>Regulation and the Land (Miscellaneous Provision) Ordinance;<br>DEVB Technical Circular (Works) No. 6/2010. |

| EIA Ref. | EM&A Ref. | Environmental Protection Measures   | Location / Duration of measures / Timing of completion of measures  | Implementation Agent | Implementation Stage <sup>1</sup> |     |    |     | Relevant Legislation & Guidelines  |
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|          |           |   |   |                      | Des                               | Con | Op | Dec |  |
|          |           | wastes generated, recycled and disposed of (including the disposal sites).  |   |                      |                                   |     |    |     |  |
| 7.6.2.2  | 6.3       | <p><b>Waste reduction measures</b></p> <p>Adoption of the following good operational practices should be recommended to ensure waste reduction:</p> <ul style="list-style-type: none"> <li>▪ Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal;</li> <li>▪ Encourage collection of aluminium cans, plastic bottles and packaging material (e.g. carton boxes) and office paper by individual collectors. Separate labelled bins should be provided to help segregate this waste from other general refuse generated by the work force; and</li> <li>▪ Any unused chemicals or those with remaining functional capacity should be reused as far as practicable.</li> </ul> | Construction site / On a regular basis / Throughout operation stage | OWTF Operator        |                                   |     | ✓  |     | Waste Disposal Ordinance;<br>Waste Disposal (Chemical Waste) (General);<br>Regulation and the Land (Miscellaneous Provision) Ordinance |
| 7.6.2.3  | 6.3       | <p><b>Waste generated from pre-treatment process</b></p> <p>Wastes generated from pre-treatment process should be recycled as far as possible. Wastes generated from pre-treatment process should also be separated from any chemical waste and stored in covered skips. The recyclables should be collected by licensed collectors, while the rest of the waste should be removed from the site on a daily basis to minimise odour, pest and litter impacts. Open burning must be strictly prohibited.</p>   | Pre-treatment process / Throughout operation stage                  | OWTF Operator        |                                   |     | ✓  |     | Waste Disposal (Chemical Waste) (General)  |
| 7.6.2.4  | 6.3       | <p><b>Chemical Waste</b></p> <ul style="list-style-type: none"> <li>▪ Chemical waste generated from machinery maintenance and servicing should be managed in accordance with the Code of Practice on the Packaging, Labelling and storage of Chemical Wastes under the provisions of Waste Disposal (Chemical Waste) (General) Regulation. The chemical waste should be collected by drum-type containers and, when transported off-site, removed by licensed chemical waste contractors. Alternatively, some of the chemical waste may be retained on-site for re-use by the Project in the manufacture of biogas or other products, subject to their composition being confirmed as suitable for such application.</li> </ul>   | Construction site<br>Throughout operation stage                     | OWTF Operator        |                                   |     | ✓  |     | Code of Practice on the Packaging Labelling and Storage of Chemical Wastes;<br>Waste Disposal (Chemical Waste) (General) Regulation    |



| EIA Ref.                                | EM&A Ref. | Environmental Protection Measures   | Location / Duration of measures / Timing of completion of measures  | Implementation Agent | Implementation Stage <sup>1</sup> |     |    |     | Relevant Legislation & Guidelines |
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|   |           |   |   |                      | Des                               | Con | Op | Dec |                                   |
|   |           | <ul style="list-style-type: none"> <li>Plant / equipment maintenance schedules should be planned in order to minimise the generation of chemical waste.</li> <li>Non-recyclable chemical wastes and lubricants should be disposed of at appropriate facilities, such as CWTC. Copies or counterfoils from collection receipts issued by the licensed waste collector should be kept for recording purpose.</li> <li>Recyclable chemical waste will be transported off-site for treatment by a licensed collector. The Contractor will need to register with EPD as a chemical waste producer.</li> </ul>  |   |                      |                                   |     |    |     |                                   |
| 7.6.2.5                                 | 6.3       | <p><b>General Refuse</b></p> <ul style="list-style-type: none"> <li>Waste generated in site offices should be reduced through segregation and collection of recyclables. To promote the recycling of wastes such as used paper, aluminium cans and plastic bottles, it is recommended that recycling bins should be clearly labelled and placed at locations with easy access. For the collection of recyclable materials, they should be collected by licensed collectors.</li> <li>General refuse, other than segregated recyclable wastes, should be separated from any chemical waste and stored in covered skips. The general refuse should be removed from the site on a daily basis to minimise odour, pest and litter impacts. Also, open burning of refuse must be strictly prohibited.</li> </ul> | Construction site / On a regular basis / Throughout operation stage | OWTF Operator        |                                   | ✓   |    |     | Waste Disposal Ordinance          |
| <b>Ecological Impact (Construction)</b> |           |   |   |                      |                                   |     |    |     |                                   |
| 8.7                                     | 7.3       | For precautionary purposes and to further ensure that no wild flora species of conservation interest will be affected, prior to commencement of any construction works, it is recommended to conduct a detailed vegetation survey as baseline monitoring to update the exact locations, number and condition of individuals of <i>Aquilaria sinensis</i> and any other floral species of conservation interest within the Project Area. A Vegetation Survey Report summarizing the findings and recommendations of the detailed vegetation survey should be prepared and submitted to AFCD for approval no later than one month prior to commencement of construction works.  | Before Project commencement   | OWTF Operator        | ✓                                 |     |    |     | EIAO-TM                           |
| 8.7                                     | 7.3       | During construction phase, erection of a temporary protective   | Throughout construction   | OWTF Operator        |                                   | ✓   |    |     | EIAO-TM                           |

| EIA Ref.  | EM&A Ref.       | Environmental Protection Measures  | Location / Duration of measures / Timing of completion of measures                                  | Implementation Agent | Implementation Stage <sup>1</sup> |     |    |     | Relevant Legislation & Guidelines     |
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|   |                 |  |   |                      | Des                               | Con | Op | Dec |                                       |
|   |                 | fence along the plantation area where trees and vegetation, including those of conservation concern identified under the detailed vegetation survey, would be retained within the Project Area is recommended for precautionary purposes to avoid any potential impact from construction activities such as vehicle movement and materials storage. Establishment of the protective fence could also raise the awareness of personnel to be present and protection of the plants. While the protective fence should be properly maintained, monitoring of individuals of <i>Aquilaria sinensis</i> and any other floral species of conservation interest identified in the detailed vegetation survey during construction phase on a monthly basis should be conducted to make sure that they are not affected by the construction works of the Project.   | stage   |                      |                                   |     |    |     |                                       |
| <b>Ecological Impact (Operation)</b>              |                 |  |   |                      |                                   |     |    |     |                                       |
| No mitigation measure is required.                |                 |  |   |                      |                                   |     |    |     |                                       |
| <b>Landscape and Visual Impact (Construction)</b> |                 |  |   |                      |                                   |     |    |     |                                       |
| Table 10.7 (CP1)                                  | Table 8.1 (CP1) | <b>Preservation of Existing Vegetation</b><br>The development proposals would avoid disturbance to the existing trees as far as practicable within the confines of the development site. A preliminary tree survey has been undertaken to establish the existing resources. A tree survey review with formal tree removal application will be submitted to the relevant government departments for approval in accordance with ETWB TC(W) 03/2006 Tree Preservation, during the detailed design phase of the Project. Based on the preliminary findings it would be possible to retain 441 of the existing trees. If possible, all trees which are not in conflict with the proposals would be retained and shall be protected through the means of fencing, where appropriate, to prevent potential damage to tree canopies and root zones from vehicles and materials storage. Specifications for the protection of existing trees will be circulated to the relevant government authorities for approval together with the formal tree removal application. | Construction site / Throughout construction stage / Until completion of all construction activities | Contractor           | ✓                                 | ✓   |    |     | Technical Circular (Works) No. 3/2006 |
| Table 10.7 (CP2)                                  | Table 8.1 (CP2) | <b>Control of site construction activities</b><br><ul style="list-style-type: none"> <li>■ Storage of materials should be carefully arranged to minimise potential landscape and visual impact.</li> </ul>   | Construction site / Throughout construction stage / Until completion                                | Contractor           | ✓                                 | ✓   |    |     | EIAO-TM                               |

| EIA Ref.                                       | EM&A Ref.       | Environmental Protection Measures  | Location / Duration of measures / Timing of completion of measures                                  | Implementation Agent              | Implementation Stage <sup>1</sup> |     |    |     | Relevant Legislation & Guidelines     |
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|  |                 |  |   |                                   | Des                               | Con | Op | Dec |                                       |
|  |                 | <ul style="list-style-type: none"> <li>The location and appearance of site accommodation should be carefully designed to minimise potential landscape and visual impact.</li> <li>Site lighting should be carefully designed to prevent light spillage,</li> <li>Extent of the works area and construction period should be minimised as far as practicable.</li> <li>Screen hoarding with compatible design to blend into the surrounding natural environment should be considered.</li> <li>Temporary works areas should be reinstated at the earliest possible opportunity.</li> </ul>  | of all construction activities  |                                   |                                   |     |    |     |                                       |
| Table 10.7 (CP3)                               | Table 8.1 (CP3) | <p><b>Transplantation of existing trees</b></p> <p>Under current proposal, no tree is recommended to be transplanted since the trees in conflict with the proposed works are not suitable to be transplanted. However, should transplantation be proposed in the detailed design stage after an update tree survey, the recommended final recipient sites should be adjacent to their current locations. Enough time should be reserved for tree transplantation works to increase the survival rate of the transplanting trees. To ensure the survival of transplanted trees, protection work should be considered. The tree transplantation proposal will be submitted to relevant authorities for approval together with the formal tree removal application.</p> | Construction site / Throughout construction stage / Until completion of all construction activities | Contractor                        | ✓                                 | ✓   |    |     | Technical Circular (Works) No. 3/2006 |
| <b>Landscape and Visual Impact (Operation)</b> |                 |  |   |                                   |                                   |     |    |     |                                       |
| Table 10.8 (OP1)                               | Table 8.2 (OP1) | <p><b>Design of the Proposed OWTF</b></p> <p>OWTF will incorporate design features as part of design mitigation measures including</p> <ul style="list-style-type: none"> <li><b>Integrated design approach</b> - the location of OWTF should be within the existing Livestock Waste Composting Plant, as far as technically feasible. The location and orientation of the OWTF should be away from landscape and visually sensitive areas such as ponds and woodlands.</li> <li><b>Building massing</b> – the proposed use of simple responsive design includes having specific height profile requirement</li> </ul>   | Construction site / During design stage   | Design Consultant / OWTF Operator | ✓                                 |     |    |     | EIAO-TM                               |

| EIA Ref.         | EM&A Ref.       | Environmental Protection Measures   | Location / Duration of measures / Timing of completion of measures | Implementation Agent              | Implementation Stage <sup>1</sup> |     |    |     | Relevant Legislation & Guidelines                 |
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|                  |                 |   |  |                                   | Des                               | Con | Op | Dec |   |
|                  |                 | <p>such as, single-storey, lower than the adjacent building structures, and avoiding large built structure for supporting facilities to reduce the intrusion of mass in the rural areas.</p> <ul style="list-style-type: none"> <li>▪ <b>Treatment of built structures</b> – the structural design should seek to reduce the apparent visual mass of the facilities further through the use of natural materials such as wooden frames or other sustainable materials such as recycled plastics.</li> <li>▪ <b>Responsive building finishes</b> – Natural tones should be considered for the colour palette for proposed structures. Non-reflective finishes are recommended on the outward facing building facades to reduce glare effect.</li> <li>▪ <b>Responsive lighting design</b> – Aesthetic design of architectural and lighting with following glare design measures:                             <ul style="list-style-type: none"> <li>– Directional and full cut off lighting is recommended within the boundaries of OWTF to minimise light spillage to the surroundings;</li> <li>– Minimise geographical spread of lighting, only applying for safety at the key access points and staircases; and</li> </ul> </li> </ul> <p>Limited lighting intensity to meet the minimum safety and operation requirement.</p> |  |                                   |                                   |     |    |     |   |
| Table 10.8 (OP2) | Table 8.2 (OP2) | <p><b>Amenity / Compensatory Planting</b></p> <p>Tree retention within the works area is considered to be important. New tree plantings will be concentrated in the proposed amenity areas along the boundaries of the site and along the exterior of OWTF buildings. Although a preliminary planting proposal is not yet available at the moment of producing this EIA Report, anticipated new tree planting within the Project site should be able to fully compensate for the loss of 14 trees proposed to be felled in terms of both quantity and quality. 441 existing trees will be retained through preserving them at their current locations. Establishment of newly planted trees is expected. Trees with high amenity value will be placed along the access routes to provide shade and soften the hard structures of OWTF buildings. Amenity plantings will utilise native tree species found on existing neighbouring slopes or</p>  | Construction site / during design and operation stage              | Design Consultant / OWTF Operator | ✓                                 |     | ✓  |     | Technical Circular (Works) Nos. 7/2002 and 3/2006 |

| EIA Ref.         | EM&A Ref.       | Environmental Protection Measures   | Location / Duration of measures / Timing of completion of measures | Implementation Agent              | Implementation Stage <sup>1</sup> |     |    |     | Relevant Legislation & Guidelines   |
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|                  |                 |   |  |                                   | Des                               | Con | Op | Dec |   |
|                  |                 | woodland areas to improve the ecological connectivity between existing habitats and create a coherent landscape network. Tree species with aggressive roots should be avoided to prevent damage to OWTF buildings and structures. Trees with high or moderate amenity value and low to medium maintenance should be considered as part of landscape resource enhancement. Recommended tree species include <i>Celtis sinensis</i> and <i>Liquidambar formosana</i> . These proposals will be subjected to review at detail design stage of the Project.   |  |                                   |                                   |     |    |     |   |
| Table 10.8 (OP3) | Table 8.2 (OP3) | <b>Treatment of Slopes</b><br>In accordance with GEO Publication No. 1/2011 "Technical Guidelines on Landscape Treatment for Slopes", these engineering structures will be aesthetically enhanced through the use of soft landscape works including tree and shrub planting to give man-made slopes a natural appearance, blending into the natural landscape. Whip-sized plantings are preferred on the face of soil cut slopes, at the crest and toe of the slope and within berm planters. These smaller, younger plants can adapt to their new growing conditions quicker than larger sized stock and establish a naturalistic effect rapidly. Recommended tree species include <i>Mallotus paniculatus</i> , <i>Broussonetia papyrifera</i> and <i>Alangium chinense</i> . | Construction site / during design and operation stage              | Design Consultant / OWTF Operator | ✓                                 |     | ✓  |     | GEO Publication No. 1/2011 "Technical Guidelines on Landscape Treatment for Slopes" |
| Table 10.8 (OP4) | Table 8.2 (OP4) | <b>Amenity enhancement</b><br>Rooftop greening and vertical greening to mitigate the visual impact of taller structures can soften the façade of OWTF structures. Frameworks utilised for vertical greening should appear naturalistic.   | Construction site / during design and operation stage              | Design Consultant / OWTF Operator | ✓                                 |     | ✓  |     | Technical Circular (Works) No. 7/2002   |

Remarks:

1. Des – Design Stage, C – Construction Stage, O – Operation, Dec - Decommissioning