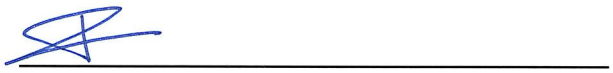
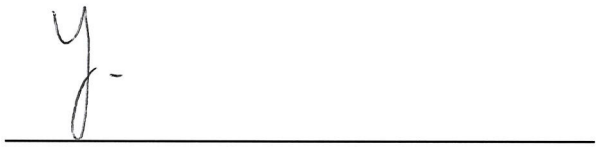
Prepared by

Ramboll Hong Kong Limited

LIGHT PUBLIC HOUSING AT YAU POK ROAD, YUEN LONG

ENVIRONMENTAL MONITORING AND AUDIT MANUAL

Date	**15 February 2024**
Prepared by	**Michael Wong** **Assistant Environmental Consultant**
Signed	
Certified By	**Y H Hui** **Environmental Team Leader**
Signed	
Project Reference	**CHEM518-ED00**
Document No.	**R9257_v2.2.docx**

Ramboll Hong Kong Limited

21/F, BEA Harbour View Centre
56 Gloucester Road, Wan Chai, Hong Kong

Tel: (852) 3465 2888
Fax: (852) 3465 2899
Email: hkinfo@ramboll.com

Q:\Projects\CHEM518-ED00\10 EMnA\10 EP_submissions\301 EMnA_Manual\R9257_v2.2.docx

CHAPTERS

TABLES

LIST OF FIGURES

ANNEXES

1. INTRODUCTION

1.1 Project Background

1.1.1 The project is for construction and operation of temporary domestic use buildings and ancillary facilities for a Light Public Housing (LPH) development (hereinafter collectively called the "Project") at Yau Pok Road, Yuen Long. The location of the project is shown in Figure 1.

1.1.2 The LPH development will comprise the following:

- 3-storey domestic blocks adopting Modular Integrated Construction (MiC) with total domestic units around 2,150 numbers;
- ancillary facilities including retail, community facilities, offices/guard rooms, store rooms, function rooms, plant rooms, sewage pumping station (SPS), Refuse Collection Points (RCP) and public transport termini;
- external leisure space including landscaped areas and children playgrounds; and
- provision of landscaping features.

1.1.3 The Project is a Designated Project (DP) under Item P1, Part I of Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO), Cap. 499, "A residential or recreational development, other than New Territories exempted houses, within Deep Bay Buffer Zone 1 or 2". The Architectural Services Department as the Project Proponent has made submitted a Project Profile (PP-652/2023) for direct application of environmental permit on 28 April 2023. Subsequently, the Director of Environmental Protection (DEP) has granted the Environmental Permit No. EP-629/2023 on 16 June 2023.

1.1.4 Condition 3.1 of EP-629/2023 requires the submission of an EM&A Manual to the DEP for approval. The EM&A Manual shall include details of EM&A programme for the Project and also the ecological monitoring activities during the construction phase.

1.2 Purpose of this EM&A Manual

1.2.1 Section 6.9 of the Project Profile (PP-652/2023) outlined the overall EM&A requirements and recommend to the relevant EM&A requirements proposed in another approved EIA Report (AEIAR-182/2014) for the same site wherever necessary. Accordingly, this EM&A Manual has been prepared taking reference to the EM&A Manual approved in 2014 (AEIAR-182/2014).

1.2.2 The main objectives of the EM&A programme include:

- To provide a database on baseline environmental quality for subsequent checking of any short or long term environmental impacts arising from the Project;
- To provide information at an early stage for identification of potential problem areas and formulation of additional environmental mitigation measures where necessary should any of the environmental control measures or practices fail to achieve the target standards;
- To monitor the performance of the Project from an environmental viewpoint and the sufficiency and effectiveness of the implemented mitigation measures;
- To verify the environmental impacts predicted in the Project Profile;
- To determine compliance of the Project with relevant regulatory standards, requirements and guidelines;

- To take remedial action should unexpected problems or unacceptable impacts are identified;
- To provide baseline and compliance monitoring data to assist the carrying out of effective environmental audits.

1.2.3 This Manual contains the following information:

- Duties of various parties involved in the environmental monitoring and audit programme;
- Information on project organisation, construction schedule and activities;
- Information on the tentative construction programme and the necessary environmental monitoring and audit programme to track the varying environmental impacts;
- Definition of Action and Limit levels, and establishment of Event and Action Plans;
- Requirements of reviewing pollution sources and work procedures in the event of non-compliance of the environmental criteria;
- Requirements of presentation of environmental monitoring and audit data and appropriate reporting procedures;
- An Implementation Schedule (Annex A) of the environmental mitigation measures recommended in the Project Profile;
- Record forms (Annex B) to be adopted where applicable during the construction phase of the Project.

1.2.4 The EM&A Manual shall be regarded as an evolving document that should be updated when necessary in order to maintain its relevance during the detailed design stage and/or the construction phase (e.g. when alternative monitoring locations are proposed). The updated EM&A Manual shall be submitted to the ER and EPD for agreement.

1.3 Scope of EM&A Programme

1.3.1 The potential impacts of air quality, noise, water quality, ecology, landscape and visual, cultural heritage, waste management and land contamination have been assessed in the Project Profile. With effective implementation of the proposed mitigation measures, adverse and unacceptable environmental impacts are not anticipated from the Project. Nevertheless, a monitoring and audit programme shall be implemented during the construction phase to check the implementation of the proposed mitigation/ control measures to closely monitor the environmental performance of the construction works.

1.3.2 Table 1.1 summarised the environmental monitoring and audits requirement.

Table 1.1 EM&A Requirements for Construction Phase

Environmental Aspects	Inspection / Audit	Monitoring
Air Quality	✓	✓
Noise	✓	✓
Water Quality	✓	✓
Ecology	✓	✓
Landscape and Visual	✓	-
Waste Management	✓	-

2. PROJECT ORGANISATION

2.1 Organisation Structure

2.1.1 The key parties in a typical EM&A programme include the Contractor, the Engineer[1] or the Engineer's representative (hereinafter referred to as the ER), the Project proponent (PP), the Environmental Team (ET), the Independent Checker (Environment) (IEC), and the Environmental Protection Department (EPD). Sufficient and suitably qualified professional and technical staff shall be employed by the respective parties to ensure full compliance with their duties and responsibility, as required in the EIA, this EM&A Manual, as well as the Project Profile for the duration of the Project.

2.1.2 A typical construction phase environmental monitoring and audit procedure is enclosed in Figure 2 for reference. The main duties and responsibilities of each party shall include but not be limited to the outline below.

2.2 Environmental Team (ET)

2.2.1 An independent ET shall be appointed to carry out the recommended EM&A works for the Project. The ET shall not be in any way an associated body of the Contractor. The ET shall be under the supervision of the ET Leader in fulfilling the EM&A duties specified in this Manual. The ET Leader shall plan, organise and manage the implementation of the EM&A programme, and to ensure that the EM&A works are undertaken to the required standards. The ET Leader shall have at least 7 years' experience in EM&A and/or environmental management subject to approval of the ER. The ET Leader is responsible for and in charge of the ET.

2.2.2 The ET Leader shall be responsible for the implementation of the EM&A programme in accordance with the EM&A requirements specified in this Manual. The ET Leader shall keep a contemporaneous log-book of each and every instance or circumstance or change of circumstances which may affect this report. This log-book shall be kept readily available for inspection by the IEC, and Director of Environmental Protection (DEP) or his authorized officers, where necessary. The ET shall not be an associated body of the IEC for the project.

2.2.3 The broad categories of works of the ET comprise the followings:

- Sampling, analysis and statistical evaluation of monitoring parameters with reference to this report;
- Analyse the EM&A data and review the success of EM&A programme to cost-effectively confirm the adequacy of mitigation measures implemented and the validity of the predictions and to identify any adverse environmental impacts arising;
- Schedule weekly environmental site audit/surveillance;
- Audit of compliance with environmental protection, and pollution prevention and control regulations;
- Monitor the implementation of environmental mitigation measures;
- Monitor compliance with the environmental protection clauses / specifications in the Contract;
- Review construction programmes and comment as necessary;
- Review work methodologies and comment as necessary;

[1] For the purpose of this manual, the "Engineer" shall refer to the Engineer as defined in the Contract and the Engineer's Representative (ER), in cases where the Engineer's powers have been delegated to the ER, in accordance with the Contract.

- Complaint investigation, evaluation and identification of corrective measures in accordance with the procedure mentioned in the EM&A Manual;
- Liaison with the IEC on all environmental performance matters;
- Advice to the Contractor on environmental improvement, awareness, enhancement matters, etc., on site during audit;
- Advise on suitable mitigation measures in case of exceedance of Action and Limit levels in accordance with the Event and Action Plans; and
- Timely submission of the EM&A report to the relevant parties as directed by the ER.

2.2.4 In the event of any exceedance in Action/Limit levels, the ET shall immediately inform the IEC, Engineer/ER and the Contractor so that appropriate remedial action can be undertaken by the Contractor promptly. The ET is also responsible for the preparation of the monthly EM&A reports for submission to IEC, the Contractor, the Engineer/ER, and the EPD. The ET shall assist the Contractor and the Engineer/ER in formulating any necessary corrective actions and/or additional mitigation measures, and liaising with relevant Government Departments where necessary.

2.3 Independent Environmental Checker (IEC)

2.3.1 The IEC shall advise the ER on environmental issues related to the Project. The IEC shall not be in any way an associated body of the Contractor or the ET for the Project. The IEC shall be empowered to audit from an independently viewpoint the environmental performance of construction. The IEC shall be a person who has at least 7 years' experience in EM&A and/or environmental management subject to approval of the ER. The IEC shall be responsible for the duties defined in this Manual, and shall audit the overall EM&A programme, including the implementation of all environmental mitigation measures, environmental submissions required in the approved EIA reports, Project Profile or this Manual. The IEC shall be responsible for verifying the environmental acceptability of permanent and temporary works, relevant design plans and environmental submissions under Project. The IEC shall verify the log-book prepared and kept by the ET Leader.

2.3.2 The main duty of the IEC is to carry out independent environmental audit of the Project. This shall include, inter alias, the followings:

- Review and audit in an independent, objective and professional manner in all aspects of the EM&A programme;
- Validate and confirm the accuracy of monitoring results; appropriateness of monitoring equipment, monitoring locations with reference to the locations of the nearby sensitive receivers, and monitoring procedures;
- Carry out random sample check and audit on monitoring data and sampling procedures, etc;
- Conduct random site inspection (monthly basis);
- Audit the recommendations in the approved EIA Report / Project Profile and requirements against the status of implementation of environmental protection measures on site;
- Review the effectiveness of environmental mitigation measures and project environmental performance;

- On a need basis, verify and certify the environmental acceptability of the construction methodology (both temporary and permanent works), relevant design plans and submissions under the contract. Where necessary, the IEC shall agree the least impact alternative in consultation with the ET Leader and the Contractor;
- Review and verify investigation results of complaint cases and the effectiveness of corrective measures;
- Review and verify EM&A report certified and submitted by the ET Leader;
- Adhere to the procedure for carrying out complaint investigation in accordance with the procedure mentioned in this Manual; and
- Feedback audit results to ET/ER by signing according to the Event/Action Plans specified in this report for different aspects.

2.4 The Contractor

2.4.1 The Contractor is responsible for providing assistance to the ET in carrying out the monitoring and EM&A duties, and providing requested information to the ET in the event of any exceedance in the environmental criteria (action/ limit levels) specified in this Manual or other current environmental standards, and to rectify unacceptable practices. The Contractor shall adhere to the procedure for carrying out complaint investigation in accordance with the procedure mentioned in the EM&A Manual. The Contractor shall discuss with the ET, IEC and ER on any additional mitigation measures identified to be required by the ET and implement the agreed measures to alleviate any identified environmental impact to acceptable levels. The Contractor shall submit the proposals on mitigation measures in case of exceedances of Action and Limit level in accordance with the Event and Action Plans, and implement the measures to reduce the impact. The Contractor shall report to the ET on the actions taken targeting at environmental protection for inclusion in the monthly report to be prepared by the ET.

2.5 The Engineer or the Engineer's Representative (ER)

2.5.1 The Engineer, or the ER shall be responsible for overseeing the operations of the Contractor and the ET. He shall advise, co-ordinate and give instruction when appropriate for efficient implementation of any specific environmental mitigation measures identified to be required by the contractor, and/or outstanding EM&A works required to be carried out by ET in consultation with the IEC. The ER shall supervise the Contractor's activities and ensure that the requirements in the approved EIA Report / Project Profile or this Manual are fully complied with. He shall inform the Contractor when action is required to reduce impacts in accordance with the Event/Action Plans. He shall review the EM&A Reports submitted by the ET and follow up the recommendations. He shall ensure that the Contractor is implementing the environmental controls and mitigation measures as set out in the approved EIA Report / Project Profile or this Manual, as well as additional measures necessary for compliance with the relevant environmental standards. The Engineer shall adhere to the procedure for carrying out complaint investigation in accordance with the procedure mentioned in this Manual.

3. AIR QUALITY

3.1 Introduction

3.1.1 During construction the Contractor shall follow the Air Pollution Control (Construction Dust) Regulation to implement dust mitigation measures during construction to minimize the dust impact to the nearby air sensitive receivers and to ensure the effectiveness of the implementation of dust mitigation measures recommended in the final EIA report and this EM&A Manual.

3.2 Air Quality Parameters

3.2.1 According to the Project Profile, with the implementation of recommended mitigation measures no adverse air quality impact is anticipated during construction. Nevertheless, EM&A programme is also proposed to monitor the effectiveness of implementation of mitigation measures. Monitoring and audit of Total Suspended Particulate (TSP) levels shall be carried out by the ET during the construction phase to ensure that any deteriorating air quality could be readily detected and timely action taken to rectify the situation.

3.2.2 1-hour TSP levels shall be measured according to the recommended programme. 1-hour TSP levels shall be measured by following the standard high volume sampling method as set out in Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B.

3.2.3 Upon agreement with the IEC, 1-hour TSP levels can alternatively be measured by direct reading methods which are capable of producing comparable results as that by the high volume sampling method, to indicate short event impacts. However, the ET should submit sufficient information to the IEC and the ER to prove that the instrument is capable of achieving a comparable result as that a High Volume Sampler (HVS) and maybe used for 1-hr sampling.

3.2.4 All relevant data including temperature, pressure, weather conditions, elapsed-time meter reading for the start and stop of the sampler, identification and weight of the filter paper, and other special phenomena and work progress of the concerned site etc. shall be recorded down in details, where appropriate. A sample data sheet is shown in Annex B.

3.3 Monitoring Equipment

3.3.1 Regarding the high volume sampling method, High Volume Sampler (HVS) in compliance with the following specifications shall be used for carrying out the monitoring:

- 0.6-1.7 m^3/min. (20-60 SCFM) adjustable flow range;
- Equipped with a timing/control device with ± 5 minutes accuracy for 24 hours operation;
- Installed with elapsed-time meter with ± 2 minutes accuracy for 24 hours operation;
- Capable of providing a minimum exposed area of 406 cm^2 (63 in^2);
- Flow control accuracy: ± 2.5% deviation over 24-hr sampling period;
- Equipped with a shelter to protect the filter and sampler;
- Incorporated with an electronic mass flow rate controller or other equivalent devices;
- Equipped with a flow recorder for continuous monitoring;
- Provided with a peaked roof inlet;

- Incorporated with a manometer;
- Able to hold and seal the filter paper to the sampler housing at horizontal position;
- Easy to change the filter; and
- Capable of operating continuously for 24-hr period.

3.3.2 If the ET proposes to use a direct reading dust meter to measure 1-hr TSP levels, he shall submit sufficient information to the IEC to prove that the instruments is capable of achieving a comparable result as that the HVS and may be used for the 1-hr sampling. The instrument shall also be calibrated regularly, and the 1-hr sampling shall be determined periodically by HVS to check the validity and accuracy of the results measured by direct reading method.

3.3.3 During the course of the project, the ET is responsible for provision of the monitoring equipment. He shall ensure that sufficient number of HVSs with an appropriate calibration kit, and direct reading dust meters are available for the carrying out of baseline monitoring, regular impact monitoring and ad hoc monitoring.

3.3.4 The HVSs shall be equipped with an electronic mass flow controller and be calibrated against a traceable standard at regular intervals. All the equipment, calibration kit, filter papers, etc. shall be clearly labelled.

3.3.5 Initial calibration of HVSs shall be conducted upon installation and thereafter at bi-monthly intervals. The transfer standard shall be traceable to the internationally recognised primary standard and be calibrated annually. The calibration data shall be properly documented for future reference by the concerned parties such as the IEC. All the data should be converted into standard temperature and pressure condition.

3.3.6 The flow-rate of the sampler before and after the sampling exercise with the filter in position shall be verified to be constant and be recorded down in the data sheet. Sample forms are provided in Annex B.

3.3.7 Wind data monitoring equipment shall also be provided and set up at a conspicuous location for logging wind speed and wind direction near to the dust monitoring locations. The location for equipment installation shall be proposed by the ET and agreed with the ER and IEC. For installation and operation of wind data monitoring equipment, the following points shall be observed:

- The wind sensors should be installed on masts at an elevated level 10m above ground so that they are clear of obstructions or turbulence caused by the buildings;
- The wind data should be captured by a data logger and to be downloaded for processing at least once a month;
- The wind data monitoring equipment should be re-calibrated at least once every six months; and
- Wind direction should be divided into 16 sectors of 22.5 degrees each.

3.3.8 In exceptional situations, the ET Leader may propose alternative methods to obtain representative wind data upon approval from the ER and agreement from the IEC.

3.4 Laboratory Measurement / Analysis

3.4.1 A clean laboratory with constant temperature and humidity control, and equipped with necessary measuring and conditioning instruments to handle the dust samples collected, shall be available for sample analysis, and equipment calibration and maintenance. The laboratory should be HOKLAS accredited or other internationally accredited laboratory.

3.4.2 If a site laboratory is set up or a non-HOKLAS accredited laboratory is hired for carrying out the laboratory analysis, the laboratory equipment shall be approved by the ER in consultation with the IEC. Measurement performed by the laboratory shall be demonstrated to the satisfaction of the ER and the IEC. The IEC shall conduct regular audit to the measurement performed by the laboratory to ensure the accuracy of measurement results. The ET shall provide the ER with one copy of the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B for his reference.

3.4.3 Filter paper of size 8" x 10" shall be labelled before sampling. It shall be a clean filter paper with no pinholes, and shall be conditioned in a humidity-controlled chamber for over 24-hours and be pre-weighed before use for the sampling.

3.4.4 After sampling, the filter paper loaded with dust shall be kept in a clean and tightly sealed plastic bag. The filter paper shall then be returned to the laboratory for reconditioning in the humidity-controlled chamber followed by accurate weighing by an electronic balance with readout down to 0.1 mg. The balance shall be regularly calibrated against a traceable standard.

3.4.5 All the collected samples shall be kept in a good condition for 6 months before disposal.

3.5 Proposed Monitoring Locations

3.5.1 The air quality impact assessment presented in the EIA report indicated that the nearby air sensitive receivers (ASRs) would not be subjected to adverse dust impact when recommended dust mitigation measures are properly applied onsite. The dust mitigation measures have been recommended and shall be implemented by the Contractor in accordance with the requirements under the Air Pollution Control (Construction Dust) Regulation. The Contractor shall be responsible for the design and implementation of the dust mitigation measures.

3.5.2 The air quality monitoring locations are listed in Table 3.1 below, while their geographical locations are shown in Figure 3.

Table 3.1 Locations of Air Quality Monitoring Stations

ID (ASR)	Representative for
AM1 (A04)	Fairview Park
AM2 (A01)	Fairview Park
AM3 (A05A, A05B)	Fairview Park
AM4 (A06, A28)	Fairview Park
AM5 (A16A)	Fairview Park

Remark: Monitoring locations are proposed as per Fairview Park Management Office request.

3.5.3 The selection of the above monitoring locations has taken into account the air quality assessment results presented in the EIA report and the availability of the monitoring locations. Since most of the ASRs assessed in the EIA which are worst affected by the construction works, are private residential development areas, access permission to these locations is unlikely be granted by the property owner. As such, nearby public areas that are in adjacent to the concerned ASRs, located closer to the project site boundary, have been selected for the monitoring.

3.5.4 Before commencement of monitoring, the ET Leader shall review the status and availability of monitoring locations which may change after issuing this Manual, and availability of continuous electricity supply for the HVS. If such cases exist, the appointed ET Leader may propose alternative monitoring locations taking into consideration of the latest status, availability and/or accessibility of the various possible monitoring locations. The alternative monitoring locations proposed by the ET shall be approved by the ER and agreed by IEC. When alternative monitoring locations are proposed, the following criteria should be followed as far as practicable:

- At the site boundary or such locations close to the major dust emission sources;
- Close to the sensitive receptors; and
- Take into account the prevailing meteorological conditions.

3.5.5 The ET Leader shall agree with the ER in consultation with the IEC on the position of the HVSs for installation of the monitoring equipment. When positioning the samplers, the following points shall be noted:

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

3.6 Baseline Monitoring

3.6.1 Baseline monitoring shall be carried out by the appointed ET Leader at all of the designated monitoring locations for at least 14 consecutive days prior to the commissioning of the construction works to obtain hourly TSP samples. 1-hr sampling shall also be done at least 3 times per day during daytime when the highest dust impact is expected. The ET Leader should inform the IEC on the baseline monitoring programme before commencement such that the IEC can conduct on-site audit to ensure accuracy of the baseline monitoring results.

3.6.2 During the baseline monitoring, there should not be any dust generation construction activities in the vicinity of the monitoring stations arising from the Site.

3.6.3 In case the baseline monitoring cannot be carried out at the designated monitoring locations during the baseline monitoring period, the ET Leader shall carry out the monitoring at alternative locations which can effectively represent the baseline conditions at the impact monitoring locations. The alternative baseline monitoring locations shall be approved by the ER and agreed with IEC.

3.6.4 In exceptional cases, when insufficient baseline monitoring data or questionable results are obtained, the ET Leader shall liaise with the IEC and EPD to agree on an appropriate set of data to be used as a baseline reference and submit to ER for approval.

3.6.5 If the ET Leader considers that the ambient conditions have been changed and a repeat of the baseline monitoring is required to be carried out for obtaining the updated baseline levels, the monitoring should be carried out at times when the contractor's activities are not generating dust in the proximity of the monitoring station. Should change in ambient conditions be determined, the baseline levels and, in turn, the air quality criteria, should be revised. The revised baseline levels and air quality criteria should be agreed with the IEC and EPD.

3.7 Impact Monitoring

3.7.1 The ET Leader shall carry out impact monitoring during the course of the construction works at the recommended dust monitoring stations.

3.7.2 For 1-hr TSP monitoring, a sampling frequency of at least three times in every six-days shall be undertaken during the hours when the highest dust impact is predicted to occur based on the nature of the construction works.

3.7.3 In case of non-compliance with the air quality criteria, more frequent monitoring exercise, as specified in the following section, shall be conducted within 24 hours after the result is obtained. This additional monitoring shall be continued until the excessive dust emission or the deterioration in air quality is rectified.

3.8 Event and Action Plan for Air Quality

3.8.1 The baseline monitoring results form the basis for determining the air quality criteria for the impact monitoring. The ET shall compare the impact monitoring results with air quality criteria set up for 1-hr TSP. Table 3.2 shows the air quality criteria, namely Action and Limit levels to be used. Should non-compliance of the air quality criteria occurs, actions in accordance with the Action Plan in Table 3.3 shall be carried out.

Table 3.2 Action and Limit Levels for Air Quality

Parameters	Action Level	Limit Level
1-Hr TSP Level in $\mu g/m^3$	For baseline level ≤ 384 $\mu g/m^3$, Action level = (Baseline level x 1.3 + Limit level) /2; For baseline level > 384 $\mu g/m^3$, Action level = Limit level;	500 $\mu g/m^3$

3.9 Construction Mitigation Measure

3.9.1 The PP has recommended various dust control and mitigation measures. The following measures are specifically recommended in the EIA for implementation together with those presented in the Air Pollution Control (Construction Dust) Regulation. An implementation schedule is provided in Annex A.

3.10 Recommended Operational Phase Mitigation Measures

3.10.1 With effective implementation of mitigation measures, adverse impacts during operational phase are not anticipated and environmental monitoring are not necessary.

Table 3.3 Event and Action Plan for Air Quality

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

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

4. NOISE

4.1 Noise Parameters

4.1.1 The construction noise level shall be measured in terms of the A-weighted equivalent continuous sound pressure level (Laeq). Laeq(30 min.) shall be used as the monitoring parameter for the time period between 0700-1900 hours on normal weekdays. For all other time periods, Laeq(5 min) shall be employed for comparison with the NCO criteria.

4.1.2 As supplementary information for data auditing, statistical results such as L10 and L90 shall also be obtained for reference. A sample data record sheet is shown in Annex B for reference.

4.2 Monitoring Equipment

4.2.1 As referred to in the Technical Memorandum 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 before and after the noise measurement, agree to within 1.0dB.

4.2.2 Noise measurements should be made in accordance with standard acoustical principles and practices in relation to weather conditions.

4.2.3 The ET Leader is responsible for the availability of the monitoring equipment. He shall ensure that sufficient noise measuring equipment and associated instrumentation are available for carrying out the baseline monitoring, regular impact monitoring and ad hoc monitoring. All the equipment and associated instrumentation shall be clearly labelled.

4.3 Monitoring Locations

4.3.1 The proposed noise monitoring locations are listed in Table 4.1 below, while their geographical locations are shown in Figure 3.

Table 4.1 Locations and Noise Criteria of Construction Noise Monitoring Stations

ID (NSRs)	Representative for	Noise Criteria, dB(A)
NM1 (N1)	Fairview Park	75
NM2 (N10)	Bethel High School	70 (65 during exam)
NM3 (N4)	Fairview Park	75
NM4 (N5)	Fairview Park	75
NM5 (N20)	Fairview Park	75

Remark: *The above noise criteria are based on the EIAO-TM, Annex 5, Noise Standards for Daytime Construction Activities

4.3.2 The selection of the above monitoring locations has taken into account the noise impact assessment results presented in the PP and the availability of the monitoring locations. Since most of the NSRs assessed in the PP which are worst affected by the construction works, are private residential development (with private garden) at existing Fairview Park and Palm Springs, access permission to these locations is unlikely be granted by the property owner. As such, nearby public area and school that are in adjacent to the concerned NSRs have been selected for the monitoring.

4.3.3 The status and availability of monitoring locations may change after issuing this Manual. If such cases exist, the appointed ET Leader may propose alternative monitoring locations taking into consideration of the latest status, availability and/or accessibility of the various possible monitoring locations. The alternative monitoring locations proposed by the ET shall be approved by the ER and agreed by IEC and EPD. When alternative monitoring locations are proposed, the following criteria should be followed as far as practicable:

- At locations close to the major site activities which are likely to have noise impacts;
- Close to the noise sensitive receivers; and
- For monitoring locations located in the vicinity of the sensitive receivers, care shall be taken to cause minimal disturbance to the occupants during monitoring.

4.3.4 The monitoring station shall normally be at a point 1m from the exterior of the sensitive receivers building facade and be at a position 1.2m above ground. If there is problem with access to the normal monitoring position, an alternative position may be chosen, and a correction to the measurements shall be made. For reference, a correction of +3dB(A) shall be made to free field measurement data. The ET Leader shall agree with the IEC on the monitoring position and the corrections adopted. Once the positions for the monitoring stations are chosen, the baseline monitoring and the impact monitoring shall be carried out at the same positions.

4.4 Baseline Monitoring

4.4.1 Baseline monitoring shall be carried out by the ET prior to the commencement of the construction works. The baseline monitoring shall be carried out daily for a period of at least 14 consecutive days prior to the commissioning of the construction works. The A-weighted levels Leq, L10 and L90 shall be logged in a sample period of 5 minutes or 30 minutes between 0700 and 1900, and 5 minutes between 1900 and 0700. The ET Leader should inform the IEC on the baseline monitoring programme before commencement such that the IEC can conduct on-site audit to ensure accuracy of the baseline monitoring results.

4.4.2 There shall not be any construction activities in the vicinity of the stations during the baseline monitoring.

4.4.3 In exceptional cases, such as insufficient baseline monitoring data or questionable results are obtained, the ET Leader shall liaise with IEC and EPD for agreement on an appropriate set of data to be used as the baseline reference and submit to the ER for approval.

4.5 Impact Monitoring

4.5.1 Noise monitoring shall be carried out at all the designated monitoring stations during the construction phase of the Project. 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 per week basis when noise generating activities are underway:

a) one set of measurement between 0700-1900 hours on normal weekdays (i.e. Monday to Saturday).

4.5.2 General construction work carrying out during restricted hours is controlled by Construction Noise Permit (CNP) system under the NCO. Without a valid construction noise permit (CNP) issued by EPD under Noise Control Ordinance (NCO), no construction work shall be carried out during restricted hours[2]. Once a valid CNP for the construction activities is issued by EPD, the ET Leader shall be appointed to carry out additional noise measurements and the IEC shall also be appointed to carry out additional site investigations and audits during the restricted hours specified in the CNP. Generally speaking, one set of measurement shall at least include 3 consecutive Leq(5min) results for construction works to be carried out during restricted hours or following the requirement specified in the CNP.

4.5.3 Moreover, the ET Leader shall propose an additional noise monitoring schedule certified by the IEC to the ER for approval before the commencement of the construction works during the restricted hours.

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

4.6 Event and Action Plan for Construction Noise

4.6.1 The Action and Limit Levels for construction noise are defined in Table 4.2. In case that a valid CNP is issued by EPD, the Action Level is the same as the non-restricted hours and the Limit Level shall be the same as the standard stated in the CNP with reference to the GW-TM/DA-TM.

4.6.2 Should non-compliance of the criteria occur, actions in accordance with the Action Plan as shown in Table 4.3 should be carried out.

Table 4.2 Action and Limit Levels for Construction Noise

Time Period	Action	Limit
0700-1900 hrs on normal weekdays	When one documented complaint is received	75* dB(A)
Restricted hours		Same as CNP

Remark: * Reduce to 70dB(A) for schools and 65dB(A) during school examination periods.

[2] All days during the evening 1900 to 2300 hours, and the night-time, 2300 to 0700 hours, and all hours of the general holidays including Sundays

Table 4.3 Event and Action Plan for Construction Noise Monitoring

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

4.7 Mitigation Measures for Construction Noise

4.7.1 The PP has recommended various construction noise control and mitigation measures. These are summarised below for easy reference. An implementation schedule is also provided in Annex A. The Contractor shall be responsible for the design and implementation of these recommended measures.

4.7.2 Noise emissions from construction sites can be minimized by adopting a number of practicable noise mitigation options, such as:

- Use of quiet/silenced equipment (QPMEs);
- Use of quieter construction methods;
- Use of movable noise barriers to shield construction activities;
- Erecting temporary noise barriers and Provision of Noise Enclosure;
- Phasing of the Construction Activities during Site Formation; and
- Good site practice and noise management.

4.7.3 The Contractor is also encouraged to arrange construction activities with care so that concurrent construction activities are avoided as much as possible. The Contractor should closely liaise with the nearby school so that noisy activities are not undertaken during school's examination period.

4.7.4 EM&A will be carried out for this Project during the construction phase in order to monitor the construction noise level and to verify the effectiveness of the above noise mitigation measures. The ET shall closely monitor contractor's performance and the residual noise level at the school. Should unacceptable construction noise level be identified during the construction noise monitoring, necessary actions following the standard Event and Action Plan specified above, will be required.

4.8 Operational Phase Noise Mitigation Measures

4.8.1 As per Condition 2.12 of the EP, a Noise Mitigation Plan (NMP) on details of operation stage noise mitigation measures shall be prepared and submitted to DEP at least 6 months before the commencement of operation of the Project. The noise mitigation measures and any EM&A requirements recommended in the approved NMP shall be fully implemented before the commencement of operation of the Project.

5. WATER QUALITY

5.1 Introduction

5.1.1 The Project Site is surrounded by existing road networks to the south and east directions; existing residential development at Fairview Park to the west; and agricultural activities in the north. Ngau Tam Mei Drainage Channel (NTMDC) is also situated to the further east of the Project Site.

5.1.2 The water quality assessment in the PP indicated that no adverse impacts on water quality would be expected from the construction phase, with proper implementation of the recommended environmental mitigation measures.

5.1.3 In order to ensure proper implementation of mitigation measures, regular water quality monitoring and site auditing programme is proposed to be carried out during the construction phase.

5.2 EM&A Requirements

5.2.1 The Contractor shall adopt the Best Management Practices (BMPs) given in the Practice Notes for Professional Persons on "Construction Site Drainage" (ProPECC PN 2/23) in controlling water pollution during the construction phase. During the operational phase, the water quality impact control measures recommended in the PP should be implemented.

5.2.2 Water quality monitoring at designated locations at the nearby inland water bodies are proposed to be carried out during the construction phase to monitor any sub-standard water discharge into the nearby water bodies from the Project Site.

5.2.3 Regular environmental audits shall be undertaken during the construction works to ensure the proper implementation of the mitigation measures for potential construction water quality impact.

5.2.4 The environmental audit shall be undertaken by the ET during construction and shall include a walk over of the active works area and surroundings. It shall include: visual inspection of the implementation of the runoff and drainage control measures from the works area; inspections of water quality surrounding the Project Site and the project discharge areas. In particular, any brown coloured water or suspended solids laden discharge shall be noted and considered to be unacceptable, triggering the Event and Action Plan.

5.2.5 The environmental audit shall include a review of the effectiveness of measures to minimize surface runoff and their effectiveness for reducing erosion and retaining suspended solids laden runoff within the Project Site. The following will be included during the review:

- Inspection of the effectiveness of silt removal facilities and erosion and sediment control structures to ensure proper and efficient operation at all times and particularly during rainstorms;
- Inspection of the effectiveness of control measures to prevent soil erosion and sediment laden run-off from the Project Site;
- Inspection of the effectiveness of collection, handling, storage and disposal of materials to ensure they do not enter the nearby stormwater drainage system; and
- Review of the Contractor's compliance with discharge license requirements.

5.3 Control/ Mitigation Measures

Construction Phase

5.3.1 The PP has recommended mitigation measures during the construction and operational phases of the Project. In particular, the following mitigation measures are required to be implemented. The implementation schedule for the recommended mitigation measures is also presented in Annex A.

5.4 Water Quality Parameters

5.4.1 The ET should carry out spot check to ensure that the Contractor has undertaken all recommended control measures to prevent direct contact of pollutants with rainwater or runoff, and measures to abate contaminants in the stormwater runoff.

5.4.2 The parameters shown in Table 5.1 are recommended to be recorded/ monitored in the routine monitoring programme.

Table 5.1 Water Quality Parameters

Parameters	Water Quality Parameters	
	Baseline Monitoring	Impact Monitoring
• In – situ Measurement	3 days per week, for a period of 4 weeks prior to the commencement of construction works	3 days per week throughout the construction period
• Temperature (°C)		
• pH (pH unit)		
• Turbidity (NTU)		
• Water Depth (m)		
• Dissolved oxygen (DO) (mg/L and % of saturation)		
• Laboratory Analysis		
• Suspended solids (SS) (mg/L)		

5.4.3 It is recommended to carry out sampling at least three times per week to measure turbidity, suspended solids, dissolved oxygen, pH, and water temperature at the control and impact monitoring locations recommended below. The monitoring frequency required shall be reviewed after the first three months and regularly thereafter.

5.4.4 In association, other relevant data such as monitoring locations/positions, time, water depth, water temperature, weather conditions, and any special phenomena and work underways should be recorded. A sample monitoring record sheet is shown in Annex B for reference.

5.5 Monitoring Equipment

5.5.1 All monitoring equipment shall be provided by the ET and approved by the ER in consultation with the IEC.

Dissolved Oxygen and Temperature Measuring Equipment

5.5.2 The instrument shall be a portable, weather proof dissolved oxygen measuring instrument complete with cable, sensor, comprehensive operation manuals, and use a DC power source. It should be capable of measuring:

- a dissolved oxygen level in the range of 0-20 mg/L and 0-200% saturation
- a temperature of 0-45°C.

5.5.3 It shall have a membrane electrode with automatic temperature compensation complete with a cable. Sufficient stocks of spare electrodes and cables shall be available for replacement where necessary (e.g. YSI model 59 meter, YSI 5739 probe, YSI 5795A submersible stirrer with reel and cable or an approved similar instrument).

Turbidity Measurement Instrument

5.5.4 The instrument shall be a portable, weatherproof turbidity-measuring instrument complete with comprehensive operation manual. The equipment shall use a DC power source. It shall have a photoelectric sensor capable of measuring turbidity between 0-1000 NTU and be complete with a cable (e.g. Hach model 2100P or an approved similar instrument).

Suspended Solids

5.5.5 A water sampler comprises a transparent PVC cylinder, with a capacity of not less than 2 litres and can be effectively sealed with latex cups at both ends. The sampler shall also have a positive latching system to keep it open and prevent premature closure until released by a messenger when the sampler is at the selected water depth (e.g. Kahlsico Water Sampler or an approved similar instrument).

5.5.6 Water samples for suspended solids measurement should be collected in high density polythene bottles, packed in ice (cooled to 4°C without being frozen), and delivered to the laboratory as soon as possible after collection.

pH Meter

5.5.7 Measurement of pH level will be recorded in-situ by a pH meter which shall consist of a potentiometer, a glass electrode, a reference electrode and a temperature-compensating device. The range of pH value shall be 0 to 14 with 0.1 as the base unit.

Checking and Calibration of Equipment

5.5.8 All in-situ/on-site monitoring instrument shall be checked and calibrated accordingly before use. The DO meter shall be calibrated by a laboratory accredited under HOKLAS or any other international accreditation scheme, and subsequently re-calibrated at 3 monthly intervals throughout all stages of the water quality monitoring. Responses of sensors and electrodes shall be checked with certified standard solutions before each use. Wet bulb calibration for a DO meter shall be carried out before measurement at each monitoring location.

5.5.9 For the on-site calibration of field equipment, the BS 127:1993, "Guide to Field and on-site test methods for the analysis of waters" shall be observed.

5.5.10 Sufficient stocks of spare parts shall be maintained for replacements when necessary. Backup monitoring equipment shall also be made available so that monitoring can proceed uninterrupted even when some equipment is under maintenance, calibration, etc.

5.6 Laboratory Measurement / Analysis

5.6.1 Water samples for suspended solids (SS) analysis should be stored in high density polythene bottles with no preservative added, packed in ice (cooled to 4°C without being frozen), delivered to the laboratory, and analysed as soon as possible after collection within 24 hours.

5.6.2 Analysis of SS shall be carried out in a HOKLAS or other internationally accredited laboratory. The reporting limit of SS shall be 2 mg/L or better. The SS determination shall follow APHA 17ed 2540D or equivalent methods subject to approval of DEP.

5.6.3 The testing laboratory shall be HOKLAS accredited (or if not, approved by the ER) and comprehensive quality assurance and control procedures in place in order to ensure quality and consistency in results.

5.6.4 If a site laboratory is set up, or a non-HOKLAS and non-international accredited laboratory, is hired for carrying out the laboratory analysis, the laboratory equipment, analytical procedures, and quality control may require to be submitted to the DEP. The ET Leader shall provide the ER and IEC with one copy of the relevant chapters of the "Standard Methods for the Examination of Water and Wastewater" updated edition and any other relevant document for his reference.

5.7 Proposed Monitoring Locations

5.7.1 It is recommended to establish control and impact monitoring stations to monitor water quality impact during construction phase. The impact monitoring stations have been selected at locations in vicinity to the construction site that may potentially be affected during the construction phase. Water quality at these locations shall be monitored during the construction. The control stations have been selected such that they are located within the same water body as the impact monitoring stations but are located outside the area of influence of the works. Data collected from the control stations enables a comparison of the water quality at the potentially impacted site with the ambient water quality.

5.7.2 The proposed water quality monitoring stations are shown in Table 5.2. The control stations C1 and C3 are set at the upstream locations, while the impact stations W1 and W3 are the corresponding stations at the downstream locations of the nearby water courses surrounding the Project Site. Figure 3 presents the approximate locations of the water quality monitoring stations.

Table 5.2 Locations of Water Quality Monitoring Stations during Construction Phase

ID	Description of Monitoring Station	Purpose of the Monitoring Station*	Coordinates (Northing, Easting)
C1	Fairview Park Nullah	As control station at upstream location of construction site and impact station W1	837093, 823201
W1	Fairview Park Nullah	As impact station at downstream location of construction site and control station C1	837506, 823280
C3	Ngau Tam Mei Drainage Channel	As control station at upstream location of construction site and impact station W3	837779, 823965
W3	Ngau Tam Mei Drainage Channel	As impact station at downstream location of construction site and control station C3	837072, 823299

Remark: * With regard to the above control and impact monitoring stations, the ET Leader shall check the tidal condition at the water quality monitoring locations before each sampling in order to identify water flow direction (e.g. with reference to the tidal information from Hong Kong Observatory and the on-site observation on water flow direction). The tidal condition and water flow direction shall be taken into account in analysing the water sampling results. In case it is identified that the water flow direction is influenced by tidal condition, the ET Leader shall determine which station would represent the control station (upstream of construction site and outside the area of influence of the works) and which station would represent the impact station (downstream of construction site influenced by the works). The ET Leader shall report above findings in the EM&A report.

** HK-Grid 1980 coordinates provided for reference only. Before commencement of water sampling, the ET Leader shall propose the exact monitoring locations and coordinates to the IEC and ER for approval.

*** Stations C2 and W2 have been omitted following site visit confirming that the nullah was dry or with very limited water and there are no other suitable alternative representative locations for water quality monitoring.

5.7.3 The status and availability of monitoring locations may change after issuing this Manual. If such cases exist, the appointed ET Leader may propose alternative monitoring locations taking into consideration of the latest status, availability and/or accessibility of the various possible monitoring locations. The ET shall seek approval from the IEC, ER and DEP on the alternative monitoring locations proposed prior to the commencement of the baseline and construction phase sampling programme.

5.7.4 When alternative monitoring locations are proposed, they should be chosen based on the following criteria:

- at locations close to and preferably at the boundary of the mixing zone of the major site activities, which are likely to have water quality impacts;
- close to the sensitive receptors which are directly or likely to be affected;
- for monitoring locations located in the vicinity of the sensitive receptors, care should be taken to cause minimal disturbance during monitoring; and
- control station shall be selected at a location to allow a comparison of the water quality at the potentially impacted site with the ambient water quality. The control station shall be selected such that it is located within the same body of water as the impact monitoring station but is located outside the area of influence of the works.

5.7.5 Given that the proposed water quality monitoring stations are mostly shallow water courses nearby, it is expected that water samples shall be collected at mid-depth level only. However, in case alternative monitoring stations are proposed by the ET, measurement shall be taken at 3 water depths, except where the water depth less than 6 m, the mid-depth station may be omitted. Should the water depth be less than 3 m, only the mid-depth station shall be monitored.

5.7.6 Enough replicates in situ measurements and sample collected from each independent sampling event are required for all parameters to ensure a robust statistically interpretable dataset.

5.7.7 The Contractor shall also submit the wastewater effluent discharge plan as stipulated in the Water Discharge License to the ET and the IEC in order to better monitor the effluent discharge of the construction site.

5.7.8 In addition to the above water quality monitoring, and as part of the environmental audit programme, the ET shall walk over of the active works area and the surroundings, and carry out regular visual inspections during the construction phase. The visual inspection shall include the implementation of the runoff and drainage control measures from the works area; inspections of water quality surrounding the Project Site and the project discharge areas. This would prevent potential impacts on nearby environs and ensure that the mitigation measures recommended in the EIA are properly implemented. In particular, any brown coloured water or suspended solids laden discharge is considered to be unacceptable, and will trigger the Event and Action Plan.

5.8 Baseline Monitoring

5.8.1 Baseline conditions of water quality should be established by the ET and agreed with IEC and DEP. The purposes of the baseline monitoring are to establish ambient conditions prior to the commencement of the works, to demonstrate the suitability of the proposed control and impact monitoring stations, and for establishment of the action and limit levels.

5.8.2 The baseline conditions should be established by measuring the water quality parameters specified in Section 5.4 above. The measurements shall be taken at all the designated control and monitoring stations, 3 days a week, for a period of 4 weeks prior to the commencement of construction works. The interval between two sets of monitoring shall not be less than 36 hours, and the baseline monitoring schedule shall be submitted to DEP and IEC at least one week prior to the commencement of the baseline monitoring. Alternative proposal including the sampling frequencies proposed by the ET should be agreed with IEC and DEP in prior.

5.8.3 There shall not be any major construction activities in the vicinity of the stations during the baseline monitoring.

5.8.4 In exceptional cases when insufficient baseline monitoring data or questionable results are obtained, the ET Leader shall seek approval from EPD on an appropriate set of data to be used as baseline reference.

5.9 Impact Monitoring

5.9.1 During the course of the construction works, impact monitoring shall be undertaken three days per week, with sampling/measurement at the designated control and impact monitoring stations. The interval between two sets of monitoring shall not be less than 36 hours except where there are exceedances of Action and/or Limit levels, in which case the monitoring frequency shall be increased.

5.9.2 Given that the proposed water quality monitoring stations are mostly shallow water courses nearby, it is expected that water samples shall be collected at mid-depth level. If the water depth is very limited that sampling of water will disturb the sediment at the bottom of the water quality monitoring location, the water sampling can be omitted subject to the Environmental Team Leader's (ETL) professional advice and agreed with the IEC and DEP. Record of the condition of the monitoring location shall be taken and reported to justify the decision of not carrying out the sampling. In that case, visual inspection shall be carried out 3 days per week and the results shall be submitted by the ETL and reported in the EM&A report.

5.9.3 Upon completion of all construction activities, a post project monitoring exercise on water quality shall be carried out for four weeks in the same manner as the impact monitoring. The results of the monitoring shall be presented in the Final EM&A Summary Report.

5.9.4 Proposed water quality monitoring schedule shall be faxed to EPD at least 1 week before the first day of the monitoring month. EPD shall also be notified immediately for any changes in schedule by fax.

5.10 Event and Action Plan for Water Quality

5.10.1 The water quality criteria, namely Action and Limit levels shall be based on the results of baseline monitoring, the Water Quality Objectives, or based on the results of statistical analysis on the difference between impact monitoring results and the control station. The Action and Limit Levels for water quality is presented in Table 5.3. Should non-compliance of the action or limit levels occur, the ET and Contractor should review and identify the potential source(s) of impact, devise and implement appropriate mitigate measures in a collaborative manner.

5.10.2 When the monitoring results of the water quality parameters at any designated monitoring stations exceed the water quality criteria, the actions in accordance with the Event and Action Plan specified in Table 5.4 shall be carried out.

Table 5.3 Typical Action and Limit Levels for Water Quality

Parameters	Action	Limit
DO in mg/L (Surface, Middle & Bottom)	Surface & Middle 5%-ile of baseline data for surface and middle layer; or Bottom 5%-ile of baseline data for bottom layer; or	Surface & Middle 4 mg/L or 1%-ile of baseline data for surface and middle layer Bottom 2 mg/L or 1%-ile of baseline data for bottom layer
SS in mg/L (depth-averaged)	95%-ile of baseline data or 120% of upstream control station's SS recorded on the same day	99%-ile of baseline data or 130% of upstream control station's SS recorded on the same day
Turbidity (Tby) in NTU (depth-averaged)	95%-ile of baseline data or 120% of upstream control station's turbidity recorded on the same day	99%-ile of baseline data or 130% of upstream control station's turbidity recorded on the same day

Remark: The proposed water quality monitoring stations are mostly shallow water courses nearby, it is expected that water samples shall be collected at mid-depth level only (Section 5.9.2 refers). However, action and limit levels for other water depths are also provided in the above table in case alternative monitoring stations are proposed by the ET.

5.11 Mitigation Measures for Water Quality

5.11.1 Measures for controlling potential water quality impact arising from the Project are summarized in Annex A.

Table 5.4 Event and Action Plan for Water Quality Monitoring

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
ACTION LEVEL				
Action level being exceeded by one sampling day	1. Identify source(s) of impact; 2. Inform IEC, contractor and ER; 3. Check monitoring data, all plant, equipment and Contractor's working methods; 4. Discuss mitigation measures with IEC and Contractor; and 5. Repeat measurement on next day of exceedance.	1. Discuss with ET and Contractor on the mitigation measures. 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; and 3. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with IEC on the proposed mitigation measures; and 2. Make agreement on the mitigation measures to be implemented.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice, if any; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET and IEC and propose mitigation measures; 6. Implement the agreed mitigation measures.
Action level being exceeded by two or more consecutive sampling days	1. Identify source(s) of impact; 2. Inform IEC, contractor and ER; 3. Check monitoring data, all plant, equipment and Contractor's working methods; 4. Discuss mitigation measures with IEC, ER and Contractor; 5. Ensure mitigation measures are implemented; 6. Prepare to increase the monitoring frequency to daily; 7. Repeat measurement on next day of exceedance.	1. Discuss with ET and Contractor on the mitigation measures. 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; and 3. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with IEC on the proposed mitigation measures; and 2. Make agreement on the mitigation measures to be implemented. 3. Assess the effectiveness of the implemented mitigation measures.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment and 4. Consider changes of working methods; 5. Discuss with ET and IEC and propose mitigation measures to IEC and ER within 3 working days; 6. Implement the agreed mitigation measures.

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Limit Level				
Limit level being exceeded by one sampling day	1. Repeat measurement on next day of exceedance to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, contractor, ER and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Ensure mitigation measures are implemented; and 6. Discuss mitigation measures with IEC, ER and Contractor;	1. Check monitoring data submitted by ET and Contractor's working methods; 2. Discuss with ET and Contractor on possible mitigation measures; and 3. Review the proposed mitigation measures submitted by Contractor and advise the ER accordingly.	1. Confirm receipt of notification of failure in writing; 2. Discuss with IEC, ET and Contractor on the proposed mitigation; 3. Request Contractor to critically review the working methods; 4. Make agreement on mitigation measures to be implemented; and 5. Ensure mitigation measures are properly implemented.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment and consider changes of working methods; 4. Discuss with ET, IEC and ER and propose mitigation measures to ER and IEC within 3 working days; and 5. Implement the agreed mitigation measures.
Limit level being exceeded by two or more consecutive sampling days	1. Repeat measurement on next day of exceedance to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, contractor, ER and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; and 7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days.	1. Check monitoring data submitted by ET and Contractor's working methods. 2. Discuss with ET and Contractor on possible mitigation measures; 3. Review the proposed mitigation measures submitted by Contractor and advise the ER accordingly; and 4. Supervise the implementation of mitigation measures.	1. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Ensure mitigation measures are properly implemented; and 5. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit level.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Take immediate action to avoid further exceedance; 3. Discuss with ET, IEC and ER and propose mitigation measures to ER and IEC within 3 working days; 4. Implement the agreed mitigation measures; 5. Resubmit proposals of mitigation measures if problem still not under control; and 6. As directed by the ER, to slow down or to stop all or part of the construction activities until no exceedance of Limit level.

6. WASTE MANAGEMENT

6.1 General Requirements

6.1.1 The contractor is responsible for waste control within the construction site, removal of the waste material produced from the Project Site and implementation of any mitigation measures to minimize waste or redress problems arising from waste generated on the Project Site.

6.1.2 The Contractor shall also pay attention to the Waste Disposal Ordinance, the Dumping at Sea Ordinance, the Public Health and Municipal Services Ordinance and the Water Pollution Control Ordinance, and carry out the appropriate waste management work. The relevant licence/permit, such as the effluent discharge licence, the chemical waste producer registration, etc. shall be obtained.

6.1.3 Waste management measures have been proposed in the approved EIA report. These measures are also reproduced in Annex A which shall be implemented for this Project.

6.2 During Detailed Design

6.2.1 The demolition and construction work shall be considered in the planning and design stages to reduce the generation of Construction and Demolition (C&D) waste where possible. Landfill disposal shall only be considered as the last resort.

6.2.2 Construction methods with minimum waste generation quantity and other environmental impacts shall be considered in the detailed design.

6.2.3 Refuse collection points (RCP) will be provided for the residential development. In order to comply with Building Regulation, mechanical ventilation will be provided. The odour nuisance to the public can be minimized by incorporating the odour absorption system.

6.3 Waste Management Measures During Construction

6.3.1 As discussed above, waste management/ control measures are provided in Annex A for implementation. Some of the recommended waste management/ control measures are presented below.

6.3.2 The excavated material may be generated during site clearance and site formation stages, which should be sorted on-site and could be reused as part of the filled material, or for the landscape area or the formation of vegetation bund within the Wetland Restoration Area given the quality of these materials should suffice the required uses, and is subject to detailed design stage. The remaining inert portion and non-inert portion of C&D waste will be disposed of at public fill facility and landfill site, respectively, where necessary. It should be noted that landfill disposal shall only be considered as the last resort.

6.3.3 The generation of wastes from these materials shall be minimised as far as practicable through recovery, reuse and/ or recycling. Whenever practicable, the production of construction waste due to over-ordering or as “side-products” of construction activities shall be minimised by the contractor through careful design, planning, good site management, control of ordering procedures, segregation and reuse of materials.

6.3.4 Wooden boards can be reused on-site or off-site, though the reusability and quantity of final waste will depend on the quality, size and shape of the boards. Those timbers which cannot be reused again shall be sorted and stored separately from all inert waste before disposed of at landfills.

6.3.5 Should construction site hoarding be erected, metal fencing or building panels, which are more durable than wooden panels, are recommended to be used as far as practicable. Opportunity shall also be sought to re-use any wooden boards used in site fencing on-site or off-site. Concrete and masonry can be crushed and used as fill material if practicable. On-site incineration of wooden waste is prohibited.

6.3.6 Cross contamination of inert C&D materials by other waste categories shall be minimised as far as practicable through provision of storage facilities for storage of different categories of waste. Inert materials including soil, rock, concrete, brick, cement plaster/ mortar, inert building debris, aggregates and asphalt should be segregated from and stored separately from other waste categories to ensure proper handling and reuse. The on-site temporary facilities should be equipped with dust control measures where necessary.

6.3.7 Spent bentonite slurries, if any, will be handled and disposed of properly in accordance with the requirements set out in the Practice Note for Professional Persons (PN2/23) Construction Site Drainage.

6.3.8 In order to avoid dust, odour and erosion impacts, all stockpile areas at the Project Area shall be covered with tarpaulin or impermeable sheets. Any vehicle carrying C&D waste shall have their load covered when leaving the works area. Vehicles shall be routed as far as possible to avoid sensitive receivers in the area.

6.3.9 General refuse generated at the construction site shall be stored separately from construction and chemical wastes to avoid cross contamination. A reliable waste collector shall be employed by the Contractor to remove general refuse from the construction site on a daily basis where appropriate to minimize the potential odour, pest and litter impacts.

6.3.10 Open burning for the disposal of construction waste or the clearance of the Project Area in preparation for construction work is prohibited under the Air Pollution Control (Open Burning) Regulation.

6.3.11 Upon appointment, the main contractor of each construction contract shall prepare and implement a Waste Management Plan (WMP), which shall be developed and incorporated in the Environmental Management Plan (EMP) to be prepared for this Project in accordance with ETWB TC(W) No. 19/2005 – Environmental Management on Construction Sites which should describe the arrangements for avoidance, reuse, recovery, recycling, storage, collection, treatment and disposal of different categories of waste to be generated from the construction activities.

6.3.12 The EMP shall provide recommendations for appropriate disposal routes if waste cannot be recycled. The EMP shall include the method statement for demolition and transportation of the excavated materials and other construction wastes. The EMP shall be approved before the commencement of construction. All mitigation measures arising from the approved EMP shall be fully implemented.

6.3.13 In formulating the EMP in respect to waste management, the following hierarchy should be considered:

- Avoidance and minimization to reduce the potential quantity of C&D materials generated;
- Reuse of materials as practical as possible;
- Recovery and Recycling as practical as possible;
- Proper treatment and disposal in respect to relevant laws, guidelines and good practice; and
- Landfill disposal shall only be considered as the last resort.

6.3.14 Such a management plan should incorporate site specific factors, such as the designation of areas for segregation and temporary storage of reusable and recyclable materials. The EMP should be submitted to the ER for approval. The contractor shall implement the waste management practices in the EMP throughout the construction stage of the Project. The EMP shall be reviewed regularly and updated (preferably monthly) by the contractor. The EMP shall take into account the recommended mitigation measures:

- A waste management policy, organization chart, and responsibility;
- An estimation on the location, type, nature, quality and quantity of different waste streams to be generated from the Project works, and the corresponding waste management methodology;
- A method statement for demolition and transportation of the excavated materials and other construction wastes;
- Potential for recycling or reuse should be explored and opportunities taken if waste generation is unavoidable;
- Recommendations for appropriate disposal routes if waste cannot be recycled;
- A system to control the disposal of C&D materials and C&D waste to public fill reception facilities, sorting facilities and landfills respectively through a trip-ticket system in accordance with the ETWB TC(W) No. 31/2004; and
- A system to record the C&D materials/ C&D waste to be generated, disposed of, reused, and recycled, respectively.

6.3.15 The project proponent/ ER will ensure that the day-to-day operations comply with the approved EMP. The project proponent shall require the contractor to separate public fill from C&D waste for disposal at appropriate facilities. In addition, the project proponent shall record the disposal, reuse and recycling of C&D materials for monitoring purposes.

6.3.16 Based on the above waste management options, a good management and control plan would be formulated. Good management and control can prevent the generation of significant amount of waste. On-site sorting of construction wastes will be recommended. Secondary on-site sorting can be achieved by avoiding the generation of “mixed waste” through good site control. Construction wastes shall be sorted to remove contaminants, with the inert materials broken up into small pieces before being transported to landfill sites.

6.3.17 In addition, the contractor(s) shall be required to reuse inert C&D materials (e.g., excavated soil) or in other suitable construction sites as far as possible, in order to minimize the disposal of C&D materials to public fill reception facilities.

6.3.18 The project proponent shall encourage the contractor to maximize the use of recycled or recyclable C&D materials, as well as the use of non-timber formwork to further minimize the generation of construction waste.

6.3.19 The following additional control/ mitigation measures are recommended to be followed by the Contractor:

- Storage of different waste types – different types of waste should be segregated and stored in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal. An on-site temporary storage area equipped with required control measures (e.g. dust) should be provided;
- Trip-ticket system – in order to monitor the proper disposal of non-inert C&D waste to landfills and to control fly-tipping, a trip-ticket system should be included as one of the contractual requirements and audited by the Environmental Team;
- Records of Wastes – a recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) should be proposed;

- Training – The contractor should provide his workers with proper training of appropriate waste management procedure to achieve waste reduction as far as practicable and cost-effective through recovery, reuse and recycling and avoid contamination of reusable C&D materials;
- Incorporate the "Recommended Pollution Control Clauses for Construction Contracts" in respect to removal of waste material from the construction site into the contract of the contractor.

Waste minimisation

6.3.20 The Contractor shall submit to the Engineer for approval a waste management plan with appropriate mitigation measures including the allocation of an area for waste segregation and shall ensure that the day-to-day site operations comply with the approved waste management plan.

6.3.21 The Contractor shall minimize the generation of waste from his work. Avoidance and minimisation of waste generation can be achieved through changing or improving design and practices, careful planning and good site management.

6.3.22 The Contractor shall ensure that different types of wastes are segregated on-site and stored in different containers, skips or stockpiles to facilitate reuse/recycling of waste and, as the last resort, disposal at different outlets as appropriate.

6.3.23 The reuse and recycling of waste shall be practised as far as possible. The recycled materials shall include paper/cardboard, timber and metal etc.

6.3.24 The Contractor shall ensure that Construction and Demolition (C&D) materials are sorted into public fill (inert portion) and C&D waste (non-inert portion). The public fill which comprises soil, rock, concrete, brick, cement plaster/mortar, inert building debris, aggregates and asphalt shall be reused in earth filling, reclamation or site formation works. The C&D waste which comprises metal, timber, paper, glass, junk and general garbage shall be reused or recycled and, as the last resort, disposal of at landfills.

6.3.25 The Contractor shall record the amount of wastes generated, recycled and disposed of (including the disposal sites).

6.3.26 The Contractor shall use a trip ticket system for the disposal of C&D materials to any designated public filling facility and/or landfill.

6.3.27 Training shall be provided for workers about the concepts of site cleanliness and appropriate waste management procedure, including waste reduction, reuse and recycling.

Waste Nuisance Control

6.3.28 The Contractor shall not permit any sewage, waste water or effluent containing sand, cement, silt or any other suspended or dissolved material to flow from the Project Area onto any adjoining land or allow any waste matter [or refuse] which is not part of the final product from waste processing plants to be deposited anywhere within the Project Area [or onto any adjoining land]. He shall arrange removal of such matter from the Project Area [or any building erected or to be erected thereon] in a proper manner to the satisfaction of the Engineer in consultation with the DEP.

Chemical Waste Control

6.3.29 The Contractor shall observe and comply with the Waste Disposal (Chemical Waste) (General) Regulation for handling, storage and disposal of chemical wastes.

6.3.30 The Contractor shall apply for registration as chemical waste producer under the Waste Disposal (Chemical Waste) (General) Regulation when chemical waste is produced. All chemical waste shall be properly stored, labelled, packaged and collected in accordance with the Regulation.

6.3.31 The Contractor shall prevent fuel and lubricating oil leakage from plant and storage sites from contaminating the construction site. All compounds in work areas shall be positioned on areas with hard paving and served by drainage facility. Sand/ silt traps and oil interceptors shall be provided at appropriate locations prior to the discharge points.

6.3.32 If off-site disposal of chemical waste is required, they shall be collected and delivered by licensed contractors and disposed of in strict accordance with the Waste Disposal (Chemical Waste) (General) Regulation.

6.3.33 Contractors shall register with EPD as chemical waste producers when disposal of chemical waste is anticipated to be required.

6.3.34 Chemical waste materials have to be stored on-site with suitable containers and away from water bodies so that leakage or spillage is prevented during the handling, storage, and subsequent transportation.

6.3.35 Handling, storage and disposal of chemical wastes shall be in accordance with the Waste Disposal (Chemical Waste) (General) Regulation and the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.

6.3.36 Fossil fuel and used lubricants from trucks and machinery are classified as chemical waste. The Contractor shall register with EPD as a chemical waste producer and observe all the requirements under the storage, labelling, transportation and disposal of chemical waste.

6.3.37 The Contractor shall prevent fuel and lubricating oil leakage from plant and storage sites from contaminating the construction site. All compounds in work areas shall be positioned on areas with hard paving and served by drainage facility. Sand/ silt traps and oil interceptors shall be provided at appropriate locations prior to the discharge points.

6.3.38 Chemical and oily wastes generated from the construction activities, vehicle and plant maintenance and oil interceptors should be disposed of as chemical waste in strict compliance with the Waste Disposal (Chemical Waste) (General) Regulations.

6.4 Waste Management Measures During Operation

6.4.1 Refuse collection points (RCP) will be provided for the project. In order to comply with Building Regulation, mechanical ventilation will be provided. The odour nuisance to the public can be minimized by incorporating the odour absorption system. With proper management and maintenance of the waste facilities, possible leachate impact from the RCP is not anticipated.

6.4.2 Collection bins for used aluminium cans, waste paper and glass bottles should be provided at strategic locations of the residential development area to promote and encourage recycling by residents during the operational phase.

6.5 Site Audit

6.5.1 The implementation schedule of the recommended mitigation measures is presented in Annex A.

6.5.2 During the site inspections and the document review procedures as mentioned in this manual , the ET shall pay special attention to the issues relating to waste management, and check whether the Contractor has implemented the recommended mitigation measures.

6.5.3 Auditing should be carried out periodically to determine if waste is being managed in accordance with prescribed waste management procedures and the EMP. The audits should examine all aspects of waste management including waste generation, storage, recycling, treatment, transportation, and disposal. The general site inspections including waste management issues will be undertaken weekly by the ET to check all construction activities for compliance with all appropriate environmental protection and pollution control measures, including those set up in the EMP. Meanwhile, waste management audit will also be carried out as part of the monthly audit by the IEC.

7. LANDSCAPE AND VISUAL

7.1 Introduction

7.1.1 The potential impacts on landscape and visual amenity originate from construction works (including materials stockpiling, excavation, and other construction activities) as well as from built structures. Details of the suggested mitigation measures are given below.

7.1.2 It is recommended that EM&A for landscape and visual resources is undertaken during the design, construction and operational phases of the project. The design, implementation and maintenance of landscape mitigation measures should be monitored to ensure that they are fully realised and that potential conflicts between the proposed landscape mitigation measures and any other project works and operational requirements are resolved at the earliest possible stage without compromise to the intent of the mitigation measures. Implementation management and maintenance of the mitigation measures recommended by the EIA will be monitored through the site audit programme.

7.2 Mitigation Measures

7.2.1 The Landscape and Visual Impact section of the PP recommended a series of mitigation measures for the construction and operation stages to ameliorate the landscape and visual impacts of the project. The plan of landscape and visual mitigation measures extracted from the PP, is presented in Figure 4.

7.2.2 The measures for both the construction and operation stage as recommended in the EIA are summarised in Table 7.1 below.

Table 7.1 Proposed Landscape and Visual Mitigation Measures

ID No.	Mitigation Measure (Construction)
CM1	Proper protection of existing trees designate to retain in-situ
CM2	Optimisation of construction areas and providing temporary landscape on temporary construction
CM3	Preservation of marsh and reedbed
CM4	Define works area and temporary works area and minimize the extent of construction works area and its residual impacts during construction
CM5	Protection of watercourse / channels of higher ecological value
CM6	Good site practice should be adopted to minimize landscape and visual impact, for example to adopt suitable height and design of temporary barriers / noise barrier to help blend in with the surrounding environment, retention of existing trees as screen planting, control of night-time lighting by hooding all lights, and reduction of construction period to practical
ID No	Mitigation Measures (Operation)
OM1	Maximize tree preservation effort
OM2	Suitable design for leisure area
OM3	Use of appropriate building materials and colours in built structures to help blend in the LPH Development to the surrounding to mitigate the landscape and visual impacts
OM4	Provision of landscape buffer and new small tree plantings along the Project Site boundary are proposed as far as practicable to provide effective screening
OM5	Sensitive design of streetscape element and suitable design and landscape treatment of along boundary
OM6	A minimum of 20% green coverage shall be provided comprising layered shrubs and lawn areas. Offsite tree compensation shall also be provided at a minimum of 1:1 ratio (tree felled: trees compensated).

7.3 Design Phase Audit

7.3.1 The landscape measures proposed in the PP to mitigate the landscape and visual impacts of the scheme should be embodied in the detailed landscape design drawings and contract documents including the protection of existing trees, the transplanting of existing trees, the retention and minor extension of existing pond and the planting of new trees and shrubs. Designs should be checked to ensure that the measures are fully incorporated and that potential conflicts with civil engineering, structures, lighting, signage, drainage, underground utilities and operational requirements are resolved prior to construction.

7.3.2 The design phase EM&A requirements for landscape and visual resources comprise the audit of the detailed landscaping drawings and specifications to be prepared during the detailed design together with ensuring that the design is sensitive to landscape and visual impacts as required under mitigation measures. Monitoring of design works against the recommendations of the landscape and visual impact assessments within the EIA should be undertaken when the designs are produced to ensure that they fulfill the intentions of mitigation measures.

7.3.3 Audits shall be carried out by a Registered Landscape Architect. The landscape auditor shall review the designs at two points in time:

- when the first draft of design drawings is prepared; and
- when the draft Tender Documents are prepared.

7.3.4 The auditor shall liaise with the Landscape Architect and Project Engineer to ensure all measures have been incorporated in the design in a format that can be specified to the Contractor for implementation. In the event of a non-conformity, the Event/Action plan as detailed in Table 7.2 below should be followed.

Table 7.2 Event/Action Plan for Design Phase

Action Level	Landscape Auditor	Project Engineer (ER)	Project Landscape Architect (PLA)
Non Conformity (with Design Standards and Specification)	• Identify Source • Inform ER and PLA • Discuss remedial actions with ER, PLA • Verify remedial actions when complete	• Notify PLA • Discuss remedial actions with PLA • Ensure remedial designs are fully incorporated	• Amend designs • Discuss remedial actions with ER

7.4 Baseline Monitoring

7.4.1 A photographic record of the Project Site at the time of the Contractor's possession should be prepared by the Contractor and approved by the ER. The approved photographic record should be submitted to the Project Proponent, ET, IEC and EPD for record.

7.5 Construction and Operation Phase Audit

7.5.1 A specialist Landscape Sub-Contractor (on the approved Government list) shall be employed by the Contractor for the implementation of landscape construction works and subsequent maintenance operations during the establishment period. Advance planting and wetland formation will be conducted within the first half of the construction contract. Thus, the establishment works will be undertaken through the latter half of the construction contract and extend throughout the Contractor's one year maintenance period which will fall within the first operational year of the project. The intention is to provide at least a 12 month establishment period for the majority of the landscape works.

7.5.2 All measures undertaken by both the Contractor and the specialist Landscape Sub-Contractor during the construction phase and first year of the operational phase shall be audited by a Registered Landscape Architect or certified Arborist, as a member of the ET, on a regular basis to ensure compliance with the intended aims of the mitigation measures. The qualification of proposed Registered Landscape Architect or certified Arborist shall be submitted to the ER for approval and agreed with the IEC. Site inspections should be undertaken at least once every two weeks throughout the construction period and once every two months during the operational phase.

7.5.3 The broad scope of the audit is detailed below but should also be undertaken with reference to the more specific checklist provided in Table 7.3. Operational phase auditing will be restricted to the last 12 months of the establishment works of the landscaping proposals and thus only those items below concerning this period are relevant to the operational phase.

- The extent of the agreed works area should be checked regularly during the construction phase and any trespass by the Contractor beyond the limit of the works, including any damage to existing trees and woodland, shall be noted.

- The progress of the engineering works should be regularly reviewed on site to identify the earliest practical opportunities for the landscape works to be undertaken.
- All existing vegetation, streams, ponds and other features within the study area which are not directly affected by the works should be retained and protected.
- The methods of protecting existing vegetation proposed by the Contractor should be acceptable and enforced.
- Preparation, lifting, transport and re-planting operations for any transplanted trees should comply with approved methods and relevant standards.
- The design and construction of buildings should conform to requirements of the EIA.
- All landscaping works should be carried out in accordance with the EIA and with approved specifications.
- Planting of new trees, shrubs, groundcover, climbers, grasses and other plants, together with the replanting of any transplanted trees, should be carried out within the right season and according to approved methods and relevant standards.
- All necessary horticultural operations and replacement planting should be undertaken throughout the Establishment Period to ensure the healthy establishment and growth of both transplanted trees and all new plants.

Table 7.3 Construction/Operation Audit Checklist

Area of Works	Items to be Monitored
Works Area	Check the extent of the Works to ensure that the Works Area is not exceeded.
Protection of all trees and woodland blocks to be retained	Identify and demarcate trees / vegetation to be retained, erect physical protection (e.g. fencing), monitor against possible incursion, physical damage, fire, pollution, surface erosion, etc.
Streams and ponds	Ensure no run-off into existing streams or ponds.
Clearance of existing vegetation	Identify and demarcate trees / vegetation to be cleared, check extent of works to minimize damage, monitor adjacent areas against possible incursion, physical damage, fire, pollution, surface erosion, etc.
Transplanting of trees	Identify and demarcate trees / vegetation to be transplanted, monitor extent of pruning / lifting works to minimise damage, timing of operations implementation of all stages of preparatory and translocation works, and maintenance of transplanted vegetation, etc.
New buildings	Ensure no buildings are greater than 3 storeys and that finish treatments comply with mitigation requirements.
Boundaries	Ensure hoarding and noise barriers are erected as required.
Night-time lighting	Ensure night-time lighting is directional (away from Visually Sensitive Receivers), hooded and shielded.
Plant supply	Monitor operations relating to the supply of specialist plant material (including the collection, germination and growth of plants from seed) to ensure that plants will be available in time to be used within the construction works.
Landscape and wetland treatments generally	Check that wetland and hard / soft landscape designs conform to intent of mitigation measures and agreed designs.
Soiling, planting, etc.	Monitor implementation and maintenance of soiling and planting works against possible incursion, physical damage, fire, pollution, surface erosion, etc.
Establishment Works	Monitor implementation of maintenance operations during Establishment Period.

7.5.4 In the event of non-compliance the responsibilities of the relevant parties are detailed in the Event/Action Plan provided on Table 7.4 below.

Table 7.4 Event/Action Plan for Construction/Operation Phase

Action Level	ET	IEC	ER	Contractor
Non-conformity on one occasion	1. Identify source. 2. Inform IEC and ER. 3. Discuss remedial actions with IEC, ER and Contractor. 4. Monitor remedial actions until rectification has been completed.	1. Check report. 2. Check Contractor's working method. 3. Discuss possible remedial measures with ES and Contractor. 4. Advise the ER on effectiveness of proposed remedial measures. 5. Check implementation of remedial measures.	1. Notify Contractor. 2. Ensure remedial measures are properly implemented.	1. Amend working methods. 2. Rectify damage and undertake any necessary replacement.
Repeated Non-conformity	1. Identify source. 2. Inform Project Proponent, IEC and ER. Inform EPD as necessary. 3. Increase monitoring frequency. 4. Discuss remedial actions with IEC, ER and Contractor. 5. Monitor remedial actions until rectification has been completed. 6. If exceedance stops, cease additional monitoring.	1. Check monitoring report. 2. Check Contractor's working method. 3. Discuss possible remedial measures with ES and Contractor. 4. Advise ER on effectiveness of proposed remedial measures. 5. Supervise implementation of remedial measures.	1. Notify Contractor. 2. Ensure remedial measures are properly implemented.	1. Amend working methods. 2. Rectify damage and undertake any necessary replacement.

8. ECOLOGY

8.1 Introduction

8.1.1 Based on the survey and the impact evaluation findings from the PP, no significant adverse ecological impact is predicted for the loss of the existing habitats which are of "very low" to "low to moderate" ecological values. It was concluded that no unacceptable ecological impact is anticipated with the implementation the recommended mitigation measures. An implementation schedule is also provided in Annex A.

8.2 Mitigation Measures for Construction Phase

8.2.1 As stated in the Project Profile, to mitigate the disturbance arising from the construction activities, the construction sequence should be carefully planned to minimise site formation in the north-eastern corner of the PS where it abuts the temporary ponds in YMST in peak wintering season for migratory birds (i.e. October - March). In addition, screening / barriers should be provided along the site boundary where it is close to NTMDC and the temporary ponds in YMST to further reduce the disturbances. Such mitigation measures are considered sufficient, because (1) the current LPH would generate less disturbances such as increased noise and dust due to the adoption of MiC method and much shorter construction period etc., and (2) only substructure construction (e.g. backfilling and shallow foundation) are anticipated to take place before March 2024, while the superstructure works (which would generally be noisier) are planned after March when the wintering season for migratory birds ends.

8.2.2 Besides, by referring to the mitigation measures proposed in the approved EIA Report (AEIAR- 182/2014) and considering the potential ecological impacts assessed in the Project Profile. The following construction phase mitigation measures are also proposed to reduce the predicted disturbance impacts to the surrounding habitats (esp. the NTMDC and wetlands in YMST) and associated wildlife to an acceptable level.

- Demarcate the construction site clearly and regularly check the boundaries to ensure that they are not breached and that no damage is caused to surrounding ecologically sensitive habitats. Any works beyond the boundary would be strictly prohibited;
- Brief site workers and other staff the sensitivity of the surrounding areas before commencement of the works, and instruct them not to disturb any areas nearby;
- Use quiet Powered Mechanical Equipment (PME) and movable noise barriers wherever necessary;
- Phasing of construction activities to minimise concurrent operation of PME;
- Use only well-maintained plant on-site. Ensure the plant to be serviced regularly during the construction program;
- Machines and plant (such as trucks) that may be in intermittent use to be shut down between work periods or to be throttled down to a minimum;
- Plant known to emit noise strongly in one direction to be, wherever possible, orientated so that the noise is directed away from the NTMDC and the wetlands in YMST project;
- Material stockpiles and other structures to be effectively utilized, wherever practicable, in screening noise from on-site construction activities.
- Comply with the Noise Control Ordinance (NCO) and implement general good site practices; and
- Implement dust control measures e.g. hard paving of the haul road, frequent watering, covering dusty materials, careful site formation scheduling etc.

8.2.3 No specific ecological requirement above and beyond the ones stated in Section 8.2.1 and 8.2.2 above are required under the impact assessments.

8.3 Mitigation Measures for Operational Phase

8.3.1 During the operational phase, the boundary where the Project Site interfaces with the YMST project should be non-transparent (e.g. Figure 5). Vegetation and shrubs will be planted densely along this boundary section, so as to screen out the visual and noise disturbances potentially arising from the increased human activities in the current LPH Project.

8.3.2 Night-time light sources will be minimised during the operational phase to further reduce the potential glare impact slightly increased from the Project. Through careful positioning and angling, lighting of the proposed LPH development will be designed to minimise directing it towards adjacent disturbance sensitive wetland areas, the NTMDC and those in YMST.

8.3.3 No significant impact is anticipated and thus no specific mitigation measure during the operational phase is to be implemented. As such there is no need for further mitigation measures beyond the ones stated in Section 8.3.1 and 8.3.2.

8.4 Monitoring Requirements

Pre-construction Ecological Monitoring

8.4.1 The ecological data obtained during the PP will provide the baseline for the evaluation of effectiveness of the proposed mitigation measures. However, prior to any site clearance and construction activities, a pre-construction survey is proposed to identify (if any) site condition changes which would affect the reliability of data obtained during the PP as a baseline. As waterbirds are the sensitive fauna in that region, monitoring will be conducted at sensitive habitats within the 500m of the Project Site, with focus at the NTMDC and the temporary ponds abutting the north-eastern boundary of the project site. The details of the surveys is provided in Table 8.1 below. A Pre-construction Ecology Survey Report will be submitted to the relevant Government departments.

Table 8.1 Summary of Pre-construction and Construction Phase Ecological Monitoring

Item	Description
Fauna group	Bird
Frequency	Pre-construction: Two times before construction during dry season (December) Construction: monthly during the construction period
Habitats	Sensitive habitats within the 500m of the Project Site, with focus at the NTMDC and the temporary ponds abutting the north-eastern boundary of the project site

Construction Phase Ecological Monitoring

8.4.2 The construction of the current LPH involves no piling works and adopts the MiC method, and last for a much shorter period of time (around 1 year) than the 3 to 4-year duration of construction works for the approved EIA Report (AEIAR-182/2014).

With effective implementation of proposed ecological mitigation measures, the potential ecological impacts would be considered minimal.

8.4.3 As a precautionary measure to verify the accuracy of impact assessment and detect any unpredictable impact arising from the proposed development, monthly monitoring of birds during the construction period is recommended. The details of the surveys are provided in Table 8.1 above.

Operational Phase Ecological Monitoring

8.4.4 Vegetation and shrubs will be planted densely along the boundary section of where the Project Site interfaces with the YMST project to screen out visual and noise disturbances potentially arising from increased human activity from the current LPH project.

8.4.5 Night-time light sources will be minimised to reduce disturbance to adjacent sensitive wetland areas during the operational phase, through careful positioning and angling.

8.4.6 As no unacceptable ecological impact is anticipated with the implementation of the mitigation measures described above, no operational phase monitoring will be required.

9. SITE ENVIRONMENTAL AUDIT

9.1 Site Surveillance

9.1.1 Site surveillance provides a direct means to trigger and enforce the specified environmental protection and pollution control measures are in compliance with the contract specifications. They shall be undertaken regularly and routinely by ET to inspect the construction activities in order to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented by the Contractor in accordance with the EM&A recommendations. With well-defined pollution control and mitigation specifications and a well-established site inspection, deficiency and action reporting system, the site inspection is one of the most effective tools to enforce the environmental protection requirements on the construction site.

9.1.2 The ET Leader is responsible for formulation of the environmental site inspection, deficiency and action reporting system, and for carrying out the site inspections under the EM&A works. He shall, in consultation with the IEC, prepare and submit a proposal on the site inspection, deficiency and action reporting procedures (including any checklists and forms) within 21 days of the construction contract commencement to the Contractor for agreement and to the ER for approval. A preliminary site inspection, deficiency and action reporting system in form of a flow chart is prepared for reference. This is shown in Figure 6 for review and refinement by the ET Leader at the commencement of the Project.

9.1.3 Regular site inspections shall be carried out at least once per week for all works areas. The areas of inspection shall not be limited to the environmental situation, pollution control and mitigation measures within the Project Site, it should also review the environmental situation outside the site area which is likely to be affected, directly or indirectly, by the site activities. The ET leader shall make reference to the following information in conducting the inspection:

- The EIA recommendations and requirements on environmental protection and pollution control mitigation measures;
- Works progress and programme, and site plans;
- Individual construction works methodology proposals (which shall include proposal on associated pollution control measures);
- The contract specifications on environmental protection and pollution prevention control;
- The relevant environmental protection and pollution control laws, ProPECC Notes; and
- Previous site inspection results.

9.1.4 The satisfactory implementation of relevant recommended mitigation measures shall be checked during the ET's regular site inspections during the relevant phases of construction works.

9.1.5 The Contractor shall update with the ET Leader on all relevant information of the construction contract for him to carry out the site inspections. The inspection results and its associated recommendations on improvements to the environmental protection and pollution control works shall be submitted, in a site inspection proforma, to the IEC and the Contractor in a site inspection proforma within 24 hours, for reference and for taking immediate action. The Contractor shall follow the procedures and time frame as stipulated in the environmental site inspection, deficiency and action reporting system formulated by the ET Leader to report on any remedial measures subsequent to the site inspections.

9.1.6 Ad hoc site inspections shall also be carried out by the ET and/or IEC when significant environmental problems are identified. Inspections may also be required subsequent to receipt of an environmental complaint, or as part of the investigation work, as specified in the Action Plan for environmental monitoring and audit.

9.2 Environmental Compliance with Legal and Contractual Requirements

9.2.1 There are contractual environmental protection and pollution control requirements as well as environmental protection and pollution control laws in Hong Kong, which the construction activities shall comply.

9.2.2 The ET Leader shall review the progress and programme of the works to check that relevant environmental laws have not been violated, and that any foreseeable potential for violating the laws can be prevented.

9.2.3 The Contractor shall regularly copy relevant documents to the ET Leader so that the checking work can be carried out effectively. The document shall at least include the updated Work Progress Reports, the updated Works Programme, the application letters for different licence/permits under the environmental protection laws, and all the valid licence/permit. The site diary shall also be available for the ET's inspection upon his request.

9.2.4 After reviewing the document, the ET Leader shall advise the ER and the Contractor of any non-compliance with the contractual and legislative requirements on environmental protection and pollution control for them to take follow-up actions. If the ET Leader's review concludes that the current status on licence/permit application and any environmental protection and pollution control preparation works may not cope with the works programme or may result in potential violation of environmental protection and pollution control requirements by the works in due course, he shall also advise the Contractor and the ER accordingly. The review shall be copied to IEC for any follow-up action.

9.2.5 Upon receipt of the advice, the Contractor shall undertake immediate action to remedy the situation. The ER shall check that appropriate actions have been taken by the Contractor in order that the environmental protection and pollution control requirements are fulfilled.

9.3 Environmental Complaints

9.3.1 Complaints received on environmental issues shall be referred to the ET Leader for carrying out complaint investigation procedures. The ET shall undertake the steps given below upon receipt of the complaints. The complaint investigation procedures are also presented in form of a flow chart in Figure 7 for easy reference.

(a) log complaint and date of receipt onto the complaint database and inform the IEC immediately;

(b) investigate the complaint to determine its validity, and to assess whether the source of the problem is due to works activities;

(c) if a complaint is valid and due to works, identify mitigation measures;

(d) if mitigation measures are required, advise the Contractor accordingly;

(e) review the Contractor's response on the identified mitigation measures, and the updated situation;

(f) if the complaint is transferred from EPD, submit interim report to EPD on status of the complaint investigation and follow-up action within the time frame assigned by EPD;

(g) undertake additional monitoring and audit to verify the situation if necessary, and ensure that any valid reason for complaint does not recur;

(h) report the investigation results and the subsequent actions to the source of complaint for responding to complainant (If the source of complaint is EPD, the results should be reported within the time frame assigned by EPD); and

(i) record the complaint, investigation, the subsequent actions and the results in the monthly EM&A reports.

9.3.2 The ER shall notify the Project Proponent of any complaints received and keep him well informed of the actions being taken to settle these complaints.

9.3.3 During the complaint investigation work, the Contractor and ER shall co-operate with the ET Leader in providing all the necessary information and assistance for completion of the investigation. If mitigation measures (in consultation with the IEC, see Section 9.3 above) are required following the investigation, the Contractor shall promptly carry out the measures. The ER shall ensure that the measures have been carried out by the Contractor.

10. REPORTING

10.1 General

10.1.1 The following reporting requirements based upon a paper-documented approach. However, the same information can be provided in an electronic medium upon agreeing the format with the ER and EPD. All the monitoring data (baseline and impact) shall also be submitted in diskettes in an agreed format. This would enable a transition from a paper/historic and reactive approach to an electronic/real time proactive approach.

10.2 Baseline Monitoring Report

10.2.1 The ET Leader shall prepare and submit Baseline Environmental Monitoring Reports within 10 working days of completion of the baseline monitoring. Copies of the Baseline Environmental Monitoring Reports shall be submitted to the relevant parties such as the Contractor, the IEC, the ER, EPD, and Agriculture, Fisheries and Conservation Department (AFCD). Before the submission, the ET Leader shall liaise with the relevant parties on the exact number of copies needed. The format and content of the report, and the representation of the baseline monitoring data to be submitted shall be agreed with EPD and AFCD.

10.2.2 The baseline monitoring report shall include at least the following:

a) up to half a page executive summary;
b) brief project background information;
c) drawings showing locations of the baseline monitoring stations;
d) monitoring results (in both hard and diskette copies) together with the following information:
    - monitoring methodology;
    - name of laboratory and types of equipment used and calibration details;
    - parameters monitored;
    - monitoring locations (and depth);
    - monitoring date, time, frequency and duration; and
    - quality assurance (QA) / quality control (QC) results and reporting limits;
e) details of influencing factors, including:
    - major activities, if any, being carried out on the Project Site during the period;
    - weather conditions during the period; and
    - other factors which might affect results;
f) determination of the Action and Limit Levels for each monitoring parameter and statistical analysis of the baseline data, the analysis shall conclude if there is any significant difference between control and impact stations for the parameters monitored;
g) revisions for inclusion in the EM&A Manual; and
h) comments and conclusions.

10.3 Monthly EM&A Reports

10.3.1 The results and findings of all EM&A work required in the Manual shall be recorded and submitted by the ET Leader during construction phase. Based on this information, a monthly EM&A report shall be prepared by the ET Leader and endorsed by the IEC, and submitted to EPD within 10 working days of the end of each reporting month, with the first report due in the month after construction commences. Copies of each monthly EM&A report shall be submitted to the parties including the Contractor, the IEC, the ER and EPD. Before submission of the first EM&A report, the ET Leader shall liaise with the parties on the exact number of copies and format of the monthly reports in both hard copy and electronic medium required.

10.3.2 The ET Leader shall review the number and location of monitoring stations and parameters to monitor every 6 months or on as needed basis in order to cater for the changes in surrounding environment and nature of works in progress.

10.4 First Monthly EM&A Report

10.4.1 The first monthly EM&A report shall include at least but not be limited to the following:

a) Executive Summary (1-2 pages)
- Breaches of AL/LL levels;
- Complaint Log;
- Notifications of any summons and successful prosecutions;
- Reporting Changes;
- Future key issues.

b) Basic Project Information
- Project organisation including key personnel contact names and telephone numbers;
- Construction Programme with fine tuning of construction activities showing the inter-relationship with environmental protection/mitigation measures for the month;
- Management structure;
- Works undertaken during the month.

c) Environmental Status
- Works undertaken during the month with illustrations (such as location of works, daily dredging/filling rates, percentage fines in the fill material used);
- Drawing showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations.

d) Summary of EM&A Requirements
- All monitoring parameters;
- Environmental quality performance limits (Action and Limit levels);
- Event and Action Plans;
- Environmental mitigation measures
- Environmental requirements in contract documents;

e) Implementation Status:
- Advice on the implementation status of environmental protection and pollution control/mitigation measures including measures in the EM&A Manual and PP.

f) Monitoring Results (in both hard and diskette copies) together with the following information:
- Monitoring methodology;
- Name of laboratory and types of equipment used and calibration details;
- Parameters monitored;
- Monitoring locations (and depth);
- Monitoring date, time, frequency, and duration;
- Weather conditions during the period;
- Graphical plots of the monitored parameters in the month annotated against:
- Major activities being carried out on site during the period;
- Weather conditions that may affect the results;
- Any other factors which might affect the monitoring results; and
- QA/QC results and detection limits.

g) Report on Non-compliance, Complaints, Notifications of Summons and Successful Prosecutions:
- Record of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
- Record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
- Record of all notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislations, including locations and nature of the breaches, investigation, follow-up actions taken, result and summary;
- Review of the reasons for and the implications of non-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures; and
- Description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance;

h) Others:
- An account of the future key issues reviewed from the works programme and work method statements;
- Advice on the solid and liquid waste management status;
- Submission of implementation status proforma, proactive environmental protection proforma, regulatory compliance proforma, site inspection proforma, data recovery schedule and complaint log summarizing the EM&A of the period.

10.5 Subsequent Monthly EM&A Reports

10.5.1 The subsequent monthly EM&A reports shall include the following:

a) Executive Summary (1-2 pages)
- Breaches of AL/LL levels;
- Complaint Log;
- Notifications of any summons and successful prosecutions;
- Reporting Changes;
- Future key issues.

b) Environmental Status
- Changes in Construction Programme, if any;
- Works undertaken during the month with illustrations including key personnel contact names and telephone numbers;
- Drawing showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations.

c) Implementation Status
- Advice on the implementation status of environmental protection and pollution control/mitigation measures including measures in the EM&A Manual and PP.

d) Monitoring Results to provide monitoring results (in both hard and diskette copies) together with the following information
- Monitoring methodology;
- Name of laboratory and types of equipment used and calibration details;
- Parameters monitored;
- Monitoring locations (and depth);
- Monitoring date, time, frequency, and duration;
- Weather conditions during the period;
- Graphical plots of the monitored parameters in the month annotated against:
  i. Major activities being carried out on site during the period;
  ii. Weather conditions that may affect the results;
  iii. Any other factors which might affect the monitoring results;
- QA/QC results and detection limits.

e) Report on Non-compliance, Complaints, Notifications of Summons and Successful Prosecutions
- Record of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
- Record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
- Record of all notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislations, including locations and nature of the breaches, investigation, follow-up actions taken, result and summary;

- Review of the reasons for and the implications of non-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures;
- A description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance.

f) Others

- An account of the future key issues reviewed from the works programme and work method statements;
- Advice on the solid and liquid waste management status.

g) Appendix

- AL/LL levels
- Graphical plots of trends of monitored parameters at key stations over the past four reporting periods for representative monitoring stations annotated against the following:
  i. Major activities being carried out on Site during the period;
  ii. Weather conditions during the period; and
  iii. Any other factors which might affect the monitoring results
- Monitoring schedule for the present and next reporting period
- Cumulative statistics on complaints, notifications of summons and successful prosecutions

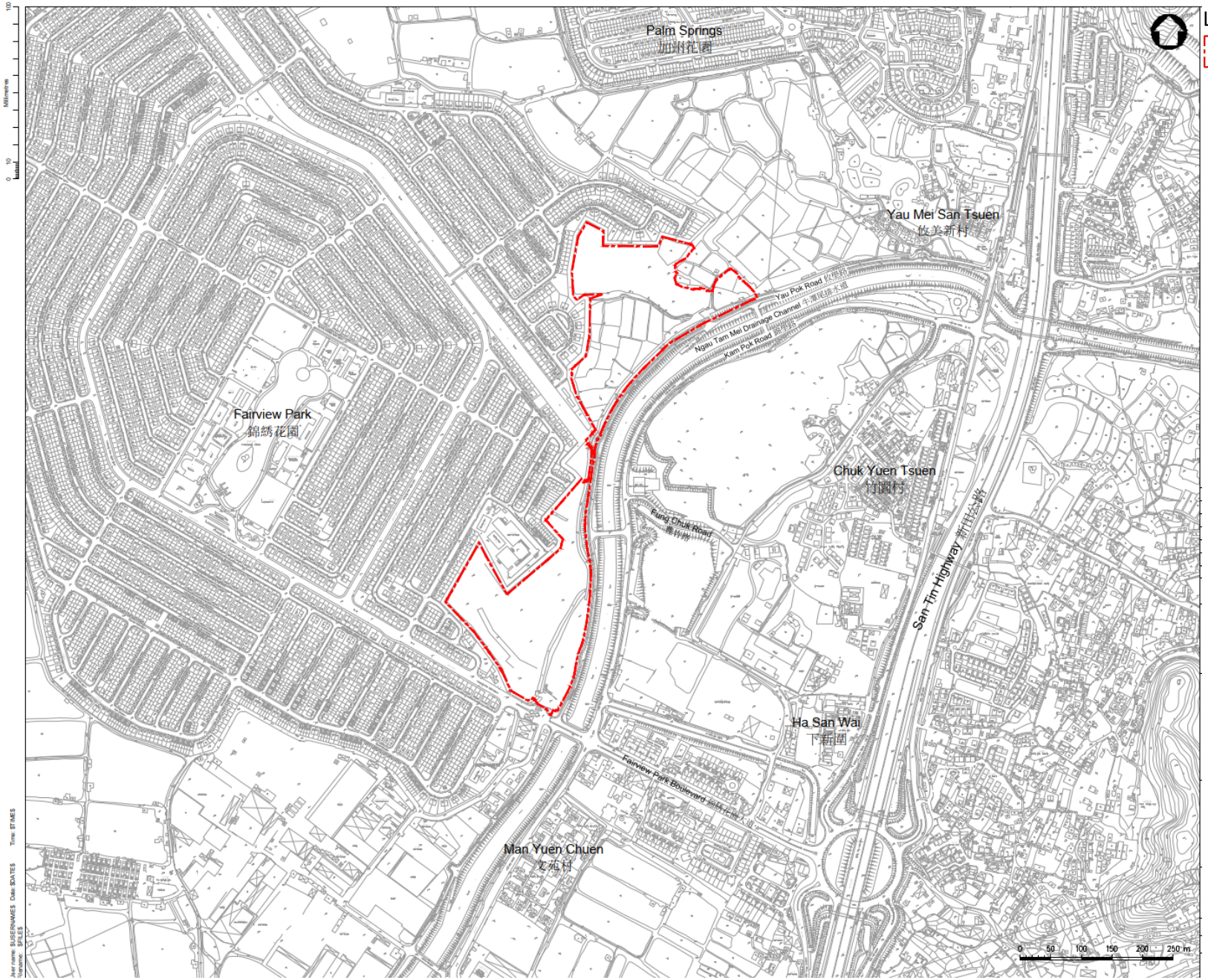
10.6 Data Keeping

10.6.1 The site document such as the monitoring field records, laboratory analysis records, site inspection forms, etc. are not required to be included in the monthly EM&A reports for submission. However, the document shall be well kept by the ET and be ready for inspection upon request. All relevant information shall be clearly and systematically recorded in the document. The monitoring data shall also be recorded in magnetic media form, and the software copy can be available upon request. The water quality data software format shall be agreed with EPD. All the documents and data shall be kept for at least one year after completion of the construction contract.

10.7 Interim Notifications of Environmental Quality Limit Exceedances

10.7.1 With reference to Event/Action Plans in previous sections, when the environmental quality limits are exceeded, the ET shall immediately notify the ER & EPD, as appropriate. The notification shall be followed up with advice to EPD on the results of the investigation, proposed action and success of the action taken, with any necessary follow-up proposals. A sample template for the interim notifications is shown in Annex B.

Figures

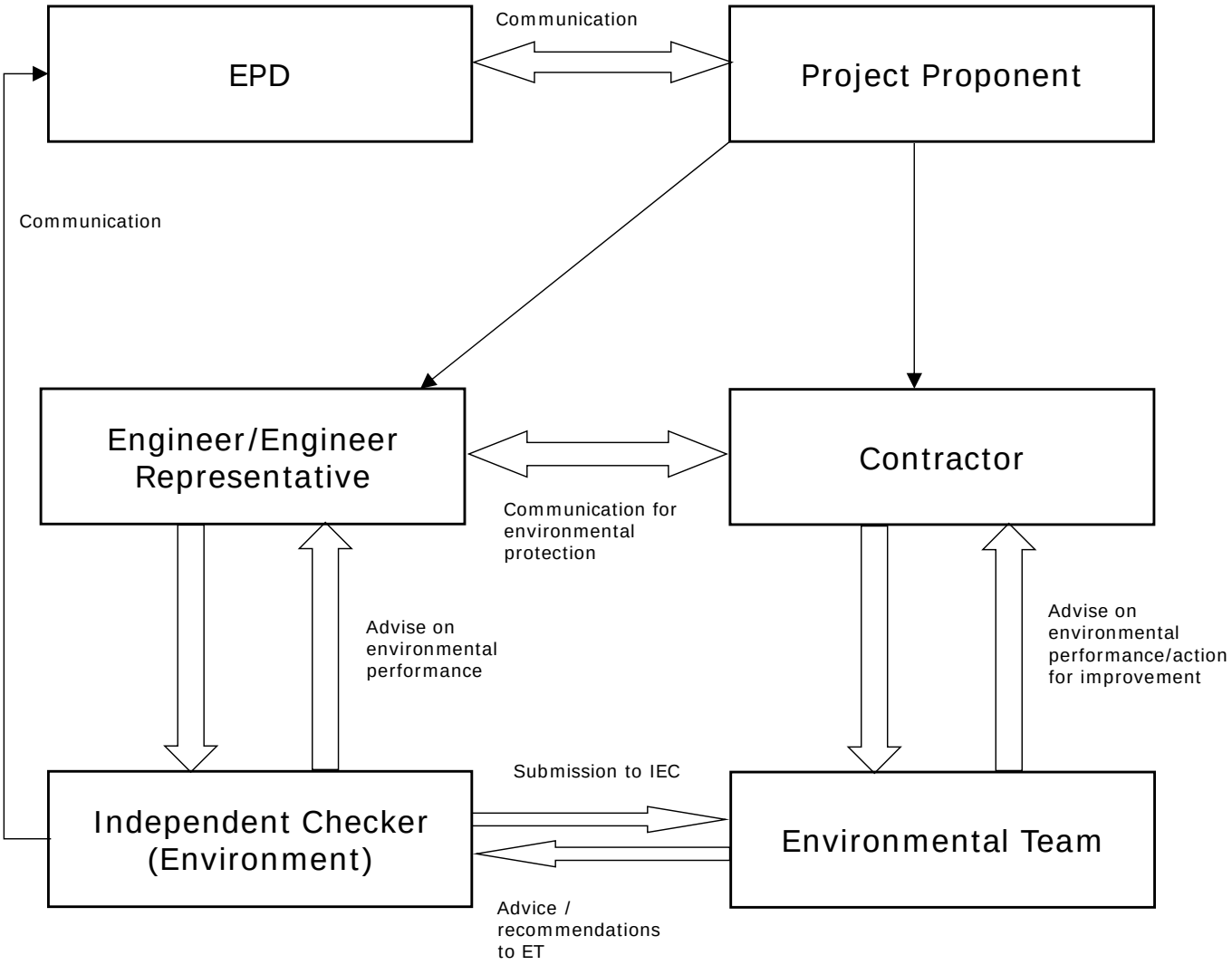


LEGEND 圖例:

PROJECT SITE 項目地點

RAMBOLL	Light Public Housing At Yau Pok Road, Yuen Long	Location of Project Site	Figure No.: 1
			Date: 5 Dec 2023
			Drawn: MW
			Scale: As shown
			Check: YH

Q:\Projects\CHEM518-ED00\10 EMnA\10 EP_submissions\301 EMnA_Manual\figures and annex\R9257_v2.0\Figure 1 Location of Project Site.pdf



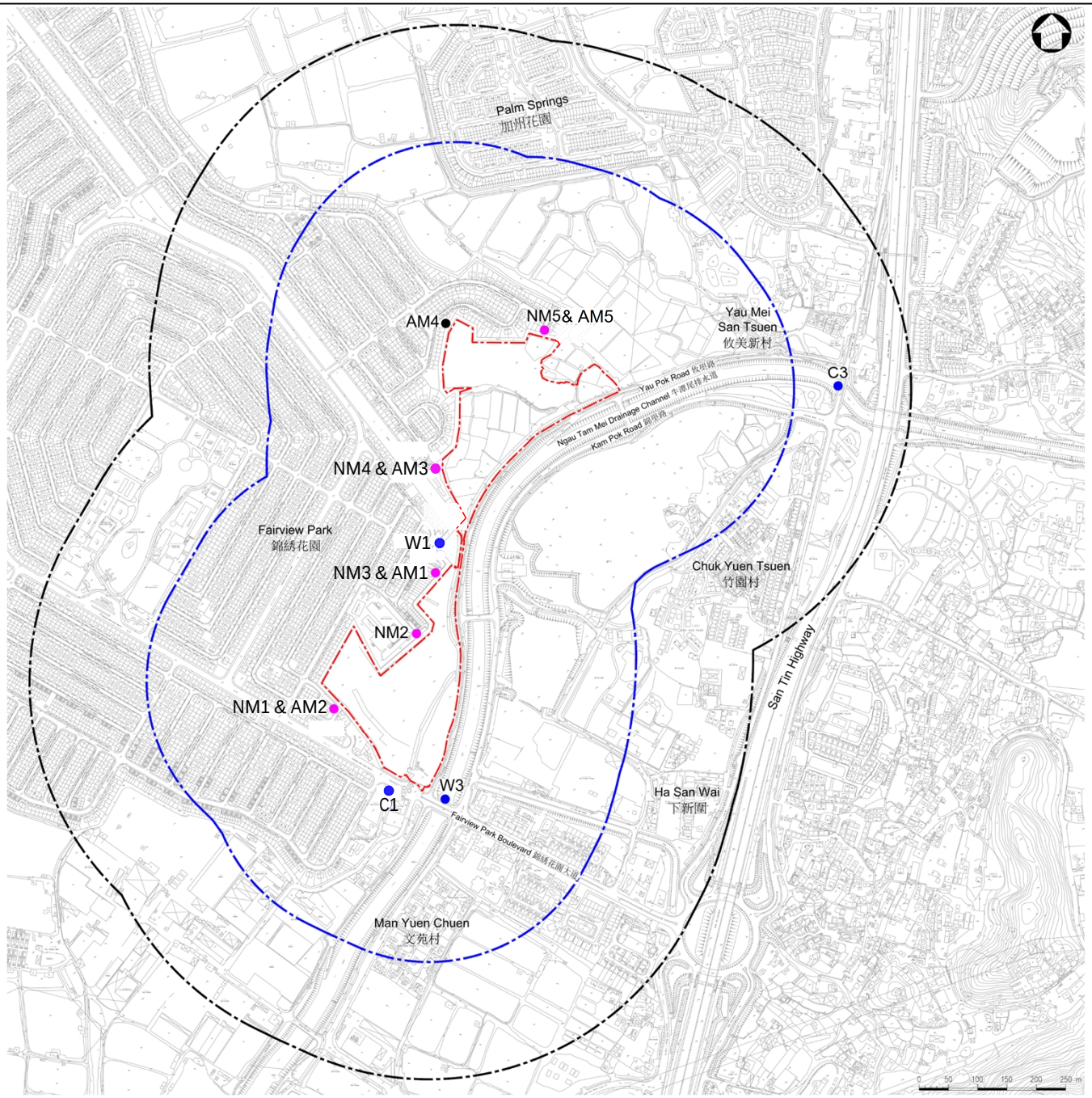
Notes:
Please refer to the EM&A Manual for duties and responsibilities of each party.

Submission from ET to IEC:
•Implementation status proforma on mitigation action;
•Proactive environmental protection proforma for construction method alternative;
•Regulatory compliance proforma listing licenses/permit compliance;
•Site inspection proforma;
•Complaint report;
•EM&A report for endorsement;
•Effectiveness of EIA recommendations.

Advice / Recommendations from IEC to ET:
•Advise on environmental performance
•Return/sign off audit proformas
•Environmental concerns recommendations on construction methods

	RAMBOLL	Light Public Housing At Yau Pok Road, Yuen Long	Typical Construction Phase Environmental Monitoring and Audit Procedures	Figure No.: 2
				Date: 5/12/2023 / Scale: N/A
				Drawn : MW / Check: YH

Q:\Projects\CHEM518-ED00\10 EMnA\10 EP_submissions\301 EMnA_Manual\figures and annex\R9257_v1.2\Figure 2 Typical Construction Phase EMnA Procedure.pdf



LEGEND 圖例:

- PROJECT SITE 項目地點
- 500m ASSESSMENT AREA FOR AIR QUALITY AND WATER QUALITY 500米空氣質素及水質評估範圍
- 300m ASSESSMENT AREA FOR NOISE 300米噪音評估範圍
- PROPOSED AIR QUALITY MONITORING STATIONS 擬議空氣質素監察站
- PROPOSED NOISE MONITORING STATIONS 擬議噪音監察站
- PROPOSED WATER QUALITY MONITORING STATIONS 擬議水質監察站

RAMBOLL

Light Public Housing At Yau Pok Road, Yuen Long

Proposed Locations of Construction Phase Air Quality, Noise and Water Quality Monitoring Stations

Figure No.: 3

Date: 13 /12 / 2023

Scale: As shown

Drawn : MW

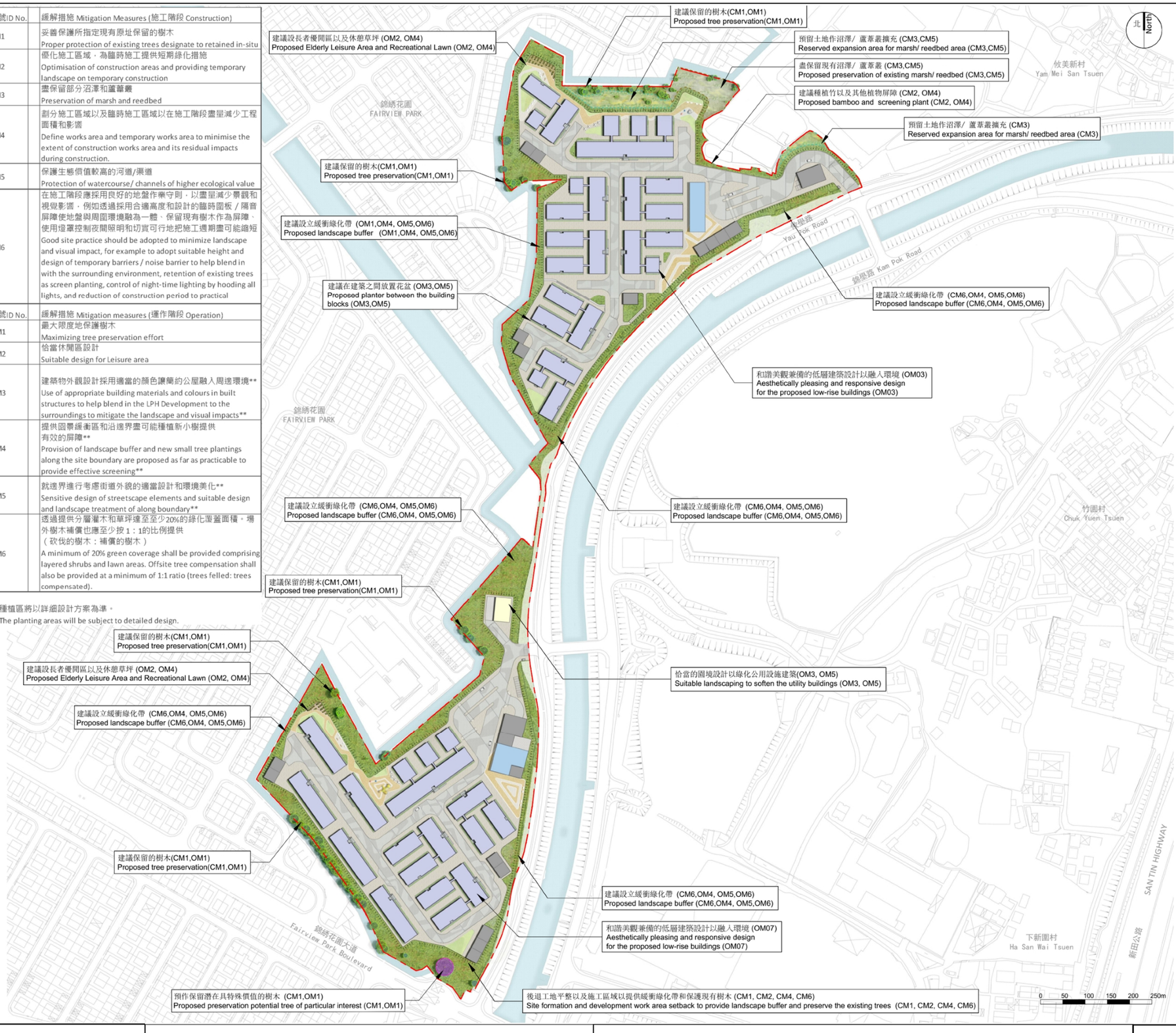
Check: YH

Q:\Projects\CHEM518-ED00\10 EMnA\10 EP_submissions\301 EMnA_Manual\figures and annex\R9257_v1.2\Figure 3 Air Quality Noise and Water Quality Monitoring Stations.pdf

編號ID No.	緩解措施 Mitigation Measures (施工階段 Construction)
CM1	妥善保護所指定現有原址保留的樹木 Proper protection of existing trees designate to retained in-situ
CM2	優化施工區域，為臨時施工提供短期綠化措施 Optimisation of construction areas and providing temporary landscape on temporary construction
CM3	盡保留部分沼澤和蘆葦叢 Preservation of marsh and reedbed
CM4	劃分施工區域以及臨時施工區域以在施工階段盡量減少工程面積和影響 Define works area and temporary works area to minimise the extent of construction works area and its residual impacts during construction.
CM5	保護生態價值較高的河道/渠道 Protection of watercourse/ channels of higher ecological value
CM6	在施工階段應採用良好的地盤作業守則，以盡量減少景觀和視覺影響，例如透過採用合適高度和設計的臨時圍板 / 隔音屏障使地盤與周圍環境融為一體、保留現有樹木作為屏障、使用燈罩控制夜間照明和切實可行地把施工週期盡可能縮短 Good site practice should be adopted to minimize landscape and visual impact, for example to adopt suitable height and design of temporary barriers / noise barrier to help blend in with the surrounding environment, retention of existing trees as screen planting, control of night-time lighting by hooding all lights, and reduction of construction period to practical

編號ID No.	緩解措施 Mitigation measures (運作階段 Operation)
OM1	最大限度地保護樹木 Maximizing tree preservation effort
OM2	恰當休閒區設計 Suitable design for Leisure area
OM3	建築物外觀設計採用適當的顏色讓簡約公屋融入周邊環境** Use of appropriate building materials and colours in built structures to help blend in the LPH Development to the surroundings to mitigate the landscape and visual impacts**
OM4	提供園景緩衝區和沿邊界盡可能種植新小樹提供有效的屏障** Provision of landscape buffer and new small tree plantings along the site boundary are proposed as far as practicable to provide effective screening**
OM5	就邊界進行考慮街道外貌的適當設計和環境美化** Sensitive design of streetscape elements and suitable design and landscape treatment of along boundary**
OM6	透過提供分層灌木和草坪達至至少20%的綠化覆蓋面積。場外樹木補償也應至少按1：1的比例提供 （砍伐的樹木：補償的樹木） A minimum of 20% green coverage shall be provided comprising layered shrubs and lawn areas. Offsite tree compensation shall also be provided at a minimum of 1:1 ratio (trees felled: trees compensated).

** 種植區將以詳細設計方案為準。
** The planting areas will be subject to detailed design.



圖例 Legend

- 發展項目邊界 Application Site Boundary
- xx.xx 現有高度 Existing Levels
- xx.xx 預計高度 Proposed Levels
- 預作行人出入口 Proposed Pedestrian Access
- 預作行車出入口 Proposed Vehicular Access
- 預作住宅建築物 Proposed Domestic Blocks
- 預作非住宅建築物 (社區設施) Proposed Non-Domestic Blocks (Community Facilities)
- 預作非住宅建築物 (機電房) Proposed Non-Domestic Blocks (E&M / Plant Rooms)
- 預作污水處理設施 Proposed Sewage Pumping Station
- 預作保留的樹木 Existing Tree to Be Retained
- 預作保留潛在具特殊價值的樹木 (T239) Potential Tree of Particular Interest (T239)
- 預作緩衝用途灌木叢 Proposed Buffer Layered Shrub Planting
- 預作草坪 Proposed Lawn
- 預作行車路(緊急車輛通道) Proposed EVA Paving
- 預作行人路 Proposed Pedestrian Footpath
- 預作特色鋪地 Proposed Feature Paving
- 預作座椅 Proposed Seating (Fixed)
- 現有沼澤/ 蘆葦叢 Existing Marsh/Reedbed Area
- 預留土地作沼澤/ 蘆葦叢擴充 Reserved Extension Area for Marsh/ Reedbed Area
- 現有綠化人造斜坡 Existing Engineered Slope Greening

RAMBOLL

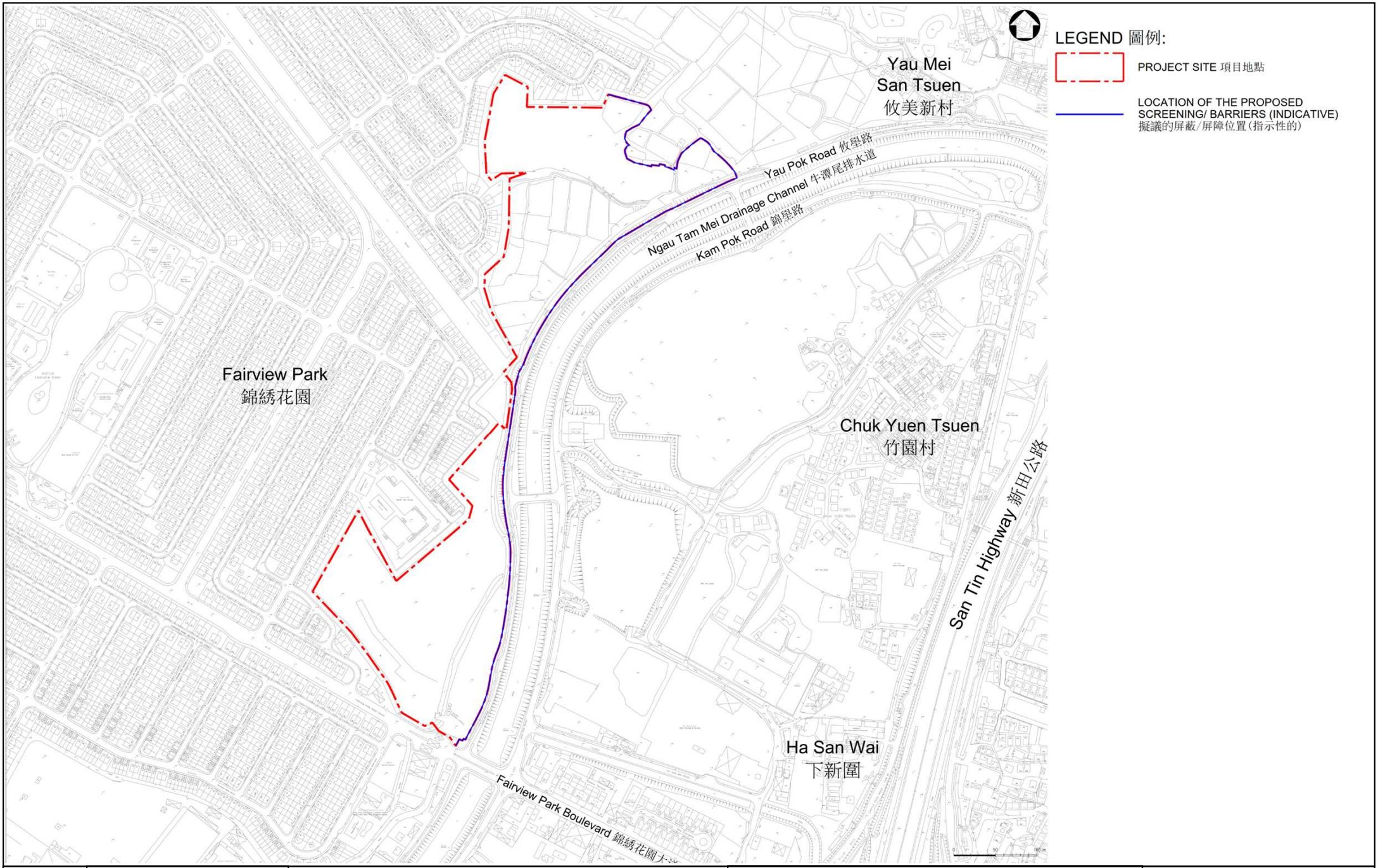
Light Public Housing At Yau Pok Road, Yuen Long

Proposed Landscape and Visual Mitigation Measures

Figure No.: 4

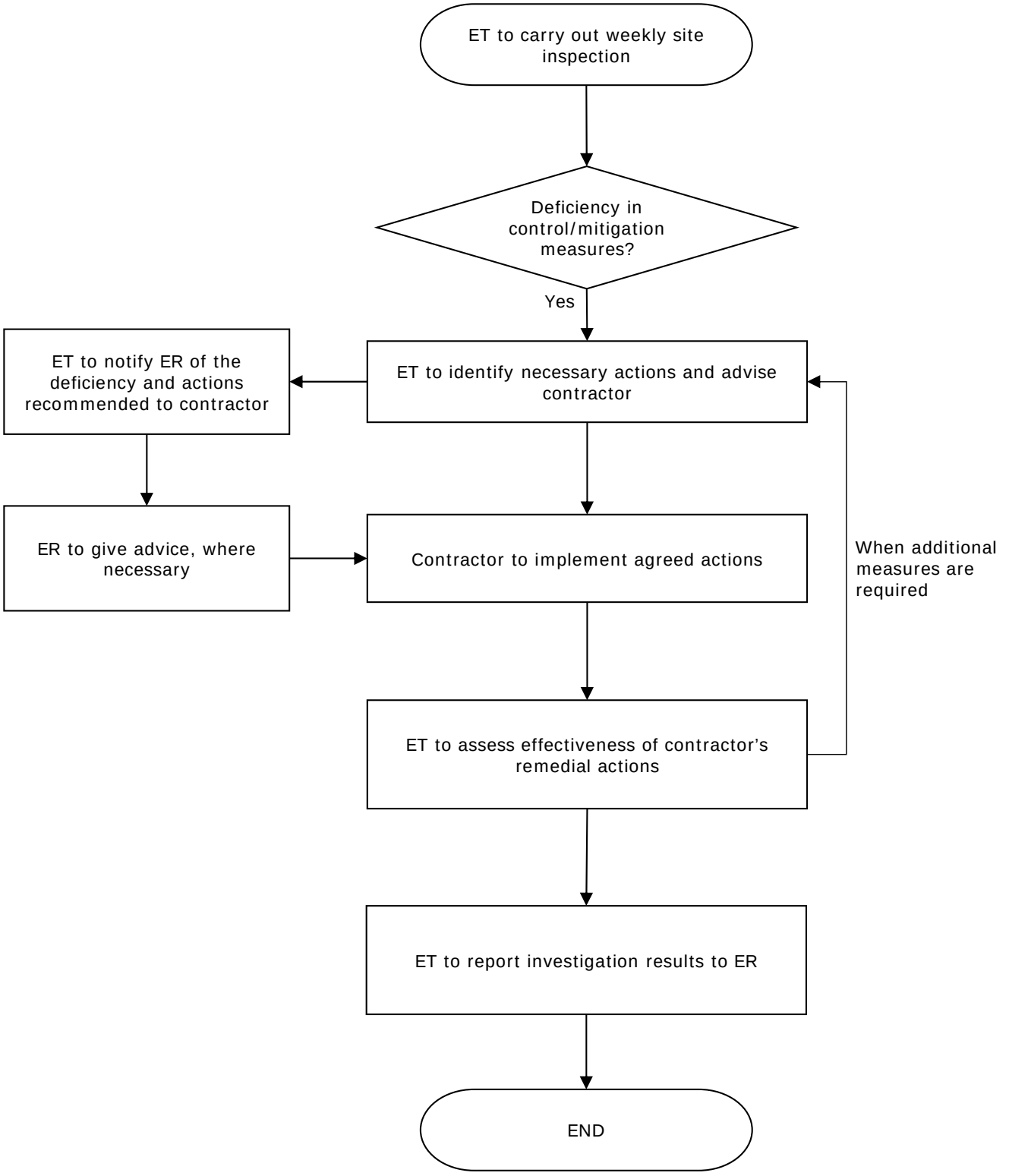
Date: 5/12/2023 | Scale: N.T.S

Drawn: MW | Check: YH



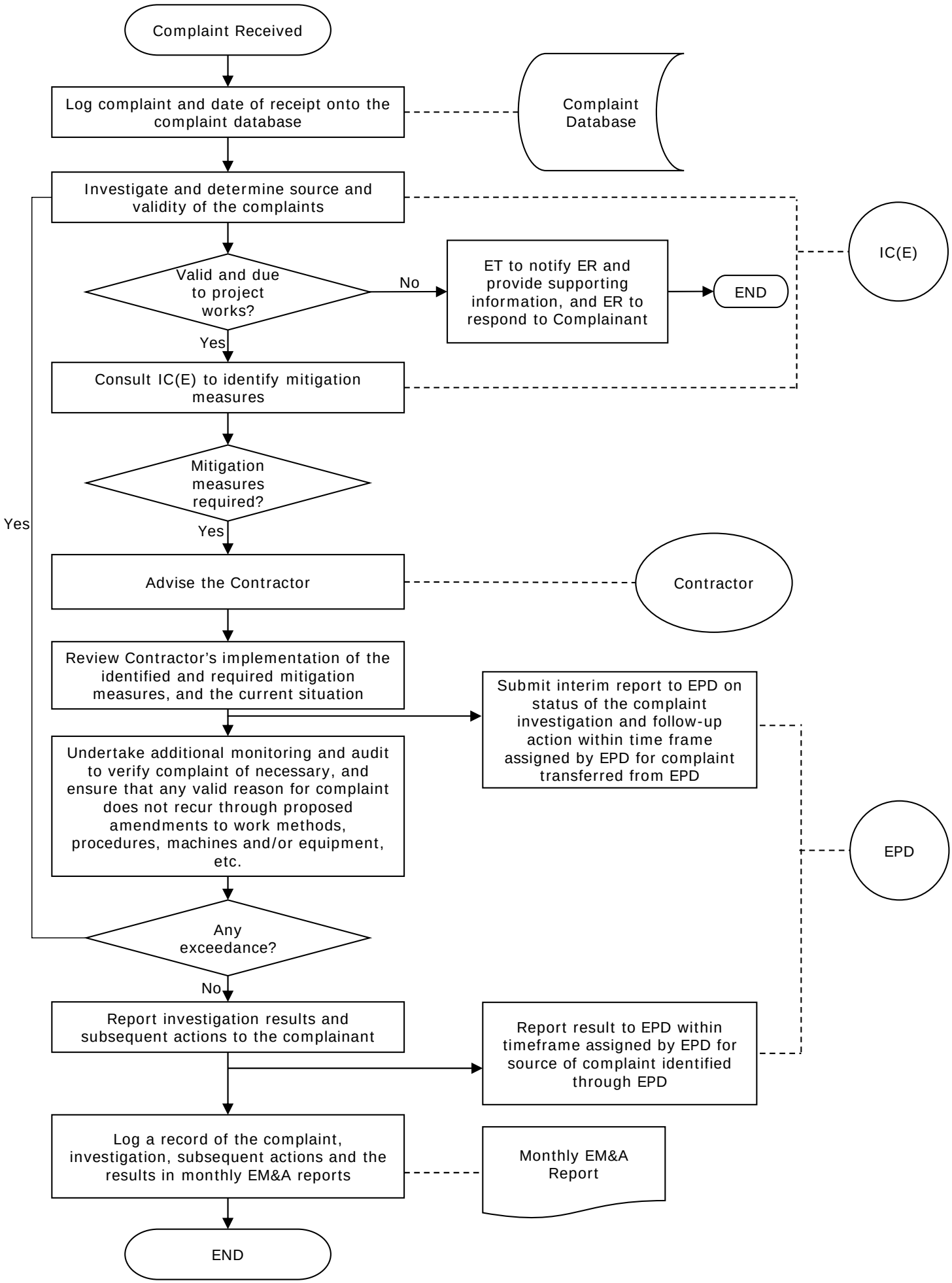
RAMBOLL	Light Public Housing At Yau Pok Road, Yuen Long	Location Plan of Proposed Screening / Barriers	Figure No.: 5	
			Date: 5/12/2023	Scale: As shown
			Drawn : MW	Check: YH

Q:\Projects\CHEM518-ED00\10 EMnA\10 EP_submissions\301 EMnA_Manual\figures and annex\R9257_v1.2\Figure 5 Location Plan of Proposed Screening or Barriers.pdf



	RAMBOLL	Light Public Housing At Yau Pok Road, Yuen Long	Preliminary Site Inspection, Deficiency and Action Report System	Figure : 6
				Date: 5/12/2023 / Scale: N/A
				Drawn : MW / Check: YH

Q:\Projects\CHEM518-ED00\10 EMnA\10 EP_submissions\301 EMnA_Manual\figures and annex\R9257_v1.2\Figure 6 Preliminary Site Inspection, Deficiency and Action Report System



	RAMBOLL	Light Public Housing At Yau Pok Road, Yuen Long	Complaint-Response Procedures	Figure : 7 Date: 5/12/2023 Scale: N/A Drawn : MW Check: YH

Q:\Projects\CHEM518-ED00\10 EMnA\10 EP_submissions\301 EMnA_Manual\figures and annex\R9257_v1.2\Complaint Response Procedures.pdf

Annex A

Implementation Schedule of Recommended Mitigation Measures

EM&A Log Ref.	PP (2023) / EIA (2014)[3]	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?
Air Quality				
During Construction Phase:				
A1	PP: 6.2.1 EIA: 3.9.1	Dust and gaseous emissions mitigation measures as stipulated in the Air Pollution Control (Construction Dust) Regulation, Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation and Air Pollution Control (Fuel Restriction) Regulation;	Air Pollution (Construction Dust) Regulation, Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation, Air Pollution (Fuel Restriction) Regulation	Contractor
A2	PP: 6.2.1 EIA: 3.9.1	The designated haul road should be hard paved to minimize fugitive dust emission;	Air Pollution (Construction Dust) Regulation	Contractor
A3	PP: 6.2.1 EIA: 3.9.1	During the site formation works, the active works areas should be water sprayed with water browser or sprayed manually hourly during construction period. The Contractor should ensure that the amount of water spraying is just enough to dampen the exposed surfaces without over-watering which could result in surface water runoff;	Air Pollution (Construction Dust) Regulation	Contractor
A4	PP: 6.2.1 EIA: 3.9.1	Dump trucks for transporting dusty materials should be totally enclosed using impervious sheeting;	Air Pollution (Construction Dust) Regulation	Contractor
A5	PP: 6.2.1 EIA: 3.9.1	Any excavated dusty materials or stockpile of dusty materials should be covered entirely by impervious sheeting or sprayed with water so as to maintain the entire surface wet, and recovered or backfilled or reinstated as soon as possible;	Air Pollution (Construction Dust) Regulation	Contractor
A6	PP: 6.2.1 EIA: 3.9.1	Dusty materials remaining after a stockpile is removed should be wetted with water;	Air Pollution (Construction Dust) Regulation	Contractor
A7	PP: 6.2.1 EIA: 3.9.1	The area where vehicle washing takes place and the section of the road between the washing facilities and the exit point should be paved with e.g. concrete, bituminous materials or hardcore or similar;	Air Pollution (Construction Dust) Regulation	Contractor
A8	PP: 6.2.1 EIA: 3.9.1	The Contractor shall only transport adequate amount of fill materials to the Project Site to minimize stockpiling of fill materials on-site, thus reducing fugitive dust emission due to wind erosion;	Air Pollution (Construction Dust) Regulation	Contractor
A9	PP: 6.2.1 EIA: 3.9.1	Should temporary stockpiling of dusty materials be required, it shall be either covered entirely by impervious sheeting, placed in an area sheltered on the top and the 3 sides; or sprayed with water so as to maintain the entire surface wet;	Air Pollution (Construction Dust) Regulation	Contractor
A10	PP: 6.2.1 EIA: 3.9.1	All dusty materials shall be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty material wet;	Air Pollution (Construction Dust) Regulation	Contractor

[3] PP (2023) = approved Project Profile (PP-652/2023); EIA (2014) = approved EIA Report (AEIAR-182/2014)

EM&A Log Ref.	PP (2023) / EIA (2014)[3]	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?
A11	PP: 6.2.1 EIA: 3.9.1	Vehicle speed to be limited to 10 kph except on completed access roads;	Air Pollution (Construction Dust) Regulation	Contractor
A12	PP: 6.2.1 EIA: 3.9.1	The portion of road leading only to a construction site that is within 30 m of a designated vehicle entrance or exit should be kept clear of dusty materials;	Air Pollution (Construction Dust) Regulation	Contractor
A13	PP: 6.2.1 EIA: 3.9.1	Every vehicle should be washed to remove any dusty materials from its body and wheels before leaving the construction sites;	Air Pollution (Construction Dust) Regulation	Contractor
A14	PP: 6.2.1 EIA: 3.9.1	The load of dusty materials carried by vehicle leaving a construction site should be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle;	Air Pollution (Construction Dust) Regulation	Contractor
A15	PP: 6.2.1 EIA: 3.9.1	The working area of excavation should be sprayed with water immediately before, during and immediately after (as necessary) the operations so as to maintain the entire surface wet;	Air Pollution (Construction Dust) Regulation	Contractor
A16	PP: 6.2.1 EIA: 3.9.1	Use of effective dust screens, sheeting or netting to be provided to enclose dry scaffolding which may be provided from the ground floor level of the building or if a canopy is provided at the first floor level, from the first floor level, up to the highest level (maximum three floors high for this Project) of the scaffolding where scaffolding is erected around the perimeter of a building under construction; and	Air Pollution (Construction Dust) Regulation	Contractor
A17	PP: 6.2.1	Electric power supply shall be provided for on-site machinery as far as practicable.	Air Pollution (Construction Dust) Regulation	Contractor
During Operation Phase:				
A18	PP: 6.2.2	Fully enclose areas and facilities of the temporary SPS.	Air Quality (Odour) Control	LPH Management Authority
A19	PP: 6.2.2	Convey SPS exhaust air to DO unit with sufficient odour removal efficiency of 99.5% for treatment before being discharged.	Air Quality (Odour) Control	LPH Management Authority
A20	PP: 6.2.2	Conduct performance or compliance test for the DO unit before commissioning.	Air Quality (Odour) Control	LPH Management Authority
A21	PP: 6.2.2	Install continuous monitoring system of the DO removal efficiency.	Air Quality (Odour) Control	LPH Management Authority
A22	PP: 6.2.2	Locate DO exhaust outlet away from nearest ASRs.	Air Quality (Odour) Control	LPH Management Authority
A23	PP: 6.2.2	Regular removal of screening waste with proper disposal.	Air Quality (Odour) Control	LPH Management Authority

EM&A Log Ref.	PP (2023) / EIA (2014)[3]	Recommended Environmental Protection Measures / Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?
A24	PP: 6.2.2	In case the design odour removal efficiency could not be fulfilled, investigation should be carried out to identify the source/ reason and undertaken maintenance of the deodourization unit if necessary.	Air Quality (Odour) Control	LPH Management Authority
Noise				
During Construction Phase:				
N1	PP: 6.3.1-6.3.4 EIA: 4.8.1	Adoption of quieter construction method;	Noise control	Contractor, ER
N2	PP: 6.3.1-6.3.4 EIA: 4.8.1	Use of QPMEs;	Noise control	Contractor, ER
N3	PP: 6.3.1-6.3.4 EIA: 4.8.2, 4.8.3	Use of movable noise barriers and noise enclosure;	Noise control	Contractor, ER
N4	PP: 6.3.1-6.3.4 EIA: 4.8.4	Scheduling of works; and	Noise control	Contractor, ER
N5	PP: 6.3.1-6.3.4 EIA: 4.8.4	Implementation of good site practices and noise management.	Noise control	Contractor, ER
During Operation Phase:				
N6	PP: 6.3.5-6.3.6 EIA: 4.7.2	Provision of 2.5m to 4.5m tall noise barrier along the southern boundary of the Southern Portion of the Project Site and subject to the Operational Phase Noise Mitigation Measures Plan submission by Project Proponent;	Noise control	LPH Management Authority
N7	PP: 5.2.8	Confine the fixed plant inside the reinforced concrete structure of the SPS;	Noise control	LPH Management Authority
N8	PP: 6.3.5-6.3.6	SPS should be properly designed to meet the Hong Kong Planning Standard and Guideline, which should be specified as the design criteria in the contract documents;	Noise control	LPH Management Authority
N9	PP: 6.3.5-6.3.6 EIA: 4.8.1	Quieter plant should be chosen as far as practicable;	Noise control	LPH Management Authority
N10	PP: 6.3.5-6.3.6	Include noise levels specifications when ordering new plant items;	Noise control	LPH Management Authority
N11	PP: 6.3.5-6.3.6	All openings, including louvres for ventilation and machine room doors should be oriented away from the NSRs as far as practicable;	Noise control	LPH Management Authority
N12	PP: 6.3.5-6.3.6 EIA: 4.8.4	Silencers, acoustic louvres or acoustic doors should be used where necessary; and	Noise control	LPH Management Authority
N13	PP: 6.3.5-6.3.6	Develop and implement a regularly scheduled plant maintenance programme so that plant items are properly operated and serviced in order to maintain controlled level of noise. The programme should be implemented by properly trained personnel.	Noise control	LPH Management Authority

EM&A Log Ref.	PP (2023) / EIA (2014)[3]	Recommended Environmental Protection Measures / Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?
Water Quality				
During Construction Phase:				
W1	PP: 6.4.1 EIA: 5.6.1.1	High loading of suspended solids (SS) in construction site runoff shall be prevented through proper site management;	Stormwater and Non-point Source Pollution Control, ProPECC PN2/23	Contractor
W2	PP: 6.4.1 EIA: 5.6.1.1	The boundary of critical work areas shall be surrounded by ditches or embankment;	Stormwater and Non-point Source Pollution Control, ProPECC PN2/23	Contractor
W3	PP: 6.4.1 EIA: 5.6.1.1	Accidental release of soil or refuse into the adjoining land should be prevented by the provision of site earth bunds, etc. at the Project Site boundary. These facilities should be constructed in advance of site formation works and roadworks;	Stormwater and Non-point Source Pollution Control, ProPECC PN2/23	Contractor
W4	PP: 6.4.1 EIA: 5.6.1.1	Consideration should be given to plan construction activities to allow the use of natural topography of the PS as a barrier to minimize uncontrolled non-point source discharge of construction site runoff;	Stormwater and Non-point Source Pollution Control, ProPECC PN2/23	Contractor
W5	PP: 6.4.1 EIA: 5.6.1.1	Temporary ditches, earth bunds should be provided to facilitate directed and controlled discharge of runoff into storm drains via sand/ silt removal facilities such as sand traps, silt traps and sediment retention basin. Oil and grease removal facilities should also be provided where appropriate, for example, in area near plant workshop/ maintenance areas;	Stormwater and Non-point Source Pollution Control, ProPECC PN2/23	Contractor
W6	PP: 6.4.1 EIA: 5.6.1.1	Sand and silt removal facilities, channels and manholes should be maintained and the deposited silt and grit should be removed regularly, and at the onset of and after each rainstorm to ensure that these facilities area functioning properly;	Stormwater and Non-point Source Pollution Control, ProPECC PN2/23	Contractor
W7	PP: 6.4.1 EIA: 5.6.1.1	Slope exposure should be minimized where practicable especially during the wet season. Exposed soil surfaces should be protected from rainfall through covering temporarily exposed slope surfaces or stockpiles with tarpaulin or the like;	Stormwater and Non-point Source Pollution Control, ProPECC PN2/23	Contractor
W8	PP: 6.4.1 EIA: 5.6.1.1	Haul roads should be protected by crushed rock, gravel or other granular materials to minimize discharge of contaminated runoff;	Stormwater and Non-point Source Pollution Control, ProPECC PN2/23	Contractor
W9	PP: 6.4.1 EIA: 5.6.1.1	Slow down water run-off flowing across exposed soil surfaces;	Stormwater and Non-point Source Pollution Control, ProPECC PN2/23	Contractor
W10	PP: 6.4.1 EIA: 5.6.1.1	Plant workshop/ maintenance areas should be bunded and constructed on a hard standing. Sediment traps and oil interceptors should be provided at appropriate locations;	Stormwater and Non-point Source Pollution Control, ProPECC PN2/23	Contractor
W11	PP: 6.4.1 EIA: 5.6.1.1	Manholes (including newly constructed ones) should be adequately covered or temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system;	Stormwater and Non-point Source Pollution Control, ProPECC PN2/23	Contractor
W12	PP: 6.4.1 EIA: 5.6.1.1	Construction works should be programmed to minimize soil excavation works where practicable during rainy conditions;	Stormwater and Non-point Source Pollution Control, ProPECC PN2/23	Contractor

EM&A Log Ref.	PP (2023) / EIA (2014)[3]	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?
W13	PP: 6.4.1 EIA: 5.6.1.1	Chemical stores should be contained (bunded) to prevent any spills from contact with water bodies. All fuel tanks and/ or storage areas should be provided with locks and be sited on hard surface;	Stormwater and Non-point Source Pollution Control, ProPECC PN2/23	Contractor
W14	PP: 6.4.1EIA: 5.6.1.1	Chemical waste arising from the Project Site should be properly stored, handled, treated and disposed of in compliance with the requirements stipulated under the Waste Disposal (Chemical Waste) (General) Regulation;	Stormwater and Non-point Source Pollution Control, ProPECC PN2/23	Contractor
W15	PP: 6.4.1 EIA: 5.6.1.1	Drainage facilities must be adequate for the controlled release of storm flows;	Stormwater and Non-point Source Pollution Control, ProPECC PN2/23	Contractor
W16	PP: 6.4.1 EIA: 5.6.1.1	Appropriate peripheral drainage system shall be constructed along the Project Site boundary to divert away surface runoff in accordance with requirements stipulated in ProPECC PN 2/23 to collect surface runoff and discharge it into the nearby existing stormwater drains nearby roadside of Yau Pok Road, and via which into the existing NTMDC;	Stormwater and Non-point Source Pollution Control, ProPECC PN2/23	Contractor
W17	PP: 6.4.1 EIA: 5.6.1.1	Temporary drains, sedimentation basins, sand traps and similar facilities shall be provided during the construction works in accordance with the ProPECC PN 2/23; and	Stormwater and Non-point Source Pollution Control, ProPECC PN2/23	Contractor
W18	PP: 6.4.1 EIA: 5.6.1.1	The Contractor shall apply for a discharge licence under the WPCO and the discharge shall comply with the terms and conditions of the licence;	Stormwater and Non-point Source Pollution Control, ProPECC PN2/23	Contractor
W19	PP: 6.4.1 EIA: 5.6.1.2	Sewage generated from the construction workforce should be contained in chemical toilets before connection to public foul sewer becomes available. Chemical toilets should be provided at a minimum rate of about 1 per 50 workers. The facility should be serviced and cleaned by a specialist contractor at regular intervals;	Stormwater and Non-point Source Pollution Control, ProPECC PN2/23	Contractor
W20	PP: 6.4.1 EIA: 5.6.1.2	Vehicle wheel washing facilities should be provided at the site exit such that mud, debris, etc. deposited onto the vehicle wheels or body can be washed off before the vehicles are leaving the site area;	Stormwater and Non-point Source Pollution Control, ProPECC PN2/23	Contractor
W21	PP: 6.4.1 EIA: 5.6.1.2	Section of the road between the wheel washing bay and the public road should be paved with backfill to reduce vehicle tracking of soil and to prevent site run-off from entering public road drains;	Stormwater and Non-point Source Pollution Control, ProPECC PN2/23	Contractor
W22	PP: 6.4.1 EIA: 5.6.1.2	Although use of bentonite in diaphragm wall and bore-pile construction is not expected, in case bentonite slurries is generated it should be reconditioned and reused as far as practicable;	Stormwater and Non-point Source Pollution Control, ProPECC PN2/23	Contractor

EM&A Log Ref.	PP (2023) / EIA (2014)[3]	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?
W23	PP: 6.4.1 EIA: 5.6.1.2	Spent bentonite should be kept in a separate slurry collection system for disposal at a marine spoil grounds subject to obtaining a marine dumping licence from EPD. If used bentonite slurry is to be disposed of through public drainage system, it should be treated to meet the respective applicable effluent standards for discharges into sewers, storm drains or the receiving waters; and	Stormwater and Non-point Source Pollution Control, ProPECC PN2/23	Contractor
W24	PP: 6.4.1 EIA: 5.6.1.3	Spillage of fuel oils or other polluting fluids should be prevented at source. It is recommended that all stocks should be stored inside proper containers and sited on sealed areas, preferably surrounded by bunds.	Stormwater and Non-point Source Pollution Control, ProPECC PN2/23	Contractor
During Operation Phase:				
W25	PP: 6.4.3	A standby pump will be provided to cater for breakdown and maintenance of the duty pump;	Stormwater and Non-point Source Pollution Control	LPH Management Authority
W26	PP: 6.4.3	Backup power supply in the form of dual/ ring circuit power supply by CLP will be provided to secure electrical power supply;	Stormwater and Non-point Source Pollution Control	Utility
W27	PP: 6.4.3	Regular maintenance and checking of plant equipment to prevent equipment failure;	Stormwater and Non-point Source Pollution Control	LPH Management Authority
W28	PP: 6.4.3	A wet well with effective volume of approximately 18.51m^3;	Stormwater and Non-point Source Pollution Control	LPH Management Authority
W29	PP: 6.4.3	Sewage will be tanked away to minimise the change of emergency overflow,	Stormwater and Non-point Source Pollution Control	LPH Management Authority
W30	PP: 6.4.5	Any incident of emergency overflows from the proposed SPS will strictly follow EPD's "A Guide on Reporting Sewage Bypass Incidents in Sewage Pumping Stations and Sewers" and DSD's "Contingency Plan that before taking the need of sewage outflows, all steps, as outlined in the Standard Checklist for Considering Various Options to Mitigate/Avoid Sewage Discharge Prior to Bypass for the Purpose of Maintenance or Minor Modifications in Existing Sewage Treatment Facilities (Appendix II(h) of Contingency Plan), should be carefully considered, and	Stormwater and Non-point Source Pollution Control	LPH Management Authority
W31	PP: 6.4.5	All emergency sewage overflows to sensitive waters nearby should also be reported to EPD except during the case of sewage bypass/overflow due to prolonged and very heavy rainfall (e.g. during black rainstorm warning).	Stormwater and Non-point Source Pollution Control	LPH Management Authority
W32	EIA: 5.6.2.1	Regular cleaning and sweeping of the access road and other paved areas are suggested so as to minimize exposure of pollutants to stormwater.	Stormwater and Non-point Source Pollution Control	LPH Management Authority
W33	EIA: 5.6.2.1	Stormwater gullies and ditches provided among the LPH development should be regularly inspected to ensure these facilities function properly.	Stormwater and Non-point Source Pollution Control	LPH Management Authority
W34	EIA: 5.6.2.1	Soft landscaping should be provided around the residential development where practicable.	Stormwater and Non-point Source Pollution Control	LPH Management Authority
W35	EIA: 5.6.2.1	In the event of emergency (e.g. car accident) where there is a major spillage of oil, chemical or fuel, dispersants or firefighting foam, etc., a system of contaminant bunding is recommended as far as practicable.	Stormwater and Non-point Source Pollution Control	LPH Management Authority

EM&A Log Ref.	PP (2023) / EIA (2014)[3]	Recommended Environmental Protection Measures / Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?
Ecology				
During Construction Phase:				
E1	PP: 6.5.1 – 6.5.3 EIA: 8.8	Plan construction sequence carefully to minimise site formation in the northeastern corner of the PS where it abuts the temporary ponds in YMST in peak wintering season for migratory birds (i.e. October - March);	Avoidance of disturbance	Contractor
E2	PP: 6.5.1 – 6.5.3 EIA: 8.8	Provide screening / barriers along the Project Site boundary to reduce the visual disturbance arising from the construction activities to nearby habitats such as NTMDC and the temporary ponds in YMST;	Avoidance of disturbance	Contractor
E3	PP: 6.5.1 – 6.5.3 EIA: 8.8	Demarcate the construction site clearly and regularly check the boundaries to ensure that they are not breached;	Avoidance of disturbance	Contractor
E4	PP: 6.5.1 – 6.5.3 EIA: 8.8	Brief site workers and other staff the sensitivity of the surrounding areas before commencement of the works, and instruct them not to disturb any areas nearby;	Avoidance of disturbance	Contractor
E5	PP: 6.5.1 – 6.5.3 EIA: 8.8	Use quiet PME and movable noise barriers wherever necessary;	Avoidance of disturbance	Contractor
E6	PP: 6.5.1 – 6.5.3 EIA: 8.8	Phasing of construction activities to minimise concurrent operation of PME;	Avoidance of disturbance	Contractor
E7	PP: 6.5.1 – 6.5.3 EIA: 8.8– 6.5.3	Use only well-maintained plant on-site.	Avoidance of disturbance	Contractor
E8	PP: 6.5.1 – 6.5.3 EIA: 8.8	Ensure the plant to be serviced regularly during the construction program;	Avoidance of disturbance	Contractor
E9	PP: 6.5.1 – 6.5.3 EIA: 8.8	Machines and plant (such as trucks) that may be in intermittent use to be shut down between work periods or to be throttled down to a minimum;	Avoidance of disturbance	Contractor
E10	PP: 6.5.1 – 6.5.3 EIA: 8.8	Plant known to emit noise strongly in one direction to be, wherever possible, orientated so that the noise is directed away from the NTMDC and the wetlands in YMST project;	Avoidance of disturbance	Contractor
E11	PP: 6.5.1 – 6.5.3 EIA: 8.8	Material stockpiles and other structures to be effectively utilized, wherever practicable, in screening noise from on-site construction activities	Avoidance of disturbance	Contractor
E12	PP: 6.5.1 – 6.5.3 EIA: 8.8	Comply with NCO and implement general good site practices;	Avoidance of disturbance	Contractor
E13	PP: 6.5.1 – 6.5.3 EIA: 8.8	Implement dust control measures e.g. hard paving of the haul road, frequent watering, covering dusty materials, careful site formation scheduling etc.;	Avoidance of disturbance	Contractor

EM&A Log Ref.	PP (2023) / EIA (2014)[3]	Recommended Environmental Protection Measures / Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?
E14	PP: 6.5.1 – 6.5.3 EIA: 8.8	Controlled wastewater discharge to the nearby water bodies in accordance with the guidelines stipulated in EPD's ProPECC PN2/23 to properly control site run-off and drainage and to minimise the potential water quality impact;	Avoidance of disturbance	Contractor
E15	PP: 6.5.1 – 6.5.3 EIA: 8.8	Provide a properly designed temporary drainage system within the construction site to direct discharge away from the watercourses downstream to nearby drainage channel. The drainage system will be equipped with sand/silt removal facilities to treat the surface runoff;	Avoidance of disturbance	Contractor
E16	PP: 6.5.1 – 6.5.3 EIA: 8.8	Provide portable chemical toilets for site workers. Ensure that chemical toilets are used and properly maintained, and that licensed contractors are employed to collect and dispose of the waste off-site at approved locations;	Avoidance of disturbance	Contractor
E17	PP: 6.5.1 – 6.5.3 EIA: 8.8	Implementation of measures to minimise magnitude of construction runoff and to avoid/ minimise the potential impact of spillage events, if any;	Avoidance of disturbance	Contractor
E18	PP: 6.5.1 – 6.5.3 EIA: 8.8	Excavated materials will be covered and/or properly disposed of as soon as possible to avoid being washed into nearby water bodies; and	Avoidance of disturbance	Contractor
E19	PP: 6.5.1 – 6.5.3 EIA: 8.8	Other mitigation measures proposed for potential impacts on water quality for this Project.	Avoidance of disturbance	Contractor
During Operation Phase:				
E20	PP: 6.5.4 – 6.5.7	The boundary where the PS interfaces with the YMST project should be non-transparent. Vegetation and shrubs will be planted densely along this boundary section;	Avoidance of disturbance	LPH Management Authority
E21	PP: 6.5.4 – 6.5.7	Night-time light sources will be minimised during the operational phase to further reduce the potential glare impact slightly increased from the Project.	Avoidance of disturbance	LPH Management Authority
E22	PP: 6.5.4 – 6.5.7	Careful positioning and angling, lighting of the proposed LPH development will be designed to minimise directing it towards adjacent disturbance-sensitive wetland areas, in particular the NTMDC and those in YMST.	Avoidance of disturbance	LPH Management Authority
Landscape and Visual				
During Construction Phase:				
LV1	PP: 6.6.1 EIA: 11.10.1	Proper protection of existing trees designated to retained in-situ;	Avoid impacts on adjacent landscape	Contractor
LV2	PP: 6.6.1 EIA: 11.10.1	Optimisations of construction areas and providing temporary landscape on temporary construction;	Avoid impacts on adjacent landscape	Contractor
LV3	PP: 6.6.1 EIA: 11.10.1	Preservation of marsh and reedbed;	Avoid impacts on adjacent landscape	Contractor

EM&A Log Ref.	PP (2023) / EIA (2014)[3]	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?
LV4	PP: 6.6.1 EIA: 11.10.1	Define works area and temporary works area to minimise the extent of construction works area and its residual impacts during construction;	Avoid impacts on adjacent landscape	Contractor
LV5	PP: 6.6.1 EIA: 11.10.1	Protection of watercourse/ channels of higher ecological value;	Avoid impacts on adjacent landscape	Contractor
LV6	PP: 6.6.1 EIA: 11.10.1	Good site practice should be adopted to minimize landscape and visual impact, for example to adopt suitable height and design of temporary barriers / noise barrier to help blend in with the surrounding environment, retention of existing trees as screen planting, control of night-time lighting by hooding all lights, and reduction of construction period to practical minimum.	Avoid impacts on adjacent landscape	Contractor
During Operational Phase:				
LV7	PP: 6.6.2-6.6.3 EIA: 11.10.1	Maximisation of tree preservation effort (i.e. Proposed preservation of potential Tree of Particular Interest);	Avoid impacts on adjacent landscape	LPH Management Authority
LV8	PP: 6.6.2-6.6.3 EIA: 11.10.1	Suitable design for leisure area (i.e. propose Elderly Leisure Area and Recreational Lawn adopting a naturalistic approach suited to the rural location and the existing landscape character);	Avoid impacts on adjacent landscape	LPH Management Authority
LV9	PP: 6.6.2-6.6.3 EIA: 11.10.1	Use of appropriate building materials and colours in built structures to help blend in the LPH Development to the surroundings to mitigate the landscape and visual impacts;	Avoid impacts on adjacent landscape	LPH Management Authority
LV10	PP: 6.6.2-6.6.3 EIA: 11.10.1	Provision of landscape buffer and new small tree plantings along the Project Site boundary are proposed as far as practicable to provide effective screening;	Avoid impacts on adjacent landscape	LPH Management Authority
LV11	PP: 6.6.2-6.6.3 EIA: 11.10.1	Sensitive design of streetscape elements and suitable design and landscape treatment of along boundary; and	Avoid impacts on adjacent landscape	LPH Management Authority
LV12	PP: 6.6.2-6.6.3 EIA: 11.10.1	A minimum of 20% green coverage shall be provided comprising layered shrubs and lawn areas. Offsite tree compensation shall also be provided at a minimum of 1:1 ratio (trees felled: trees compensated).	Avoid impacts on adjacent landscape	LPH Management Authority
<u>Cultural Heritage</u>				
During Construction Phase:				
CH1	PP 6.7.2	As a precautionary measure, the Antiquities and Monuments Office (AMO) should be informed immediately in case of discovery of antiquities or supposed antiquities in the course of works, so that appropriate mitigation measures, if needed, can be timely formulated and implemented in agreement with AMO.	Preserve any terrestrial archaeology or built heritage resources.	Contractor
During Operational Phase:				
		nil	nil	nil
<u>Waste Management</u>				
During Construction Phase:				

EM&A Log Ref.	PP (2023) / EIA (2014)[3]	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?
WM1	PP: 6.8.1-6.8.5 EIA: 7.5	All C&D materials generated should be sorted into different categories on-site for recycling and reuse as fill materials as far as practicable prior to disposal at public filling reception facilities and landfills. To prohibit illegal dumping and landfilling of C&D materials, the dump trucks engaged on site should be equipped with GPS or equivalent automatic system for real time tracking and monitoring of their travel routings, parking locations and disposal activities.	Waste management	Contractor
WM2	PP: 6.8.1-6.8.5 EIA: 7.5	Chemical wastes should be handled, stored and disposed of properly and in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.	Waste management, ProPECC PN2/23, Water Pollution Control Ordinance	Contractor
WM3	PP: 6.8.1-6.8.5 EIA: 7.4.5	General refuse should be stored in enclosed bins or compaction units. A reputable waste collector should be employed by the contractor to remove general refuse from the Project Site on a daily basis or every other day to minimise odour, pest and litter impacts.	Waste management, Air Pollution Control (Open Burning) Regulation	Contractor
During Operation Phase:				
WM4	PP: 6.8.6-6.8.7 EIA: 7.6	General refuse should be collected with lidded bins and delivered to a refuse storage and material recovery chamber and stored in enclosed containers. A 4-bin recycling system for paper, metals, plastics and glass should be adopted together with a general refuse bin.	Waste management, Waste Disposal Ordinance	LPH Management Authority
WM5	PP: 6.8.6-6.8.7 EIA: 7.5	Chemical and oily wastes generated from the maintenance activities, which should be disposed of as chemical waste in compliance with the Waste Disposal (Chemical Waste) (General) Regulations.	Waste management, Waste Disposal Ordinance	LPH Management Authority

Annex B

Sample EM&A Proforma and Record Forms

IMPLEMENTATION SCHEDULE

EIA* Ref	EM&A Log Ref	Environmental Protection Measures*	Location/ Timing	Implementation Agent	Implementation Stages**			
					Des	C	O	Dec

* All recommendations and requirements resulted during the course of EIA/EA Process, including ACE and/or accepted public comment to the proposed project.

** Des=Design, C=Construction, O=Operation, Dec=Decommissioning

Signed by Project Proponent: _____ Date: _____

IMPLEMENTATION STATUS PROFORMA Ref:_____

Ref**	Environmental Protection Measures*	Implementation Status

* *All recommendations and requirements resulted during the Course of EIA/EA Process, including ACE and /or accepted public comment to the proposed project*

** *EIA Ref/EM&A Log Ref/Design Document Ref*

Signed by Environmental Team Leader: _____ Date: _____

Audited by Independent Checker (Environment): _____ Date: _____

DATA RECOVERY SCHEDULE Ref:_____

Date	Air Quality Monitoring					Noise Monitoring					Water Quality Monitoring				
	Monitoring Station*					Monitoring Location*					Monitoring Location*				
	A1	A2	A3	A4	A5	N1	N2	N3	N4	N5	W1	W2	W3	W4	W5
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															
26															
27															
28															
29															
30															
31															
% of R															

* *Remark type of parameters*

% of R *The percentage of Data Recovery is the actual monitoring over the scheduled monitoring*

Signed by Environmental Team Leader: _____ Date: _____

Copy to Independent Checker (Environment)

SITE INSPECTION PROFORMA Ref:_____

Date	Location	Req't Ref.*	Observation/Deficiency	Mitigation Action** (Responsible Agency)	Date*** of Confirmation

* *EIA Ref/EM&A Log Ref/Design Document Ref/Environmental Protection Contract Clause*
** *Specific Environmental Mitigation Measures should be stated, such as, equipment, processes, systems, practices or technologies.*
*** *The required completion date to confirm the specified Environmental Protection Action*

This Proforma is an Environmental Protection Instruction for: _____ on _____

Signed by Environmental Team Leader: _____ Date: _____

Copy to Independent Checker (Environment)

PROACTIVE ENVIRONMENTAL PROTECTION PROFORMA Ref:_____

Ref*	Proposed Construction Method**	Location/ Working Period	Anticipated Impacts	Recommended Mitigation Measures

* *EIA Ref/EM&A Log Ref/Design Document Ref*
** *Details of equipment, vehicles, plants, processes, technologies for the option of construction method*

Reviewed by Environmental Team Leader: _____ Date: _____

Approved by Independent Checker (Environment): _____ Date: _____

REGULATORY COMPLIANCE PROFORMA Ref:_____

Ref**	Environmental License/Permit*	Control Area/Facility/Location	Effective Date

* *Name of Applicant, Business Corporation, relevant regulation and remark of license/permit conditions*
** *File reference of the licensee/permittee*

Recorded by Environmental Team Leader: _____ Date: _____

Signed by Independent Checker (Environment): _____ Date: _____

COMPLAINT LOG Ref:_____

Log Ref	Date/Location	Complainant/ Date of Contact	Details of Complaint	Investigation/Mitigation Action	File Closed

Filed by Environmental Team Leader: _____ Date: _____

Sample Template for Interim Notifications of Environmental Quality Limits Exceedances

---

Incident Report on Action Level or Limit Level Non-compliance

Project	
Date	
Time	
Monitoring Location	
Parameter	
Action & Limit Levels	
Measured Level	
Possible reason for Action or Limit Level Non-compliance	
Actions taken / to be taken	
Remarks	

Location Plan

Prepared by : _____

Designation : _____

Signature : _____

Date : _____

Data Sheet for TSP Monitoring

Monitoring Location		
Details of Location		
Sampler Identification		
Date & Time of Sampling		
Elapsed-time Meter Reading	Start (min.)	
	Stop (min.)	
Total Sampling Time (min.)		
Weather Conditions		
Site Conditions		
Initial Flow Rate, Qsi	Pi (mmHg)	
	Ti (°C)	
	Hi(in.)	
	Qsi (Std. m^3)	
Final Flow Rate, Qsf	Pf (mmHg)	
	Tf (°C)	
	Hf (in.)	
	Qsf (Std. m^3)	
Average Flow Rate (Std. m^3)		
Total Volume (Std. m^3)		
Filter Identification No.		
Initial Wt. of Filter (g)		
Final Wt. of Filter (g)		
Measured TSP Level ($\mu g/m^3$)		

Name & Designation Signature Date

Field Operator : _____

Laboratory Staff :

Checked by : _____

Noise Monitoring Field Record Sheet

Monitoring Location		
Description of Location		
Date of Monitoring		
Measurement Start Time (hh:mm)		
Measurement Time Length (min.)		
Noise Meter Model/Identification		
Calibrator Model/Identification		
Measurement Results	L_{90} (dB(A))	
	L_{10} (dB(A))	
	L_{EQ} (dB(A))	
Major Construction Noise Source(s) During Monitoring		
Other Noise Source(s) During Monitoring		
Remarks		

	Name & Designation	Signature	Date
Recorded By :			
Checked By :			

Water Quality Monitoring Data Record Sheet

Location				
Date				
Start Time (hh:mm)				
Weather				
Sea Conditions				
Tidal Mode				
Water Depth (m)				
Monitoring Depth		Surface	Middle	Bottom
Salinity				
Temperature (°C)				
DO Saturation (%)				
DO (mg/l)				
Turbidity (NTU)				
SS Sample Identification				
SS (mg/l)				
Observed Construction Activities	<100m from location			
	>100m from location			
Other Observations				

Name & Designation Signature Date

Recorded By : _____

Checked By : _____

Note: The SS results are to be filled up once they are available from the laboratory.