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1 Introduction

1.1 Project Background

1.1.1.1 In June 2017, The Chief Executive in Council has agreed in principle to the government proposal to grant a piece of land in Tai Po to Sha Lo Tung Development Company Limited (the Project Proponent) in exchange for its private land in Sha Lo Tung which has high ecological values. Under the non-in-situ land exchange proposal, the piece of land at the Shuen Wan Restored Landfill in Tai Po will be granted to the Project Proponent for the development of a private golf course and the Sha Lo Tung site would be considered by government for active conservation management to avoid degradation and damage for long-term public enjoyment. This land exchange proposal is a unique, exceptional and isolated case, and adding the idea is technically feasible as the private land ownership is largely unified under one entity and both Sha Lo Tung and the land at the landfill site, which has been planned for golf course development, are located in Tai Po.

1.1.1.2 In November 2017, the Project Proponent commissioned Ove Arup & Partners Hong Kong Limited (Arup) to provide consultancy services in respect of Shuen Wan Golf Course (the Project). This consultancy also includes compilation and submission of an Environmental Impact Assessment (EIA) Report to fulfil the relevant legislative requirements.

1.1.1.3 The Project Profile (No. PP-558/2017) was submitted by the Project Proponent to Environmental Protection Department (EPD) for an EIA Study Brief under Section 5(1)(a) of the EIA Ordinance on 15 September 2017. The EIA Study Brief (EIA Study Brief No.: ESB-303/2017) was formally issued by EPD on 26 October 2017.

1.2 Purpose of the Manual

1.2.1.1 The purposes of this Environmental Monitoring and Audit (EM&A) Manual are to:

- Guide the setup of an EM&A programme to ensure compliance with the EIA recommendations;
- Specify the requirements for monitoring equipment;
- Propose environmental monitoring points, monitoring frequency etc.;
- Propose Action and Limit levels; and
- Propose Event and Action Plans.

1.2.1.2 This Manual outlines the monitoring and auditing programme for the construction and operation of the proposed Project and provides systematic procedures for monitoring, auditing and minimising

environmental impacts.

1.2.1.3 Hong Kong environmental regulations and the Hong Kong Planning Standards and Guidelines (HKPSG) have served as environmental standards and guidelines in the preparation of this Manual. In addition, this EM&A Manual has been prepared in accordance with the requirements stipulated in Annex 21 of the Technical Memorandum on the EIA Process (TM-EIAO).

1.2.1.4 This Manual contains the following information:

- Responsibilities of the Contractor, the Engineer or Engineer's Representative (ER), Environmental Team (ET), and the Independent Environmental Checker (IEC) under the context of EM&A;
- Project organisation for the EM&A works;
- The basis for, and description of the broad approach underlying the EM&A programme;
- Details of the methodologies to be adopted, including all laboratories and analytical procedures, and details on quality assurance and quality control programme;
- The rationale on which the environmental monitoring data will be evaluated and interpreted;
- Definitions of Action and Limit levels;
- Establishment of Event and Action Plans;
- Requirements for reviewing pollution sources and working procedures required in the event of non-compliance with the environmental criteria and complaints; and
- Requirements for presentation of environmental monitoring and audit data and appropriate reporting procedures.

1.2.1.5 For the purpose of this Manual, the ER shall refer to the Engineer as defined in the Construction Contract, in cases where the Engineer's powers have been delegated to the ER, in accordance with the Construction Contract. The ET leader, who shall be responsible for and in charge of the ET, shall refer to the person delegated the role of executing the environmental monitoring and audit requirements.

2 Project Description

2.1 General Description of the Project

2.1.1.1 Section 2 of the EIA Report has described the approaches adopted to avoid and minimise various environmental impacts throughout the design process. The design has therefore been taken forward as the basis for this EIA to demonstrate that all statutory requirements under EIA Study Brief (ESB-303/2017) and the Environmental Impact Assessment Ordinance (EIAO) are complied with. A brief summary of key elements of the Project is given below:

- Construction and operation of a golf course and its ancillary facilities; and
- Other infrastructure such as drainage system, sewerage system, irrigation system to support the daily operations of the golf course (including temporary storage system as required).

2.1.1.2 The location and construction programme of the Project are shown in **Figure 2.1** and **Appendix 2.1** respectively.

2.2 Designated Project

2.2.1.1 The Project comprises construction and operation of a golf course and the managed turf area within. The following which is classified as a Designated Project (DP) as per Schedule 2, Part I of the EIA Ordinance.

- Item O.1 – An outdoor golf course and all managed turf areas.

2.3 Tentative Implementation Programme

2.3.1.1 According to the latest programme, the construction of the Project is to commence in 2021. The construction works would take about 3 years and the target commissioning year is 2024.

3 Project Organisation

3.1 Project Organisation

3.1.1.1 The proposed project organisation and lines of communication with respect to environmental protection works are shown in **Appendix 3.1**.

3.1.1.2 Only one ET with ET Leader shall be engaged for the entire Project at any time. The ET shall conduct the EM&A programme and ensure the Contractor's compliance with the Project's environmental performance requirements. The ET shall be directly employed by the Project Proponent, or shall be part of the Resident Site Staff of the Engineer and directly supervised by the Engineer or Engineer's Representative, and shall be an independent party from the Contractor or the IEC for the Project. The ET shall be led and managed by an ET leader. The ET leader shall possess at least 7 years of experience in EM&A and/or environmental management. The minimum on-site time for the ET leader and ET shall be proposed with justifications having regard to potential environmental impacts arising from activities on site at various stages of the Project as detailed in the Contractor's construction programme, and the qualifications and experience of the specialists in the ET shall also be proposed, for the approval of the EPD.

3.1.1.3 Only one IEC with a supporting team shall be directly employed by the Project Proponent for the entire Project at any time. The IEC shall audit the overall EM&A programme, including the implementation of all environmental mitigation measures, submissions required in this Manual, as well as any other relevant submissions required under the Environmental Permit. The IEC shall be an independent party from the Engineer or Engineer's Representative, Contractor and the ET for the Project. The IEC shall possess at least 7 years of experience in EM&A and/or environmental management. The IEC shall report directly to the EPD on matters relating to the EM&A programme and environmental impacts from the Project. The minimum on-site time for the IEC and his/her supporting team shall be proposed with justifications, having regard to potential environmental impacts arising from activities on site at various stages of the Project as detailed in the Contractor's construction programme, for the approval of the EPD.

3.1.1.4 The responsibilities of respective parties are:

The Contractor

- Implement the EIA recommendations and requirements;
- Provide assistance to ET in carrying out relevant monitoring and audit;
- Submit proposals on mitigation measures in case of exceedances of Action and Limit levels in accordance with the Event and Action Plans;

- Implement measures to reduce impact where Action and Limit levels are exceeded; and
- Adhere to the agreed procedures for carrying out environmental compliant investigation.

Engineer or Engineer's Representative (ER)

- Supervise the Contractor's activities and ensure that the requirements in the EM&A Manual are fully complied with;
- Inform the Contractor when action is required to reduce impacts in accordance with the Event and Action Plans;
- Assist the Project Proponent in employing an ET to undertake monitoring, laboratory analysis and reporting of environmental monitoring and audit;
- Assist the Project Proponent in employing an IEC to audit the results of the EM&A works carried out by the ET;
- Comply with the agreed Event and Action Plans in the event of any exceedance;
- Participate in joint site inspections and audits undertaken by the ET; and
- Adhere to the procedures for carrying out complaint investigations.

Environmental Team (ET)

- Set up all the required environmental monitoring stations;
- Monitor various environmental parameters as required in the EM&A Manual;
- Analyse the environmental monitoring and audit data, review the success of EM&A programme, confirm the adequacy of mitigation measures implemented and the validity of the EIA predictions, and to identify any adverse environmental impacts arising;
- Carry out site inspection to investigate and audit the Contractors' site practice, equipment and work methodologies with respect to pollution control and environmental mitigation measures, and take proactive actions to pre-empt problems;
- Audit and prepare audit reports on the environmental monitoring data and site environmental conditions;
- Report on the environmental monitoring and audit results to the IEC, Contractor, and the ER or its delegated representative;

- Recommend suitable mitigation measures to the Contractor in the case of exceedance of Action and Limit levels in accordance with the Event and Action Plans;
- Undertake regular on-site audits / inspections and report to the Contractor and the ER of any potential non-compliance;
- Follow up and close out non-compliance actions;
- Advise the Contractor on environmental improvement, awareness , enhancement matters, etc., on site; and
- Adhere to the procedures for carrying out environmental complaint investigation.

Independent Environmental Checker (IEC)

- Review the EM&A works performed by the ET (at not less than monthly intervals) in an independent, objective and professional manner;
- Audit the monitoring activities and results (at not less than monthly intervals);
- Validate and confirm the accuracy of monitoring results, monitoring equipment, monitoring locations, monitoring procedures and locations of sensitive receivers;
- Report the audit results to the ER and EPD in parallel;
- Review the EM&A reports (monthly and quarterly summary reports) submitted by the ET;
- Review the proposal on mitigation measures submitted by the Contractor in accordance with the Event and Action Plans;
- Check the mitigation measures submitted by the Contractor in accordance with the Event and Action Plans;
- Check the mitigation measures that have been recommended in the EIA and this Manual, and ensure they are properly implemented in a timely manner, when necessary; and
- Report the findings of site inspections and other environmental performance reviews to ER and EPD.

3.1.1.5 Sufficient and suitably qualified professional and technical staff shall be employed by the respective parties to ensure full compliance with their duties and responsibilities, as required under the EM&A programme of the Project.

4 Air Quality

4.1 Introduction

4.1.1.1 The EIA has considered the potential air quality impacts associated with the Project. Based on the assessment results, fugitive dust emission would be the key potential impact during the construction phase. No adverse impact from the Project is anticipated during the operational phase.

4.2 Mitigation Measures

4.2.1 Construction Phase

4.2.1.1 Prior to commencement of construction activities, the potential construction dust impacts to nearby receivers should be assessed and documented in a Construction Dust Management Plan. Contractor shall prepare the plan and submit to EPD for approval.

4.2.1.2 During the construction phase, regular watering and other good site practices should be implemented. In particular, a 3m high hoarding of around 110m in length is proposed at the northern boundary of the Project Site in order to minimize potential dust impacts to the receivers in close proximity to the construction site (See **Figure 4.1a** for proposed extent). All the recommended good practices are summarized in **Appendix 4.1a** the Environmental Mitigation Implementation Schedule (EMIS).

4.2.2 Operational Phase

4.2.2.1 No adverse impact from the Project is anticipated during the operational phase. Nevertheless, deododouriser equipped with 99.5% odour removal efficiency should be installed at the proposed sewage pumping station (SPS) prior to operation of the Project to minimize any potential odour nuisance.

4.3 Air Quality Monitoring Parameters

4.3.1.1 Monitoring and audit of the Total Suspended Particulate (TSP) levels shall be carried out by the ET to ensure that any deteriorating air quality could be readily detected and timely action taken to rectify the situation.

4.3.1.2 One-hour TSP levels shall be measured to indicate the impacts of construction dust on air quality. The 1-hour TSP levels shall be measured by following the standard high volume sampling method as set out in the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B. Upon approval of the IEC, 1-hour TSP levels can be measured by direct reading method which are capable of

producing comparable results as that by the high volume sampling method, to indicate short event impacts.

4.3.1.3 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 any other local atmospheric factors affecting or affected by site conditions, etc., shall be recorded down in detail. A sample data sheet is shown in **Appendix 4.1.**

4.4 Monitoring Equipment

4.4.1.1 High volume samplers (HVSs) complying with the following specifications shall be used for carrying out the 1-hour TSP monitoring:

- 0.6 – 1.7 m^3 per minute adjustable flow range;
- Equipped with a timing / control device with +/– 5 minutes accuracy for 24 hours operations;
- Installed with elapsed-time meter with +/– 2 minutes accuracy for 24 hours operation;
- Capable of providing a minimum exposed area of 406 cm^2;
- Flow control accuracy: +/– 2.5% deviation over 24-hour sampling period;
- Equipped with a shelter to protect the filer 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;
- Easily changeable filter; and
- Capable of operating continuously for a 24-hour period.

4.4.1.2 The ET is responsible for the provision, installation, operation, maintenance, dismantle of the monitoring equipment. They shall ensure that sufficient number of HVSs with an appropriate calibration kit is available for carrying out the baseline monitoring, regular impact monitoring and ad hoc monitoring. The HVSs shall be equipped with an electronic mass flow controller and be calibrated against a traceable standard at regular intervals. All equipment, calibration kit, filter papers,

etc., shall be clearly labelled.

4.4.1.3 Initial calibration of dust monitoring equipment shall be conducted upon installation and thereafter every six months. The transfer standard shall be traceable to the internationally recognized primary standard and be calibrated annually. The calibration data should be properly documented for future reference by IEC. All the data should be converted into standard temperature and pressure condition.

4.4.1.4 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 in the data sheet as mentioned in **Appendix 4.1.**

4.4.1.5 If the ET proposes to use a direct reading dust meter to measure 1-hour TSP levels, they shall submit sufficient information to the IEC to prove that the instrument is capable of achieving a comparable results to the HVS. The instrument should also be calibrated regularly, and the 1-hour sampling shall be determined periodically by the HVS to check the validity and accuracy of the results measured by direct reading method.

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

- The wind sensors should be installed at an elevated level 10m above ground so that they are clear of obstructions or turbulence caused by buildings;
- The wind data should be captured by a data logger, the data recorded in the data logger shall be downloaded periodically for analysis 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.

4.4.1.7 If the ET propose alternative dust monitoring equipment / methodology (e.g. direct reading methods) after the approval of this Manual, agreement from the IEC should be sought. The instrument should also be calibrated regularly following the requirements specified by the equipment manufacturers.

4.5 Laboratory Measurement / Analysis

4.5.1.1 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 Hong Kong Laboratory Accreditation Scheme (HOKLAS) accredited or other internationally accredited laboratory.

4.5.1.2 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 verified by IEC. Measurement performed by the laboratory shall be demonstrated to the satisfaction of the ER, IEC and EPD.

4.5.1.3 IEC shall conduct regularly audit to the measurement performed by the laboratory to ensure the accuracy of measurement results. The ET Leader shall provide the ER with one copy of the Title 40 of Code of Federal Regulations, Chapter 1 (Part 50), Appendix B for his / her reference.

4.5.1.4 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.

4.5.1.5 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.

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

4.6 Monitoring Locations

4.6.1.1 **Figure 4.1** shows the location of the proposed construction dust monitoring stations. The impact monitoring period is based on the tentative construction programme provided in the EIA report (i.e. Appendix 3.1 of the EIA report). The actual monitoring periods will be finalised according to the Construction Dust Management Plan and as detailed in **Section.4.8.1.2**. The status and location of dust sensitive receivers may change after issuing this manual. If such cases exist, the ET shall propose alternative monitoring locations and seek approval from ER and agreement from the IEC.

Table 4.1 Construction dust monitoring locations and monitoring period

Monitoring Station ID	ASR ID[1]	Location	Impact Monitoring Period [2]
DM-1	A13	EPD Site Office	Year 2021 – Year 2023 (Entire construction period)
DM-2	A1	Fortune Garden	Year 2021 – Year 2022 (Area 2 works)

Monitoring Station ID	ASR ID[1]	Location	Impact Monitoring Period [2]
DM-3	A7	Hung Hing Printing Centre	Year 2022 – Year 2023 (Area 3 works)

Note:
[1] ASR – Air Sensitive Receiver
[2] The time of commencement and ending of the monitoring listed are based on the tentative construction programme at the time of preparation of this EIA. The actual monitoring period will be finalised according to the Construction Dust Management Plan.

4.6.1.2 When alternative monitoring locations are proposed, the proposed site should, as far as practicable:

- be at the site boundary or such locations close to the major dust emission sources;
- be close to ASRs as defined in the TM-EIAO;
- have assurance of the minimal disturbance to the occupants and working under a safe condition during monitoring; and
- take into account the prevailing meteorological conditions.

4.6.1.3 The ET shall agree with IEC on the position of the HVS for the 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 meters apart;
- the distance between the sampler and an obstacle, such as buildings, must be at least twice the height that the obstacle protrudes above the sampler;
- a minimum of 2 meters of separation from walls, parapets and penthouses is required for rooftop samplers;
- a minimum of 2 meters separation from any supporting structure, measured horizontally is required;
- no furnace or incinerator flue is nearby;
- airflow around the sampler is unrestricted;
- the sampler is more than 20 meters from the dripline;
- any wire fence and gate, to protect the sampler, should not cause any obstruction during monitoring;

- permission must be obtained to set up the samplers and to obtain access to the monitoring stations; and
- a secured supply of electricity is needed to operate the samplers.

4.6.1.4 The ET may, depending on site conditions and monitoring results, decide whether additional monitoring locations shall be included or any monitoring locations could be removed / relocated during any stage of the construction phase.

4.7 Baseline Monitoring

4.7.1.1 Baseline monitoring shall be carried out at all of the designated monitoring locations (see **Table 4.1**) for at least two weeks prior to the commissioning of major construction works to obtain ambient 1-hour TSP samples. Ambient 1-hour sampling should also be done at least 3 times per day at each monitoring station.

4.7.1.2 During the baseline monitoring, there should not be any major construction or dust generation activities in the vicinity of the monitoring stations. Before commencing baseline monitoring, the ET shall inform the IEC of the baseline monitoring programme such that IEC can conduct on-site audit to ensure accuracy of the baseline monitoring results.

4.7.1.3 In case the baseline monitoring cannot be carried out at the designated monitoring location, the ET shall carry out the monitoring at alternative location that can effectively represent the baseline conditions at the impact monitoring location. The alternative baseline monitoring location shall be agreed with the IEC prior to commencement of baseline monitoring.

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

4.7.1.5 General meteorological conditions (wind speed, direction and precipitation) and notes regarding any significant adjacent dust producing sources should also be recorded throughout the baseline monitoring period. If the ET Leader considers that significant changes in the ambient conditions have arisen, a repeat of the baseline monitoring may be carried out to update the baseline levels and air quality criteria, after consultation and agreement with the ER, IEC and EPD.

4.8 Impact Monitoring

4.8.1.1 The ET shall carry out impact monitoring during major construction activities for the Project as specified in **Table 4.1**. For 1-hour TSP

monitoring, the sampling frequency of at least 3 times in every 6 days should be undertaken when the highest dust impact occurs.

4.8.1.2 The monthly schedule of the impact monitoring programme should be drawn up by the ET one month prior to the commencement of the scheduled construction period. Before commencing impact monitoring, the ET shall inform the IEC of the impact monitoring programme such that the IEC can conduct on-site audit.

4.9 Action and Limit Levels

4.9.1.1 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-hour TSP. **Table 4.2** shows the air quality criteria, namely Action and Limit levels to be used.

Table 4.2 Action and Limit levels for air quality

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

4.9.1.2 The Event and Action Plan prescribes procedures and actions associated with the outcome of the comparison of air quality monitoring data recorded and the agreed Action and Limit levels. In the cases where exceedances of these Action and Limit levels occur, the ET, the IEC, the ER and the Contractor should strictly observe the relevant actions of the respective Event and Action Plan listed in **Table 4.3.**

4.10 Event and Action Plan

4.10.1.1 Should non-compliance of the air quality criteria occur, actions in accordance with the Event and Action Plan in **Table 4.3** shall be carried out.

Table 4.3 Event and Action Plan for air quality

Event	Action			
	ET	**IEC**	**ER**	**Contractor**
Action level exceedance for one sample	1. Repeat measurement to confirm finding; 2. If exeedance is confirmed, inform Contractor, IEC and ER; 3. Identify source(s), investigate the causes of exceedance and propose remedial measures; 4. Increase monitoring frequency.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET, ER and Contractor on possible remedial measures; 4. Review and advise the ET and ER on the effectiveness of the proposed remedial measures.	1. Confirm receipt of notification of exceedance in writing.	1. Identify source(s), investigate the causes of exceedance and propose remedial measures; 2. Implement remedial measures; 3. Amend working methods agreed with the ER as appropriate.
Action level exceedance for two or more consecutive samples	1. Repeat measurement to confirm finding; 2. If exeedance is confirmed, inform Contractor, IEC and ER; 3. Identify source(s), investigate the causes of exceedance and propose remedial measures; 4. Increase monitoring frequency to daily; 5. Advise the Contractor and ER on the effectiveness of the proposed remedial measures; 6. Discuss with IEC and Contractor on remedial actions required;	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET, ER and Contractor on possible remedial measures; 4. Review and advise the ET and ER on the effectiveness of the proposed remedial measures;	1. Confirm receipt of notification of exceedance in writing; 2. In consultation with the ET and IEC agree with the Contractor on the remedial measures to be implemented; 3. Supervise implementation of remedial measures.	1. Identify source(s), investigate the causes of exceedance and propose remedial measures; 2. Submit proposals for remedial measures to the ER, ET and IEC within three working days of notification for agreement; 3. Implement the agreed proposals; 4. Amend proposal if appropriate.

Event	Action			
	ET	**IEC**	**ER**	**Contractor**
	7. If exceedance continues, arrange meeting with IEC and ER to discuss the remedial measures to be taken; 8. If exceedance stops, cease additional monitoring.	5. Supervise Implementation of remedial measures.		
Limit level exceedance for one sample	1. Repeat measurement to confirm finding; 2. If exeedance is confirmed, inform IEC, ER, Contractor and EPD; 3. Identify source(s), investigate the causes of exceedance and propose remedial measures; 4. Increase monitoring frequency to daily; 5. Discuss with the ER, IEC and Contractor on the remedial measures and assess effectiveness.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET, ER and Contractor on possible remedial measures; 4. Review and advise the ET and ER on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing; 2. Review and agree on the remedial measures proposed by the Contractor; 3. Ensure remedial measures properly implemented.	1. Identify source(s), investigate the causes of exceedance and propose remedial measures 2. Take immediate action to avoid further exceedance; 3. Submit proposals for remedial actions to ER, ET and IEC within three working days of notification for agreement; 4. Implement the agreed proposals; 5. Amend proposal if appropriate.
Limit level exceedance for two or more consecutive samples	1. Repeat measurement to confirm finding; 2. If exeedance is confirmed, inform IEC, ER, Contractor and EPD; 3. Identify source(s), investigate the causes of exceedance and propose remedial measures; 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;	1. Check monitoring data submitted by ET 2. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 3. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly;	1. Confirm receipt of notification of exceedance in writing; 2. In consultation with the ET and IEC, agree with the Contractor on the remedial measures to be implemented; 3. Supervise the implementation of remedial measures;	1. Identify source(s), investigate the causes of exceedance and propose remedial measures 2. Take immediate action to avoid further exceedance; 3. Submit proposals for remedial actions to ER, IEC and ET within three working days of notification for agreement;

Event	Action			
	ET	**IEC**	**ER**	**Contractor**
	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.	4. Supervise the implementation of remedial measures.	4. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	4. Implement the agreed proposals; 5. Review and resubmit proposals if problem still not under control; 6. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Note:
ET – Environmental Team
IEC – Independent Environmental Checker
ER – Engineer's Representative

5 Hazard to Life

5.1 Introduction

5.1.1.1 The EIA Report has reviewed the potential hazard to life due to the presence of a hazardous facility nearby (i.e. Tai Po Gas Production Plant(TPGPP)). Based on the design, adverse impacts from potential hazard to life during construction and operational phases are not anticipated.

5.2 Mitigation Measures

5.2.1 Construction Phase

5.2.1.1 Construction of the Project would not induce significant impact to the prevailing risks level of TPGPP. No mitigation measures are therefore required. Notwithstanding the above, precautionary measures including the provision of emergency plan for efficient evacuation and safety trainings (e.g. fire drills) will be implemented during construction phase of the Project. A communication mechanism would be established between the operators of TPGPP and the ER to allow evacuation in case of emergency.

5.2.2 Operational Phase

5.2.2.1 Operation of the Project would not induce significant impact to the prevailing risks level of TPGPP. No mitigation measures are therefore required. Notwithstanding the above, precautionary measures including the provision of emergency plan for efficient evacuation and safety trainings (e.g. fire drills) will be implemented during operational phase of the Project. A communication mechanism would be established between the TPGPP's operator and the Golf Course's operator to allow evacuation in case of emergency.

5.3 Environmental Monitoring and Site Audit Requirements

5.3.1 Construction Phase

5.3.1.1 Monitoring and audit requirements are not required for construction phase.

5.3.2 Operational Phase

5.3.2.1 Monitoring and audit requirements are not required for operational phase.

6 Noise

6.1 Introduction

6.1.1.1 The EIA Report has considered the potential noise impacts associated with the Project. Construction noise from the use of powered mechanical equipment during site clearance, site formation works, construction of new ancillary facilities etc. would be the major potential noise impacts during the construction phase. Noise monitoring is proposed to be conducted during construction phase. During the operational phase, adverse noise impact from fixed noise sources is not anticipated. Thus, mitigation measures and monitoring are not required. Notwithstanding, fixed noise commissioning test shall be conducted prior to the operation of the Project to confirm that the relevant standards stipulated in TM-EIAO and Noise Control Ordinance (NCO) would be complied with.

6.2 Mitigation Measures

6.2.1 Construction Phase

6.2.1.1 The EIA Report has recommended construction noise mitigation measures including use of quiet plant and temporary noise barriers, etc. All the proposed mitigation measures are summarized in **Appendix 4.1a**.

6.2.2 Operational Phase

Fixed Noise Sources

6.2.2.1 For the proposed fixed noise sources which are located near the existing Noise Sensitive Receivers (NSRs), the following noise mitigation measures shall be considered:

- All the pumps should be enclosed inside building structures;
- Proper selection of quiet plant aiming to reduce the tonality at NSRs;
- Installation of silencer / acoustic enclosure / acoustic louver for the exhaust of ventilation system;
- Openings of ventilation systems should be located away from NSRs as far as practicable; and
- Installation of absorptive noise barrier (with density of absorption material of 48kg/m^3) for the aerator which would duly shield the engine and other noisy parts of the aerator as far as practicable.

6.3 Noise Monitoring Parameters

6.3.1 Noise Monitoring Parameter for Construction Phase

6.3.1.1 Construction noise level shall be measured in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}). $L_{eq\ (30min)}$ shall be used as the monitoring parameter for the time period between 0700 and 1900 hours on normal weekdays. For all other time periods, $L_{eq\ (5min)}$ shall be employed for comparison with the Noise Control Ordinance (NCO) criteria. A sample data sheet is shown in **Appendix 6.1**.

6.3.1.2 As supplementary information for data auditing, statistical results such as L_{10} and L_{90} shall also be obtained for reference.

6.3.2 Noise Monitoring Parameter for Operational Phase

6.3.2.1 As fixed plant noise impact during the operational phase is not anticipated, noise monitoring for the operation of the Project is not required. Nevertheless, fixed noise commissioning test should be conducted prior to the operation of the Project.

6.4 Monitoring Equipment

6.4.1.1 As referred to the Technical Memorandum (TM) issued under the NCO, sound level meters in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications shall be used for carrying out the noise monitoring. Immediately prior to and following each noise measurement, the accuracy of the sound level meter shall be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements may be accepted as valid only if the calibration level from before and after the noise measurement agrees to within 1.0 dB.

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

6.4.1.3 The ET is responsible for the provision, installation, operation, maintenance, dismantle of the monitoring equipment. They 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.

6.5 Monitoring Locations

6.5.1 Monitoring Locations for Construction Phase

6.5.1.1 The most representative and affected NSRs were selected as monitoring stations and details could be referred to the EIA Report. The locations

of construction airborne noise monitoring stations are summarised in **Table 6.1** and shown in **Figure 6.1**.

Table 6.1 Proposed construction noise monitoring locations

Monitoring Station ID	Location
NM-1	Fortune Garden
NM-2	Village House at 53 Ting Kok Road

6.5.1.2 The ET shall select the monitoring locations from the above table based on the locations of the construction activities and seek approval from ER and agreement from the IEC and EPD to the proposal. The monitoring locations should be chosen based on the following criteria:

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

6.5.1.3 The monitoring station shall normally be at a point 1m from the exterior of the sensitive receiver building facade and be at a position 1.2m above the 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 to the free field measurements. The ET shall agree with the IEC on the monitoring stations are chosen, the baseline monitoring and the impact monitoring shall be carried out at the same positions.

6.5.1.4 The ET may, depending on site conditions and monitoring results, decide whether additional monitoring locations shall be included or any monitoring locations could be removed/relocated during any stage of the construction phase.

6.6 Baseline Monitoring

6.6.1.1 The ET shall carry out baseline noise monitoring prior to the commencement of the construction works. There shall not be any construction activities in the vicinity of the noise monitoring stations during the baseline monitoring. Continuous baseline noise monitoring for the A-weighted levels L_{eq}, L_{10} and L_{90} shall be carried out daily for a period of at least two weeks in a sample period of 5 minutes or 30 minutes between 0700 and 1900, and 5 minutes between 1900 and 0700. A schedule on the baseline monitoring shall be submitted to the ER and IEC for approval before the monitoring starts.

6.6.1.2 In exceptional cases, when insufficient baseline monitoring data or questionable results are obtained, the ET shall liaise with the IEC and EPD to agree on an appropriate set of data to be used as a baseline

reference.

6.7 Impact Monitoring

6.7.1 Impact Monitoring for Construction Phase

6.7.1.1 During normal construction working hours (0700-1900 Monday to Saturday), monitoring of $L_{eq, (30min)}$ noise levels shall be carried out at the agreed monitoring locations once every week in accordance with the methodology in the TM issued under NCO.

6.7.1.2 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.

6.7.1.3 The monthly schedule of the impact monitoring programme should be drawn up by the ET one month prior to the commencement of the scheduled construction period. Before commencing impact monitoring, the ET shall inform the IEC of the impact monitoring programme such that the IEC can conduct on-site audit.

6.7.2 Fixed Noise Commissioning Test

6.7.2.1 The maximum allowable sound power levels of the identified fixed noise sources have been predicted in the EIA Report. The Contractor should implement and refine the specified sound power levels as appropriate to ensure compliances with the noise standards stipulated in the TM-EIAO and NCO for the fixed plant operations.

6.7.2.2 The Contractor should also carry out a noise commissioning test for all fixed noise sources before the operation of the Project, in order to ensure compliance of the noise levels with the stipulated noise standards in the TM-EIAO and NCO.

6.8 Action and Limit Levels

6.8.1.1 The ET shall compare the construction noise monitoring results with noise criteria. **Table 6.4** shows the noise criteria, namely Action and Limit levels to be used.

Table 6.2 Action and Limit levels for construction noise

Time Period	Action Level	Limit Level
0700 - 1900 hours on normal weekdays	When one documented complaint is received	75 dB(A) *

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

6.9 Event and Action Plan

6.9.1.1 Should non-compliance of the noise criteria occur, actions in accordance with the Event and Action Plan in **Table 6.5** shall be carried out.

Table 6.5 Event and Action Plan for construction noise

Event	Action			
	ET	**IEC**	**ER**	**Contractor**
Action Level Exceedance	1. Notify IEC, ER and Contractor; 2. Carry out investigation; 3. Report the results of investigation to the IEC, ER and Contractor; 4. Discuss with the Contractor and formulate remedial measures; 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 and ER; 2. Implement noise mitigation proposals.
Limit Level Exceedance	1. Identify source; 2. Inform IEC, ER, EPD and Contractor; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency;	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly;	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem;	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;

Event	Action			
	ET	**IEC**	**ER**	**Contractor**
	5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Inform IEC, ER and EPD the causes and actions taken for the exceedances; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	3. Supervise the implementation of remedial measures.	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.	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.

Note:
ET – Environmental Team
IEC – Independent Environmental Checker
ER – Engineer's Representative

7 Water Quality

7.1 Introduction

7.1.1.1 The EIA Report has assessed the potential water quality impacts associated with the Project. According to the EIA Report, the water quality impact could be minimised with the implementation of mitigation measures. The water quality monitoring programme as discussed below could ensure the implementation of the recommended mitigation measures and provide continue improvements to the environmental conditions. Nevertheless, since the Turfgrass Management Plan would need to be further updated during the detailed design stage, the water quality monitoring parameters and other relevant parts should be subject to review throughout the course of the detailed design stage, subject to determination from the review findings and subject to agreement with relevant authorities.

7.2 Mitigation Measures

7.2.1 Construction Phase

7.2.1.1 During the construction phase, the EIA Report has recommended mitigation measures including good site practices to control construction site runoff, portable chemical toilets to collect the sewage from workforce, etc. All the mitigation measures are summarized in **Appendix 4.1a**.

7.2.2 Operational Phase

7.2.2.1 During the operational phase, the EIA report has recommended to design a drainage system to withstand rainstorms of a 50-year return period to reduce the chance of surface overflow, design water storage tanks with a total volume of 30,000m^3 to avoid and limit uncontrolled surface runoff and soil erosion, a proper location of the outfall from water storage tanks to minimise the water quality impact to the Water Sensitive Receivers (WSRs) in the vicinity from surface runoff, etc. Additional provisions including dual feed power supply or backup power supply facilities, standby pumps and using sewage tanker vehicles to remove sewage from the SPS to existing public sewer manhole located in front of main entrance of golf development on Ting Kok Road are suggested to be considered for the SPS to avoid the occurrence for emergency bypass.

7.3 Water Quality Monitoring Parameters

7.3.1 Construction Phase

7.3.1.1 The monitoring shall be established by measuring the dissolved oxygen

(DO), dissolved oxygen saturation (DO%), temperature, turbidity, salinity, pH and suspended solids (SS) in the water body at all designated locations as specified in **Section 7.6**.

7.3.1.2 The measurements shall be taken at all designated monitoring stations 3 days per week during construction phase. The interval between two sampling surveys shall not be less than 36 hours.

7.3.1.3 Replicate in-situ measurements and samples collected from each independent sampling event shall be collected to ensure a robust statistically interpretable database. DO, pH value, salinity, temperature and turbidity should be measured in-situ whereas other parameters should be determined by an accredited laboratory.

7.3.1.4 Other relevant data shall be recorded, including monitoring location / position, time, water depth, tidal stages, weather conditions and any special phenomena or work underway at the Project Site.

7.3.2 Operational Phase

7.3.2.1 The monitoring shall be established by measuring the total inorganic nitrogen (TIN), total phosphorus (TP), specific fungicide (i.e. chlorothalonil (active ingredient of Daconil)) and specific insecticide (i.e. chlorpyrifos) [1] in the water body at all designated locations as specified in **Section 7.6**.

7.3.2.2 The water quality of the operational phase should be monitored to ensure the compliance of relevant WQO standards at Tolo Harbour and Channel Water Control Zone, EPD guideline values and discharge standards and the criteria established in the EIA Report. The Project Proponent should review if the monitoring programme would need to be continued 2 months before the end of the 1-year monitoring period and agree with EPD.

7.3.2.3 The measurements shall be taken at all designated monitoring stations on a bi-weekly basis for the first 12 months. The frequency will be reviewed for the remaining 12 months and subject to EPD's approval. The water monitoring should cater the tidal effects. At least one sampling at mid-flood tides and one sampling at mid-ebb tides shall be conducted for each monitoring.

7.3.2.4 In case the Project Proponent wishes to change the fungicides and insecticides to be applied at the proposed golf course during the monitoring period, the Project Proponent shall update the monitoring parameters, detection limits and analytical methods accordingly. The Project Proponent should seek approval from EPD before changing the

[1] Daconil and Bayleton are two types of fungicides selected for the turf management. As shown in the calculation in the EIA report, the predicted concentration of Daconil in the water storage tanks is relatively much closer to the criteria, compared with Bayleton. So Daconil is selected as the more critical fungicide for monitoring. Similarly, Chlorpyrifos is selected as the more critical insecticide for monitoring.

monitoring parameters.

7.3.2.5 Replicate samples collected from each independent sampling event shall be collected to ensure a robust statistically interpretable database. Samples should be determined by an accredited laboratory.

7.3.2.6 Other relevant data shall be recorded, including monitoring location / position, time, water depth, tidal stages, weather conditions and any special phenomena or work underway at the Project Site.

7.4 Monitoring Equipment

7.4.1 Dissolved Oxygen, Dissolved Oxygen Saturation and Temperature Measuring Equipment

7.4.1.1 The dissolved oxygen (DO) measuring instruments should be portable and weatherproof. The equipment should complete with cable and sensor, and DC power source. It should be capable of measuring:

- A DO level in the range of 0 – 20 mg/L and 0 – 200% saturation; and
- A temperature of 0 – 45 degree Celsius.

7.4.1.2 The equipment should have a membrane electrode with automatic temperature compensation complete with a cable.

7.4.1.3 Should salinity compensation not be built-in to the DO equipment, in-situ salinity should be measured to calibrate the DO measuring instruments prior to each measurement.

7.4.2 Turbidity Measuring Equipment

7.4.2.1 The turbidity measuring instruments should be portable and weatherproof with DC power source. It should have a photoelectric sensor capable of measuring turbidity level between 0 – 1000 NTU (for example, Hach model 2100P or an approved similar instrument).

7.4.3 Salinity Measuring Equipment

7.4.3.1 A portable salinometer capable of measuring salinity in the range of 0 – 40 parts per thousand (ppt) should be provided for measuring salinity of the water at each monitoring location.

7.4.4 pH Measuring Equipment

7.4.4.1 A portable pH meter of measuring a pH range between 0.0 and 14.0 shall be provided under the specified conditions (for example Orion Model 250A or an approved similar equipment).

7.4.5 Positioning Equipment

7.4.5.1 A hand-held or boat-fixed type digital Differential Global Positioning System (DGPS) with way point bearing indication and Radio Technical Commission for Maritime (RTCM) Type 16 error message "screen pop-up" facilities (for real-time auto-display of error messages and DGPS corrections from the Hong Kong Hydrographic Office), or other equipment instrument of similar accuracy, should be provided and used during marine water monitoring to ensure the monitoring vessel is at the correct location before taking measurements.

7.4.6 Water Depth Detector

7.4.6.1 A portable, battery-operated echo sounder should be used for water depths determination at each designated monitoring station. The detector can either be hand-held or affixed to the bottom of the work boat, if the same vessel is to be used throughout the monitoring programme.

7.4.7 Water Sampling Equipment

7.4.7.1 Proper water samplers are required for monitoring. It should comprise a transparent PVC cylinder, with a capacity of not less than 2 litres, which can be effectively sealed with latex cups at both ends. The sampler should have a positive latching system to keep it open to prevent premature closure until released by a messenger when the sampler is at the selected water depth (for example, Kahlsico Water Sampler or an approved similar instrument).

7.4.8 Sample Containers and Storage

7.4.8.1 Water samples for SS should be stored in high density polythene bottles with no preservative added, while those for fungicides and insecticides should be stored in amber glass bottles with no preservative added, packed in ice (cooled to 4°C without being frozen) and shipment to the testing laboratory. The samples shall be delivered to the laboratory of collection and be analysed as soon as possible after collection.

7.4.9 Calibration of In-Situ Instruments

7.4.9.1 The pH meter, DO meter and turbidimeter shall be checked and calibrated before use. DO meter and turbidimeter shall be certified by a laboratory accredited under HOKLAS or any other international accreditation scheme, and subsequently re-calibrated on quarterly basis throughout all stages of the water quality monitoring. Responses of sensors and electrodes should 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 station.

7.4.10 Back-up Equipment and Vessels

7.4.10.1 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, malfunction, etc.

7.4.10.2 The water quality monitoring will involve two and four monitoring stations respectively for the construction and operational phases, and measurements should be conducted within the prescribed tidal conditions in order to ensure the measurement / samples are representative. A multi-probe monitoring equipment set integrated with water sampler(s) is highly recommended to improve the monitoring efficiency. Depending on the actual operation, more than one field survey vessels might be required simultaneously to ensure the monitoring are conducted within the acceptable monitoring period. The ET shall also consider the use of unattended automatic sampling / monitoring devices at fixed stations where monitoring are required throughout the construction period. The use of such unattended automatic devices, however, shall be subject to the approval of the ER, IEC and EPD.

7.5 Laboratory Measurement / Analysis

7.5.1 Construction Phase

7.5.1.1 At least 3 replicate samples from each independent sampling event are required for the SS measurement which shall be carried out in a HOKLAS or international accredited laboratory. Where water depth is allowed, sampling should be conducted at three water depths which are 1m below water surface, mid-depth, and 1m above the sea bed. If the sampling water depth is less than 6m, the mid-depth may be omitted. If the water depth is less than 3m, only the mid-depth may be monitored. Sufficient water samples shall be collected at the monitoring stations for carrying out the laboratory measurement and analysis. The laboratory determination work shall start within 24 hours after the collection of water samples. The analysis for suspended solids is presented in **Table 7.1**.

Table 7.1 Laboratory analysis for construction phase water quality monitoring

Parameters	Analytical Method	Reporting Limit
Suspended Solid (SS)	APHA 2540-D	0.5 mg/L

7.5.2 Operational Phase

7.5.2.1 At least 3 replicate samples from each independent sampling event are required for the TIN, TP, chlorothalonil (active ingredient of Daconil) and chlorpyrifos measurement which shall be carried out in a HOKLAS or international accredited laboratory. Where water depth is allowed, sampling should be conducted at three water depths which are 1m

below water surface, mid-depth, and 1m above the sea bed. If the sampling water depth is less than 6m, the mid-depth may be omitted. If the water depth is less than 3m, only the mid-depth may be monitored. Sufficient water samples shall be collected at the monitoring stations for carrying out the laboratory measurement and analysis. The laboratory determination work shall start within 24 hours after the collection of water samples. Remaining samples after analysis shall be kept by the laboratory for 3 months if any repeat analysis is required. The analytical method and reporting limit are presented in **Table 7.2**.

Table 7.2 Laboratory analysis for operational phase water quality monitoring

Parameters	Analytical Method	Reporting Limit
Total Inorganic Nitrogen	APHA 4500-NH_3:G APHA 4500-NO_3^-:I	0.02 mg/L
Total Phosphorus	APHA 4500-P:J	0.01 mg/L
Chlorothalonil (active ingredient of Daconil)	LCMS Standard Methods or equivalent	0.002 mg/L
Chlorpyrifos	USEPA 8270	0.002 mg/L

7.6 Monitoring Locations

7.6.1 Construction Phase

7.6.1.1 Water quality monitoring will be carried out at two locations at Tolo Harbour Water Control Zone nearby the Project Site.

7.6.1.2 The proposed water quality monitoring locations during the construction phase are shown in **Figure 7.1** and listed in **Table 7.3**. The ET shall seek approval from IEC and EPD for any alternative monitoring locations.

Table 7.3 Locations of proposed water quality monitoring stations during construction phase

Monitoring Station ID	Description	Easting	Northing
WM-1	South of Project Site near coral sites	838145	834573
WM-2	West of Yim Tin Tsai Fish Culture Zone	839362	834856

7.6.2 Operational Phase

7.6.2.1 Water quality monitoring will be carried out at water storage tanks within the Project Site and three locations at Tolo Harbour Water Control Zone nearby the Project Site.

7.6.2.2 The proposed water quality monitoring locations during the operational phase are shown in **Figure 7.2** and listed in **Table 7.4**. The ET shall seek approval from IEC and EPD for any alternative monitoring locations.

Table 7.4 Locations of proposed water quality monitoring stations during operational phase

Monitoring Station ID	Description	Easting	Northing
WM-1	South of Project Site near Coral Sites	838145	834573
WM-2	West of Yim Tin Tsai Fish Culture Zone	839362	834856
WM-3	Water storage tanks	838444	835279
WM-4	Bypass point at Tolo Harbour	838387	834786
WM-5	Southeast of the bypass point	839362	833994

7.7 Baseline Monitoring

7.7.1.1 Baseline conditions for water quality shall be established and agreed with EPD prior to the commencement of construction works. The baseline conditions shall include the water quality parameters specified in **Section 7.3**. The proposed water quality monitoring schedule shall be submitted to EPD by the ET at least 2 weeks before the first day of the monitoring month. The baseline monitoring shall be conducted for at least 4 weeks prior to the commencement of construction works with a frequency of 3 days in a week, at mid-flood and mid-ebb tides. The interval between two sets of monitoring shall not be less than 36 hours. EPD shall also be notified immediately for any changes in schedule.

7.7.1.2 In general, where the difference in value between the first and second in-situ measurement of DO or turbidity parameters is more than 25% of the value of the first reading, the reading shall be discarded and further readings should be taken.

7.7.1.3 There should be no construction work in the vicinity of the stations during the baseline monitoring. The baseline data will be used to establish the Action and Limit levels. The determination of Action and Limit levels will be discussed in **Section 7.9**.

7.7.1.4 **Table 7.5** below summarizes the proposed water quality monitoring programme for baseline monitoring.

Table 7.5 Proposed water quality monitoring programme for baseline monitoring

Item	Baseline Monitoring
Monitoring Period	At least 4 weeks prior to the commencement of construction works
Monitoring Frequency	3 days in a week
Monitoring Locations	All stations in **Table 7.4** except WM-3

Item	Baseline Monitoring
Monitoring Parameters	Dissolved oxygen (DO), dissolved oxygen saturation (DO%), temperature, turbidity, salinity, pH, suspended solids (SS), total inorganic nitrogen (TIN), total phosphorus (TP), specific fungicide (i.e. chlorothalonil (active ingredient of Daconil)) and specific insecticide (i.e. chlorpyrifos)
Intervals between 2 Sets of Monitoring	Not less than 36 hours

7.8 Impact Monitoring

7.8.1 Construction Phase

7.8.1.1 The impact monitoring shall be conducted during construction periods. The purpose of impact monitoring is to ensure the implementation of the recommended mitigation measures, provide effective control of any malpractices, and provide continuous improvements to the environmental conditions. The proposed water quality monitoring schedule shall be submitted to EPD by the ET at least 2 weeks before the first day of the monitoring month. The interval between two sets of monitoring shall not be less than 36 hours with a frequency of 3 days in a week, at mid-flood and mid-ebb tides. EPD shall also be notified immediately for any changes in schedule.

7.8.1.2 In general, where the difference in value between the first and second in-situ measurement of DO or turbidity parameters is more than 25% of the value of the first reading, the reading shall be discarded and further readings should be taken.

7.8.1.3 In case of project-related exceedances of Action and/or Limit Levels, the impact monitoring frequency shall be increased according to the requirement of Event and Action Plan. The details of Event and Action Plan will be discussed in **Section 7.10**.

7.8.1.4 **Table 7.6** below summarizes the proposed water quality monitoring programme for impact monitoring during construction phase.

Table 7.6 Proposed water quality monitoring programme for impact monitoring during construction phase

Item	Impact Monitoring during Construction Phase
Monitoring Period	During the entire construction phase
Monitoring Frequency	3 Days in a Week
Monitoring Locations	All stations in **Table 7.3**

Item	Impact Monitoring during Construction Phase
Monitoring Parameters	Dissolved oxygen (DO), dissolved oxygen saturation (DO%), temperature, turbidity, salinity, pH and suspended solids (SS)
Intervals between 2 Sets of Monitoring	Not less than 36 hours

7.8.2 Operational Phase

7.8.2.1 The impact monitoring shall be conducted during operational phase. The purpose of impact monitoring is to ensure the implementation of the recommended mitigation measures, provide effective control of any malpractices, and to identify any further need for the additional mitigation measures during operational phase of the proposed golf course. A 1-year monitoring period is proposed for the operational phase on a bi-weekly basis, at mid-flood and mid-ebb tides. The Project Proponent should review if the monitoring programme would need to be continued 2 months before the end of the 1-year monitoring period and agree with EPD.

7.8.2.2 In case of project-related exceedances of Action and/or Limit Levels, the impact monitoring frequency shall be increased according to the requirement of Event and Action Plan, except for the monitoring station WM-3. The details of Event and Action Plan will be discussed in **Section 7.10**.

7.8.2.3 **Table 7.7** below summarizes the proposed water quality monitoring programme for impact monitoring during operational phase.

Table 7.7 Proposed water quality monitoring programme for impact monitoring during operational phase

Item	Impact Monitoring during Operational Phase
Monitoring Period	First year of the operational phase, and thereafter to be agreed with EPD
Monitoring Frequency	Bi-weekly
Monitoring Locations	All stations in **Table 7.4**
Monitoring Parameters	Total inorganic nitrogen (TIN), total phosphorus (TP), specific fungicide (i.e. chlorothalonil (active ingredient of Daconil)) and specific insecticide (i.e. chlorpyrifos). Any change in monitoring parameters to be agreed with EPD, based on the Turfgrass Management Plan to be approved by EPD (Refer to Section .2.7.1.2 of the EIA Report)
Intervals between 2 Sets of Monitoring	N/A

7.9 Action and Limit Levels

7.9.1 Construction Phase

7.9.1.1 The Action and Limit levels for water quality of all water monitoring stations during the construction phase are defined in **Table 7.8** below.

Table 7.8 Action and Limit levels for water quality

Parameters	Action Level	Limit Level
DO in mg/L (Surface, Middle & Bottom)	Surface and Middle 5 percentile of baseline data. [1] Bottom 5 percentile of baseline data. [1]	Surface and Middle 4 mg/L except 5 mg/L for fish culture zone; or 1 percentile of baseline data. [1] Bottom 2 mg/L or 1 percentile of baseline data. [1]
SS in mg/L (depth-averaged) [3]	95 percentile of baseline data [2]	99 percentile of baseline data [2]
Turbidity in NTU (depth-averaged) [3]	95 percentile of baseline data [2]	99 percentile of baseline data [2]

Notes:
[1] For DO, non-compliance occurs when monitoring results is lower than the limits.
[2] For SS and turbidity, non-compliance occurs when monitoring results is larger than the limits.
[3] "Depth-averaged" is calculated by taking the arithmetic means of readings of all three depths.

7.9.2 Operational Phase

7.9.2.1 The Action and Limit levels for water quality of all water monitoring station except WM-3 during the operational phase are defined in **Table 7.9** below.

Table 7.9 Action and Limit levels for water quality

Parameters	Action Level	Limit Level
TIN in mg/L (depth-averaged)[1]	95 percentile of baseline data	99 percentile of baseline data
TP in mg/L (depth-averaged)[1]	95 percentile of baseline data	99 percentile of baseline data
Chlorothalonil (active ingredient of Daconil) (depth-averaged)[1]	Level of detection limit	Level of detection limit
Chlorpyrifos (depth-averaged)[1]	0.003 mg/L	0.004 mg/L

Note:

[1] "Depth-averaged" is calculated by taking the arithmetic means of readings of all three depths.
[2] The above Action and Limit levels does not apply to WM-3 which is not a WSR.

7.10 Event and Action Plan

7.10.1.1 Should non-compliance of the criteria occur, action in accordance with the Event and Action Plan in the **Table 7.10** below shall be carried out.

Table 7.10 Event and Action Plan for water quality

Event	Action			
	ET	**IEC**	**ER**	**Contractor**
Action level exceedance for one sampling day	1. Inform IEC, Contractor and ER; 2. Check monitoring data, all plant, equipment and Contractor's working methods; and 3. Discuss remedial measures with IEC and Contractor and ER.	1. Discuss with ET, ER and Contractor on the implemented mitigation measures; 2. Review proposals on remedial measures submitted by Contractor and advise the ER accordingly; and 3. Review and advise the ET and ER on the effectiveness of the implemented mitigation measures.	1. Discuss with IEC, ET and Contractor on the implemented mitigation measures; 2. Make agreement on the remedial measures to be implemented; 3. Supervise the implementation of agreed remedial measures.	1. Identify source(s) of impact; 2. Inform the ER and confirm notification of the non-compliance in writing; 3. Rectify unacceptable practice; 4.Check all plant and equipment; 5. Consider changes of working methods; 6. Discuss with ER, ET and IEC and purpose remedial measures to IEC and ER; and 7. Implement the agreed mitigation measures.
Action level exceedance for more than one consecutive sampling days	1. Repeat in-situ measurement on next day of exceedance to confirm findings; 2. Inform IEC, contractor and ER; 3. Check monitoring data, all plant, equipment and	1. Discuss with ET, Contractor and ER on the implemented mitigation measures; 2. Review the proposed remedial measures submitted by Contractor and advise the ER accordingly; and	1. Discuss with ET, IEC and Contractor on the proposed mitigation measures; 2. Make agreement on the remedial measures to be implemented ; and	1. Identify source(s) of impact; 2. Inform the ER and confirm notification of the non-compliance in writing; 3. Rectify unacceptable practice;

Event	Action			
	ET	**IEC**	**ER**	**Contractor**
	Contractor's working methods; 4. Discuss remedial measures with IEC, contractor and ER 5. Ensure remedial measures are implemented	3. Review and advise the ET and ER on the effectiveness of the implemented mitigation measures.	3. Discuss with ET, IEC and Contractor on the effectiveness of the implemented remedial measures.	4. Check all plant and equipment and consider changes of working methods; 5. Discuss with ET, IEC and ER and submit proposal of remedial measures to ER and IEC within 3 working days of notification; and 6. Implement the agreed mitigation measures.
Limit level exceedance for one sampling day	1. Repeat measurement on next day of exceedance to confirm findings; 2. Inform IEC, contractor and ER; 3. Rectify unacceptable practice; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Consider changes of working methods; 6. Discuss mitigation measures with IEC, ER and Contractor; and 7. Ensure the agreed remedial measures are implemented	1. Discuss with ET, Contractor and ER on the implemented mitigation measures; 2. Review the proposed remedial measures submitted by Contractor and advise the ER accordingly; and 3. Review and advise the ET and ER on the effectiveness of the implemented mitigation measures.	1. Discuss with ET, IEC and Contractor on the implemented remedial measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the remedial measures to be implemented; and 4. Discuss with ET, IEC and Contractor on the effectiveness of the implemented remedial measures.	1. Identify source(s) of impact; 2. Inform the ER and confirm notification of the non-compliance in writing; 3. Rectify unacceptable practice; 4. Check all plant and equipment and consider changes of working methods; 5. Discuss with ET, IEC and ER and submit proposal of additional mitigation measures to ER and IEC within 3 working days of notification; and 6. Implement the agreed remedial measures.

Event	Action			
	ET	IEC	ER	Contractor
Limit level exceedance for more than one consecutive sampling days	1. Inform IEC, contractor and ER; 2. Check monitoring data, all plant, equipment and Contractor's working methods; 3. Discuss mitigation measures with IEC, ER and Contractor; and 4. Ensure mitigation measures are implemented; and 5. Increase the monitoring frequency to daily until no exceedance of Limit Level for two consecutive days	1. Discuss with ET, Contractor and ER on the implemented mitigation measures; 2. Review the proposed remedial measures submitted by Contractor and advise the ER accordingly; and 3. Review and advise the ET and ER on the effectiveness of the implemented mitigation measures.	1. Discuss with ET, IEC and Contractor on the implemented remedial measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the remedial measures to be implemented; 4. Discuss with ET and IEC on the effectiveness of the implemented mitigation measures; and 5. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the dredging activities until no exceedance of Limit level.	1. Identify source(s) of impact; 2. Inform the ER and confirm notification of the non-compliance in writing; 3. Rectify unacceptable practice; 4. Check all plant and equipment and consider changes of working methods; 5. Discuss with ET, IEC and ER and submit proposal of additional mitigation measures to ER and IEC within 3 working days of notification; and 6. Implement the agreed remedial measures. 7. As directed by the ER, to slow down or stop all or part of the dredging activities until no exceedance of Limit level.

Note:

ET – Environmental Team

IEC – Independent Environmental Checker

ER – Engineer's Representative

Each step of actions required shall be implemented within 1 working days unless otherwise specified or agreed with EPD.

8 Waste Management

8.1 Introduction

8.1.1.1 The quantity and timing for the generation of waste during the construction phase have been estimated in the EIA Report. Measures including the opportunity for on-site sorting, reusing excavated materials etc., are devised in the construction methodology to minimise the surplus materials to be disposed of off-site. Chemical waste should be collected by licensed chemical waste collectors for proper disposal.

8.2 Mitigation Measures

8.2.1 Construction Phase

8.2.1.1 All the proposed mitigation measures during construction phase are stipulated in the EIA Report and summarised in **Appendix 4.1a**.

8.2.1.2 Waste will be handled in accordance with the relevant legislation and guidelines and with the implementation of the proposed mitigation measures, no adverse environmental impacts from waste management are anticipated. EM&A is required for waste management during the construction phase only and the effective management of waste arising during the construction phase will be monitored through the site audit programme. The aims of the waste audit are:

- to ensure the waste arising from the works are handled, stored, collected, transferred and disposed of in an environmentally acceptable manner; and
- to encourage the reuse and recycling of material.

8.2.1.3 A trip-ticket system should be operated to monitor all movements of non-inert C&D materials for disposal at landfill and chemical wastes which will be collected by licensed chemical waste collectors to licensed facilities for final treatment and disposal. Recommendations have been made in the EIA Report to ensure proper treatment and proper disposal of these wastes and summarised in **Appendix 4.1a**.

8.2.1.4 All dump trucks engaged on site should be equipped with Global Positioning System (GPS) or equivalent system for tracking and monitoring of their travel routings and parking locations to prohibit illegal dumping and landfilling of C&D materials. Closed-circuit television (CCTV) will be installed at the site entrances to monitor and estimate the quantity of waste leaving the site. Records and analysis of data collected by the mentioned GPS, CCTV and/or equivalent systems should be kept.

8.2.2 Operational Phase

8.2.2.1 The types and quantities of waste that would be generated during the operational phase have been assessed. General refuse generated from the Project should be collected with lidded bins and at least daily collection should be arranged by the waste collector as stated in the EIA Report. If any chemical waste is to be generated from the operation of the Project, the operator shall register as a Chemical Waste Producer with EPD and manage the chemical waste in accordance with Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354C). Furthermore, organic waste such as grass clippings is encouraged to be used for composting on-site through the 3-Bin Composting System. With proper management, it is anticipated there would not be any insurmountable impacts during the operational phase.

8.3 Environmental Monitoring and Site Audit Requirements

8.3.1 Construction Phase

8.3.1.1 The Contractor shall be required to pay attention to the environmental standard and guidelines and carry out appropriate waste management and obtain the relevant licenses / permits for waste disposal. The ET shall ensure that the Contractor has obtained from the appropriate authorities the necessary waste disposal permits or licenses including:

- Chemical Waste Collection License / Chemical Waste Disposal License under the Waste Disposal Ordinance (Cap 354);
- Chemical Waste Producer Registration;
- Dumping License under the Land (Miscellaneous Provisions) Ordinance (Cap 28);
- Water Pollution Control Ordinance License under the Water Pollution Control Ordinance.

8.3.1.2 The Contractor shall refer to EPD's Guidance Notes for License Application when applying for the license / permit and the ET shall refer to these Guidance Notes for auditing purposes.

8.3.1.3 Regular audits and site inspections should be carried out during construction phase by the ET to ensure that the recommended good site practices and other mitigation measures recommended in the EIA Report and in **Appendix 4.1a** are properly implemented by the Contractor. The audits should concern all aspects of on-site waste management practices including waste generation, storage, recycling, transport and disposal. Apart from site inspection, documents including licenses, permits, disposal and recycling records should be reviewed and audited for compliance with the legislation and contract requirements.

8.3.1.4 The requirements of the environmental audit programme are set out in

Section 14 of this Manual. The audit programme will verify the implementation status and evaluate the effectiveness of the mitigation measures.

8.3.2 Operational Phase

8.3.2.1 As it is anticipated that there would not be any insurmountable impacts during the operational phase, monitoring and audit requirements are not required.

9 Land Contamination

9.1 Introduction

9.1.1.1 The EIA Report has documented the land contamination issues associated with the Project.

9.2 Site Investigation for Potentially Contaminated Areas

9.2.1.1 As outlined in Section 8 of the EIA Report, based on the desktop review findings of selected aerial photos, the information collected during site survey, from the operator of the current Golf Driving Range as well as EPD and Fire Services Department (FSD), the storage/ workshop area is identified as the only potential contaminated site within the boundary of the Project and the works of the Project. Nevertheless, the land contamination potential at the storage/ workshop area is low.

9.2.1.2 Project Proponent (PP) is recommended to conduct further land contamination assessment at the storage/ workshop area at later stage of the Project after the area within the boundary of the Project and the works of the Project is handed over to the PP. Further land contamination assessment should include site re-appraisal, submission of Land Contamination Review (LCR) or Contamination Assessment Plan (CAP), Site Investigation (SI) and submission of Contamination Assessment Report (CAR), if necessary.

9.3 Mitigation Measures

9.3.1 Construction Phase

9.3.1.1 PP is recommended to conduct further land contamination assessment at the storage/ workshop area at later stage of the Project after the area within the boundary of the Project and the works of the Project is handed over to the PP. If land contamination is confirmed, a Remediation Action Plan (RAP) should be submitted to formulate viable remedial measures. Possible remediation methods include air sparging, biopile, stabilisation / solidification, thermal desorption, etc. The contaminated land should then be remediated according to the approved RAP, and a Remediation Report (RR) should be submitted to demonstrate the land has been remediated adequately.

9.3.2 Operational Phase

9.3.2.1 The operation of the Project is regarded as a potential contaminated use in accordance with EPD's *Practice Guide for Investigation and Remediation of Contaminated Land*. The application of agrochemicals including fertilizer, pesticides and herbicides as well as accidental

chemical spillages may cause land contamination issues.

9.3.2.2 Agrochemical Management

9.3.2.3 Agrochemicals including pesticides would be applied at the Project Site to provide a suitable growth environment for the turf, and avoid any potential public health impacts arising from the insects. Economic and environmental approach to the use of agrochemicals is by minimizing the use of agrochemicals, while maintaining the viability of turf grass and inhibit growth of pathogens. As such, the application, handling and storage of pesticides should follow AFCD's *Code of Practice for the Safe and Efficient Use of Pesticides on Sports Turf*, *A Guide to Labelling of Pesticide* and *Safety Guidelines for Storage of Pesticides* respectively. The storage of pesticides shall follow the Pesticides Ordinance (PO) (Cap. 133), Dangerous Goods Ordinance (Cap. 295) and Gas Safety Ordinance (Cap. 51).

9.3.2.4 Any disposal of agrochemicals including pesticides shall follow the Waste Disposal Ordinance (Cap. 354), Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354C) and *A Guide to the Chemical Waste Control Scheme* promulgated by EPD. The operator of the Project shall be registered as a Chemical Waste Producer and shall only engage a licensed waste collector for the collection and removal of chemical waste.

Chemical Spillage Control

9.3.2.5 In case of any chemical spillage, the operator should follow the instruction of the labels and take precautionary measures before handling the spillage. In the absence of specific instruction for handling the spillage of the product, the following procedures may be followed:

- Contain and cover the spillage with double its volume of inert absorbent e.g. sand, sawdust or soil;
- After the spill has been absorbed, sweep or shovel this up thoroughly;
- Put all contaminated debris in a sealed and marked container or large heavy duty plastic bag and place this in a secure area to await safe disposal;
- Water used to clean containers, or any contaminated liquids should under no circumstances be allowed to enter drains or watercourses;
- Disposal of contaminated liquids and debris should be carried out only after consultation with EPD.

9.3.2.6 With reference to EPD's *Code of Practice for the Packaging, Labelling and Storage of Chemical Wastes*, in incidents where the spillage may result in significant contamination of an area or risk of pollution, EPD should be informed immediately.

Environmental Conscious Turfgrass Management Plan

9.3.2.7 In order to prevent the agrochemicals from contaminating the land, an environmental conscious Turfgrass Management Plan (TMP) would be developed during the detailed design stage. The outline of the environmental conscious TMP is presented in Section 2.7 of the EIA Report. Details on the application, handling and storage of agrochemicals as well as measures to be carried out in the occurrence of chemical spillage will be provided in the TMP.

9.4 Environmental Monitoring and Site Audit Requirements

9.4.1 Construction Phase

9.4.1.1 Environmental monitoring and site audit are not required for construction phase.

9.4.2 Operational Phase

9.4.2.1 Environmental monitoring and site audit are not required for operational phase.

10 Landfill Gas Hazards

10.1 Introduction

10.1.1.1 The EIA Report has documented the landfill gas (LFG) hazards associated with the Project. According to the EIA Report, with the provision of mitigation measures, adverse impacts on the targets within the Project are not anticipated.

10.2 Mitigation Measures

10.2.1 Construction Phase

10.2.1.1 All the proposed mitigation measures during construction phase are stipulated in the EIA Report and summarised in **Appendix 4.1a**. These mitigation measures include appointment of Safety Officer, site safety measures, landfill gas monitoring and emergency management.

10.2.2 Operational Phase

10.2.2.1 During the operational phase, the following protective and precautionary measures will be provided/implemented wherever practicable:

- Active gas control (e.g. mechanical ventilation system);
- Semi-active gas control (e.g. wind scoops);
- Passive gas control (e.g. gas-proof membranes, compacted high density concrete, ventilation by natural air movement);
- Gas detection system;
- Good site management; and
- Entry safety procedures for confined spaces.

10.2.2.2 Subsurface services within the Consultation Zone shall be so designed and installed to avoid the potential vertical or lateral migration of LFG. All the proposed mitigation measures during operational phase are stipulated in the EIA Report and summarised in **Appendix 4.1a**.

10.3 Environmental Monitoring and Site Audit Requirements

10.3.1 Construction Phase

10.3.1.1 Periodically during ground-works construction, the works area should be monitored by the site Safety Officer for oxygen, methane and carbon dioxide gas concentrations using appropriately calibrated portable gas detection equipment. Routine monitoring should be carried out in all excavations, manholes, chambers and any other confined spaces that

may have been created. The monitoring frequency and areas to be monitored should be set down prior to commencement of ground-works by the Safety Officers. The monitoring requirement of excavations stated in the Landfill Gas Hazard Assessment Guidance Note (EPD/TR8/ 97) sections 8.25 to 8.27 will be followed. All measurements of LFG should be recorded and documented by a standard record form to be approved by EPD. The form will detail the location, time of monitoring and equipment used, together with the gas concentrations measured to ensure all relevant data are recorded. LFG monitoring during construction phase will be reported in the monthly EM&A Reports.

10.3.1.2 The gas detection equipment should be appropriately calibrated and able to measure the following gases in the ranges indicated below:

Methane	0-100% LEL and 0-100% v/v
Carbon dioxide	0-100%
Oxygen	0-21%

10.3.1.3 Monitoring should be performed properly to make sure that the area is free of LFG before any man enters into the area.

10.3.1.4 All measurements in excavations should be made with the extended monitoring tube located not more than 10mm from the exposed ground surface. The monitoring should be undertaken by the Safety Officer.

10.3.1.5 For excavations deeper than 1m, measurements should be carried out:

- at the ground surface before excavation commences;
- immediately before any worker enters the excavation;
- at the beginning of each working day for the entire period the excavation remains open; and
- periodically throughout the working day whilst workers are in the excavation.

10.3.1.6 For excavations between 0.3m and 1m deep, measurements should be carried out:

- directly after the excavation has been completed; and
- periodically whilst the excavation remains open.

10.3.1.7 For excavations less than 0.3m deep, monitoring may be omitted, at the discretion of the Safety Officer or other appropriately competent environmental specialist.

10.3.1.8 Depending on the results of the measurements, actions required will vary and should be set down by the Safety Officer or other appropriately environmental specialist. As a minimum, these should encompass those actions specified in **Table 10.1**.

Table 10.1 Actions in the event of LFG being detected in excavations

Parameter	Monitoring Results	Actions
Methane	>10% LEL (i.e. >0.5% v/v)	Prohibit hot works; Ventilate to restore methane to <10%LEL.
	>20% LEL (i.e. >1% v/v)	Stop works; Inform EPD and Landfill Contractor; Evacuate all personnel/prohibit entry; Increase ventilation to restore methane to <10% LEL.
Carbon dioxide	>0.5% v/v	Ventilate to restore carbon dioxide to <0.5% v/v.
	>1.5% v/v	Stop works; Inform EPD and Landfill Contractor; Evacuate all personnel/prohibit entry; Increase ventilation to restore carbon dioxide to <0.5% v/v.
Oxygen	<19%	Ventilation trench/void to restore oxygen to >19%
	<18%	Stop works; Inform EPD and Landfill Operator; Evacuate personnel/prohibit entry; Increase ventilation to restore oxygen to >19%

10.3.1.9 Upon completion of the works, a competent professional person representing the Project Proponent shall confirm in writing to EPD that all the recommended LFG protection measures for the Project have been properly incorporated, installed and implemented. This could be in form of a report with photos showing the installation of membrane, installation of gas detection system, etc. as well as the relevant as-built drawings related to LFG protection measures.

10.3.2 Operational Phase

10.3.2.1 Always-on gas detection system would be provided at all rooms, houses and indoor environment such as car park, lift and staircases, offices, golf shop, changing rooms, staff quarters and overnight accommodation etc. which will be occupied by medium and highly sensitive targets and be involved in the long-term uses. The gas detector is used to monitor the methane, carbon dioxide and oxygen gas concentrations and should be calibrated on a regular basis according to the manufacturers' recommendations. The sensors detect methane, carbon dioxide and oxygen gases by the catalytic oxidation or infra-red principles, and pass data back to a control panel by electrical cabling. Appendix 9.6b of the EIA report shows the schematic of automatic gas detection system. In the event of a power failure, the detectors should have an 8-hour battery back-up system, and the procedures should indicate for manual monitoring in the stations in the event of prolonged power failure (of longer than 8 hours).

10.3.2.2 The gas detection system should include an alarm set at the trigger levels as mentioned in **Table 10.2** in order to give warning to the public and evacuate sensitive targets from buildings. The gas detection system will also interlock with the mechanical ventilation system. In case the gas concentrations exceed the trigger levels, mechanical ventilation system will be operated to restore methane, carbon dioxide and oxygen levels to safe concentrations as soon as possible.

Table 10.2 Actions in the event of LFG being detected in the building structure

Parameter	Monitoring Results	Actions
Methane	>10% LEL (i.e. >0.5% v/v)	Inform EPD, Landfill Contractor and the nominated person (e.g. golf course facility manager); Remove all source of ignition from the affected areas of the building; Ventilate the affected area to restore methane to <10% LEL (<0.5% v/v), carbon dioxide to <0.5% v/v and/or oxygen levels to >19% v/v; Seek specialist to review the existing precautionary measures to ensure the continuous safety of the occupants.
Carbon dioxide	>0.5% v/v	
Oxygen	<19% v/v	
Methane	>20% LEL (i.e. >1% v/v)	Inform EPD, Landfill Contractor and the nominated person (e.g. golf course facility manager); Advise and evacuate occupants/prohibit entry to the affected areas of the building; Remove all sources of ignition from the affected areas of the building; Increase ventilation to restore methane to <10% LEL (<0.5% v/v), carbon dioxide to <0.5% v/v and oxygen levels to >19% v/v; Seek specialist to review the existing precautionary measures to ensure the continuous safety of the occupants.
Carbon dioxide	>1.5% v/v	
Oxygen	<18% v/v	

10.3.2.3 Routine monitoring should be carried out in trenches, service pipes, manholes and other subsurface utilities that are not provided with gas detection system. Monitoring should be conducted at least once a month. The levels shall not exceed the following limits:

- Methane: 1% v/v
- Carbon dioxide: 1.5% v/v above natural background

10.3.2.4 In case the above limits are exceeded, EPD and Landfill Contractor should be informed. Specialist should also be sought to review the existing precautionary measures to ensure the continuous safety of the site.

11 Ecology

11.1 Introduction

11.1.1.1 The EIA has evaluated the ecological impacts of the Project and recommended ecological mitigation measures to avoid, minimize and compensate the impact arising from the Project.

11.2 Mitigation Measures

11.2.1.1 The proposed mitigation measures for ecological impacts are summarised in **Appendix 4.1a**.

11.2.2 Avoidance

Avoidance of recognised sites of conservation importance

11.2.2.1 All the recognised sites of conservation importance, including Country Parks, Sites of Special Scientific Interest (SSSIs), Ecologically Important Streams (EISs), and existing / proposed Marine Parks have been avoided and will not be encroached by any developments under the present Project during both construction and operation phases.

Avoidance of marine works during construction

11.2.2.2 There will be no marine works and marine traffic during the construction and operational phases of the Project to avoid potential impact on the marine habitats of conservation importance (e.g. Ting Kok SSSI) and marine ecological resources in the vicinity of the Project. In particular, no modification of existing seawall and no dredging works would be anticipated for the Project.

Avoidance of effluent discharge to Tolo Harbour

11.2.2.3 The ancillary facilities including food and beverage, offices, etc. within the Project would inevitably generate some sewage during their daily operation. Although the number of population and hence quantity of sewage generated is small (i.e. only about 500m^3/day of Average Dry Weather Flow (ADWF)), it still needs to be properly handled in order to avoid any adverse impacts on the neighbouring Tolo Harbour water body. The generated effluent will be conveyed to TPSTW for proper treatment and disposal, hence discharge of effluent would be avoided as far as practicable.

11.2.3 Minimization

11.2.3.1 Several measures will be implemented to minimise potential impacts.

Minimization of impacts due to loss/disturbance of night roosts of Collared Crow and Black Kite

11.2.3.2 The following measures will be implemented to minimise impacts due to loss/disturbance of night roosts of Collared Crow and Black Kite:

- Preservation of some existing tree groups to minimise the loss;
- Erection of fencing without foundation surrounding these tree groups to minimise the construction phase impact;
- Phasing of construction works and works areas to minimise duration of impact; and
- Restriction of construction works hours to minimise the construction phase impact.

11.2.3.3 **Tree Preservation:** Some existing tree groups used by Collared Crow and Black Kite as night roosts will be preserved in order to minimise the potential impact of loss of roosting sites. Reduction of available plantation as roosting sites for Collared Crow and Black Kites during construction phase is inevitable due to site constraints. After taking into account the conservation need, the engineering constraints, and the requirements of a viable golf course design, the total area size of preserved existing tree groups is about 6.1 ha, and the major tree group at the south side as the night roost site is about 1.2 ha. Considering that both species roost in groups on limited number of trees (the roosting individuals of Collared Crow usually roosts only on a few trees, mostly 3-5, trees, and Black Kite individuals as observed also utilized less than 20 number of trees) and the roosting birds do not display strong fidelity to particular spots along the plantation at the waterfront for roosting, the preserved trees are hence of considerable size for serving as roosts and also screening and buffer during both construction and operational phase.

11.2.3.4 Several patches of plantation tree groups along the eastern boundary of the Project Site, which also include trees used by Collared Crow and Black Kite as night roosts, will also be preserved as well. Other major preserved tree groups include plantations along the western boundary of the Project Site will also be preserved as alternative roost sites for Collared Crow and Black Kite and also to provide visual screening from the industrial estate. The heights of these trees are similar to those used by Collared Crow and Black Kite as night roosts, and the tree species used as roosts is also present in these preserved plantations.

11.2.3.5 **Fencing:** Protective fencing without foundation will be erected to protect the preserved tree group from construction disturbance. Upon completion of construction, the area will be fenced off. Additional screening planting would also be proposed in the future detailed planting plans adjacent to the preserved tree group to expand the plantation area size as roosting sites for Collared Crow and Black Kite.

11.2.3.6 **Phasing of Construction Works:** Construction phasing is designed to minimise the duration of possible indirect disturbance to the major preserved tree group as roost sites. Construction activities in the Project Site will be implemented by phases. This will enable existing plantation trees to be lost gradually, and new planting will also be provided gradually during the construction, rather than after all construction is finished as in other projects. Upon completion of site formation at each phase, landscape planting will be implemented immediately before the beginning of next phase such that new tree groups aiming for roosting site provision will be planted before site clearance in the next phase. Extensive new tree planting is proposed under Landscape Impact Assessment of the present EIA and the new tree groups will cover about 10 ha. The new trees will be planted in patches or several rows, to allow the future tree groups suitable for bird roosting. Heavy standard trees (or mature-size trees where possible) will be included in the planting list to facilitate the establishment of new tree groups as early as possible.

11.2.3.7 The construction site will be divided into three areas (i.e. northern, middle and southern in Area 1, 2 and 3 respectively) and the major earth works in each area will be conducted separately in three phases, starting from landward side and without overlapping. Such that the roosting habitats will not all be lost in one time, but by phases. No roost site used by either Collared Crow or Black Kite was recorded in the works area of Area 1 during the surveys, so no impacts to the roosting colonies are anticipated during Area 1 construction, and the roosting habitats in Area 2 and Area 3 will not be impacted in one time, but by phases. Site formation of the area near the major preserved tree group would fall under the last phase (Area 3) of construction.

11.2.3.8 **Restriction of Construction Works Hours:** During construction phase, working hours will be restricted to minimise potential disturbance to utilisation of the preserved plantations by Collared Crow and Black Kite as night roosts. Construction hours will also be restricted to daytime when Collared Crow and Black Kite mainly use areas outside the Project Site. While the normal works hours are 0700-1900 hrs, work hours of powered mechanical equipment for Area 3 of the Construction Programme (i.e. the southern part of the Project Site, near the major preserved tree group), the ancillary facilities (including part of the water storage tanks and traffic along the existing access road), and the eastern part of Area 2 (near other preserved tree groups) will be restricted to at least one hour before sunset, following the proposed restriction hours derived from the earliest sunset time in each month between 2018 and 2020 (source: Hong Kong Observatory) (see **Table 10.9.1** of the present EIA). The proposed restriction of works hours would slightly extend the construction programme as a trade-off, but would provide sufficient time for powered mechanical equipment to halt well before the earliest sunset time when Collared Crow and Black Kite might be in search of a roost site. Therefore, given these multiple protection measures, the potential construction disturbance to the

preserved tree group for Collared Crows and Black Kites would be minimised.

11.2.3.9 **Reduce Impact from Human Activities:** In contrary to typical golf courses which would arrange the golf driving range immediately next to their ancillary facilities, the current layout has opted to locate the golf driving range away from the ancillary facilities by at least 250m in order to preserve the major tree group utilised as night roost sites and allow buffer from human activities. The adjacent golf hole alignments has also been modified, and the size of the proposed driving range has been substantially reduced, from 25,000m^2 to 20,000m^2 to maximise the area size of this major tree group to be preserved. The current layout of has strategically positioned the golf driving range in order to direct the golf shots towards the north, and lighting will also be limited to the driving bay area. This would minimise the potential disturbance on the major preserved tree group, in the cost of compromising the view enjoyed by the users at the golf driving range.

Minimising Impact on Protected Plant Species

11.2.3.10 The two individuals of *Aquilaria sinensis* in conflict with site formation will be preserved in-situ. Should further individuals of Incense Trees be found and having direct conflict with the golf course layout, transplantation will be recommended to minimize the potential impact.

Minimising Impact on Aquatic/Marine Habitats

11.2.3.11 Good site practices as described in Practice Note for Professional Persons on Construction Site Drainage, Environmental Protection Department, 1994 (ProPECC PN 1/94) should be implemented where applicable to avoid potential adverse water quality impacts.

11.2.3.12 A temporary drainage system would be installed around the site perimeter to intercept all construction runoff and divert it to the water storage tanks during the construction phase. Construction site surface runoff collected by the storage tanks will undergo sufficient sedimentation before discharge to Tolo Harbour.

11.2.3.13 Mitigation measures stated in the water quality section, including dikes or embankments for flood protection, silt/sediment traps, oil interceptors, should be implemented wherever appropriate.

11.2.3.14 Construction works should be programmed to minimize surface excavation works during the rainy seasons. All exposed earth areas should be vegetated as soon as possible after earthworks have been completed. If excavation of soil cannot be avoided during the rainy season, or at any time of year when rainstorms are likely, exposed slope surfaces should be covered by tarpaulin or other means.

11.2.3.15 All construction materials at temporary storage areas will be covered with tarpaulins or similar fabric during rainstorms. Measures should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system.

11.2.3.16 A drainage system which can withstand rainstorms of a 50-year return period will be designed for the Project during operational phase. The surface runoff from turfgrass and landscaped areas will be collected by surface channels and diverted to the water storage tanks with a total volume of 30,000 m^3.

11.2.3.17 Mechanical methods (hand weeding) of removing turfgrass weeds will be the primary means of weed control. The amount of herbicides to be applied will be minimised through the implementation of the environmental conscious Turfgrass Management Plan.

11.2.4 Compensation

Compensation for Loss of Plantation

11.2.4.1 There will be extensive plantation areas with higher plant diversity and number of native species in the future golf course. Bird-attracting and butterfly-attracting plant species will be planted to enhance the utilisation of the Project Site by birds and butterflies. The new plantation areas and planting will provide higher ecological functions than the existing plantation which is of low diversity.

Compensation for Loss of Roosting Sites

11.2.4.2 To mitigate the loss of roosting sites for Black Kites and Collared Crow, heavy standard trees (or mature-size where possible) of native species with large growth form including *Hibiscus tiliaceus*, *Liquidambar formosana*, *Schima superba* and *Aquilaria sinensis* will be planted in patches/tree belts along the access road and near the waterfront to quickly provide established tree groups. *Casuarina equisetifolia* is the tree species most used for roosting on site. Besides intentional preservation of some existing *Casuarina equisetifolia* tree individuals, the proposed planting list for the new trees also includes *Casuarina equisetifolia* though it is an exotic species. More potential roosting sites will be available as the landscape tree plantings mature over time.

11.3 Environmental Monitoring and Site Audit Requirements

11.3.1 Monitoring for Utilisation of Roosting Sites during Construction Phase

11.3.1.1 During construction phase, roost surveys should be conducted on the Project Site to monitor utilisation of the preserved and/or the newly planted tree groups by Collared Crow and Black Kite.

11.3.1.2 **Collared Crow Pre-roost/Roost Survey:** Surveys of utilization of the preserved tree groups by Collared Crow will be conducted at least monthly during the Phase 1 and Phase 2 of the construction programme, and at least weekly during the Phase 3 of the construction programme.

Surveys will be carried out at least one hour before sunset (making reference to information from the Hong Kong Observatory), and continued after sunset until the light condition is not sufficient for counting. Observations will be made from vantage points which can cover the preserved and/or the newly planted tree groups within the Project Site. Observations will be made with binoculars and spotting scope, and the number of Collared Crows utilizing the preserved and/or the newly planted tree groups will be counted. Locations of roost(s) will be marked on maps.

11.3.1.3 **Black Kite Pre-Roost/Roost Survey:** Surveys of utilization of the preserved and/or the newly planted tree groups by Black Kite will be conducted at least monthly during the construction phase. Surveys will be carried out at least one hour before sunset (making reference to the information from the Hong Kong Observatory), and continued after sunset until the light condition is not sufficient for counting. Observations will be made from vantage points which can cover the preserved and/or the newly planted tree groups within the Project Site. Observations will be made with binoculars and spotting scope, and the number of Black Kites utilizing the preserved and/or the newly planted tree groups will be counted. Locations of roost(s) will be marked on maps.

11.3.2 Monitoring for Utilisation of roosting Sites during Operational Phase

11.3.2.1 During operational phase, roost surveys should be conducted to monitor the utilisation by Collared Crow and Black Kite of both the preserved and the newly planted tree groups within the Project Site.

11.3.2.2 **Collared Crow Pre-roost/Roost Survey:** Surveys of roost locations of Collared Crow will be conducted at least monthly for a duration of one year during the operational phase. Surveys will be carried out at least one hour before sunset (making reference to the information from the Hong Kong Observatory), and continued after sunset until the light condition is not sufficient for counting. Observations will be made from vantage points which can cover the Project Site. Observations will be made with binoculars and spotting scope, and the number of Collared Crows utilizing the preserved and/or the newly planted tree groups will be counted. Locations of roost(s) will be marked on maps.

11.3.2.3 **Black Kite Pre-roost/Roost Survey:** Surveys of roost locations of Black Kite will be conducted at least monthly for a duration of one year during the operational phase. Surveys will be carried out at least one hour before sunset (making reference to the information from the Hong Kong Observatory), and continued after sunset until the light condition is not sufficient for counting. Observations will be made from vantage points which can cover the Project Site. Observations will be made with binoculars and spotting scope. Number of Black Kites roosting within the Project Site will be recorded. Locations of roost(s) will be marked

on maps.

11.3.3 EM&A for Marine Ecology

11.3.3.1 Site inspections and water quality monitoring during construction phase shall be carried out to monitor any malpractice leading to deterioration of water quality of the surrounding which may in turn affect marine ecology. Water monitoring are also required during operational phase to verify the prediction of no anticipated adverse impact.

12 Fisheries

12.1 Introduction

12.1.1.1 The EIA has evaluated the potential fisheries impact and recommended water quality mitigation measures to avoid and minimise the impact arising from the Project.

12.2 Mitigation Measures

12.2.1.1 No fisheries specific mitigation measures and monitoring would be required and mitigation measures recommended in the water quality impacts will also minimise any adverse impacts on fisheries.

12.2.2 Construction Phase

12.2.2.1 Though fisheries impact is unlikely, precautionary practices to prevent fisheries impacts due to the deterioration of marine water quality should be implemented. Good site practices as listed in the water quality section should be maintained to mitigate the surface runoff generate from the construction works.

12.2.3 Operational Phase

12.2.3.1 During operational phase, the chance of affecting the water quality by the residual agrochemicals and fertilizers in turf area runoff should be minimised by the provision of storage tanks as mentioned in the water quality section.

12.3 Environmental Monitoring and Site Audit Requirements

12.3.1 Construction Phase

12.3.1.1 Site inspections during construction phase shall be carried out to monitor any malpractice leading to deterioration of water quality of the surrounding which may in turn affect the fisheries resources. Site inspection shall be undertaken by the ET at least once per week during the routine environmental audit as detailed in **Section 14**. During construction phase, the proposed water quality monitoring programme stated in Section 6 of the EIA report will include the closest FCZ (i.e. Yim Tin Tsai FCZ).

12.3.2 Operational Phase

12.3.2.1 As there is no anticipated adverse impact during operational phase, monitoring and audit requirements are not required. Nevertheless, water quality monitoring and audit will be conducted during the operational

phase to ensure there will not be any adverse impact on fisheries. The proposed water quality monitoring programme stated in Section 6 of the EIA report will include the closest FCZ (i.e. Yim Tin Tsai FCZ).

13 Landscape and Visual

13.1 Introduction

13.1.1.1 The EIA has 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 checked to ensure that any potential conflicts between the proposed landscape measures and any other works of the Project would be resolved at early as practical without affecting the implementation of the mitigation measures.

13.1.1.2 The proposed mitigation measures of landscape and visual impacts are summarised in **Appendix 4.1a** for both Scenario 1 and Scenario 2 and shown on **Figure 13.1.1** to **Figure 13.27.2**. These measures proposed will be incorporated in the landscape, building and engineering design during detailed design phase. The construction phase mitigation measures will be adopted and audited from the commencement of construction throughout the entire construction period. Mitigation measures for the operational phase will be adopted during the detailed design and be built as part of the construction works so that they are in place on commissioning of the Project..

13.2 Baseline Monitoring

13.2.1.1 Baseline monitoring mainly comprises of checking and updating of any change on preserved trees within the Project Site due to further development and implementation of the Project.

13.2.1.2 The baseline monitoring shall be carried out by the ET and audited by Architect, Engineer, Landscape Architect or a competent person, as a member of the ET. The qualification of proposed auditor shall be submitted to the ER for approval and agreed with the IEC the Landscape Mitigation Measures to be monitored.

13.3 Mitigation Measures

13.3.1.1 The landscape impact mitigation measures to be incorporated in the design, construction and operational phase, and relevant funding/implementation/management and maintenance agencies for the measures are summarized in **Table 13.1a** and **Table 13.2b** and shown on **Figure 13.1.1** to **Figure 13.27.2**. Detailed requirements are also provided below:

Table 13.1a Construction phase landscape mitigation measures (Scenario 1 and Scenario 2)

Mitigation Measure Code	Landscape Mitigation Measure	Funding Agency	Implementation Agency
CP1	*Preservation of Existing Vegetation* - The proposed works shall avoid disturbance to the existing trees and vegetation as far as practicable within the Project Site. The tree preservation proposals shall be coordinated with the layout and design of the engineering and architectural works of the Project. It is recommended that a full tree survey and felling application shall be undertaken and submitted for approval by the relevant government departments in accordance with LAO PN No. 7/2007 and 7/2007A Tree Preservation and Tree Removal Application for Building Development in Private Projects during the detailed design phase of the Project. All preserved trees shall be protected by means of fencing where appropriate to prevent potential damage to tree canopies and root zones from vehicles and storage of materials during construction stage. Specifications for tree protection measures will be formulated at detailed design stage and to be implemented by contractors before site formation/ built structures construction works commence.	Project Proponent	Project Architect/ Landscape Architect/ Contractor
CP2	*Implementation of Mitigation Planting and Planting Species Selection* - Replanting of existing / disturbed vegetation will be undertaken at the earliest possible stage of the construction phase of the Project. Native or locally adopted tree species to enhance the biodiversity of the ex-landfill site shall be predominantly utilised. Mature trees would be planted along the proposed access road. Species will be strategically selected, which will be suitable for golf course and not interfere with golf playing and players' safety. Proposed mitigation planting shall not only be limited to conventional amenity planting, but also consider alternative greening measures such as vertical greening for screening and softening of the built structures such as retaining wall and green roof on built structures for enhancing the visual amenity. Small shrubs, climbing plants, turf and groundcover shall be used in specific locations where technically feasible.	Project Proponent	Project Architect/ Landscape Architect/ Contractor

Mitigation Measure Code	Landscape Mitigation Measure	Funding Agency	Implementation Agency
CP3	*Transplantation of Existing Trees* – Some specimens which have relatively higher amenity value and technically suitable will be considered for transplanting. The final recipient site will be in planting areas within the Project Site and integrated with preserved trees. These trees continue their contribution to the local landscape context as well as the future recreational landscape. The transplanting proposal is subject to review at detailed design stage and seeks for the approval from the relevant government departments in accordance with LAO PN No. 7/2007 and 7/2007A Tree Preservation and Tree Removal Application for Building Development in Private Projects. The implementation programme for the proposed works will reserve enough time for the advanced tree transplanting preparation works to enhance the survival of the transplanted trees.	Project Proponent	Project Architect/ Landscape Architect/ Contractor
CP4	*Minimisation of Topographical Changes* – change of grading of the Project Site will be minimised as far as possible through import of soil mix for necessary site levelling of golf playing area and association of planting works and to minimise adding extensive loading and affect the protective layer of landfill underneath.	Project Proponent	Project Architect/ Landscape Architect/ Contractor
CP5	*Protection of Coastline* – The existing coastline will be maintained without any alternation. Responsive access road alignment of using the existing maintenance track to minimise disturbance of vegetation and the coastline.	Project Proponent	Project Architect/ Landscape Architect/ Contractor

Table 13.1b Operational phase landscape mitigation measures (Scenario 1 and Scenario 2)

Mitigation Measure Code	Landscape Mitigation Measure	Funding Agency	Implementation Agency	Management Agency	Maintenance Agency
OP1	*Roadside and Amenity Planting* –The planting proposals will predominantly utilise native or locally adopted tree species, supplement with ornamental species and broadleaf trees in combination of wind and salinity tolerant plant species along access road. A terraced planter with trees / shrubs / trailing plants will be adopted all along the seashore of the eastern boundary to create landscape buffer to soften the development edge. It will form a continuous landscape buffer at the periphery of the Project Site in combination with tree preservation proposal. Enough soil depth of 1200mm will be reserved for tree planting area to ensure healthy planting establishment. High canopy clearance tree planting will be utilised alongside of access road and not to interfere the EVA requirement and vehicular traffic. Larger size of tree stock will be planted at strategic location to create instant greening effect and landscape vista. The implementation of new planting shall be undertaken as soon as technically feasible after completion of road and building works upon works completion in phase and planting area are ready to ensure the effectiveness of this mitigation during operational phase.	Project Proponent	Project Landscape Architect/ Contractor	Project Proponent/ Operation Management Agent	Project Proponent/ Operation Management Agent
OP2	*Compensatory Planting Proposals* – As the works are largely located within the Project and along excess road, the planting proposals have sought to utilise all of the available and suitable space for new trees, whips and shrub planting to create a comprehensive landscape framework which is connected to areas of retained and preserved vegetation and designed to integrate the proposals within their future recreational landscape setting. The new planting will be maintained in accordance with good horticultural practice in order to realise the objectives of the mitigation measures. This includes the replacement of defective and invasive plant species in the new	Project Proponent	Project Landscape Architect/ Contractor	Project Proponent/ Operation Management Agent	Project Proponent/ Operation Management Agent

Mitigation Measure Code	Landscape Mitigation Measure	Funding Agency	Implementation Agency	Management Agency	Maintenance Agency
	planting areas to enhance the aesthetic, landscape and ecological quality of the context. The compensatory planting proposal will be developed at detailed design stage in accordance with the requirements listed in the LAO PN No. 7/2007 and 7/2007A 'Tree Preservation and Tree Removal Application for Building Development in Private Project'. New tree planting will utilise heavy standard size trees at selected area as accent, standard to light standard size trees in general landscape and roadside planting areas. Smaller planting stock will be used on slope and landscape buffer. **Figure 13.1** to **Figure 13.6** shows the indicative tree planting locations that will create an instant greening and screening effect to the Project. Based on a preliminary estimation, the planting proposal would achieve replanting ratio of approximately 1:1 (Total number of tree loss: Total number of compensatory trees and whips) in terms of quantity upon the completion of replanting works. Proposed compensatory planting consists of 4,180 trees and 4,818 whips. This replanting ratio has been maximised in balance with the planting and safety requirement for golf course. The development has sought to preserve approximately 2,200 existing trees (19.6%) through retention in their current locations or tree transplanting and plant 4,180 compensatory trees and 4,818whips. Upon the completion of the tree preservation and planting proposal, the Project could accommodate approximately 11,198 trees (including 4,818 whips on slope) in combination of tree preservation and new tree planting, which will formulate a landscape context with good quality. The tree preservation and planting proposal within this green recreation facility will cover the loss of re-instated vegetation on land fill site. The above recommendations are subject to change at detailed design stage. The findings and recommendations on existing trees are subject to review at detailed design stage and a tree felling and transplanting application will				

Mitigation Measure Code	Landscape Mitigation Measure	Funding Agency	Implementation Agency	Management Agency	Maintenance Agency
	be prepared in accordance with LAO PN 7/2007 and 7/2007A Tree Preservation and Tree Removal Application for Building Development in Private Projects and submitted to DLO for approval.				
OP3	*Design of Engineering Structure* – Alternative greening measures including greening on the roof and/or vertical greening on the structures and retaining wall will be used wherever possible to disguise their function appearance in both medium and long distance views and maximise the greening opportunities. Tree preservation, new tree planting and alternative greening measures on and adjacent to the engineering structures will create an instant greening effect soften the visual mass.	Project Proponent	Project Landscape Architects/ Contractor	Project Proponent/ Operation Management Agent	Project Proponent/ Operation Management Agent
OP4	*Creation of Landscape Buffer* – Predominantly planting native or locally adopted tree species and shrub planting creating landscape buffer along Ting Kok Road and the periphery of the Project Site to enhance the aesthetic and landscape biodiversity of the local context. Appropriate height and form of the landscape buffer to create a naturalistic amenity. Treatment of retaining walls should be aesthetically enhanced through the use of soft landscape works including tree and shrub planting to create a more natural appearance blending into the local rural landscape.	Project Proponent	Project Landscape Architect/ Architect/ Contractor	Project Proponent/ Operation Management Agent	Project Proponent/ Operation Management Agent
OP5	*Creation of Landscape Ponds / Lakes / Water Features* – Introduction of ponds/lakes will create watered habitat and plantation to enhance landscape amenity and biodiversity of the context.	Project Proponent	Project Landscape Architects/ Contractor	Project Proponent/ Operation Management Agent	Project Proponent/ Operation Management Agent

13.4 Visual Mitigation Measures

13.4.1.1 The visual impact mitigation measures in the design, construction and operational phase, and relevant funding/implementation/management and maintenance agencies for the measures for both Scenario 1 and Scenario 2 are summarised in **Table 13.2a** to **Table 13.2b** and shown on **Figure 13.1.1** to **Figure 13.27.2**. Detailed requirements are also provided below.

Table 13.2a Construction phase visual mitigation measures (Scenario 1 and Scenario 2)

Mitigation Measure Code	Visual Mitigation Measure	Funding Agency	Implementation Agency
CPV1	*Preservation of Existing Vegetation* – The tree preservation proposals will coordinate with the layout and design of the engineering and architectural layout at detailed design stage. The preservation of existing trees will provide instant greening and screening effect for the Project.	Project Proponent	Project Engineers/ Architects/ Landscape Architects/ Contractor
CPV2	*Works Area and Temporary Works Areas* – The landscape of the works areas will be restored to their original condition or enhanced through the introduction of new amenity planting areas following the completion of the construction phase. The construction sequence and construction programme will be optimised in order to minimise the duration of impact. Construction site controls will be enforced including the storage of materials, the location and appearance of site accommodation and site storage; and the careful design of site lighting to prevent light spillage. Hoarding designed with recessive colour will be set up around the construction site providing screening effect for the construction works. The site office or temporary above-ground structures will be sited at less visual prominent locations.	Project Proponent	Project Architect/ Contractor
CPV3	*Coordination with Concurrent Projects* – Coordinated implementation programme with concurrent projects to minimise potential cumulative impacts and where possible reduce the period of disturbance to visual context.	Project Proponent	Project Engineers/ Architects/ Landscape Architects/ Contractor

Table 13.2b Operational phase visual mitigation measures (Scenario 1 and Scenario 2)

Mitigation Measure Code	Visual Mitigation Measure	Funding Agency	Implementation Agency	Management Agency	Maintenance Agency
OPV1	*Responsive Design of Buildings* – The design of the proposed building structures, access road and utility facilities will incorporate features as part of visual mitigation measures including: *Integrated design approach* Responsive design of built structures considered the location of ancillary facilities and utilities. The disposition and height profile of the buildings and above ground utilities structures at less visually prominent location respond to the seashore context. Design measures include the low profile and small building mass to reduce the apparent visual mass and to enhance the sense of visual integration with the existing low profile context. *Building Treatment* The architectural design seeks to reduce the apparent visual mass of the structures further through the use of recessive colour palette. Incorporation of alternative greening measures such as green roof /vertical greening on built structures where condition allows and particularly at where fronting to the public realm and waterfront. Non-reflective finishes also recommended to reduce the potential glare effect.	Project Proponent	Project Architect	Project Proponent/ Operation Management Agent	Project Proponent/ Operation Management Agent
OPV2	*Design of Engineering Structure* – Particularly attention on the design, the appearance and construction methods of the structures of proposed engineering structures such as fence wall, retaining walls, slope regarding and utilities installation. The architect and landscape consultants shall work in liaison with the engineers on the aesthetic aspects of the structures and their relationship with the landscape and built structures.	Project Proponent	Project Engineer/ Architect/ Landscape Architect	Project Proponent/ Operation Management Agent	Project Proponent/ Operation Management Agent

Mitigation Measure Code	Visual Mitigation Measure	Funding Agency	Implementation Agency	Management Agency	Maintenance Agency
	Alternative greening measures including greening on the roof and/or vertical greening on the structures and on regarded sloping areas will be used wherever possible to disguise their function appearance in both medium and long distance views and maximise the greening opportunities. Tree preservation, new tree planting and alternative greening measures on and adjacent to the engineering structures will create an instant greening effect soften the visual mass.				
OPV3	*Creation of Landscape Buffer* - Native and ornamental tree and shrub planting and climbing plants will be utilised for the creation of landscape buffer along the periphery of the Project Site. Appropriate height and form of the landscape buffer to create naturalistic amenity. Treatment of slopes should be aesthetically enhanced through the use of soft landscape works including tree and shrub planting to create a more natural appearance blending into the recreational landscape. The creation of landscape buffer at the periphery of the Project Site, the height and form of the planting proposals have key role in screening as well as to enhance visual amenity.	Project Proponent	Project Engineer/ Architect	Project Proponent/ Operation Management Agent	Project Proponent/ Operation Management Agent
OPV4	*Control of Operation Lights* – Through management of operation of the Project at night time, use of direction lights and limited lux level to meet safety standard. Reference has been made to "Charter on External Lighting" and "Guidelines on Industry Best Practices for External Lighting Installations" promulgated by the Environment Bureau, including the operating hours of lighting and light nuisance control measures, etc.	Project Proponent	Project Engineer/ Architect/ Landscape Architect	Project Proponent/ Operation Management Agent	Project Proponent/ Operation Management Agent

Mitigation Measure Code	Visual Mitigation Measure	Funding Agency	Implementation Agency	Management Agency	Maintenance Agency
OPV5	*Creation of Landscape Ponds / Lakes / Water Features* – Created variety of visual elements and landscape vistas to enhance the visual amenity and context.	Project Proponent	Project Architect	Project Proponent/ Operation Management Agent	Project Proponent/ Operation Management Agent

13.5 Environmental Monitoring and Site Audit Requirements

13.5.1.1 Audits will be carried out during construction phase to ensure all the recommended landscape and visual mitigation measures in the EIA are properly and effectively implemented and to ensure compliance with the intended aims of the measures. The EM&A comprises of monitoring and auditing of proper site management to reduce visual nuisance, the protection of preserved and transplanted trees, advance tree transplanting and mitigation planting works, the implementation and establishment of compensatory planting through site audit programme. Site inspections should be undertaken by the ET at least twice a month during the construction period. The audit will be undertaken by a member of the ET who is a certified arborist or who has tree survey relevant experiences not less than 1 year for monitoring and auditing the landscape works, monthly during the construction period (construction phase) and quarterly during the planting establishment period (operational phase).

13.5.1.2 A qualified softworks contractor will be employed for the implementation of tree protection and transplanting works, landscape works and the subsequent planting establishment works. The planting works will be conducted as soon as technically feasible upon the completion of construction in phases and when the planting areas are ready for receiving plants. At least 12 months establishment period should be provided for all planting works.

13.5.1.3 The landscape and visual baseline will be determined with reference to any tree survey report and the landscape and visual impact assessments included in the EIA and subsequent Government approval of tree treatment and landscape works.

13.5.1.4 The extent of works of the Project should be regularly checked. Any trespass by the Contractor outside the limit of the works, including any vandalism/damage by inclement weather to preserved and transplanted trees shall be recorded.

13.6 Event and Action Plan

13.6.1.1 In the event of non-compliance, the responsibilities of the relevant parties are detailed in the Event/Action plan provided in **Table 13.5**.

Table 13.5 Event/Action Plan for Landscape and Visual

Event	Action			
	ET	**IEC**	**ER**	**Contractor**
Design Check	1. Check final design conforms to the requirements of EP and prepare report.	1. Check report. 2. Recommend remedial design if necessary.	1. Undertake remedial design if necessary.	N/A
Non-conformity on one occasion	1. Inform the IEC, ER and the Contractor 2. Discuss remedial actions with IEC, ER and Contractor 3. Monitor remedial actions until rectification has been completed	1. Check report. 2. Check Contractor's working method 3. Discuss with ET, ER and Contractor on possible remedial measures. 4. Advise ER on effective of proposed remedial measures. 5. Check implementation of remedial measures	1. Confirm receipt of notification of non-conformity in writing 2. Review and agree on the remedial measures proposed by the Contractor 3. Ensure remedial measures are properly implemented	1. Identify source and investigate the non-conformity 2. Amend working methods agreed with ER as appropriate 3. Rectify damage and undertake any necessary replacement

Event	Action			
	ET	**IEC**	**ER**	**Contractor**
Repeated Non-conformity	1. Identify sources 2. Inform the Contractor, IEC and ER 3. Discuss inspection frequency 4. Discuss remedial actions with IEC, ER and Contractor 5. Monitor remedial actions until rectification has been completed 6. If non-conformity stops, cease additional monitoring	1. Check inspection report 2. Check Contractor's working method 3. Discuss with ET,ER and Contractor on possible remedial measures 4. Advise ER on effectiveness of proposed remedial measures	1. Notify the Contractor 2. In consultation with the ET and IEC, agree with the Contractor on the remedial measures to be implemented 3. Supervise implementation of remedial measures	1. Identify source and investigate the non-conformity 2. Amend working methods agreed with ER as appropriate 3. Rectify damage and undertake any necessary replacement. Stop relevant portion of works as determined by ER until the non-conformity is abated.

Note:
ET – Environmental Team
IEC – Independent Environmental Checker
ER – Engineer's Representative

14 Site Environmental Audit

14.1 Site Inspection

14.1.1.1 Site inspection provides a direct means to initiate and enforce specified environmental protection and pollution control measures. These shall be undertaken routinely to inspect construction activities in order to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented. Site inspection is one of the most effective tools to enforce the environmental protection requirements at the works area.

14.1.1.2 The ET shall be responsible for formulating the environmental site inspection programme as well as the deficiency and action reporting system, and for carrying out the site inspections. The proposal for rectification, if any, should be prepared and submitted to the ET Leader and IEC by the Contractor.

14.1.1.3 Regular site inspections shall be carried out and led by the ER and attended by the Contractor and ET at least once per week during the construction phase. The areas of inspection shall not be limited to the environmental situation, pollution control and mitigation measures within the site. It should also review the environmental conditions of locations outside the works area which is likely to be affected, directly or indirectly, by the construction site activities of the Project. The ET shall make reference to the following information in conducting the inspection. During the inspection, the following information should be referred to:

(i) EIA Report and EM&A Manual recommendations on environmental protection and pollution control mitigation measures;

(ii) ongoing results of the EM&A programme;

(iii) works progress and programme;

(iv) individual works methodology proposals (which shall include the proposal on associated pollution control measures);

(v) contract specifications on environmental protection;

(vi) relevant environmental protection and pollution control legislations; and

(vii) previous site inspection results undertaken by the ET and others.

14.1.1.4 The Contractor shall keep the ER and ET Leader updated with all the relevant environmental related information on the construction contract necessary for him to carry out the site inspections. Site inspection results and associated recommendations for improvements to the environmental protection and pollution control efforts should be recorded and followed up by the Contractor in an agreed time-frame.

The Contractor shall follow the procedures and time-frame as stipulated in the environmental site inspection, and the deficiency and action reporting system formulated by the ET, to report on any remedial measures subsequent to the site inspections.

14.1.1.5 The ER, ET and the Contractor should also carry out ad-hoc site inspections if significant environmental problems are identified. Inspections may also be required subsequent to receipt of a valid environmental complaint, or as part of the investigation work, as specified in the Event and Action Plans for the EM&A programme.

14.2 Environmental Compliance

14.2.1.1 There are statutory requirements on environmental protection and pollution control requirements with which construction activities must comply.

14.2.1.2 In order to ensure the works comply with statutory requirements, all method statements of works should be submitted by the Contractor to the ER for approval and to the ET Leader for vetting to ensure sufficient environmental protection and pollution control measures have been included. EMIS is summarised in **Appendix 4.1a**. Any proposed changes to the mitigation measures shall be certified by the ET Leader and verified by the IEC as conforming to the relevant information and recommendations contained in the EIA Report.

14.2.1.3 The ER and ET shall also review the progress and programme of the works to check that relevant environmental legislation has not been violated, and that any foreseeable potential for violating laws can be prevented.

14.2.1.4 The Contractor should provide the update of the relevant documents to the ET Leader so that checking can be carried out. The document shall at least include the updated Works Progress Reports, updated Works Programme, method statements, any application letters for different licenses / permits under the environmental protection laws, and copies of all valid licenses / permits. The site diary and environmental records shall also be available for inspection by the relevant parties.

14.2.1.5 After reviewing the document, the ET shall advise the IEC and the Contractor of any non-compliance with legislative requirements on environmental protection and pollution control so that they can timely take follow-up actions as appropriate. If the follow-up actions still result in potential violation of environmental protection and pollution control requirements, the ER and ET should provide further advice to the Contractor to take remedial action to resolve the problem.

14.2.1.6 Upon receipt of the advice, the Contractor shall undertake immediate actions to correct the situation. The ER and ET shall follow up to ensure that appropriate action has been taken in order to satisfy legal requirements.

14.3 Choice of Construction Method

14.3.1.1 At times during the construction phase, the Contractor may submit method statements for various aspects of construction. This state of affairs would only apply to those construction methods that the EIA has not imposed conditions while for construction methods that have been assessed in the EIA, the Contractor is bound to follow the requirements and recommendations in the EIA study. The Contractor's options for alternative construction methods may introduce adverse environmental impacts into the Project. It is the responsibility of the Contractor and ET, in accordance with established standards, guidelines and EIA study recommendations and requirements, to review and determine the adequacy of the environmental protection and pollution control measures in the Contractor's proposal in order to ensure no unacceptable impacts would result. To achieve this end, the ET shall provide a copy of the Proactive Environmental Protection Proforma as shown in **Appendix 14.1** to the IEC for approval before commencement of work. The IEC should audit the review of the construction method and endorse the proposal on the basis of no adverse environmental impacts.

14.4 Environment Complaints

14.4.1.1 The following procedures should be undertaken upon receipt of any environmental complaint:

- The Contractor to log complaint and date of receipt onto the complaint database and inform the ER, ET and IEC immediately;
- The Contractor to investigate, with the ER and ET, the complaint to determine its validity, and assess whether the source of the problem is due to construction works of the Project with the support of additional monitoring frequency and stations, if necessary;
- The Contractor to identify remedial measures in consultation with the IEC, ET and ER if a complaint is valid and due to the construction works of the Project;
- The Contractor to implement the remedial measures as required by the ER and to agree with the ET and IEC any additional monitoring frequency and stations, where necessary, for checking the effectiveness of the remedial measures;
- The ER, ET and IEC to review the effectiveness of the Contractor's remedial measures and the updated situation;

- The ET/Contractor to undertake monitoring and audit to verify the situation if necessary, and oversee that circumstances leading to the complaint do not recur;

- If the complaint is referred by the EPD, the Contractor to prepare interim report on the status of the complaint investigation and follow-up actions stipulated above, including the details of the remedial measures and monitoring identified or already taken, for submission to EPD within the time frame assigned by the EPD; and

- The ET to record the details of the complaint, results of the investigation, subsequent actions taken to address the complaint and updated situation including the effectiveness of the remedial measures, supported by regular and monitoring results in the monthly EM&A reports.

15 Reporting

15.1 General

15.1.1.1 Reports can be provided in an electronic medium upon agreeing the format with the ER and EPD. This would enable a transition from a paper / historic and reactive approach to an electronic / real time proactive approach. All the monitoring data shall also be submitted on diskettes or other approved medium. The formats for monitoring data to be submitted shall be separately agreed.

15.1.1.2 Types of reports that the ET shall prepare and submit include monthly EM&A report and final EM&A report. In accordance with Annex 21 of the TM-EIAO, a copy of the monthly and final EM&A reports shall be made available to the Director of Environmental Protection.

15.2 Baseline Monitoring Report

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

(i) up to half a page executive summary;

(ii) brief project background information;

(iii) drawings showing locations of the baseline monitoring stations;

(iv) 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;
- monitoring date, time, frequency and duration; and
- quality assurance (QA) / quality control (QC) results and detection limits;

(v) details of influencing factors, including:

- major activities, if any, being carried out on the site during the period;
- weather conditions during the period; and
- other factors which might affect monitoring results;

(vi) determination of the Action and Limit levels for each monitoring parameter and statistical analysis of the baseline data;

(vii) revisions for inclusion in the EM&A Manual; and

(viii) comments, recommendations and conclusions.

15.3 Monthly Monitoring Reports

15.3.1.1 The results and findings of all EM&A work required in the Manual shall be recorded in the monthly EM&A reports prepared by the ET and endorsed by the IEC. The EM&A report shall be prepared and submitted to EPD within 10 working days of the end of each reporting month, with the first report within the month after major construction works commences. Copies of each monthly EM&A report shall be submitted to the following parties: the IEC, the ER and EPD. Before submission of the first EM&A report, the ET shall liaise with the parties on the required number of copies and format of the monthly reports in both hard copy and electronic medium.

15.3.1.2 The ET should prepare and submit a Baseline Environmental Monitoring Report at least one month before commencement of construction of the Project. Copies of the Baseline Environmental Monitoring Report should be submitted to the IEC, the ER and EPD. The ET should liaise with the relevant parties on the exact number of copies required.

15.3.1.3 The ET shall review the number and location of monitoring stations and parameters every six months, or on as needed basis, in order to cater for any changes in the surrounding environment and the nature of works in progress.

First Monthly EM&A Report

15.3.1.4 The first monthly EM&A report shall include at least the following:

(i) Executive summary (1-2 pages):

- breaches of Action and Limit levels;
- compliant log;
- notifications of any summons and successful prosecutions;
- reporting changes; and
- future key issues.

(ii) Basic project information:

- project organisation including key personnel contact names and telephone numbers;
- programme;
- management structure; and
- the work undertaken during the month.

(iii) Environmental status:

- advice on the status of statutory environmental compliance such as the status of compliance with the environmental permit (EP) conditions under the EIAO, submission status under the EP and implementation status of mitigation measures;
- works undertaken during the month with illustrations (such as location of works, daily excavation rate, etc.); and
- drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring stations (with co-ordinates of the monitoring locations).

(iv) A brief summary of EM&A requirements including:

- all monitoring parameters;
- environmental quality performance limits (Action and Limit levels);
- Event and Action Plans;
- environmental mitigation measures, as recommended in the EIA Report; and
- environmental requirements in contract documents.

(v) Implementation status

- advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the EIA Report.

(vi) 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;
- monitoring parameters;
- monitoring locations;
- monitoring date, time, frequency, and duration;
- weather conditions during the period;
- any other factors which might affect the monitoring results; and
- QA/QC results and detection limits.

(vii) Report on non-compliance, complaints, and 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 notification of summons and successful prosecutions for breaches of current environmental protection / pollution control legislation, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary;
- review of the reasons for and the implications of non-compliances, 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.

(viii) Others

- an account of the future key issues as reviewed from the works programme and work method statements;
- advice on the solid and liquid waste management status;
- record of any project changes from the originally proposed as described in the EIA Report (e.g. construction methods, mitigation proposals, design changes, etc.); and
- comments (for example, effectiveness and efficiency of the mitigation measures), recommendations (for example, any improvement in the EM&A programme) and conclusions.

Subsequent Monthly EM&A Reports

15.3.1.5 Subsequent monthly EM&A reports shall include at least the following:

(i) Executive summary (1-2 pages):

- breaches of Action and Limit levels;
- compliant log;
- notifications of any summons and successful prosecutions;
- reporting changes; and
- future key issues.

(ii) Basic project information:

- project organisation including key personnel contact names and telephone numbers;

- programme;
- management structure; and
- the work undertaken during the month; and
- any updates as needed to the scope of works and construction methodologies.

(iii) Environmental status:

- advice on the status of statutory environmental compliance such as the status of compliance with the environmental permit (EP) conditions under the EIAO, submission status under the EP and implementation status of mitigation measures;
- works undertaken during the month with illustrations (such as location of works, daily excavation rate, etc.); and
- drawings showing the Project area, any environmental sensitive receivers and the locations of the monitoring stations (with co-ordinates of the monitoring locations).

(iv) Implementation status

- advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the EIA Report.

(ix) 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;
- monitoring parameters;
- monitoring locations;
- monitoring date, time, frequency, and duration;
- weather conditions during the period;
- any other factors which might affect the monitoring results; and
- QA/QC results and detection limits.

(v) Report on non-compliance, complaints, and 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 notification of summons and successful prosecutions for breaches of current environmental protection / pollution control legislation, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary;
- review of the reasons for and the implications of non-compliances, 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.

(vi) Others

- an account of the future key issues as reviewed from the works programme and work method statements;
- advice on the solid and liquid waste management status;
- record of any project changes from the originally proposed as described in the EIA (e.g. construction methods, mitigation proposals, design changes, etc.); and
- comments (for example, effectiveness and efficiency of the mitigation measures), recommendations (for example, any improvement in the EM&A programme) and conclusions.

(vii) Appendices

- Action and Limit levels;
- graphical plots of trends of the monitoring parameters at key stations over the past four reporting periods for representative monitoring stations annotated against the following:
  a) major activities being carried out on site during the period;
  b) weather conditions during the period; and
  c) any other factors that might affect the monitoring results.
- monitoring schedule for the present and next reporting period;
- cumulative statistics on complaints, notifications of summons and successful prosecutions; and
- outstanding issues and deficiencies.

15.3.1.6 Upon completion of the Project, Contractor should conduct the fixed

noise commissioning test and ET should incorporate the results of the test into the subsequent monthly EM&A report.

15.4 Final EM&A Review Report for Construction and Operational Phases

15.4.1.1 The construction phase final report shall be submitted within 1 month after completion of the Project. Meanwhile the operational phase final report shall be submitted within 1 month after the termination of post-Project EM&A.

15.4.1.2 Prior to the proposed termination, it may be advisable to consult relevant local communities. The proposed termination should only be implemented after the proposal has been endorsed by the IEC, the ER and the Project Proponent followed by approval from the Director of Environmental Protection.

15.4.1.3 The final EM&A report should contain at least the following information:

(i) Executive summary (1-2 pages):

(ii) Drawings showing the Project area, any environmental sensitive receivers and locations of monitoring stations and commissioning test;

(iii) Basic project information including a synopsis of the project organisation, contacts of key management, and a synopsis of work undertaken during the course of the Project or past twelve months;

(iv) A brief summary of EM&A requirements including:

- environmental mitigation measure, as recommended in the EIA Report;
- environmental impact hypotheses tested;
- environmental quality performance limits (Action and Limit levels);
- all monitoring parameters; and
- Event and Action Plans.

(v) A summary of the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the project EIA Report, and summarised in the updated implementation schedule;

(vi) Graphical plots and the statistical analysis of the trends of monitoring parameters over the course of the Project, including:

- the major activities being carried out on site during the period;

- weather conditions during the period; and
- any other factors which might affect the monitoring results;

(vii) A summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);

(viii) A review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures as appropriate;

(ix) A description of the actions taken in the event of non-compliance;

(x) A summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up actions taken and results;

(xi) A review of the validity of EIA predictions and identification of shortcomings in EIA recommendations;

(xii) Comments (for example, a review of the effectiveness and efficiency of the mitigation measures and of the performance of the environmental management system, that is, of the overall EM&A programme); and

(xiii) Recommendations and conclusions (for example, a review of success of the overall EM&A programme to cost-effectively identify deterioration and to initiate prompt effective mitigatory action when necessary).

15.5 Data Keeping

15.5.1.1 No site-based documents (such as monitoring field records, laboratory analysis records, site inspection forms, etc.) are required to be included in the monthly EM&A reports. However, any such 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. Monitoring data shall also be recorded on diskettes or other approved media, and the software copy must be available upon request. Data format shall be agreed with EPD. All documents and data shall be kept for at least one year following completion of the construction phase monitoring and one year following completion of the operational phase monitoring for construction phase EM&A and operational phase EM&A respectively.

15.6 Interim Notifications of Environmental Quality Limit Exceedances

15.6.1.1 With reference to the Event and Action Plans, when the environmental quality performance limits are exceeded and if they are proven to be valid, the ET should immediately notify the IEC and EPD, as

appropriate. The notification should be followed up with advice to the IEC and EPD on the results of the investigation, proposed actions and success of the actions taken, with any necessary follow-up proposals. A sample template for the interim notification is presented in **Appendix 15.1**.