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1 INTRODUCTION

1.1 Background

1.1.1 West Kowloon Cultural District (WKCD) is an arts and cultural facilities (ACF) building programme which aims to deliver new performance and visual arts venues, museums, open spaces, education resources, commercial and retail opportunities for the residents of Hong Kong and visitors from overseas. The works include a 2-lane flyover (including approaching roads) across the toll plaza of Western Harbour Tunnel (Austin Road Flyover).

1.1.2 As raised by Members of District Council in the Yau Tsim Mong District Council Meeting in November 2014, traffic leaving WKCD to Austin Road West Roundabout and Nga Cheung Road Flyover would add significant burden on the capacity of these road networks, which are already congested with traffic at the moment. As such, the Revised Austin Road Flyover from WKCD should be proposed to allow access to the section of Lin Cheung Road running in parallel to the West Kowloon Highway (Route 3) aiming to divert traffic from Nga Cheung Road Flyover and Austin Road West Roundabout. The location plan of the Revised Austin Road Flyover is shown in **Figure 1.1**.

1.1.3 The Revised Austin Road Flyover integrates the proposed exit road with the proposed Flyover. The proposed exit road would connect the service road of West Kowloon Highway (Route 3 – Western Harbour Crossing Tunnel Area). Other than providing connection from WKCD to adjacent local roads, the Revised Flyover provides an additional single road way to alleviate the traffic from the WKCD to the West Kowloon Highway.

1.2 Project Scope and Location

1.2.1 The Project site is situated within part of the WKCD area and across the toll plaza of the Western Harbour Crossing (WHC). The western boundaries of the study area are at the side of the WKCD Waterfront Promenade to the west of the WHC toll plaza, while the eastern boundaries of the study area are at the side of the Austin Road West / Nga Cheung Road roundabout.

1.2.2 The scope of the Revised Austin Road Flyover is to construct and operate a single 2-lane flyover of about 400m connecting the western end of the elevated Austin Road West with the WKCD at the western side of the WHC toll plaza area and mainly comprises:

- (i) Construction of a single 2-lane flyover of about 400m long across WHC toll plaza area;
- (ii) Construction of a single 2-lane ramp of about 250m long from the western end of the Revised Austin Road Flyover to the WKCD;
- (iii) Construction of a single-lane ramp of about 300m long from the western end of the Revised Austin Road Flyover towards the northbound service road of WHC; and
- (iv) Modification of at-grade roads within the interface of WKCD road network to connect with the ramp stated in (ii).

1.3 Construction Programme

1.3.1 The Project construction works will be divided into 2 Phases as described below and tentatively commence in 2022 with completion in 2025. The phasing of construction works is illustrated in **Figure 1.2**, while the tentative construction programme is presented in **Appendix A**.

- Phase 1: Construction of NER (within WKCD Area)

- Phase 2: Construction of NER (within WHC Area) and Construction of WHC Flyover (within WHC Area)

1.3.2 The major construction activities for the above 2 Phases will be site clearance / set-up / plant mobilization and underground utilities (UU) protection and diversion works, which are to be followed by construction works including piling works, pile cap and pier / abutment construction, falsework and deck construction, drainage and pavement construction and other miscellaneous works. The tentative construction phase for Phase 1 and Phase 2 will be from March 2022 to December 2024 and from February 2023 to September 2025 respectively.

1.3.3 The Project will be in operation after all construction works are completed, i.e. after September 2025, and no phased operation is planned.

1.4 Purpose of this Manual

1.4.1 The purpose of this Environmental Monitoring and Audit (EM&A) Manual is to guide the setups of an EM&A programme to ensure compliance with the EIA study recommendations, to assess the effectiveness of the recommended mitigation measures and to identify any further need for additional mitigation measures or remedial action. This Manual outlines the monitoring and audit programme for the construction and operational phases of the Project. It aims to provide systematic procedures for monitoring, auditing and minimizing environmental impacts associated with construction works and operational activities.

1.4.2 Hong Kong environmental regulations have served as environmental standards and guidelines in the preparation of this Manual. In addition, the EM&A Manual has been prepared in accordance with the requirements stipulated in Annex 21 of the EIAO-TM.

1.4.3 This Manual contains the following information:

- Responsibilities of the Contractor, the Engineer or Engineer's Representative (ER), Environmental Team (ET) and Independent Environment Checker (IEC) with respect to the environmental monitoring and audit requirements during the course of the Project;
- 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 field 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;
- Definition 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; and

- Requirements for reviewing the EIA predictions and the effectiveness of the mitigation measures / environmental management systems and the EM&A programme.

1.4.4 For the purpose of this Manual, 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 EM&A requirements.

1.5 Project Organization

1.5.1 Involvement of relevant parties in a collaborative and interactive manner is essential for the implementation of the recommended EM&A programme. The following sections outline the primary responsibilities and duties of the key EM&A programme participants. The proposed project organization and lines of communication with respect to EM&A works are shown in **Appendix B**.

The Contractor

1.5.2 The Contractor shall report to the ER. The duties and responsibilities of the Contractor comprise the following:

- Work within the scope of the contract and other tender conditions with respect to environmental requirements;
- Operate and strictly adhere to the guidelines and requirements in this EM&A programme and contract specifications;
- Provide assistance to ET in carrying out monitoring and auditing;
- Participate in the site inspections undertaken by ET as required, and undertake correction actions;
- Provide information / advice to ET regarding works activities which may contribute, or be continuing to the generation of adverse environmental conditions;
- Submit proposals on mitigation measures in case of exceedance of Action and Limit levels in accordance with the Event / Action Plans;
- Implement measures to reduce impact where Action and Limit levels are exceeded; and
- Adhere to the procedures for carrying out complaint investigation.

Environmental Team (ET)

1.5.3 The ET Leader and the ET shall be employed by project proponent to conduct the EM&A programme and to ensure the Contractor's compliance with the Project's environmental performance requirements. The ET Leader shall be an independent party from the Contractor and have relevant professional qualifications, or have sufficient relevant EM&A experience subject to the approval of the ER and the Environmental Protection Department (EPD). The ET shall be led and managed by the ET leader. The ET leader shall possess at least 7 years of experience in EM&A and/or environmental management.

1.5.4 The duties and responsibilities of the ET are:

- Monitor various environmental parameters as required in this EM&A Manual;
- Analyse the environmental monitoring and audit data and review the success of EM&A programme to cost-effectively confirm the adequacy of mitigation measures

implemented and the validity of the EIA predictions and to identify any adverse environmental impacts arising;

- Carry out regular site inspection to investigate and audit the Contractors' site practice, equipment and work methodologies with respect to pollution control and environmental mitigation, and effect proactive action to pre-empt problems; carry out ad hoc site inspections if significant environmental problems are identified;
- Audit and prepare monitoring and audit reports on the environmental monitoring data and site environmental conditions;
- Report on the environmental monitoring and audit results to the Independent Environmental Checker, Contractor, the ER and EPD 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;
- Advice to the Contractor on environmental improvement, awareness, enhancement matters, etc. on site;
- Timely submission of the EM&A report to the Project Proponent and the EPD; and
- Adhere to the procedures for carrying out complaint investigation.

Engineer or Engineer's Representative (ER)

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

- 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;
- Participate in joint site inspection undertaken by the ET; and
- Adhere to the procedures for carrying out complaint investigation

Independent Environmental Checker (IEC)

1.5.6 The IEC shall be employed by the project proponent prior to the commencement of the construction of the Project. The IEC shall be an independent party from the Contractor and the ET and possess at least 7 years' 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 duties and responsibilities of the IEC are:

- Review the EM&A works performed by the ET (at least at monthly intervals);
- Carry out random sample check and audit the monitoring activities and results (at least at monthly intervals);
- Conduct random site inspection;
- Review the EM&A reports submitted by the ET;

- Review the effectiveness of environmental mitigation measures and project environmental performance;
- Review the proposal on 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
- Adhere to the procedures for carrying out complaint investigation.

1.5.7 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 for the duration of the Project.

1.6 Structure of the EM&A Manual

1.6.1 Following this introductory section, the remainder of the Manual is set out as follows:

- Section 2 – Sets out EM&A requirement for air quality;
- Section 3 – Sets out EM&A requirement for noise;
- Section 4 – Sets out EM&A requirement for water quality;
- Section 5 – Sets out EM&A requirement for waste management;
- Section 6 – Sets out EM&A requirement for land contamination;
- Section 7 – Sets out EM&A requirement for landscape and visual impact;
- Section 8 – Describes scope and frequency of environmental site audits and sets out the general requirements of the EM&A programme; and
- Section 9 – Details the EM&A reporting requirements.

2 AIR QUALITY

2.1 Introduction

2.1.1 Potential air quality impacts arising from the construction and operation phases of the Project on the air sensitive receivers (ASRs) were assessed in the EIA Report. The locations of the representative ASRs are shown in **Figure 2.1**. No adverse air quality impact from the Project would be anticipated during construction phase. Dust monitoring is proposed to be conducted during construction phase of the Project.

2.1.2 Regular site environmental audit is recommended to be conducted during the entire construction phase of the Project so as to ensure the implementation of the proposed dust mitigation measures and the dust suppression measures stipulated in *Air Pollution Control (Construction Dust) Regulation*. Implementation schedule of mitigation measures are presented in **Appendix C**. No adverse air quality impact arising from the Project would be anticipated during the operation phase of the Project. No operational air quality monitoring or audit is therefore considered necessary.

2.1.3 This section presents the requirements, methodology, equipment, monitoring locations, criteria and protocols for the monitoring and audit of air quality impact during the construction phase of the Project.

2.2 Monitoring Parameters

2.2.1 The dusty construction activities of the Project would mainly be related to construction dust from site clearance, minor excavation limited backfilling for column installation and wind erosion of limited exposed area which would generate dust emissions. Therefore, 1-hour Total Suspended Particulates (TSP) is recommended to be monitored and audited at the proposed monitoring locations during construction phase.

2.2.2 The criteria against which ambient air quality monitoring to be assessed are 1-hour TSP limit of $500 \mu\text{g m}^{-3}$. This level is not to be exceeded at ASRs.

2.2.3 Monitoring and audit of the TSP levels shall be carried out by the ET to ensure that any deteriorating air quality could be readily detected and timely action shall be undertaken to rectify such situation.

2.2.4 1-hour TSP levels should be measured to indicate the impacts of construction dust on air quality. The TSP levels should be measured by following the standard method as set out in High Volume Method for Total Suspended Particulates, Part 50 Chapter 1 Appendix B, Title 40 of the Code of Federal Regulations of the USEPA (hereinafter referred to as "HVS method"). Upon approval of EPD and IEC, an alternative sampling method of using direct reading methods which are capable of producing comparable results as that by the high volume sampling method can be used to indicate short event impacts

2.2.5 All relevant data including temperature, pressure, weather conditions, elapsed-time meter reading for the start and stop of sampler, identification and weight of the filter paper, and other special phenomena and work progress of the concerned site, etc., should be recorded down in detail. A sample data sheet is shown in **Appendix D**.

2.3 Monitoring Equipment

2.3.1 High volume sampler (HVS) in compliance with the following specifications should be used for carrying out the 1-hour TSP monitoring:

- 0.6 - 1.7 m^3 per minute (20 - 60 standard cubic feet per minute) adjustable flow range;
- equipped with a timing / control device with ± 5 minutes accuracy for 24 hours operation;
- installed with elapsed-time meter with ± 2 minutes accuracy for 24 hours operation;
- capable of providing a minimum exposed area of 406 cm^2 ;
- flow control accuracy: $\pm 2.5\%$ deviation over 24-hour sampling period;
- equipped with a shelter to protect the filter and sampler;

- incorporated with an electronic mass flow rate controller or other equivalent devices;
- equipped with a flow recorder for continuous monitoring;
- provided with a peaked roof inlet;
- incorporated with a manometer;
- able to hold and seal the filter paper to the sampler housing at horizontal position;
- easy to change the filter; and
- capable of operating continuously for 24-hour period.

- 2.3.2 The ET shall be responsible for the provision of the monitoring equipment. He shall ensure that sufficient number of HVSs with appropriate calibration kit is available for carrying out the baseline, regular impacts 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, in accordance with requirements stated in the manufacturers operating manual. All the equipment, calibration kit, filter papers, etc., shall be clearly labelled. If direct reading dust meters is proposed to be used, the ET Leader should submit sufficient information to the IEC to prove that the instrument is capable of achieving a comparable result as that the HVS may be used for the 1-hour sampling. The instrument should also be calibrated regularly.
- 2.3.3 Initial calibration of the dust monitoring equipment shall be conducted upon installation and prior to commissioning at bi-monthly intervals. The transfer standard shall be traceable to the internationally recognized primary standard and be calibrated annually. The calibration data shall be properly documented for future reference by the concerned parties such as the IEC. All the data shall be converted into standard temperature and pressure condition.
- 2.3.4 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 on the data sheet as shown in **Appendix D**.
- 2.3.5 If the ET Leader proposes to use a direct reading dust meter to measure 1-hour TSP levels, he shall submit sufficient information to the IEC to prove that the instrument is capable of achieving a comparable result as that of the HVS before it may be used for the 1-hour sampling. The instrument shall also be calibrated regularly, and the 1-hour sampling shall be determined periodically by HVS to check the validity and accuracy of the results measured by direct reading method.
- 2.3.6 Wind data monitoring equipment shall also be provided and set up at conspicuous locations for logging wind speed and wind direction near to the dust monitoring locations. The equipment installation location shall be proposed by the ET and agreed with the ER and the IEC. For installation and operation of wind data monitoring equipment, the following points shall be observed.
- The wind sensors shall be installed on masts at an elevated level 10m above ground so that they are clear of obstructions or turbulence caused by the buildings;
 - The wind data shall 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 shall be re-calibrated at least once every six months; and
 - Wind direction should be divided into 16 sectors of 22.5 degrees each.
- 2.3.7 In exceptional situations, the ET may propose alternative methods to obtain representative wind data upon approval from the ER and agreement from the IEC.

2.4 Laboratory Measurement / Analysis

- 2.4.1 A clean laboratory with constant temperature and humidity control and equipped with necessary measuring and conditioning instruments to handle the dust samples collected, shall be available for sample analysis, and equipment calibration and maintenance. The laboratory shall be the Hong Kong Laboratory Accreditation Scheme (HOKLAS) accredited

or other internationally accredited laboratory.

- 2.4.2 If a site laboratory is set up or a non-HOKLAS accredited laboratory is hired for carrying out the laboratory analysis, the laboratory equipment shall be verified by the IEC and approved by the ER. Measurement performed by the laboratory shall be demonstrated to the satisfaction of the ER and the IEC.
- 2.4.3 The IEC shall conduct regular audit of the measurement performed by the laboratory so as to ensure the accuracy of measurement results. The ET shall provide the ER with one copy of the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B for his/her reference.
- 2.4.4 Filter paper of size 8"x10" 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-hour and be pre-weighed before use for the sampling.
- 2.4.5 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 a readout down to 0.1mg. The balance shall be regularly calibrated against a traceable standard.
- 2.4.6 All the collected samples shall be kept in a good condition for 6 months before disposal.

2.5 Monitoring Locations

- 2.5.1 The selected monitoring locations are the worst potentially affected air sensitive receivers located in the vicinity of construction sites. The proposed air quality monitoring locations during construction phase are listed in **Table 2.1** below and shown in **Figure 2.2**.

Table 2.1 Proposed Construction Dust Monitoring Stations for Baseline and Impact Monitoring

Air Quality Monitoring Station	Air Quality Assessment Point ID in EIA	Location
AM1	CUL1	The Cullinan I
AM2	ICC	International Commerce Centre
AM3	P46Aa	Parcel 46A - Hong Kong Palace Museum

- 2.5.2 The status and locations of the air quality sensitive receivers may change after issuing this Manual. In such case, the ET shall propose updated monitoring locations and seek approval from ER and IEC and agreement from EPD on the proposal.
- 2.5.3 When alternative monitoring locations are proposed, the following criteria, as far as practicable, shall be followed:
- (i) at the site boundary or such locations close to the major dust emission source;
 - (ii) close to the air sensitive receivers as defined in the EIAO-TM;
 - (iii) proper position/sitting and orientation of the monitoring equipment; and
 - (iv) take into account the prevailing meteorological conditions.
- 2.5.4 The ET shall agree with the IEC on the position of the HVS for installation of the monitoring equipment. When positioning the samplers, the following points shall be noted:
- (i) a horizontal platform with appropriate support to secure the samplers against gusty wind shall be provided;
 - (ii) two samplers shall be placed less than 2 metres apart;

- (iii) 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;
- (iv) a minimum of 2 metres of separation from walls, parapets and penthouses is required for rooftop samplers;
- (v) a minimum of 2 metres of separation from any supporting structure, measured horizontally is required;
- (vi) no furnace or incinerator flue is nearby;
- (vii) airflow around the sampler is unrestricted;
- (viii) the sampler is more than 20 metres from the dripline;
- (ix) any wire fence and gate, to protect the sampler, shall not cause any obstruction during monitoring;
- (x) permission must be obtained to set up the samplers and to obtain access to the monitoring stations; and
- (xi) a secured supply of electricity is needed to operate the samplers.

2.6 Baseline Monitoring

- 2.6.1 Baseline monitoring shall be carried out to determine the ambient 1-hour TSP levels at the monitoring locations prior to the commencement of the Project. During the baseline monitoring, there shall not be any construction or dust generating activities in the vicinity of the monitoring stations. The baseline monitoring will provide data for the determination of the appropriate Action levels with the Limit levels set against statutory or otherwise agreed limits.
- 2.6.2 Before commencing the baseline monitoring, the ET shall inform the IEC of the baseline monitoring programme such that the IEC can conduct on-site audit to ensure accuracy of the baseline monitoring results.
- 2.6.3 TSP baseline monitoring should be carried out at all of the designated monitoring locations for at least 14 consecutive days prior to the commissioning of the construction works. 1-hour TSP sampling shall be done at least three times per day at each monitoring station. During the baseline monitoring, there should not be any construction or dust generating activities in the vicinity of the monitoring stations. 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. A summary of baseline monitoring is presented in **Table 2.2**.
- 2.6.4 In case the baseline monitoring cannot be carried out at the designated monitoring locations during the baseline monitoring period, the ET Leader shall carry out the monitoring at alternative locations which can effectively represent the baseline conditions at the impact monitoring locations. The alternative baseline monitoring location shall be approved by the ER and agreed with IEC.
- 2.6.5 In exceptional cases, when insufficient baseline monitoring data or questionable results are obtained, the ET Leader shall liaise with the IEC and EPD to agree on an appropriate set of data to be used as a baseline reference and submit to ER for approval.
- 2.6.6 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. The revised baseline levels, in turn, the air quality criteria, shall be agreed with the IEC and EPD.

2.7 Impact Monitoring

- 2.7.1 The ET shall carry out impact monitoring during construction phase of the Project. For 1-

hour TSP monitoring, the sampling frequency of at least three times in every six-days should be undertaken when the highest dust impact occurs. In case of non-compliance with the air criteria, more frequent monitoring, as specified in the Action Plan in the following section, should be conducted. This additional monitoring should be continued until the excessive dust emission or the deterioration in the air quality is rectified. The impact monitoring programme is summarized in **Table 2.2**.

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

Table 2.2 Summary of Construction Dust Monitoring Programme

Monitoring Period	Duration	Sampling Parameter	Frequency
Baseline Monitoring	Consecutive days of at least 2 weeks before commencement of major construction works	1-hour TSP	3 times per day
Impact Monitoring	Throughout the construction phase	1-hour TSP	3 times in every 6 days

2.8 Event and Action Plan

- 2.8.1 The baseline monitoring results form the basis for determining the air quality criteria for the impact monitoring. The ET shall compare the impact monitoring results with air quality criteria set up for 1-hour TSP. **Table 2.3** shows the air quality criteria, namely Action and Limit levels to be used. Should non-compliance of the air quality criteria occur, action in accordance with the Action Plan in **Table 2.4** shall be carried out.

Table 2.3 Action and Limit Levels for Air Quality (Construction Dust)

Parameter	Action Level ^[1]	Limit Level
TSP (1-hour average)	BL ≤ 384 µgm ⁻³ , AL = (BL * 1.3 + LL)/2 BL > 384 µgm ⁻³ , AL = LL	500 µgm ⁻³

Note:

[1] BL = Baseline level, AL = Action level, LL = Limit level

Table 2.4 Event and Action Plan for Air Quality (Construction Dust)

Event	Action			
	ET	IEC	ER	Contractor
Action level being exceeded by	<ol style="list-style-type: none"> 1. Identify source, investigate the causes of complaint and propose remedial measures; 2. Inform Contractor, IEC and ER; 3. Repeat measurement to confirm finding; and 4. Increase monitoring frequency to daily. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; and 3. Review and advise the ET and ER on the effectiveness of the proposed remedial measures. 	<ol style="list-style-type: none"> 1. Notify Contractor. 	<ol style="list-style-type: none"> 1. Identify source(s), investigate the causes of exceedance and propose remedial measures; 2. Implement remedial measures; and 3. Amend working methods agreed with the ER as appropriate.
Action level being exceeded by two or more consecutive	<ol style="list-style-type: none"> 1. Identify source; 2. Inform Contractor, IEC and ER; 3. Advise the Contractor and ER on the effectiveness of the proposed remedial measures; 4. Repeat measurements to confirm findings; 5. Increase monitoring frequency to daily; 6. Discuss with IEC and Contractor on remedial actions required; 7. If exceedance continues, arrange meeting with Contractor, IEC and ER; and 8. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET, ER and Contractor on possible remedial measures; 4. Advise the ET and ER on the effectiveness of the proposed remedial measures; and 5. Supervise Implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented. 	<ol style="list-style-type: none"> 1. Identify source and investigate the causes of exceedance; 2. Submit proposals for remedial measures to the ER with a copy to ET and IEC within three working days of notification; 3. Implement the agreed proposals; and 4. Amend proposal as appropriate.
Limit level being exceeded by one sampling	<ol style="list-style-type: none"> 1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform Contractor, IEC, ER, and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; and 5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; and 5. Supervise implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented. 	<ol style="list-style-type: none"> 1. Identify source(s) and investigate the causes of exceedance; 2. Take immediate action to avoid further exceedance; 3. Submit proposals for remedial measures to ER with a copy to ET and IEC within three working days of notification; 4. Implement the agreed proposals; and 5. Amend proposal if appropriate.
Limit level being exceeded by two or more consecutive sampling	<ol style="list-style-type: none"> 1. Notify IEC, ER, Contractor and EPD; 2. Identify source; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with IEC and ER to discuss the remedial actions to be taken; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; and 8. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by the ET; 2. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 3. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; and 4. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing; 2. In consultation with the ET and IEC, agree with the Contractor on the remedial measures to be implemented; 3. Supervise the implementation of remedial measures; and 4. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated. 	<ol style="list-style-type: none"> 1. Identify source(s) and investigate the causes of exceedance; 2. Take immediate action to avoid further exceedance; 3. Submit proposals for remedial measures to the ER with a copy to the IEC and ET within three working days of notification; 4. Implement the agreed proposals; 5. Revise and resubmit proposals if problem still not under control; and 6. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

2.9 Mitigation Measures

- 2.9.1 Mitigation measures for construction phase air quality impacts have been recommended in the EIA Report. All the recommended mitigation measures are detailed in the implementation schedule in **Appendix C**. The Contractor should be responsible for the design and implementation of the mitigation measures.

2.10 Audit Requirements

- 2.10.1 Regular site inspection and audit at least once per week should be conducted during the construction phase of the Project to ensure the recommended mitigation measures are properly implemented.

3 NOISE

3.1 Introduction

3.1.1 Potential noise impacts arising from the construction and operation phases of the Project on the representative noise sensitive receivers were assessed in the EIA Report. The locations of the representative NSRs are shown in **Figure 3.1**. No construction noise exceedances would be predicted at the representative NSRs during the construction phase of the Project. Nevertheless, construction noise monitoring is recommended during the construction phase to check compliance with the noise criteria.

3.1.2 No adverse noise impact arising from the Project would be anticipated during the operation phase of the Project. No operational noise monitoring or audit is therefore considered necessary.

3.1.3 In this section, the requirements, methodology, equipment, monitoring locations, and protocols for the monitoring and audit of noise impacts during the construction phase of the Project are presented.

3.2 Monitoring Parameters

3.2.1 The construction noise level should be measured in terms of the 30-minute A-weighted equivalent continuous sound pressure level (L_{eq}). $L_{eq(30\text{ min})}$ should be used as the monitoring parameter for the time period between 0700 and 1900 hours on normal weekdays.

3.2.2 Supplementary information for data auditing and statistical results such as L_{10} and L_{90} should also be obtained for reference. Sample noise field data sheets are shown in **Appendix D** of this Manual for reference. The ET Leader may modify the data record sheet for this EM&A programme but the format of which should be agreed by the IEC.

3.3 Monitoring Equipment

3.3.1 As referred to in the Technical Memorandum (TM) issued under the Noise Control Ordinance (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 shall be accepted as valid only if the calibration level from before and after the noise measurement agree to within 1.0 dB.

3.3.2 Noise measurements shall not be made in fog, rain, wind with a steady speed exceeding 5 m/s or wind with gusts exceeding 10 m/s. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in m/s.

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

3.4 Monitoring Locations

3.4.1 The proposed noise monitoring stations for the construction phase are listed in **Table 3.1** and shown in **Figure 3.2**. The locations of noise monitoring stations and the works activities may change after issuing this Manual. For such occasion, the ET Leader shall propose with justification for changes to monitoring locations or other requirements of the EM&A

programme, taking into account the following considerations and seek approval from the IEC and EPD:

- (i) locate close to the major site activities which are likely to have noise impacts;
- (ii) locate close to the most affected existing NSRs; and
- (iii) take into account the possibility of minimizing disturbance to occupants at the NSRs during monitoring.

Table 3.1 Proposed Noise Monitoring Stations for Baseline and Impact Monitoring

Noise Monitoring Station	Noise Assessment Point ID in EIA	Location
NM1	CUL1	The Cullinan I
NM2	CUL2	The Cullinan II
NM3	HT	The Harbourside – Tower 3
NM4	SRT	Sorrento – Tower 1

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

3.5 Baseline Monitoring

3.5.1 Baseline noise monitoring shall be carried out daily in all identified monitoring stations for 2 weeks prior to the commissioning of the construction works. The baseline noise levels of A-weighted levels L_{eq} , L_{10} and L_{90} , should be measured for a continuous period of at least 14 consecutive days at a minimum logging interval of 30 minutes for daytime (between 0700 and 1900 hours of normal weekdays) and 15 minutes (as three consecutive L_{eq} , (5 minutes) readings) for evening time (between 1900 and 2300 hours on normal weekdays), general holidays including Sundays (between 0700 and 2300 hours) and night-time (between 2300 and 0700 on all days). A schedule of the baseline monitoring shall be submitted to the IEC for approval before the monitoring starts.

3.5.2 During the baseline monitoring, there shall not be any construction activities in the vicinity of the monitoring stations.

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

3.6 Impact Monitoring

3.6.1 Construction noise monitoring should be carried out at the designated monitoring station when there are Project-related construction activities being undertaken within a radius of 300 m from the monitoring stations. The monitoring frequency should depend on the scale of the construction activities. An initial guide on the monitoring is to obtain one set of 30-minute measurement at each station between 0700 and 1900 hours on normal weekdays

at a frequency of once a week when construction activities are underway. A schedule of the impact monitoring shall be submitted to the IEC for approval before the monitoring starts.

3.6.2 If construction works are extended to include works during the hours of 1900 to 0700, applicable permits under NCO shall be obtained by the Contractor. The monitoring requirements and conditions stipulated in the permits have to be followed.

3.6.3 In case of non-compliance with the construction noise criteria, more frequent monitoring, as specified in the Action Plan in **Table 3.3** 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.

3.7 Event and Action Plan

3.7.1 The action and limit levels for construction noise are defined in **Table 3.2**. Should non-compliances of the criteria occur, actions in accordance with the Action Plan in **Table 3.3** shall be carried out.

Table 3.2 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:

[1] If works are to be carried out during restricted hours, the monitoring requirements and the conditions stipulated in the Construction Noise Permit (CNP) issued by the Noise Control Authority have to be followed.

Table 3.3 Event and Action Plan for Construction Noise

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

3.8 Mitigation Measures

- 3.8.1 The construction noise assessment results indicate that, in the absence of any mitigation measures, there would not be exceedances of the construction noise criteria at all NSRs. Nonetheless, good site practice was recommended to minimize the potential noise nuisance during construction phase. The Contractor should be responsible for the implementation of these measures. The implementation schedule for the recommended mitigation measures is presented in **Appendix C**.

3.9 Audit Requirements

- 3.9.1 Regular site environmental audit at least once per week during the construction phase of the Project should be conducted to ensure good site practices as listed in **Appendix C** are implemented properly to further minimize the potential noise nuisance during construction phase of the Project.

4 WATER QUALITY

4.1 Introduction

- 4.1.1 Potential water quality impacts arising from the construction and operation phases of the Project on the representative water sensitive receivers (WSRs) were identified and assessed in the EIA Report. The locations of the representative WSRs are shown in **Figure 4.1**. While the project only consists of land-based works, and no adverse water quality impacts would be expected with implementation of the recommended mitigation measures according to the assessment result of the EIA Report, water quality monitoring is considered not necessary. Nonetheless, regular site inspections are recommended during the construction phase to ensure the recommended mitigation measures are properly implemented.

5 WASTE MANAGEMENT IMPLICATION

5.1 Introduction

5.1.1 Construction and Demolition (C&D) materials, chemical waste and general refuse from workforce would be generated during the construction phase. It is the Contractor's responsibility to ensure that all the waste arising from the Project are handled, stored and disposed of in accordance with good waste management practices, relevant legislation and waste management guidelines. Provided that these wastes are handled, transported and disposed of using approved methods and that the recommended good site practices and relevant legislation are strictly followed, adverse environmental impacts would not be expected.

5.1.2 It is expected that no waste will be generated during the operation phase of the Project. As such, it is considered that there should be no adverse environmental impacts. Monitoring and audit programme for the operation phase of the Project would not be required.

5.2 Mitigation Measures

5.2.1 Mitigation measures for waste management recommended in the EIA Report should form the basis of the site Waste Management Plan (WMP), as part of Environmental Management Plan (EMP), to be developed by the Contractor in the construction stage. **Appendix C** provides the implementation schedule of the recommended mitigation measures during both construction and operational phases.

5.2.2 Waste generated during the construction activities should be audited regularly by the ET to determine if waste is being managed in accordance with approved procedures and the site WMP. The audit should look at 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 legislations and contract requirements. In addition, the routine site inspections should check the implementation of the recommended good site practices, waste reduction measures, and other waste management mitigation measures.

5.2.3 With the appropriate handling, storage and removal of waste arisings during the construction of the Project as presented in **Appendix C**, the potential to cause adverse environmental impacts would be minimized. During the site inspections, the ET shall pay special attention to the issues relating to waste management and check whether the Contractor has implemented the recommended good site practices, waste reduction measures and other mitigation measures.

5.3 Audit Requirements

5.3.1 Regular audits and site inspections should be carried out during construction phases by the ER, ET and Contractor to ensure that the recommended good site practices and the recommended mitigation measures listed in **Appendix C** 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.

5.3.2 The requirements of the environmental audit programme are set out in **Section 8** of this Manual. The audit programme should verify the implementation status and evaluate the effectiveness of the mitigation measures.

6 LAND CONTAMINATION

6.1 Introduction

- 6.1.1 The land contamination assessment has examined the potential contaminating land uses within the Assessment Area and investigated any potential land contamination impacts arising from the Project.
- 6.1.2 Based on the site appraisal, adverse land contamination impact arising from Project is not anticipated. No EM&A programme is therefore required.

7 LANDSCAPE AND VISUAL IMPACT

7.1 Introduction

7.1.1 The EIA has recommended landscape and visual mitigation measures to be undertaken during both the 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 as early as practicable without affecting the implementation of the mitigation measures.

7.2 Mitigation Measures

7.2.1 The proposed mitigation measures of landscape and visual impacts are summarized in **Appendix C**. The landscape and visual mitigation measures proposed should be incorporated in the detailed landscape and engineering design. The construction phase mitigation measures should be adopted from the commencement of construction and should be in place throughout the entire construction period. Mitigation measures for the operational phase should 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.

7.2.2 Any potential conflicts among the proposed mitigation measures, the Project works, and operational requirements should also be identified and resolved at early stage. Any changes to the mitigation measures should be incorporated in the detailed design.

7.3 Audit Requirement

7.3.1 Site audits should be undertaken during the construction phase of the Project to check that the proposed landscape and visual mitigation measures are properly implemented and maintained as per their intended objectives. Site inspections should be undertaken by the ET at least once every two weeks during the construction period.

7.3.2 In the event of non-compliance, the responsibilities of the relevant parties are detailed in the Event/Action plan provided in **Table 7.1**.

Table 7.1 Event / Action Plan for Landscape and Visual during Construction Stage

Action Level	ET	IEC	ER	Contractor
Non-conformity on one occasion	<ol style="list-style-type: none"> 1. Inform the Contractor, the IEC and the ER; 2. Discuss remedial actions with the IEC, the ER and the Contractor; and 3. Monitor the remedial actions until rectification has been completed. 	<ol style="list-style-type: none"> 1. Check the inspection report; 2. Check the Contractor's working method; 3. Discuss with the ET, ER and the Contractor on possible remedial measures; and 4. Advise the ER on effectiveness of proposed remedial measures 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of nonconformity in writing; 2. Review and agree on the remedial measures proposed by the Contractor; and 3. Supervise implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Identify Source and investigate the nonconformity; 2. Implement remedial measures; 3. Amend working methods agreed with the ER as appropriate; and 4. Rectify damage and undertake any necessary replacement.
Repeated Non-conformity	<ol style="list-style-type: none"> 1. Identify source; 2. Inform the Contractor, the IEC and the ER; 3. Increase inspection frequency; 4. Discuss remedial actions with the IEC, the ER and the Contractor; 5. Monitor remedial actions until rectification has been completed; and 6. If nonconformity stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Check inspection report; 2. Check the Contractor's working method; 3. Discuss with the ET and the Contractor on possible remedial measures; and 4. Advise the ER on effectiveness of proposed remedial measures. 	<ol style="list-style-type: none"> 1. Notify the Contractor; 2. In consultation with the ET and IEC, agree with the Contractor on the remedial measures to be implemented; and 3. Supervise implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Identify Source and investigate the nonconformity; 2. Implement remedial measures; 3. Amend working methods agreed with the ER as appropriate; and 4. Rectify damage and undertake any necessary replacement. Stop relevant portion of works as determined by the ER until the non-conformity is abated.

Note:

ET – Environmental Team

IEC – Independent Environmental Checker

ER – Engineer's Representative

8 SITE INSPECTION / AUDIT

8.1 Site Inspection Requirements

- 8.1.1 Site inspections/audits provide a direct means to trigger and enforce the specified environmental protection and pollution control measures. They shall be undertaken routinely, at least once per week, to inspect/audit the construction activities in order to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented. With reference to the Project's contractual environmental requirements, pollution control and mitigation specifications and a well-established site inspection/audit, deficiency and action reporting system in accordance with the event contingency plan of the EM&A programme, the site inspection/audit would be one of the most effective tools used to enforce the environmental protection requirements on the construction site. A site inspection/audit checklist, to be used for undertaking site inspection/audit, will be prepared by the ET and submitted to the IEC for agreement, and to the WKCA for approval.
- 8.1.2 The ET is responsible for formulation of the environmental site inspection, deficiency and action reporting system, and for carrying out the site inspection works. The proposal for rectification, if any, should be prepared by the Contractor and submitted to the ET Leader and IEC.
- 8.1.3 Regular site inspections shall be carried out at least once per week and led by the WKCDA and attended by the ET and Contractor during construction phase. All observations and results will be recorded in the data record sheets, which will pass to the Contractor. If non-compliance is found on site, the Event / Action Plan will be implemented.
- 8.1.4 The areas of inspection shall not be limited to the environmental condition, pollution control and mitigation measures within the site, it should also review the environmental condition outside the site area which is likely to be affected, directly or indirectly, by the site activities. During inspection, the ET shall make reference to the following information in conducting the inspection/audit.
- The EIA and EM&A recommendations on environmental protection and pollution control mitigation measures;
 - The requirements of the EM&A Manual and conditions of the Environmental Permit;
 - Works progress and programme;
 - On-going results of the EM&A programme;
 - Individual works methodology proposals (which shall include proposal on associated pollution control measures);
 - Contract specifications on environmental protection and pollution prevention control;
 - Relevant environmental protection and pollution control laws; and
 - Previous site inspection/audit results undertaken by the ET and others.
- 8.1.5 The Contractor shall keep to update the WKCDA and ET Leader with all relevant environmental information of the construction contract for him to carry out the site inspections. The site inspection results and its associated recommendations on improvements to the environmental protection and pollution control works shall be recorded by the Contractor and submitted to the ET and WKCDA within 24 hours, for reference and for taking immediate action in an agreed time-frame. The Contractor shall follow the procedures and time-frame as stipulated in the environmental site inspection/audit, deficiency and action reporting system formulated by the ET Leader, to report on any remedial measures subsequent to the site inspections/audits. Weekly site inspection

should be carried out to check the implementation status of the recommended environmental mitigation measures throughout construction period.

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

8.2 Compliance with Legal and Contractual Requirements

- 8.2.1 There are contractual environmental protection and pollution control requirements as well as environmental protection and pollution control laws in Hong Kong, which the construction activities shall comply with.
- 8.2.2 In order that the works are in compliance with the contractual and statutory requirements, all the works method statements should be submitted by the Contractor to the WKCDA for approval and to the ET Leader of vetting to see whether sufficient environmental protection and pollution control measures have been included.
- 8.2.3 The ET Leader shall also review the progress and programme of the works to check that relevant environmental laws have not been violated and that the any foreseeable potential for violating the laws can be prevented.
- 8.2.4 The Contractor shall regularly provide the update of the relevant documents to the ET Leader so that the works checking can be carried out effectively. The document shall at least include the updated Work Progress Reports, the updated Works Programme, the application letters for different licence/permits under the environmental protection laws, and all the valid licence/permit. The site diary shall also be available for the ET Leader's inspection upon his request.
- 8.2.5 After reviewing the documentation, the ET Leader shall advise the WKCDA and the Contractor of any non-compliance with the contractual and statutory requirements on environmental protection and pollution control for them to take follow-up actions as appropriate. If the ET Leader's review concludes that the current status on licence/permit application and any environmental protection and pollution control preparation works may not cope with the works programme or follow-up actions may still result in potential violation of environmental protection and pollution control requirements, the ET should provide further advice to the Contractor to take remedial action to resolve the problem.
- 8.2.6 Upon receipt of the advice, the Contractor shall undertake immediate action to remedy the situation. The ET shall follow up to ensure that appropriate action has been taken by the Contractor in order to fulfil the contractual and statutory requirements.

8.3 Environmental Complaints

- 8.3.1 Complaints shall be referred to the ET Leader for carrying out complaint investigation procedures. The following procedures shall be undertaken upon receipt of the any environmental complaints:
- The ET Leader to log complaint and date of receipt onto the complaint database and inform the IEC and WKCDA immediately;
 - The ET Leader to investigate the complaint to determine its validity, and to assess whether the source of the problem is due to works activities;
 - The ET Leader to identify remedial measures in consultation with the IEC and WKCDA if a complaint is valid and due to construction works of Project;
 - The Contractor to implement the remedial measures as identified by ET Leader and agreed with IEC and WKCDA. Any additional monitoring frequency and stations, where necessary, for checking the effectiveness of the remedial measures should be proposed

by ET Leader and agreed with IEC and WKCDA;

- The ET and IEC to review the effectiveness of the Contractor's remedial measures and the updated situation;
- The ET/Contractor to undertake additional monitoring and audit to verify the situation if necessary, and oversee that circumstance leading to the complaint do not recur;
- If the complaint is a referral from EPD, the ET Leader to prepare interim report on status of the complaint investigation and follow-up action stipulated above, including the details of the remedial measures and additional monitoring identified or already taken, after endorsement by IEC and WKCDA, for submission to EPD within the time frame assigned by EPD;
- The ET report the investigation results and the subsequent actions to the source of complaint for responding to complainant (If the source of complain is a referral from EPD, the result should be reported within the time frame assigned by the EPD); and
- The ET 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 additional monitoring results in the monthly EM&A reports.

8.3.2 During the complaint investigation works, the Contractor and WKCDA shall cooperate with the ET Leader in providing all necessary information and assistance for completion of the investigation. If mitigation measures are identified in the investigation, the Contractor shall promptly carry out the mitigation. The ET and IEC shall ensure that the measures have been carried out by the Contractor properly.

9 REPORTING

9.1 Introduction

9.1.1 The types of reports that the ET Leader should prepare and submit including Baseline Environmental Monitoring Report, Monthly EM&A Reports and Final EM&A Review Report. In accordance with Annex 21 of the EIAO-TM, a copy of the monthly and final review EM&A reports should be submitted to the EPD. The exact details of the frequency, distribution and time frame for submission should be agreed with the IEC, WKCDA and EPD prior to commencement of works.

9.1.2 Reports can be provided in an electronic medium upon agreeing the format with the WKCDA and EPD. All monitoring data (baseline and impact) should be submitted in electronic medium.

9.2 Baseline Environmental Monitoring Report

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

9.2.2 The Baseline Environmental Monitoring Report should include at least the following information:

- (i) Up to half a page of executive summary;
- (ii) Brief description of project background information;
- (iii) Drawings showing locations of the baseline monitoring stations;
- (iv) Monitoring results (in both hard and soft copies) together with the following information:
 - Monitoring methodology
 - Name of laboratory and types of equipment used and calibration details
 - Parameters monitored
 - Monitoring locations (and depth)
 - Monitoring date, time, frequency and duration
 - Quality assurance (QA) / quality control (QC) results and detection limits
- (v) Details of influencing factor, including:
 - Major activities, if any, being carried out on the Project site during the period
 - Weather conditions during the period
 - Other factors which might affect the monitoring results
- (vi) Determination of the Action and Limit Levels (AL levels) for each monitoring parameter and statistical analysis of the baseline data;
- (vii) Revisions for inclusion in the EM&A Manual; and
- (viii) Comments and conclusions.

9.3 Monthly EM&A Reports

9.3.1 The results and finding of all EM&A works required in the Manual should be recorded in the monthly EM&A reports prepared by the ET and endorsed by the IEC. The first Monthly EM&A Report should be prepared and submitted to EPD in the month after the major

construction works commence with the subsequently Monthly Reports due in 10 working days of the end of each reporting month. Copies of each monthly EM&A report shall be submitted to the parties: Contractor, IEC, WKCD and EPD. Before submission of the first monthly EM&A Report, the ET shall liaise with the parties on the exact number of copies and format of the monthly reports in both hard copy and electronic medium.

9.3.2 The first monthly EM&A Report shall be included at least the following:

- (i) 1-2 pages executive summary:
 - 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 organization including key personnel contact names and telephone numbers;
 - Construction programme;
 - Management structure; and
 - Works undertaken during the reporting month.
- (iii) Environmental status:
 - Advice on the status of statutory environmental compliance such as the status of compliance with the EP conditions under the EIAO, submission status under the EP and implementation status of mitigation measures;
 - Works undertaken during the reporting month with illustrations (such as location of works, etc.); and
 - Drawings showing the Project area, any environmental sensitive receivers and the locations of the monitoring and control stations.
- (iv) Summary of EM&A requirement:
 - All monitoring parameters;
 - Environmental quality performance limits (Action and Limit Levels);
 - Event and Action Plan;
 - 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, summarized in the updated implementation schedule.
- (vi) Monitoring results (in both hard and electronic copies) together the following information:
 - Monitoring methodology;
 - Name of laboratory and types of equipment used and calibration details;
 - Monitoring parameters;
 - Monitoring locations (and depth); and

- Monitoring date, time, frequency and duration.
- (vii) Graphical plots of monitored trends over the past four reporting periods and the following information:
- Major activities being carried out on site during the period;
 - Weather condition during the period; and
 - Other factor which might affect the monitoring results.
- (viii) 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.
- (ix) 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;
 - A forecast of the works programme, impact predictions and monitoring schedule for the next three months;
 - 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 examples, any improvement in the EM&A programme) and conclusions.

9.3.3 The subsequent Monthly EM&A Reports shall include at least the following:

- (i) 1-2 pages executive summary;
- Breaches of Action / Limit Levels;
 - Complaint 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;
 - Works 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 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, etc.); and
 - Drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations.
- (iv) Implementation status
- Advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the project EIA Report, summarized in the updated implementation schedule.
- (v) Monitoring results (in both hard and soft copies) together with the following information:
- Monitoring methodology;
 - Name of laboratory and types of equipment used and calibration details;
 - Monitoring parameters;
 - Monitoring locations (and depth);
 - 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.
- (vi) Graphical plots of monitored trends over the past four reporting periods and the following information:
- Major activities being carried out on site during the period;
 - Weather condition during the period; and
 - Other factor which might affect the monitoring results.
- (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;
 - A forecast of the works programme, impact predictions and monitoring schedule for the next three months;
 - 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 examples, effectiveness and efficiency of the mitigation measures), recommendations (for examples, any improvement in the EM&A programme) and conclusions.
- (ix) 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.

9.4 Quarterly EM&A Summary Report

9.4.1 A quarterly EM&A summary report of around five pages shall be produced by the ET Leader and shall contain at least the following information. Apart from these, the first quarterly summary report should also confirm that the monitoring work is proving effective and that it is generating data with the necessary statistical power to categorically identify or confirm the absence of impact attributable to the works. Each quarterly EM&A report shall be submitted to the following parties: the IEC, the ER and EPD.

- (i) 1-2 pages executive summary;
- (ii) Basic project information including a synopsis of the project organisation, programme, contacts of key management, and a synopsis of works undertaken during the quarter;
- (iii) A brief summary of EM&A requirements including:
 - Monitoring parameters;
 - Environmental quality performance limits (Action and Limit levels);
 - Environmental mitigation measures for construction stage, as recommended in the project EIA Report
- (iv) Advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the project EIA Report,

- summarized in the updated implementation schedule;
- (v) Drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
 - (vi) Graphical plots of the trends of monitored parameters over the course of the project, including the post-project monitoring for all monitoring stations annotated against:
 - Major activities being carried out on site during the period;
 - Weather condition during the period; and
 - Other factor which might affect the monitoring results.
 - (vii) Advice on the solid and liquid waste management status;
 - (viii) A summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
 - (ix) A brief review of the reasons for and the implications of any non-compliance, including a review of pollution sources and working procedures;
 - (x) A summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;
 - (xi) A summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;
 - (xii) A summary record of notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislations, locations and nature of breaches, investigation, follow-up actions taken and results;
 - (xiii) Comments (for examples, a review of the effectiveness and efficiency of the mitigation measures and the performance of the environmental management system, that is, of the overall EM&A programme); recommendations (for example, any improvement in the EM&A programme) and conclusions for the quarter; and
 - (xiv) Proponents' contacts and any hotline telephone number for the public to make enquiries.

9.5 Final EM&A Review Report

- 9.5.1 The EM&A programme for construction stage should be terminated upon the completion of the construction activities, and / or the completion of post-construction monitoring requirements.
- 9.5.2 The proposed termination should only be implemented after the proposal has been endorsed by the IEC and WKCDA followed by final approval from the Director of Environmental Protection.
- 9.5.3 The ET Leader should prepare and submit the Final EM&A Review Report, which should contain at least the following information:
- (i) Executive summary (1-2 pages);
 - (ii) Drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
 - (iii) Basic project information including a synopsis of the project organization, 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:
 - Monitoring parameters;
 - Environmental quality performance limits (Action and Limit levels);

- Environmental mitigation measures for construction stage, as recommended in the project EIA Report; and
 - Event and Action Plan.
- (v) A summary of the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the EIA Report, summarized 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 post-project monitoring for all monitoring stations annotated against:
- The major activities being carried out on site during the reporting period;
 - Weather conditions during the reporting period; and
 - Any other factors which might affect the monitoring results.
- (vii) A brief 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 summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;
- (x) A summary record of all complaints received (written or verbal) for each media, including locations and nature of complaints, liaison and consultation undertaken, actions and follow-up procedures taken;
- (xi) A summary record of notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislations, locations and nature of breaches, investigation, follow-up actions taken and results;
- (xii) A review of the validity of EIA predictions and identification of shortcomings of the recommendations proposed in EIA Report;
- (xiii) Comments (for example, a review of the effectiveness and efficiency of the mitigation measures, the performance of the environmental management system, and the overall EM&A programme); and
- (xiv) 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 mitigation action when necessary).

9.6 Data Keeping

- 9.6.1 No site-based documents (such as monitoring field records, laboratory analysis records, site inspection forms etc.) are required to be included in the EM&A reporting documents. However, any such documents should be properly maintained by the ET and be ready for inspection upon request. All relevant information should be recorded in electronic format, and the software copy must be available upon request. All document and data should be kept for at least one year after completion of the construction phase of the project.

9.7 Interim Notifications of Environmental Quality Limit Exceedances

- 9.7.1 With reference to the Event and Action Plan, when the environmental quality performance limits are exceeded and if they are proven to be valid, the ET should immediately notify the IEC, WKCDA and EPD, as appropriate. The notification should be followed up with advice to the IEC, WKCDA 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 E**.