



Agreement No. NEX/1034

Tsim Sha Tsui Station Northern Subway

Environmental Monitoring and Audit Manual

**Revision A
September 2008**

MTR Corporation Limited

Consultancy Agreement No. NEX/1034
Tsim Sha Tsui Station Northern Subway

Environmental Monitoring and Audit Manual

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1. INTRODUCTION

1.1. Project Description

Project Background

- 1.1.1 The title of this project is known as “Tsim Sha Tsui Station Northern Subway” (TNS) (hereafter known as the Project). The Project Proponent is MTR Corporation Limited (MTRCL). ENSR Asia (HK) Limited has been commissioned to carry out an Environmental Impact Assessment Study for the Project.

Project Location and Description

- 1.1.2 The Project is located in Tsim Sha Tsui district which is an urban area with mixture of commercial and residential developments. The proposed works lie along Nathan Road from Cameron Road junction to Miramar Shopping Centre near Kimberley Road. The proposed new plant basement will be located under the existing Entrance A1 of the Tsim Sha Tsui (TST) Station. The location of the proposed Project is shown in **Figure 1.1**. The Project includes (a) A subway (Subway TST) from the north end of TST Station, running approximate 85m under Nathan Road to a Satellite Concourse; (b) A satellite concourse (45m approximately) underneath Nathan Road located adjacent to Tung Ying Building and the Miramar Hotel; and (c) A subway (Subway MSC) from the north end of the Satellite Concourse, running approximate 80m under Nathan Road to the Miramar Shopping Centre (MSC).

Project Scope and Programme

- 1.1.3 The Project mainly comprises:
- A subway (Subway TST) from the north end of TST Station, running approx 85m under Nathan Road to a Satellite Concourse;
 - A satellite concourse (the Satellite Concourse) approx 45m underneath Nathan Road, containing ticket gates (reversible type), ticket issuing machines (TIMs), self service points, help-lines, etc. It has direct underground connections to the basements of the Miramar Hotel and of the development on the site of the former Tung Ying Building - these integrated entrances are designated Q2 and Q1 respectively. A mezzanine level in the Satellite Concourse contains electrical and ventilation plantrooms for the subway;
 - A subway (Subway MSC) from the north end of the Satellite Concourse, running approx 80m under Nathan Road to the Miramar Shopping Centre (MSC), where an underground link connects to its basement. This integrated entrance is designated Q3;
 - An Emergency Exit situated in the east footpath and planter of Nathan Road, outside the Miramar Shopping Centre;
 - Ventilation shafts for the proposed subway and satellite concourse. The ventilation shafts will be integrated with the Tung Ying Redevelopment and Miramar Hotel; and

- A new plant basement near existing Entrance A1 to house the station equipment relocated from the north end of TST Station for accommodating the TNS connection. The Entrance A1 will be reconstructed on the same site.

1.1.4 The proposed works are scheduled to commence in June 2009 with duration of approximately 35 months. The entire project is scheduled to be completed in May 2012. The preliminary construction programme for the Project is shown as shown in **Table 1.1** and presented in **Appendix A**.

Table 1.1 Preliminary Construction Programme

Activity	Time period
Site clearance and set up	Jun 2009 to Jul 2009
Tree Protection	Jun 2009 to Jan 2012
Plant Basement and Entrance A1 construction	Jul 2009 to Dec 2010 and Nov 2010 to Nov 2011
Satellite Concourse and Entrances Q1 and Q2 construction	Nov 2009 to Jan 2012
Subway to TST Station	Mar 2011 to Dec 2011
Subway to Miramar Shopping Centre and Entrance Q3 construction	Feb 2011 to Dec 2011
Emergency Exit at Miramar Shopping Centre	Jul 2009 to Aug 2009, Nov 2011 to Feb 2012
TST Connection Chamber	Jul 2009 to Mar 2010
TST North End modification	Jun 2011 to Mar 2012
Landscaping works	Oct 2011 to Jan 2012
Site reinstatement works	Jan 2012 to May 2012

Concurrent Projects

1.1.5 Based on the tentative construction programme, the Project will be carried out concurrently with the adjacent Tung Ying Building Redevelopment, which is under construction. It is expected that the foundation and infrastructure works of the Tung Ying Building Redevelopment will be completed at the time of the commencement of this Project. Consequently, cumulative environmental impacts from the Tung Ying Building Redevelopment are envisaged to be insignificant.

1.2. Need of an EM&A Programme

1.2.1 According to EPD's EM&A Guidelines for Development Projects in Hong Kong, the need of an EM&A programme for this Project is concluded with the reasons that, the project has the potential of causing construction air quality and noise impacts to the sensitive receivers close to the proposed works areas if the recommended mitigation measures are not properly implemented.

1.3. Purpose of the Manual

- 1.3.1 The purpose of this Environmental Monitoring and Audit (EM&A) Manual is to guide the set up of an EM&A programme to ensure compliance with the Environmental Impact Assessment (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 proposed Project. It aims to provide systematic procedures for monitoring, auditing and minimising environmental impacts associated with Project activities.
- 1.3.2 *Guidelines for Development Projects in Hong Kong – Environmental Monitoring and Audit* has been referenced 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 Technical Memorandum on the EIA Process (EIAO-TM).
- 1.3.3 This Manual contains the following information:
- Responsibilities of the Contractor, the Engineer or Engineer's Representative (ER), Environmental Team (ET) and Independent Environmental Checker (IEC) with respect to the EM&A requirements during the course of the Project;
 - Project organisation;
 - The basis for, and description of the broad approach underlying the EM&A programme;
 - Requirements with respect to the construction programme schedule and the necessary EM&A programme to track the varying environmental impact;
 - 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;
 - Requirements for presentation of EM&A data and appropriate reporting procedures; and
 - Requirements for review of EIA predictions and the effectiveness of the mitigation measures and the EM&A programme.
- 1.3.4 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.

1.4. Project Organisation

1.4.1 The roles and responsibilities of the various parties involved in the EM&A process are outlined in the following paragraphs. The roles of ET and ER will both be played by MTRCL like all other MTRCL projects. This organisation structure will allow optimal lines of communications between ET, ER and the Contractor and will ensure that the Contractor will perform the implementation measures effectively and in a timely fashion. The proposed project organisation and lines of communication with respect to environmental management for the Project are shown in **Figure 1.2**.

Engineer or Engineer's Representative (ER)

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

- Supervising the Contractor's activities and ensure the requirements in the EM&A Manual are fully complied with;
- Informing the Contractor when action is required to reduce impacts in accordance with the Event and Action Plans;
- Participating in joint site inspection undertaken by the ET and IEC; and
- Adhering to the procedures for carrying out complaint investigation.

The Contractor

1.4.3 The Contractor shall report to the Engineer. The duties and responsibilities of the Contractor are:

- To provide assistance to ET in carrying out monitoring;
- To submit proposals on mitigation measures in case of exceedances of Action and Limit Levels in accordance with the Event and Action Plans;
- To implement measures to reduce impact where Action and Limit Levels are exceeded;
- To implement the corrective actions instructed by the Engineer;
- To accompany joint site inspection undertaken by the ET; and
- To adhere to the procedures for carrying out complaint investigation.

Environmental Team (ET)

1.4.4 The ET shall conduct the EM&A programme and be managed by the ET Leader. The ET Leader shall have a relevant professional qualification and sufficient experience in EM&A. Suitably qualified staff should be included in the ET. The duties of the ET shall include:

- To monitor various environmental parameters as required in this EM&A Manual;

- To analyse the EM&A data and review the success of EM&A programme to cost-effectively confirm the adequacy of mitigation measures implemented and the validity of the EIA predictions and to identify any adverse environmental impacts arising;
- To carry out regular site inspection to investigate and audit the Contractors' site practice, equipment/plant and work methodologies with respect to pollution control and environmental mitigation, and effect proactive action to pre-empt problems;
- To audit and prepare monitoring and audit reports on the environmental monitoring data and site environmental conditions;
- To recommend suitable mitigation measures to the Contractor in the case of exceedance of Action and Limit Levels in accordance with the Event and Action Plans; and
- To adhere to the procedures for carrying out complaint investigation.

Independent Environmental Checker (IEC)

1.4.5 The IEC shall have project management experience in addition to the requirements of the ET Leader stated above. The duties and responsibilities of the IEC are:

- To provide proactive advice on EM&A matters related to the Project, independent from the management of construction works, but empowered to audit the environmental performance of construction;
- To audit in an independent, objective and professional manner in all aspects of the EM&A programme;
- To check, review, verify and validate the overall environmental performance of the project, including the implementation of environmental protection and mitigation measures, submissions relating to EM&A, and any other submissions required under the Environmental Permit (EP) for the project; and
- On a need basis, to verify and certify the environmental acceptability of the construction methodology, relevant design plans and submissions under the EP.

1.4.6 Sufficient and suitably qualified professional and technical staff should 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.

2. CONSTRUCTION AIR QUALITY

2.1. Introduction

2.1.1 This section presents the requirements, methodology, equipment, monitoring locations, criteria and protocols for the monitoring and audit of air quality impacts during the construction phase of the Project. No exceedances of the Hong Kong Air Quality Objectives (HKAQO) criteria were predicted in the EIA report at Air Sensitive Receivers (ASRs) in the vicinity of the construction sites and it is concluded that the Project would not cause any adverse air quality impacts. However, environmental monitoring and audit is recommended to monitor the effectiveness of the proposed mitigation measures.

2.1.2 The objectives of the air quality monitoring are:

- To identify the extent of construction dust impacts on sensitive receivers;
- To determine the effectiveness of mitigation measures to control fugitive dust emission from activities during construction phase;
- To audit the compliance of the Contractor with regard to dust control, contract conditions and the relevant dust impact criteria;
- To recommend further mitigation measures if found to be necessary; and
- To comply with Action and Limit (A/L) Levels for air quality as defined in this Manual.

2.2. Methodology and Criteria

2.2.1 The criteria against which ambient air quality monitoring shall be assessed are:

- The Hong Kong Air Quality Objectives (AQOs) for TSP, 24-hour TSP levels of $260\mu\text{g m}^{-3}$
- The 1-hour TSP limit of $500\mu\text{g m}^{-3}$ under EIAO TM.

2.2.2 These levels are not to be exceeded at Air Sensitive Receivers (ASRs).

2.2.3 Monitoring and audit of the TSP levels shall be carried out by the ET to detect any deteriorating air quality and to take timely action to rectify such situation.

2.2.4 1-hour or 24-hour average TSP levels shall be measured to indicate the impacts of construction dust on air quality. The 24-hour average TSP levels shall be measured by referring to the standard high volume sampling method as set out in the *Title 40 of the United States Code of Federal Regulations, Chapter I (Part 50) Appendix B*. Upon agreement from the IEC, 1-hour average TSP levels can be measured by direct reading methods to indicate short-term impacts.

2.2.5 All relevant data including temperature, pressure, wind speed and direction, weather conditions, elapsed-time meter reading for the start and stop of the sampler, identification and weight of the filter paper, other local atmospheric factors affecting or affected by site conditions and work progress of the concerned site, etc. shall be recorded in detail. A sample data record sheet based on the one presented in the EM&A Guidelines for Development Projects in Hong Kong is shown in **Appendix C**. The ET may modify the data record sheet for this EM&A programme.

2.3. Monitoring Equipment

2.3.1 The ET shall be responsible for the provision of the monitoring equipment. The ET shall provide sufficient number of high volume sampler (HVS) and / or direct reading dust meter with appropriate calibration kit 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. All the equipment, calibration kit, filter papers, etc, shall be clearly labelled.

2.3.2 Calibration of dust monitoring equipment shall be conducted as specified by the manufacturer. The calibration data shall be properly documented for future reference. All the data shall be converted into standard temperature and pressure condition.

2.3.3 A HVS in compliance with the following specifications shall be used for carrying out the 1-hour and 24-hour TSP monitoring:

- 0.6 - 1.7 m³ per minute (20 - 60 standard cubic feet per minute) adjustable flow range;
- Equipped with a timing / control device for 24 hours operation;
- Installed with elapsed-time meter for 24 hours operation;
- Capable of providing a minimum exposed area of 406 cm² (63 in²);
- 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.

2.3.4 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 down on the data sheet as mentioned in **Appendix C**.

2.4. Laboratory Measurement / Analysis

2.4.1 Filter paper 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.

2.4.2 After sampling, the filter paper loaded with dust shall be kept in a clean and tight sealed 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. The balance shall be regularly calibrated against a traceable standard.

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

2.5. Monitoring Locations

2.5.1 Besides the distance to the emission sources, the nature and scale of works are considered for selection of monitoring location. The cut-and-cover works area in front of Comfort Building involves only small amount of excavation. In addition, the predicted TSP concentrations (both 1-hr and 24-hr) at ASR A14 (Comfort Building) are well below the EIAO-TM criteria. Hence A2 is identified as the representative dust monitoring location as listed in **Table 2.1** below and shown in **Figure 2.1**.

Table 2.1 Proposed Dust Monitoring Stations

Identification No.	ASR ID in EIA Report	Air Quality Monitoring Location
M1	A2	Hai Phong Mansion

2.5.2 When alternative monitoring locations are proposed, the following criteria, as far as practicable, shall be followed:

- At the site boundary or such locations close to the major dust emission source;
- Close to the air sensitive receivers;
- Proper position/sitting and orientation of the monitoring equipment; and
- Take into account the prevailing meteorological conditions.

2.5.3 When positioning the sampler, the following points shall be noted:

- A horizontal platform with appropriate support to secure the samplers against gusty wind shall be provided;
- No two samplers shall be placed less than 2m 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 2m of separation from walls, parapets and penthouses is required for rooftops samplers;
- A minimum of 2m of separation from any supporting structure, measures horizontally is required;
- No furnace or incinerator flue is nearby;

- Airflow around the sampler is unrestricted;
- The sampler is more than 20m from the dripline;
- Any wire fence and gate to protect the sampler, shall 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.

2.6. Baseline Monitoring

- 2.6.1 Baseline monitoring shall be carried out to determine the ambient 1-hour and 24-hour TSP levels at the monitoring locations prior to the commencement of the Project works. 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 Baseline monitoring shall be carried out at each designated monitoring location for a continuous period of at least 14 days prior to the commissioning of the construction works to obtain daily 24-hour TSP samples. 1-hour sampling shall also be done at least 3 times per day. Baseline monitoring shall be carried out under typical weather conditions. General meteorological conditions (wind speed, direction and precipitation) and notes regarding any significant adjacent dust producing sources shall also be recorded throughout the baseline monitoring period.
- 2.6.3 In case the baseline monitoring cannot be carried out at the designated monitoring locations during baseline monitoring period, the ET shall carry out the monitoring at alternative locations which can effectively represent the baseline conditions at the impact monitoring locations.
- 2.6.4 In exception cases, when insufficient baseline monitoring data or questionable results are obtained, the ET shall liaise with EPD to agree on an appropriate set of data to be used as a baseline reference.
- 2.6.5 If the ET 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 monitoring shall be at times when the contractor's activities are not generating dust. The revised levels, in turn, the air quality criteria, shall be agreed with EPD.

2.7. Impact Monitoring

- 2.7.1 The ET shall carry out impact monitoring during construction phase of the Project. For regular impact monitoring, a sampling frequency of at least once per week shall be strictly observed at all of the monitoring station for 24-hour TSP monitoring.

2.7.2 In case of non-compliance with the air quality criteria, more frequent monitoring, as specified in the Event and Action Plan in **Table 2.3**, shall be conducted within the 24 hours after the non-compliance is known. 1-hour TSP monitoring shall be conducted after the non-compliance is known instead of 24-hour TSP monitoring. This additional monitoring shall be continued until the excessive dust emission or the deterioration in air quality is rectified.

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 and 24-hour TSP. **Table 2.2** shows the air quality criteria, namely Action and Limit Levels to be used. Should non-compliance of the air quality occur, action in accordance with the Event and Action Plan in **Table 2.3** shall be carried out.

Table 2.2 Action and Limit Levels for Air Quality (Dust)

Parameter	Action Level ⁽¹⁾	Limit Level
24-hour TSP	<ul style="list-style-type: none"> • $BL \leq 200 \mu\text{g m}^{-3}$, $AL = (BL * 1.3 + LL)/2$ • $BL > 200 \mu\text{g m}^{-3}$, $AL = LL$ 	$260 \mu\text{g m}^{-3}$
1-hour TSP	<ul style="list-style-type: none"> • $BL \leq 384 \mu\text{g m}^{-3}$, $AL = (BL * 1.3 + LL)/2$ • $BL > 384 \mu\text{g m}^{-3}$, $AL = LL$ 	$500 \mu\text{g m}^{-3}$

(1) BL = Baseline level, AL = Action level, LL = Limit level.

Table 2.3 Event / Action Plan for Air Quality (Dust)

Event	Action			
	ET	Contractor	ER	
<p>Action Level being exceeded</p>	<ol style="list-style-type: none"> 1. Conduct additional measurement to confirm finding. 2. Identify source and investigate the causes of exceedance, if caused by MTRCL's work. 3. Inform IEC, ER and Contractor. 4. Discuss with IEC, ER and Contractor on remedial actions required. 5. If necessary, conduct additional monitoring to assess the effectiveness of Contractor's remedial actions. 6. If exceedance continues, arrange meeting with IEC and ER to review implementation and identify further appropriate mitigation measures. 7. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Discuss with ET on proper remedial actions. 2. Submit proposals for remedial actions to ER within 3 working days of notification. 3. Amend proposal if appropriate. 4. Implement the agreed proposals. 5. Liaise with ER to optimize the effectiveness of the agreed mitigation. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance. 2. Notify Contractor. 3. Check Contractor's working methods. 4. Agree with the Contractor on the remedial measures to be implemented. 5. Ensure proper implementation of remedial measures. 6. Assess the efficiency of remedial actions and keep the Contractor informed. 	<ol style="list-style-type: none"> 1. Check Contractor's working method. 2. Advise ET on the effectiveness of the proposed remedial measures.

Event	Action			IEC
	ET	Contractor	ER	
Limit level being exceeded	<ol style="list-style-type: none"> 1. Conduct additional measurement to confirm findings. 2. Identify source and investigate the causes of exceedance; 3. Notify EPD, IEC, ER and Contractor. 4. Check Contractor's working procedures. 5. Discuss with IEC, ER and Contractor on remedial actions required. 6. If necessary, conduct additional monitoring to assess effectiveness of Contractor's remedial actions. 7. Keep EPD, IEC and ER informed of the monitoring results. 8. If exceedance continues, arrange meeting with IEC and ER to review implementation and identify further appropriate mitigation measures. 9. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance. 2. Discuss with ET and ER on proper remedial actions. 3. Submit proposals for remedial actions to ER within 3 working days of notification. 4. Implement the agreed proposals. 5. Liaise with ER to optimize the effectiveness of the agreed mitigation. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance. 2. Notify Contractor. 3. Check Contractor's working methods. 4. Agree with the Contractor on the remedial measures to be implemented. 5. Ensure proper implementation of remedial measures. 6. Assess the efficiency of remedial actions and keep the Contractor informed. 	<ol style="list-style-type: none"> 1. Check Contractor's working method. 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ET accordingly.

2.9. Mitigation Measures

- 2.9.1 Mitigation measures for dust control have been recommended in the EIA Report. The Contractor shall be responsible for the design and implementation of these measures.
- 2.9.2 To comply with the guideline level and AQO at the ASRs, the good site practices and mitigating measures stipulated in the *Air Pollution Control (Construction Dust) Regulation* should be implemented to minimize construction dust impact. A number of practical measures are listed below:
- Watering of active construction works area twice a day.
 - Skip hoist for material transport should be totally enclosed by impervious sheeting.
 - Every vehicle should be washed to remove any dusty materials from its body and wheels before leaving a construction site.
 - The area where vehicle washing takes place and the section of the road between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores.
 - Where a site boundary adjoins a road, streets or other accessible to the public, hoarding of not less than 2.4m high from ground level should be provided along the entire length except for a site entrance or exit.
 - Every stack of more than 20 bags of cement should be covered entirely by impervious sheeting places in an area sheltered on the top and the 3 sides.
 - All dusty materials should be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet.
 - The height from which excavated materials are dropped should be controlled to a minimum practical height to limit fugitive dust generation from unloading.
 - Stockpile of excavated or dusty materials shall be covered entirely by clean impervious sheeting.
 - The load of dusty materials carried by vehicle leaving a construction site should be covered entirely by clean impervious sheeting to ensure dust materials do not leak from the vehicle.
 - Instigation of an environmental monitoring and auditing program to monitor the construction process in order to enforce controls and modify method of work if dusty conditions arise.
- 2.9.3 The implementation schedule for the recommended construction air quality impact mitigation measures is presented in Appendix B.

3. NOISE

3.1. Introduction

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

3.2. Construction Noise Parameters

3.2.1 The construction noise level shall be measured in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}). $L_{eq (30 \text{ minutes})}$ shall be used as the monitoring parameter for the time period between 0700 and 1900 hours on normal weekdays. For all other time periods, $L_{eq (5 \text{ minutes})}$ shall be employed for comparison with the Noise Control Ordinance (NCO) criteria.

3.2.2 A sample data record sheet based on the one presented in *EM&A Guidelines for Development Projects in Hong Kong* is shown in Appendix C. The ET may modify the data record sheet for this EM&A programme.

3.3. Construction Monitoring Equipment

3.3.1 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 levels from before and after the noise measurement agree to within 1.0 dB. The calibration of the sound level meters and their respective calibrators shall be carried out in accordance with the manufacturer's requirements.

3.3.2 Noise measurements should not be made in the presence of fog, rain, wind with a steady speed exceeding 5ms^{-1} or wind with gusts exceeding 10ms^{-1} .

3.3.3 The ET is responsible for providing sufficient and suitable noise measuring equipment and associated instrumentation 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. Construction Noise Monitoring Locations

3.4.1 Based on the EIA Report, the locations designated for construction noise monitoring are listed in Table 3.1 and illustrated in Figure 2.1.

Table 3.1 Noise Monitoring Stations during Construction Phase

Identification No.	NSR ID in EIA Report	Noise Monitoring Location
M1	N1	Hai Phong Mansion
M2	N3	Comfort Building
M3	N4	Burlington Arcade

- 3.4.2 As residual noise impact is predicted in the EIA Study, it is recommended to set up a community liaison channel. Other than handling public enquiry/complaint, the management office of Milton Mansion can inform the proponent through this channel if any part of the building becomes residential use.
- 3.4.3 The status and location of noise sensitive receivers may change after issuing this manual. If such cases exist, the ET shall propose updated monitoring locations and seek approval from EPD. When alternative monitoring locations are proposed, the monitoring locations shall be chosen based on the following criteria:
- Monitoring at sensitive receivers close to the major site activities which are likely to have noise impacts
 - Monitoring at the noise sensitive receivers as defined in the TM
 - Assurance of minimal disturbance to the occupants during monitoring
- 3.4.4 The monitoring station shall normally be at a point 1m from the exterior of the noise sensitive facade and be at a position 1.2m above ground. If there is a problem with access to the normal monitoring position, an alternative position should be chosen. 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. Construction Noise Baseline Monitoring**
- 3.5.1 The ET shall carry out baseline noise monitoring prior to the commencement of the construction works. The baseline monitoring shall be carried out daily for a period of at least 2 weeks.
- 3.5.2 In exceptional cases, when insufficient baseline monitoring data or questionable results are obtained, the ET shall liaise with EPD to agree on an appropriate set of data to be used as a baseline reference.
- 3.6. Construction Noise Impact Monitoring**
- 3.6.1 Noise monitoring shall be carried out at the designated monitoring stations. The monitoring frequency shall depend on the scale of the construction activities. When noise generating activities are underway a weekly monitoring frequency (one set of measurement between 0700 and 1900 hours on normal weekdays) shall be adopted.
- 3.6.2 If construction works are extended to include works during the hours of 1900 – 0700 as well as public holidays and Sundays, applicable construction noise permits (CNP) under NCO shall be obtained by the Contractor.
- 3.6.3 In case of non-compliance with the construction noise criteria, more frequent monitoring, as specified in Event and Action Plan in **Table 3.3** shall be carried out. This additional monitoring shall be continued until the recorded noise levels are rectified or demonstrated to be unrelated to the construction activities.

- 3.6.4 To address the residual construction noise impact predicted in the EIA Study, it is recommended to set up a community liaison channel to handle any public query/complaint. This communication channel with the management office of Milton Mansion is set up such that the proponent would be informed at once if any part of the building becomes residential use.

3.7. Event and Action Plan for Construction Noise

- 3.7.1 The Action and Limit levels for construction noise are defined in **Table 3.2**. Should non-compliance of the criteria occur, action in accordance with the Event and Action Plan in **Table 3.3** shall be implemented.

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)*

* Reduced to 70dB(A) for schools or institution and 65dB(A) during school examination periods

- 3.7.2 To account for cases where ambient noise levels as identified by baseline monitoring approach or exceed the stipulated limit level prior to the commencement of construction, a Maximum Acceptable Impact Level may be defined and agreed with EPD which incorporates the baseline noise value and the identified construction noise limit level by logarithmically summing the two. The amended level will therefore be greater than the limit level and will represent the maximum allowable noise level at a specific monitoring station. Correction factors for the effect of acoustic screening and / or architectural features of NSRs may also be applied as specified in the TM.

Table 3.3 Event and Action Plan for Construction Noise

Event	Action			IEC
	ET	Contractor	ER	
Action Level being exceeded	<ol style="list-style-type: none"> 1. Undertake measurement to establish validity of complaint. 2. Identify source(s) of complaint. 3. Notify IEC, ER and Contractor. 4. Discuss with the IEC, ER and Contractor on remedial measures required. 5. Increase monitoring frequency to check mitigation effectiveness. 6. If exceedance continues, arrange meeting with IEC and ER to review implementation and identify further appropriate mitigation measures. 7. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to ER within three working days of notification. 2. Amend proposal if appropriate. 3. Implement noise mitigation proposals. 4. Liaise with ER to optimize the effectiveness of the agreed mitigation. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of complaint. 2. Notify Contractor. 3. Check Contractor's working methods. 4. Agree with the Contractor on the remedial measures to be implemented. 5. Ensure proper implementation of remedial measures. 6. Assess the efficiency of remedial actions and keep the Contractor informed. 7. Inform complainant of actions taken. 	<ol style="list-style-type: none"> 1. Check Contractor's working methods. 2. Review the proposed remedial measures by the Contractor and advise the ET accordingly.

Event	Action			IEC
	ET	Contractor	ER	
Limit Level being exceeded	<ol style="list-style-type: none"> 1. Repeat measurement to confirm findings. 2. Identify source and investigate the cause of exceedance. 3. Inform EPD, IEC, ER and Contractor. 4. Check Contractor's working procedures. 5. Discuss with the IEC, Contractor and ER on remedial measures required. 6. Increase monitoring frequency to assess effectiveness of Contractor's mitigation actions and keep EPD, IEC and ER informed the results. 7. If exceedance continues, arrange meeting with IEC and ER to review implementation and identify further appropriate mitigation measures. 8. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance. 2. Submit proposals for remedial actions to ER within 3 working days of notification. 3. Implement the agreed proposals. 4. Liaise with ER to optimize the effectiveness of the agreed mitigation. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance. 2. Notify Contractor. 3. Check Contractor's working methods. 4. Agree with the Contractor on the remedial measures to be implemented. 5. Ensure proper implementation of remedial measures. 6. Assess the efficiency of remedial actions and keep the Contractor informed. 	<ol style="list-style-type: none"> 1. Check Contractor's working methods. 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ET accordingly.

3.8. Construction Noise Mitigation Measures

3.8.1 The EIA report indicated some noise exceedance for limited periods of time. Therefore, appropriate mitigation measures and good site practices are recommended to be properly implemented. The mitigation measures recommended in the EIA report are summarised below:

- Use of silenced type of powered mechanical equipment, which should be in accordance with BS 5228: Part 1, 1997 during construction;
- Use of movable noise barrier;
- Use of noise enclosure / acoustic shed;
- Use of silencer;
- Use of noise insulating fabric;
- Decking over the excavation areas at the Entrance A1 and satellite concourse; and
- Implementation of the following good site practices:
 - Only well-maintained plant shall be operated on-site and plant shall be serviced regularly during the construction program.
 - Silencers or mufflers on construction equipment shall be utilised and shall be properly maintained during the construction program.
 - Mobile plant, if any, shall be sited as far away from NSRs as possible.
 - Machines and plant (such as trucks) that may be in intermittent use shall be shut down between works periods or shall be throttled down to a minimum.
 - Plant known to emit noise strongly in one direction shall, wherever possible, be orientated so that the noise is directed away from the nearby NSRs.
 - Material stockpiles and other structures shall be effectively utilised, wherever practicable, in screening noise from on-site construction activities.

3.8.2 A community liaison channel will be set up to handle any public enquiry and complaint.

3.8.3 The implementation schedule for the recommended mitigation measures is presented in **Appendix B**.

3.9. Operation Ventilation Noise

3.9.1 The EIA report has provided the maximum allowable sound power levels (SWLs) for the ventilation shafts to be operated. The SWL criteria shall be implemented and refined by the Contractor. The Contractor should also implement any necessary mitigation measures to ensure the compliance of the operation airborne noise levels with the TM's stipulated noise standard. A summary of Max SWL for ventilation shafts is given in the following table:

Table 3.4 Summary of Max SWL for Ventilation Shafts

*Source Location	**Direction Facing	Shortest horizontal distance to Milton Mansion, m	Maximum SWL at 0700-2300, dB(A)	Maximum SWL at 2300-0700, dB(A)
Tung Ying Building	West (Nathan Road)	17	92	85
	South (Granville Road)	15	91	84
Hotel Miramar	West (Nathan Road)	44	100	93

Note: (*) Only one of the sources would be in operation as the exact locations for exhaust or smoke extraction are still under design.

(**) The vent shaft would be located at one direction only. The exact location of the shaft opening from Tung Ying Building is still under design. MTRCL would take the responsibility of the design and maintenance of the proposed ventilation system and implement the noise mitigation measures to ensure the noise criteria could be met.

3.9.2 However, it is still recommended that the following noise reduction measures shall be considered as far as practicable during construction:

- Choose quieter plant such as those which have been effectively silenced.
- Include noise levels specification when ordering new plant (including chillier and E/M equipment).
- Locate fixed plant/louver away from any NSRs as far as practicable.
- Locate fixed plant in walled plant rooms or in specially designed enclosures.
- Locate noisy machines in a basement or a completely separate building.
- Install direct noise mitigation measures including silencers, acoustic louvers and acoustic enclosure where necessary.
- Develop and implement a regularly scheduled plant maintenance programme so that equipment is properly operated and serviced in order to maintain controlled level of noise. The programme should be implemented by properly trained personnel.

4. CONSTRUCTION WATER QUALITY

4.1. Introduction

4.1.1 The water quality impact assessment in the EIA Report identified that no adverse impact would occur during the construction of the Project provided the recommended mitigation measures were correctly implemented. It is recommended that regular site inspections shall be undertaken to inspect the construction activities and works areas in order to ensure the recommended mitigation measures are properly implemented.

4.2. Site Inspection

4.2.1 Regular site inspection should be conducted to inspect the construction activities and works areas in order to ensure the recommended mitigation measures are properly implemented, which is adequate for protection of water resources.

4.3. Mitigation Measures

4.3.1 Mitigation measures recommended for the construction phase of the Project are summarized below. The implementation schedule of the recommended water quality mitigation measures is presented in **Appendix B**.

Construction Site Run-off and Drainage

4.3.2 Construction runoff and site drainage should be prevented or minimized in accordance with the guidelines stipulated in ProPECC PN 1/94 "Construction Site Drainage". The specified mitigation measures and practices include the following:

- Provision of perimeter drains to intercept off-site water around the site with internal drainage works and erosion and sedimentation control facilities implemented. These shall be constructed in advance of site formation works and earthworks. Earth bunds or sand bag barriers should be provided on-site to direct storm water to silt removal facilities. The design of the temporary on-site drainage system will be undertaken by the Contractor prior to the commencement of construction.
- All drainage facilities and erosion and sediment control structures should be regularly inspected and maintained to ensure proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit should be regularly removed, at the onset of and after each rainstorm to ensure that these facilities are functioning properly at all times.
- Exposed slope/soil surface should be covered by tarpaulin as soon as possible to reduce the potential of soil erosion. Arrangements should always be in place to ensure that adequate surface protection measures can be safely carried out well before the arrival of a rainstorm. Other measures that need to be implemented before, during and after rainstorms are summarized in ProPECC PN 1/94.
- Open stockpiles of construction materials (e.g. aggregates, sand and fill material) or construction wastes on-site of more than 50m³ should be covered with tarpaulin or similar fabric during rainstorms.

- Construction works should be programmed to minimise surface excavation works during the rainy seasons (April to September). All exposed earth areas should be completed and vegetated as soon as possible after earthworks have been completed, or alternatively, within 14 days of the cessation of earthworks where practicable. If excavation of soil cannot be avoided during the rainy season, or at any time of year when rainstorms are likely, exposed surfaces should be covered by tarpaulin or other means.
- Manholes should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris being washed into the drainage system and storm runoff being directed into foul sewers.
- Precautions be taken at any time of year when rainstorms are likely, actions to be taken when a rainstorm is imminent or forecasted, and actions to be taken during or after rainstorms are summarised in Appendix A2 of ProPECC PN 1/94.
- All vehicles and plant should be cleaned before leaving a construction site to ensure no earth, mud, debris and the like is deposited by them on roads. An adequate designed and sited wheel washing facilities should be provided at every construction site exit, where practicable. Wash-water should have sand and silt settled out and removed at least on a weekly basis to ensure the continued efficiency of the process. The section of access road leading to, and exiting from, the wheel-wash bay to the public road should be paved with sufficient backfall toward the wheel-wash bay to prevent vehicle tracking of soil and silty water to public roads and drains.
- Oil interceptors should be provided in the drainage system downstream of any oil/fuel pollution sources. The oil interceptors should be emptied and cleaned regularly to prevent the release of oil and grease into the storm water drainage system after accidental spillage. A bypass should be provided for the oil interceptors to prevent flushing during heaving rain.
- Construction solid waste, debris and rubbish on site should be collected, handled and disposed of properly to avoid water quality impacts.

Underground Works

- 4.3.3 Underground works should be conducted sequentially to limit the amount of construction runoff generated from exposed areas during the wet season (April to September).
- 4.3.4 Uncontaminated discharge should pass through settlement tanks prior to off-site discharge.
- 4.3.5 The wastewater with a high concentration of SS should be treated (e.g. by settlement in tanks with sufficient retention time) on-site prior to off-site discharge. Oil interceptors would also be installed to remove the oil, lubricants and grease from the wastewater if required.

Sewage Effluent

- 4.3.6 Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site where necessary to handle sewage from the workforce. A licensed contractor would be responsible for appropriate disposal of waste matter and maintenance of these facilities.

General Construction Site Activities

- 4.3.7 Debris and rubbish generated on-site should be collected, handled and disposed of properly to avoid being flushed or blown by wind into the drainage culvert. Stockpiles of cement and other construction materials should be kept covered when not being used.
- 4.3.8 Oils and fuels should only be used and stored in designated areas which have pollution prevention facilities. To prevent spillage of fuels and solvents, all fuel tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. The bund should be drained of rainwater after a rain event.

5. WASTE MANAGEMENT IMPLICATIONS

5.1. Introduction

5.1.1 Waste management during the construction phase will be the contractor's responsibility. The contractor must confirm that all wastes produced during the construction phase of the Project are handled, stored and disposed of in accordance with good waste management practices and EPD's regulations and requirements. The recommended mitigation measures in the EIA Report should form the basis of the Waste Management Plan to be developed by the Contractor in the construction stage.

5.1.2 Waste materials generated during construction activities, such as construction and demolition (C&D) materials and general refuse, are recommended to be audited at regular intervals to ensure that proper storage, transportation and disposal practices are being implemented. The Contractor would be responsible for the implementation of any mitigation measures to minimise waste or redress problems arising from the waste materials.

5.2. Mitigation Measures

5.2.1 Mitigation measures for waste management as recommended in the EIA Report are summarised below. With the appropriate handling, storage and removal of waste arising during the construction works as defined below, the potential to cause adverse environmental impacts would be minimised.

5.2.2 The implementation schedule of the recommended mitigation measures is presented in Appendix B. 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 and other mitigation measures.

Good Site Practices

5.2.3 Adverse impacts related to waste management are not expected to arise, provided that good site practices are strictly followed. Recommendations for good site practices during the construction activities include:

- Nomination of an approved person, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site.
- Training of site personnel in proper waste management and chemical waste handling procedures.
- Provision of sufficient waste disposal points and regular collection for disposal.
- Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers.
- Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors.

- A Waste Management Plan should be prepared and submitted to the Engineer for approval. One may make reference to ETWB TCW No. 19/2005 for details.
- A recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) should be proposed.

5.2.4 In order to monitor the disposal of C&D materials at public fill reception facilities, as appropriate, and to control fly tipping, a trip-ticket system should be included as one of the contractual requirements. One may make reference to ETWB TCW No. 31/2004 for details. The use of a trip-ticket system would be required to avoid any illegal or unplanned dumping of waste generated by the Project.

Waste Reduction Measures

5.2.5 Good management and control can prevent the generation of significant amount of waste. Waste reduction is best achieved at the planning and design stage, as well as by implementing of good site practices. Recommendations to achieve waste reduction include:

- Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal;
- Encourage collection of aluminium cans by providing separate labelled bins to enable this waste to be segregated from other general refuse generated by the workforce;
- Any unused chemicals or those with remaining functional capacity shall be recycled;
- Proper storage and site practices to minimise the potential for damage or contamination of construction materials; and
- Plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste.

5.2.6 In addition to the above measures, specific mitigation measures are recommended below for the identified waste arisings to minimise environmental impacts during handling,

Construction and Demolition Material

5.2.7 Within stockpile areas, the following measures should be taken to control potential environmental impacts or nuisance:

- Covering stockpile of C&D material entirely by clean impervious sheet to reduce potential dust impact;
- Locating stockpiles to minimise potential visual impacts; and
- Minimizing land intake of stockpile areas as far as possible.

- 5.2.8 When disposing C&D material at a public fill reception facility, the material shall only consist of soil, rock, concrete, brick, cement plaster/mortar, inert building debris, aggregates and asphalt. The material shall be free from marine mud, household refuse, plastic, metals, industrial and chemical waste, animal and vegetable matter, and other material considered to be unsuitable by the Filling Supervisor.

Chemical Wastes

- 5.2.9 After use, chemical wastes (for example, cleaning fluids, solvents, lubrication oil and fuel) should be handled according to the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes*. Spent chemicals should be collected by a licensed collector for disposal at the Chemical Waste Treatment Centre or other licensed facility, in accordance with the *Waste Disposal (Chemical Waste) (General) Regulation*.

General Refuse

- 5.2.10 General refuse should be stored in enclosed bins or compaction units separate from C&D material. A licensed waste collector should be employed by the contractor to remove general refuse from the site, separately from C&D material. Preferably an enclosed and covered area should be provided to reduce the occurrence of 'wind blown' light material.

6. LANDSCAPE AND VISUAL

6.1. Introduction

6.1.1 It is recommended that EM&A for landscape and visual resources is undertaken during the detailed design stage as well as the construction and operational phases of the project.

6.1.2 The key landscape resources and visual sensitive receivers are shown in Figures of EIA report, mitigation measures are shown in **Figure 6.1**.

6.2. Monitoring Details

6.2.1 The design, implementation and maintenance of landscape mitigation measures should be checked to ensure that they are fully realised and that potential conflicts between the proposed landscape measures and any other project works and operational requirements are resolved at the earliest possible date and without compromise to the intention of the mitigation measures.

Design

6.2.2 The incorporation of design guidelines proposed within the EIA during the detailed design stage should be checked to ensure that they fulfil the intentions of the mitigation measures. Any design changes should also be checked.

Construction & Establishment Period

6.2.3 Implementation of the mitigation measures recommended by the EIA should be monitored throughout the construction phase site audit programme to ensure compliance with the intended aims of the measures.

6.2.4 The implementation of landscape works including tree transplanting and preservation works, and subsequent maintenance during the 12-month establishment period must be supervised by a competent landscape architect (employed by the Contractor). Measures undertaken by both the Contractor and Landscape Contractor shall be audited by the ET on a regular basis to ensure compliance with the intended aims of the measures. Moreover, detailed tree preservation, transplanting and compensatory planting proposals shall be submitted to relevant government departments for approval in accordance with ET WBTC no. 3/2006.

6.2.5 The progress of the engineering works shall be regularly reviewed on site to identify the earliest practical opportunities for the landscape works to be undertaken.

OVT Protection

6.2.6 Appropriate protection measures for OVTs have been recommended in the EIA Report. Under the study, the residual impacts on OVTs are considered as insubstantial with mitigation measures as no OVTs will be affected. The crown and root of OVTs will be preserved in-situ.

- 6.2.7 The proposed emergency exit in front of the Miramar Shopping Centre has been designed to place well away from the OVT in the roadside planter. It will be located at approximately 12m from the trunk of the OVT and approximately 5m away from its drip line. Nevertheless, appropriate protection measures for the OVT as recommended by Professor C.Y. Jim of the University of Hong Kong are proposed. Extra care will be taken to ensure that the OVT will not be unduly affected.
- Measures stipulated in the ETWB TCW No. 29/ 2004 will be followed as appropriate.
 - The area will be instituted to guard against intrusion into Cordon Zone (CZ).
 - The CZ should not be allowed to become a resting place, eating or recreational space for workers.
 - No construction crews, vehicles or equipment should be allowed for enter the CZ.
 - Construction materials and equipment should not be stored inside the CZ.
 - Construction wastewater or effluent should not flow into the CZ.
 - Exhaust fumes and hot air emanated by construction machines should not drift into the tree crown.
 - The existing concrete paving and soil within CZ should be kept intact to avoid disturbing the soil and the enclosed roots.
 - As far as practicable, construction equipment with a short rig or body should be employed to avoid conflicts with the tree crown.
 - Grouting will be carried out in a controlled and effective manner for the protection of tree roots along Nathan Road.
 - A programme of close monitoring of tree condition before (baseline evaluation), during and for one year after completion of construction, shall be instituted at regular intervals.
 - Induction seminar will be organized to coach construction workers and their supervisors of the need and the precautions to protect the tree.
 - Precautionary measures, such as site inspection on tree condition, shall be conducted to protect the trees during the construction stage.

6.3. Mitigation Measures

6.3.1 A series on mitigation measures as recommended in the EIA Report are summarised below:

Construction Phase (Landscape)

- Existing trees including OVTs to be retained on site should be carefully protected and maintained during construction. Encroachment of any works close to the drip line of OVTs should be avoided. (CM1)
- Trees of high amenity and survival rate after transplanting which unavoidably affected by the works should be transplanted where practical. (CM2) Tree Transplanting/Replanting Works shall be implemented as early as practical.

Construction Phase (Visual)

- Control of night – time lighting. (CM3)
- Erection of decorative screen hoarding compatible with surrounding setting. (CM4)

Operation Phase (Landscape)

- Aesthetic design of Entrance A1 (Mimimisation of building bulk and adoption of transparent material) and Emergency Exit. (OM1)
- Planting of 4 nos. of *Delonix regia* or species as agreed with LCSD along Haiphong Road. (OM3). Monitoring and maintenance of re-planting during the 12 months Establishment Period.

Operation Phase (Visual)

- Reinstatement of Kowloon Park entrance. (OM2)

7. BUILT HERITAGE

7.1. Introduction

7.1.1 Two built heritage resources i.e. the retaining wall of the former Whitfield Barracks and Block S4 of the former Whitfield Barracks have been identified in close proximity to the proposed works areas during the built heritage survey. Two granite columns (east of brick wall of modern extension of former Whitfield Barracks) will be required temporary removal and be stored securely during construction period, and reinstated back to its original location after completion of works. Other identified resources are located at 60m or more from the proposed works areas.

7.1.2 The proposed works would not cause any insurmountable adverse impacts to the near historical buildings. However, precaution measures and monitoring are recommended as below to prevent any damage to the historical building.

7.2. Precaution Measures / Monitoring

7.2.1 The construction impact to the near historical buildings has been identified as minimal. However, precautions shall be taken throughout the constructions stage to prevent any damage to the historical building.

7.2.2 Precautions shall be taken throughout the constructions stage to prevent any damage to the historical building. Moreover, MTRCL is required to instigate an assurance system and control scheme to ensure the management of the construction works are at a standard not inferior to that required under the Building Ordinance.

7.2.3 In addition, before the commencement of the construction work, the Contractor shall also consult AMO on any other mitigation measures that would be required administratively or under Antiquities and Monuments Ordinance. The Contractor shall implement these requirements from AMO during the construction period. Method statement of the removal/reinstatement works for two columns at Health Education Exhibition & Resource Centre, should be agreed with AMO by the Contractor.

7.2.4 Besides, there is potential temporary visual impact during construction phase to the two historical structures as identified in the EIA Report and appropriate mitigation measures have been recommended including sensitively designed hoardings.

8. ENVIRONMENTAL AUDITING

8.1. Site Inspections

- 8.1.1 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 on site.
- 8.1.2 The ET shall be responsible for formulating the environmental site inspection, the deficiency and action reporting system, and for carrying out the site inspection works. The Contractor's proposal for rectification would be made known to the ER.
- 8.1.3 Regular site inspections by the ET shall be carried out. 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 situation in the vicinity of the Project sites which is likely to be affected, directly or indirectly, by the site activities. The ET shall make reference to the following information in conducting the inspection:
- The EIA and EM&A recommendations on environmental protection and pollution control mitigation measures;
 - The Environmental Permit conditions;
 - Ongoing results of the EM&A program;
 - Works progress and programme;
 - Individual works methodology proposals (which shall include proposal on associated pollution control measures);
 - Contract specifications on environmental protection;
 - Relevant environmental protection and pollution control laws; and
 - Previous site inspection results undertaken by the ET and others.
- 8.1.4 The Contractor shall keep the ET updated with all relevant information on the construction contract necessary for him to carry out the site inspections. Inspection results and associated recommendations for improvements to the environmental protection and pollution control works shall be passed to the ER and the Contractor for reference and for taking immediate action. The Contractor shall follow the procedures and time-frame 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.
- 8.1.5 The ET shall also 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.

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 with which construction activities must comply.
- 8.2.2 In order that the works are in compliance with the contractual requirements, relevant sections (e.g. sections related to environmental measures) of works method statement submitted by the Contractor to the ER for approval shall be sent to the ET for vetting to see whether sufficient environmental protection and pollution control measures have been included.
- 8.2.3 The ET shall also keep informed of the progress and programme of the works to check that relevant environmental laws have not been violated, and that any foreseeable potential for violating laws can be prevented.
- 8.2.4 The Contractor shall regularly copy relevant documents to the ET so that works checking can be carried out. The document shall at least include the updated Works Progress Reports, updated Works Programme, any application letters for different licence / permits under the environmental protection laws, and copies of all valid licences / permits. The site diary shall also be available for the ET's inspection upon request.
- 8.2.5 After reviewing the documentation, the ET shall advise the ER and the Contractor of any non-compliance with contractual and legislative requirements on environmental protection and pollution control for them to take follow-up actions, including any potential violation of requirements.
- 8.2.6 Upon receipt of the advice, the Contractor shall undertake immediate action to correct the situation. The ER shall follow up to ensure that appropriate action has been taken in order to satisfy contractual and legal requirements.

8.3. Environmental Complaints

- 8.3.1 Environmental complaints shall be referred to the ET for carrying out complaint investigation. Handling of environmental complaints should follow the environmental complaint flow diagram and reporting channel as presented in **Figure 8.1**.
- 8.3.2 During the complaint investigation work, the Contractor and Engineer shall cooperate with the ET 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 works. The Engineer shall ensure that the measures have been carried out by the Contractor.

9. REPORTING

9.1. General

9.1.1 Computer-based environmental monitoring and audit software operated by MTRCL in various recent MTRCL projects such as Tung Chung Cable Car, Penny's Bay Rail Link and Modifications to Tsim Sha Tsui MTR Station will be applied for data recording and reporting.

9.1.2 Types of reports that the ET shall prepare and submit include baseline monitoring report, monthly EM&A report 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 shall be made available to the Director of Environmental Protection (DEP). The exact details of the frequency, distribution and time frame for submission shall be agreed with EPD prior to commencement of works.

9.2. Electronic Reporting of EM&A Information

9.2.1 To facilitate the public inspection of the baseline monitoring report and various EM&A reports, via the EIAO Internet Website and at the EIAO Register Office, electronic copies of these Reports shall be prepared in Hyper Text Markup Language (HTML) or in Portable Document Format (PDF), unless otherwise agreed by EPD and shall be submitted at the same time as the hard copies. An internet website shall be provided to place these electronic reports. The content of the electronic copies of these reports must be the same as the hard copies. The summary of the monitoring data taken shall be included in the various EM&A reports to allow for public inspection via the EIAO internet website.

9.3. Baseline Monitoring Report

9.3.1 The ET shall prepare and submit to EPD a Baseline Environmental Monitoring Report two weeks prior to the commencement of construction.

9.3.2 The baseline monitoring report shall include, but not limited to the following:

- (i) Brief project background information;
- (ii) Drawings showing locations of the baseline monitoring stations;
- (iii) An updated construction programme;
- (iv) Monitoring results together with the following information:
 - Monitoring methodology
 - Types of equipment used and calibration details
 - Parameters monitored
 - Monitoring locations
 - Monitoring date, time, frequency and duration
- (v) Details of influencing factors, including:
 - Major activities, if any, being carried out on the site during the period
 - Weather conditions during the period
 - Other factors which might affect results

- (vi) Determination of the Action and Limit Levels for each monitoring parameter and statistical analysis of the baseline data; and
- (vii) Comments, recommendations and conclusions.

9.4. Monthly EM&A Reports

- 9.4.1 The results and findings of all EM&A work required in this Manual shall be recorded in the monthly EM&A reports prepared by the ET. The EM&A report shall be prepared and submitted to EPD within two weeks after the end of each reporting month, with the first report due in the month after construction commences. Before submission of the first EM&A report, the ET shall liaise with EPD on the required number of copies and format of the monthly reports.
- 9.4.2 The ET shall review the number and location of monitoring stations and parameters on as needed basis, in order to cater for any changes in the surrounding environment and the nature of works in progress.

9.5. First Monthly EM&A Report

- 9.5.1 The first monthly EM&A report shall include at least but not limited to the following:
- (i) Executive summary:
 - Breaches of Action and Limit levels;
 - Complaint log;
 - Notifications of any summons and successful prosecutions;
 - Reporting changes; and
 - Future key issues.
 - (ii) Basic project information:
 - Works undertaken during the month and upcoming months.
 - (iii) Environmental status:
 - Drawings showing the project area and the locations of the monitoring stations; and
 - Advice on status of statutory environmental compliance, the status of compliance with environmental permit (EP) conditions under the EIA Ordinance, submission status under the EP and implementation status of mitigation measures.
 - (iv) A brief summary of EM&A requirements including:
 - All monitoring parameters; and
 - Environmental quality performance limits (Action and Limit levels).
 - (v) Monitoring results together with the following information:
 - Monitoring methodology;
 - Types of equipment used and calibration details;
 - Parameters monitored;
 - Monitoring locations;
 - Monitoring date, time, frequency, and duration;

- Graphical plots of the monitored parameters in the month; and
 - Any other factors which might affect the monitoring results.
- (vi) 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, 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-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures; and
 - Description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance.
- (vii) others
- An account of the future key issues as reviewed from the works programme;
 - Advice on the solid and liquid waste management status during the month including waste generation and disposal records; and
 - Comments including effectiveness of the mitigation measures, recommendations (for example, any improvement in the EM&A programme) and conclusions.

9.6. Subsequent Monthly EM&A Reports

9.6.1 Subsequent monthly EM&A reports shall include the following:

- (i) Executive summary:
- Breaches of Action and Limit levels;
 - Complaints log;
 - Notifications of any summons and successful prosecutions;
 - Reporting changes; and
 - Future key issues.
- (ii) Environmental status:
- Works undertaken during the month and next month;
 - Drawing showing the locations of the monitoring stations; and
 - Advice on status of statutory environmental compliance, the status of compliance with environmental Permit (EP) conditions under the EIA Ordinance, submission status under the EP and implementation status of mitigation measures.

- (iii) Monitoring results together with the following information:
 - Parameters monitored;
 - Monitoring locations;
 - Monitoring date, time, frequency, and duration;
 - Graphical plots of the monitored parameters in the month; and
 - Any other factors which might affect the monitoring results.
- (iv) 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, 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-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures; and
 - Description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance.
- (v) others
 - An account of the future key issues as reviewed from the works programme;
 - Advice on the solid and liquid waste management status during the month including waste generation and disposal records; and
 - Comments including effectiveness of the mitigation measures, recommendations (for example, any improvement in the EM&A programme) and conclusions.

9.7. Final EM&A Review Report

- 9.7.1 The EM&A program shall be terminated upon completion of those construction activities that have the potential to result in a significant environmental impact.
- 9.7.2 The termination of EM&A programme shall be determined on the following basis:
 - (a) completion of construction activities and insignificant environmental impacts of the remaining outstanding construction works;
 - (b) trends analysis to demonstrate the narrow down of monitoring exceedances due to construction activities and the return of ambient environmental conditions in comparison with baseline data; and
 - (c) no environmental complaint and prosecution involved.

The proposed termination should be implemented after it has been endorsed by the IEC, followed by approval from the DEP.

- 9.7.3 The final EM&A summary report contain at least the following information:
- (i) Executive summary;
 - (ii) Basic project information including a synopsis of work undertaken during the course of the Project or past twelve months;
 - (iii) A brief summary of EM&A requirements including:
 - Monitoring parameters; and
 - Environmental quality performance limits (Action and Limit levels).
 - (iv) Advice on the implementation status of environmental and pollution control/mitigation measures;
 - (v) Drawings showing the project area and the locations of the monitoring stations;
 - (vi) Graphical plots of the trends of monitored parameters over the course of the Project;
 - (vii) Provide clear-cut decisions on the environmental acceptability of the project;
 - (viii) Advice on the solid and liquid waste management status including waste generation and disposal records;
 - (ix) A summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit Levels);
 - (x) A brief review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures;
 - (xi) A summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;
 - (xii) A summary record of all complaints received, liaison and consultation undertaken, actions and follow-up procedures taken;
 - (xiii) Review the monitoring methodology adopted and with the benefit of hindsight, comment and its effectiveness (including cost effectiveness);
 - (xiv) A summary record of notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislations, locations and nature of the breaches, investigation, follow-up actions taken and results; and
 - (xv) Review the practicality and effectiveness of the EM&A programme (e.g. a review of the effectiveness and efficiency of the mitigation measures), recommendations (for example, any improvement in the EM&A programme).

9.8. Data Keeping

- 9.8.1 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 reports. However, such document shall be well kept by the ET and be ready for inspection upon request. All documents and data shall be kept for at least one year following completion of the construction contract.

9.9. Interim Notifications of Environmental Quality Limit Exceedances

- 9.9.1 With reference to the Event and Action Plan, when the environmental quality performance limits are exceeded, the ET shall immediately notify the IEC and EPD, as appropriate. The notification shall be followed up with advice to 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 notifications is presented in **Appendix D**.