FINAL REPORT

Highways Department

Agreement No. WD 6/2007 Improvement to Pok Oi Interchange – Environmental Impact Assessment Study: *Environmental Monitoring and Audit Manual*

November 2008

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November 2008

Reference 0072252

For and on behalf of
ERM-Hong Kong, Limited

Approved by: Dr Robin Kennish

Signed: Robin Kennish

Position: Director

Date: 14TH NOVEMBER 2008

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1 INTRODUCTION

1.1 PROJECT DESCRIPTION

1.1.1 Project Background

At present, traffic queues are already observed on the northern approach of Pok Oi Roundabout (POR) during the evening peak period and the southern approach at both morning and evening peaks. The situation will likely deteriorate further when the nearby developments are completed. The tailback of traffic onto the southbound carriageway on the northern approach to POR may block the through traffic from Tai Lam Tunnel / New Territories (NT) North to Tuen Mun / Tin Shui Wai / Hong Kong – Shenzhen Western Corridor.

The *Technical Feasibility Statement* (TFS) for the Improvement to Pok Oi Interchange was completed in November 2005. In September 2006, Highways Department (HyD) commissioned Mott Connell Ltd (MCL) to undertake the *Traffic Impact Assessment* and *Alignment Design Study (Agreement No. WD 3/2006)*. The Study reviewed the preliminary improvement layouts proposed in the TFS, presented recommendations on preferred alignment, configuration and layout, and investigated the traffic carrying capacities of the improvement scheme.

An application under the *Environmental Impact Assessment Ordinance (EIAO)* for an *Environmental Impact Assessment (EIA) Study Brief* was submitted by HyD in May 2007 with the *EIA Study Brief* (No. ESB-166/2007) issued in July 2007.

ERM-Hong Kong, Ltd (ERM), supported by Halcrow China Ltd (Halcrow), has been commissioned by HyD to undertake the *Improvement to Pok Oi Interchange – Environmental Impact Assessment Study* (hereafter referred to as "the Assignment") under *Agreement No. WD 6/2007*. As part of the Assignment, an EIA Study has been undertaken in accordance with the *EIA Study Brief* (No. ESB-166/2007) and the Environmental Monitoring and Audit (EM&A) requirements are presented in this EM&A Manual.

1.1.2 Project Location and Scope

The Project is located at Pok Oi Interchange (POI) in the Yuen Long region of the North-West New Territories. The Study Area is generally rural in nature, with village houses at Wong Uk Tsuen and Small Traders New Village in the surrounding area and along Yuen Long Highway, high-rise residential development at YOHO Town, educational institution at Kwong Ming Ying Loi School, Pok Oi Hospital and Jockey Club Care and Attention Home.

The scope of the Project is as follows:

- provision of a single lane flyover (approximately 140m in length) adjacent to the northbound carriageway of Pok Oi Flyover (POF) (denoted as Flyover A in *Figure 1.1* and subsequent sections of this report);

- construction of a slip road (approximately 410m in length) connecting the northbound carriageway of the ground level road of Yuen Long Highway (YLH) on the southern arm of POR to the proposed flyover (denoted as Slip Road A in *Figure 1.1* and subsequent sections of this report);

- construction of a slip road (approximately 100m in length) connecting the proposed flyover to the northbound carriageway of the ground level section of YLH on the northern arm of POR (denoted as Slip Road B in *Figure 1.1* and subsequent sections of this report);

- construction of a slip road (approximately 280m in length) connecting the southbound carriageway of POF to the southbound carriageway of the ground level section of YLH on the southern arm of POR (denoted as Slip Road C in *Figure 1.1* and subsequent sections of this report);

- resurfacing and re-marking of a stretch of the southbound carriageway (approximately 280m in length) of the ground level section of YLH on the northern arm of POR to increase the number of traffic lanes on the carriageway from three to four (denoted as Road Resurfacing and Remarking A in *Figure 1.1* and subsequent sections of this report);

- resurfacing and re-marking of a stretch of the northbound carriageway (approximately 470m in length) of the ground level section of YLH on the northern arm of POR (denoted as Road Resurfacing and Remarking B in *Figure 1.1* and subsequent sections of this report);

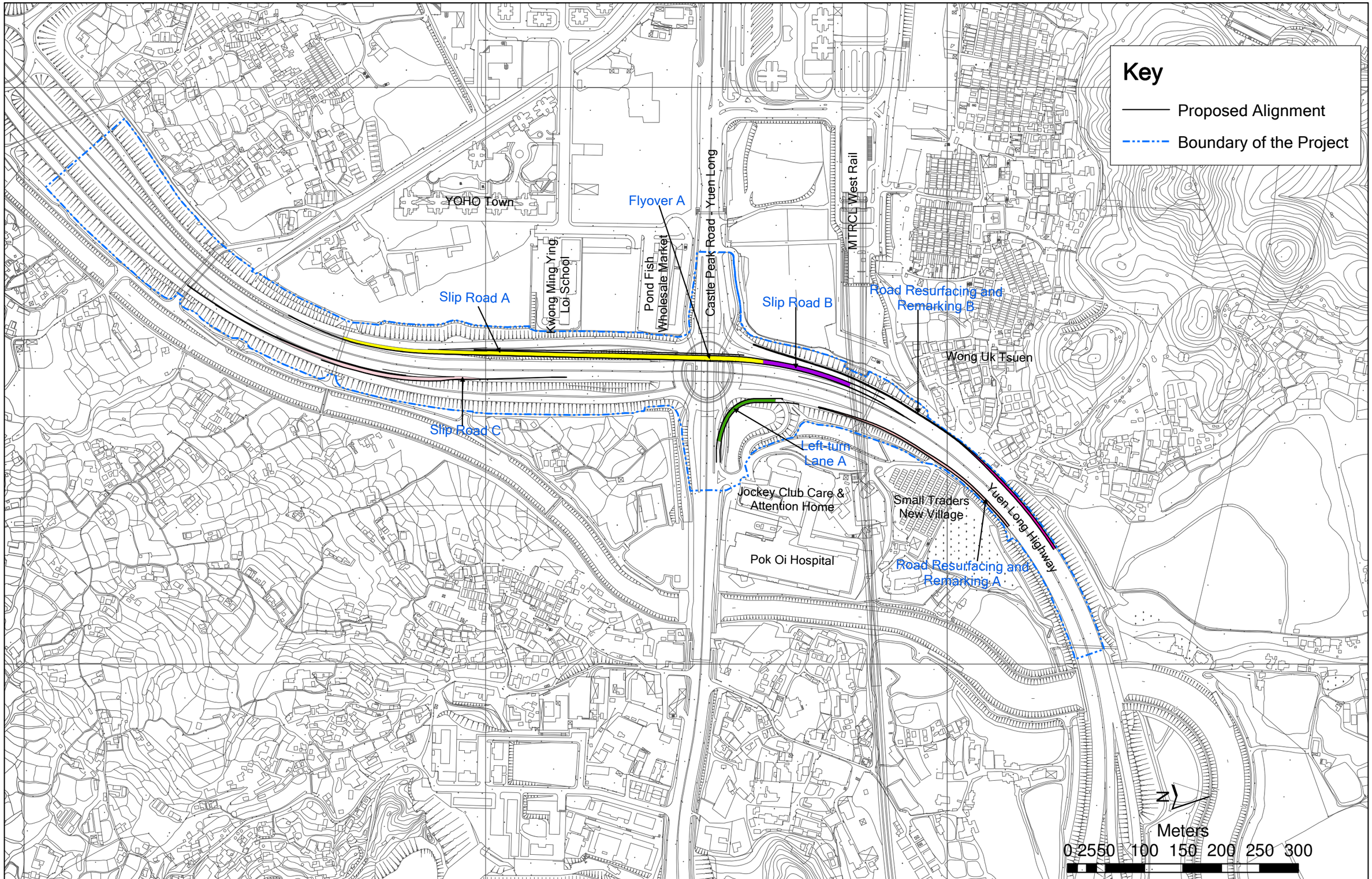
- construction of a segregated left-turn lane (approximately 110m in length) at the northern arm of POR (denoted as Left-turn Lane A in *Figure 1.1* and subsequent sections of this report); and

- associated ancillary works.

The proposed alignment of the Project is presented in *Figure 1.1*.

The Project qualifies as a Designated Project under Item A.1 of Part 1, Schedule 2 of the *EIAO* and the construction and operation of the Project will require an Environmental Permit (EP).

The overall objectives of the EIA Study are to provide information on the nature and extent of environmental impacts arising from the Project and related activities that take place concurrently; to recommend appropriate mitigation measures to control the potential environmental impacts so that it complies with the requirements of the *Technical Memorandum on Environmental Impact Assessment Process of Environmental Impact Assessment Ordinance* (*EIAO-TM*), and to confirm the environmental acceptability of the Project.



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1.1.3 Construction Programme

The construction activities are scheduled to commence in December 2009 and complete in December 2011. A preliminary outline construction programme is provided in *Annex A*.

1.2 PURPOSE OF THE EM&A MANUAL

The purpose of this EM&A Manual is to guide the set up 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 EM&A Manual outlines the environmental monitoring and auditing works for both construction and operation phases of the Project. It provides systematic procedures for the monitoring and auditing of potential environmental impacts that may arise from the works.

Hong Kong environmental regulations, the Hong Kong Planning Standards and Guidelines and the recommendations in the EIA Report of this Project have served as environmental standards and guidelines in the preparation of this EM&A Manual. In addition, this EM&A Manual has been prepared in accordance with the requirements stipulated in *Annex 21* of the *EIAO-TM*.

This EM&A 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 environmental monitoring and audit requirements during construction phase;
- Project organization for the Project;
- Requirements with respect to the construction programme schedule and the necessary environmental monitoring and audit 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;
- 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 environmental monitoring and audit data and appropriate reporting procedures; and

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

This EM&A Manual is a dynamic document that should be reviewed regularly and to be updated (as necessary) during the implementation of the Project.

For the purpose of this EM&A Manual, the "Engineer" refers to the Engineer as defined in the Contract and the ER, in case where the Engineer's power have been delegated to the ER, in accordance with the Contract. The ET Leader, who should be responsible for and in charge of the ET, refers to the person delegated the role of executing the EM&A requirements. The IEC should undertake the auditing role.

1.3 PROJECT ORGANIZATION

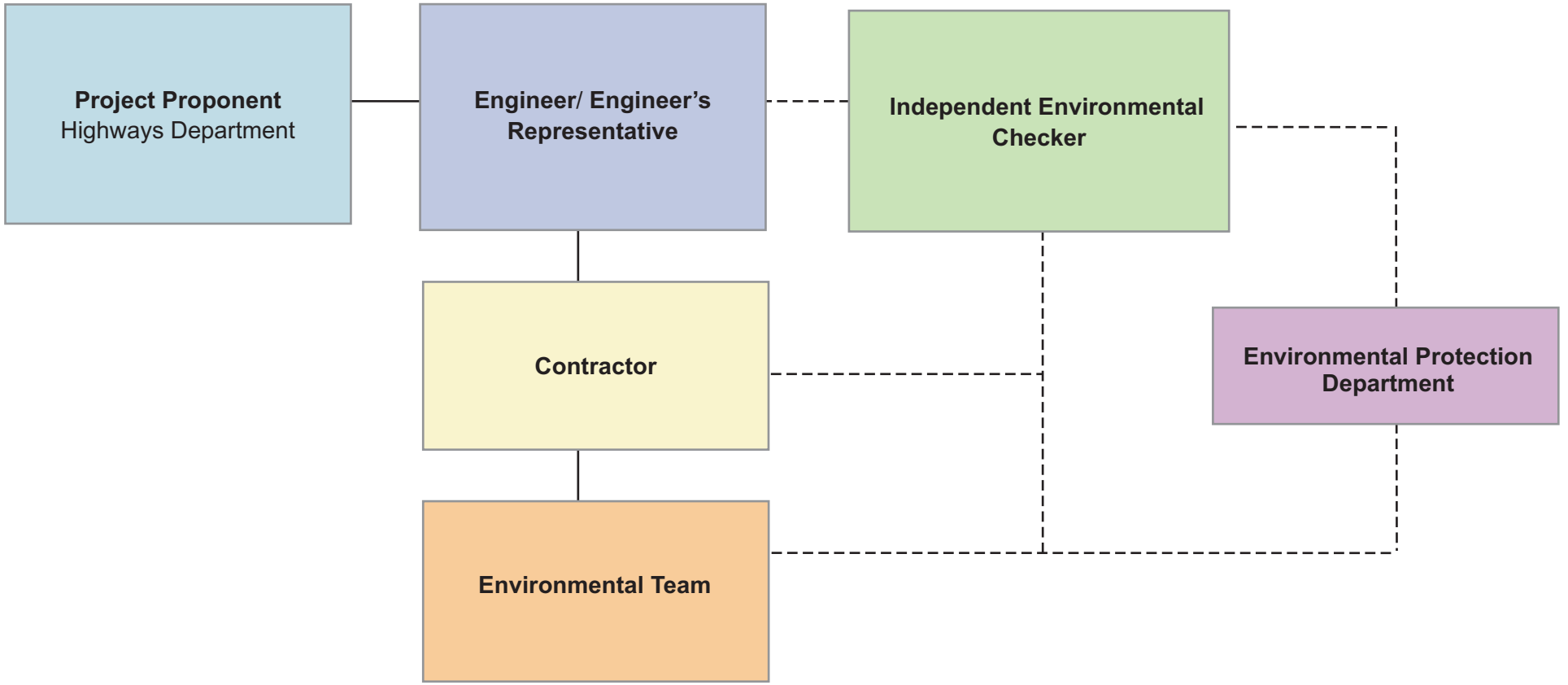
The roles and responsibilities of the various parties involved in the construction phase EM&A programme are outlined below. The organization and lines of communication with respect to environmental management for the Project are shown in *Figure 1.3*.

The leader of the Environmental Team (ET) should be an independent party from the Contractor and should possess at least 7 years experience of EM&A and have relevant professional qualifications, which should include being an Accredited Monitoring Professional of HKIEIA, subject to approval of the Environmental Protection Department (EPD). The Independent Environmental Checker (IEC) should have the same experience and professional qualifications as stipulated above for the ET Leader.

The duties and responsibilities of respective parties are as follows:

Engineer or Engineer's Representative (ER)

- Supervise the Contractor's activities and ensure that the requirements in the EM&A Manual are fully complied with;
- Monitor the Contractor's compliance with Contract Specifications, including the implementation and maintenance of environmental mitigation measures and other aspects of the EM&A programme;
- Monitor the implementation of EM&A programme;
- Inform the Contractor when action is required to reduce impacts in accordance with the EAPs or protocols or those in the Contract Specifications in the event of exceedance or complaint;
- Participate in joint site inspection undertaken by the ET; and
- Adhere to the procedures for carrying out complaint investigation in accordance with Section 9 of this EM&A Manual.



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Contractor

- Appoint an ET to undertake monitoring, laboratory analysis and reporting of the EM&A requirements outlined in this Manual;
- Ensure thorough implementation of mitigation measures as required;
- Provide assistance to the ET in carrying out monitoring and preparing reporting;
- Accompany joint site inspections undertaken by ET and implement the corrective / follow-up actions / recommendations instructed by the Engineer;
- Follow the procedures stipulated in the agreed EAPs in the event of exceedance or complaint;
- Submit proposals on mitigation measures in case of exceedances of Action and Limit levels in accordance with the EAPs;
- Implement measures to educe impact whenever Action and Limit levels are exceeded;
- Report all findings of site inspections and corrective / follow-up actions taken to the ER; and
- Adhere to the procedures for carrying out complaint investigation in accordance with Section 9 of this EM&A Manual.

Environmental Team (ET)

- Monitor the various environmental parameters as required by this or subsequent revisions to the Manual;
- Provide advice on all environmental issues to the Contractor;
- 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;
- Carry out site inspection to investigate and audit the Contractor's site practice, equipment and work methodologies with respect to pollution control and environmental mitigation, and review the programme of works, in order to anticipate environmental issues that may require mitigation before the problem arises;
- Audit the environmental monitoring data and report the status of general site environmental conditions and of the implementation of mitigation measures resulting from site inspections;

- Follow the procedures stipulated in the agreed EAPs in the event of exceedance or complaint;
- Report the EM&A results and wider environmental issues and conditions to the IEC, Contractor, ER, and EPD;
- Prepare EM&A Reports as required in the EM&A Manual
- Recommend suitable mitigation measures to the Contractor in the case of exceedance of Action and Limit levels in accordance with the EAPs; and
- Adhere to the procedures for carrying out complaint investigation in accordance with Section 9 of this EM&A Manual.

Independent Environmental Checker (IEC)

- Review the EM&A works performed by the ET (at not less than monthly intervals);
- Audit the monitoring activities and results (at not less than monthly intervals);
- Report the audit results to the ER and EPD in parallel;
- Review the EM&A Reports submitted by the ET;
- Review the proposal on mitigation measures submitted by the Contractor in accordance with the EAPs; and
- Adhere to the procedures for carrying out complaint investigation in accordance with Section 9 of this EM&A Manual.

Sufficient and suitably qualified professional and technical staff should be appointed 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.

1.4 STRUCTURE OF THE EM&A MANUAL

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

- *Section 2* – Sets out general requirements of EM&A programme;
- *Section 3* – Details auditing requirements for air quality;
- *Section 4* – Details methodology and criteria, monitoring equipment, locations for baseline and impact monitoring and mitigation measures for noise, compliance assessment and EAP;
- *Section 5* – Details auditing requirements for water quality;

- *Section 6* – Detail auditing requirements for waste management;
- *Section 7* – Details baseline monitoring, auditing requirements and mitigation measures for landscape and visual impact, compliance assessment and EAP;
- *Section 8* – Describes scope and frequency of environmental site audit;
- *Section 9* – Details protocols in handling environmental enquires and complaints; and
- *Section 10* – Details the EM&A reporting requirements.

2 GENERAL REQUIREMENTS OF EM&A PROGRAMME

2.1 INTRODUCTION

General requirements of the EM&A programme for the Project are presented in this section. The scope of the programme is developed with reference to the findings and recommendations of the EIA Report.

2.2 OBJECTIVES OF THE EM&A PROGRAMME

The potential environmental impacts associated with the Project have been assessed and described in the EIA Report. The EIA Report also specifies the mitigation measures required to comply with the environmental criteria. These mitigation measures and their implementation requirements are presented in the Implementation Schedule (see Annex B). The EIA recommends that an EM&A programme be implemented to assess the effectiveness of measures and to confirm that there will be no adverse environmental impacts during all phases of the Project. It is also recommended that regular site audits be undertaken during construction and operation phase to check whether good site practices are properly implemented to prevent adverse environmental impacts. Any activities that have a potential to cause adverse environmental impacts are identified before the adverse impacts occurred. Ad-hoc visits should also be undertaken in response to any complaints or reported non-compliance with environmental standards in order to enable prompt actions are taken to address the impacts.

This Manual provides details of the EM&A requirements that have been recommended in the EIA Report. The main objectives of the EM&A programme are to:

- verify the environmental impacts predicted in the EIA Report;
- monitor the performance of the Project and the effectiveness of mitigation measures;
- determine Project compliance with regulatory requirements and standards;
- provide an early indication should any of the environmental control measures or practices fail to achieve the required standards;
- take remedial action if unexpected problems or unacceptable impacts arise;
- provide a database against which any short or long term environmental impacts of the Project can be determined; and
- provide data against which environmental audits may be undertaken.

2.3 *SCOPE OF THE EM&A PROGRAMME*

The scope of the EM&A Programme is to:

- Establish baseline noise levels at designated locations;
- Implement impact monitoring programmes for construction noise;
- Implement inspection and audit programmes for air quality, noise, water quality, waste management; and landscape and visual issues;
- Liaise with, and provide environmental advice (as requested or when otherwise necessary) to construction site staff on the comprehension and consequences of the environmental monitoring data and exceedances;
- Identify and resolve environmental issues and other functions as they may arise from the works;
- Check and advice the Contractor's overall environmental performance, the implementation of Event and Action Plans (EAPs), and remedial actions taken to mitigate adverse environmental impacts as they may arise from the works;
- Conduct monthly reviews of monitored impact data as the basis for assessing compliance with the defined criteria and to ensure that necessary mitigation measures are identified and implemented, and to undertake additional ad hoc monitoring and auditing as required by special circumstances;
- Evaluate and interpret all environmental monitoring data to provide an early indication should any of the environmental control measures or practices fail to achieve the acceptable standards, and to verify the environmental impacts assessed in the EIA Study;
- Manage and liaise with other individuals or parties concerning other environmental issues deemed to be relevant to the construction process;
- Conduct regular site inspections to assess:
    - the level of the Contractor's general environmental awareness;
    - the Contractor's implementation of the recommendations in the EIA Report;
    - the Contractor's performance as measured by the EM&A programme;
    - the need for specific mitigation measures to be implemented or the continued usage of those previously agreed;
    - to advise the Site Staff of any identified potential environmental issues; and

- Submit Monthly EM&A Reports which summarises environmental monitoring and auditing data, with full interpretation illustrating the acceptability or otherwise of any environmental impacts and identification or assessment of the implementation status of agreed mitigation measures.

2.4 METHODOLOGY AND CRITERIA

The environmental issues associated with the construction phase of the Project will be mitigated through the monitoring and mitigation measures specified in the EIA Report and this EM&A Manual.

During the construction phase, air quality, noise, water quality, waste arising, landscape and visual issues will be subjected to EM&A, including noise monitoring.

The monitoring of the effectiveness of the mitigation measures will be achieved through the environmental monitoring programme as well as through site inspections. The inspections will include within scope, mechanisms to review and assess the implementation of the recommended mitigation measures, and that the timely resolution of received complaints are managed and controlled in a manner consistent with the recommendations given in the EIA Report and the EM&A Manual.

2.5 ENVIRONMENTAL MONITORING

The environmental monitoring works throughout the construction period and the first year after commencement of operation of the Project should be carried out in accordance with the EM&A Manual and reported by the ET. Monitoring should be conducted at the chosen and agreed representative sensitive receivers.

2.6 ACTION AND LIMIT (A/L) LEVELS

Action and Limit (A/L) Levels are defined levels for impact recorded by the environmental monitoring works, which represent levels at which a prescribed response is required. These levels are described in the principle below and later quantitatively defined in the relevant sections of the EM&A Manual:

- Action Level – beyond which there is a clear indication of a deteriorating ambient environment for which appropriate remedial actions are likely to be necessary to prevent environmental quality from falling outside the Limit Levels, which will be unacceptable.

- Limit Level – statutory limits stipulated in the relevant pollution control ordinances, Hong Kong Planning Standard Guidelines, or Environmental Quality Objectives established by the EPD. If these are exceeded, works

should not proceed without appropriate remedial action, including a critical review of plant and working methods.

2.7 EVENT AND ACTION PLANS

The purpose of the EAPs is to provide, in association with the environmental monitoring activities, procedures for ensuring that if any significant environmental impacts occur in the form of exceedance of A/L Levels identified in the EM&A programme, cause(s) will be quickly identified and remediated.

2.8 ENVIRONMENTAL AUDIT

The ET should undertake environmental audit of the compliance with stipulated procedures and site inspections of on-site practices. The primary objective is to assess the effectiveness of the implementation of the environmental mitigation measures as recommended in the EIA Report and the EM&A Manual.

Whilst environmental audit will complement the environmental monitoring activity with regard to the effectiveness of dust suppression, noise attenuation and vibration control, the criteria against which the audit should be derived from the clauses within the Contract, which seek to enforce the recommendations of the EIA Report and the EM&A Manual.

The findings of the environmental audit and site inspection should be made known to the Contractor at the time of the audit / inspection to enable rapid resolution of identified non-compliances or observations. Non-compliances, observations, the corrective / follow-up actions undertaken will be reported in the Monthly EM&A Reports.

2.9 ENQUIRIES, COMPLAINTS AND REQUESTS FOR INFORMATION

Enquiries, complaints and requests for information will be expected from a wide range of individuals and organizations including members of the public, government departments, nearby residents, press and community groups.

All enquiries concerning the environmental effects of the construction works, irrespective of the channel of receipt, will be directed to the Contractor, and copied to the ER and Highways Department (HyD). Procedures for handling enquiry and complaints should follow the procedures set out in *Section 9*.

In all cases, the complainant should be notified of the findings, and environmental audit and site inspection should be put in place to minimize the reoccurrence of similar problems.

2.10 REPORTING

During the construction phase, Environmental Baseline Monitoring Report, Monthly EM&A Reports, Quarterly EM&A Summary Reports and Final EM&A Review Report should be prepared and certified by the ET Leader and verified by IEC prior to submission to the Contractor and HyD. In accordance with Annex 21 of the *EIAO-TM*, a copy of the monthly, quarterly summary and final review EM&A reports should be made available to the Director of Environmental Protection. Details of reporting requirement and submission schedule should be in accordance with the guidelines set out in *Section 10*.

2.11 CHANGE OR CESSATION OF EM&A PROGRAMME

The ET should carry out the EM&A programme in accordance with the EM&A Manual throughout the construction and operational phases of the Project. Any change or cessation of the EM&A programme, or any part of it, should be justified by the ET Leader and verified by the IEC as conforming to the requirements set out in the EM&A Manual, and should be submitted to the EPD for approval.

3 AIR QUALITY

3.1 INTRODUCTION

No adverse air quality impact is anticipated during the construction phase with the implementation of good site practices and appropriate mitigation measures. The EIA Report has identified that construction dust is the only concern as the construction scale is relatively small, and dust emission from the site could be audited during the regular site inspection.

3.2 AUDIT REQUIREMENTS

In order to ensure no adverse air quality impact will arise from the construction of the Project, it is necessary to undertake regular environmental audits and site inspections to ensure those recommended mitigation measures were properly implemented. The requirements of the environmental audit programme were set out in *Section 8* of the Manual.

The audit programme will verify the implementation status and evaluate the effectiveness and stability of the mitigation measures.

3.3 MITIGATION MEASURES

The EIA Report has recommended dust control and mitigation measures. The Contractor should be responsible for the design and implementation of these measures.

The dust control measures stipulated in the *Air Pollution Control (Construction Dust) Regulation* should be incorporated in the contract specifications. These should be implemented during construction in order to reduce dust impact produced by the site activities. Typical control measures are:

- 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 the 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 accesses to the public, hoarding of not less than 2.4 m high from ground level should be provided along the entire length except for a site entrance or exit;
- every stock of more than 20 bags of cement should be covered entirely by impervious sheeting placed it 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;
- all stockpiles of aggregate or spoil should be covered and water applied;
- the height from which excavated materials are dropped should be controlled to a minimum practical height to limit fugitive dust generation from unloading; and
- 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.

The air quality mitigation measures recommended in the EIA Study are outlined in the Environmental Mitigation Implementation Schedule (EMIS) (*Annex B*).

In the event of complaints, or non-compliance / area of improvement is observed, the ET and the Contractor should be responsible for reviewing the effectiveness of these mitigation measures and for proposing to ER for approval, designing and implementing alternative or additional mitigation measures as appropriate.

4 NOISE

4.1 INTRODUCTION

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

4.2 METHODOLOGY AND CRITERIA

Noise measurements should be carried out in accordance with the guidelines given in *Annex – General Calibration and Measurement Procedures* of *Technical Memorandum on Noise from Construction Work other than Percussive Piling* (*GW-TM*).

Whilst the *Noise Control Ordinance* (*NCO*) does not provide for the statutory control of construction activities occurring on weekdays during normal working hours (ie Monday to Saturday inclusive 0700-1900 hours), a daytime standard of $L_{eq(30min)}$ 75dB(A) as stipulated in Annex 5 of the *Technical Memorandum on Environmental Impact Assessment Process* (*EIAO-TM*) will be adopted as the noise criterion for all residential dwellings; while a daytime standard of $L_{eq(30min)}$ 70dB(A) will be adopted for all educational institutions during normal school days and $L_{eq(30min)}$ 65dB(A) during examination periods.

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

Supplementary information for data auditing, two statistical sound levels L_{10} and L_{90}; the levels exceeded for 10 and 90 percent of the time respectively, should also be recorded during the monitoring for reference. A sample data record sheet is shown in *Annex C* for reference.

Noise measurements should generally not be made in the presence of fog, rain, wind with a steady speed exceeding 5ms^{-1} or wind with gusts exceeding 10ms^{-1}. The wind speed should be checked with a portable wind speed meter capable of measuring the wind speed in ms^{-1}.

4.3 MONITORING EQUIPMENT

As referred to the *GW-TM*, sound level meters in compliance with the *International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1) Specifications* should be used for carrying out the noise monitoring. Immediately prior to and following each noise measurement the accuracy of the sound level meter should 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 ET should ensure that the equipment is maintained in a good working order in accordance with the manufacturer's recommendations with sufficient spare equipment available in the event of breakdown to maintain the planned monitoring programme.

The ET is responsible for the provision of the monitoring equipment and will ensure that sufficient noise measuring equipment and associated instrumentation are available for carrying out the baseline monitoring and impact monitoring. All the equipment and associated instrumentation will be clearly labelled.

4.4 MONITORING LOCATIONS

Representative locations were selected to monitor the noise levels from the construction of the Project. The noise monitoring stations are listed in *Table 4.1* and presented in *Figure 4.1*.

Table 4.1 Noise Monitoring Stations for Construction Noise

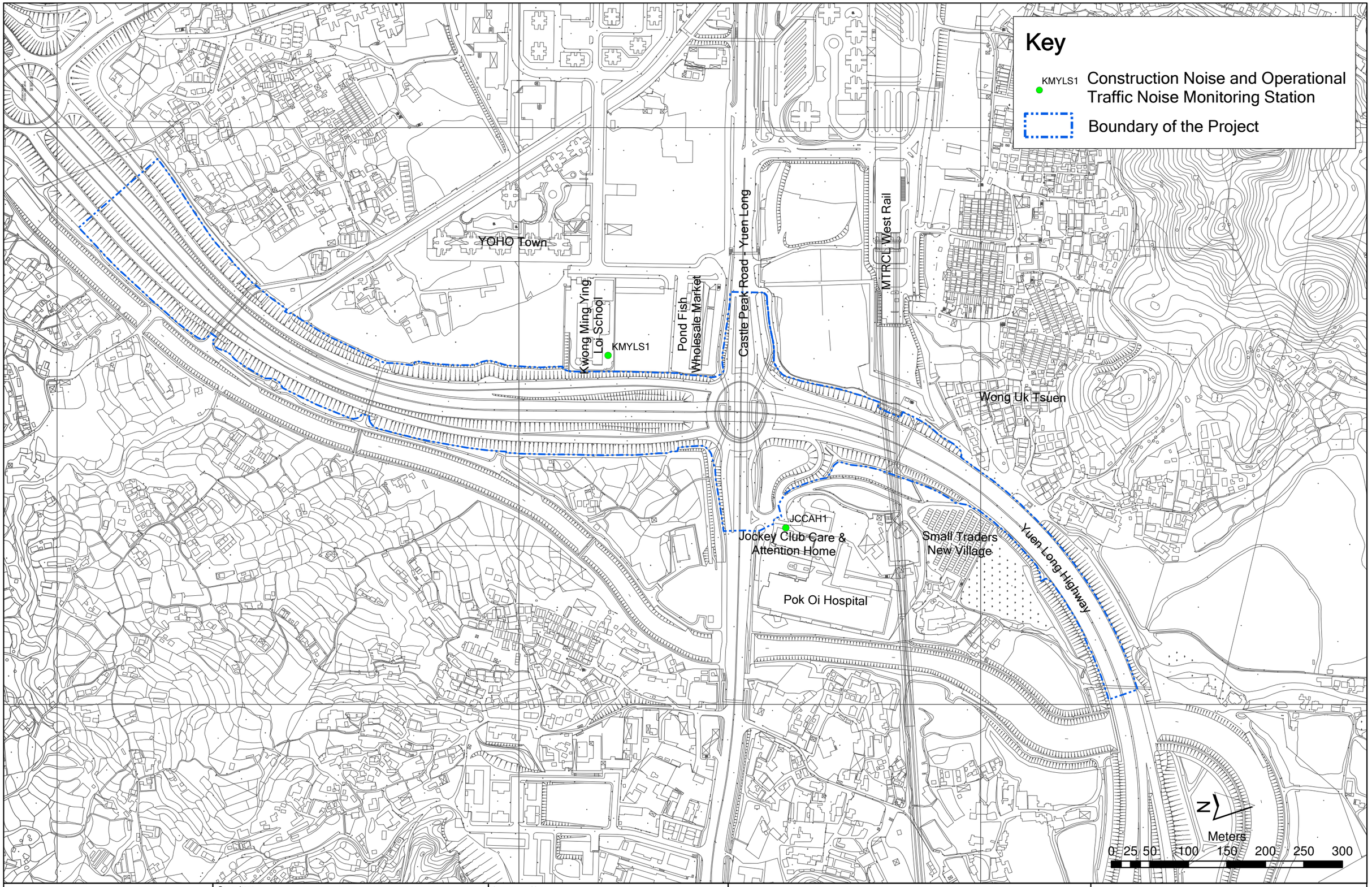
Monitoring Station	Description
KMYLS1	Kwong Ming Ying Loi School
JCCAH1	Jockey Club Care & Attention Home

The status and locations of noise sensitive receivers (NSRs) may change after issuing this Manual and the location of the noise monitoring station may need to be adjusted accordingly. If such changes occur, the ET should propose an updated monitoring location for the agreement from the ER, IEC and EPD.

When alternative monitoring location is proposed, the following criteria, as far as practicable, should be followed:

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

The monitoring station will normally be at a point 1 m from the exterior of the NSR building façade and at a height of approximately 1.2 m above ground or at the height that has the least obstructed view of the construction activities in relation to the NSR. If access to the normal monitoring position cannot be obtained, an alternative position will be chosen, and a correction to the measurements should be made, if appropriate. For instance, a correction of +3 dB(A) should be made to free-field measurements. The ET should agree with the ER, IEC, EPD and the owners/occupants of the premises on the monitoring position. Once the positions for the monitoring stations are



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chosen, the baseline monitoring and the impact monitoring should be carried out at the same positions.

4.5 BASELINE MONITORING

The ET should carry out baseline noise monitoring prior to the commencement of any construction works. The baseline monitoring should be measured for a continuous period of at least 14 consecutive days at a minimum logging interval of 30 minutes for daytime and 15 minutes (as three consecutive $L_{eq(5min)}$ readings) for evening, holidays and night-time.

Before commencing the baseline monitoring, ET should inform the Contractor, IEC, ER and the EPD of the baseline monitoring schedule programme such that relevant parties could conduct on-site audit to ensure accuracy of the baseline monitoring results.

During the baseline monitoring, there should not be any construction activities in the vicinity of the monitoring stations. Any non-Project related construction activities in the vicinity of the stations during the baseline monitoring should be noted and the source(s) and location(s) be recorded.

In case the baseline monitoring could not be carried out at any of the designated monitoring locations during the baseline monitoring period, the ET should carry out the monitoring at alternative location which could effectively represent the baseline conditions at the impact monitoring locations. The alternative baseline monitoring locations should be agreed with the ER and IEC and approved by EPD.

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

4.6 IMPACT MONITORING

Noise monitoring should be carried out at all the designated monitoring stations. 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.

If construction works are extended to include works during the hours between 1900 and 0700 hours, or on general holidays and Sundays, applicable Construction Noise Permits (CNPs) will be obtained by the Contractor under the *NCO* requirements, and the frequency and scope of monitoring will be determined by EPD in the capacity of the *Noise Control Authority* (NCA).

4.7 ENVIRONMENTAL QUALITY PERFORMANCE LIMITS

Action and Limit (A/L) Levels provide an appropriate framework for the interpretation of monitoring results. Interpretation of monitoring results is undertaken through checking them against the Action and Limit (A/L) Levels defined in *Table 4.2*.

Table 4.2 Action and Limit Level for Construction Noise Monitoring

Time Period	Action Level	Limit Level
0700 – 1900 hours on normal weekdays	When one documented complaint is received from any one of the sensitive receivers	75 dB(A)(Note)

Note:

(1) Acceptable Noise Levels for Area Sensitivity Rating of A/B/C. Limit Level is reduced to 70dB(A) for schools and 65dB(A) during school examination periods.

(2) If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the NCA have to be followed.

To account for cases where ambient noise levels, as identified by baseline monitoring, approach or exceed the stipulated Limit Level prior to commencement of construction, a Maximum Acceptable Impact Level, which incorporates the baseline noise level and the identified construction noise Limit Level, might be defined upon agreement with the EPD. This amended level will, therefore, be greater than 75 dB(A) and will represent the maximum acceptable noise level at a specific monitoring station.

For compliance checking, after taking into account any adjustments agreed with EPD, comparison with either the Limit or the Maximum Acceptable Impact Level will represent the governing criteria for noise impact assessment during impact monitoring.

4.8 EVENT AND ACTION PLAN

The ET should compare the impact monitoring results with the noise criteria as defined in *Table 4.2*. In cases where exceedance of these criteria occurs, actions should be carried out in accordance with the Action Plan shown in *Table 4.3*.

Table 4.3 Event and Action Plan for Construction Noise

Event	Action			
	ET	**IEC**	**ER**	**Contractor**
Action Level	1. Notify IEC and Contractor; 2. Carry out investigation; 3. Report the results of investigation to the IEC, ER and Contractor; 4. Discuss with the Contractor and formulate remedial measures; 5. Increase monitoring frequency to check mitigation effectiveness.	1. Review the analysed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures are properly implemented.	1. Submit noise mitigation proposals to IEC; 2. Implement noise mitigation proposals.
Limit Level	1. Identify source; 2. Inform IEC and ER: 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; 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

4.9 AUDIT REQUIREMENTS

It is necessary to undertake regular environmental audits and site inspections to ensure those recommended mitigation measures were properly implemented. The requirements of the environmental audit programme were set out in *Section 8* of the Manual.

The audit programme will verify the implementation status and evaluate the effectiveness and stability of the mitigation measures.

4.10 MITIGATION MEASURES

4.10.1 Construction Phase

In order to reduce the noise impact of construction site activities on nearby NSRs, the following mitigation measures have been considered:

- Good Site Practice;
- Use of quiet PME;
- Use of acoustic enclosure;
- Adoption of movable noise barriers, and
- Scheduling of PME/construction activities.

Good Site Practices

Good site practices and noise management can considerably reduce the impact of construction site activities on nearby Noise Sensitive Receivers (NSRs). The noise benefits of these practices can vary according to specific site conditions and operations. The following site practices should be followed during the construction of the Project:

- Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction program;
- Silencers or mufflers on construction equipment should be utilized and should be properly maintained during the construction program;
- Mobile plant, if any, should be sited as far from NSRs as possible;
- Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum;
- Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs;

- Material stockpiles and other structures should be effectively utilised, wherever practicable, in screening noise from on-site construction activities; and

- The contractor should liaise with the school regarding the examination periods. Noisy construction activities, including piling, excavation and earth-breaking works, will be carried out outside the examination periods.

Use of Quiet Powered Mechanical Equipment (PME)

The use of quiet PME was considered to be a practicable means to mitigate the construction noise impact. Quiet plant is defined as a PME having actual SWL lower than the value specified in the *GW-TM*.

Use of Acoustic Enclosure

Temporary acoustic enclosure is a common and effective means to mitigate the noise impact arising from operation of certain small size PMEs. A frame covered with noise insulation materials (sound insulation materials with a superficial surface density of at least 7 kg/m^2 or sound absorbing materials of at least 50mm and average absorption coefficient between 125 Hz and 4000 Hz of 0.4) could at least 5 dB(A) reduction for plant items such as hand-held breaker and circular wood saw. The locations of the temporary acoustic enclosure should be adjusted wherever and whenever necessary to protect the noise sensitive receivers, the enclosures should have no openings or gaps.

Adoption of Movable Noise Barriers

The use of noise barriers will be an effective means to mitigate the noise impact arising from the construction works, particularly for low-rise NSRs. For the low-rise nature of the NSRs, movable noise barriers of 3 to 5 m high (depending on the size of the plant that requires to be screened) with skid footing should be used and located within a few metres of stationary plant and mobile plant such that the line of sight to the NSR is blocked by the barriers. The length of the barriers should be at least five times greater than its height. These movable noise barriers could produce at least 5 dB(A) noise reduction for mobile plant such as backhoe and roller as well as large scale plant such as crane. With reference to *A Practical Guide for the Reduction of Noise from Construction Works*, the noise barrier material should have a superficial surface density of at least 7 kg/m^2 and have no openings or gaps.

Scheduling of Construction Works

To further alleviate the construction noise impacts, only one group of PME (Group A or B) will be operated during road drainage, utilities and water mains works at work site of slip road A and also during site works like road resurfacing and remarking A and B. All noisy construction activities should be suspended at work site of slip road A and flyover A during examination period of the Kwong Ming Ying Loi School.

4.10.2 Operational Phase

Notwithstanding the prediction that the NSRs will not be subject to adverse noise impact during the operational phase of the Project, noise monitoring should be carried out during the first year after opening to ensure noise compliance.

The ET should prepare and deposit to EPD, at least 6 months before the operation of the works under the Project, a monitoring plan for the purpose of assessing the accuracy of traffic noise predictions by comparing the project noise impact predictions with the actual impacts. The monitoring plan should contain information on the monitoring locations, monitoring schedules, methodology of noise monitoring including noise measurement procedures, traffic counts and speed checks, and methodology of comparison with the predicted levels. The ET should implement the monitoring plan in accordance with the deposited monitoring plan unless with prior justification. Monitoring details and results including the comparison between the measured noise levels and the predicted levels should be recorded in a report to be deposited with EPD within one month of the completion of the monitoring. The report should be certified by the ET Leader and the Project Proponent before deposit with EPD.

The traffic noise levels should be measured twice at 6-month intervals within the first year upon completion of the Project. Measurements should be made in terms of the A-weighted L_{10} over 3 half hour periods during the peak traffic hour, other parameters including L_{eq} should also be taken for reference.

As shown in *Table 4.4* and *Figure 4.1*, two designated monitoring stations are selected for the operational noise monitoring. The status and locations of noise sensitive receivers may change after this Manual is issued. If such cases exist, the ET Leader should propose updated monitoring locations and seek approval from the ER and IEC and agreement from EPD of the proposal.

Table 4.4 Noise Monitoring Stations for Operational Traffic Noise

Monitoring Station	Description
KMYLS1	Kwong Ming Ying Loi School
JCCAH1	Jockey Club Care & Attention Home

The monitoring locations should be selected according to the following criteria:-

- they should be at NSRs in the vicinity of recommended direct technical remedies; preferably, there should be one representative monitoring locations near each types of noise screening element (ie vertical barrier, cantilever barrier and enclosure);

- one high floor and one medium floor monitoring points should be chosen at each location as far as practicable; and

- selected monitoring locations should allow monitoring to be done twice within one year after implementation of the mitigation measures during operation of the Project.

The status and location of NSRs may change after issuing this manual. If such case exists, the ET Leader should propose updated monitoring locations and seek approval from EPD and agreement from the ER and the IEC before baseline monitoring commences.

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

- alternative location should be similarly exposed to potential noise impacts;
- it should be close to the NSRs; and
- should be located so as to minimise disturbance to the occupants.

The operational noise monitoring should be carried out at a distance of 1 m from the openable window and 1.2 m above the floor level of the noise sensitive receivers identified. The ET Leader should agree with the IEC on any necessary corrections adopted.

Traffic noise monitoring should be carried out at all the designated traffic noise monitoring stations. The following is an initial guide on the traffic noise monitoring requirements during the operational phase:

- one set of measurements during the morning traffic peak hour on a normal weekday;
- one set of measurements during the evening traffic peak hour on a normal weekday;
- a concurrent census of traffic flow and percentage heavy vehicles should be conducted for the far-side and near-side of the road and the existing road network in the vicinity of each measurement points;
- average vehicle speed estimated for far-side and near-side of the road and the existing road network in the vicinity of each measuring points; and
- the two sets of monitoring data should be obtained within the first your of operation.

Measured noise levels should be compared with the predicted noise levels by applying appropriate conversion corrections to allow for the traffic conditions at the time of measurement. A sample data record sheet for traffic noise monitoring during operational phase is shown in *Annex C* for reference.

The measured/ monitored noise levels should be compared with the predicted results and the predicted traffic flow conditions (calculated noise

levels based on concurrent traffic census obtained). In case discrepancies are observed, explanation should be given to justify the discrepancies.

5 WATER QUALITY

5.1 INTRODUCTION

No adverse water quality impact is anticipated during the construction phase with the implementation of good site practices and appropriate mitigation measures in accordance with the *Practice Note for Professional Persons* on *Construction Site Drainage* (*ProPECC PN 1/94*) and other relevant guidelines. The recommended mitigation measures include the provision of dedicated propriety treatment system and associated site runoff collection system.

5.2 AUDIT REQUIREMENTS

In order to ensure no adverse water quality impact will arise from the construction of the Project, it is necessary to undertake regular environmental audits and site inspections to ensure those recommended mitigation measures were properly implemented. The requirements of the environmental audit programme were set out in *Section 8* of the Manual.

The audit programme will verify the implementation status and evaluate the effectiveness and stability of the mitigation measures.

5.3 MITIGATION MEASURES

The mitigation measures recommended in the EIA Study are outlined in the Environmental Mitigation Implementation Schedule (EMIS) (*Annex B*).

In the event of complaints, or non-compliance / area of improvement is observed, the ET and the Contractor should be responsible for reviewing the effectiveness of these mitigation measures and for proposing to ER for approval, designing and implementing alternative or additional mitigation measures as appropriate.

6 WASTE MANAGEMENT

6.1 INTRODUCTION

This section sets out the handling, recycling, storage, transportation and disposal measures which are recommended to avoid, and minimize potential adverse impacts associated with waste arising from the construction of the Project.

6.2 WASTE MANAGEMENT APPROACH

6.2.1 Management of Waste Disposal

In accordance with the *Waste Disposal (Charges for Disposal of Construction Waste) Regulation*, the Contractor should open a billing account with the EPD. Every construction waste or public fill load to be transferred to the Government waste disposal facilities, namely public fill reception facilities, construction waste sorting facilities, and landfills will require a valid "chit" which contains information of the account holder (the Contractor) to facilitate waste transaction recording and billing to the waste producer.

Inert C&D material generated from the Project will be transferred to Tuen Mun Area 38 Fill Bank (TMFB), or other public fill reception facilities, managed by Civil Engineering and Development Department (CEDD), while the non-inert C&D material, after segregation, will be sent to West New Territories Landfill (WENT), or other waste disposal facilities, managed by the EPD.

A trip-ticket system will be maintained in accordance with *Environment, Transport and Works Bureau Technical Circular No. 31/2004* and a recording system will also established for recording the amount of waste and C&D material generated, reused, recycled and disposed of (including the disposal sites) in a form of similar to relevant appendices of *Environment, Transport and Works Bureau Technical Circular No. 19/2005*. A sample of waste flow table (WFT) is presented in *Annex D* to record the quantities of waste and C&D material generated each month. The quantities and details of all the recyclable and reused materials will also be recorded in the monthly summary WFT. The quantities of waste and C&D material generated, reused and recycled during the reporting month, together with the disposal sites, will be presented in monthly EM&A report.

6.2.2 Approach to Reduce Waste Generation

Construction and Demolition (C&D) Material

C&D material would be generated from the following works of the Project:

- Road widening works;

- Construction of retaining wall and flyover;
- Demolition of existing parapets or footing for existing noise barriers;
- Fill slope / slope reprofiling involved in road realignment; and
- Extension of subway in Left-Turn Lane A.

The types of C&D material during the construction works would be excavated soil, fill and concrete.

The waste concrete and shotcrete will be segregated from other non-inert C&D material and be disposed of at TMFB, or other public fill reception facilities.

The non-inert C&D material will be further segregated into recyclable material, such as cardboard, carton box, waste paper and scrap metal for the collection by recyclers and non-recyclable material, such as waste timber and packaging material, which will be disposed of at WENT, or other waste disposal facilities.

General Refuse

General refuse will be generated from daily site office operation and workforce. Recycling bins should be provided at strategic locations, such as the entrance of site office to facilitate recovery of aluminium cans and waste paper generated from the Site. Materials collected in the recycling bins should be collected by or sold to local recyclers.

6.2.3 Management of Chemical Waste

Chemical wastes likely to be generated from the construction of the Project may include:

- Residual paints and solvents; and
- Used lubricant oil from maintenance of the construction plant.

It is anticipated that the quantity of chemical waste to be generated will be small and in the order of a few hundred litres for whole construction phase. These chemical waste will be stored and disposed of in an appropriate manner, as outlined in the *Waste Disposal (Chemical Waste) (General) Regulation* and the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.*

The Contractor should register as a chemical waste producer with the EPD, and handle the chemical waste in accordance with the *Code of Practice on the Package, Labelling and Storage of Chemical Wastes*. A brief summary of the site arrangement should be as follows:

Storage Containers

- Be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed;
- Have a capacity of less than 450L unless specifications have been approved by the EPD; and
- Display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the Regulations.

Storage Area

- Be clearly labelled and used solely for the storage of chemical waste;
- Be enclosed on at least 3 sides;
- Have an impermeable floor and bunding, of a capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area, whichever is the greatest;
- Have adequate ventilation;
- Be covered to prevent rainfall entering (with water collected within the bund be disposed of as chemical waste when necessary); and
- Be arranged so that incompatible materials are appropriately separated.

Disposal

- Be collected by licensed chemical waste collector; and
- Be disposed / transferred to a facility licensed to receive chemical waste, such as Chemical Waste Treatment Facility (CWTF) at Tsing Yi or other chemical waste recyclers.

6.3 STAFF TRAINING

At the commencement of the construction works, training should be provided to workers on the concepts of site cleanliness and on appropriate waste management procedures, including waste reduction, reuse and recycling.

Location map and label showing different waste facilities on site will be provided at conspicuous locations to facilitate waste storage, segregation and recycling.

Tool box talk regarding waste management practices on site should be arranged on regular basis to maintain and / or improve site practices.

6.4 AUDIT REQUIREMENTS

In order to review the good site practices of waste management, regular audit and site inspection should be carried out by the ET to check whether the Contractor has implemented the recommended good site practices and other mitigation measures. The inspection 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 licences, permits, disposal and recycling records should be reviewed and audited for compliance with the legislation and Contract requirements. Designated staff of the Contractor responsible for resources allocation, staff training and controlling the relevant documents will also be interviewed to review the effectiveness of site management.

The requirements of the environmental audit programme were set out in *Section 8* of the Manual. The audit programme will verify the implementation status and evaluate the effectiveness and stability of the mitigation measures.

6.5 MITIGATION MEASURES

Good Site Practice

Under the condition of good site practices are strictly followed, it is anticipated that no adverse waste management related impacts would arise. Recommendations for good site practices during the construction activities include:

- nomination of an approved personnel, such as a site manager, to be responsible for the implementation of 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 site cleanliness, appropriate waste management procedures, including chemical waste handling procedures, and concepts of waste reduction, reuse and recycling;
- 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;
- separation of chemical wastes for special handling and appropriate treatment at the CWTF;
- regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors;

- implementation with a recording system for the amount of wastes generated, recycled and disposed (including the disposal sites; should be proposed; and

- a waste management plan (WMP) should be prepared in accordance with ETWB TC No. 19/2005 and submitted to the ER for approval.

Waste Reduction Measures

Good management and control can prevent generation of significant amount of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation 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 material and their proper disposal;

- Encourage collection of aluminium cans and waste paper by individual collectors during construction with separate labelled bins being provided to allow the segregation of these wastes from other general refuse generated by the workforce;

- Any unused chemicals and those with remaining functional capacity be recycled as far as possible;

- Use of reusable non-timber formwork to reduce the amount of C&D materials;

- Prior to disposal of construction waste, wood, steel and other metals should be separated, to the extent practical for re-use and/or recycling to reduce the quantity of waste to be disposed at landfills;

- Proper storage and site practices to reduce the potential for damage or contamination of construction materials; and

- Plan and stock construction materials carefully to reduce amount of waste generated and avoid unnecessary generation of waste.

Waste management approach recommended in the EIA Study is outlined in the Environmental Mitigation Implementation Schedule (EMIS) (*Annex B*).

In the event of complaints, or non-compliance / area of improvement is observed, the ET and the Contractor should be responsible for reviewing the effectiveness of these mitigation measures and for proposing to ER for approval, designing and implementing alternative or additional mitigation measures as appropriate.

7 LANDSCAPE AND VISUAL IMPACT

7.1 INTRODUCTION

The EIA Report has recommended landscape and visual mitigation measures to be undertaken during construction and operation phases of the Project. This Section defines the EM&A requirements to ensure the proposed landscape and visual impact mitigation measures are effectively implemented.

7.2 BASELINE MONITORING

The ET should carry out baseline landscape and visual monitoring prior to the commencement of any construction works. The baseline monitoring should be conducted as a one-off site survey.

Before commencing the baseline monitoring, ET should inform the Contractor, IEC, ER and the EPD of the baseline monitoring schedule programme such that relevant parties could conduct on-site audit to ensure accuracy of the baseline monitoring results.

Any baseline changes with respect to the landscape and visual impact should be recorded in reference to the baseline conditions of the site as described in Section 8 of the EIA Report. The baseline monitoring should in particular record changes of each landscape resource, landscape character area and the view conditions of each visual sensitive receiver. Parameters used to describe changes in each of the above should be the same as in Section 8 of the EIA Report.

The purposes of the baseline monitoring are:

- to check the status of the landscape resources within, and immediately adjacent to, the construction sites and works areas;
- to determine whether any change has occurred to the status of the landscape resources since the EIA Study carried out;
- to determine whether amendments in the design of the landscape and visual mitigation measures are required for those changes; and
- to recommend any necessary amendments to the design of the landscape and visual mitigation measures.

A competent Landscape Architect should be employed to conduct the baseline landscape and visual environmental monitoring.

7.3 AUDIT REQUIREMENTS

In order to ensure landscape and visual impact is controlled and mitigated during both construction and operational phases of the Project, the ET should undertake regular site inspections to ensure those recommended mitigation measures were properly implemented. *Section 8* of this Manual sets out inspection requirements, and the inspection programme will verify the implementation status and evaluate the effectiveness and stability of the mitigation measures.

A competent Landscape Architect should be employed to conduct the regular landscape audit during both construction and operational stage.

For the operational phase, all landscape and visual mitigation measures should be monitored monthly during the first year of the operational phase to ensure that the effectiveness of the mitigations.

7.4 EVENT AND ACTION PLAN

In cases where non-compliance of landscape and visual impacts occurs, actions should be carried out in accordance with the Action Plan shown in *Table 7.1*.

Table 7.1 Event and Action Plan for Landscape and Visual Impact

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

7.5 MITIGATION MEASURES

The landscape and visual mitigation measures should be incorporated to ensure the mitigation effect and achieve the intended aims as described in *Tables 7.2 and 7.3* below, together with an indication of Funding, Implementation and Maintenance Agencies. Approval-in-principle to the implementation, management and maintenance of the proposed mitigation measures is sought from the appropriate authorities are indicated in *Tables 7.2 and 7.3 below*; according to the principles in *Works Bureau Technical Circular WBTC 14/2002*. Any changes to the mitigation measures that may be recommended as a result of the baseline monitoring or ongoing monitoring of the design, construction and establishment works should be taken into account.

Table 7.2 Proposed Landscape and Visual Mitigation Measures during Construction Phase

Items	Landscape and Visual Mitigation Measures	Funding Agency	Implementation Agency
1	LMM 5 – Early Planting Works. Where technically feasible, new plantings are to be installed as early as possible during the construction works.	HyD	Contractor
2	LMM 6 – Site hoardings to be compatible with the surrounding environment. Where possible site hoardings to be coloured to complement the surrounding areas. Colours such as green and light brown are recommended.	HyD	Contractor

Table 7.3 Proposed Landscape and Visual Mitigation Measures during Operational Phase

Items	Landscape and Visual Mitigation Measures	Funding Agency	Implementation Agency	Maintenance/ Management Agency
1	Cultivation of areas compacted during construction. Areas compacted during the construction phase that are not required during the operation phase, are to be cultivated to a depth of up to 300mm in accordance with the future Landscape Specification.	HyD	Contractor/HyD	LCSD/HyD
2	Soil stabilisation and planting. During the design phase, a soil stabilisation and embankment planting strategy will be developed to ensure that land affected by slope excavation can be replanted. Soil preparation and the selection and provision of suitable growing medium is to be completed in accordance with the relevant best practice guidelines.	HyD	Contractor/HyD	LCSD/HyD

Items	Landscape and Visual Mitigation Measures	Funding Agency	Implementation Agency	Maintenance/ Management Agency
3	Tree and Shrub Planting. All planting of trees and shrubs is to be carried out in accordance with the relevant best practice guidelines. Plant densities are to be provided in future detailed design documents and are to be selected so as to achieve a finished landscape that matches the surrounding, undisturbed, equivalent landscape types.	HyD	Contractor/HyD	LCSD/HyD
4	LMM 4 - Relocation. Landscape Resources of value to be re-located where practically feasible.	HyD	Contractor/HyD	LCSD
5	Design of Structures. Where possible, built structures will utilise appropriate designs to complement the surrounding landscape. Materials and finishes will also be considered during detailed design.	HyD	Contractor/HyD	HyD
6	Design of noise barriers. The 2.5m high vertical noise barrier for the planned schools will be in the form of concrete structure installed with barrier panels to align with the existing provision in the vicinity and to integrate into the landscape.	HyD	Contractor/HyD	HyD
7	Plantings in addition to the landscape mitigation plantings proposed, appropriate new plantings will be installed as appropriate to help integrate the new structures into the surrounding landscape.	HyD	Contractor/HyD	LCSD/HyD
Note: (1) LCSD means Leisure and Cultural Services Department; (2) HyD should be responsible for the maintenance and management for hard streetscape works and LCSD should be responsible for the maintenance and management of soft landscape works.				

The design, implementation and maintenance of landscape and visual mitigation measures should be checked monthly to ensure that they are fully implemented. Any potential conflicts between the proposed landscape measures and any other project works or operational requirements should also be recorded for the Contractor to resolve in early stage, without compromising the intention of the mitigation measures.

The landscape and visual mitigation measures recommended in the EIA Study are outlined in the Environmental Mitigation Implementation Schedule (EMIS) (*Annex B*).

8 ENVIRONMENTAL AUDIT

8.1 SITE INSPECTION

Site inspections provide a direct means to track and ensure the enforcement of specified environmental protection and pollution control measures. The inspections should be undertaken by the ET to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented. Additionally, the ET should be responsible for defining the scope of the inspections, detailing any deficiencies that are identified, and reporting any necessary action or mitigation measures that are implemented as a result of the inspection.

Site inspections should be carried out at least once per week. The areas of inspection should not limited to the general environmental conditions in the vicinity of the site and the pollution control and mitigation measures within the site; the environmental conditions outside the site area which are likely to be affected, directly or indirectly, by site activities. The ET Leader should make reference to the following information in conducting the inspections:

- the EIA Study and EM&A recommendations on environmental protection and pollution control mitigation measures;
- ongoing results of the EM&A programme;
- works progress and programme;
- individual works method statements which should include proposals on associated pollution control measures;
- contract specifications on environmental protection;
- relevant environmental legislation and guidelines; and
- previous site inspection results undertaken.

The inspection results and their associated recommendations on improvements to the environmental protection and pollution control works should be submitted to the IEC and the Contractor, as appropriate, within one working day, for reference and for taking immediate action. They should also be presented, along with the remedial actions taken, in the monthly EM&A report. The Contractor should follow the procedures and time-frames stipulated in the environmental site inspection for the implementation of mitigation proposal. An action reporting system should be formulated and implemented to report on any remedial measures implemented subsequent to the site inspections.

The ET should 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 associated investigation work, as specified in the Action Plan for environmental monitoring and audit.

8.2 COMPLIANCE WITH LEGAL AND CONTRACTUAL REQUIREMENTS

There are contractual environmental protection and pollution control requirements, which the Contractor should comply with, in addition to Hong Kong's environmental protection and pollution control laws.

In order that the works are in compliance with the contractual requirements, all works method statements submitted by the Contractor to the ER for approval should sent to the ET Leader for vetting to see whether sufficient environmental protection and pollution control measures have been included.

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

The Contractor should also make available for inspection relevant documents to the ET so that the checking and auditing process can be carried out. The relevant documents are expected to include the updated work progress reports, the updated works programme, the application letters for different licences/permits under the environmental protection laws, all valid licences/permits and environmental related records. The site diary should also be available, upon request, to the ET during his site inspection.

After reviewing the documentation, the ET Leader should advise the IEC and the Contractor of any non-compliance with the contractual and legislative requirements on environmental protection and pollution control for them to take follow-up actions. If the ET Leader's review concludes that the current status on licence/permit application and any environmental protection and pollution control preparation works is incompatible with the works programme or may result in a potential violation of environmental protection and pollution control requirements by the works in due course, he should also advise the Contractor and the ER accordingly.

Upon receipt of the advice, the Contractor should undertake immediate action to remedy the situation. The ER should follow up to ensure that appropriate action has been taken by the Contractor in order to satisfy contractual and legal requirements.

9 ENVIRONMENTAL ENQUIRIES AND COMPLAINTS

9.1 INTRODUCTION

This section sets out the handling protocol in dealing with environmental related complaints and enquiries. The handling protocols aimed at:

- Ensuring that environmental complaints and enquiries are received, recorded and communicated to the ER and HyD.
- Ensuring that the ER and HyD are kept fully informed of action taken to address the calls received.
- Enabling mobilization of resources quickly to mitigate the potential impacts.

9.2 HANDLING PROTOCOLS

The Contractor should establish a community liaison office with a 24-hour hotline for receiving enquiry and complaint from the public on the construction activities related to the Project.

In addition, the Contractor should also establish guidance in handling enquiry or complaints via phone calls, correspondence, classification of complaint and enquiry, assignment of responsible staff, investigation procedures, follow-up action to be taken and compilation of complaint record for inspection. In general, complaints made via phone calls should be responded immediately by the designated holder or relevant staff.

All environmental related complaints via phone call or correspondence should be forwarded to the ET Leader to carry out an independent complaint investigation with the following procedures:

- log complaint and date of receipt onto the complaint database and inform the IEC and the ER immediately;
- investigate the complaint to determine its validity, and assess whether the source of the problem is due to works activities;
- identify mitigation measures in consultation with the IEC if a complaint is valid and due to works;
- advise the Contractor and the ER if mitigation measures are required;
- review the Contractor's response to identified mitigation measures, and the updated situation;
- submit interim report to the EPD on status of the complaint investigation and follow-up action;

- upon the identification of follow-up action, the Contractor should implement it as soon as possible;

- review the implementation status and its effectiveness, and when necessary, undertake additional monitoring and audit to verify the situation, and review that circumstances leading to the complaint do not recur;

- record the complaint, investigation, the subsequent actions and results into the Complaint Investigation Form as shown in *Annex E* and submit to the IEC, Contractor, ER, EPD and the complainant directly (if required);

- close the complaint and update the complain log as shown in *Annex E*, if the environmental condition is acceptable; and

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

During the complaint investigation stage, the Contractor and the ER should cooperate with the ET in providing all necessary information and assistance for completion of the investigation. If mitigation measures are required following the investigation, the Contractor should promptly carryout the measures. The ET should ensure that the measures have been carried out by the Contractor.

10 REPORTING

10.1 GENERAL

Reports can be provided in an electronic medium upon agreeing the format with the ER and the EPD. This will enable a transition from a paper / historic and reactive approach to an electronic/real time proactive approach.

Types of reports that the ET Leader should prepare and submit include Baseline Noise Monitoring Report, Monthly EM&A Report, Quarterly EM&A Summary Report and Final Review EM&A Report. In accordance with Annex 21 of the *EIAO-TM*, a copy of the monthly, quarterly summary and final review EM&A reports should be made available to the Director of Environmental Protection.

10.2 INTERIM NOTIFICATION OF ENVIRONMENTAL QUALITY LIMIT EXCEEDANCES

With reference to the Event and Action Plan, when the environmental quality performance limits are exceeded, the ET Leader should immediately notify the IEC and ER, as appropriate. The notification should be followed up with advice to the IEC and EPD on the results of the investigation, proposed actions and success of the actions taken, with any necessary follow-up proposals. A sample template for the interim notifications of environmental quality limits exceedances is presented in *Annex F*.

10.3 ELECTRONIC REPORTING OF EM&A INFORMATION

In order to facilitate public inspection of Baseline Noise Monitoring Report and Monthly EM&A Reports via electronic media, electronic copies of these Reports should be prepared in Hyper Text Markup Language (HTML) and in Portable Document Format and should be submitted at the same time as the hard copies. For the HTML version, a content page capable of providing hyperlink to each section and sub-section of these Reports should be included at the beginning of the document. Hyperlinks to all figures, drawings and tables in these Reports should be provided in the main text from where the respective references are made. All graphics in these Reports should be in interlaced GIF format unless otherwise agreed by EPD. The content of the electronic copies of these reports must be the same as the hard copies. The Baseline Monitoring Report and Monthly EM&A Reports should be made available to the public via a dedicated Internet Website in the shortest possible time and in any event no later than two weeks after the relevant environmental monitoring data are collected or become available, unless otherwise agreed with EPD.

For environmental monitoring data and results, they should be made available to the public through a dedicated web site within two working days

for construction noise data and two weeks for other data/results after the relevant environmental monitoring data are collected or become available.

The Internet website should enable user-friendly public access to the environmental monitoring data and project information. The Internet website should have features capable of:

- providing access to all environmental monitoring data of the Project collected since the commencement of construction;
- providing access to all finalized submissions as required under this Manual;
- searching by date;
- searching by types of noise monitoring data; and
- Hyperlinks to relevant monitoring data after searching;

10.4 BASELINE MONITORING REPORT

The ET Leader should prepare and submit a Baseline Monitoring Report within 10 working days of completion of the baseline monitoring and at least one week before commencement of construction of the Project. Copies of the Baseline Monitoring Report should be submitted to the Contractor, IEC, ER and EPD. The ET Leader should liaise with the relevant parties on the exact number of copies they require. The report format and baseline monitoring data format should be agreed with the EPD prior to submission.

The baseline monitoring report will include at least the following:

- up to half a page executive summary;
- brief project background information;
- drawings showing locations of the baseline monitoring stations;
- an updated construction programme;
- monitoring results (in both hard and diskette copies) together with the following information:
  - monitoring methodology;
  - name of laboratory and types of equipment used and calibration details;
  - parameters monitored;
  - monitoring locations;
  - monitoring date, time, frequency and duration; and

- quality assurance (QA) / quality control (QC) results and detection limits;

- details on influencing factors, including:
  - major activities, if any, being carried out on the site during the period;
  - weather conditions during the period; and
  - other factors which might affect results;
- determination of the Action and Limit Levels (A/L levels) for each monitoring parameter and statistical analysis of the baseline data;
- revisions for inclusion in the EM&A Manual; and
- comments, recommendations and conclusions.

10.5 MONTHLY EM&A REPORTS

The results and findings of all EM&A work required in the Manual should be recorded in the Monthly EM&A Reports prepared by the ET Leader. The Monthly EM&A Reports should be prepared and certified by the ET Leader; and verified and certified by the IEC and submitted within 10 working days after the end of each reporting month, with the first report due in the month after construction commences. Each monthly EM&A report should be submitted to the Contractor, IEC, ER and EPD. The ET Leader should liaise with each party on the required number of copies of the Monthly EM&A Reports in both hard copy and electronic medium requirement.

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

10.5.1 First Monthly EM&A Report

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

- executive summary (1-2 pages):
  - breaches of Action and Limit levels;
  - complaint log;
  - notifications of any summons and successful prosecutions;
  - reporting changes; and
  - future key issues.
- basic project information:

- project organization including key personnel contact names and telephone numbers;
- construction programme;
- management structure, and
- works undertaken during the month;

- environmental status:
  - 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 stations;

- a brief summary of EM&A requirements including:
  - all monitoring parameters;
  - environmental quality performance limits (Action and Limit levels);
  - Event and Action Plans;
  - environmental mitigation measures, as recommended in the EIA Study Final Report; and
  - environmental requirements in contract documents;

- implementation status:
  - advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the EIA Study, summarized in the updated implementation schedule;

- monitoring results (in tabulated form in both hard and diskette copies) together with the following information:
  - monitoring methodology;
  - name of laboratory and types of equipment used and calibration details;
  - parameters monitored;
  - monitoring locations;
  - monitoring date, time, frequency, and duration;
  - weather conditions during the period;

- graphical plots of the monitored parameters in the month annotated against:
- the major activities being carried out on site during the period;
- weather conditions that may affect the results; and
- any other factors which might affect the monitoring results; and
- quality assurance (QA) / quality control (QC) results and detection limits;

- report on non-compliance, complaints, notifications of summons and successful prosecutions:
  - record of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
  - record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
  - record of all notification of summons and successful prosecutions for breaches of current environmental protection / pollution control legislations, 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;

- 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 during the period; and
  - comments (for examples, effectiveness and efficiency of the mitigation measures), recommendations (for example, any improvement in the EM&A programme) and conclusions.

10.5.2 Subsequent Monthly EM&A Reports

The subsequent monthly EM&A reports should include at least the following:

- executive summary (1 - 2 pages):
  - breaches of Action and Limit Levels;
  - complaints log;
  - notifications of any summons and successful prosecutions;
  - reporting changes; and
  - future key issues.
- environmental status:
  - construction programme;
  - works undertaken during the month with illustrations including key personnel contact names and telephone numbers; and
  - drawing showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations.
- implementation status:
  - advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the EIA Study, summarized in the updated implementation schedule;
- monitoring results (in tabulated form in both hard and diskette copies) together with the following information:
  - monitoring methodology;
  - name of laboratory and types of equipment used and calibration details;
  - parameters monitored;
  - monitoring locations;
  - monitoring date, time, frequency, and duration;
  - weather conditions during the period;
  - graphical plots of the monitored parameters in the month annotated against;
  - the major activities being carried out on site during the period;
  - weather conditions that may affect the results;
  - any other factors which might affect the monitoring results; and

- quality assurance (QA) / quality control (QC) results and detection limits.

- 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 legislations, 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.

- 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 during the period; and
  - comments (for examples, effectiveness and efficiency of the mitigation measures), recommendations (for example, any improvement in the EM&A programme) and conclusions.

- appendix
  - Action and Limit levels;
  - graphical plots of trends of monitored parameters at key stations over the past four reporting periods for representative monitoring stations

- monitoring schedule for the present and next reporting period;

- cumulative statistics on complaints, notifications of summons and successful prosecutions; and

- outstanding issues and deficiencies.

10.5.3 Quarterly EM&A Summary Reports

A quarterly EM&A summary report of around five pages should be produced and should contain at least the following information:

- up to half page executive summary;
- basic project information including a synopsis of the project organisation, programme, contacts of key management, and a synopsis of works undertaken during the quarter;
- a brief summary of EM&A requirements including:
  - monitoring parameters;
  - environmental quality performance limits (Action and Limit levels); and
  - environmental mitigation measures, as recommended in the EIA Report;
- advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the EIA Report, summarised in the updated implementation schedule;
- drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
- graphical plots of any trends in monitored parameters over the past four months (the last month of the previous quarter and the present quarter) for representative monitoring stations annotated against:
  - the major activities being carried out on site during the period;
  - weather conditions during the period; and
  - any other factors which might affect the monitoring results;
- advice on the solid and liquid waste management status during the reporting period;
- a summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
- a brief review of the reasons for and the implications of any non-compliance, including a review of pollution sources and working procedures;
- a summary description of actions taken in the event of non-compliance and any follow-up procedures related to any earlier non-compliance;

- a summarised record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;

- comments (for examples, a review of the effectiveness and efficiency of the mitigation measures) recommendations (for example, any improvement in the EM&A programme) and conclusions for the quarter; and

- proponents' contacts and any hotline telephone number for the public to make enquiries.

10.5.4 Final EM&A Summary Report

The Final EM&A Review Report will include at least the following:

- an executive summary;

- drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;

- basic project information including a synopsis of the project organisation, contacts of key management, and a synopsis of work undertaken during the entire construction period;

- brief summary of EM&A requirements including:

  - monitoring parameters;

  - environmental quality performance limits (Action and Limit levels); and

  - environmental mitigation measures, as recommended in the EIA Report;

  - Event and Action Plans.

- advice on the implementation status of environmental protection and pollution control/mitigation measures, as recommended in the Project Profile, summarized in the updated implementation schedule;

- graphical plots of the trends of monitored parameters over the construction period for representative monitoring stations annotated against:

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

  - weather conditions during the period; and

  - any other factors which might affect the monitoring results;

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

- a brief review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures;
- a summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;
- a summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;
- 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;
- a review of the validity of EIA predictions and identification of shortcomings in the EIA recommendations;
- advice on the environmental acceptability of the Project with reference to the specific impact hypothesis;
- advice on the solid and liquid waste management status;
- review monitoring methodology adopted and with the benefit of hindsight, comment on its effectiveness (including cost effectiveness);
- review the practicality and effectiveness of the EM&A programme (for examples, a review of the effectiveness and efficiency of the mitigation measures), recommend any improvement in the EM&A programme; and
- recommendations and recommendations (for example, a review of success of the overall EM&A programme to cost-effectively identify deterioration and to initiate prompt effective mitigatory action when necessary).

10.6 DATA KEEPING

Documentation such as the monitoring field records, laboratory analysis records, site inspection forms, etc. are not required to be included in the Monthly EM&A Reports. However, such documents should be well kept by the ET Leader, as appropriate, and should be available for inspection upon request. All relevant information should be clearly and systematically recorded in the documents. Monitoring data should also be recorded in electronic format, and the soft copy should be available upon request. All documents and data should be kept for at least one year following completion of the construction contract.

Annex A

Summarised Construction Programme

Annex A

Summarised Construction Programme

Annex A-1

Preliminary Summarised Construction Programme (Construction Method for Flyover A : Option 1 - Precast Segmental Balanced Cantilever Box Girder)

No.	Activity Description	2009	2010												2011											
		Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
DESIGNATED PROJECT																										
Improvement to Pok Oi Interchange																										
I	**Flyover A**																									
1	Site clearance	Y	Y	Y																						
3	Piling				Y	Y	Y	Y	Y	Y																
4	Road drainage, utilities & water mains works										Y	Y														
8	Construct pilecaps and piers												Y	Y	Y	Y	Y									
9	Construct flyover																	Y	Y	Y						
10	Install concrete parapets and planters																				Y	Y				
13	Pavement construction																						Y	Y		
II	**Slip Road A**																									
1	Site clearance										Y	Y														
2	Site formation												Y	Y	Y											
4	Road drainage, utilities & water mains works															Y	Y									
5	Construct retaining walls, abutments and embankment																	Y	Y	Y	Y	Y				
13	Pavement construction																						Y	Y		
III	**Slip Road B**																									
1	Site clearance										Y	Y														
2	Site formation												Y	Y	Y											
4	Road drainage, utilities & water mains works															Y	Y									
5	Construct retaining walls, abutments and embankment																	Y	Y	Y	Y	Y				
13	Pavement construction																						Y	Y		
IV	**Slip Road C**																									
1	Site clearance	Y	Y	Y																						
2	Site formation				Y	Y	Y																			
4	Road drainage, utilities & water mains works							Y	Y																	
5	Construct retaining walls, abutments and embankment									Y	Y	Y	Y	Y	Y											
13	Pavement construction															Y	Y									
V	**Left-turn Lane A**																									
1	Site clearance	Y	Y	Y																						
2	Site formation				Y	Y																				
4	Road drainage, utilities & water mains works						Y	Y																		
5	Construct retaining walls, abutments and embankment								Y	Y	Y															
7	Extend subway											Y	Y													
10	Install concrete parapets and planters													Y												
6	Demolish existing structures														Y											
13	Pavement construction															Y	Y									
VI	**Road Resurfacing and Remarking A**																									
11	Road resurfacing and remarking															Y	Y									
VII	**Road Resurfacing and Remarking B**																									
11	Road resurfacing and remarking																						Y	Y	Y	Y
CONCURRENT PROJECTS																										
Kau Hui Development - Engineering Works in Area 16, Yuen Long Phase 2 - Extension of Road L3 [1]																										
1	Site formation																									
2	Box culvert																									
3	Retaining wall construction & associated works																									
4	Road embankment	Y	Y	Y	Y																					
5	Road drainage, utilities & water mains works					Y	Y	Y	Y	Y	Y															
6	Pavement construction											Y	Y	Y	Y	Y	Y									
Proposed Left Turn Lane at POI for the Development at YOHO Town Phase II																										
1	Site formation		Y	Y	Y																					
5	Road drainage, utilities & water mains works					Y	Y	Y																		
6	Pavement construction								Y	Y	Y	Y														

Notes:

[1] Activity 1 to 3 (i.e. site formation, box culvert and retaining wall construction & associated works) shall tentatively be completed before December 2009.

Annex A-2

Preliminary Summarised Construction Programmen (Construction Method for Flyover A : Option 2 : Cast In-situ Deck with Conventional Temporary Works)

No.	Activity Description	2009	2010												2011											
		Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
DESIGNATED PROJECT																										
Improvement to Pok Oi Interchange																										
I	**Flyover A**																									
1	Site clearance	Y	Y	Y																						
3	Piling				Y	Y	Y	Y	Y	Y																
4	Road drainage, utilities & water mains works										Y	Y														
8	Construct pilecaps and piers												Y	Y	Y	Y	Y									
9	Construct flyover																	Y	Y	Y	Y	Y				
10	Install concrete parapets and planters																							Y	Y	
13	Pavement construction																								Y	Y
II	**Slip Road A**																									
1	Site clearance										Y	Y														
2	Site formation												Y	Y	Y											
4	Road drainage, utilities & water mains works															Y	Y									
5	Construct retaining walls, abutments and embankment																	Y	Y	Y	Y	Y				
13	Pavement construction																							Y	Y	
III	**Slip Road B**																									
1	Site clearance										Y	Y														
2	Site formation												Y	Y	Y											
4	Road drainage, utilities & water mains works															Y	Y									
5	Construct retaining walls, abutments and embankment																	Y	Y	Y	Y	Y				
13	Pavement construction																							Y	Y	
IV	**Slip Road C**																									
1	Site clearance	Y	Y	Y																						
2	Site formation				Y	Y	Y																			
4	Road drainage, utilities & water mains works							Y	Y																	
5	Construct retaining walls, abutments and embankment									Y	Y	Y	Y	Y	Y											
13	Pavement construction															Y	Y									
V	**Left-turn Lane A**																									
1	Site clearance	Y	Y	Y																						
2	Site formation				Y	Y																				
4	Road drainage, utilities & water mains works						Y	Y																		
5	Construct retaining walls, abutments and embankment								Y	Y	Y															
7	Extend subway											Y	Y													
10	Install concrete parapets and planters													Y												
6	Demolish existing structures														Y											
13	Pavement construction															Y	Y									
VI	**Road Resurfacing and Remarking A**																									
11	Road resurfacing and remarking															Y	Y									
VII	**Road Resurfacing and Remarking B**																									
11	Road resurfacing and remarking																							Y	Y	Y	Y
CONCURRENT PROJECTS																										
Kau Hui Development - Engineering Works in Area 16, Yuen Long Phase 2 - Extension of Road L3 [1]																										
1	Site formation																									
2	Box culvert																									
3	Retaining wall construction & associated works																									
4	Road embankment	Y	Y	Y	Y																					
5	Road drainage, utilities & water mains works					Y	Y	Y	Y	Y	Y															
6	Pavement construction											Y	Y	Y	Y	Y	Y									
Proposed Left Turn Lane at POI for the Development at YOHO Town Phase II																										
1	Site formation		Y	Y	Y																					
5	Road drainage, utilities & water mains works					Y	Y	Y																		
6	Pavement construction								Y	Y	Y	Y														

Notes:

[1] Activity 1 to 3 (i.e. site formation, box culvert and retaining wall construction & associated works) shall tentatively be completed before December 2009.

Annex B

Environmental Mitigation Implementation Schedule (EMIS)

B1 IMPLEMENTATION SCHEDULE

B1.1 INTRODUCTION

This *Annex* summarises all the mitigation measures recommended in the *EIA Study* and presents them in the form of an Implementation Schedule in accordance with the requirements of Section 3.4.7.3 of the *EIA Study Brief No. ESB-166/2007*.

The Implementation Schedule has the following column headings:

EIA Ref

This denotes the section number or reference from the EIA Report Main text.

EM&A Ref

This denotes the sequential number of each of the recommended mitigation measures specified in the Implementation Schedule.

Recommended Mitigation Measures

This denotes the recommended mitigation measures, courses of action or subsequent deliverables that are to be adopted, undertaken or delivered to avoid, reduce or ameliorate predicted environmental impacts.

Objectives of the Recommended Measure and Main Concerns to be Addressed

This denotes the objectives of the recommended mitigation measures and main concerns to address.

Location

This indicates the spatial area in which the recommended mitigation measures are to be implemented together with details of the programming or timing of their implementation.

Who to Implement the Measure

This denotes where the responsibility lies for the implementation of the recommended mitigation measures.

When to Implement the Measure

This denotes the stage at which the recommended mitigation measures are to be implemented either during the Design, Construction or Operation phases.

What Requirements or Standards for the Measure to Achieve

This defines the controlling legislation that is required to be complied with.

Table B1.1a Implementation Schedule

EIA Ref.	EM&A Ref	Environmental Protection Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? (1) D C O	What requirements or standards for the measure to achieve?
Noise – Construction Phase							
4.7.1	N1	Adopt good site practice listed below: • Only well-maintained plant will be operated on-site and plant should be serviced regularly during the construction program; • Silencers or mufflers on construction equipment should be utilized and will be properly maintained during the construction program; • Mobile plant, if any, will be sited as far from NSRs as possible; • Machines and plant (such as trucks) that may be in intermittent use will be shut down between work periods or should be throttled down to a minimum; • Plant known to emit noise strongly in one direction will, wherever possible, be orientated so that the noise is directed away from the nearby NSRs; and • Material stockpiles and other structures will be effectively utilised, wherever practicable, in screening noise from on-site construction activities. • Noisy construction activities, including piling,	To minimise potential construction noise nuisance.	All construction work areas	Contractor	✓	*Noise Control Ordinance (NCO) and EIAO-TM Annex 5*

(1) D=Design; C=Construction; and O=Operation

EIA Ref.	EM&A Ref	Environmental Protection Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? (1) D	C	O	What requirements or standards for the measure to achieve?
		excavation and earth-breaking works, will be carried out outside the examination periods of Kwong Ming Ying Loi School.							
4.7.1	N2	Use of quiet powered mechanical equipment	To minimise potential construction noise nuisance.	All construction work areas	Contractor		✓		*Noise Control Ordinance (NCO) and EIAO-TM Annex 5*
4.7.1	N3	Use of acoustic enclosure	To minimise potential construction noise nuisance.	All construction work areas	Contractor		✓		*Noise Control Ordinance (NCO) and EIAO-TM Annex 5*
4.7.1	N4	Adoption of Movable Noise Barriers. The barrier material shall have a surface mass of not less than 7 kg/m^2 on skid footing.	To minimise potential construction noise nuisance.	At locations shown in *Figure 4.7* of the *EIA Report*	Contractor		✓		*Noise Control Ordinance (NCO) and EIAO-TM Annex 5*
4.9.1	N5	Weekly noise monitoring	Ensure noise generated from the Project meets the criteria	At monitoring locations shown in *Figure 4.1* of the *EM&A Manual*	ET		✓		*Noise Control Ordinance (NCO) and EIAO-TM Annex 5*
Noise – Operation Phase									
4.9.2	N6	Traffic noise monitoring – twice at 6-month intervals within the first year upon completion of the Project.	Ensure noise generated from the Project meets the criteria	At monitoring locations shown in *Figure 4.1* of the *EM&A Manual*	ET			✓	*Noise Control Ordinance (NCO) and EIAO-TM Annex 5*
Air Quality – Construction Phase									
5.7.1	AQ1	Adopt good site practices and dust control measures	To minimise potential	All construction work	Contractor		✓		*Air Pollution Control*

EIA Ref.	EM&A Ref	Environmental Protection Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? (1) D C O	What requirements or standards for the measure to achieve?
		listed below: • Any stockpile of dusty material will be covered entirely with impervious sheeting or sprayed with water so as to maintain the entire surface wet; • Where a site boundary adjoins a road, or other area accessible to the public, hoarding shall be provided a long the entire length of that portion of the site boundary; • All dusty materials will be sprayed with water immediately prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet; • Where a vehicle leaving the works site is carrying a load of dusty materials, the load will be covered entirely with clean impervious sheeting to ensure that the dusty materials do not leak from the vehicles; • The working area of any demolition, excavation or earth moving operation will be sprayed with water or dust suppression chemicals immediately after the operation so as to maintain the entire surface wet; • The construction plants will be regularly maintained to avoid the emissions of black smoke; and • The construction plants will be switched off when not in use to avoid gaseous emissions.	dust nuisance	areas			*(Construction Dust) Regulations* *HKAQO and EIAO-TM Annex 4*
Water Quality – Construction Phase							

EIA Ref.	EM&A Ref	Environmental Protection Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? (1) D C O	What requirements or standards for the measure to achieve?
6.6.1	WQ1	<u>Construction Site Run-off and Drainage</u>					
		• Silt removal facilities such as silt traps or sedimentation facilities should be provided to remove silt particles from runoff to meet the requirements of the WPCO-TM standard. The design of silt removal facilities should be based on the guidelines provided in *ProPECC PN 1/94*. All drainage facilities and erosion and sediment control structures should be inspected monthly and maintained to ensure proper and efficient operation at all times and particularly during rainstorms.	To minimise potential water quality impacts arising from the construction works	All construction work areas	Contractor	✓	*ProPECC PN 1/94* *Water Pollution Control Ordinance (WPCO)* *EIAO-TM Annex 6*
		• Careful programming of the works to minimise surface excavations for the Project during the wet season. If excavation of soil cannot be avoided during the wet season, exposed slope surfaces should be covered by tarpaulin or other means. Other measures that need to be implemented before, during, and after rainstorms are summarised in *ProPECC PN 1/94*. • Exposed soil surfaces should be protected by paving or fill material as soon as possible to reduce the potential of soil erosion. • Open stockpiles of construction materials or construction wastes on-site of more than 50m3 should be covered with tarpaulin or similar fabric during rainstorms. These materials should not be placed near water courses. • A Drainage Management Plan (DMP) should be					

EIA Ref.	EM&A Ref	Environmental Protection Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? (1) D C O	What requirements or standards for the measure to achieve?
		prepared by the Contractor and submitted to EPD before the commencement of any construction works to detail the procedures for control of construction site runoff. No site run-off or drainage should be allowed enter the nearby WSRs.					
6.6.1	WQ2	<u>General Construction Activities</u>					
		• Debris and refuse generated on-site should be collected, handled and disposed of properly to avoid entering the nearby WSRs. Stockpiles of cement and other construction materials should be kept covered when not being used.	To minimise potential water quality impacts arising from the construction works	All construction work areas	Contractor	✓	*ProPECC PN 1/94* *Water Pollution Control Ordinance (WPCO)* *EIAO-TM Annex 6*
		• Oils and fuels should only be used and stored in designated areas which have pollution prevention facilities. 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 container or 20% by volume of the chemical waste stored in that area, whichever is the greatest. The bund should be drained of rainwater after a rain event.					
6.6.1	WQ3	<u>Sewage generated from On-site Workforce</u>	To minimise potential water quality impacts arising from the construction works	All construction work areas	Contractor	✓	*ProPECC PN 1/94* *Water Pollution Control Ordinance (WPCO)* *EIAO-TM Annex 6*
		• Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site. A licensed contractor would be responsible for appropriate disposal and regular maintenance of these facilities.					
6.6.1	WQ4	<u>Piling Activities</u>					
			To minimise potential	All construction work			*ProPECC PN 1/94*

EIA Ref.	EM&A Ref	Environmental Protection Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? (1) D	C	O	What requirements or standards for the measure to achieve?
		• Silt removal facilities such as silt traps or sedimentation facilities should be provided to remove silt particles from groundwater to meet the requirements of the *WPCO-TM* standard. The design of silt removal facilities should be based on the guidelines provided in ProPECC PN 1/94. All drainage facilities and erosion and sediment control structures should be inspected and maintained on a regular basis to ensure proper and efficient operation at all times and particularly during rainstorms.	water quality impacts arising from the construction works	areas	Contractor		✓		*Water Pollution Control Ordinance (WPCO)* *EIAO-TM Annex 6*
Water Quality – Operation Phase									
6.6.2	WQ5	Standard HyD road gullies will be installed along the road drainage system to trap any silt and grit in the first flush of runoff.	To minimise potential water quality impacts on surface water.	All construction work areas	HyD/ Contractor	✓	✓	✓	*WPCO* *Technical Memorandum Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Inshore Waters (Water-TM)* *EIAO-TM Annex 6*
Waste Management – Construction Phase									
7.5.1	WM1	All the necessary waste disposal permits are obtained prior to the commencement of construction work.	To ensure compliance with relevant statutory requirements	Before construction works commence	Contractor	✓	✓		*WDO*
7.5.1	WM2	<u>Management of Waste Disposal</u> The construction contractor will open a billing account	To ensure that adverse	All construction work	Contractor		✓		*WDO*

EIA Ref.	EM&A Ref	Environmental Protection Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? (1) D	C	O	What requirements or standards for the measure to achieve?
		with the EPD. Every construction waste or public fill load to be transferred to the Government waste disposal facilities such as public fill reception facilities, sorting facilities, landfills will required a valid "chit" which contains the information of the account holder to facilitate waste transaction recording and billing to the waste producer. A trip-ticket system will also be established to monitor the disposal of construction waste at the Landfill and to control fly-tipping. The trip-ticket system will be included as one of the contractual requirements and implemented by the contractor. A recording system for the amount of waste generated, recycled and disposed of (including the disposal sites) will be established.	environmental impacts are prevented	areas					*Waste Disposal (Charges for Disposal of Construction Waste) Regulation;* *Works Bureau Technical Circular No.31/2004; and* *Annex 5 and Annex 6 of Appendix G of ETWBTC No. 19/2005)*
7.5.1	WM3	<u>Measures for the Reduction of Construction Waste Generation</u>							
		Inert and non-inert construction waste will be segregated and stored in different containers or skips to facilitate reuse or recycling of the inert waste and proper disposal of the non-inert construction waste. Specific areas of the work site will be designated for such segregation and storage if immediate use is not practicable.	To reduce construction waste generation	All construction work areas	Contractor		✓		*WDO* *EIAO-TM Annex 7*
7.5.2	WM4	<u>Management of Waste Disposal</u>							
		The construction contractor will open a billing account with the EPD. Every construction waste or public fill load to be transferred to the Tuen Mun Area 38 Public Filling Area or other approved designated public fill	To reduce construction waste generation	All construction work areas	Contractor		✓		*WDO* *Waste Disposal (Charges for Disposal of Construction*

EIA Ref.	EM&A Ref	Environmental Protection Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? (1) D	C	O	What requirements or standards for the measure to achieve?
		facilities will require a valid "chit". A trip-ticket system will also be established to monitor the disposal of construction waste at the Tuen Mun Area 38 Public Filling Area or other approved designated public fill facilities, and to control fly-tipping.							*Waste) Regulation & Works Bureau Technical Circular No.31/2004*
7.5.3	WM5	<u>Chemical Waste</u>							
		The construction contractor will register as a chemical waste producer with the EPD. Chemical waste will be handled in accordance with the *Code of Practice on the Packaging, Handling and Storage of Chemical Wastes.*	To ensure proper handling of chemical waste	All construction work areas	Contractor		✓		*WDO* *Code of Practice on the Packaging, Handling and Storage of Chemical Wastes*
7.5.4	WM6	<u>Staff Training</u>							
		At the commencement of the construction works, training will be provided to workers on the concepts of site cleanliness and on appropriate waste management procedures, including waste reduction, reuse and recycling.	To ensure that adverse environmental impacts are prevented	All construction work areas	ET		✓		-
7.8	WM7	<u>Environmental Monitoring & Audit Requirements</u>							
		Monthly audits of the waste management practices will be carried out during the construction phase to determine if wastes are being managed in accordance with the good site practices described in this *EIA Report*. The audits examine all aspects of waste management including waste generation, storage, recycling, transport and disposal.	To ensure that adverse environmental impacts are prevented	All construction work areas	Contractor		✓		*WDO*
Landscape and Visual – Construction Phase									

EIA Ref.	EM&A Ref	Environmental Protection Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? (1)			What requirements or standards for the measure to achieve?
						D	C	O	
8.7.11	LV1	*LMM 5 – Early Planting Works.* Where technically feasible, new plantings are to be installed as early as possible during the construction works.	To reduce construction impacts on Landscape	Where technically feasible	Contractor	✓	✓		*EIAO-TM Annexes 10, 18, ETWB TCW 2/2004, ETWB TCW 3/2006*
8.7.11	LV2	*LMM 6 – Site hoardings to be compatible with the surrounding environment.* Where possible site hoardings to be coloured to complement the surrounding areas. Colours such as green and light brown are recommended.	To reduce construction impacts on Landscape	All construction work areas	Contractor		✓		*EIAO-TM Annexes 10, 18, ETWB TCW 2/2004, ETWB TCW 3/2006*
Landscape and Visual –Operation Phase									
8.7.11	LV3	*Cultivation of areas compacted during construction.* Areas compacted during the construction phase that are not required during the operation phase, are to be cultivated to a depth of up to 300mm in accordance with the future Landscape Specification.	To assist in establishment of vegetation to reduce landscape impacts	All construction work areas where new plantings are to be installed	Contractor/ HyD	✓	✓	✓	*EIAO-TM Annexes 10, 18, ETWB TCW 2/2004, ETWB TCW 3/2006*
8.7.11	LV4	*Soil stabilisation and planting.* During the design phase, a soil stabilisation and embankment planting strategy will be developed to ensure that land affected by slope excavation can be replanted. Soil preparation and the selection and provision of suitable growing medium is to be completed in accordance with the relevant best practice guidelines.	To reduce landscape impacts	All construction work areas in slope areas	Contractor/ HyD	✓	✓	✓	*EIAO-TM Annexes 10, 18, ETWB TCW 2/2004, ETWB TCW 3/2006*
8.7.11	LV5	*Tree and Shrub Planting.* All planting of trees and shrubs is to be carried out in accordance with the relevant best practice guidelines. Plant densities are to be provided in future detailed design documents and are to be selected so as to achieve a finished landscape that matches the surrounding, undisturbed, equivalent landscape types.	To reduce landscape impacts	All available following construction	Contractor/ HyD	✓	✓	✓	*EIAO-TM Annexes 10, 18, ETWB TCW 2/2004, ETWB TCW 3/2006*

EIA Ref.	EM&A Ref	Environmental Protection Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? (1)			What requirements or standards for the measure to achieve?
						D	C	O	
8.7.11	LV6	*LMM 4 - Relocation.* Landscape Resources of value to be re-located where practically feasible.	To reduce landscape impacts and retain valuable LRs	As required	Contractor / HyD	✓	✓	✓	*EIAO-TM Annexes 10, 18, ETWB TCW 2/2004, ETWB TCW 3/2006*
8.8.9	LV7	*Design of Structures.* Built structures, in particular noise barriers that will be setback and reprovisioned will be utilise appropriate designs to complement the surrounding landscape. Materials and finishes will also be considered during detailed design.	To reduce visual impacts	Noise barriers	Contractor / HyD	✓	✓	✓	*EIAO-TM Annexes 10, 18, ETWB TCW 2/2004, ETWB TCW 3/2006*
8.8.9	LV8	*Design of noise barriers*. The 2.5m high vertical noise barrier for the planned schools will be in the form of concrete structure installed with barrier panels to align with the existing provision in the vicinity and to integrate into the landscape.	To reduce visual impacts	Noise barriers	Contractor / HyD	✓	✓	✓	*EIAO-TM Annexes 10, 18, ETWB TCW 2/2004, ETWB TCW 3/2006*
8.8.9	LV9	*Plantings* In addition to the landscape mitigation plantings proposed, appropriate new plantings will be installed as appropriate to help integrate the new structures into the surrounding landscape.	To reduce visual impacts	All construction work areas	Contractor / HyD	✓	✓	✓	*EIAO-TM Annexes 10, 18, ETWB TCW 2/2004, ETWB TCW 3/2006*

Annex C

Sample Data Record Sheets for Noise Monitoring

Annex C1

Sample Data Record Sheet for Noise Monitoring during Construction Phase

Noise Monitoring Field Record Sheet

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

	Name & Designation	Signature	Date
Recorded By :			
Checked By :			

Annex C2

Sample Data Record Sheet for Noise Monitoring during Operational Phase

Improvement to Pok Oi Interchange

Operational Stage Traffic Noise Monitoring – Field Survey Record Sheet

A. General	
Monitoring location/Reference No.	
Person-in-charge	
Date and Day of monitoring	
Measurement time	From to
Description of location (incl. floor level) (attach plan separately)	
Microphone position	

B. Weather Conditions	
Weather Conditions	
Temperature ^{O}C	
Wind speed ms^{-1}	

C. Equipment			
Instrument	**Type**	**Serial No.**	**Setting**
Sound level meter			
Calibrator			

D. Calibration	
Before measurement:	After measurement:

E. Raw Data									
Time	**Traffic data***				**Noise Level (30 min) dB (A)**				**Average speed kph a/b/c/d#**
	Near side		**Far side**						
	LV	**HV**	**LV**	**HV**	**L_{10}**	**L_{90}**	**L_{eq}**	**L_{max}**	

Note: LV - light vehicle (ie private car, motorcycle, taxis and van)

HV - heavy vehicle (ie other than LV)

* - traffic count for a duration of 15 minutes

\# - a/b/c/d = near side LV/near side HV/far side LV/far side HV

F. Other	
Mitigation measures in place near measurement location	
Other noise source(s) during monitoring	
Remarks	

G. Personnel				
	Name	**Designation**	**Signature**	**Date**
Recorded by				
Checked by				

Annex D

Sample of Waste Flow Table

Improvement to Pok Oi Interchange

Name of Project Proponent: Highways Department
Project Commencement Date: _____
Construction Completion Date: _____

Monthly Summary Waste Flow Table for Year 2009

Period	Actual Quantities of inert C&D Materials (in 10^3 Kg) [1]					Actual Quantities of C&D Wastes (in 10^3 Kg) [4]								
	Total Quantity Generated	Broken Concrete [2]	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Metals		Plastic [3]		Paper/cardboard packaging		Chemical Waste (L)		Other waste (e.g. general refuse)
	(a)	(b)	(c)	(d)	(a)-(b)-(c)-(d)	Recycle	Disposal	Recycle	Disposal	Recycle	Disposal	Recycle	Disposal	Disposal
Total														

Note: [1] Inert C&D materials include bricks, concrete, building debris, rubble and excavated soil.
[2] Broken concrete for recycling into aggregates.
[3] Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material
[4] C&D waste includes metals, paper / cardboard packaging waste, chemical waste and other wastes such as general refuse.

Annex E

Complaint Investigation Form and Complaint Log

Improvement to Pok Oi Interchange

Complaint Log

Log No.	*Location*	*Complaint made on*	*Details of Complaint*	*Investigation and Mitigation Action*	*Status*

Improvement to Pok Oi Interchange

Investigation Report – Complaint Received on _____

Log No.	Complaint Log No. S___
Date of Investigation Report	
Date & Time of Complaint	
Description of Complaint	
Investigation Report	
Immediate Measures Taken	
Further Measures Taken	
Recommendations	-
Status of Complaint	Closed / Not yet closed

Annex F

Notification of Exceedance

Improvement to Pok Oi Interchange

Notification of Exceedance

Log No.	
Date	
Time	
Monitoring Station	
Parameter	
Action & Limit Levels	
Measured Level	
Possible Reason for Action or Limit Level Non-compliance	
Actions Taken / To Be Taken	
Remarks	-

Reported by : _____ (Environmental Team Leader)

Date : _____