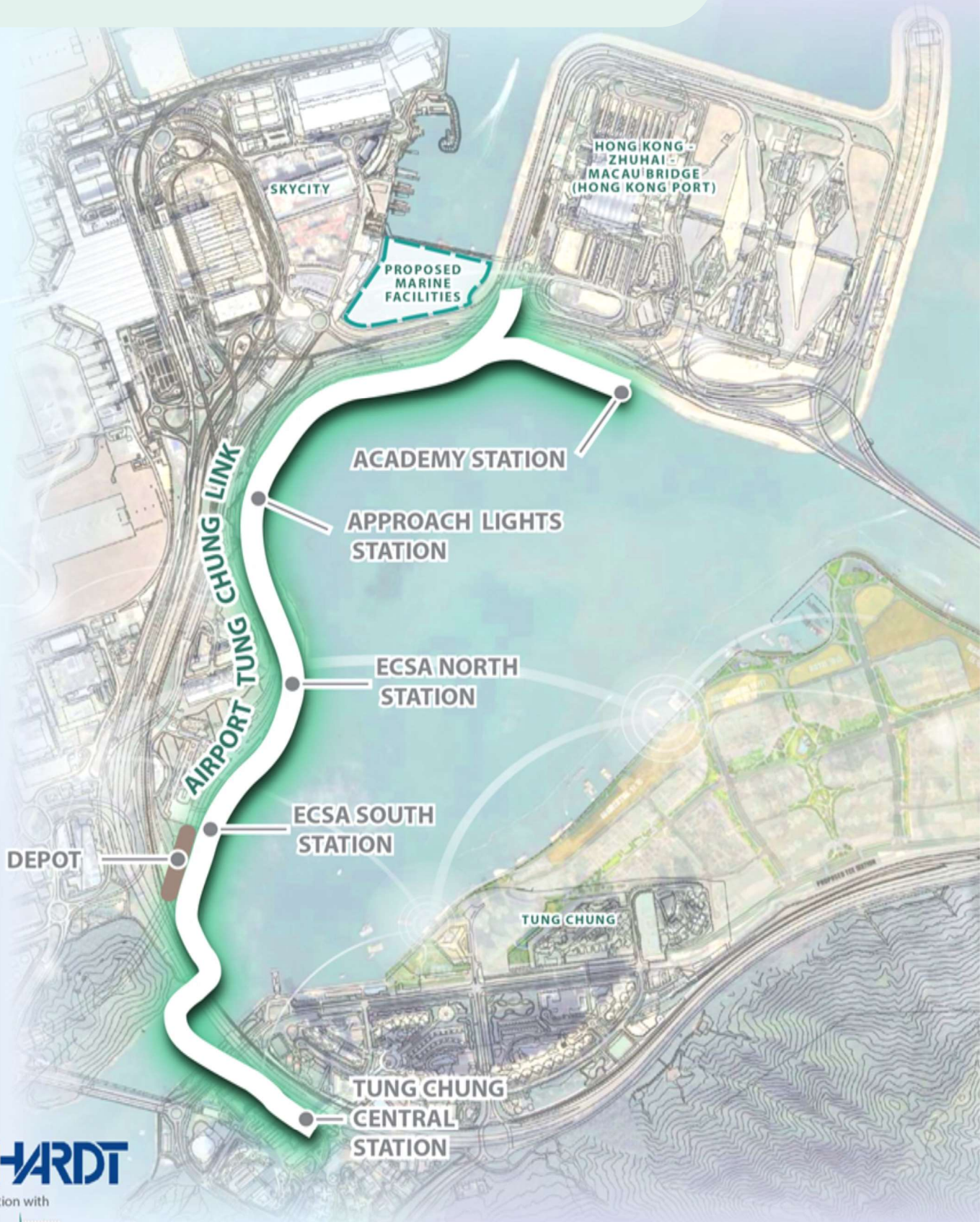


# Airport Tung Chung Link Project

## Environmental Monitoring and Audit Manual August 2023



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## **1 INTRODUCTION**

### **1.1 Project Background**

#### **Strategic Context: Airport City**

- 1.1.1 Airport Authority Hong Kong (AAHK) first put forward its vision to transform Hong Kong International Airport (HKIA) into an Airport City in the “*From City Airport to Airport City*” report published in 2019. The Airport City vision envisages growing HKIA’s position as the preeminent international aviation hub in Asia Pacific, while transforming HKIA into a new landmark and one of the key economic growth engines for Hong Kong. To realise the Airport City vision, AAHK has adopted a strategy to fully capitalise on the unique geographical advantage of HKIA and capture opportunities arising from the new infrastructures connected to the airport, such as the Hong Kong-Zhuhai-Macao Bridge (HZMB).
- 1.1.2 The infrastructural support to the airport’s capacity and functional enhancements includes, among others, a series of AAHK’s recommendations for land uses on the Hong Kong Port (HKP) (formerly known as Hong Kong Boundary Crossing Facilities) Island of HZMB. The key project items include the building of automated car parks for transit air passengers and visitors travelling via HZMB, and the Airportcity Link, a vehicular and pedestrian bridge, on which the AAHK operates an autonomous transportation system to connect HKP Island and SKYCITY, and plans to extend such system to Tung Chung Town Centre. In addition, land parcels on the HKP Island have been reserved for the development of air cargo logistics. As announced in the Chief Executive’s 2020 Policy Address, the HKSAR Government has accepted these proposals. It is also noted in the 2020 Policy Address that optimising the use of the land adjacent to the airport will not only provide more job opportunities and a better living environment for the expanding Tung Chung community, but also inject new development elements and economic impetus into the whole North Lantau.
- 1.1.3 A Project Profile (No. PP-623/2021) was submitted to the Environmental Protection Department (EPD) for application of an EIA Study Brief under Section 5(1)(a) of the Environmental Impact Assessment Ordinance (EIAO) and an EIA Study Brief (No. ESB-342/2021) for the Project was issued on 26 July 2021 under Section 5(7)(a) of the EIAO.
- 1.1.4 On 21 September 2021, the Airport Authority Hong Kong appointed Meinhardt (Hong Kong) Ltd, to provide consultancy services for the Airport Tung Chung Link Project under Contract C21C04.

### **1.2 Project Description**

#### **Site Location of the Project and History**

- 1.2.1 The Project involves the construction and operation of (i) a proposed Airport Tung Chung Link (ATCL) to connect HKP Island, Airport Island and Tung Chung Town Centre via a dedicated road link; and (ii) marine facilities in the waters between Airport Island and HKP Island. The ATCL will be extended from the planned Airportcity Link (ACL) to

its south & east and run along the eastern coast of the Airport Island for connection with the East Coast Support Area (ECSA) in the Airport Island and Tung Chung Town Centre. Part of the ATCL is located in the marine area (marine viaduct section) and part in the land area (at-grade and land viaduct section). AAHK's zero emission vehicles (e.g. electric vehicles), and ultimately an autonomous transportation system (supported by zero emission autonomous vehicles), will be operated on the proposed ATCL. The marine facilities include the SKYCITY Pier and berthing facilities are developed with a view to promote tourism and form part of the leisure offerings in SKYCITY. Location of the Project is shown in [Figure 1.1](#).

1.2.2 Subsequent to the issue of the EIA Study Brief (No. ESB-342/2021), two design developments have been changed as compared to the Project Profile. These include:

1. Maintenance dredging for the marine facilities is necessary for its future operation; and
2. Kwo Lo Wan Road (KLW Road) upgrading works will be carried out separately, i.e. independent from the ATCL, so as to provide an access to the ECSA before ECSA construction.

1.2.3 In accordance with Clause 6.2 of the EIA Study Brief, it was checked if there was any key change in the scope of the Project mentioned in Section 1.2 of the EIA Study Brief and in Project Profile (No. PP-623/2021). It was demonstrated that inclusion of maintenance dredging for marine facilities and removal of KLW Road would not fundamentally alter the key scope of the EIA Study Brief. The EIA Study Brief is still valid for the preparation of the EIA Report.

### **Designated Projects**

1.2.4 The Project consists of the following designated projects under the following items of Part I, Schedule 2 of the EIAO:

- Item A.6(c) – A transport depot located less than 200 m from the nearest boundary of an existing or planned educational institution;
- Item A.8 – A road or railway bridge more than 100 m in length between abutments;
- Item C.3(a) – Reclamation works resulting in 5% decrease in cross sectional area calculated on the basis of 0.0mPD in a sea channel;
- Item C.12(b) – A dredging operation exceeding 500,000 m<sup>3</sup> or a dredging operation which is less than 100 m from a seawater intake point; and
- Item O.2 – A marina designed to provide moorings or dry storage for not less than 30 vessels used primarily for pleasure or recreation.

### **Implementation Programme**

1.2.5 The construction works of the Project will be tentatively commenced in Q4 2025 and be completed in 2027/2028. A summary of the key construction works period is listed below.

- ATCL (including ATCL alignment, stations and other associated works)  
Tentative construction period: Q4 2025 to Q1 2028
- Marine Facilities (including SKYCITY Pier and berthing facilities)  
Tentative construction period: Q2 2026 to Q4 2027

### **1.3 Purpose of this EM&A Manual**

1.3.1 The purpose of this Environmental Monitoring and Audit (EM&A) Manual (hereinafter refer to as the “Manual”) is to guide the setup of an EM&A programme to ensure compliance with the EIA recommendations, to assess the effectiveness of the recommended mitigation measures and to identify any further need for additional mitigation measures or remedial action. This Manual outlines the proposed monitoring and audit programme for the Project.

1.3.2 The Manual provides specific information, guidance and instruction to personnel in charged with environmental responsibilities and undertaking environmental monitoring and auditing works for the Project. It also provides systematic procedures for monitoring, auditing and minimising environmental impacts associated with the Project.

### **1.4 Contents of this EM&A Manual**

1.4.1 This EM&A Manual has been prepared in accordance with the requirements stipulated in Clause 3.5 of the EIA Study Brief (No. ESB-342/2021) and Annex 21 of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM).

1.4.2 The EM&A Manual contain the following information:

- Project organisation for the EM&A works;
- Responsibilities of the Contractor, the Project Manager (PM) or Project Manager’s Representative (PMR) of AAHK, Environmental Team (ET) and Independent Environmental Checker (IEC) under the context of EM&A;
- The basis for, and description of the broad approach underlying the EM&A programme;
- Details of the methodologies to be adopted, including all field laboratories and analytical procedures, and details on quality assurance and quality control programme;
- Definition of Action and Limit levels;
- Establishment of Event and Action Plans;

- Requirements for reviewing pollution sources and working procedures required in the event of non-compliance with the environmental criteria and complaints; and
- Requirements for presentation of environmental monitoring and audit data and appropriate reporting procedures.

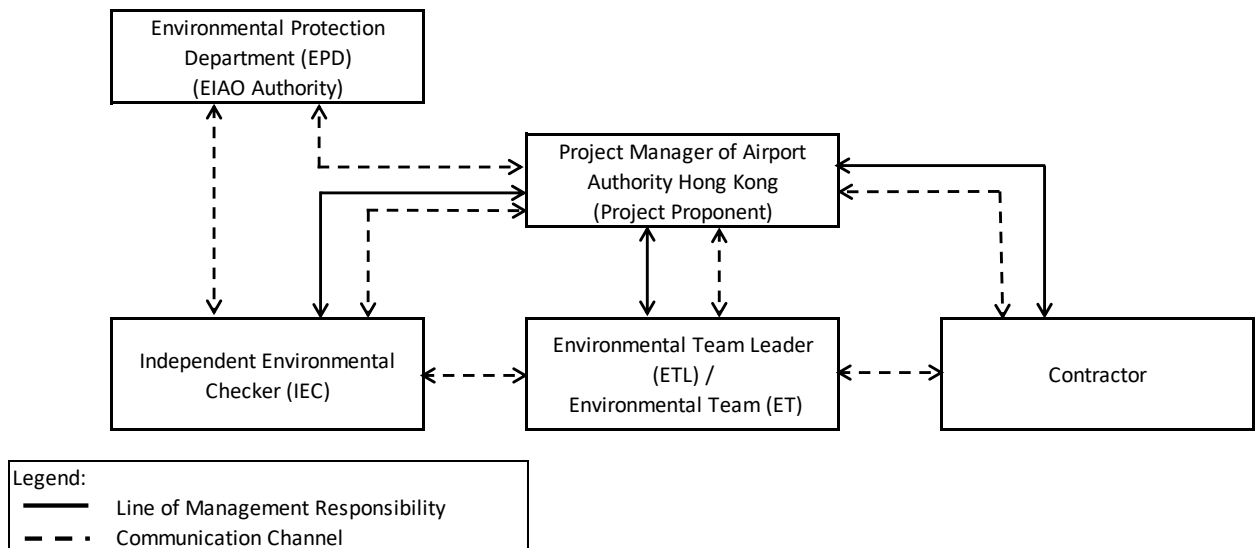
1.4.3 An implementation schedule of the environmental mitigation measures has been developed and presented in [Appendix A](#) in accordance with the requirements of Clause 3.5.3 of the EIA Study Brief.



## 2 PROJECT ORGANISATION

### 2.1 Project Organisation

2.1.1 The Project EM&A organisation and lines of communication are defined below.



2.1.2 The roles and responsibilities of various parties involved in the EM&A process and the organisational structure of the parties responsible for implementing the EM&A programme are outlined in the sections below.

#### Project Manager of Airport Authority Hong Kong (AAHK/PM)

2.1.3 The Project Manager (PM) or PM’s Representative (PMR) of AAHK is responsible for overseeing the construction works and for ensuring that the works are undertaken by the Contractor in accordance with the specification and contract requirements. The duties and responsibilities of the AAHK/PM with respect to the EM&A comprise the following:

- Monitor the contractor’s compliance with the contract specifications, the requirements in the Environmental Permit (EP) and EM&A Manual, and the effective implementation and operation of environmental mitigation measures in a timely manner;
- Employ the Environmental Team (ET) to conduct the EM&A works and an Independent Environmental Checker (IEC) to audit the results of the EM&A works carried out by the ET;
- Review the programme of works with a view to identifying any potential environmental impacts before they arise;
- Check that mitigation measures that have been recommended in the EIA Report, this document and contract documents, or as required, are correctly implemented in a timely manner, when necessary;

- Oversee the implementation of the agreed Event and Action Plan in the event of any exceedance; and
- Instruct the Contractor to follow the agreed protocols or those in the contract specifications in the event of exceedance or complaints.

### **The Contractor**

2.1.4 The Contractor shall report to the AAHK/PM. The duties and responsibilities of the Contractor comprise the following:

- Implement the EIA recommendations and requirements;
- Provide assistance to ET in carrying out relevant environmental monitoring and auditing;
- Participate in the site inspections undertaken by ET as required, and undertake correction actions;
- Provide information / advice to ET regarding works activities which may contribute, or be continuing to the generation of adverse environmental conditions;
- Submit proposals on mitigation measures in case of exceedance of Action and Limit levels in accordance with the Event and Action Plans;
- Implement measures to reduce environmental impacts where Action and Limit levels are exceeded until the events are resolved; and
- Adhere to the procedures for carrying out complaint investigation.

### **Environmental Team (ET)**

2.1.5 The ET Leader and the ET shall be employed by AAHK/PM to conduct the EM&A programme and ensure the Contractor's compliance with the project's environmental performance requirements during construction. The ET Leader or the ET shall be an independent party from the IEC and the Contractor and have relevant professional qualifications, or have sufficient relevant EM&A experience subject to approval of the AAHK/PM and EPD. The ET shall be led and managed by the ET Leader. The ET Leader shall possess at least 7 years' experience in EM&A.

2.1.6 The duties and responsibilities of the ET are:

- Set up all the required environmental monitoring stations;
- Monitor various environmental parameters as required in the EM&A Manual;
- Analyse the environmental monitoring and audit data, review the success of EM&A programme, confirm the adequacy of mitigation measures implemented and the validity of the EIA predictions, and to identify any adverse environmental impacts arising;

- Carry out site inspection to investigate and audit the Contractors' site practice, equipment and work methodologies with respect to pollution control and environmental mitigation, and take proactive action to pre-empt problems; carry out ad hoc site inspections if significant environmental problems are identified;
- Prepare reports on the environmental monitoring data and site environmental conditions;
- Report on the environmental monitoring and audit results to the IEC, Contractor, the AAHK / PM and the EPD or its delegated representative;
- Recommend suitable mitigation measures to the Contractor in the case of exceedance of Action and Limit Levels in accordance with the Event and Action Plans;
- Undertake regular on-site audits / inspections and report to the Contractor and the AAHK/PM of any potential non-compliance;
- Follow up and close out non-compliance actions;
- Timely submission of the EM&A report(s) to the AAHK/PM, IEC and EPD;
- Advise the Contractor on environmental improvement, awareness, enhancement matters, etc. on site;
- Adhere to the procedures for carrying out complaint investigation;
- Liaise with IEC on all the performance matters, and timely submission of all the EM&A performance for IEC's approval; and
- On as-need basis, verify and certify the environmental acceptability of the EP holder's construction methodology (both temporary and permanent works), relevant design plans and submissions under the EP.

### **Independent Environmental Checker (IEC)**

2.1.7 The IEC shall advise the AAHK/PM on environmental issues related to the Project and shall be empowered to audit from an independent viewpoint the environmental performance during the construction of the Project. The IEC shall be employed by the AAHK/PM prior to the commencement of the construction of the Project. The IEC shall not be in any way an associated body of the Contractor or the ET for the Project. The IEC shall be a person who has relevant professional qualifications in environmental control and at least 7 years' experience in EM&A.

2.1.8 The duties and responsibilities of IEC are:

- 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);

- Validate and confirm the accuracy of monitoring results, monitoring equipment, monitoring locations, monitoring procedures and location of sensitive receivers;
- Report the audit results to the AAHK/PM;
- Review and verify the EM&A reports (monthly and final reports) submitted by the ET;
- Review the proposal on mitigation measures submitted by the Contractor in accordance with the Event and Action Plans;
- Check the mitigation measures submitted by the Contractor in accordance with the Event and Action Plans;
- Check the mitigation measures that have been recommended in the EIA and this Manual, and ensure they are properly implemented in a timely manner, when necessary;
- Review the effectiveness of mitigation measures and project environmental performance regularly in accordance to Event and Action Plans;
- Report the findings of site inspections and other environmental performance reviews to AAHK/PM;
- Carry out random sample check quarterly and audit on monitoring data and sampling procedures, etc.;
- Conduct random monthly site inspection;
- On as-needed basis, verify and certify the environmental acceptability of Contractor's construction methodology (both temporary and permanent works), including relevant design plans and submissions under the EP;
- Verify the investigation results of the environmental complaints and the effectiveness of corrective measures;
- Provide feedback of the audit results to the ET and AAHK/PM according to the requirements in the EM&A manual.

### 3 AIR QUALITY

#### 3.1 Introduction

- 3.1.1 The EIA of the Project concluded that, with the implementation of the dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation, good site practices and proposed mitigation measures, adverse dust impacts would not be anticipated at the Air Sensitive Receivers (ASRs) in the vicinity of the construction sites. Construction dust monitoring and regular site environmental audits are recommended to check the implementation of mitigation measures and good site practices.
- 3.1.2 Air quality monitoring during the operational phase of the Project is considered not necessary as the Project would not be expected to generate any adverse air quality impacts to the adjacent identified ASRs.

#### 3.2 Monitoring Requirements

##### Monitoring Parameters and Equipment

- 3.2.1 Monitoring and audit of the Total Suspended Particulate (TSP) levels shall be carried out by the ET to ensure that any deteriorating air quality could be readily detected and timely actions could be taken to rectify the situation.
- 3.2.2 The one-hour TSP levels should be measured by following the standard high volume sampling method as set out in the Part 50 Chapter 1 Appendix B, Title 40 of the Code of Federal Regulations of the USEPA.
- 3.2.3 All the relevant data including the temperature, pressure, weather conditions, elapsed-time meter reading for the start and stop of sampler, identification and weight of the filter paper, and other specific phenomena and works progress of the concerned works sites, etc, should be recorded in detail. A sample data sheet is shown in [Appendix D](#).
- 3.2.4 High volume samplers (HVSs) in compliance with the following specifications should be used for carrying out the 1-hour TSP monitoring:
- (i) 0.6-1.7m<sup>3</sup> per minute adjustable flow range;
  - (ii) Equipped with a timing/control device with  $\pm 5$  minutes accuracy for 24 hours operation;
  - (iii) Installed with elapsed-time meter with  $\pm 2$  minutes accuracy for 24 hours operation;
  - (iv) Capable of providing a minimum exposed area of 406 cm<sup>2</sup>;
  - (v) Flow control accuracy:  $\pm 2.5\%$  deviation over 24 hours sampling period;
  - (vi) Incorporated with an electronic mass flow rate controller or other equivalent devices;
  - (vii) Equipped with a shelter to protect the filter and sampler;
  - (viii) Equipped with a flow recorder for continuous monitoring;
  - (ix) Provided with a peaked roof inlet;
  - (x) Incorporated with a manometer;

- (xi) Able to hold and seal the filter paper to the sampler housing at horizontal position;
  - (xii) Easy to change the filter; and
  - (xiii) Capable of operating continuously for 24 hours period.
- 3.2.5 The ET is responsible for the provision, installation, operation, maintenance, dismantle of the monitoring equipment and should ensure that sufficient number of HVSs with an appropriate calibration kit is available for carrying out the baseline monitoring, regular impact monitoring and ad-hoc monitoring. The HVSs should be equipped with an electronic mass flow controller and be calibrated against a traceable standard at regular intervals, in accordance with the requirements in the manufacturer's operating manual and as described below. All equipment, calibration kit, filter papers, etc, should be clearly labelled.
- 3.2.6 Initial calibration of the HVSs with mass flow controller should be conducted upon the installation and thereafter in every 6 months. The transfer standard shall be traceable to the internationally recognized primary standard and be calibrated annually. The calibration data should be properly documented for the future reference by the IEC. The flow rates of the sampler before and after the sampling with the filter in position should be verified to be constant and be recorded on the data sheet as mentioned in [Appendix D](#).
- 3.2.7 If the ET Leader proposes alternative dust monitoring equipment / methodology (e.g. direct reading methods), they shall submit sufficient information to the IEC to prove that the instrument is capable of achieving a comparable result to the HVS. Also, the 1-hour sampling shall be determined periodically by HVS to check the validity and accuracy of the results measured by direct reading method, and the instrument should also conduct necessary assurance (QA)/ quality control (QC).
- 3.2.8 Wind data monitoring equipment shall also be provided and set up for logging wind speed and wind direction near to the dust monitoring locations. The equipment installation location shall be proposed by the ET and agreed with the IEC. For installation and operation of wind data monitoring equipment, the following points shall be observed:
- The wind sensors shall be installed at an elevated level 10m above ground so that they are clear of obstructions or turbulence caused by the buildings;
  - The wind data shall be captured by a data logger. The data recorded in the data logger shall be downloaded periodically for analysis at least once a month;
  - The wind data monitoring equipment shall be re-calibrated at least once every six months; and
  - Wind direction shall be divided into 16 sectors of 22.5 degrees each.
- 3.2.9 In exceptional situations, the ET may propose alternative methods to obtain representative wind data upon agreement from the IEC. The instrument should also conduct necessary quality assurance (QA) / quality control (QC) and be calibrated regularly following the requirements specified by the equipment manufacturers.

### Laboratory Measurement / Analysis

- 3.2.10 A clean laboratory with constant temperature and humidity control, and equipped with necessary measuring and conditioning instruments to handle the dust samples collected, shall be available for sample analysis, and equipment calibration and maintenance. The laboratory should be Hong Kong Laboratory Accreditation Scheme (HOKLAS) accredited or other internationally accredited laboratory.
- 3.2.11 If a site laboratory is set up or a non-HOKLAS accredited laboratory is hired for carrying out the laboratory analysis, the laboratory equipment shall be verified by IEC. Measurement performed by the laboratory shall be demonstrated to the satisfaction of the ER and the IEC.
- 3.2.12 IEC shall conduct regular audit to the measurement performed by the laboratory to ensure the accuracy of measurement results. The ET Leader shall provide the ER with one copy of the Title 40 of Code of Federal Regulations, Chapter 1 (Part 50), Appendix B for his / her reference.
- 3.2.13 Filter paper of size 8" x 10" shall be labelled before sampling. It shall be a clean filter paper with no pinholes, and shall be conditioned in a humidity-controlled chamber for over 24 hours and be pre-weighed before use for the sampling.
- 3.2.14 After sampling, the filter paper loaded with dust shall be kept in a clean and tightly sealed plastic bag. The filter paper shall then be returned to the laboratory for reconditioning in the humidity-controlled chamber followed by accurate weighing by an electronic balance with readout down to 0.1 mg. The balance shall be regularly calibrated against a traceable standard.
- 3.2.15 All collected samples shall be kept in a good condition for 6 months before disposal.

### Dust Monitoring Stations

- 3.2.16 The locations of the proposed construction dust monitoring stations are listed in **Table 3.1** and **Table 3.2**, and depicted in **Figure 3.1**.

**Table 3.1 Proposed Dust Monitoring Stations for ATCL during Construction Phase**

| Monitoring Station ID | Representative ASR ID in EIA Report | Description                         |
|-----------------------|-------------------------------------|-------------------------------------|
| AM1                   | A20                                 | Tung Chung Community Garden         |
| AM2                   | A11                                 | Hong Kong Airlines Training Academy |
| AM3                   | A10                                 | CNAC House                          |

\* Impact monitoring should be conducted at the monitoring stations for 1-hour TSP monitoring when there are project-related construction activities being undertaken within a radius of 500m from these monitoring stations.

**Table 3.2 Proposed Dust Monitoring Stations for the Proposed Marine Facilities during Construction Phase**

| Monitoring Station ID | Representative ASR ID in EIA Report | Description            |
|-----------------------|-------------------------------------|------------------------|
| AM4                   | P04                                 | Planned Commercial Use |

\* Impact monitoring should be conducted at the monitoring stations for 1-hour TSP monitoring when there are project-related construction activities being undertaken within a radius of 500m from these monitoring stations.

3.2.17 The status and locations of the air sensitive receivers (ASRs) may change after this EM&A Manual has been issued. In such cases, the ET should propose the updated monitoring locations and seek agreement from the AAHK/PM, IEC and EPD. The alternative monitoring locations should be proposed based on the following criteria.

- (i) Monitoring at site boundary or at ASRs close to the major site activities which are likely to have air quality impacts;
- (ii) Monitoring as close as possible to the ASRs as defined in the EIAO-TM;
- (iii) Assurance of the minimal disturbance to the occupants and working under a safety condition during monitoring; and
- (iv) Take into account the prevailing meteorological conditions.

3.2.18 The ET shall agree with IEC on the position of the HVS for the installation of the monitoring equipment. When positioning the HVSs, the following points should be noted:

- (i) A horizontal platform with the appropriate support to secure the HVSs against the gusty wind should be provided;
- (ii) No two HVSs should be placed less than 2m apart;
- (iii) The distance between the HVSs and an obstacle, e.g. buildings, must be at least twice the height of the obstacle protruding above the HVSs;
- (iv) A minimum of 2m separation from the walls, parapets and penthouses is required for rooftops HVSs;
- (v) A minimum of 2m separation from any supporting structures measured horizontally is required;
- (vi) No furnace or incinerator flue is nearby;
- (vii) Airflow around the HVSs is unrestricted;
- (viii) The HVSs are more than 20m from the dripline;
- (ix) Any wire fences and gate, to protect the HVSs, should not cause obstructions during monitoring;
- (x) Permission must be obtained to set up the HVSs and to obtain access to the monitoring stations; and
- (xi) A secured supply of electricity is needed to operate the HVSs.

### Baseline Monitoring

3.2.19 Baseline monitoring should be carried out to obtain the ambient 1-hour TSP samples at the designated monitoring locations for at least two weeks prior to the commencement of the major construction works for the Project. Ambient 1-hour sampling should be done at least 3 times per day at each monitoring station. Prior to commencing the baseline monitoring, the ETL should inform the IEC of the baseline monitoring



programme such that the IEC can conduct the on-site audit to ensure the accuracy of the baseline monitoring results

- 3.2.20 During the baseline monitoring, there should not be any major construction or dust generating activities in the vicinity of the monitoring stations as far as practicable. General meteorological conditions (e.g. wind speed, direction and precipitation) and notes regarding any significant adjacent dust producing sources should be recorded throughout the baseline monitoring. If the ETL considers that significant changes in the ambient conditions have arisen, a repeat of the baseline monitoring may be carried out to update the baseline levels and Action levels, upon the consultation and agreement with the AAHK/PM, IEC and EPD.
- 3.2.21 In case the baseline monitoring cannot be carried out at the designated monitoring locations, the ET shall carry out the monitoring at alternative locations that can effectively represent the baseline conditions at the impact monitoring location. The alternative baseline monitoring locations shall be agreed with the IEC and EPD prior to commencement of baseline monitoring.
- 3.2.22 In exceptional cases, when baseline monitoring data obtained are insufficient or questionable, the ET should liaise with the IEC and EPD to agree on an appropriate set of data to be used as the baseline reference.

### Impact Monitoring

- 3.2.23 The monthly schedule of the impact monitoring programme should be drawn up by the ET one month prior to the commencement of the scheduled construction period.
- 3.2.24 For 1-hour TSP impact monitoring, the sampling frequency of at least three times in every 6 days should be conducted when the highest dust impacts occurs.
- 3.2.25 Before commencing the impact monitoring, the ET should inform the IEC of the impact monitoring programme such that the IEC can conduct an on-site audit to ensure the accuracy of the impact monitoring results.

### Action and Limit Levels

- 3.2.26 The baseline monitoring results form the basis for determining the air quality criteria for the impact monitoring during the construction phase. The ET shall compare the impact monitoring results with air quality criteria set up for 1-hour TSP. The air quality criteria, namely Action and Limit Levels, are summarised in **Table 3.3**.

**Table 3.3 Action and Limit (A/L) Levels for Air Quality**

| Parameter                                    | Action Level*  | Limit Level                  |
|--|--|------------------------------|
| 1-hour TSP Level in $\mu\text{g}/\text{m}^3$ | $\text{BL} \leq 384 \mu\text{g}/\text{m}^3$ , $\text{AL} = (\text{BL} \times 1.3 + \text{LL})/2$<br>$\text{BL} > 384 \mu\text{g}/\text{m}^3$ , $\text{AL} = \text{LL}$ | 500 $\mu\text{g}/\text{m}^3$ |

\* BL = Baseline level; AL = Action level; LL = Limit level

- 3.2.27 The Event and Action Plan prescribes the procedures and action associated with the outcome of the comparison of the air quality monitoring data recorded and the agreed A/L levels. In the cases where exceedances of these A/L levels occur, the ET, IEC,

AAHK/PM and Contractor should strictly observe the relevant actions of the respective Event and Action Plan as listed in **Table 3.4**.

#### **Event and Action Plan**

- 3.2.28 Should non-compliance of the air quality criteria occur, actions in accordance with the Event and Action Plan in **Table 3.4** shall be carried out.

**Table 3.4 Event and Action Plan for Air Quality**

| EVENT  | ACTION   |  |  |  |
|--|--|--|--|--|
|  | ET   | IEC  | AAHK/PM  | Contractor   |
| 1. Action level exceedance for one sample                      | <ol style="list-style-type: none"> <li>Repeat measurement to confirm finding;</li> <li>If exceedance is confirmed, inform Contractor, IEC and AAHK /PM.</li> <li>Identify sources, investigate the causes of exceedance and propose remedial measures.</li> <li>Discuss with the Contractor, IEC and AAHK/PM on the remedial measures required.</li> <li>Increase monitoring frequency to daily.</li> </ol>  | <ol style="list-style-type: none"> <li>Check monitoring data submitted by ET.</li> <li>Check Contractor's working methods.</li> <li>Discuss with ET, AAHK/PM and Contractor on possible remedial measures.</li> <li>Review and advise ET and AAHK/PM on the effectiveness of the proposed remedial measures.</li> </ol>  | <ol style="list-style-type: none"> <li>Confirm receipt of notification of exceedance in writing.</li> </ol>  | <ol style="list-style-type: none"> <li>Identify source(s), investigate the causes of exceedance and propose remedial measures.</li> <li>Implement remedial measures.</li> <li>Amend working methods agreed with the AAHK/PM as appropriate.</li> </ol>   |
| 2. Action level exceedance for two or more consecutive samples | <ol style="list-style-type: none"> <li>Repeat measurements to confirm findings.</li> <li>If exceedance is confirmed, inform Contractor, IEC and AAHK /PM.</li> <li>Identify sources, investigate the causes of exceedance and propose remedial measures.</li> <li>Advise the Contractor and AAHK/PM on the effectiveness of the proposed remedial measures;</li> <li>Increase monitoring frequency to daily.</li> <li>If exceedance continues, arrange meeting with the IEC, Contractor and AAHK/PM to discuss measures to be taken.</li> <li>If exceedance stops, cease additional monitoring.</li> </ol> | <ol style="list-style-type: none"> <li>Check monitoring data submitted by ET.</li> <li>Check the Contractor's working methods.</li> <li>Discuss with the ET, AAHK/PM and Contractor on possible remedial measures.</li> <li>Review and advise ET, AAHK/PM on the effectiveness of proposed remedial measures.</li> </ol> | <ol style="list-style-type: none"> <li>Confirm receipt of notification of exceedance in writing.</li> <li>In consultation with ET and IEC agree with Contractor on the remedial measures to be implemented.</li> <li>Supervise implementation of remedial measures.</li> </ol> | <ol style="list-style-type: none"> <li>Identify source(s), investigate the causes of exceedance and propose remedial measures.</li> <li>Submit proposals for remedial measures to AAHK/PM, ET and IEC within 3 working days of notification for agreement.</li> <li>Implement the agreed proposals.</li> <li>Amend proposal as appropriate.</li> </ol> |

| EVENT   | ACTION   |   |   |  |
|---|--|---|---|--|
|   | ET   | IEC   | AAHK/PM   | Contractor   |
| 3. Limit level exceedance for one sample                      | <ol style="list-style-type: none"> <li>Repeat measurement to confirm finding.</li> <li>If exceedance is confirmed, inform IEC, AAHK/PM, Contractor and EPD.</li> <li>Increase monitoring frequency to daily.</li> <li>Discuss with the AAHK/PM, IEC and Contractor on the remedial measures and assess effectiveness.</li> <li>Keep IEC, AAHK/PM and EPD informed of the results of the effectiveness of remedial measures.</li> </ol>   | <ol style="list-style-type: none"> <li>Check monitoring data submitted by ET.</li> <li>Check Contractor's working methods.</li> <li>Discuss with the ET, AAHK/PM and Contractor on possible remedial measures.</li> <li>Review and advise ET and AAHK/PM on the effectiveness of the proposed remedial measures.</li> </ol> | <ol style="list-style-type: none"> <li>Confirm receipt of the notification of exceedance in writing.</li> <li>Review and agree on the remedial measures proposed by Contractor.</li> <li>Ensure remedial measures are properly implemented.</li> <li>Supervise implementation of remedial measures.</li> </ol>  | <ol style="list-style-type: none"> <li>Identify source(s), investigate the causes of exceedance and propose remedial measures.</li> <li>Take immediate action to avoid further exceedance.</li> <li>Submit proposals for remedial measures to AAHK/PM, ET and IEC within 3 working days of notification for agreement.</li> <li>Implement the agreed proposals.</li> <li>Amend proposals as appropriate.</li> </ol>  |
| 4. Limit level exceedance for two or more consecutive samples | <ol style="list-style-type: none"> <li>Repeat measurements to confirm findings.</li> <li>If exceedance is confirmed, inform IEC, AAHK/PM, Contractor and EPD.</li> <li>Increase monitoring frequency to daily.</li> <li>Carry out analysis of the Contractor's working procedures to determine the possible mitigation to be implemented.</li> <li>Arrange meeting with IEC and AAHK/PM to discuss the remedial measures to be taken.</li> <li>Assess the effectiveness of the Contractor's remedial measures and keep the IEC, EPD and AAHK/PM informed of the results.</li> <li>If exceedance stops, cease additional monitoring.</li> </ol> | <ol style="list-style-type: none"> <li>Check monitoring data submitted by ET</li> <li>Discuss amongst AAHK/PM, ET and Contractor on the potential remedial measures.</li> <li>Review the Contractor's remedial action whenever necessary to assure their effectiveness and advise AAHK/PM and ET accordingly.</li> </ol>    | <ol style="list-style-type: none"> <li>Confirm receipt of the notification of exceedance in writing.</li> <li>In consultation with IEC and ET, agree with Contractor on the remedial measures to be implemented.</li> <li>Supervise the implementation of remedial measures to be implemented.</li> <li>If exceedance continues, consider what portion of works is responsible and instruct the Contractor to stop that portion of works until the exceedance is abated.</li> </ol> | <ol style="list-style-type: none"> <li>Identify source(s), investigate the causes of exceedance and propose remedial measures.</li> <li>Take immediate action to avoid further exceedance.</li> <li>Submit proposals for remedial measures to the AAHK/PM and copy to the IEC and ET within 3 working days of notification.</li> <li>Implement the agreed proposals.</li> <li>Review and resubmit proposals if problems still not under control.</li> <li>Stop the relevant portion of works as determined by AAHK/PM until the exceedance is abated.</li> </ol> |

Notes: ET – Environmental Team; EP – Environmental Permit; PM – Project Manager; IEC – Independent Environmental Checker; AAHK – Airport Authority Hong Kong

### **3.3 Mitigation Measures**

3.3.1 The specific mitigation measures recommended in the EIA report comprise watering of the construction areas, good site practices and dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation. The Contractor shall be responsible for the design and implementation of these measures. In addition, mitigation measures to control the exhaust emissions from construction plant and equipment are also required. All the recommended good practices are summarised in the Environmental Mitigation Implementation Schedule (EMIS) in [Appendix A](#).

### **3.4 Environmental Monitoring and Audit Requirements**

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

## 4 NOISE

### 4.1 Introduction

4.1.1 Potential noise impacts arising from the construction and operational phases of the Project were assessed in the EIA Report. Construction noise arising from the construction activities would be the major potential noise impact during the construction phase. With the implementation of mitigation measures, no adverse construction noise impact is anticipated. Construction noise monitoring and regular site environmental inspection during construction phase is required. During the operational phase, noise commissioning test for zero emission vehicles shall be conducted prior to the operation of the Project to confirm that the relevant standards stipulated in EIAO-TM and Noise Control Ordinance (NCO) would be complied with. The assessment results indicated that no adverse noise impact under unmitigated scenario, mitigation measure is not required during operational phase.

### 4.2 Mitigation Measures

#### Construction Phase

4.2.1 No adverse construction noise impact is anticipated with the implementation of mitigation measures such as good site practices, use of quieter construction methods, quieter powered mechanical equipment (PME), noise insulating fabric, noise barrier, and noise enclosure to screen noise from PME. All the recommended mitigation measures and good site practices are summarised in the EMIS given in [Appendix A](#).

4.2.2 A Construction Noise Management Plan (CNMP) should be prepared to submit during pre-tender stage, if any, and before commencement of construction works, so that both the verification of the inventory of noise sources, and the assessment of the effectiveness and practicality of all identified measures for mitigating the construction noise impact of the Project, would be performed during the design, tendering and implementation stage of the construction works. A clear method statement of all the recommended mitigation measures for controlling the construction noise impacts should be formulated in the CNMP(s) to be prepared by future Contractors, such that all the recommended mitigation measures will be implemented and executed properly. In case there is any change to noise mitigation measures, the Contractor should update the CNMP accordingly to demonstrate the compliance of EIAO-TM with the implementation of proposed noise mitigation measures. The CNMP(s) should be certified by the ET Leader and verified by the IEC.

#### Operational Phase

4.2.3 For the operational noise impact, no adverse impact is expected with properly selection of the zero emission vehicles. Noise commissioning test of the zero emission vehicles should be carried out prior to operation to verify the Sound Power Level (SWL) of the zero emission vehicles is 100dB(A) or below.

### 4.3 Construction Noise Monitoring

#### Monitoring Equipment and Methodology

- 4.3.1 As referred to the requirements of the Technical Memorandum (TM) issued under the NCO, the 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 difference between calibration levels obtained before and after the noise measurement is less than 1.0dB.
- 4.3.2 Noise measurement should be made in accordance with standard acoustical principles and practices in relation to weather conditions.
- 4.3.3 The ET is responsible for the provision, installation, operation, maintenance, dismantle of the monitoring equipment and should ensure that sufficient noise measuring equipment and associated instrumentation are available for carrying out the baseline monitoring, regular impact monitoring and ad hoc monitoring. All the equipment and associated instrumentation should be clearly labelled.

#### Noise Parameters and Criteria

- 4.3.4 The construction noise level should be measured in terms of the A-weighted equivalent continuous sound pressure level ( $L_{eq}$ ). The  $L_{eq(30min)}$  should be used as the monitoring parameter for the time period from 0700-1900 hours on any day not being a Sunday or general holiday. For all other time periods,  $L_{eq(5min)}$  shall be employed for comparison with the NCO criteria. The supplementary information for data auditing and statistical results, e.g.  $L_{10}$  and  $L_{90}$ , should be obtained for reference. A sample data record sheet is shown in [Appendix D](#) for reference.

#### Monitoring Location

- 4.3.5 The locations of the construction noise monitoring stations are summarised in **Table 4.1** and shown in [Figure 4.1](#).

**Table 4.1 Proposed Construction Noise Monitoring Stations**

| Monitoring Station ID | Representative NSR ID in EIA Report | Description  |
|-----------------------|-------------------------------------|--|
| NM1                   | N01                                 | Seaview Crescent   |
| NM2                   | N03                                 | Ling Liang Church E Wun Secondary School                       |
| NM3                   | N08                                 | Fu Tung Estate Tung Ma House                                   |
| NM4                   | N09                                 | Tung Chung Crescent  |
| NM5                   | N10                                 | Priests' Quarters of the Planned Visitation Church Development |

- 4.3.6 When alternative monitoring locations are proposed, they should be chosen based on the following criteria:
- At locations close to the major construction works activities that are likely to have noise impacts;
  - Close to the most affected existing NSRs; and
  - The assurance of the minimal disturbance and working under a safe condition to the occupants during the monitoring in the vicinity of the NSRs.
- 4.3.7 The monitoring station shall normally be at a point 1m from the exterior of the sensitive receiver building façade and be at a position 1.2m above the ground. If there is problem with access to the normal monitoring position, an alternative position should be chosen, and a correction to the measurement results should be made. For reference, a correction of +3dB(A) should be made to the free-field measurements. The ETL should agree with the IEC and EPD on the alternative monitoring position and corrections adopted. Once the positions for the monitoring stations are chosen, the baseline and impact monitoring should be carried out at the same positions.

#### **Baseline Monitoring**

- 4.3.8 The ET should carry out the baseline noise monitoring in all identified construction noise monitoring stations prior to the commencement of the construction works. The baseline noise levels should be measured for a continuous period of at least 14 consecutive days at a minimum logging interval of 30 minutes during the daytime between 0700-1900, and 5 minutes between 1900 and 0700 as well as all time at general holidays including Sundays. A-weighted levels  $L_{eq}$ ,  $L_{10}$  and  $L_{90}$  should be recorded at the specified intervals. A schedule for the baseline monitoring should be submitted to the AAHK/PM and IEC for approval before the baseline monitoring starts.
- 4.3.9 There should not be any construction activities in the vicinity of the construction noise monitoring stations during the baseline monitoring. Any non-project related construction activities in the vicinity of the monitoring stations during the baseline monitoring should be noted and the source and location of such activities should be recorded.
- 4.3.10 In exceptional cases, when baseline monitoring data obtained are insufficient or questionable, the ET should liaise with the IEC and EPD to agree on an appropriate set of data to be used as the baseline reference.

#### **Impact Monitoring**

- 4.3.11 During normal construction working hours (0700-1900 hours on any day not being a Sunday or general holiday), monitoring of  $L_{eq(30min)}$  noise levels should be carried out at the agreed monitoring locations once every week in accordance with the methodology in the TM issued under the NCO when there are project-related construction activities being undertaken within a radius of 300m from these monitoring stations.



- 4.3.12 In case of non-compliances with the construction noise criteria, more frequent monitoring as specified in the Event and Action Plan should be carried out. This additional monitoring should be continued until the recorded noise levels are rectified or proved to be irrelevant to the project-related construction activities.
- 4.3.13 The monthly schedule of the impact monitoring programme should be drawn up by the ET at least 2 weeks prior to the commencement of the scheduled construction period. Before commencing impact monitoring, the ET shall inform the IEC of the impact monitoring programme such that the IEC can conduct on-site audit.

**Action and Limit Levels**

- 4.3.14 The Action and Limit levels for the construction noise are shown in **Table 4.2**. The ET should compare the construction noise monitoring results with noise criteria, namely Action and Limit Levels to be used.

**Table 4.2 Action and Limit (A/L) Levels for Construction Noise**

| Time Period                             | Action Level                                    | Limit Level   |
|---|---|---|
| 0700 – 1900 hours<br>on normal weekdays | When one<br>documented<br>complaint is received | 75 dB(A) for residential premises                             |
|   |   | 70 dB(A) for school and<br>65 dB(A) during examination period |

**Event and Action Plan**

- 4.3.15 Should non-compliance of the noise criteria occur, actions in accordance with the Event and Action Plan (**Table 4.3**) should be carried out.

**Table 4.3 Event and Action Plan for Construction Noise**

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

Notes: ET – Environmental Team; PM – Project Manager; IEC – Independent Environmental Checker; AAHK – Airport Authority Hong Kong

4.3.16 In order to account for cases in which ambient noise levels, as identified in the baseline monitoring, approach or exceed the stipulated Limit Levels prior to the commencement of the construction, a Maximum Acceptable Impact Level, which incorporates the baseline noise levels and the identified construction noise Limit Level, may be defined and agreed with the EPD. The amended level would be greater than 75dB(A) and represent the maximum acceptable noise level at a specific monitoring station. Correction factors for the effects of the acoustic screening and/or architectural features of NSRs may also be applied as specified in the Technical Memorandum on Noise from Construction Work other than Percussive Piling (GW-TM).

#### **4.4 Operational Noise**

##### **Maximum Allowable Sound Power Levels of Fixed Plant**

4.4.1 The maximum allowable sound power level of zero emission vehicles (i.e. 100 dB(A)) was predicted in the EIA Report. With the proper selection of zero emission vehicles, the operational noise levels would comply with the noise standards stipulated in the EIAO-TM and NCO.

##### **Commissioning Test**

4.4.2 Prior to the operation of the ATCL, noise commissioning test for the operational noise sources (zero emission vehicles) shall be conducted to ensure the noise emission comply with the maximum allowable sound power level in the EIA Report. The noise commissioning test report should be submitted to ETL for certification, IEC for verification and to EPD for approval prior to the operation.

#### **4.5 Environmental Monitoring and Audit Requirements**

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

## 5 WATER QUALITY

### 5.1 Introduction

5.1.1 Potential water quality impacts arising from the construction phase and operational phase of the Project were identified and assessed in the EIA Report. No adverse water quality impacts from the Project would be expected during the construction and operational phase of the Project with proper implementation of the recommended mitigation measures and good site practices.

### 5.2 Mitigation Measures

5.2.1 The EIA Report has recommended mitigation measures during construction and operational phases. The proposed mitigation measures are summarized in the EMIS in [Appendix A](#).

### 5.3 Monitoring Parameters

5.3.1 Monitoring for Dissolved Oxygen (DO), Dissolved Oxygen Saturation (DO%), temperature, pH, turbidity, salinity, suspended solid (SS) and water depth should be undertaken at all designated monitoring locations. All parameters should be measured in-situ whereas SS should be determined by an accredited laboratory. DO should be presented in mg/L and in % saturation.

5.3.2 Two (2) replicate *in-situ* measurements and samples collected from each independent sampling event shall be collected to ensure a robust statistically interpretable database.

5.3.3 Other relevant data should also be recorded, including monitoring location / position, time, water depth, tidal stages, weather conditions and any special phenomena or work underway at the construction site.

### 5.4 Monitoring Locations

5.4.1 5 locations (IM1, SR1, SR2, C1 and C2) are proposed to monitor for works conducted in vicinity of marine facilities in the waters between Airport Island and HKP Island during construction phase of the Project. 5 locations (IM2, IM3, SR3, C3 and C4) are proposed to monitor for marine viaduct works between the Airport Island and Tung Chung during construction phase as well as the operational phase maintenance dredging of the Project.

5.4.2 The proposed marine water quality monitoring stations are listed in **Table 5.1** and **Table 5.2** and its locations are shown in [Figure 5.1](#). The ET shall seek approval from IEC and EPD for any alternative monitoring locations.

**Table 5.1 Proposed Marine Water Quality Monitoring Stations for Marine Facilities during the Construction Phase and the Maintenance Dredging during the Operational Phase**

| Station | Descriptions                   | Easting | Northing |
|---------|--------------------------------|---------|----------|
| IM1     | Impact station                 | 812658  | 820508   |
| SR1     | Hong Kong Port Seawater Intake | 812736  | 820086   |
| SR2     | SKYCITY Seawater Intake        | 812280  | 819784   |
| C1      | Control station                | 814132  | 822185   |
| C2      | Control station                | 811444  | 822421   |

**Table 5.2 Proposed Marine Water Quality Monitoring Stations for the Marine Viaduct during Construction Phase**

| Station | Descriptions                  | Easting | Northing |
|---------|-------------------------------|---------|----------|
| IM2     | Impact station                | 812258  | 817871   |
| IM3     | Impact station                | 810725  | 816626   |
| SR3     | Seawater Intake at Tung Chung | 811780  | 817172   |
| C3      | Control station               | 812785  | 818754   |
| C4      | Control station               | 809533  | 817234   |

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

- close to the sensitive receivers which are directly or likely to be affected;
- for monitoring locations located in the vicinity of the sensitive receivers, care shall be taken to cause minimal disturbance during monitoring;
- two or more control stations which shall be at representative locations of the Project site in its undisturbed condition. Control stations shall be located, as far as practicable, both upstream and downstream of the works area.

## 5.5 Monitoring Equipment

5.5.1 The following equipment and facilities should be provided by the ET and used for the monitoring of water quality impacts:

### Monitoring Position Equipment

5.5.2 A hand-held or boat-fixed type digital Differential Global Positioning System (DGPS) with way point bearing indication or other equipment instrument of similar accuracy, should be provided and used during water quality monitoring to ensure the monitoring vessel is at the correct location before taking measurements.

### **Water Sampling Equipment**

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

### **Water Depth Detector**

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

### **Dissolved Oxygen, Dissolved Oxygen Saturation and Temperature Measuring Equipment**

- 5.5.5 The equipment should be portable and weatherproof. The equipment should also complete with cable and sensor, and use a DC power source. The equipment should be capable of measuring:

- a DO-level in the range of 0 - 20 mg/L and 0 - 200% saturation; and
- a temperature of 0 - 45 degree Celsius with a capability of measuring to  $\pm 0.1$  degree Celsius.

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

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

### **Turbidity Measuring Instrument**

- 5.5.8 Turbidity should be measured in-situ by the nephelometric method. The instrument should be portable and weatherproof using a DC power source complete with cable, sensor and comprehensive operation manuals. It should have a photoelectric sensor capable of measuring turbidity between 0 - 1000 NTU (for example, Hach model 2100P or an approved similar instrument). The cable should not be less than 25m in length. The meter should be calibrated in order to establish the relationship between NTU units and the levels of suspended solids. The turbidity measurement should be carried out on split water sample collected from the same depths of suspended solids samples.

### **Salinity Measuring Equipment**

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

### **pH Measuring Equipment**

- 5.5.10 The instrument shall consist of a potentiometer, a glass electrode, a reference electrode and a temperature-compensating device. It shall be readable to 0.1 pH in a range of 0.0 to 14.0. Standard buffer solutions of at least pH 7 and pH 10 shall be used for calibration of the instrument before and after use. Details of the method shall comply with APHA, 19th Edition 4500-HTB.

### **Sample Containers and Storage**

- 5.5.11 Water samples for SS determination should be stored in high density polythene containers with no preservative added, packed in ice (cooled to 4°C without being frozen) and delivered to the testing laboratory within 24 hours of collection and analysed as soon as possible after collection. Sufficient volume of samples should be collected to achieve the detection limit.

### **Calibration of in-situ Instruments**

- 5.5.12 The pH meter, DO meter and turbidimeter should be checked, calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme before use and subsequently re-calibrated at three monthly intervals throughout all stages of the water quality monitoring. Responses of sensors and electrodes should be checked with certified standard solutions before each use. Wet bulb calibration for a DO meter should be carried out before measurement at each monitoring location.
- 5.5.13 For the on-site calibration of field equipment, the BS 127:1993, Guide to Field and On-Site Test Methods for the Analysis of Water should be observed.

### **Back-up Equipment**

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

## **5.6 Laboratory Measurement / Analysis**

- 5.6.1 At least 2 replicate samples from each independent sampling event are required for the SS measurement. Analysis of SS level should be carried out in a HOKLAS (or other international accredited laboratory that is HOKLAS-equivalent). Sufficient water samples of not less than 2 litres should be collected at the monitoring stations for

carrying out the laboratory SS determination. All samples should be assigned a unique code and accompanied by Chain of Custody (COC) sheets.

- 5.6.2 The SS determination work should start within 24 hours after collection of the water samples. The SS analyses should follow the standard method APHA 2540D with a detection limit of 1 mg/L as described in *APHA Standard Methods for the Examination of Water and Wastewater, 21<sup>st</sup> Edition*, unless otherwise specified.
- 5.6.3 Detailed testing methods, pre-treatment procedures, instrument use, Quality Assurance/Quality Control (QA/QC) details (such as blank, spike recovery, number of duplicate samples per batch, etc.), detection limits and accuracy should be submitted to EPD for approval prior to the commencement of monitoring programme. EPD may also request the laboratory to carry out analysis of known standards provided by EPD for quality assurance. The testing methods and related proposal should be checked and certified by IEC before submission to EPD for approval.
- 5.6.4 Additional duplicate samples may be required by EPD for inter laboratory calibration. Remaining samples after analysis should be kept by the laboratory for 3 months in case repeat analysis is required. If in-house or non-standard methods are proposed, details of the method verification may also be required to submit to EPD. In any circumstance, the sample testing should have comprehensive quality assurance and quality control programmes. The laboratory should prepare to demonstrate the programmes to EPD or his representatives when requested.

## 5.7 Monitoring Requirement

- 5.7.1 Baseline, impact and post construction monitoring shall be conducted. The following requirements should be followed for baseline, impact and post construction monitoring.
- Measurement should be taken at 3 water depths, namely, 1m below water surface, mid-depth and 1m above sea bed, except where the water depth less than 6m, the mid-depth station may be omitted. Should the water depth be less than 3m, only the mid-depth station will be monitored. The ET should agree with EPD on all the monitoring stations.
  - Duplicate in-situ measurements and water samples collected from each independent monitoring event are required for all parameters to ensure a robust statistically interpretable dataset.
  - No sampling should be carried out when typhoon signal No. 3 or above or black rainstorm signal is hoisted.
  - At each measurement depth, two consecutive measurements would be taken. The probes would be retrieved out of the water after the first measurement and then redeployed for the second measurement. When the difference in value between the first and second measurement of on-site parameters is more than 25% of the value of the first reading, the reading shall be discarded and further readings shall be taken.



### Construction Phase Baseline Monitoring

- 5.7.2 Baseline conditions for marine water quality should be established and agreed with EPD prior to the commencement of all marine construction works. The purpose of the baseline monitoring is to establish ambient conditions prior to the commencement of the marine construction works and to demonstrate the suitability of the proposed impact and control monitoring stations.
- 5.7.3 The baseline monitoring report should be submitted to EPD at least 2 weeks before the commencement of marine construction works for agreement. EPD shall also be notified immediately for any changes in schedule. The baseline monitoring report should be certified by the ET Leader and verified by IEC before submission to EPD.
- 5.7.4 The baseline conditions should be established by measuring water quality parameters as specified in **Section 5.3** at the designated monitoring stations (IM1, SR1, C1 and C2 for construction phase marine works in vicinity of marine facilities; IM2, IM3, SR2, C3 and C4 for construction of marine viaduct between Airport Island and Tung Chung) as shown in **Table 5.1** and **Table 5.2**. The measurement depths shall follow those specified in **Section 5.7.1**. The measurements should be taken at all designated monitoring stations including control station, 3 days per week, at mid-flood and mid-ebb tides, for at least 4 weeks prior to the commencement of marine works. There should not be any marine construction activities in the vicinity of the stations during the baseline monitoring. The interval between 2 sets of monitoring should not be less than 36 hours.
- 5.7.5 In general, where the difference in value between the first and second in-situ measurement of DO or turbidity parameters is more than 25% of the value of the first reading, the reading shall be discarded and further readings should be taken.
- 5.7.6 There should be no construction work in the vicinity of the stations during the baseline monitoring. The baseline data will be used to establish the Action and Limit Levels. The determination of Action and Limit Levels will be discussed in **Section 5.7.16**.

### Construction Phase Impact Monitoring

- 5.7.7 During the marine construction period, impact monitoring should be undertaken 3 days per week, at mid-flood and mid-ebb tides, with sampling/measurement at the same monitoring stations including control station as specified in **Section 5.7.4**. The interval between 2 sets of monitoring should not be less than 36 hours except where there are exceedances of Action and/or Limit levels, in which case the monitoring frequency will be increased. The monitoring parameters and measurement depths shall follow those specified in **Section 5.3** and **Section 5.7.1**, respectively. Duplicate water samples should be taken and analysed.
- 5.7.8 The proposed water quality monitoring schedule shall be submitted to EPD by the ET at least 2 weeks before the first day of the monitoring month. EPD shall also be notified immediately for any changes in schedule.

- 5.7.9 In general, where the difference in value between the first and second in-situ measurement of DO or turbidity parameters is more than 25% of the value of the first reading, the reading shall be discarded and further readings should be taken.
- 5.7.10 In case of project-related exceedances of Action and/or Limit Levels, analysis should be conducted to identify whether the exceedance is caused by Project activities. If the data analysis results indicate that the exceedance is caused by this Project, appropriate actions including lowering the working rate, or rescheduling of works should be taken and additional mitigation measures should be implemented as necessary. The details of Event and Action Plan will be discussed in **Section 5.7.17**.
- 5.7.11 Note that given the marine construction works for the marine facilities and the marine viaduct are expected to start and end at different time, the impact monitoring for the construction works for the marine facilities and marine viaduct would be conducted separately following their individual schedule. The corresponding monitoring stations are listed in **Table 5.1** and **Table 5.2** respectively.

**Post Construction Phase Monitoring**

- 5.7.12 Upon completion of marine construction works for the marine facilities and marine viaduct, a post construction water quality monitoring should be carried out separately for 4 weeks in the same manner as the impact monitoring at the corresponding monitoring stations as shown in **Table 5.1** and **Table 5.2**.

**Baseline Monitoring for the Maintenance Dredging during the Operational Phase**

- 5.7.13 Baseline monitoring shall be conducted for 4 weeks in the same manner as the construction phase baseline monitoring at the four monitoring stations as shown in **Table 5.1**.

**Impact Monitoring for the Maintenance Dredging during the Operational Phase**

- 5.7.14 For the first maintenance dredging, monitoring should be carried out in the same manner as the construction phase impact monitoring at the four monitoring stations as shown in **Table 5.1**.
- 5.7.15 Project proponent will review the need for conducting monitoring for maintenance dredging during the operational phase upon the completion of monitoring for the first maintenance dredging and seek agreement from EPD. Suspension of the monitoring for maintenance dredging during the operational phase shall only be considered upon demonstration of no adverse water quality impact due to the project maintenance dredging.

**Action and Limit Levels**

- 5.7.16 The Action and Limit (AL) Levels for water quality are defined in **Table 5.3** below.

**Table 5.3 Action and Limit Levels for Marine Water Quality**

| Parameters | Action Level   | Limit Level               |
|------------|--|---------------------------|
| DO in mg/L | <u>Surface and Middle</u><br>5 percentile of baseline data | <u>Surface and Middle</u> |

| Parameters       | Action Level   | Limit Level  |
|------------------|--|--|
|                  | <u>Bottom</u><br>5 percentile of baseline data   | 4 mg/L or<br>1 percentile of baseline data<br><u>Bottom</u><br>2 mg/L, or<br>1 percentile of baseline data                   |
| SS in mg/L       | <u>Depth Average</u><br>95 percentile of baseline data and 120% of upstream control station at the same tide of the same day | <u>Depth Average</u><br>99 percentile of baseline data and 130% of upstream control station at the same tide of the same day |
| Turbidity in NTU | <u>Depth Average</u><br>95 percentile of baseline data and 120% of upstream control station at the same tide of the same day | <u>Depth Average</u><br>99 percentile of baseline data and 130% of upstream control station at the same tide of the same day |

Note:

1. "Depth Average" is calculated by taking the arithmetic means of reading of all sampling depths.
2. For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.
3. For turbidity and SS, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.
4. All the figures given in the table are used for reference only and the EPD may amend the figures whenever it is considered as necessary.

### Event and Action Plan

- 5.7.17 Should non-compliance of the criteria occur, action in accordance with the Action Plan in the **Table 5.4** below shall be carried out.

**Table 5.4 Event and Action Plan for Marine Water Quality**

| EVENT   | ACTION  |  |   |   |
|---|---|--|---|---|
|   | ET  | IEC  | AAHK/PM   | Contractor  |
| 1. Action level being exceeded by one sampling day                      | <ol style="list-style-type: none"> <li>1. Inform IEC, Contractor and AAHK/PM.</li> <li>2. Check monitoring data, all plant, equipment and Contractor's working methods.</li> <li>3. Discuss mitigation measures with IEC, Contractor and AAHK/PM.</li> </ol>  | <ol style="list-style-type: none"> <li>1. Discuss with ET, Contractor and AAHK/PM on the mitigation measures.</li> <li>2. Review proposals on mitigation measures submitted by Contractor and advise AAHK/PM accordingly.</li> <li>3. Review and advise ET and AAHK/PM on the effectiveness of the implemented mitigation measures.</li> </ol>     | <ol style="list-style-type: none"> <li>1. Discuss with IEC, ET and Contractor on the implemented mitigation measures.</li> <li>2. Make agreement on the mitigation measures to be implemented.</li> <li>3. Supervise the implementation of agreed remedial measures.</li> </ol>                                     | <ol style="list-style-type: none"> <li>1. Identify source(s) of impact.</li> <li>2. Inform AAHK/PM and confirm notification of the non-compliance in writing.</li> <li>3. Rectify unacceptable practice;</li> <li>4. Check all plant and equipment;</li> <li>5. Consider changes of working methods.</li> <li>6. Discuss with ET, IEC and AAHK/PM and propose mitigation measures to IEC and AAHK/PM.</li> <li>7. Implement the agreed mitigation measures.</li> </ol>  |
| 2. Action level being exceeded by two or more consecutive sampling days | <ol style="list-style-type: none"> <li>1. Repeat <i>in-situ</i> measurement on next day of exceedance to confirm findings.</li> <li>2. Inform IEC, Contractor and AAHK/PM.</li> <li>3. Check monitoring data, all plant, equipment and Contractor's working methods.</li> <li>4. Discuss mitigation measures with IEC, Contractor and AAHK/PM.</li> <li>5. Ensure mitigation measures are implemented.</li> </ol> | <ol style="list-style-type: none"> <li>1. Discuss with ET, Contractor and AAHK/PM on the mitigation measures.</li> <li>2. Review the proposed mitigation measures submitted by Contractor and advise the AAHK/PM accordingly.</li> <li>3. Review and advise ET and AAHK/PM on the effectiveness of the implemented mitigation measures.</li> </ol> | <ol style="list-style-type: none"> <li>1. Discuss with ET, IEC and Contractor on the proposed mitigation measures.</li> <li>2. Make agreement on the mitigation measures to be implemented.</li> <li>3. Discuss with ET, IEC and Contractor on the effectiveness of the implemented mitigation measures.</li> </ol> | <ol style="list-style-type: none"> <li>1. Identify source(s) of impact.</li> <li>2. Inform AAHK/PM and confirm notification of the non-compliance in writing.</li> <li>3. Rectify unacceptable practice.</li> <li>4. Check all plant and equipment.</li> <li>5. Consider changes of working methods.</li> <li>6. Discuss with ET, IEC and AAHK/PM and submit proposal of mitigation measures to IEC and AAHK/PM within 3 working days of notification.</li> <li>7. Implement the agreed mitigation measures.</li> </ol> |

| EVENT  | ACTION   |  |  |   |
|--|--|--|--|---|
|  | ET   | IEC  | AAHK/PM  | Contractor  |
| 3. Limit level being exceeded by one sampling day                      | <ol style="list-style-type: none"> <li>1. Repeat measurement on next day of exceedance to confirm findings.</li> <li>2. Inform IEC, Contractor and AAHK/PM.</li> <li>3. Rectify unacceptable practice.</li> <li>4. Check monitoring data, all plant, equipment and Contractor's working methods.</li> <li>5. Discuss mitigation measures with IEC, AAHK/PM and Contractor.</li> <li>6. Ensure the agreed mitigation measures are implemented.</li> </ol>   | <ol style="list-style-type: none"> <li>1. Discuss with ET, Contractor and AAHK/PM on the implemented mitigation measures.</li> <li>2. Review the proposed mitigation measures submitted by Contractor and advise the AAHK/PM accordingly.</li> <li>3. Review and advise ET and AAHK/PM on the effectiveness of the implemented mitigation measures.</li> </ol> | <ol style="list-style-type: none"> <li>1. Discuss with IEC, ET and Contractor on the implemented mitigation measures.</li> <li>2. Request Contractor to critically review the working methods.</li> <li>3. Make agreement on the mitigation measures to be implemented.</li> <li>4. Review and advise ET and AAHK/PM on the effectiveness of the implemented mitigation measures.</li> </ol>   | <ol style="list-style-type: none"> <li>1. Identify source(s) of impact.</li> <li>2. Inform AAHK/PM and confirm notification of the non-compliance in writing.</li> <li>3. Rectify unacceptable practice.</li> <li>4. Check all plant and equipment.</li> <li>5. Consider changes of working methods.</li> <li>6. Discuss with ET, IEC and AAHK/PM and submit proposal of additional mitigation measures to IEC and AAHK/PM within 3 working days of notification.</li> <li>7. Implement the agreed mitigation measures.</li> </ol>  |
| 4. Limit level being exceeded by two or more consecutive sampling days | <ol style="list-style-type: none"> <li>1. Inform IEC, Contractor, AAHK / PM;</li> <li>2. Identify reasons for non-compliance and source(s) of impact;</li> <li>3. Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>4. Discuss mitigation measures with IEC, AAHK / PM and Contractor;</li> <li>5. Ensure mitigation measures are implemented;</li> <li>7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days.</li> </ol> | <ol style="list-style-type: none"> <li>1. Discuss with ET, Contractor and AAHK/PM on the implemented mitigation measures.</li> <li>2. Review the proposed mitigation measures submitted by Contractor and advise AAHK/PM accordingly.</li> <li>3. Review and advise ET and AAHK/PM on the effectiveness of implemented mitigation measures.</li> </ol>         | <ol style="list-style-type: none"> <li>1. Discuss with IEC, ET and Contractor on the implemented mitigation measures.</li> <li>2. Request Contractor to critically review the working methods.</li> <li>3. Make agreement on the mitigation measures to be implemented.</li> <li>4. Discuss with ET and IEC on the effectiveness of the implemented mitigation measures.</li> <li>5. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit level.</li> </ol> | <ol style="list-style-type: none"> <li>1. Identify source(s) of impact.</li> <li>2. Inform AAHK/PM and confirm notification of non-compliance in writing.</li> <li>3. Rectify unacceptable practices.</li> <li>4. Check all plant and equipment.</li> <li>5. Consider changes of working method.</li> <li>6. Discuss with ET, IEC and AAHK/PM and submit proposal of additional mitigation measures to IEC and AAHK/PM within 3 working days of notification</li> <li>7. Implement the agreed mitigation measures;</li> <li>8. As directed by the AAHK/PM, to slow down or to stop all or part of the construction activities.</li> </ol> |

Notes: ET – Environmental Team; EP – Environmental Permit; PM – Project Manager; IEC – Independent Environmental Checker; AAHK – Airport Authority Hong Kong

## **5.8 Environmental Monitoring and Audit Requirements**

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

## **6 WASTE MANAGEMENT**

### **6.1 Introduction**

- 6.1.1 Waste management during the construction phase will mainly be the responsibility of the Contractor, who shall implement the mitigation measures recommended in the EIA Report in order to minimise waste or resolve the issues associated with the management of wastes. The Contractor shall also ensure that all wastes produced during the construction phase would be handled, stored and disposed of in accordance with good waste management practices, relevant legislation and waste management guidelines. Wastes generated from the construction activities, such as the construction and demolition (C&D) materials, shall be audited at least once a week to ensure that proper storage, transportation and disposal practices are undertaken. Such audits would ensure that the wastes generated would be properly disposed of.
- 6.1.2 No adverse environmental impacts would arise with the implementation of good waste management practices during operational phase of the Project. Therefore, an audit programme for the operational phase will not be required.

### **6.2 Mitigation Measures**

- 6.2.1 With the proper handling, storage and disposal of wastes arising from the construction and operation of the Project as recommended in the EIA Report and summarised in the Environmental Mitigation Implementation Schedule (EMIS) in [Appendix A](#) of this EM&A Manual, adverse environmental impacts is not anticipated.

### **6.3 Environmental Monitoring and Audit Requirements**

- 6.3.1 This section outlines the requirements of the environmental audit program. As part of the audit program, it is necessary to verify the status of the mitigation measures and evaluate their effectiveness.
- 6.3.2 During construction phase, weekly site inspections and audits shall be carried out by the ET, to ensure that the recommended good site practices and other mitigation measures listed in [Appendix A](#) are implemented by the Contractor. The inspections and audits shall look at all aspects of on-site waste management practices including the waste generation, storage, recycling, transport and disposal. A Waste Management Plan (WMP), as part of the Environmental Management Plan (EMP), shall be prepared by the Contractor and submitted to the PM/PMR of AAHK for approval prior to the commencement of construction work. Documents including licenses, permits, disposal and recycling records shall be reviewed and audited for the compliance with the legislation and contract requirements.
- 6.3.3 During operational phase, no adverse waste impact would be anticipated with the implementation of the good waste management practices. No monitoring or audit is required during operational phase.

## 7 ECOLOGY

### 7.1 Introduction

7.1.1 Potential ecological impacts arising from the construction and operational phases of the Project were assessed in the EIA Report. Mitigation and precautionary measures have been recommended to further minimize potential direct and indirect impacts to ecological resources. With the implementation of appropriate marine and terrestrial ecological measures, no unacceptable marine and terrestrial ecological impacts would be anticipated.

### 7.2 Mitigation Measures and Precautionary Measures

7.2.1 The recommended mitigation measures for alleviating terrestrial and marine ecological impacts arising from construction and operation works include the implementation of good site practice, water quality mitigation measures and vessel speed restriction, to minimize disturbance to terrestrial and marine resources near works area, as listed in [Appendix A](#).

### 7.3 Environmental Monitoring and Audit Requirements

7.3.1 There will be a water quality monitoring programme during the construction phase of the Project to ensure that all the recommended water quality measures and best management practices are properly implemented. Details are discussed in **Section 5** of this Manual.

7.3.2 All vessels used in this Project will be required to slow down to 10 knots around the Project's marine works areas and areas with potential high dolphin usage, including existing and proposed marine parks, based upon a precautionary approach to avoid vessel collision with Chinese White Dolphins.



## **8 FISHERIES**

### **8.1 Introduction**

8.1.1 Potential fisheries impacts arising from the construction and operational phases of the Project were identified and assessed in the EIA Report. No adverse fisheries impacts from the Project would be expected during the construction and operational phases of the Project. Monitoring of fisheries resources during these construction and operation activities is not considered necessary. No fisheries-specific mitigation measures are required.

### **8.2 Mitigation Measures**

8.2.1 No specific fisheries mitigation measures and monitoring would be required during both construction and operational phases. Mitigation measures recommended in the water quality impact assessment will also minimise any adverse impacts on fisheries.

### **8.3 Environmental Monitoring and Audit Requirements**

8.3.1 As no unacceptable impacts have been predicted to occur during construction and operation of the Project, monitoring of fisheries resources during these construction and operation activities is not considered necessary. Appropriate notification, communications, site protection and marking would be adopted to reduce navigation risks with fishing vessels. The details of the water quality monitoring programme are presented in this **EM&A Manual (Section 5)**.

## **9 CULTURAL HERITAGE**

### **9.1 Introduction**

9.1.1 The EIA concluded that no cultural heritage/marine archaeological impact is anticipated during construction phase and operational phase of the Project, no mitigation measure is required. However, as a precautionary measure, Antiquities and Monuments Office (AMO) should be informed immediately in case of any antiquities or supposed antiquities under the Antiquities and Monuments Ordinance (Cap 53) are discovered during the seabed disturbance works in the Project site, so that appropriate mitigation measures, if needed, can be timely formulated and implemented in agreement with AMO.

### **9.2 Mitigation Measure**

#### **Construction Phase**

9.2.1 No impact on declared monuments, proposed monuments, graded historic sites/buildings/structures, sites/buildings/structures in the new list of proposed grading items; and Government historic sites and Site of Archaeological Interest has been identified. No mitigation measure is required. If there are any buildings / structures both at grade level and underground which were built on or before 1969, the applicant is required to alert AMO in an early stage or once identified.

9.2.2 As sonar contacts and magnetic anomalies identified from geophysical survey are of no marine archaeological potential, no marine archaeological impact is anticipated and therefore no mitigation measures is required.

9.2.3 As a precautionary measure, AMO should be informed immediately in case of any antiquities or supposed antiquities under the Antiquities and Monuments Ordinance (Cap 53) are discovered during the seabed disturbance works in the Project site.

#### **Operational Phase**

9.2.4 As no adverse cultural heritage/marine archaeological impact is anticipated in operational phase of the Project, no mitigation measure is required.

### **9.3 Environmental Monitoring & Audit Requirements**

#### **Construction Phase**

9.3.1 As no archaeological impact and cultural heritage impact during construction phase of the Project are expected, monitoring and audit are considered not necessary.

9.3.2 As a precautionary measure, AMO should be informed immediately in case of any antiquities or supposed antiquities under the Antiquities and Monuments Ordinance (Cap 53) are discovered during the seabed disturbance works in the Project site.

### **Operational Phase**

- 9.3.3 As no adverse cultural heritage/marine archaeological impact is anticipated in operational phase of the Project, no monitoring and audit are required.

## **10 LANDSCAPE AND VISUAL IMPACT**

### **10.1 Introduction**

10.1.1 Potential landscape and visual impacts arising from the construction and operational phases of the Project were assessed and landscape and visual mitigation measures were recommended in the EIA Report. This Section defines the EM&A requirements to ensure the recommended landscape and visual mitigation measures are effectively implemented.

### **10.2 Mitigation Measures**

10.2.1 The landscape and visual mitigation measures should be incorporated in the detailed design of the Project. The mitigation measures during construction and operational phases as recommended in the EIA Report are presented in [Appendix A](#).

10.2.2 Mitigation measures to be implemented should be adopted from the start of construction and be in place throughout the entire construction period. Mitigation measures to be implemented during the operation should be integrated into the detailed design and built as part of the construction works so that they are in place on commissioning of the Project as far as practical.

### **10.3 Environmental Monitoring and Audit Requirements**

10.3.1 Site audits should be undertaken during the construction phase to check that the proposed landscape and visual mitigation measures are properly implemented and maintained as per their intended objectives. Site inspections should be undertaken by the ET at least bi-weekly during the construction period.

### **10.4 Event & Action Plan**

10.4.1 In the event of non-compliance, the responsibilities of the relevant parties are detailed in the Event/Action plan provided in **Table 10.1**.

**Table 10.1 Event and Action Plan for Landscape and Visual**

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

Notes: ET – Environmental Team; EP – Environmental Permit; PM – Project Manager; IEC – Independent Environmental Checker; AAHK – Airport Authority Hong Kong

## **11 SITE ENVIRONMENTAL AUDIT**

### **11.1 Site Inspection**

11.1.1 Site inspection provides a direct means to initiate and enforce the specified environmental protection and pollution control measures. These shall be undertaken regularly and routinely to inspect the construction activities in order to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented. Site inspection is one of the most effective tools used to enforce the environmental protection requirements on the construction site. A site inspection/audit checklist, to be used for undertaking site inspection/audit, will be prepared by the ET and submitted to the IEC for agreement, and to the AAHK / PM for approval.

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

11.1.3 Regular site inspections shall be carried out and led by the AAHK/PM and attended by the Contractor and ET at least once per week during the construction phase of the Project. The IEC shall undertake regular site audit at least once per month to assess the performance of the Contractor(s). The areas of inspection shall include, but are not be limited to, the environmental situation, pollution control and mitigation measures within the site. It shall also review the environmental conditions of locations outside the works area that is likely to be affected, directly or indirectly, by the construction site activities of the Project. The ET Leader shall make reference to the following information in conducting the inspection:

- EIA Report and EM&A Manual recommendations on environmental protection and pollution control mitigation measures;
- On-going results of the EM&A programme;
- Works progress and programme;
- Individual works methodology proposals (which shall include proposals on associated pollution control measures);
- Contract specifications on environmental protection;
- Relevant environmental protection and pollution control legislations; and
- Previous site inspection results undertaken by the ET and others.

11.1.4 The Contractor shall keep to update the AAHK/PM and ET Leader on all relevant environmental related information on the construction contract necessary for him

to carry out the site inspections. Site inspection results and associated recommendations for improvements to the environmental protection and pollution control efforts shall be recorded and followed up by the Contractor and submitted to the ET and AAHK/PM in an agreed time-frame. The Contractor shall follow the procedures and time-frame as stipulated in the environmental site inspection, deficiency and action reporting system formulated by the ET Leader, to report on any remedial measures subsequent to the site inspections/audits. Weekly site inspection should be carried out to check the implementation status of the recommended environmental mitigation measures throughout construction period.

- 11.1.5 The AAHK/PM, ET and Contractor should conduct ad-hoc site inspections if significant environmental problems are identified. The IEC shall also conduct random site audits and inspections. Inspections may also be required subsequent to receipt of an environmental complaint, or as part of the investigation work, as specified in the Event and Action Plans for the EM&A programme.

## **11.2 Environmental Compliance**

- 11.2.1 There are statutory requirements on environmental protection and pollution control requirements with which the construction activities must comply with.
- 11.2.2 In order to ensure that the works are in compliance with the statutory requirements, all method statements of works should be submitted by the Contractor to the AAHK/PM for approval and to the ET Leader of vetting to see whether sufficient environmental protection and pollution control measures have been included.
- 11.2.3 The AAHK/PM and ET Leader shall also review the progress and programme of the works to check that relevant environmental laws have not been violated, and that the any foreseeable potential for violating the laws can be prevented.
- 11.2.4 The Contractor shall provide the update of the relevant documents to the ET Leader so that the works checking can be carried out effectively. The document shall at least include the updated Works Progress Reports, the updated Works Programme, method statements, any application letters for different licence/permits under the environmental protection laws, and copies all the valid licence/permit. The site diary and environmental records shall also be available for inspection by the relevant parties.
- 11.2.5 After reviewing the document, the ET Leader shall advise the IEC, AAHK/PM and the Contractor of any non-compliance with the legislative requirements on environmental protection and pollution control so that they can timely take follow-up actions as appropriate. If the ET Leader's review concludes that the current status on licence/permit application and any environmental protection and pollution control preparation works may not cope with the works programme or follow-up actions may still result in potential violation of environmental protection and

pollution control requirements, the ET should provide further advice to the Contractor to take remedial action to resolve the problem.

- 11.2.6 Upon receipt of the advice, the Contractor shall undertake immediate actions to remedy the situation. The ET shall follow up to ensure that appropriate action has been taken by the Contractor in order to satisfy legal requirements.

### **11.3 Environmental Complaints**

- 11.3.1 Complaints shall be referred to the ET Leader for carrying out complaint investigation procedures. The following procedures shall be undertaken upon receipt of the any environmental complaints:

- The ET Leader to log complaint and date of receipt onto the complaint database and inform the IEC and AAHK/PM immediately;
- The ET Leader to investigate the complaint to determine its validity, and to assess whether the source of the problem is due to construction works with the support of additional monitoring frequency and stations, if necessary;
- The ET Leader to identify remedial measures in consultation with the IEC and AAHK/PM if a complaint is valid and due to construction works of Project;
- The Contractor to implement the remedial measures as identified by ET Leader and agreed with IEC and AAHK/PM. Any additional monitoring frequency and stations, where necessary, for checking the effectiveness of the remedial measures should be proposed by ET Leader and agreed with IEC and AAHK/PM;
- The ET and IEC to review the effectiveness of the Contractor's remedial measures and the updated situation;
- The ET/Contractor to undertake monitoring and audit to verify the situation if necessary, and oversee that circumstance leading to the complaint do not recur;
- If the complaint is a referral by the EPD, the Contractor to prepare interim report on status of the complaint investigation and follow-up actions stipulated above, including the details of the remedial measures and monitoring identified or already taken, after endorsement by IEC and AAHK/PM, for submission to EPD within the time frame assigned by EPD;
- The ET undertake additional monitoring and audit to verify the situation if necessary, and review that any valid reason for complaint does not recur;
- The ET report the investigation results and the subsequent actions to the source of complaint for responding to complainant (If the source of complaint is a referral from EPD, the result should be reported within the time frame



assigned by the EPD); and

- The ET to record the details of the complaint, results of the investigation, subsequent actions taken to address the complaint and updated situation including the effectiveness of the remedial measures, supported by regular and additional monitoring results in the monthly EM&A reports. (If the source of complaint is a referral from EPD, the result should be reported within the time frame assigned by the EPD).

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

## **12 REPORTING**

### **12.1 Introduction**

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

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

### **12.2 Baseline Monitoring Report**

12.2.1 The ET should prepare and submit a Baseline Monitoring Report at least 2 weeks before commencement of construction works (including construction phase and operational phase maintenance dredging). Copies of the Baseline Monitoring Report should be submitted to the IEC, AAHK/PM and EPD. The ET should liaise with the relevant parties on the exact number of copies require.

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

- (i) Up to half a page of executive summary;
- (ii) Brief description of project background information;
- (iii) Drawings showing locations of the baseline monitoring stations;
- (iv) Monitoring results (in both hard and soft copies) together with the following information:
  - Monitoring methodology;
  - Name of laboratory and types of equipment used and calibration details;
  - Parameters monitored;
  - Monitoring locations (and depth);
  - Monitoring date, time, frequency and duration; and
  - Quality assurance (QA) / quality control (QC) results and detection limits.
- (v) Details of influencing factor, including:
  - Major activities, if any, being carried out on the Project site during the period;

- Weather conditions during the period; and
  - Other factors which might affect the monitoring results.
- (vi) Determination of the Action and Limit levels (AL levels) for each monitoring parameter and statistical analysis of the baseline data;
- (vii) Revisions for inclusion in the EM&A Manual; and
- (viii) Comments and conclusions.

### **12.3 Monthly Environmental Monitoring and Audit (EM&A) Report**

12.3.1.1 The results and finding of all EM&A works required in the Manual should be recorded in the monthly EM&A reports prepared by the ET and endorsed by the IEC. The EM&A Report should be prepared and submitted to EPD within 10 working days of the end of each reporting month with the first report within the month after major construction works for construction phase or maintenance dredging for operational phase commences. Copies of each monthly EM&A report shall be submitted to the parties: Contractor, IEC, AAHK/PM and EPD. Before submission of the first monthly EM&A Report, the ET shall liaise with the parties on the required number of copies and format of the monthly reports in both hard copy and/or electronic medium.

#### **12.3.2 First Monthly EM&A Report**

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

- (i) 1-2 pages executive summary:
- Breaches of Action and Limit levels;
  - Complaint log;
  - Notifications of any summons and successful prosecutions;
  - Reporting changes; and
  - Future key issues.
- (ii) Basic project information:
- Project organization including key personnel contact names and telephone numbers;
  - Construction programme;
  - Management structure; and
  - Works undertaken during the reporting month.
- (iii) Environmental status:
- Advice on the status of statutory environmental compliance, such as the status of compliance with the environmental permit (EP) conditions

- under the EIAO, schedule and progress of any submissions as required under the EP, application of Construction Noise Permit (CNP), Waste Water Discharge License in accordance to Water Pollution Control Ordinance (WPCO), C&D Waste Disposal, Chemical Waste Disposal License, etc;
- Works undertaken during the reporting month with illustrations (e.g. location of works, etc); and
  - Drawings showing the Project area, environmental sensitive receivers and locations of monitoring and control stations (with co-ordinates of the monitoring and control locations).
- (iv) Summary of EM&A Requirement including:
- All monitoring parameters;
  - Environmental quality performance limits (Action and Limit Levels);
  - Event and Action Plans;
  - Environmental mitigation measures, as recommended in the EIA Report; and
  - Environmental requirements in contract documents.
- (v) Implementation Status:
- Advice on the implementation status of environmental protection and pollution control/mitigation measures, as recommended in the EIA Report.
- (vi) Monitoring results (in both hard and electronic copies) together the following information:
- Monitoring methodology;
  - Name of laboratory and types of equipment used and calibration details;
  - Monitoring parameters;
  - Monitoring locations (and depth);
  - Monitoring date, time, frequency and duration;
  - Weather conditions during the period;
  - Any other factors which might affect the monitoring results; and
  - QA/QC results and detection limits.
- (vii) Report on the non-compliances, complaints, notifications of summons and status of prosecutions:
- Record of all non-compliance (exceedances) of the environmental

quality performance limits (Action and Limit levels);

- Record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
- Record of all notification of summons and successful prosecutions for breaches of current environmental protection / pollution control legislation, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary;
- Review of the reasons for and the implications of non-compliances, complaints, summons and prosecutions including review of pollution sources and working procedures; and
- Description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance.

(viii) Others

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

### 12.3.3 Subsequent Monthly EM&A Reports

12.3.3.1 Subsequent monthly EM&A Reports during the construction phase shall include the following information:

- (i) 1-2 pages executive summary:
- Breaches of Action and Limit levels;
  - Complaint log;
  - Notifications of any summons and successful prosecutions;
  - Reporting changes; and
  - Future key issues.
- (ii) Basic project information:

- Project organization including key personnel contact names and telephone numbers;
  - Construction programme;
  - Management structure;
  - Works undertaken during the reporting month; and
  - Any updates as needed to the scope of works and construction methodologies.
- (iii) Environmental status:
- Advice on the status of statutory environmental compliance, such as the status of compliance with the environmental permit (EP) conditions under the EIAO, schedule and progress of any submissions as required under the EP, application of Construction Noise Permit (CNP), Waste Water Discharge License in accordance to Water Pollution Control Ordinance (WPCO), C&D Waste Disposal, Chemical Waste Disposal License, etc;
  - Works undertaken during the reporting month with illustrations (e.g. location of works, etc); and
  - Drawings showing the Project area, environmental sensitive receivers and the locations of the monitoring and control stations (with co-ordinates of the monitoring and control locations).
- (iv) Summary of EM&A Requirement:
- All monitoring parameters;
  - Environmental quality performance limits (Action and Limit Levels);
  - Event and Action Plan;
  - Environmental mitigation measures as recommended in the EIA Report; and
  - Environmental requirements in contract documents.
- (v) Implementation Status:
- Advice on the implementation status of environmental protection and pollution control/mitigation measures as recommended in the EIA Report, summarised in the updated implementation schedule.
- (vi) Monitoring results (in both hard and electronic copies) together the following information:
- Monitoring methodology;
  - Name of laboratory and types of equipment used and calibration details;

- Monitoring parameters;
  - Monitoring locations (and depth);
  - Monitoring date, time, frequency and duration;
  - Weather condition during the period;
  - Any other factor which might affect the monitoring results; and
  - QA/QC results and detection limits.
- (vii) Report on the non-compliances, complaints, notifications of summons and status of prosecutions:
- Record of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels); and
  - Record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
  - Record of all notification of summons and successful prosecutions for breaches of current environmental protection / pollution control legislation, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary;
  - Review of the reasons for and implications of non-compliances, complaints, summons and prosecutions including review of pollution sources and working procedures; and
  - Description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance.
- (viii) Summary of Site Audit/ Inspection
- Records the dates and time of the site audit/ inspection, and any environmental problems observed;
  - Record the details of personnel involved; and
  - Descriptions of the mitigation measures/ action plans taken if environmental problems are identified during the audit/ inspection.
- (ix) Others
- An account of the future key issues as reviewed from the works programme and work method statements;
  - Advice on the solid and liquid waste management status;
  - Record of any project changes from originally proposed as described in the EIA (e.g. construction methods, mitigation proposals, design changes, etc)

- Comments (for example, effectiveness and efficiency of the mitigation measures), recommendations (for examples, any improvement in the EM&A programme) and conclusions.
  - Ad-hoc audits carried out.
- (x) Appendices
- Action and Limit levels;
  - Graphical plots of trends of the monitoring parameters at key stations over the past four reporting periods for representative monitoring stations annotated against the following:
    - (a) Major activities being carried out on site during the period;
    - (b) Weather conditions during the period; and
    - (c) Any other factors that might affect the monitoring results.
  - Monitoring schedule for the present and next reporting period;
  - Cumulative statistics on complaints, notifications of summons and successful prosecutions; and
  - Outstanding issues and deficiencies.

#### **12.4 Final EM&A Review Report**

- 12.4.1 The EM&A programme shall be terminated upon the completion of the construction activities that have the potential to cause significant environmental impacts.
- 12.4.2 The proposed termination shall only be implemented after the proposal has been endorsed by the IEC and AAHK/PM followed by the approval from the Director of Environmental Protection.
- 12.4.3 The ET shall prepare and submit the Final EM&A Report within 14 working days after approval of termination of EM&A programme has been granted. The Final EM&A Review Report shall contain at least the following information:
- (i) Executive summary (1-2 pages);
  - (ii) Drawings showing the Project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
  - (iii) The basic project information including a synopsis of the project organization, contacts of key management, and a synopsis of work undertaken during the course of the Project or past twelve months;
  - (iv) A brief summary of EM&A requirements including:
    - Environmental mitigation measures, as recommended in the EIA Report;



- Environmental impact hypotheses tested;
  - Environmental quality performance limits (Action and Limit levels);
  - All monitoring parameters; and
  - Event and Action Plans.
- (v) A summary of the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the EIA Report, summarised in the updated implementation schedule;
- (vi) A summary of the site audit/inspection carried out, including a summary of observations and follow up actions taken;
- (vii) Graphical plots and the statistical analysis of the trends of monitoring parameters over the course of the Project, including:
- The major activities being carried out on site during the reporting period;
  - Weather conditions during the reporting period; and
  - Any other factors which might affect the monitoring results;
- (viii) A summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
- (ix) A review of the reasons for and implications of non-compliances including review of pollution sources and working procedures as appropriate;
- (x) A description of the actions taken in the event of non-compliance;
- (xi) A summary record of all complaints received (written or verbal), liaison and consultation undertaken, actions and follow-up actions taken and results;
- (xii) A summary record of the notifications of summons and successful prosecutions for breaches of the current environmental protection / pollution control legislation, locations and nature of the breaches, follow-up investigation taken and results;
- (xiii) A review of the validity of EIA predictions and identification of shortcomings in EIA recommendations;
- (xiv) Comments (for example, a review of the effectiveness and efficiency of the mitigation measures, the performance of the environmental management system, and the overall EM&A programme); and
- (xv) Recommendations and conclusions (for example, a review of success of the overall EM&A programme to cost-effectively identify deterioration and to initiate prompt effective mitigatory action when necessary).

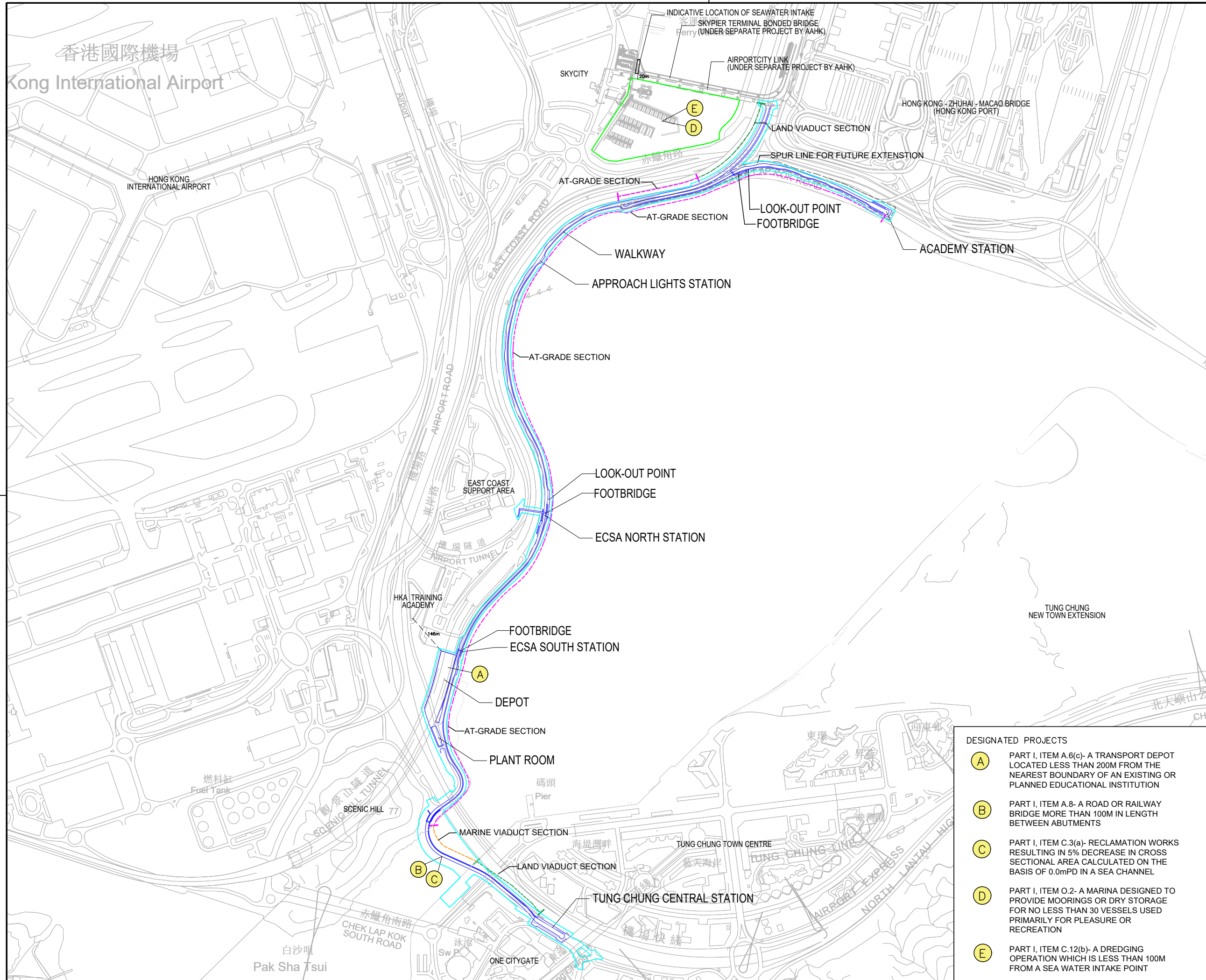
## **12.5 Data Keeping**

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

## **12.6 Interim Notifications of Environmental Quality Limit Exceedances**

12.6.1 With reference to the Event and Action Plans, when the environmental quality performance limits are exceeded and if they are proven to be valid, the ET should immediately notify the IEC, AAHK/PM and EPD, as appropriate. The notification should be followed up with advice to the IEC, AAHK/PM and EPD on the results of the investigation, proposed actions and success of the actions taken, with any necessary follow-up proposals. A sample template for the interim notification is presented in [Appendix E](#).

**FIGURES**



**LEGEND**

- PROPOSED ALIGNMENT OF AIRPORT TUNG CHUNG LINK
- PROPOSED MARINE FACILITIES
- CONSTRUCTION SITE BOUNDARY
- LAND VIADUCT SECTION
- MARINE VIADUCT SECTION
- AT-GRADE SECTION
- SPUR LINE

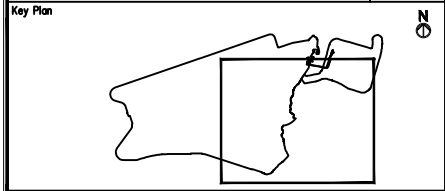
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HONG KONG INTERNATIONAL AIRPORT



| Consultant's Signatures for Approval |  | Date |
|--------------------------------------|--|------|
| Design Supervisor                    |  |      |
| Checkers                             |  |      |
| Authorised Representative            |  |      |



Title  
AIRPORT TUNG CHUNG LINK PROJECT  
PROJECT LOCATION

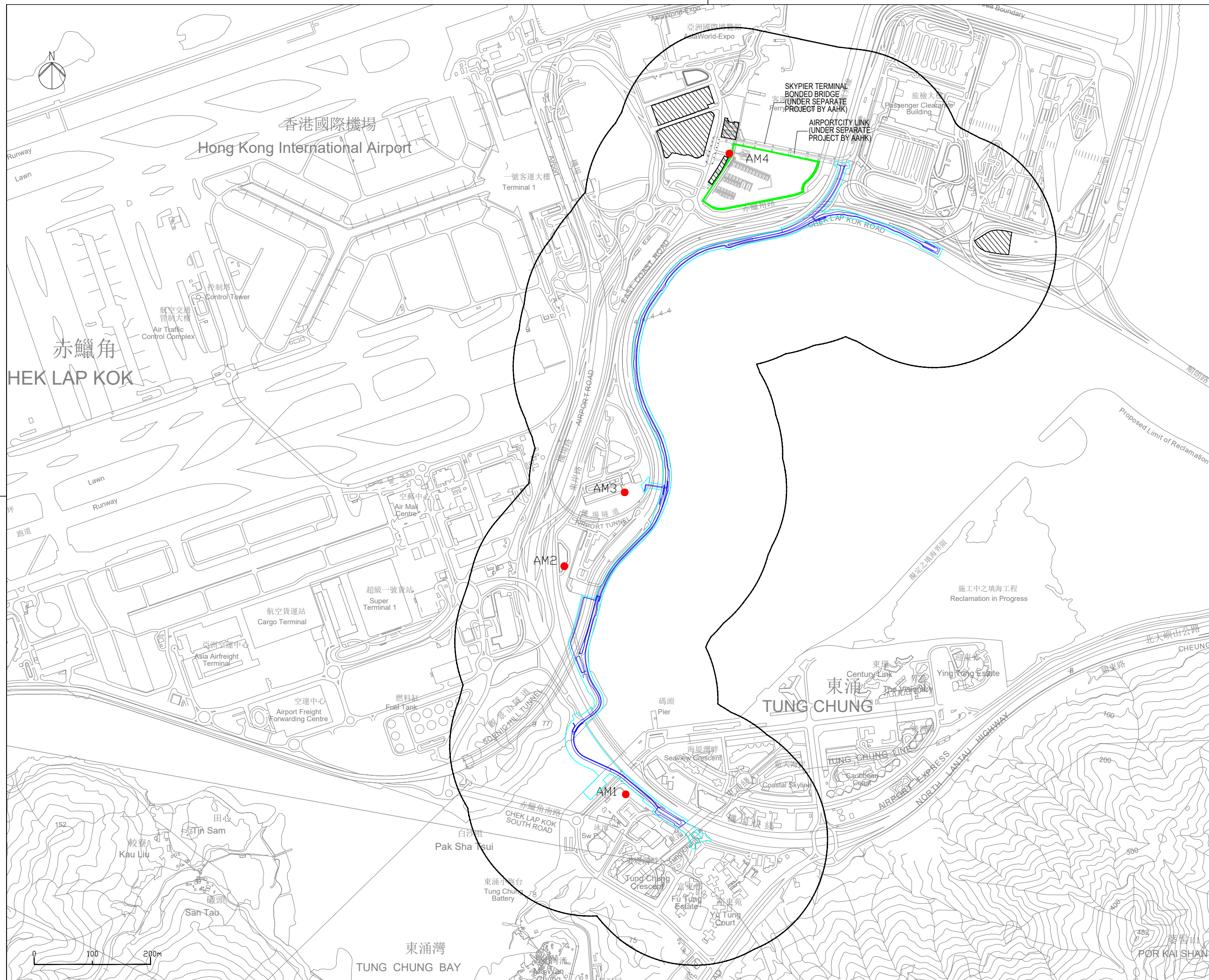
Drawing No. **FIGURE 1.1**






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| Status | Rev |
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| DESIGN |     |

- DESIGNATED PROJECTS**
- (A)** PART I, ITEM A.6(c)- A TRANSPORT DEPOT LOCATED LESS THAN 200M FROM THE NEAREST BOUNDARY OF AN EXISTING OR PLANNED EDUCATIONAL INSTITUTION
  - (B)** PART I, ITEM A.8- A ROAD OR RAILWAY BRIDGE MORE THAN 100M IN LENGTH BETWEEN ABUTMENTS
  - (C)** PART I, ITEM C.3(a)- RECLAMATION WORKS RESULTING IN 5% DECREASE IN CROSS SECTIONAL AREA CALCULATED ON THE BASIS OF 0.0mPD IN A SEA CHANNEL
  - (D)** PART I, ITEM O.2- A MARINA DESIGNED TO PROVIDE MOORINGS OR DRY STORAGE FOR NO LESS THAN 30 VESSELS USED PRIMARILY FOR PLEASURE OR RECREATION
  - (E)** PART I, ITEM C.12(b)- A DREDGING OPERATION WHICH IS LESS THAN 100M FROM A SEA WATER INTAKE POINT



- LEGEND**
-  PROPOSED ALIGNMENT OF AIRPORT TUNG CHUNG LINK
  -  PROPOSED MARINE FACILITIES
  -  500m ASSESSMENT AREA (CONSTRUCTION PHASE)
  -  DUST MONITORING STATION
  -  CONSTRUCTION SITE BOUNDARY

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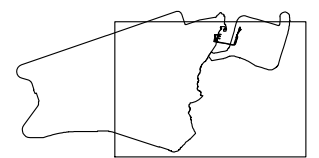
Consultant's Signatures for Approval

Design Supervisor

Checkers

Authorised Representative

Key Plan



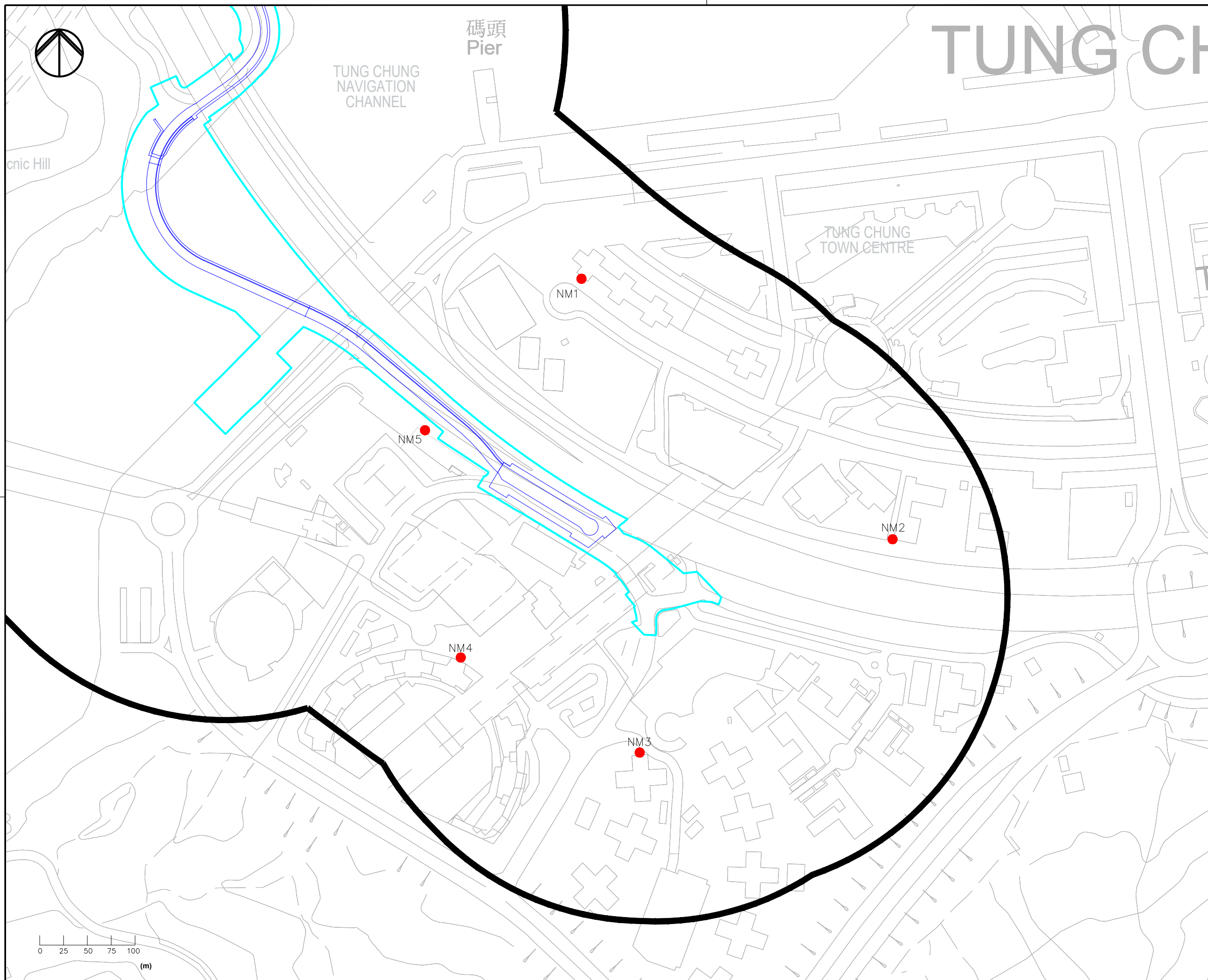
Title

**AIRPORT TUNG CHUNG LINK PROJECT**  
**LOCATIONS OF DUST MONITORING STATIONS**

Drawing No.

**FIGURE 3.1**

| Originator | Location | Discipline | Type     | Seq | Sequence No. |
|------------|----------|------------|----------|-----|--------------|
| Status     | Design   | Scale      | As Shown | Rev | Design       |



**LEGEND**

- PROPOSED ALIGNMENT OF AIRPORT TUNG CHUNG LINK
- 300M ASSESSMENT AREA
- CONSTRUCTION WORKS AREA
- NOISE MONITORING STATION

| Rev | Date | Descriptions | Check |
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HONG KONG INTERNATIONAL AIRPORT

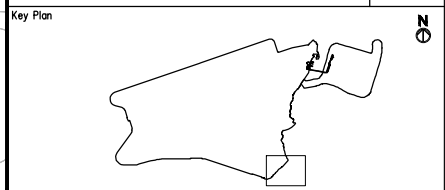


Consultant's Signatures for Approval

Design Supervisor

Checkers

Authorised Representative



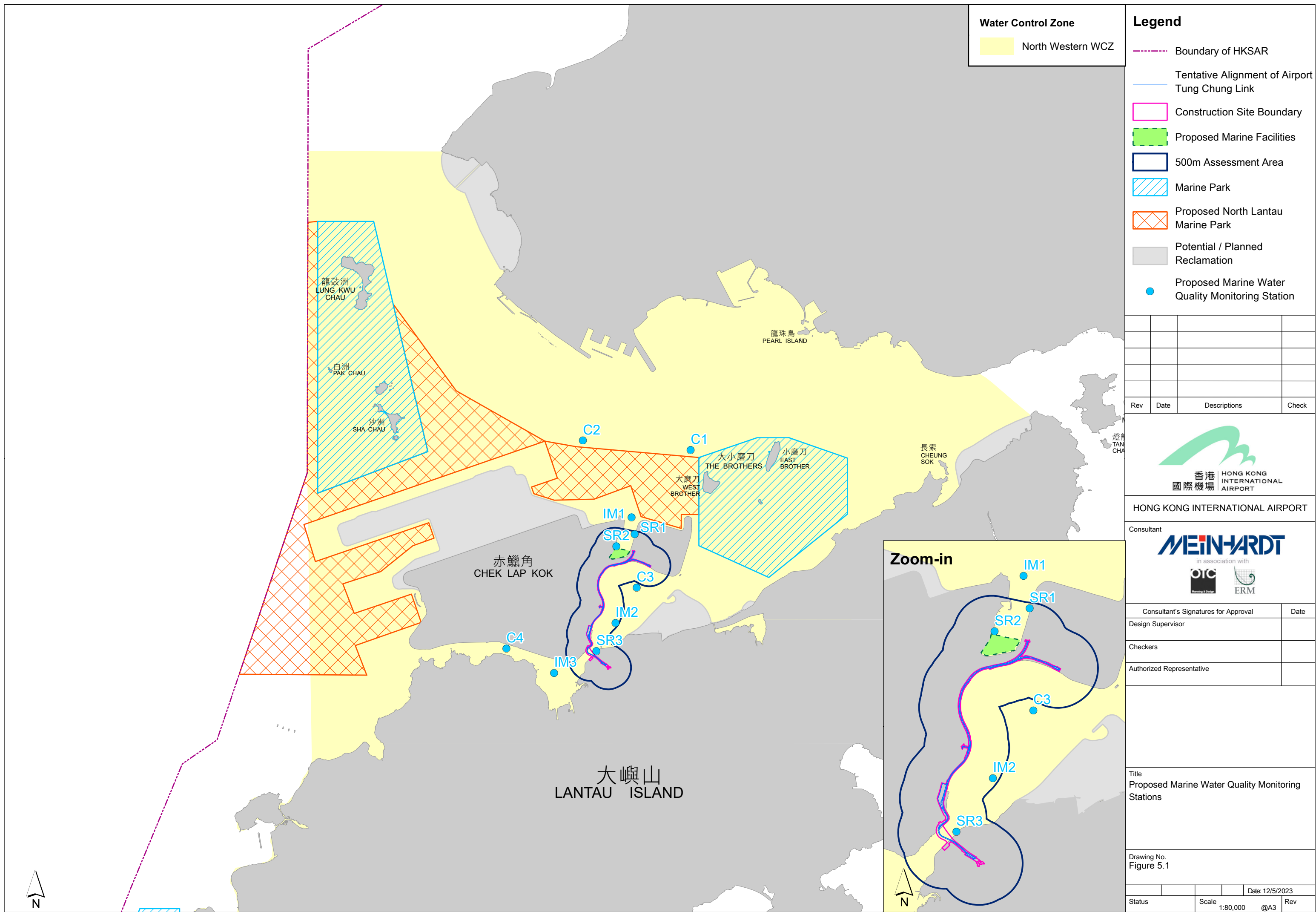
Title

**AIRPORT TUNG CHUNG LINK PROJECT**  
LOCATIONS OF NOISE MONITORING STATIONS

Drawing No.

**FIGURE 4.1**

| Originator | Location | Discipline | Type     | Dwg Sequence No. |
|------------|----------|------------|----------|------------------|
| Status     | Design   | Scale      | As shown | Rev              |
|            |          |            |          | Design           |



**Water Control Zone**  
 North Western WCZ

- Legend**
- Boundary of HKSAR
  - Tentative Alignment of Airport Tung Chung Link
  - Construction Site Boundary
  - Proposed Marine Facilities
  - 500m Assessment Area
  - Marine Park
  - Proposed North Lantau Marine Park
  - Potential / Planned Reclamation
  - Proposed Marine Water Quality Monitoring Station

| Rev | Date | Descriptions | Check |
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HONG KONG INTERNATIONAL AIRPORT



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| Consultant's Signatures for Approval | Date |
| Design Supervisor                    |      |
| Checkers                             |      |
| Authorized Representative            |      |

Title  
 Proposed Marine Water Quality Monitoring Stations

Drawing No.  
 Figure 5.1

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## **APPENDIX A**

# **Implementation Schedule for Environmental Mitigation Measures**



## Appendix A Implementation Schedule and Recommended Environmental Mitigation Measures

| EIA Reference        | EM&A Manual Reference | Environmental Protection Measures  | Objectives of Measures and Main Concern to Address | Location        | Implementation Agent | Relevant Standard or Requirement  | Implementation Stages |   |   |
|----------------------|-----------------------|--|--|-----------------|----------------------|---|-----------------------|---|---|
|                      |                       |  |  |                 |                      |   | D                     | C | O |
| <b>Air Quality</b>   |                       |  |  |                 |                      |   |                       |   |   |
| EIA Sections 3.5.4.2 | EM&A Section 3.3      | <p>The dust control measures detailed below shall also be incorporated into the Contract Specification where practicable as an integral part of good construction practice:</p> <ul style="list-style-type: none"> <li>• Use of regular watering once per two hours to reduce dust emissions from all exposed site surfaces with dust emission and unpaved roads, particularly during dry weather;</li> <li>• Side enclosure and covering of any aggregate or dusty material storage piles to reduce emissions. Where this is not practicable owing to frequent usage, watering shall be applied to aggregate fines;</li> <li>• Open stockpiles shall be avoided or covered. Prevent placing dusty material storage piles near ASRs;</li> <li>• Tarpaulin covering of all dusty vehicle loads transported to, from and between site locations;</li> <li>• Establishment and use of vehicle wheel and body washing facilities at the exit points of the site;</li> <li>• Imposition of speed controls for vehicles on unpaved site roads, 8km per hour is the recommended limit;</li> <li>• Routing of vehicles and position of construction plant should be at the maximum possible distance from ASRs;</li> <li>• Every stock of more than 20 bags of cement or dry pulverised fuel ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides;</li> </ul> | To minimise dust impacts                           | All works sites | Contractor           | <p>Air Pollution Control Ordinance (APCO)</p> <p>Air Pollution Control (Construction Dust) Regulation</p> <p>HKAQO</p> <p>Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM)</p> |                       | ✓ |   |

| EIA Reference        | EM&A Manual Reference | Environmental Protection Measures   | Objectives of Measures and Main Concern to Address      | Location        | Implementation Agent | Relevant Standard or Requirement | Implementation Stages |   |   |
|----------------------|-----------------------|---|---|-----------------|----------------------|----------------------------------|-----------------------|---|---|
|                      |                       |   |   |                 |                      |                                  | D                     | C | O |
|                      |                       | <ul style="list-style-type: none"> <li>Cement or dry PFA delivered in bulk should be stored in a closed silo fitted with an audible high-level alarm which is interlocked with the material filling line and no overfilling is allowed; and</li> <li>Loading, unloading, transfer, handling or storage of bulk cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with an effective fabric filter or equivalent air pollution control system.</li> </ul>  |   |                 |                      |                                  |                       |   |   |
| EIA Section 3.5.2.25 | EM&A Section 3.3      | Watering on heavy construction work areas to reduce dust emission by 91.7%. Any potential dust impact and watering mitigation would be subject to the actual site condition.  | To minimise dust impacts                                | All works sites | Contractor           | APCO                             |                       | ✓ |   |
| EIA Section 3.5.4.3  | EM&A Section 3.3      | <p>In addition to the dust control measures mentioned above, the following good site practices are recommended to further control and reduce the emission from the use of non-road mobile machinery from the Project:</p> <ul style="list-style-type: none"> <li>Connect construction plant and equipment to main electricity supply and avoid use of diesel generators and diesel-powered equipment;</li> <li>Avoid usage of exempted NRMMS as far as practicable;</li> <li>Deploy electrified NRMMS and PME as far as practicable;</li> <li>Switch off the engine of PME when idling;</li> <li>Implement regular and proper maintenance for plant and equipment;</li> <li>Employ plant and equipment of adequate size and power output and avoid overloading of the plant;</li> <li>Locate the PME away from sensitive receivers as far as possible; and</li> </ul> | To minimise gaseous and PM emissions from NRMMS and PME | All works sites | Contractor           | APCO                             |                       | ✓ |   |

| EIA Reference                     | EM&A Manual Reference | Environmental Protection Measures  | Objectives of Measures and Main Concern to Address | Location                          | Implementation Agent | Relevant Standard or Requirement             | Implementation Stages |   |   |
|-----------------------------------|-----------------------|--|--|-----------------------------------|----------------------|--|-----------------------|---|---|
|                                   |                       |  |  |                                   |                      |  | D                     | C | O |
|                                   |                       | <ul style="list-style-type: none"> <li>Erect screen to shield the emission source from sensitive receivers where necessary and practicable.</li> </ul>   |  |                                   |                      |  |                       |   |   |
| EIA Section 3.7                   | EM&A Section 3.3      | Implement regular dust monitoring under EM&A programme during the construction phase.  | Monitoring of dust impact                          | Selected dust monitoring stations | Contractor           | EIAO-TM                                      |                       | ✓ |   |
| <b>Noise (Construction Phase)</b> |                       |  |  |                                   |                      |  |                       |   |   |
| EIA Section 4.5.4.2               | EM&A Section 4.2.1    | <p>The following quieter construction methods should be implemented:</p> <ul style="list-style-type: none"> <li>Hydraulic concrete crusher should be used for rock breaking activities during site establishment, instead of traditional hydraulic breaker;</li> <li>Non-explosive chemical expansion agent should be used for concrete breaking activities during site establishment, instead of traditional hydraulic breaker;</li> <li>Self-compacting concrete will be used for concreting works, instead of traditional vibratory poker;</li> <li>Silent piling by Press-in Method (Press-in piling) will be used for sheet piling works, instead of traditional massive augering and piling machines.</li> </ul> | To minimise construction noise impact              | All works sites                   | Contractor           | EIAO-TM<br><br>Noise Control Ordinance (NCO) |                       | ✓ |   |
| EIA Section 4.5.4.3               | EM&A Section 4.2.1    | Use of quieter Powered Mechanical Equipment is recommended to reduce the noise impact (See Table 4.8 of EIA).  | To minimise construction noise impact              | All works sites                   | Contractor           | EIAO-TM<br><br>NCO                           |                       | ✓ |   |
| EIA Section 4.5.4.4               | EM&A Section 4.2.1    | Noise barrier shall be placed as close to the PME as possible and a location intercepting the line of sight between the NSRs and PME. The barrier material shall have a surface density of at least 10 kg/m <sup>2</sup> with internal sound absorptive material.  | To minimise construction noise impact              | All works sites                   | Contractor           | EIAO-TM<br><br>NCO                           |                       | ✓ |   |
| EIA Section                       | EM&A Section          | Noise enclosure with covers at top and three sides shall be used to enclose the PME and the  | To minimise construction noise                     | All works sites                   | Contractor           | EIAO-TM                                      |                       | ✓ |   |

| EIA Reference        | EM&A Manual Reference | Environmental Protection Measures   | Objectives of Measures and Main Concern to Address | Location        | Implementation Agent | Relevant Standard or Requirement | Implementation Stages |   |   |
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|                      |                       |   |  |                 |                      |                                  | D                     | C | O |
| 4.5.4.5              | 4.2.1                 | open side shall be faced away to the NSRs. The enclosure shall have a surface density of at least 10kg/m <sup>2</sup> with internal sound absorptive material.  | impact   |                 |                      | NCO                              |                       |   |   |
| EIA Section 4.5.4.6  | EM&A Section 4.2.1    | Noise insulating fabric can be adopted for certain PME such as piling machine. The fabric should be lapped such that there would be no openings or gaps on the joints.  | To minimise construction noise impact              | All works sites | Contractor           | EIAO-TM<br>NCO                   |                       | ✓ |   |
| EIA Section 4.5.4.9  | EM&A Section 4.2.1    | Good site practices that can further reduce the noise levels at NSRs. These include: <ul style="list-style-type: none"> <li>• Only well-maintained plant should be operated on-site and plants should be serviced regularly during the construction period;</li> <li>• Mobile plant, if any, should be sited as far from NSRs as possible;</li> <li>• Plant known to emit noise strongly in one direction should, wherever possible, be properly orientated so that the noise is directed away from the nearby NSRs;</li> <li>• Use of site hoarding as a noise barrier to screen noise at low level NSRs;</li> <li>• Machines and plant that may be used intermittently should be shut down between works periods or should be throttled down to a minimum; and</li> <li>• Any material stockpiles and other structures should be effectively utilised, wherever practicable, to screen the noise from on-site construction activities.</li> </ul> | To minimise construction noise impact              | All works sites | Contractor           | EIAO-TM<br>NCO                   |                       | ✓ |   |
| EIA Section 4.5.4.10 | EM&A Section 4.2.2    | Construction Noise Management Plan(s) (CNMP) with reference to Section 8 and Annex 21 of the EIAO-TM should be prepared to submit during pre-tender stage, if any, and before commencement of construction works, so that both the verification of the inventory of noise   | To minimise construction noise impact              | -               | Contractor           | EIAO-TM<br>NCO                   | ✓                     | ✓ |   |

| EIA Reference                             | EM&A Manual Reference    | Environmental Protection Measures   | Objectives of Measures and Main Concern to Address  | Location        | Implementation Agent | Relevant Standard or Requirement                                    | Implementation Stages |   |   |
|---|--------------------------|---|---|-----------------|----------------------|---|-----------------------|---|---|
|   |                          |   |   |                 |                      |   | D                     | C | O |
|   |                          | sources, and the assessment of the effectiveness and practicality of all identified measures for mitigating the construction noise impact of the Project, would be performed during the design, tendering and implementation stage of the construction works. |   |                 |                      |   |                       |   |   |
| <b>Noise (Operation Phase)</b>            |                          |   |   |                 |                      |   |                       |   |   |
| EIA Section 4.8.2.1                       | EM&A Section 4.2.3 & 4.4 | Noise commissioning test of the zero emission vehicles should be carried out prior to operation to verify the Sound Power Level (SWL) of the zero emission vehicles is 100dB(A) or below  | To minimise zero emission vehicles noise impact     | -               | Contractor           | EIAO-TM<br>NCO  |                       |   | ✓ |
| <b>Water Quality (Construction Phase)</b> |                          |   |   |                 |                      |   |                       |   |   |
| EIA Section 5.9.1.1                       | EM&A Section 5.2         | There will be at most 2 piles installed concurrently for the marine facilities. Similarly, there will be at most 2 piles installed concurrently for the marine viaduct.   | To minimize construction phase water quality impact | All works sites | Contractor           | -   |                       | ✓ |   |
| EIA Section 5.9.1.1                       | EM&A Section 5.2         | Silt curtain would be set up to enclose the entire active work area before commencement of piling works for marine facilities and marine viaduct to control sediment dispersion.  | To minimize construction phase water quality impact | All works sites | Contractor           | -   |                       | ✓ |   |
| EIA Section 5.9.1.1                       | EM&A Section 5.2         | All vessels should be well maintained and inspected before use to limit any potential discharges to the marine environment.   | To minimize construction phase water quality impact | All works sites | Contractor           | -   |                       | ✓ |   |
| EIA Section 5.9.1.1                       | EM&A Section 5.2         | All vessels must have a clean ballast system.   | To minimize construction phase water quality impact | All works sites | Contractor           | -   |                       | ✓ |   |
| EIA Section 5.9.1.1                       | EM&A Section 5.2         | All vessels shall be sized such that adequate clearance is maintained between vessels and the sea bed at all states of the tide to ensure that undue turbidity is not generated by turbulence   | To minimize construction phase water quality impact | All works sites | Contractor           | Professional Persons Environmental Consultative Committee (ProPECC) |                       | ✓ |   |

| EIA Reference       | EM&A Manual Reference | Environmental Protection Measures   | Objectives of Measures and Main Concern to Address  | Location        | Implementation Agent | Relevant Standard or Requirement | Implementation Stages |   |   |
|---------------------|-----------------------|---|---|-----------------|----------------------|----------------------------------|-----------------------|---|---|
|                     |                       |   |   |                 |                      |                                  | D                     | C | O |
|                     |                       | from vessel movement or propeller wash.   |   |                 |                      | Practice Note (PN) 1/94          |                       |   |   |
| EIA Section 5.9.1.1 | EM&A Section 5.2      | Marine works shall not cause foam, oil, grease, litter or other objectionable matter to be present in the water within and adjacent to the works site.  | To minimize construction phase water quality impact | All works sites | Contractor           | ProPECC PN1/94                   |                       | ✓ |   |
| EIA Section 5.9.1.1 | EM&A Section 5.2      | Wastewater from potentially contaminated area on working vessels should be minimized and collected. These kinds of wastewater should be brought back to port and discharged at appropriate collection and treatment system.   | To minimize construction phase water quality impact | All works sites | Contractor           | ProPECC PN1/94                   |                       | ✓ |   |
| EIA Section 5.9.1.1 | EM&A Section 5.2      | No solid waste is allowed to be disposed overboard.   | To minimize construction phase water quality impact | All works sites | Contractor           | -                                |                       | ✓ |   |
| EIA Section 5.9.1.1 | EM&A Section 5.2      | Best Management Practices (BMPs) of mitigation measures in controlling water pollution and good site management, as specified in the ProPECC PN 1/94 "Construction Site Drainage" are followed, where applicable, to prevent runoff with high level of SS from entering the surrounding waters. | To minimize construction phase water quality impact | All works sites | Contractor           | ProPECC PN1/94                   |                       | ✓ |   |
| EIA Section 5.9.1.1 | EM&A Section 5.2      | At the start of site establishment, perimeter cut-off drains to direct off-site water around the site should be constructed with internal drainage works. Channels, earth bunds or sand bag barriers should be provided on site to direct stormwater to silt removal facilities.                | To minimize construction phase water quality impact | All works sites | Contractor           | -                                |                       | ✓ |   |
| EIA Section 5.9.1.1 | EM&A Section 5.2      | Diversion of natural stormwater should be provided as far as possible. The design of temporary on-site drainage should prevent runoff going through site surface, construction  | To minimize construction phase water quality impact | All works sites | Contractor           | -                                |                       | ✓ |   |

| EIA Reference       | EM&A Manual Reference | Environmental Protection Measures   | Objectives of Measures and Main Concern to Address  | Location        | Implementation Agent | Relevant Standard or Requirement | Implementation Stages |   |   |
|---------------------|-----------------------|---|---|-----------------|----------------------|----------------------------------|-----------------------|---|---|
|                     |                       |   |   |                 |                      |                                  | D                     | C | O |
|                     |                       | machinery and equipment in order to avoid or minimize polluted runoff. Sedimentation tanks with sufficient capacity, constructed from pre-formed individual cells of approximately 6 to 8 m <sup>3</sup> capacities, are recommended as a general mitigation measure which can be used for settling surface runoff prior to disposal. The system capacity shall be flexible and able to handle multiple inputs from a variety of sources and suited to applications where the influent is pumped. |   |                 |                      |                                  |                       |   |   |
| EIA Section 5.9.1.1 | EM&A Section 5.2      | The dikes or embankments for flood protection should be implemented around the boundaries of earthwork areas. Temporary ditches should be provided to facilitate the runoff discharge into an appropriate watercourse, through a silt/sediment trap. The silt/sediment traps should be incorporated in the permanent drainage channels to enhance deposition rates.   | To minimize construction phase water quality impact | All works sites | Contractor           | -                                |                       | ✓ |   |
| EIA Section 5.9.1.1 | EM&A Section 5.2      | The design of efficient silt removal facilities should be based on the guidelines in Appendix A1 of ProPECC PN 1/94. The detailed design of the sand/silt traps should be undertaken by the Contractor prior to the commencement of construction.   | To minimize construction phase water quality impact | All works sites | Contractor           | ProPECC PN1/94                   |                       | ✓ |   |
| EIA Section 5.9.1.1 | EM&A Section 5.2      | All drainage facilities and erosion and sediment control structures should be regularly inspected and maintained to ensure proper and efficient operation at all times and particularly following rainstorms. Deposited silt and grit should be   | To minimize construction phase water quality impact | All works sites | Contractor           | ProPECC PN1/94                   |                       | ✓ |   |

| EIA Reference       | EM&A Manual Reference | Environmental Protection Measures  | Objectives of Measures and Main Concern to Address  | Location        | Implementation Agent | Relevant Standard or Requirement | Implementation Stages |   |   |
|---------------------|-----------------------|--|---|-----------------|----------------------|----------------------------------|-----------------------|---|---|
|                     |                       |  |   |                 |                      |                                  | D                     | C | O |
|                     |                       | removed regularly and disposed of by spreading evenly over stable, vegetated areas.  |   |                 |                      |                                  |                       |   |   |
| EIA Section 5.9.1.1 | EM&A Section 5.2      | All open stockpiles of construction materials (for example, aggregates, sand and fill material) should be covered with tarpaulin or similar fabric during rainstorms. Measures should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system.   | To minimize construction phase water quality impact | All works sites | Contractor           | ProPECC PN1/94                   |                       | ✓ |   |
| EIA Section 5.9.1.1 | EM&A Section 5.2      | Manholes (including newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris being washed into the drainage system and storm runoff being directed into foul sewers.   | To minimize construction phase water quality impact | All works sites | Contractor           | ProPECC PN1/94                   |                       | ✓ |   |
| EIA Section 5.9.1.1 | EM&A Section 5.2      | Precautions to be taken at any time of year when rainstorms are likely, actions to be taken when a rainstorm is imminent or forecasted, and actions to be taken during or after rainstorms are summarized in Appendix A2 of ProPECC PN 1/94.   | To minimize construction phase water quality impact | All works sites | Contractor           | ProPECC PN1/94                   |                       | ✓ |   |
| EIA Section 5.9.1.1 | EM&A Section 5.2      | All vehicles and plant should be cleaned before leaving a construction site to ensure no earth, mud, debris and the like is deposited by them on roads. An adequately designed and sited wheel washing facilities should be provided at every construction site exit where practicable. Wash-water should have sand and silt settled out and removed at least on a weekly basis to ensure the continued efficiency of the process. The section | To minimize construction phase water quality impact | All works sites | Contractor           | ProPECC PN1/94                   |                       | ✓ |   |



| EIA Reference        | EM&A Manual Reference | Environmental Protection Measures   | Objectives of Measures and Main Concern to Address  | Location  | Implementation Agent | Relevant Standard or Requirement | Implementation Stages |   |   |
|----------------------|-----------------------|---|---|---|----------------------|----------------------------------|-----------------------|---|---|
|                      |                       |   |   |   |                      |                                  | D                     | C | O |
|                      |                       | of access road leading to, and exiting from, the wheel-wash bay to the public road should be paved with sufficient backfall toward the wheel-wash bay to prevent vehicle tracking of soil and silty water to public roads and drains.   |   |   |                      |                                  |                       |   |   |
| EIA Section 5.9.1.1  | EM&A Section 5.2      | Construction solid waste, debris and rubbish on site should be collected, handled and disposed of properly to avoid water quality impacts.  | To minimize construction phase water quality impact | All works sites   | Contractor           | EIAO-TM                          |                       | ✓ |   |
| EIA Section 5.9.1.1  | EM&A Section 5.2      | Appropriate numbers of chemical toilets will be provided by a licensed contractor to serve the construction workers over the construction sites to prevent direct disposal of sewage into the water environment. No onsite discharge from these chemical toilets will be allowed. | To minimize construction phase water quality impact | All works sites   | Contractor           | -                                |                       | ✓ |   |
| EIA Section 5.9.1.1  | EM&A Section 5.2      | All fuel tanks and storage areas should be provided with locks and sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank to prevent spilled fuel oils from reaching water sensitive receivers nearby.                       | To minimize construction phase water quality impact | All works sites   | Contractor           | EIAO-TM                          |                       | ✓ |   |
| EIA Section 5.9.1.1  | EM&A Section 5.2      | The contractors shall ensure that leakages or spillages are contained and cleaned up immediately.   | To minimize construction phase water quality impact | All works sites   | Contractor           | -                                |                       | ✓ |   |
| EIA Section 5.12.1.1 | EM&A Section 5.7.7    | During the marine construction period, impact monitoring should be undertaken 3 days per week, at mid-flood and mid-ebb tides, with sampling/measurement at all designated monitoring stations including control station as specified in EM&A Manual Table 5.1 and Table          | To minimize construction phase water quality impact | Proposed marine facilities and marine viaduct between Airport Island and Tung Chung Town Centre | Contractor           | EIAO-TM                          |                       | ✓ |   |

| EIA Reference                            | EM&A Manual Reference | Environmental Protection Measures   | Objectives of Measures and Main Concern to Address | Location                   | Implementation Agent                | Relevant Standard or Requirement         | Implementation Stages |   |   |
|--|-----------------------|---|--|----------------------------|-------------------------------------|--|-----------------------|---|---|
|  |                       |   |  |                            |                                     |  | D                     | C | O |
|  |                       | 5.2.  |  |                            |                                     |  |                       |   |   |
| <b>Water Quality (Operational Phase)</b> |                       |   |  |                            |                                     |  |                       |   |   |
| EIA Section 5.12.1.1                     | EM&A Section 5.7.12   | Upon completion of all construction phase marine works, post construction phase monitoring should be carried out for 4 weeks in the same manner as the impact monitoring.   | To minimize operational phase water quality impact | Proposed marine facilities | Project Proponent / Contractor      | Water Pollution Control Ordinance (WPCO) |                       |   | ✓ |
| EIA Section 5.12.1.1                     | EM&A Section 5.7.12   | During the maintenance dredging period, impact monitoring should be undertaken 3 days per week, at mid-flood and mid-ebb tides, with sampling/measurement at all designated monitoring stations including control station as specified in EM&A Manual Table 5.2.  | To minimize operational phase water quality impact | Proposed marine facilities | Project Proponent / Contractor      | Water Pollution Control Ordinance (WPCO) |                       |   | ✓ |
| EIA Section 5.9.2.1                      | EM&A Section 5.2      | Cage type silt curtain will be provided during maintenance dredging. The maximum working rate for maintenance dredging is assumed to be 40m <sup>3</sup> per hour and only one closed grab dredger will be working in any time.   | To minimize operational phase water quality impact | Proposed marine facilities | Project Proponent / Future operator | WPCO                                     |                       |   | ✓ |
| EIA Section 5.9.2.2                      | EM&A Section 5.2      | Local connections to the public sewer would be installed and no direct discharge of sewage and wastewater to the nearby drainage system and marine waters would be allowed. Regular cleaning and removal of floating refuse should be conducted within the area of the marine facilities and coastal area around the Project to avoid excessive accumulation. | To minimize operational phase water quality impact | Proposed marine facilities | Project Proponent / Future operator | WPCO                                     |                       |   | ✓ |
| EIA Section 5.9.2.2                      | EM&A Section 5.2      | Also, any new drainage outfall(s) under this Project will be located outside of the marine facilities.  | To minimize operational phase water quality impact | Proposed marine facilities | Project Proponent / Future operator | WPCO                                     |                       |   | ✓ |

| EIA Reference                                | EM&A Manual Reference | Environmental Protection Measures  | Objectives of Measures and Main Concern to Address  | Location                   | Implementation Agent                | Relevant Standard or Requirement  | Implementation Stages |   |   |
|--|-----------------------|--|---|----------------------------|-------------------------------------|---|-----------------------|---|---|
|  |                       |  |   |                            |                                     |   | D                     | C | O |
| EIA Section 5.9.2.3                          | EM&A Section 5.2      | Spillage clean up equipment should be provided at the marine facilities to allow quick response in case of emergency.  | To minimize operational phase water quality impact  | Proposed marine facilities | Project Proponent / Future operator | WPCO  |                       |   | ✓ |
| EIA Section 5.9.2.4                          | EM&A Section 5.2      | A surface water drainage system of the ATCL should be provided to collect road runoff to the new drainage system with new storm water outfall and adequate designed pollution removal devices such as silt trap and, as necessary, oil/grease trap, which should be regularly cleaned and maintained to ensure proper functioning.   | To minimize operational phase water quality impact  | Proposed marine facilities | Project Proponent / Future operator | WPCO  | ✓                     |   | ✓ |
| <b>Waste Management (Construction Phase)</b> |                       |  |   |                            |                                     |   |                       |   |   |
| EIA Section 6.5.1.2                          | EM&A Section 6.2      | <p><u>Good Site Practices</u></p> <ul style="list-style-type: none"> <li>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;</li> <li>Training of site personnel in site cleanliness, appropriate waste management procedures and concepts of waste reduction, reuse and recycling;</li> <li>Provision of sufficient waste disposal points and regular collection for disposal;</li> <li>Appropriate measures to minimize windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers;</li> <li>Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors;</li> <li>Provision of wheel washing facilities at site exit before the trucks leave the works areas to minimize dust disturbance due to the trucks</li> </ul> | Good site practice to minimize the waste generation and recycle the C&D materials as far as practicable so as to reduce the amount for final disposal | All works sites            | Contractor                          | EIAO-TM<br><br>Waste Disposal Ordinance (WDO)<br><br>DEVB TC(W) No. 6/2010<br><br>PNAP ADV-19 |                       | ✓ |   |

| EIA Reference                  | EM&A Manual Reference | Environmental Protection Measures  | Objectives of Measures and Main Concern to Address  | Location        | Implementation Agent | Relevant Standard or Requirement                        | Implementation Stages |   |   |
|--------------------------------|-----------------------|--|---|-----------------|----------------------|---|-----------------------|---|---|
|                                |                       |  |   |                 |                      |   | D                     | C | O |
|                                |                       | transportation to the public road network; and <ul style="list-style-type: none"> <li>The Contractor should prepare a Waste Management Plan (WMP) as part of the Environmental Management Plan (EMP) in accordance with the PNAP ADV-19. The WMP should be submitted to the Project Manager/ Representatives of project proponent for approval. Mitigation measures proposed in the EIA Report and the EM&amp;A Manual should be adopted.</li> </ul>   |   |                 |                      |   |                       |   |   |
| EIA Section 6.5.1.3            | EM&A Section 6.2      | <u>Waste Reduction Measures</u> <ul style="list-style-type: none"> <li>Segregate and store different types of waste in different containers, skip or stockpiles to enhance reuse or recycling of materials and their proper disposal.</li> <li>Proper storage and good site practices to minimize the potential contamination of construction materials.</li> <li>Plan and stock construction materials carefully to minimize amount of waste generated and avoid unnecessary generation of waste.</li> <li>Provide training to workers on the importance of appropriate waste management procedures, including waste reduction, reuse and recycling.</li> </ul> | Segregation to minimise waste generation during construction  | All works sites | Contractor           | EIAO-TM<br><br>WDO                                      |                       | ✓ |   |
| EIA Sections 6.5.1.4 – 6.5.1.5 | EM&A Section 6.2      | <u>Storage, Collection and Transportation of Waste</u> <ul style="list-style-type: none"> <li>Non-inert C&amp;D materials such as top soil should be handled and stored well to ensure secure containment of the materials.</li> <li>Stockpiling area/ temporary stockpiling area should be provided with covers and water spraying system to prevent materials from wind-blown or being washed away.</li> </ul>   | Proper storage, collection and transportation of wastes to minimize the environmental impacts on site and at the transportation route | All works sites | Contractor           | WDO<br><br>PNAP ADV-19<br><br>EIAO-TM<br><br>DEVB TC(W) |                       | ✓ |   |

| EIA Reference                  | EM&A Manual Reference | Environmental Protection Measures   | Objectives of Measures and Main Concern to Address  | Location        | Implementation Agent | Relevant Standard or Requirement        | Implementation Stages |   |   |
|--------------------------------|-----------------------|---|---|-----------------|----------------------|---|-----------------------|---|---|
|                                |                       |   |   |                 |                      |   | D                     | C | O |
|                                |                       | <ul style="list-style-type: none"> <li>Different locations should be designated to stockpile each material to enhance reuse.</li> <li>Remove waste in timely manner.</li> <li>Employ the trucks with cover or enclosed containers for waste transportation.</li> <li>Obtain relevant waste disposal permits from the appropriate authorities.</li> <li>Disposal of waste should be done at licensed waste disposal facilities.</li> <li>In order to monitor the disposal of C&amp;D materials at PFRFs and landfills and to control fly-tipping, a trip-ticket system should be established in accordance with DEVB TCW No. 6/2010. A recording system for the amount of waste generated, recycled and disposed, including the disposal sites, should also be set up. Warning signs should be put up to remind the designated disposal sites. CCTV should be installed at the vehicular entrance and exit of the site as additional measures to prevent fly-tipping.</li> </ul> |   |                 |                      | No. 6/2010                              |                       |   |   |
| EIA Sections 6.5.1.7 - 6.5.1.9 | EM&A Section 6.2      | <u>C&amp;D Material</u> <ul style="list-style-type: none"> <li>Carry out on-site sorting;</li> <li>Make provisions in the Contract documents to allow and promote the use of recycled aggregates where appropriate.</li> <li>Implement a trip-ticket system for each works contract in accordance with DEVB TCW No. 06/2010 to ensure that the disposal of C&amp;D</li> </ul>   | Segregation to minimise cross contamination and minimise waste generation during construction | All works sites | Contractor           | EIAO-TM<br><br>DEVB TC(W)<br>No. 6/2010 |                       | ✓ |   |

| EIA Reference | EM&A Manual Reference | Environmental Protection Measures  | Objectives of Measures and Main Concern to Address | Location | Implementation Agent | Relevant Standard or Requirement | Implementation Stages |   |   |
|---------------|-----------------------|--|--|----------|----------------------|----------------------------------|-----------------------|---|---|
|               |                       |  |  |          |                      |                                  | D                     | C | O |
|               |                       | <p>materials is properly documented.</p> <ul style="list-style-type: none"> <li>All dump trucks carrying inert C&amp;D materials to the designated locations shall equipped with GPS or equivalent devices so that the travel routes and parking locations can be tracked and monitored. A real-time GPS tracking system connecting to the internet or intranet will allow efficient tracking and monitoring to avoid illegal dumping or landfilling of C&amp;D materials. The data collected by GPS or equivalent system should be recorded properly for checking by Environmental Team (ET) and Independent Environmental Checker (IEC) regularly.</li> </ul> <p><i>On-site Sorting of C&amp;D Materials</i></p> <ul style="list-style-type: none"> <li>Storage areas should be located within the site during construction phase for temporary storage of inert C&amp;D materials.</li> <li>All C&amp;D materials arising from the construction would be sorted on-site to recover the inert C&amp;D materials and reusable and recyclable materials prior to disposal off-site as far as practicable. Non-inert portion of C&amp;D materials should also be reused whenever possible and be disposal of at landfills as a last resort.</li> <li>The Contractor would be responsible for on-site sorting of C&amp;D materials and promptly remove all sorted and processed material arising from the construction activities to minimize temporary stockpiling on-site.</li> </ul> <p><i>Reuse of C&amp;D Materials</i></p> <ul style="list-style-type: none"> <li>Reuse suitable inert C&amp;D materials on-site as</li> </ul> |  |          |                      |                                  |                       |   |   |

| EIA Reference                 | EM&A Manual Reference | Environmental Protection Measures   | Objectives of Measures and Main Concern to Address | Location                         | Implementation Agent | Relevant Standard or Requirement | Implementation Stages |   |   |
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|                               |                       |   |  |                                  |                      |                                  | D                     | C | O |
|                               |                       | <p>far as practicable.</p> <ul style="list-style-type: none"> <li>Reuse suitable excavated rock by reworking at approved quarries (e.g. Crushed as aggregates).</li> <li>Sorting of demolition debris and excavated materials from demolition works to recover reusable/ recyclable portions (e.g. Soil, broken concrete, metal).</li> <li>Protect recyclable material to keep it in usable condition.</li> </ul>   |  |                                  |                      |                                  |                       |   |   |
| EIA Section 6.5.1.10-6.5.1.13 | EM&A Section 6.2      | <p><u>Land-based and Marine-based Sediment</u></p> <ul style="list-style-type: none"> <li>Excavated marine sediment should be reused as far as possible within the Project Site before considering disposal. Subject to availability of suitable location and review on the backfilling method, part or all of the marine sediment would be reused on site. Possible methods for the reuse of marine sediment on site including the reuse as backfilling materials after mixing with cement should be explored. The criteria for reuse of treated sediments are proposed with reference to the Unconfined Compressive Strength (UCS) and the Universal Treatment Standards (UTS), which specify the Toxicity Characteristics Leaching Procedure (TCLP) test limits as given in Section 4.1 and Table 4.6 of the Practice Guide for Investigation and Remediation of Contaminated Land. A pilot trial will be carried out for the concerned sediments in order to confirm the treatment options. The following mitigation measures shall be adopted to minimise the potential</li> </ul> | Handling excavated sediment                        | All works sites where applicable | Contractor           | DASO<br><br>PNAP ADV-21          |                       | ✓ |   |

| EIA Reference | EM&A Manual Reference | Environmental Protection Measures   | Objectives of Measures and Main Concern to Address | Location | Implementation Agent | Relevant Standard or Requirement | Implementation Stages |   |   |
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|               |                       |   |  |          |                      |                                  | D                     | C | O |
|               |                       | <p>environmental impacts:</p> <ul style="list-style-type: none"> <li>• Cement mixing process should be enclosed to minimize odour/ dust emissions.</li> <li>• Loading, unloading, handling, transferring and storing for treated and untreated sediment should be carried out in a good site practices that prevents or minimizes dust emissions.</li> <li>• An impermeable surfacing shall be placed under the mixing areas and a cover should be employed to prevent dust emission and possible cross contamination.</li> <li>• Good housekeeping should be maintained at the mixing and treatment area.</li> <li>• Treated and untreated sediment should be clearly separated and stored separately.</li> <li>• Surface runoff from the mixing and treatment area should be properly collected and stored separately, and then properly treated to levels in compliance with the relevant effluent standards as required by the Water Pollution Control Ordinance before final discharge.</li> <li>• Prior to the cement mixing operation, safety training and environmental training should be provided to all related site staff and workers.</li> </ul> |  |          |                      |                                  |                       |   |   |



| EIA Reference | EM&A Manual Reference | Environmental Protection Measures  | Objectives of Measures and Main Concern to Address | Location | Implementation Agent | Relevant Standard or Requirement | Implementation Stages |   |   |
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|               |                       |  |  |          |                      |                                  | D                     | C | O |
|               |                       | <ul style="list-style-type: none"> <li>For the Cement S/S works, at least one safety officer shall be provided by the Main Contractor to identify possible hazards and ensure the implementation of all relevant safety measures.</li> <li>Skilled and qualified personnel should be employed to carry out the work and the plant operator must obtain valid certificate to complete the job. The safety officer must ensure that sufficient trainings will be provided to all workers with respect to the safety awareness and safety precaution of work.</li> <li>Backhoe / Excavator should be examined by Registered Professional Engineer according to statutory requirements before use. Only the plant operators with valid qualified certificates should be allowed to operate the relevant plants</li> <li>All workers in site area should wear appropriate personal protective equipment, such as safety helmet, safety shoes, gloves, goggles and protective coveralls (if necessary). No person should approach to the backhoe / excavator during their operation.</li> <li>Workers, vehicles, instruments, and equipment in touch with the marine sediment will be properly decontaminated by cleaned with non-phosphate detergent and rinsed with distilled water between each excavation and sampling event and before leaving</li> </ul> |  |          |                      |                                  |                       |   |   |

| EIA Reference | EM&A Manual Reference | Environmental Protection Measures   | Objectives of Measures and Main Concern to Address | Location | Implementation Agent | Relevant Standard or Requirement | Implementation Stages |   |   |
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|               |                       |   |  |          |                      |                                  | D                     | C | O |
|               |                       | <p>the site.</p> <ul style="list-style-type: none"> <li>The excavated area should be vacated and fenced off and adequate warning signs should be displayed.</li> <li>Excavation works should be done within short period of time. No excavation should be held during the rainy days to avoid the migration of contaminants on site.</li> <li>Smoking, eating or drinking during activities with exposure to the contaminated materials should be prohibited.</li> <li>Marine disposal option for the marine sediment should only be considered as the last resort upon exhaustion of reuse options. In case off-site disposal is unavoidable, the below mitigation measures shall be adopted to handle the sediment: <ul style="list-style-type: none"> <li>All construction plant and equipment shall be designed and maintained to minimise the risk of sediments being released into the water column or deposited in the locations other than designated location.</li> <li>All vessels should be sized so that adequate clearance is maintained between vessels and the seabed in all tide conditions, to minimise that undue turbidity is not generated by turbulence from vessel movement or propeller wash.</li> </ul> </li> <li>Adequate freeboard shall be maintained</li> </ul> |  |          |                      |                                  |                       |   |   |

| EIA Reference         | EM&A Manual Reference | Environmental Protection Measures   | Objectives of Measures and Main Concern to Address    | Location        | Implementation Agent | Relevant Standard or Requirement         | Implementation Stages |   |   |
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|                       |                       |   |   |                 |                      |  | D                     | C | O |
|                       |                       | <p>on barges to ensure that decks are not washed by wave action.</p> <ul style="list-style-type: none"> <li>All marine sediments shall be transported to the designated location by water-tight containers and dump trucks with tarpaulin cover.</li> <li>The requirements and procedures for dredged/excavated sediment specified under the PNAP ADV-21 should be followed. The Contractor must ensure that all the necessary waste disposal and marine dumping permits or licences are obtained prior to the commencement of the construction works.</li> <li>All dumping vessels have to be approved in a marine dumping permit issued under the DASO. Each of the vessels has to be installed with an automatic recording equipment, namely the Front End Mobile Unit (FEMU), which is a key component of the Real Time Tracking &amp; Monitoring of Vessel (RTTMV) System of EPD. The FEMU transmits self-monitoring data direct from the barge at sea to the Control Centre at EPD through GPRS mobile communication network. The transportation route avoiding the ecological sensitive areas shall be proposed when applying the dumping permit.</li> </ul> |   |                 |                      |  |                       |   |   |
| EIA Sections 6.5.1.14 | EM&A Section 6.2      | <p><u>Chemical Wastes</u></p> <ul style="list-style-type: none"> <li>For those processes which generated chemical waste, it may be possible to find</li> </ul>  | Control the chemical waste and ensure proper storage, | All works sites | Contractor           | Waste Disposal ((Chemical Waste)General) |                       | ✓ |   |

| EIA Reference   | EM&A Manual Reference | Environmental Protection Measures  | Objectives of Measures and Main Concern to Address | Location | Implementation Agent | Relevant Standard or Requirement   | Implementation Stages |   |   |
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|                 |                       |  |  |          |                      |  | D                     | C | O |
| and<br>6.5.1.15 |                       | <p>alternatives to eliminate the use of chemicals, to reduce the generation quantities or to select a chemical type of less impact on environment, health and safety as far as possible. Wherever possible, opportunities for the reuse and recycling of materials will be taken.</p> <ul style="list-style-type: none"> <li>The Contractor shall register as Chemical Waste Producers with the EPD. Chemical waste should be handled in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes as follows: <ul style="list-style-type: none"> <li>The containers used for storing chemical waste should be suitable for the substance to be held, resistant to corrosion, maintained in good conditions and securely closed;</li> <li>The containers should have a capacity of &lt;450L unless the specifications have been approved by the EPD;</li> <li>The label on the containers should be clearly labelled in English and Chinese and comply with the requirements prescribed in Schedule 2 of Waste Disposal (Chemical Waste) (General) Regulation;</li> <li>The storage area for the chemical waste should be used solely for the storage of chemical wastes;</li> <li>The storage area should be enclosed on at least three sides by a wall, partition or fence with a height of not less than two</li> </ul> </li> </ul> | handling and disposal                              |          |                      | <p>Regulation</p> <p>Code of Practice on the Packaging, Labeling and Storage of Chemical Waste</p> |                       |   |   |

| EIA Reference | EM&A Manual Reference | Environmental Protection Measures   | Objectives of Measures and Main Concern to Address | Location | Implementation Agent | Relevant Standard or Requirement | Implementation Stages |   |   |
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|               |                       |   |  |          |                      |                                  | D                     | C | O |
|               |                       | <p>metres or the total height of containers in stack, whichever is less;</p> <ul style="list-style-type: none"> <li>Where containers of liquid chemical wastes are stored, the area should be designed with impermeable floor and provided with a bund with capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in the area, whichever is greatest;</li> <li>Adequate ventilation should be allowed in the storage area by leaving some space between the top of the enclosure walls and the ceiling, or provision of louvers on the sides of the enclosure walls;</li> <li>The storage area should be sufficiently covered to prevent rainfall entering (water collected within the bund must be tested and disposed of as chemical waste, if necessary);</li> <li>Separate containers should be used for packing different types of waste or waste arising from different sources and process to minimise mixing of incompatible materials;</li> <li>Drip tray should be provided to chemical waste containers. The drip tray should be clean up regularly. Clean up should be done before foreseeable inclement weather such as typhoon or heavy rain; and</li> <li>Waste oils, chemicals or solvents shall</li> </ul> |  |          |                      |                                  |                       |   |   |

| EIA Reference                      | EM&A Manual Reference | Environmental Protection Measures  | Objectives of Measures and Main Concern to Address                                 | Location        | Implementation Agent | Relevant Standard or Requirement  | Implementation Stages |   |   |
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|                                    |                       |  |  |                 |                      |   | D                     | C | O |
|                                    |                       | not be disposed of to drain.   |  |                 |                      |   |                       |   |   |
| EIA Sections 6.5.1.16 and 6.5.1.17 | EM&A Section 6.2      | <p><u>General Refuse</u></p> <ul style="list-style-type: none"> <li>General refuse should be stored in enclosed bins or compaction units separately from C&amp;D materials/ wastes and chemical wastes. Sufficient bins shall be provided for storage of general refuse as required under the Public Cleansing and Prevention of Nuisances Regulation.</li> <li>Recycling bins should also be placed to encourage recycling.</li> <li>Preferably enclosed and covered areas should be provided for general refuse collection and routine cleaning for these areas should also be implemented to keep areas clean.</li> <li>A reputable waste collector should be employed to remove general refuse on a regular basis and shall be disposed of to the nearest landfill or refuse transfer station. Burning of refuse on construction sites is prohibited. Disposal of general refuse is recommended before foreseeable inclement weather such as typhoon or heavy rain.</li> <li>Segregation and storage of different types of waste should be promoted to facilitate the reuse and recycling of the materials. Separately labelled bins for the deposition of aluminum cans, paper and plastic bottles etc. Should be provided as far as practicable. Arrangements should be made with the recycling companies to collect the recycle waste as required.</li> </ul> | Minimize production of the general refuse and avoid odour, pest and litter impacts | All works sites | Contractor           | EIAO-TM<br><br>Public Cleansing and Prevention of Nuisances Regulation (Cap. 132BK) |                       | ✓ |   |

| EIA Reference                               | EM&A Manual Reference | Environmental Protection Measures   | Objectives of Measures and Main Concern to Address                                  | Location        | Implementation Agent                | Relevant Standard or Requirement  | Implementation Stages |   |   |
|---|-----------------------|---|---|-----------------|-------------------------------------|---|-----------------------|---|---|
|   |                       |   |   |                 |                                     |   | D                     | C | O |
|   |                       | <ul style="list-style-type: none"> <li>Implement an education programme for workers relating to avoiding, reducing, reusing and recycling general waste. Participation in a local collection scheme should be considered by the Contractor to facilitate waste reduction.</li> </ul>  |   |                 |                                     |   |                       |   |   |
| EIA Section 6.5.1.18                        | EM&A Section 6.2      | <p><u>Floating Refuse</u></p> <ul style="list-style-type: none"> <li>Tool-box training shall be provided to site workers to ensure proper site waste management and good site practice are implemented.</li> <li>Weekly inspection shall also be carried out to ensure no floating refuse is found within the Project Area.</li> <li>If any floating refuse is accidentally trapped in the marine waters within the Project Area, it will be collected by the Contractor and recycled as far as possible, the remaining waste will be disposed of as general refuse.</li> </ul> | Minimize production of the floating refuse and avoid odour, pest and litter impacts | All works sites | Contractor                          | WDO<br><br>Public Cleansing and Prevention of Nuisances Regulation (Cap. 132BK) |                       | ✓ |   |
| <b>Waste Management (Operational Phase)</b> |                       |   |   |                 |                                     |   |                       |   |   |
| EIA Section 6.5.2.1                         | EM&A Section 6.2      | <p><u>Municipal Solid Waste (MSW)</u></p> <ul style="list-style-type: none"> <li>Designated areas will be assigned for proper storage and collection of MSW generated on site.</li> <li>Clearly labelled recycling bins at designated locations which could be accessed conveniently should be provided.</li> <li>A reputable waste collector should be employed to remove MSW regularly.</li> </ul>  | Minimize production of the MSW and ensure proper storage, handling and disposal     | All works sites | Project Proponent / Future operator | WDO<br><br>Public Cleansing and Prevention of Nuisances Regulation (Cap. 132BK) |                       |   | ✓ |
| EIA Section                                 | EM&A Section 6.2      | <p><u>Chemical Waste</u></p>  | Control the chemical waste and ensure   | All works sites | Project Proponent /                 | Waste Disposal ((Chemical   |                       |   | ✓ |

| EIA Reference       | EM&A Manual Reference | Environmental Protection Measures  | Objectives of Measures and Main Concern to Address                                  | Location        | Implementation Agent                | Relevant Standard or Requirement   | Implementation Stages |   |   |
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|                     |                       |  |   |                 |                                     |  | D                     | C | O |
| 6.5.2.2-6.5.2.3     |                       | <ul style="list-style-type: none"> <li>If chemical waste is produced, AAHK or its operator(s) would be required to register with the EPD as a Chemical Waste Producer(s).</li> <li>The guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes should be followed in handling of chemical waste.</li> <li>Appropriate containers with proper labels should be used for storage of chemical wastes.</li> <li>Chemical wastes should be collected and delivered to designated outlet by a licensed chemical waste collector.</li> <li>Chemical waste shall be disposed of at appropriate facility such as the CWTC by licensed collectors.</li> <li>Prepare an Emergency Response Plan (ERP) to prevent and handle chemical spillages caused by the operations of depot during the operational stage. The ERP shall include the spill prevention and precaution, responses action and procedures for spill clean up and disposal. If any spillage occurs, AAHK or its operator(s) shall Inform Environmental Protection Department, Fire Services Department and Police in the case where the spillage of chemicals would cause serious contamination of an area or risk of pollution.</li> </ul> | proper storage, handling and disposal   |                 | Future operator                     | Waste)General) Regulation<br><br>Code of Practice on the Packaging, Labeling and Storage of Chemical Waste |                       |   |   |
| EIA Section 6.5.2.5 | EM&A Section 6.2      | <u>Floating Refuse</u> <ul style="list-style-type: none"> <li>Adequate rubbish bins shall be provided at marine facilities and ATCL.</li> <li>Regular inspection and collection of floating</li> </ul>   | Minimize production of the floating refuse and avoid odour, pest and litter impacts | All works sites | Project Proponent / Future operator | WDO<br><br>Public Cleansing and  |                       |   | ✓ |



| EIA Reference                 | EM&A Manual Reference | Environmental Protection Measures  | Objectives of Measures and Main Concern to Address | Location          | Implementation Agent                | Relevant Standard or Requirement                | Implementation Stages |   |   |
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|                               |                       |  |  |                   |                                     |   | D                     | C | O |
|                               |                       | <p>refuse should be carried out.</p> <ul style="list-style-type: none"> <li>If any floating refuse is found within the Project area, it will be collected and recycled as far as possible, the remaining waste will be disposed of as general refuse.</li> </ul>   |  |                   |                                     | Prevention of Nuisances Regulation (Cap. 132BK) |                       |   |   |
| EIA Section 6.5.2.6 – 6.5.2.7 | EM&A Section 6.2      | <p><u>Marine-based Sediment during Maintenance Dredging</u></p> <p>The below mitigation measures shall be adopted to handle the sediments:</p> <ul style="list-style-type: none"> <li>All construction plant and equipment shall be designed and maintained to minimise the risk of sediments being released into the water column or deposited in the locations other than designated location.</li> <li>All vessels should be sized so that adequate clearance is maintained between vessels and the seabed in all tide conditions, to minimise that undue turbidity is not generated by turbulence from vessel movement or propeller wash.</li> <li>Adequate freeboard shall be maintained on barges to ensure that decks are not washed by wave action.</li> <li>All marine sediments shall be transported to the designated location by water-tight containers and dump trucks with tarpaulin cover.</li> <li>The requirements and procedures for dredged/excavated sediment specified under the PNAP ADV-21 should be followed. The Contractor must ensure that all the necessary waste disposal and marine dumping permits</li> </ul> | Handling excavated sediment                        | Marine Facilities | Project Proponent / Future operator | DASO<br>PNAP ADV-21                             |                       |   | ✓ |

| EIA Reference       | EM&A Manual Reference | Environmental Protection Measures   | Objectives of Measures and Main Concern to Address                     | Location  | Implementation Agent           | Relevant Standard or Requirement | Implementation Stages |   |   |
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|                     |                       |   |  |   |                                |                                  | D                     | C | O |
|                     |                       | <p>or licences are obtained prior to the commencement of the construction works.</p> <ul style="list-style-type: none"> <li>All dumping vessels have to be approved in a marine dumping permit issued under the DASO. Each of the vessels has to be installed with an automatic recording equipment, namely the Front End Mobile Unit (FEMU), which is a key component of the Real Time Tracking &amp; Monitoring of Vessel (RTTMV) System of EPD. The FEMU transmits self-monitoring data direct from the barge at sea to the Control Centre at EPD through GPRS mobile communication network. The transportation route avoiding the ecological sensitive areas shall be proposed when applying the dumping permit.</li> </ul> |  |   |                                |                                  |                       |   |   |
| <b>Ecology</b>      |                       |   |  |   |                                |                                  |                       |   |   |
| EIA Section 7.9.1.2 | EM&A Section 7.2      | The mitigation measures designed to mitigate indirect disturbances to surrounding habitats and associated wildlife.   | To minimise construction phase ecological impacts                      | All works sites   | Contractor                     | -                                |                       | ✓ |   |
| EIA Section 7.9.1.3 | EM&A Section 7.2      | The mitigation measures designed to mitigate impacts to water quality to acceptable levels (compliance with assessment criteria) are expected to mitigate impacts to marine ecological resources.   | To minimise construction and operation phase marine ecological impacts | All works sites   | Contractor                     | -                                |                       | ✓ | ✓ |
| EIA Section 7.9.1.3 | EM&A Section 7.2      | Speed restriction of 10 knots for all vessels used during the construction and operation of the Project.  | To minimise vessel collision risk with CWDs                            | At the Project's marine works areas and areas with potential high dolphin usage, including existing and proposed marine parks | Future marine vessel operators | -                                |                       | ✓ | ✓ |

| EIA Reference                                    | EM&A Manual Reference | Environmental Protection Measures   | Objectives of Measures and Main Concern to Address  | Location                            | Implementation Agent                                 | Relevant Standard or Requirement  | Implementation Stages |   |   |
|--|-----------------------|---|---|-------------------------------------|--|---|-----------------------|---|---|
|  |                       |   |   |                                     |  |   | D                     | C | O |
| <b>Fisheries (Construction Phase)</b>            |                       |   |   |                                     |  |   |                       |   |   |
| EIA Section 8.10.1.2                             | EM&A Section 5.2      | Appropriate notification, communications, site protection and marking would be adopted to reduce navigation risks with fishing vessels.   | To avoid construction phase fisheries impact  | Proposed marine work sites area     | Contractor   | EIAO-TM   |                       | ✓ |   |
| <b>Cultural Heritage</b>                         |                       |   |   |                                     |  |   |                       |   |   |
| EIA Section 9.6.1.3                              | EM&A Section 9.2.3    | As a precautionary measure, the project proponent and his/her contractor are required to inform AMO immediately when any antiquities or supposed antiquities under the Antiquities and Monuments Ordinance (Cap. 53) are discovered during the seabed disturbance works in the MF Site and the ATCL Site  | To avoid potential construction phase Cultural Heritage impact                                    | Areas of proposed marine work sites | Project Proponent / Contractor / and Sub-contractors | EIAO-TM Annexes 10 and 19 and the Guidelines for CHIA in Appendix H of EIA Study Brief (ESB-342/2021) |                       | ✓ |   |
| <b>Landscape and Visual (Construction Phase)</b> |                       |   |   |                                     |  |   |                       |   |   |
| EIA Section 10.9.2                               | EM&A Section 10.2     | <b>CM1 - Preservation of Existing Trees and Other Vegetation</b><br><br>All the existing Trees to be retained and not to be affected by the Project should be carefully protected during the construction phase in accordance with DEVB TCW No. 4/2020 – titled “Tree Preservation” and the latest “Guidelines on Tree Preservation during Development” issued by GLTM Section of DEVB, including provision of Tree Protection Zones (TPZs). Any existing vegetation in landscaped areas and natural terrain not to be affected by the Project should also be carefully preserved. Therefore, these existing landscape elements can maintain their qualities throughout the construction phase. | To preserve existing vegetation.  | Refer to EIA Figures 10.10a-h       | Project Proponent / Contractor                       | DEVB (GLTM) TC(W) No. 4/2020<br><br>LAO PN. No. 2/2020  | ✓                     | ✓ |   |
| EIA Section 10.9.2                               | EM&A Section 10.2     | <b>CM2 - Transplanting of Affected Trees</b><br><br>Trees unavoidably affected by the works should be transplanted where practical. The requirement shall follow the “Guidelines on Tree  | To transplant particular interest and high amenity value trees unavoidably affected by the works. | Refer to EIA Figures 10.10a-h       | Project Proponent / Contractor                       | DEVB (GLTM) TC(W) No. 4/2020<br><br>LAO PN. No.   | ✓                     | ✓ |   |

| EIA Reference      | EM&A Manual Reference | Environmental Protection Measures  | Objectives of Measures and Main Concern to Address                              | Location                      | Implementation Agent           | Relevant Standard or Requirement   | Implementation Stages |   |   |
|--------------------|-----------------------|--|---|-------------------------------|--------------------------------|--|-----------------------|---|---|
|                    |                       |  |   |                               |                                |  | D                     | C | O |
|                    |                       | Transplanting" released by GLTM Section of DEVB.   |   |                               |                                | 2/2020<br><br>DEVB (GLTM) – Guidelines on Tree Transplanting<br><br>S 2.6 of TRAM Guidelines   |                       |   |   |
| EIA Section 10.9.2 | EM&A Section 10.2     | <b>CM3 - Compensatory Tree Planting</b><br><br>Compensatory tree planting should be provided to compensate for felled trees during construction according to DEVB TCW No. 4/2020 – titled "Tree Preservation" and satisfaction of relevant Government departments. Sufficient planting area shall be provided for the growth of trees. Required numbers and locations of compensatory trees shall be determined and agreed separately with Government during the Tree Felling Application. | To enhance ecological value and improve overall value of landscape setting.     | Refer to EIA Figures 10.10a-h | Project Proponent / Contractor | DEVB (GLTM) TC(W) No. 4/2020<br><br>LAO PN. No. 2/2020<br><br>GEO Publication No. 1/2011<br><br>CEDD Greening Master Plan<br><br>DEVB (GLTM) Street Tree Selection Guide<br><br>HKIA Approved Plant Species List | ✓                     | ✓ |   |
| EIA Section 10.9.2 | EM&A Section 10.2     | <b>CM4 - Control of Night-time Lighting Glare</b><br><br>Lighting for the construction works at night, if any, should be carefully controlled to prevent light overspill to the nearby VSRs and into the sky.  | Control the lighting impacts to the VSRs during construction phase at nighttime | All works sites               | Contractor                     | ENB Guidelines on Industry Best Practices for External Lighting Installations  | ✓                     | ✓ |   |
| EIA Section        | EM&A Section          | <b>CM5 - Erection of Decorative Screen Hoardings</b>   | To minimise the potential landscape and   | All works sites               | Contractor                     | -  |                       | ✓ |   |

| EIA Reference                                   | EM&A Manual Reference | Environmental Protection Measures  | Objectives of Measures and Main Concern to Address                                | Location                      | Implementation Agent                | Relevant Standard or Requirement | Implementation Stages |   |   |
|---|-----------------------|--|---|-------------------------------|-------------------------------------|----------------------------------|-----------------------|---|---|
|   |                       |  |   |                               |                                     |                                  | D                     | C | O |
| 10.9.2  | 10.2                  | Decorative Hoardings, with designs and forms compatible with the surrounding settings, should be erected during the construction phase to minimise the potential landscape and visual impacts from the construction works and activities, e.g. avoiding unintended destruction of existing trees and other landscape elements, and reducing visual bulkiness of the screen hoardings, etc. | visual impacts due to the construction works and activities.                      |                               |                                     |                                  |                       |   |   |
| EIA Section 10.9.2                              | EM&A Section 10.2     | <b>CM6 - Management of Construction Activities and Facilities</b><br><br>The layout and arrangement of construction site facilities which include site office and temporary storage area should be properly managed and construction activities at the site should be carefully supervised and controlled to minimise potential adverse landscape and visual impacts.                      | To minimise any potential adverse landscape and visual impacts.                   | All works sites               | Contractor                          | -                                |                       | ✓ |   |
| EIA Section 10.9.2                              | EM&A Section 10.2     | <b>CM7 - Reinstatement of Temporarily Disturbed Landscape Areas</b><br><br>All hard and soft landscape areas disturbed temporarily during construction shall be reinstated on like-to-like basis, to the satisfaction of the relevant Government Departments.  | To reinstate to equal or better quality of temporarily disturbed landscape areas. | Refer to EIA Figures 10.10a-h | Contractor                          | -                                |                       | ✓ |   |
| <b>Landscape and Visual (Operational Phase)</b> |                       |  |   |                               |                                     |                                  |                       |   |   |
| EIA Section 10.9.2                              | EM&A Section 10.2     | <b>OM1 - Aesthetically Pleasing Design of Aboveground / Above Sea Structures</b><br><br>The proposed structures in regard of layouts, forms, materials, and finishes shall be sensitively designed so as to blend in the structures to the adjacent landscape and visual context.  | To minimise any potential adverse landscape and visual impact.                    | Refer to EIA Figures 10.10a-h | Project Proponent / Future operator | -                                | ✓                     | ✓ | ✓ |

| EIA Reference      | EM&A Manual Reference | Environmental Protection Measures  | Objectives of Measures and Main Concern to Address      | Location                      | Implementation Agent                | Relevant Standard or Requirement  | Implementation Stages |   |   |
|--------------------|-----------------------|--|---|-------------------------------|-------------------------------------|---|-----------------------|---|---|
|                    |                       |  |   |                               |                                     |   | D                     | C | O |
| EIA Section 10.9.2 | EM&A Section 10.2     | <p><b>OM2 - Provision of Amenity Planting and Landscape Features</b></p> <p>Amenity planting and landscape features shall be provided to soften the proposed above-ground structures on HKP Island and to create attractive open spaces.</p> | To maximize the greening effect throughout the Project. | Refer to EIA Figures 10.10a-h | Project Proponent / Future operator | <p>CEDD Greening Master Plan</p> <p>DEVB (GLTM) Street Tree Selection Guide</p> <p>HKIA Approved Plant Species List</p> | ✓                     | ✓ | ✓ |

Remarks: D = Design Stage, C = Construction Stage, O = Operational Stage

**APPENDIX B**  
**Site Inspection Proforma**

**SITE INSPECTION PROFORMA**

Ref: \_\_\_\_\_

| Date | Location | Reqt Ref.* | Observation / Deficiency | Mitigation Action**<br>(Responsible Agency) | Date*** of Confirmation |
|------|----------|------------|--------------------------|---|-------------------------|
|      |          |            |                          |   |                         |
|      |          |            |                          |   |                         |
|      |          |            |                          |   |                         |
|      |          |            |                          |   |                         |
|      |          |            |                          |   |                         |
|      |          |            |                          |   |                         |
|      |          |            |                          |   |                         |
|      |          |            |                          |   |                         |
|      |          |            |                          |   |                         |
|      |          |            |                          |   |                         |

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

This Proforma is an:  
Environmental Protection Instruction for

\_\_\_\_\_ Date: \_\_\_\_\_

Signed by Environmental Team Leader

\_\_\_\_\_ Date: \_\_\_\_\_

Copy to Independent Environmental Checker

(Full Name)



**APPENDIX C**  
**Complaint Log**

**COMPLAINT LOG**

Ref: \_\_\_\_\_

| Log Ref. | Date / Location | Complainant/<br>Date of Contract | Details of Complaint | Investigation / Mitigation Action | File Closed |
|----------|-----------------|----------------------------------|----------------------|-----------------------------------|-------------|
|          |                 |                                  |                      |                                   |             |
|          |                 |                                  |                      |                                   |             |
|          |                 |                                  |                      |                                   |             |
|          |                 |                                  |                      |                                   |             |
|          |                 |                                  |                      |                                   |             |
|          |                 |                                  |                      |                                   |             |
|          |                 |                                  |                      |                                   |             |
|          |                 |                                  |                      |                                   |             |
|          |                 |                                  |                      |                                   |             |

Filed by Environmental Team Leader \_\_\_\_\_  
(Full Name)

Date: \_\_\_\_\_

## **APPENDIX D**

### **Sample of Monitoring Data Sheet**

### Data Sheet for TSP Monitoring

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

Name & Designation

Signature

Date

Field Operator :

Laboratory Staff :

Checked by :

### Noise Monitoring Field Record Sheet

|  |                         |  |
|--|-------------------------|--|
| Monitoring Location                                  |                         |  |
| Description of Location                              |                         |  |
| Date of Monitoring                                   |                         |  |
| Measurement Start Time (hh:mm)                       |                         |  |
| Measurement Time Length (min.)                       |                         |  |
| Noise Meter Model/Identification                     |                         |  |
| Calibrator Model/Identification                      |                         |  |
| Measurement Results                                  | L <sub>90</sub> (dB(A)) |  |
|  | L <sub>10</sub> (dB(A)) |  |
|  | L <sub>eq</sub> (dB(A)) |  |
| Major Construction Noise Source(s) During Monitoring |                         |  |
| Other Noise Source(s) During Monitoring              |                         |  |
| Remarks  |                         |  |

Name & Designation

Signature

Date

Recorded By :

\_\_\_\_\_

Checked By :

\_\_\_\_\_

## Water Quality Monitoring Data Record Sheet

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

Name & Designation

Signature

Date

Recorded By :

\_\_\_\_\_

Checked By :

\_\_\_\_\_

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

## **APPENDIX E**

### **Sample Template for the Interim Notification**

**Sample Template for Interim Notifications of Environmental Quality Limits Exceedances**

---

Incident Report on Action Level or Limit Level Non-compliance

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

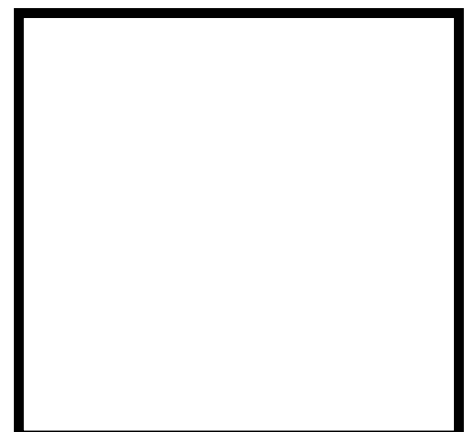
**Location Plan**

Prepared by : \_\_\_\_\_

Designation : \_\_\_\_\_

Signature : \_\_\_\_\_

Date : \_\_\_\_\_







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Meinhardt (Hong Kong) Ltd  
邁進(香港)有限公司

📍 10/F GENESIS 33-35 WONG CHUK HANG ROAD HONG KONG  
香港黃竹坑道33-35號創協坊10樓

☎ +852 2858 0738 | FAX +852 2540 1580

✉ mail@meinhardt.com.hk

🌐 www.meinhardt-china.com | www.meinhardtgroup.com