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Civil Engineering and Development Department

**Environmental Impact Assessment (EIA) Ordinance, Cap.499**
**Application for Study Brief**

**Project Title: Cycle Track between Tsuen Wan and Tuen Mun (Tuen Mun to So Kwun Wat)**
**(Application No. ESB-295/2016)**

I refer to your above application received on 15 August 2016 for an EIA Study Brief under Section 5(1)(a) of the EIA Ordinance.

In accordance with Section 5(7)(a) of the Ordinance and after public inspection of the project profile, I issue the attached EIA Study Brief no. ESB-295/2016 for your preparation of an EIA report.

Under Section 15 of the Ordinance, the EIA Study Brief will be placed on the EIA Ordinance Register. It will also be placed on the EIA Ordinance website (http://www.epd.gov.hk/eia/).

You may submit an application for approval of the EIA report in accordance with Section 6(2) of the Ordinance after its completion. Upon receipt of your application, this department will decide under Section 6(3) of the Ordinance whether the EIA report meets the requirements of the EIA Study Brief and Technical Memorandum on EIA Process, and accordingly advise you under Section 6(4) of the Ordinance whether a submission to the Advisory Council on the Environment (ACE) or its subcommittee is required. In this connection, you are required to provide sufficient copies of the Executive Summary of the EIA report to the Secretary of the EIA Subcommittee of ACE for selection for submission when you submit the EIA report to this department for approval. Please liaise with Ms. Becky LAM (Tel: 2594 6323) regarding the details in due course.

If the EIA report is selected by ACE for submission and presentation, you are expected to provide ACE with an account of the environmental issues arising from the project, major

conclusions and recommendations of the EIA study. In particular, the main environmental concerns of the general public and interest groups who may be affected by the project should be identified and addressed in the EIA study. As such, you are strongly advised to engage the public and interest groups during the course of the EIA study. Please find attached a copy of the "Modus Operandi of the EIA Subcommittee of the ACE" for your reference.

Please note that if you are aggrieved by any of the content of this EIA Study Brief, you may appeal under Section 17 of the EIA Ordinance within 30 days of receipt of this EIA Study Brief.

Should you have any queries on the above application, please contact Mr. Johnson WONG of this department at 2835 1107.

Yours sincerely,

(WONG Chuen-fai)
Principal Environmental Protection Officer
for Director of Environmental Protection

**Environmental Impact Assessment Ordinance (Cap. 499)**
**Section 5 (7)**

**Environmental Impact Assessment Study Brief No. ESB-295/2016**

**Project Title : Cycle Track between Tsuen Wan and Tuen Mun (Tuen Mun to So Kwun Wat) (hereinafter known as the "Project")**

**Name of Applicant : Civil Engineering and Development Department (hereinafter known as the "Applicant")**

## 1. BACKGROUND

1.1 An application (No. ESB-295/2016) for an Environmental Impact Assessment (EIA) study brief under section 5(1)(a) of the Environmental Impact Assessment Ordinance (EIAO) was submitted by the Applicant on 15 August 2016 with a project profile (No. PP-543/2016) (the Project Profile).

1.2 The Project is to construct and operate a cycle track between Tuen Mun and So Kwun Wat with supporting and recreation facilities. The location of the Project is shown in Figure 1 of this EIA Study Brief.

1.3 Based on the information provided in the Project Profile, the Project will comprise the following designated projects :-

a) Item A.8, Part 1, Schedule 2 of the EIAO : A road bridge more than 100m in length between abutments; and

b) Item C.12, Part 1, Schedule 2 of the EIAO: A dredging operation due to construction of foundation construction being less than 500m from the nearest boundary of an existing bathing beaches.

1.4 Pursuant to section 5(7)(a) of the EIAO, the Director of Environmental Protection (the Director) issues this Environmental Impact Assessment (EIA) study brief to the Applicant to carry out an EIA study.

1.5 The purpose of this EIA study is to provide information on the nature and extent of environmental impacts arising from the construction and operation of the Project and associated works that will take place concurrently. This information will contribute to decisions by the Director on:

(i) the overall acceptability of any adverse environmental consequences that are likely to arise as a result of the Project and associated works;

(ii) the conditions and requirements for the detailed design, construction and operation of the Project and associated works to mitigate against adverse environmental consequences wherever practicable; and

(iii) the acceptability of residual impacts after the proposed mitigation measures are implemented.

## 2. OBJECTIVES OF THE EIA STUDY

2.1 The objectives of the EIA study are as follows:

(i) to describe the Project and associated works together with the requirements and environmental benefits for carrying out the Project;

(ii) to identify and describe the elements of the community and environment likely to be affected by the Project and associated works and/or likely to cause adverse impacts to the Project, including both the natural and man-made environment and the associated environmental constraints;

(iii) to identify and quantify emission sources and determine the significance of impacts on sensitive receivers and potential affected uses;

(iv) to identify and quantify any potential losses or damage to flora, fauna and natural habitats;

(v) to identify any negative impacts on cultural heritage and to propose measures to mitigate these impacts;

(vi) to propose the provision of infrastructure or mitigation measures to minimize pollution, environmental disturbance and nuisance during construction and operation of the Project;

(vi) to investigate the feasibility, effectiveness and implications of the proposed mitigation measures;

(vii) to identify, predict and evaluate the residual (i.e. after practicable mitigation) environmental impacts and the cumulative effects expected to arise during the construction and operation phases of the Project in relation to the sensitive receivers and potential affected uses;

(viii) to identify, assesses and specify methods, measures and standards, to be included in the detailed design, construction and operation of the Project which are necessary to mitigate these residual environmental impacts and cumulative effects and reduce them to acceptable levels;

(ix) to design and specify the environmental monitoring and audit requirements; and

(x) to identify any additional studies necessary to implement the mitigation measures or monitoring and proposals recommended in the EIA report.

## 3. DETAILED REQUIREMENTS OF THE EIA STUDY

### 3.1 The Purpose

3.1.1 The purpose of this study brief is to set out the purposes and objectives of the EIA study, the scope of environmental issues which shall be addressed, the requirements that the EIA study shall need to fulfil, and the necessary procedural and reporting requirements. The Applicant shall demonstrate in the EIA report whether the criteria in the relevant sections of the Technical Memorandum on the Environmental Impact Assessment

Process of the Environmental Impact Assessment Ordinance (hereinafter referred to as the "TM") are complied with.

## 3.2 The Scope

3.2.1 The scope of this EIA study shall cover the Project and associated works mentioned in sub-section 1.2 above. For the purpose of assessing whether the environmental impacts shall comply with the criteria of the TM, the EIA study shall address the key issues described below, together with any other key issues identified during the course of the EIA study:

(i) environmental benefits and dis-benefits of different development options and alignments, construction methods, system design and operational mode of the Project with a view to deriving option(s) for aligning, constructing and operating the Project that will avoid or minimise adverse environmental impact;

(ii) potential air quality impact on air sensitive receivers (ASRs) due to the Project;

(iii) potential noise impact on noise sensitive receivers (NSRs) due to the Project;

(iv) potential water quality impact due to the Project on the relevant water system(s) such as the North Western Water Control Zones and water sensitive receivers such as bathing beaches along the coastline between Tuen Mun and So Kwun Wat, in particular arising from dredging and other marine works activities;

(v) potential waste management implications arising from the Project, including handling and disposal of dredged sediments, construction and demolition materials, chemical waste and general refuse;

(vi) potential extent of land contamination within the project area for development works and relevant mitigation measures;

(vii) potential ecological impact due to the Project on ecologically sensitive areas/habitats;

(viii) potential fisheries impacts due to the Project;

(ix) potential landscape and visual impacts due to the Project, in particular the elevated portion of the cycle track;

(x) potential cultural heritage, including built heritage and marine archaeological impact due to the Project; and

(xi) potential cumulative environmental impacts of the Project, through interaction or in combination with other existing, committed and planned projects in the vicinity of the Project, and that those impacts may have a bearing on the environmental acceptability of the Project.

## 3.3 Description of the Project

3.3.1 Purpose(s) and Objectives of the Project

The Applicant shall provide information on the purpose(s) and objectives of the Project, and describe the benefit of the Project and scenarios with and without the Project.

3.3.2 Details of the Project

The Applicant shall indicate the nature and status of project decision(s) for which the EIA study is undertaken. The Applicant shall describe the proposed land uses, design, size, construction methods, the nature and methods of production or other major activities involved in operation of the project, using diagrams, plans and/or maps as necessary. The estimated duration of the construction phase and operational phase of the Project together with the programme within these phases shall be given. The land taken by the Project site(s), construction sites, and any associated access arrangements, auxiliary facilities and landscaping areas shall be shown on a scaled map. The uses of the Project shall be described and different land use areas shall be demarcated as appropriate.

3.3.3 Background and History of the Project

The Applicant shall provide information on the site location and site history of the Project and the consideration of different practicable layout (including road width) and alignment options of the Project together with the resting stations and crossings over beaches. The key reasons for selecting the proposed layout and alignment of the Project and the construction methods and associated access arrangements for the Project, and the part environmental factors played in the selection shall be described. The main environmental impacts of different practicable layout and alignment options of the Project, in particular to the proposed viaducts next to existing beaches, the proposed resting stations and entry/exit hubs shall be compared with those of the proposed Project and with the likely future environmental conditions in the absence of the Project, especially with regard to the coastal areas and existing beaches.

## 3.4 Technical Requirements

3.4.1 The Applicant shall conduct the EIA study to address the environmental aspects of the activities as described in the scope set out above. The assessment shall be based on the best and latest information available during the course of the EIA study.

3.4.2 The EIA report shall include the construction and operational programmes as well as approaches and methodologies for assessing environmental impacts of the Project. The EIA report shall provide the time frame, staged implementation programme, and works programmes of the Project and other concurrent projects, for assessing the cumulative environmental impacts from the Project and interacting projects as identified in the EIA study.

3.4.3 The EIA study shall follow the technical requirements specified below and in the Appendices of this EIA study brief.

### 3.4.4 Air Quality Impact

3.4.4.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing air quality impact as stated in section 1 of Annex 4 and Annex 12 of the TM respectively.

3.4.4.2 The study area for air quality impact assessment shall be defined by a distance of 500 meters from the boundary of the Project site or other project locations as identified in the EIA, which shall be extended to include major existing, planned and committed air pollutant emission sources that may have a bearing on the environmental acceptability of the Project. The assessment shall include the existing, planned and committed sensitive receivers within the study area as well as areas where air quality may be potentially

affected by the Project.

3.4.4.3 The assessment of potential air quality impacts of the Project shall be conducted in accordance with the technical requirements in Appendix A of this EIA Study Brief.

### 3.4.5 Noise Impact

3.4.5.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing noise impact as stated in Annex 5 and Annex 13 of the TM respectively.

3.4.5.2 Assessment shall include the noise impact assessment of the existing, committed and planned NSRs earmarked on the relevant Outline Zoning Plans, Development Permission Area Plans, Outline Development Plans, Layout Plans and other relevant published land use plans, including plans and drawings published by the Lands Department and any land use and development applications approved by the Town Planning Board, in the vicinity of the Project.

3.4.5.3 The Applicant shall propose the assessment area for agreement of the Director before commencing the assessment. The assessment area for the noise impact assessment shall generally include areas within 300 metres from the boundary of the Project and the works of the Project. For construction, if NSRs are identified within the assessment area, quantitative noise impact assessment shall be carried out. The Applicant shall propose methodology for agreement of the Director, with reference to Section 4.4.2 of the TM, prior to the commencement of the assessment.

3.4.5.4 The noise impact assessment of the Project shall follow the detailed technical requirements given in Appendix B of this EIA Study Brief.

### 3.4.6 Water Quality Impact

3.4.6.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing water pollution as stated in Annexes 6 and 14 of the TM respectively.

3.4.6.2 The study area for the water quality impact assessment shall include areas within 500 metres from the site boundary of the Project and shall cover North Western Water Control Zone as designated under the Water Pollution Control Ordinance (Cap. 358) and the water sensitive receivers in the vicinity of the Project. The study area shall be extended to include other areas if they are found also being impacted during the course of the EIA study and have a bearing on the environmental acceptability of the Project.

3.4.6.3 The water quality impact assessment of the Project shall follow the detailed technical requirements given in Appendix C of this EIA Study Brief.

### 3.4.7 Waste Management Implications and Land Contamination

3.4.7.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing waste management implications as stated in Annexes 7 and 15 of the TM respectively.

3.4.7.2 The assessment of the waste management implications arising from the of the Project shall follow the detailed technical requirements given in Appendix D of this EIA Study Brief.

3.4.7.3 The Applicant shall follow the guidelines for evaluating and assessing potential land

contamination issues as stated in Section 3.1 of Annex 19 of the TM.

3.4.7.4 The assessment of the potential land contamination issues shall follow the detailed requirements given in Appendix D of this EIA Study Brief.

### 3.4.8 Ecological Impact

3.4.8.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing ecological impact as stated in Annexes 8 and 16 of the TM respectively.

3.4.8.2 The assessment area for the purpose of the terrestrial ecological impact assessment shall include areas within 500 meters distance from the boundary of the Project and any other areas likely to be impacted by the Project. For marine ecological impact assessment, the assessment area shall be the same as the water quality impact assessment described in section 3.4.6. The assessment shall include ecological sensitive receivers in the vicinity of the Project

3.4.8.3 The ecological impact assessment of the Project shall follow the detailed technical requirements given in Appendix E of this EIA Study Brief.

### 3.4.9 Fisheries Impact

3.4.9.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing fisheries impact as stated in Annexes 9 and 17 of the TM respectively.

3.4.9.2 The study area for fisheries impact shall include areas within 500 metres from the site boundary of the Project site and the associated works. The study area shall be extended to include other areas if they are also found likely to be impacted by the construction or operation of the Project during the course of the EIA study. Special attention shall be given to potential loss or disturbance of fishing grounds, fisheries resources and habitats, spawning grounds at sensitive receivers particularly the Ma Wan Fish Culture Zone.

3.4.9.3 The fisheries impact assessment of the Project shall follow the detailed technical requirements given in Appendix F of this EIA Study Brief.

### 3.4.10 Landscape and Visual Impact

3.4.10.1 The Applicant shall follow the criteria and guidelines as stated in Annexes 10 and 18 of the TM respectively, and the EIAO Guidance Note No. 8/2010 on "Preparation of Landscape and Visual Impact Assessment under the Environmental Impact Assessment Ordinance" for evaluating and assessing visual impact.

3.4.10.2 The study area for landscape impact assessment shall include areas within a distance of 500m from the site boundary of the Project while the study area for visual impact shall be defined by the visual envelope of the Project.

3.4.10.3 The landscape and visual impact assessment of the Project shall follow the detailed technical requirements given in Appendix G of this EIA Study Brief.

### 3.4.11 Impact on Cultural Heritage

3.4.11.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing the

cultural heritage impact as stated in Annexes 10 and 19 of the TM respectively.

3.4.11.2 The cultural heritage impact assessment shall include Built Heritage Impact Assessment (BHIA) and Marine Archaeological Investigation (MAI). The Applicant shall conduct a BHIA, taking the result of previous BHIA and other background of the site into account, to identify known and unknown built heritage items within the assessment area that may be affected by the Project and its associated works to assess the direct and indirect impacts on the built heritage items. The Applicant shall refer to relevant sections of the Guidelines for Cultural Heritage Impact Assessment in Appendix H of this EIA Study Brief.

3.4.11.3 A marine archaeological investigation (MAI) shall be conducted. It shall include area to be affected by the marine works of the Project. The MAI shall follow the detailed technical requirements given in Appendix I of this EIA Study Brief.

## 3.5 Environmental Monitoring and Audit (EM&A) Requirements

3.5.1 The Applicant shall identify and justify in the EIA study whether there is any need for EM&A activities during the construction and operation phases of the Project and, if affirmative, to define the scope of the EM&A requirements for the Project in the EIA study.

3.5.2 Subject to the confirmation of the EIA study findings, the Applicant shall comply with the requirements as stipulated in Annex 21 of the TM.

3.5.3 The Applicant shall prepare a project implementation schedule (in the form of a checklist as shown in Appendix J of this EIA Study Brief) containing the EIA study recommendations and mitigation measures with reference to the implementation programme.

## 3.6 Presentation of Summary Information

3.6.1 Summary of Environmental Outcomes

The EIA report shall contain a summary of key environmental outcomes arising from the EIA study, including estimated population protected from various environmental impacts, environmentally sensitive areas protected, environmentally friendly options considered and incorporated in the preferred option, environmental designs recommended, key environmental problems avoided, compensation areas included and the environmental benefits of environmental protection measures recommended.

3.6.2 Summary of Environmental Impacts

To facilitate effective retrieval of pertinent key information, the EIA report shall contain a summary table of environmental impacts showing the assessment points, results of impact predictions, relevant standards or criteria, extents of exceedances predicted, impact avoidance measures considered, mitigation measures proposed and residual impacts (after mitigation). This summary shall cover each individual impact and shall also form an essential part of the executive summary of the EIA report.

3.6.3 Summary of Alternative Options and Mitigation Measures

The EIA report shall contain a summary of alternative development options and mitigation measures considered during the course of the EIA study, including the alternative alignments, construction methods and associated access arrangements of

the Project with a view to avoiding or minimizing adverse environmental impacts. A comparison of the environmental benefits and dis-benefits of applying different development options and/or mitigation measures shall be made.

3.6.4 Documentation of Key Assessment Assumptions, Limitation of Assessment Methodologies and related Prior Agreement(s) with the Director

The EIA report shall contain a summary including the assessment methodologies and key assessment assumptions adopted in the EIA study, the limitations of these assessment(s) methodologies/assumptions, if any, plus relevant prior agreement(s) with the Director or other Authorities on individual environmental media assessment components. The proposed use of any alternative assessment tool(s) or assumption(s) have to be justified by the Applicant, with supporting documents based on cogent, scientific and objectively derived reason(s) before seeking the Director's agreement. The supporting documents shall be provided in the EIA report.

3.6.5 Documentation of Public Concerns

The EIA report shall contain a summary of key concerns of the general public, interested parties and relevant statutory or advisory bodies identified or received by the Applicant during the course of the EIA study, and describe how the relevant concerns have been taken into account and addressed in the EIA study, including the considerations of main environmental impact of different practicable layout and alignment options of the Project.

## 4. DURATION OF VALIDITY

4.1 The Applicant shall notify the Director of the commencement of the EIA study. If the EIA study does not commence within 36 months after the date of issue of this EIA study brief, the Applicant shall apply to the Director for a fresh EIA study brief before commencement of the EIA study.

## 5. REPORTING REQUIREMENTS

5.1 In preparing the EIA report, the Applicant shall refer to Annex 11 of the TM for the contents of an EIA report. The Applicant shall also refer to Annex 20 of the TM, which stipulates the guidelines for the review of an EIA report. When submitting the EIA report to the Director, the Applicant shall provide a summary, pointing out where the EIA report and respective requirements of this EIA Study Brief and TM (in particular Annexes 11 and 20) have been addressed and fulfilled.

5.2 The Applicant shall supply the Director with hard and electronic copies of the EIA report and the executive summary in accordance with the requirements given in Appendix K of this EIA study brief. The Applicant shall, upon request, make additional copies of the above documents available to the public, subject to payment by the interested parties of full costs of printing.

## 6. OTHER PROCEDURAL REQUIREMENTS

6.1 If there is any change in the name of the Applicant for this EIA study brief during the course of EIA study, the Applicant must notify the Director immediately.

6.2 If there is any key change in the scope of the Project mentioned in section 1.2 of this EIA study brief and in Project Profile (No. PP-543/2016), the Applicant must seek confirmation from the Director in writing on whether or not the scope of issues covered by this EIA study brief can still cover the key changes, and any additional issues must also be addressed in the EIA study. If the changes to the Project fundamentally alter the key scope of the EIA study brief, the Applicant shall apply to the Director for a fresh EIA study brief.

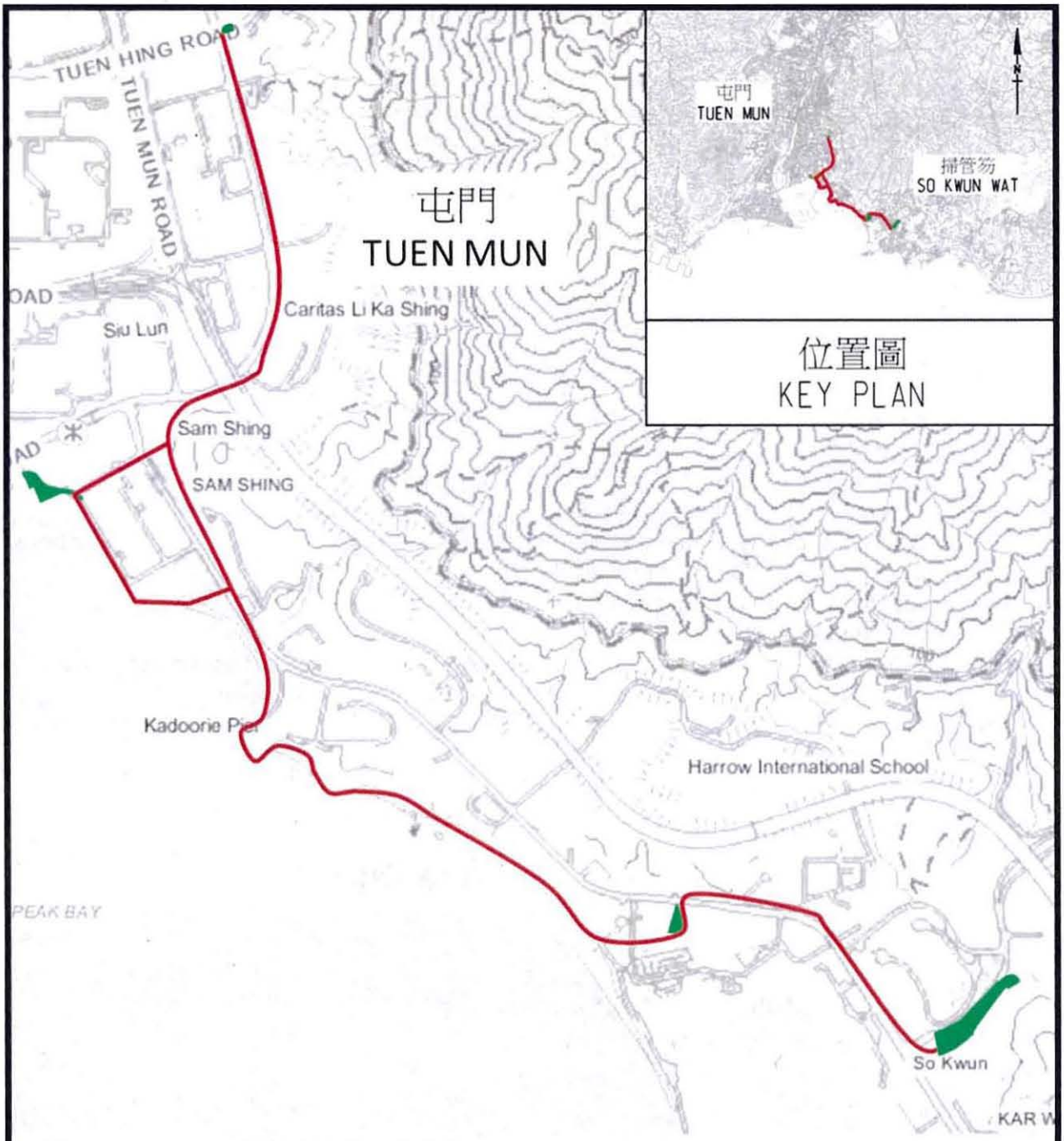
## 7. LIST OF FIGURES AND APPENDICES

7.1 This EIA study brief includes the following figure and appendices:

Figure 1 – Location Plan of the Project
Appendix A - Requirements for Air Quality Impact Assessment
Appendix A1 - Air Quality Modelling Guidelines
Appendix B – Requirements for Noise Impact Assessment
Appendix C - Requirements for Water Quality Impact Assessment
Appendix C1 - Hydrodynamic and Water Quality Modelling Requirements
Appendix D - Requirements for Assessment of Waste Management Implications and Land Contamination
Appendix E - Requirements for Ecological Impact Assessment
Appendix F - Requirements for Fisheries Impact Assessment
Appendix G - Requirements for Landscape and Visual Impact Assessment
Appendix H - Guidelines for Cultural Heritage Impact Assessment
Appendix I - Guidelines for Marine Archaeological Investigation (MAI)
Appendix J - Implementation Schedule
Appendix K - Requirements for EIA Report Documents

END of EIA STUDY BRIEF

September 2016
Environmental Assessment Division
Environmental Protection Department




Proposed Cycle Track between Tsuen Wan and Tuen Mun (Tuen Mun to So Kwun Wat Section)
擬建荃灣至屯門單車徑 (屯門至掃管笏段)

Location Plan of the Project–工程項目的位置圖

Figure 1 附圖 1

EIA Study Brief No. ESB-295/2016
環評研究概要編號 ESB-295/2016

## Requirements for Air Quality Impact Assessment

The air quality impact assessment shall include the following:

### 1. Background and Analysis of Activities

(i) Provision of background information relating to air quality issues relevant to the Project, e.g. description of the types of activities of the Project that may affect air quality during operational stage of the Project.

(ii) Provision of an account, where appropriate, of the consideration/measures that have been taken into consideration in the planning of the Project to abate the air pollution impact. The Applicant shall consider alternative operational system and mode to minimise the air quality impact during operational stages of the Project.

(iii) Presentation of background air quality levels in the study area for the purpose of evaluating cumulative air quality impacts during operational stage of the Project. If PATH (Pollutants in the Atmosphere and their Transport over Hong Kong) model is used to estimate the background air quality, details for the estimation of the emission sources to be adopted in the model runs should be clearly presented.

### 2. Identification of Air Sensitive Receivers (ASRs) and Examination of Emission/ Dispersion Characteristics

(i) Identification and description of existing, planned and committed ASRs arising from the Project or to be affected by the Project, including those earmarked on the relevant Outline Zoning Plans, Development Permission Area Plans, Outline Development Plans, Layout Plans and other relevant published land use plans, including plans and drawings published by Lands Department and any land use and development applications approved by the Town Planning Board. The Applicant shall select the assessment points of the identified ASRs that represent the worst impact point of these ASRs. A map clearly showing the location and description such as name of buildings, their uses and height of the selected assessment points shall be given. The separation distances of these ASRs from the nearest emission sources shall also be given.

(ii) Provision of a list of air pollutant emission sources, including any nearby emission sources which are likely to have impact related to the Project based on the analysis of the activities during operational stage of the Project in section 1 above. Confirmation regarding the validity of the assumptions adopted and the magnitude of the activities shall be obtained from the relevant government departments /authorities and documented.

(iii) Identification of chimneys and obtainment of relevant chimney emission data in the assessment area by carrying out a survey for assessing the cumulative air quality impact of air pollutants through chimneys. The Applicant shall ensure and confirm the validity of the emission data used in their assessment. Any errors found in their emission data used may render the submission invalid

(iv) The emissions from any concurrent projects identified as relevant during the course of the EIA study shall be taken into account as contributing towards the overall

cumulative air quality impact. The impact at the existing, committed and planned ASRs within the assessment area shall be assessed, based on the best information available at the time of assessment.

## 3. Construction Phase Air Quality Impact

(i) The Applicant shall follow the requirements stipulated under the Air Pollution Control (Construction Dust) Regulation to ensure that construction dust impacts are controlled within the relevant standards as stipulated in Section 1 of Annex 4 of the TM.

(ii) If the Applicant anticipates that the Project will give rise to significant construction dust impacts likely to exceed recommended limits in the TM at the ASRs identified within the assessment area as defined in Section 3.4.4.2 of this study brief despite the incorporation of the dust control measures proposed, a quantitative assessment shall be carried out to evaluate the construction dust impact at the identified ASRs. The Applicant shall follow the methodology set out in Section 5 below when carrying out the quantitative assessment.

(iii) Where necessary, the Applicant shall consider and evaluate direct mitigation measures, including but not limited to water-spraying, re-scheduling construction programme to minimize concurrent dust impact arising from different construction sites, for fugitive dust control. Any mitigation measures recommended for fugitive dust control should be well documented in the EIA report.

(iv) A monitoring and audit programme for the construction phase of the Project shall be devised to verify the effectiveness of the proposed control measures so as to ensure proper control of fugitive dust emission.

## 4. Operational Phase Air Quality Impact

(i) The Applicant shall assess the expected air pollutant impacts at the identified ASRs arising from the operation of the Project, if any, based on an assumed reasonably worst-case scenario under normal operating conditions. If the applicant anticipates that the operational air quality impact that will likely cause exceedances of the recommended limits in the TM on any part of the Project which would be considered as ASRs in accordance with Annex 12 of the TM, then a quantitative assessment should be carried out to evaluate the operational phase air quality impacts at the identified ASRs. The Applicant shall follow the methodology set out in Section 4 below when carrying out the quantitative assessment.

(ii) A monitoring and audit programme for the operational phase of the Project shall be devised to verify the effectiveness of the control measures proposed so as to ensure proper control of operational air quality impacts.

## 5. Quantitative Assessment Methodology

If quantitative assessment is required, the Applicant should follow the relevant methodology set out below when carrying out the assessment:

(i) The Applicant shall conduct the quantitative assessment by applying the general principles enunciated in the modelling guidelines in Appendix A-1 while making

allowance for the specific characteristic of the Project. The Applicant shall ensure consistency between the text description and the model files at every stage of submissions for review. In case of doubt, prior agreement between the Applicant and the Director on specific modelling details shall be sought.

(ii) The Applicant shall identify the key/representative air pollutant parameters (types of pollutants and the averaging time concentrations) to be evaluated and provide explanation for selecting such parameters for assessing the impact from the Project and associated works.

(iii) The air pollution impacts of future road traffic shall be calculated based on the highest emission strength from road vehicles in the assessment area within the next 15 years upon commissioning of the proposed development. The Applicant shall demonstrate that the selected year of assessment represents the highest emission scenario given the combination of vehicular emission factors and traffic flow for the selected year. If necessary, the Fleet Average Emission Factors shall be determined by a motor vehicle emission model such as EMFAC-HK model to be agreed with the Director. The traffic flow data and assumptions, such as the exhaust technology fractions, vehicle age/population distribution, traffic forecast and speed fractions, that are used in the assessment shall be presented in the form of both summary table(s) and graph(s).

(iv) For estimating the future background air quality, the Applicant may use EPD's PATH model or results, taking into consideration the major air pollutant emission sources projected for Hong Kong and nearby regions, or other models as agreed by the Director. Details of the adopted emission sources should be presented.

(v) Ozone Limiting Method (OLM) or Discrete Parcel Method (DPM) or other appropriate method shall be used to estimate the conversion ratio of NOx to $NO_2$ if $NO_2$ has been identified as a key/representative air pollutant.

(vi) The Applicant shall calculate the overall cumulative air quality impact at the identified ASRs and compare these results against the criteria set out in Section 1 of Annex 4 in the TM. The predicted air quality impacts (both unmitigated and mitigated) shall be presented in the form of summary table(s) and pollution contours, to be evaluated against the relevant air quality standards and on any effect they may have on the land use implications. Plans of a suitable scale should be used to present pollution contours to allow proper determination of buffer distance requirements.

## 6. Mitigation Measures for Air Quality Impact

Consideration for Mitigation Measures

(i) When the predicted air quality impact exceeds the criteria set in section 1 of Annex 4 in the TM, the Applicant shall consider mitigation measures to reduce the air quality impact on the identified ASRs. The feasibility, practicability, programming and effectiveness of the recommended mitigation measures shall be assessed and documented in the EIA report. Specific reasons for not adopting certain workable mitigation measures to reduce the air quality to a level meeting the criteria in the TM or to maximise the protection of the ASRs as far as possible

should be clearly substantiated and documented in the EIA report.

Evaluation of Residual Air Quality Impact

(ii) Upon consideration of mitigation measures, if the mitigated air quality impact still exceeds the relevant criteria in Annex 4 of the TM, the Applicant shall identify, predict, evaluate the residual air quality impact in accordance with Section 4.4.3 of the TM and estimate the total number of existing dwellings, classrooms and other air sensitive elements that will be exposed to residual air quality impacts exceeding the criteria set in Annex 4 in the TM.

## 7. Submission of Model Files

Input and output file(s) of the model run(s), including those files for generating the pollution contours and emission calculation work sheets, shall be submitted to the Director in electronic format together with the submission of the EIA report.

## Air Quality Modelling Guidelines

*[The information contained in this Appendix is meant to assist the Applicant in performing the air quality assessment. The Applicant must exercise professional judgment in applying this general information.]*

The air quality modelling guidelines shall include the following guidelines as published on the website of the Environmental Protection Department (http://www.epd.gov.hk/epd/english/environmentinhk/air/guide_ref/guide_aqa_model.html):

i) Guidelines on Choice of Models and Model Parameters (Revised);

ii) Guidelines on Assessing the 'Total" Air Quality Impact (Revised);

iii) Guidelines on the Use of Alternative Computer Models in Air Quality Assessment;

iv) Guidelines on the Estimation of PM2.5 for Air Quality Assessment in Hong Kong; and

v) Guidelines on the Estimation of 10-minute Average SO2 Concentration for Air Quality Assessment in Hong Kong.

**Appendix B**

## Requirements for Noise Impact Assessment

The noise impact assessment shall include the following:

### 1. Description of the Noise Environment

The Applicant shall describe the prevailing noise environment in the EIA report.

### 2. Construction Noise Impact Assessment

2.1 Construction Noise Impact Assessment Methodology

2.1.1 The Applicant shall carry out construction noise impact assessment (excluding percussive piling) of the Project during daytime, i.e. 7am to 7pm, on weekdays other than general holidays in accordance with methodology in paragraphs 5.3 and 5.4 of Annex 13 of the TM.

2.1.2 For ground-borne construction noise impact, the Applicant shall propose assessment methodology and computational model which shall be confirmed with the Director, with reference to Section 4.4.2 of the TM, prior to the commencement of the assessment. Site measurements at appropriate locations may be required in order to obtain the empirical input parameters required in the computational model.

2.2 Identification of Construction Noise Impact

2.2.1 Identification of Assessment Area and Noise Sensitive Receivers

(a) The Applicant shall propose the assessment area for agreement of the Director before commencing the assessment. The assessment area for the construction noise impact assessment shall generally include areas within 300 metres from the boundary of the Project and the works of the Project.

(b) The Applicant shall identify all existing NSRs in the assessment area and select assessment points to represent identified NSRs for carrying out quantitative construction noise impact assessment described below.

(c) The assessment points shall be confirmed with the Director prior to the commencement of the quantitative construction noise impact assessment and may be varied subject to the best and latest information available during the course of the EIA study.

(d) A map showing the location and description such as name of building, use, and floor of each and every selected assessment point shall be given. Photographs of existing NSRs shall be appended to the EIA report.

2.2.2 Inventory of Noise Sources

The Applicant shall identify and quantify an inventory of noise sources for representative

construction equipment for the purpose of construction noise impact assessment.

## 2.3 Prediction and Evaluation of Construction Noise Impact

### 2.3.1 Phases of Construction

The Applicant shall identify representative phases of construction that would have noticeable varying construction noise emissions at existing NSRs at the assessment area for agreement of the Director before commencing the construction noise impact assessment.

### 2.3.2 Scenarios

The Applicant shall quantitatively assess the construction noise impact, with respect to criteria set in Annex 5 of the TM, of unmitigated scenario and mitigated scenario at different phases of construction of the Project.

### 2.3.3 Prediction of Noise Impact

(a) The Applicant shall present the predicted noise levels in Leq (30 min) dB(A) at the selected assessment points at various representative floor levels (in m P.D.) on tables and plans of suitable scale.

(b) The assessment shall cover the cumulative construction noise impact resulting from the construction works of the Project and other concurrent projects identified during the course of the EIA study on existing NSRs within the assessment area.

(c) The potential construction noise impact under different phases of construction shall be quantified by estimating the total number of dwellings, classrooms and other noise sensitive receivers that will be exposed to noise impact exceeding the criteria set in Annex 5 in the TM.

(d) The Applicant shall, as far as practicable, formulate a reasonable construction programme so that no work will be required in restricted hours as defined under the Noise Control Ordinance (NCO). In case the Applicant needs to evaluate whether construction works in restricted hours as defined under the NCO are feasible or not in the context of programming construction works, reference should be made to relevant technical memoranda issued under the NCO. Regardless of the results of construction noise impact assessment for restricted hours, the Noise Control Authority will process Construction Noise Permit (CNP) application, if necessary, based on the NCO, the relevant technical memoranda issued under the NCO, and the contemporary conditions/situations. This aspect should be explicitly stated in the noise chapter and the conclusions and recommendations chapter in EIA report.

## 2.4 Mitigation of Construction Noise Impact

Direct Mitigation Measures

Where the predicted construction noise impact exceeds the criteria set in Table 1B of Annex 5 of the TM, the Applicant shall consider and evaluate direct mitigation measures including but not limited to, movable barriers, enclosures, quieter alternative methods, re-scheduling, restricting hours of operation of noisy tasks, etc. The feasibility, practicability, programming.

## 2.5 Evaluation of Residual Construction Noise Impact

Upon exhaust of direct mitigation measures, if the mitigated noise impact still exceeds the relevant criteria in Annex 5 of TM, the Applicant shall identify, predict and evaluate the residual construction noise impact in accordance with Section 4.4.3 of the TM and estimate the total number of existing dwellings, classrooms and other noise sensitive elements that will be exposed to residual noise impact exceeding the criteria set in Annex 5 of the TM.

**Appendix C**

## Requirements for Water Quality Impact Assessment

1. The Applicant shall identify and analyse physical, chemical and biological disruptions of the water system(s) arising from the construction and operation of the Project.

2. The Applicant shall predict, quantify and assess any water quality impacts arising from the construction and operation of the Project by appropriate mathematical modelling and/or other techniques proposed by the Applicant and agreed with the Director. The mathematical modelling requirements are set out in Appendix C-1. Possible impacts due to, but not be limited to, dredging, fill extraction, backfilling, transportation and disposal of dredged materials, other marine works activities, effluent discharges, and site runoff, and shall include changes in hydrology, flow and regime, sediment erosion and deposition patterns, morphological change of seabed, water and sediment quality. The prediction shall include possible different construction stages or sequences of the Project. Affected sensitive receivers shall be identified by the assessment tool with indications of degree of severity.

3. The assessment shall include, but not be limited to the following:

   (i) the water quality impacts of the site runoff generated during the construction stage such as the effluents generated from dewatering associated with piling activities, grouting and concrete washing and those specified in the ProPECC PN 1/94;

   (ii) the water quality impacts arising from marine dredging works including change in suspended solids and dissolved oxygen concentration, sediment plume dispersion, contaminant and nutrient release and any impacts which may be resulted in changing of water quality should also be included;

   (iii) the water quality impacts on existing, planned or potential designated area for secondary contact recreation, corals, water sports activities, beaches, etc.;

   (iv) the water quality impacts due to wastewater arising from operation of the Project.

4. The Applicant shall address water quality impacts due to the construction and operation of the Project. Essentially, the assessment shall address the following :

   (i) collect and review background information on affected existing and planned water systems, their respective catchments and sensitive receivers which may be affected by the Project;

   (ii) characterize water quality of the water systems and sensitive receivers, which may be affected by the Project based on existing best available information or through appropriate site survey and tests;

   (iii) identify and analyse relevant existing and planned future activities, beneficial uses and water sensitive receivers related to the affected water system(s). The Applicant should refer to, inter alia, those developments and uses earmarked on the relevant Outline Zoning Plans, Development Permission Area Plans, Outline Development Plans and Layout Plans, and any other relevant published land use plans;

(iv) identify pertinent Water Quality Objectives and establish other appropriate water quality criteria or standards for the water system(s) and the sensitive receivers identified in (i), (ii) & (iii) above;

(v) review the specific construction methods (e.g. consideration of alternative dredging methods) and configurations, and operation of the Project to identify and predict the likely water quality impacts arising from the Project;

(vi) identify any alternation of any water courses, natural streams, ponds, wetlands, change of water holding/flow regimes, change of catchment types or areas, erosion or sedimentation due to the Project and any other hydrological changes in the assessment area;

(vii) identify and quantify existing and likely future water pollution sources, including point discharges and non-point sources to surface water runoff, sewage from workforce and polluted discharge generated from the Project, contaminant release from works on marine sediment and sediment release or re-suspension from works into water bodies;

(viii) provide an emission inventory on the quantities and characteristics of these existing and future pollution sources in the assessment area. Field investigation and laboratory test, shall be conducted as appropriate to fill relevant information gaps;

(ix) predict and quantify the impacts on the water system(s) and their sensitive receivers due to those alternations and changes identified in (vi) above and the pollution sources identified in (vii) above. The prediction shall take into account and include possible different construction and operation stages of the Project;

(x) assess the cumulative impacts due to other related concurrent and planned projects, activities or pollution sources in the vicinity of the assessment area that may have a bearing on the environmental acceptability of the Project;

(xi) analyze the provision and adequacy of existing and planned future facilities to reduce pollution arising from the point and non-point sources identified in (vii) above;

(xii) develop effective construction methods (e.g. dredging methods and piling methods, etc.), infrastructure upgrading or provision, contingency plan, water pollution prevention and mitigation measures to be implemented during construction and operation stages, including emergency discharge (if any), so as to handle any wastewater discharge from the Project and to reduce the water quality impacts to within standards ;

(xiii) investigate and develop best management practices to reduce storm water and non-point source pollution as appropriate; and

(xiv) evaluate and quantify residual impacts on water system(s) and the sensitive receivers with regard to the appropriate Water Quality Objectives, criteria, standards or guidelines. If the mitigated water quality impact still exceeds the relevant criteria in Annex 6 of TM, the Applicant shall identify, predict and evaluate the residual water quality impact in accordance with Section 4.4.3 of the

evaluate the residual water quality impact in accordance with Section 4.4.3 of the TM and estimate the significance of the residual impact to the water system(s) and the water sensitive receivers.

**Appendix C-1**

## Hydrodynamic and Water Quality Modelling Requirements

### Modelling Software General

1. The modelling software shall be fully 3-dimensional capable of accurately simulating the stratified condition, salinity transport, and effects of wind and tide on the water body within the model area.

2. The modelling software shall consist of hydrodynamic, water quality, sediment transport, thermal and particle dispersion modules. All modules shall have been proven with successful applications locally and overseas.

3. The hydrodynamic, water quality, sediment transport and thermal modules shall be strictly mass conserved at all levels.

4. An initial dilution model shall be used to characterize the initial mixing of the effluent discharge, and to feed the terminal level and size of the plume into the far field water quality modules where necessary. The initial dilution model shall have been proven with successful applications locally and overseas.

### Model Details – Calibration and Validation

1. The models shall be properly calibrated and validated against applicable existing and/or newly collected field data before their use in this study in the Hong Kong waters, the Pearl Estuary and the Dangan (Lema) Channel. The field data set for calibration and validation shall be agreed with EPD.

2. Tidal data shall be calibrated and validated in both frequency and time domain manner.

3. For the purpose of calibration and validation, the model shall run for not less than 15 days of real sequence of tide (excluding model spin up) in both dry and wet seasons with due consideration of the time required to establish initial conditions.

4. In general the hydrodynamic models shall be calibrated to the following criteria:

| Criteria | Level of fitness with field data |
|---|---|
| tidal elevation (@) | < 8 % |
| maximum phase error at high water and low water | < 20 minutes |
| maximum current speed deviation | < 30 % |
| maximum phase error at peak speed | < 20 minutes |
| maximum direction error at peak speed | < 15 degrees |
| maximum salinity deviation | < 2.5 ppt |

@ Root mean square of the error including the mean and fluctuating components shall meet the criteria at no less than 80% of the monitoring stations in the model domain

5. The consultants shall be responsible for acquiring/developing and calibration of the models for use in this study themselves. They may make reference to the models developed under the Update on Cumulative Water Quality and Hydrological Effect of

Coastal Developments and Upgrading of Assessment Tool (Agreement No. CE 42/97). They may also propose to use other models subject to agreement with EPD.

**Model Details – Simulation**

1. The water quality modelling results shall be qualitatively explainable, and any identifiable trend and variations in water quality shall be reproduced by the model. The water quality model shall be able to simulate and take account of the interaction of dissolved oxygen, phytoplankton, organic and inorganic nitrogen, phosphorus, silicate, BOD, temperature, suspended solids, contaminants release of dredged and disposed material, air-water exchange, *E. coli* and benthic processes. It shall also simulate salinity. Salinity results simulated by hydrodynamic models and water quality models shall be demonstrated to be consistent.

2. The sediment transport module for assessing impacts of sediment loss due to marine works shall include the processes of settling, deposition and re-erosion. The values of the modelling parameters shall be agreed with EPD. Contaminants release and DO depletion during dredging and dumping shall be simulated by the model.

3. The thermal model shall be based on the flow field produced by the hydrodynamic model. It shall incorporate the physical processes of thermal / cooled water discharge and abstraction flow, buoyancy effect of the thermal plume, and surface heat exchange. Dispersion of biocides in the discharge shall also be simulated with appropriate decay rates.

4. The models shall at least cover the Hong Kong waters, the Pearl Estuary and the Dangan Channel to incorporate all major influences on hydrodynamic and water quality. A fine grid model may be used for detailed assessment of this study. It shall either be linked to a far field model or form part of a larger model by gradual grid refinement. The coverage of the fine grid model shall be properly designed such that it is remote enough so that the boundary conditions will not be affected by the project. The model coverage area shall be agreed with EPD.

5. In general, grid size at the area affected by the project shall be less than 400 m in open waters and less than 75 m around sensitive receivers. The grid shall also be able to reasonably represent coastal features existing and proposed in the project. The grid schematization shall be agreed with EPD.

**Modelling Assessment**

1. The assessment shall include the construction and operational phase of the Project. Where appropriate, the assessment shall also include maintenance dredging. Scenarios to be assessed shall cover the baseline condition and scenarios with various different options proposed by the Applicant in order to quantify the environmental impacts and improvements that will be brought about by these options. Corresponding pollution load, bathymetry and coastline shall be adopted in the model set up.

2. Hydrodynamic, sediment transport, fuel spillage and thermal modules, where appropriate, shall be run for (with proper model spin up) at least a real sequence of 15 days spring-neap tidal cycle in both the dry season and the wet season.

3. Water quality module shall run for (with proper model spin up) a complete year incorporating monthly variations in Pearl River discharges, solar radiation, water

temperature and wind velocity in the operational stage. Construction stage impacts, cooling water discharge and floating refuse and debris entrapment may be assessed by simulating typical spring-neap cycles in the dry and wet seasons.

4. For assessing temporary discharges via the emergency outfall, the Applicant shall estimate discharge loading, pattern and duration. The worst case scenario shall include discharge near slack water of neap tide. A period of at least 15 days spring-neap cycle in wet season, but long enough for recovery of the receiving water, shall be simulated. Detailed methodology shall be agreed with EPD.

5. The results shall be assessed for compliance of Water Quality Objectives. Any changes in hydrodynamic regime shall be assessed. Daily erosion / sedimentation rate shall be computed and its ecological impact shall be assessed.

6. The impact on all sensitive receivers shall be assessed.

7. Cumulative impacts due to other projects, activities or pollution sources within a boundary to the agreement of EPD shall also be predicted and quantified.

**Appendix D**

## Requirements for Assessment of Waste Management Implication and Land Contamination

The assessment of waste management implication shall cover the following:

1. Analysis of Activities and Waste Generation

   (i) The Applicant shall identify the quantity, quality and timing of the waste arising as a result of the demolition, construction and operation activities of the Project based on the sequence and duration of these activities, e.g. construction and demolition materials (C&DM), any dredged/excavated sediment/mud, chemical waste and other wastes which will be generated during construction and operation stages.

   (ii) The Applicant shall adopt appropriate design, general layout, construction methods and programme to minimize the generation of public fill/inert C&DM and maximize the use of public fill/inert C&DM for other construction works.

2. Proposal for Waste Management

   (i) Prior to considering the disposal options for various types of wastes, opportunities for reducing waste generation, on-site or off-site re-use and recycling shall be fully evaluated. Measures which can be taken in planning and design stages e.g. by modifying the design approach and in the construction stage for maximizing waste reduction shall be separately considered.

   (ii) After considering the opportunities for reducing waste generation and maximizing re-use, the types and quantities of the wastes required to be disposed of as a consequence shall be estimated and the disposal methods/options for each type of wastes shall be described in detail. The disposal methods/options recommended for each type of wastes shall take into account of the result of the assessment in (iv) below.

   (iii) The EIA report shall also state clearly the transportation routings and the frequency of the trucks/vessels involved, any barging point or conveyor system to be used, the stockpiling areas, the disposal outlets for the waste identified.

   (iv) The impact caused by handling (including stockpiling, labelling, packaging and storage), collection, transportation and re-use/disposal of wastes shall be addressed in detail and appropriate mitigation measures shall be proposed. This assessment shall cover the following areas :
   - potential hazard;
   - air and odour emissions;
   - noise;
   - wastewater discharge;
   - ecology; and
   - public transport.

3. Excavation/Dredging and Dumping

   (i) The Applicant shall identify and estimate dredging/excavation, dredged/excavated sediment/mud transportation and disposal activities and requirements. Potential

dumping ground to be involved shall also be identified. Appropriate field investigation, sampling and chemical and biological laboratory tests to characterize the sediment/mud concerned shall be conducted. The ranges of parameters to be analyzed; the number, type and methods of sampling; sample preservation; chemical and biological laboratory test methods to be used shall be agreed with the Director (with reference to Section 4.4.2(c) of the TM) prior to the commencement of the tests and document in the EIA report for consideration. The categories of sediment/mud which are to be disposed of in accordance with the Dumping at Sea Ordinance (DASO) shall be identified by both chemical and biological tests and their quantities shall be estimated. If the presence of contamination of sediment/mud which requires special treatment/disposal is confirmed, the Applicant shall identify the appropriate treatment and/or disposal arrangement and demonstrate its viability in consultation with relevant authorities.

(ii) The Applicant shall identify and evaluate the practical dredging/excavation methods to minimize dredging/excavation and dumping requirements based on the criterion that existing sediment/mud shall be left in place and not to be disturbed as far as possible.

4. Land Contamination

(i) The Applicant shall identify the potential land contamination site(s) within the Study Area (Figure 1 refers) and, if any, within the boundaries of associated areas (e.g. work areas) of the Project.

(ii) The Applicant shall provide a clear and detailed account of the present land use (including description of the activities, chemicals and hazardous substances handled, with clear indication of their storage and location, by reference to a site layout plan) and a complete past land uses history, in chronological order, in relation to possible land contamination (including accident records and change of land use(s) and the like).

(iii) If any contaminated land uses as stated in Section 3.1 of Annex 19 in the TM is identified, the Applicant shall carry out the land contamination assessment as detailed from sub-section (iv) to (vi) below and propose measures to avoid disposal.

(iv) During the course of the EIA study, the Applicant shall submit a Contamination Assessment Plan (CAP) to the Director for endorsement prior to conducting an actual contamination impact assessment of the land or site(s). The CAP shall include proposal with details on representative sampling and analysis required to determine the nature and the extent of the contamination of the land or site(s). Alternatively, the Applicant may refer to other previously agreed and still relevant and valid CAP(s) for the concerned site(s).

(v) Based on the endorsed CAP, the Applicant shall conduct a land contamination impact assessment and submit a Contamination Assessment Report (CAR) to the Director for endorsement. If land contamination is confirmed, a Remedial Action Plan (RAP) to formulate viable remedial measures with supporting documents, such as agreement by the relevant facilities management authorities, shall be submitted to the Director for approval. The Applicant shall then clean up the contaminated land or site(s) according to the approved RAP, and a Remediation Report (RR) to demonstrate adequate clean-up should be prepared and submitted to

the Director for endorsement prior to the commencement of any development or redevelopment works within the Study Area. The CAP, CAR and RAP shall be documented in the EIA report.

(vi) If there are potential contaminated sites which are inaccessible for conducting sampling and analysis during the course of the EIA study, e.g. due to site access problem, the Applicant's CAP shall include :

(a) a review of the available and relevant information;

(b) an initial contamination evaluation of these sites and possible remediation methods;

(c) a confirmation of whether the contamination problem at these sites would be surmountable;

(d) a sampling and analysis proposal which shall aim at determining the nature and the extent of the contamination of these sites ; and

(e) where appropriate, a schedule of submission of revised or supplementary CAP, CAR, RAP and RR as soon as these sites become accessible.

## Requirements for Ecological Impact Assessment (Terrestrial and Marine)

1. The Applicant shall examine the flora, fauna and other components of the ecological habitats within the assessment area. The aim shall be to protect, maintain or rehabilitate the natural environment. In particular, the Project shall avoid or minimise impacts on recognised sites of conservation importance and other ecologically sensitive areas. The assessment shall identify and quantify as far as possible the potential ecological impacts associated with the Project, both directly by physical disturbance and indirectly by change of water quality and hydrodynamic regime to important habitats and the associated wildlife groups/species.

2. The assessment shall include the following major tasks:

   (i) review the findings of relevant studies/surveys and collate the available information regarding the ecological characters of the assessment area;

   (ii) evaluate the information collected, identify any information gap relating to the assessment of potential ecological impacts, and determine the ecological field surveys and investigations that are needed for impact assessments as required under the following sections.

   (iii) carry out necessary ecological field surveys, the duration of which shall be at least 4 months, and investigations to verify the information collected, to fill the information gap and to fulfil the objectives of the EIA Study. The field surveys shall cover flora, fauna and any other habitats/species of conservation importance;

   (iv) establish the general ecological profile of the assessment area based on data of relevant previous studies/surveys and the results of the ecological field surveys and description of the characteristics of each habitat found. Major information to be provided shall include :

      (a) description of the physical environment, including all recognized sites of conservation importance and other ecologically sensitive area, and assessment of whether these sites will be affected by the Project or not;

      (b) habitat maps of suitable scale (1:1000 to 1:5000) showing the types and locations of habitats and species in the assessment area;

      (c) ecological characteristics of each habitat type such as size, vegetation and/or substrate type, species present, dominant species found, species richness and abundance of major taxa groups, seasonal patterns, inter-dependence of the habitats and species, and presence of any features of ecological importance;.

      (d) representative colour photos of each habitat type and any important ecological features identified; and

      (e) species found that are rare, endangered and/or listed under local legislation, international conventions for conservation of wildlife/habitats or red data books.

(v) investigate and describe the existing wildlife uses of various habitats with special attention to those wildlife groups and habitats with conservation interest, including but not limited to the following:

(a) woodland and plantations
(b) coastal/marine waters;
(c) intertidal, subtidal and benthic communities and coral communities
(d) mangroves;
(e) Chinese White Dolphins
(f) invertebrates (e.g. butterflies, odonates, crustaceans);
(g) vertebrates (e.g. avifauna, mammals, fish, herpetofauna etc.); and
(h) any other habitats / species identified as having special conservation interest by this EIA study

(vi) use suitable methodologies and consider also any works activities from other projects reasonably likely to occur at the time, identify and quantify as far as possible any direct (e.g. loss of habitats due to various elements and other associated works of the Project), indirect (e.g. change in water qualities, hydrodynamics properties, underwater noise and other disturbance generated by the construction and operational activities including dredging and marine traffic, etc), on-site, off-site, primary, secondary and cumulative ecological impacts on the wildlife groups and habitats identified such as destruction of habitats, reduction of species abundance/diversity, loss of feeding and breeding grounds, reduction of ecological carrying capacity and habitat fragmentation, in particular the following:

(a) loss of habitats as mentioned in Section (v) above;
(b) disturbance to animal and plants, especially those as mentioned in Section (v) above; and
(c) indirect ecological impacts due to potential changes in the water quality, hydrodynamics properties, sedimentation hydrology as a result of surface run-off and discharges on habitats as mentioned in Section (v) above during the construction and operation stages of the Project.

(vii) evaluate ecological impact based on the best and latest information available during the course of the EIA study, using quantitative approach as far as practicable and covering construction and operation phases of the Project as well as the subsequent management and maintenance requirement of the Project;

(viii) recommend possible and practicable mitigation measures such as alternative location, alignment, design and operational mode of the Project and modification/change of construction methods to avoid, minimize and/or compensate for the adverse ecological impacts identified during construction and operation of the Project;

(ix) evaluate feasibility and effectiveness of the recommended mitigation measures and define the scope, type, location, implementation arrangement, resources requirement, subsequent management and maintenance of such measures;

(x) determine and quantify as far as possible of the residual ecological impacts after implementation of the proposed mitigation measures;

(xi) evaluate the severity and acceptability of the residual ecological impacts using

well-defined criteria in Annex 8 of the TM and determine if off-site mitigation measures are necessary to mitigate the residual impacts by following the guidelines and requirements laid down in Annex 16 of the TM; and

(xii) review the need for and recommend any ecological monitoring programme required.

**Appendix F**

## Requirements for Fisheries Impact Assessment

1. Existing information regarding the assessment area shall be reviewed. Based on the review results, the assessment shall identify data gap and determine if there is any need for field surveys to collect adequate and updated baseline information. If field surveys are considered necessary, the assessment shall recommend appropriate methodology, duration and timing for such surveys.

2. The fisheries impact assessment shall cover any potential direct, indirect, short-term and long-term impacts on capture and culture fisheries during the construction and operation stages of the Project.

3. The fisheries impact assessment shall provide the following information:-

   (i) description of the physical environmental background;

   (ii) description and quantification of the existing fisheries activities;

   (iii) description and quantification of the existing fisheries resources;

   (iv) identification of parameters (e.g. water quality parameters) and sites of fisheries importance;

   (v) prediction and evaluation of any other direct/indirect, onsite/offsite impacts on fisheries (such as potential loss or disturbance of fishing grounds, fisheries habitats, spawning or nursery grounds, fishing activities; water quality deterioration at sensitive receivers such as fish culture zones and artificial reefs) caused by the Project;

   (vi) evaluation of cumulative impacts on fisheries due to other planned and committed concurrent development projects at or near the assessment area;

   (vii) proposals of practicable mitigation measures with details on justification, description of and programme feasibility as well as staff and financial implications including those related to subsequent management and maintenance requirements of the measures; and

   (viii) review for the need of monitoring during the construction and operation stages of the Project and, if necessary, proposal for a monitoring and audit programme.

**Appendix G**

## Requirements for Landscape and Visual Impact Assessment

1. The Applicant shall assess the landscape impact of the Project. The Applicant shall describe, appraise, analyse and evaluate the existing and future landscape resources and character of the study area. A system shall be derived for judging the landscape impact significance as required under the TM and the EIAO Guidance Note No. 8/2010 "Preparation of Landscape and Visual Impact Assessment under the EIAO". Clear illustrations of the landscape impact assessment are required.

2. The Applicant shall review relevant outline zoning plans, development permission area plans, outline development plans, layout plans, other published land use plans, planning briefs and studies which may identify areas of high landscape value and recommend conservation area, coastal protection area, open space, amenity area and green belt designations. Any guidelines on landscape strategies, landscape framework, urban design concept, special design area, open space network and landscape links that may affect the appreciation of the project should also be reviewed. The aim is to gain an insight to the future outlook of the area affected so as to assess whether the Project can fit into surrounding setting. Any conflict with the published land use plan(s) should be highlighted and appropriate follow-up action should be recommended.

3. The Applicant shall describe, appraise, analyze and evaluate the existing landscape resource and character of the assessment area. For judging landscape and visual impact significance, reference should be made to EIAO Guidance Note No. 8/2010 "Preparation of Landscape and Visual Impact Assessment under the Environmental Impact Assessment Ordinance". Annotated oblique aerial photographs and plans of suitable scale showing the baseline landscape character areas and landscape resources and mapping of impact assessment shall be extensively used to present the findings of the impact assessment. Descriptive text shall provide a concise and reasoned judgment from a landscape and visual point of view. The assessment shall particularly focus on the sensitivity of the landscape framework and its ability to accommodate change. The Applicant shall identify the degree of compatibility of the Project with the existing and planned landscape settings. The landscape impact assessment shall quantify the potential landscape impacts as far as possible, so as to illustrate the significance of such impacts arising from the Project. Clear mapping of the landscape impact is required. A broad brush tree survey shall be carried out for the 500m study area, while a detailed tree survey shall be carried out for the affected areas of the Project and the impacts on existing trees shall be addressed and summarized in the text. The detailed tree survey shall include but not limited to information such as the species, size (diameter at breast height, crown spread, overall height), health condition, location Cumulative landscape and visual impacts of the Project with other existing, committed and planned developments in the study area shall be assessed.

4. The Applicant shall assess the visual impacts of the Project. A system shall be derived for judging visual impact significance as required under the TM. Clear illustrations of visual impact assessment are required. The assessment shall include the following:

   (i) identification and plotting of visual envelope of the Project;

   (ii) identification of the key groups of existing and planned sensitive receivers within the visual envelope and their views at ground level, sea level and elevated vantage points;

(iii) evaluation of visual impacts, by taking into account the factors affecting the sensitivity of receivers (including value and quality of existing views, availability and amenity alternative views, type and estimated number of receiver population, duration of view and degree of visibility) and the magnitude of change of view (including compatibility of the Project with the surrounding landscape, seascape and planned setting, duration of impacts under construction and operation phases, scale of development, reversibility of change, viewing distance and potential blockage of view). The visual impacts of the Project with and without mitigation measures shall also be included so as to demonstrate the effectiveness of the proposed mitigation measures;

(iv) clear evaluations and explanation with supportive arguments of all relevant factors considered in arriving the significance thresholds of visual impacts.

5. Alternative layout, design, built-form and construction methods that would avoid or reduce the identified landscape and visual impacts, such as minimize the tree felling or tree transplants, shall be evaluated for comparison before adopting other mitigation or compensatory measures to alleviate the impacts. The Applicant shall recommend mitigation measures to minimise the adverse effects identified above. The mitigation measures proposed shall not only be concerned with damage reduction but shall also include consideration of potential enhancement of existing landscape and visual quality.

6. The mitigation measures may include provision of preservation of vegetation and natural coastline, transplanting, screen planting, sensitive design of structures, re-vegetation of disturbed land, woodland restoration, compensatory planting, provisioning/ reprovisioning of amenity areas and open spaces, colour scheme and texture of materials used and any measures to mitigate the impact on existing lands uses. Parties shall be identified and in-principle agreement shall be reached with the relevant authorities during the EIA stage for the ongoing management and maintenance of the proposed mitigation works to ensure their effectiveness throughout the operation phase of the Project. Presentation of photomontages of the Project in the existing and planned setting illustrating the effectiveness of the proposed mitigation measures shall be included.

7. Annotated illustration such as coloured perspective drawings, plans and section/elevation diagrams, oblique aerial photographs, photographs taken at vantage points and computer-generated photomontage, particularly from but not limited to the most severely affected vantage points shall be adopted to illustrate the significance of the visual impacts of the Project in four stages i.e. existing conditions, unmitigated impacts at Day 1, mitigated impacts at Day 1 and residual impact at Year 10. Options of design schemes shall be illustrated with photomontages to show the visual impact on the surrounding areas. True colour samples may be requested if found necessary and appropriate. Technical details in preparing the illustration, which may need to be submitted for verification of accuracy of the illustration shall be recorded. Computer graphics shall be compatible with Microstation DGN file format.

**Appendix H**

## Guidelines for Cultural Heritage Impact Assessment

(as at 12 January 2012)

### Introduction

The purpose of the guidelines is to assist the understanding of the requirements in assessing impact on archaeological and built heritage. The guidelines which will be revised by the Antiquities and Monuments Office (AMO) of the Leisure and Cultural Services Department from time to time, where appropriate, and when required should be followed in the interest of professional practice.

A comprehensive Cultural Heritage Impact Assessment (CHIA) includes a baseline study, an impact assessment study associated with the appropriate mitigation measures proposed and to be implemented by project proponents.

### (1) Baseline Study

1.1 A baseline study shall be conducted:

a. to compile a comprehensive inventory of heritage sites within the proposed project area, which include:

(i) all recorded sites of archaeological interest (both terrestrial and marine);
(ii) all declared monuments;
(iii) all proposed monuments;
(iv) all buildings/ structures/ sites graded or proposed to be graded by the Antiquities Advisory Board (AAB);
(v) Government historic sites identified by AMO;
(vi) buildings/ structures/ sites of high architectural / historical significance and interest which are not included in items (i) to (v) above.
(vii) cultural landscapes include places associated with historic event, activity, or person or exhibiting other cultural or aesthetic values, such as sacred religious sites, battlefields, a setting for buildings or structures of architectural or archaeological importance, historic field patterns, clan graves, old tracks, *fung shui* woodlands and ponds, and etc.

b. to identify the direct and indirect impacts on the heritage sites at the planning stage in order to avoid causing any negative effects. The impacts include the direct loss, destruction or disturbance of an element of cultural heritage, impact on its settings or impinging on its character through inappropriate sitting or design, potential damage to the physical fabric of archaeological remains and historic buildings/ structures/ sites through air pollution, change of ground water level, vibration, ecological damage, new recreation or other daily needs to be caused by the new development. The impacts listed are merely to illustrate the range of potential impacts and not intended to be exhaustive.

1.2 The baseline study shall also include a desk-top research and a field evaluation.

1.3. Desk-top Research

1.3.1 Desk-top research should be conducted to analyse, collect and collate the best available information. It shall include (if applicable) but not limited to:

a. List of declared and proposed monuments protected by the Antiquities and Monuments Ordinance (Chapter 53).
b. Graded and proposed graded historic buildings/ structures/ sites.
c. Government historic sites identified by AMO.
d. Lists and archives kept in the Reference Library of AMO including sites of archaeological interest, declared monuments, proposed monuments and recorded historic buildings/ structures/ sites identified by AMO.
e. Publications on local historical, architectural, anthropological, archaeological and other cultural studies, such as, Journals of the Royal Asiatic Society (Hong Kong Branch), Journals of the Hong Kong Archaeological Society, AMO Monograph Series and so forth.
f. Other unpublished papers, records, archival and historical documents through public libraries, archives, and the tertiary institutions, such as the Hong Kong Collection and libraries of the Department of Architecture of the University of Hong Kong and the Chinese University of Hong Kong, Public Records Office, photographic library of the Information Services Department and so forth.
g. Any other unpublished archaeological investigation and excavation reports kept by AMO.
h. Relevant information from AMO's website.
i. Historical documents in the Public Records Office, the Land Registry, District Lands Office, District Office and the Hong Kong Museum of History and so forth.
j. Cartographic and pictorial documents. Old and recent maps and aerial photos searched in the Map and Aerial Photo Library of the Lands Department.
k. Existing geological and topographic information (for archaeological desk-top research).
l. Discussion with local informants.

## 1.4 Field Evaluation

### 1.4.1 General

The potential value of the project area with regard the cultural heritage could be established easily where the area is well-documented. However, it does not mean that the area is devoid of interest if it lacks information. In these instances, site inspections and consultations with appropriate individuals or organisations should be conducted by those with expertise in local heritage to clarify the situation.

### 1.4.2 Field survey on historic buildings/ structures/ sites

a. Field scan of all the historic buildings/ structures/ sites within the project area.
b. Photographic recording of each historic building/ structure/ site including the exterior (the elevations of all faces of the building premises, the roof, close up for the special architectural details) and the interior (special architectural details), if possible, as well as the surroundings, the associated cultural landscape features and the associated intangible cultural heritage (if any) of each historic building/ structure/ site.
c. Interview with local elders and other informants on local historical, architectural, anthropological and other cultural information related to the historic buildings/ structures/ sites.
d. Historical and architectural appraisal of the historic buildings/ structures/ sites, their associated cultural landscape and intangible cultural elements.

1.4.3 Archaeological Survey

a. Appropriate methods for pricing and valuation of the archaeological survey, including by means of a Bill of Quantities or a Schedule of Rates should be adopted when appropriate in preparing specifications and relevant documents for calling tenders to carry out the archaeological survey. The specifications and relevant documents should be sent to AMO for agreement prior to calling tenders to conduct the archaeological survey.

b. For archaeologists involved in contract archaeological works, they should adhere to recognized standards for professional practice and ethical conduct in undertaking commissioned archaeological works under contracts. They should make themselves fully understand recognized principles and guidelines regarding contract archaeological works, such as those of the Institute for Archaeologists, European Associations of Archaeologists and in Mainland China.

c. A licence shall be obtained from the Antiquities Authority for conducting archaeological field work. It takes at least two months to process an application.

d. An archaeological brief/proposal, as an outline framework of the proposed archaeological works, should be prepared. The brief/proposal should clearly state the project and archaeological background, address necessary archaeological works required, elaborate the strategy and methodology adopted, including what particular research question(s) will be resolved, how the archaeological data will be collected and recorded, how the evidence will be analysed and interpreted and how the archaeological finds and results will be organized and made available. Effective field techniques including method and sampling details are required to be demonstrated clearly in the brief/proposal. Monitoring arrangement, reporting, contingency plan for field and post-excavation works and archive deposition (including finds, field and laboratory records, etc.) should also be addressed in the brief/proposal. The brief/proposal should be submitted to AMO for agreement prior to applying for a licence. Prior site visit to the project site before the submission of the brief/proposal is required so as to ascertain the feasibility of the proposed strategy and methodology as well as the availability of the proposed locations for auger survey and test pitting.

e. The following methods of archaeological survey (but not limited to) should be applied to assess the archaeological potential of the project area:

(i) Definition of areas of natural land undisturbed in the recent past.
(ii) Field scan of the natural land undisturbed in the recent past in detail with special attention paid to areas of exposed soil which were searched for artifacts.
(iii) Conduct systematic auger survey and test pitting. The data collected from auger survey and test pitting should be able to establish the horizontal spread of cultural materials deposits.
(iv) Excavation of test pits to establish the vertical sequence of cultural materials. The hand digging of 1 x 1 m or 1.5 x 1.5 m test pits to determine the presence or absence of deeper archaeological deposits and their cultural history.

(v) The quantity and location of auger holes and test pits should be agreed with AMO prior to applying for a licence. Additional auger holes and test pits may be required to ascertain and demarcate the extent of archaeological deposits and remains.

(vi) A qualified land surveyor should be engaged to record reduced levels and coordinates as well as set base points and reference lines in the course of the field survey.

(vii) All archaeological works should be properly completed and recorded to agreed standards.

f. Archaeologists should adhere to all the agreed professional and ethical standards for archaeological works, such as the standards and guidelines of the Institute for Archaeologists, English Heritage, European Associations of Archaeologists, Society for American Archaeology and in Mainland China.

g. A Marine Archaeological Investigation (MAI) following *Guidelines for MAI* may be required for projects involving disturbance of seabed.

1.4.4 If the field evaluation identifies any additional heritage sites within the study area which are of potential historic or archaeological importance/interest and not recorded by AMO, the findings should be reported to AMO as soon as possible.

1.5 The Report of Baseline Study

1.5.1 The study report should unequivocally include all the direct and concrete evidence to show that the process of the above desk-top and field survey has been satisfactorily completed. This should take the form of a detailed inventory of the heritage sites supported by full description of their significance. The description should contain detailed geographical, historical, archaeological, architectural, anthropological, ethnographic and other relevant data supplemented with illustrations below and photographic and cartographic records, if required.

1.5.2 A master layout plan showing all the identified archaeological and built heritage sites within the study area should be provided in the report. All the identified heritage sites should be properly numbered with their locations indicated on the master layout plan.

1.5.3 Historic Buildings/ Structures/ Sites

a. A map in 1:1000 scale showing the boundary of each historic item.
b. Photographic records of each historic item.
c. Detailed recording form of each historic item including its construction year, previous and present uses, architectural characteristics, as well as legends, historic persons and events, cultural landscape features and cultural activities associated with the structure.
d. A cross-referenced checklist including the reference number of each historic item, their photo and drawing reference, as well as the page number of the detailed recording form of each identified historic item for easy cross-checking of individual records.

1.5.4 Sites of Archaeological Interest

a. A map showing the boundary of each site of archaeological interest as supported

and delineated by field walking, augering and test-pitting.

b. Drawing of stratigraphic section of test-pits excavated which shows the cultural sequence of a site.
c. Reduced levels, coordinates, base points and reference lines should be clearly defined and certified by a qualified land surveyor.
d. *Guidelines for Archaeological Reports* should be followed (Annex 1).

1.5.5 A full bibliography and the source of information consulted should be provided to assist the evaluation of the quality of the evidence, including the title of the relevant material, its author(s), publisher, publication place and date. To facilitate verification of the accuracy, AMO will reserve the right to examine the full details of the research materials collected under the baseline study.

1.6 Finds and Archives

1.6.1 Archaeological finds and archives should be handled following *Guidelines for Handling of Archaeological Finds and Archives* (Annex 2).

1.7 Safety Issue

1.7.1 During the course of the CHIA Study, all participants shall comply with all Ordinances, Regulations and By-laws which may be relevant or applicable in safety aspect in connection with the carrying out of the CHIA Study, such as site safety, insurance for personal injuries, death and property damage as well as personal safety apparatuses, etc.

1.7.2 A Risk Assessment for the fieldwork shall be carried out with full consideration to all relevant Ordinances, Regulations and By-laws.

1.8 Information Disclosure

1.8.1 For releasing any information on the CHIA Study, the archaeologist/expert involved should strictly comply with the terms and conditions set in the contract/agreement and avoid conflict of interest.

**(2) Impact Assessment Study**

2.1 Identification of impact on heritage

2.1.1 The impact assessment study must be undertaken to identify the impacts on the heritage sites which will be affected by the proposed development subject to the result of desktop research and field evaluation. The prediction of impacts and an evaluation of their significance must be undertaken by expert(s) in local heritage.

2.1.2 During the assessment, both the direct impacts such as loss or damage of important features as well as indirect impacts should be clearly stated, such as adverse visual impact on heritage sites, landscape change to the associated cultural landscape features of the heritage sites, temporary change of access to the heritage sites during the work period, change of ground level or water level which may affect the preservation of the archaeological and built heritage *in- situ* during the implementation stage of the project.

2.1.3 The evaluation of cultural heritage impact assessment may be classified into five levels of significance based on type and extent of the effects concluded in the CHIA study:

a. Beneficial impact: the impact is beneficial if the project will enhance the preservation of the heritage site(s) such as improving the flooding problem of the historic building after the sewerage project of the area;
b. Acceptable impact: if the assessment indicates that there will be no significant effects on the heritage site(s);
c. Acceptable impact with mitigation measures: if there will be some adverse effects, but these can be eliminated, reduced or offset to a large extent by specific measures, such as conduct a follow-up Conservation Proposal or Conservation Management Plan for the affected heritage site(s) before commencement of work in order to avoid any inappropriate and unnecessary interventions to the building;
d. Unacceptable impact: if the adverse effects are considered to be too excessive and are unable to mitigate practically;
e. Undetermined impact: if the significant adverse effects are likely, but the extent to which they may occur or may be mitigated cannot be determined from the study. Further detailed study will be required for the specific effects in question.

2.1.4 Preservation in totality must be taken as the first priority as it will be a beneficial impact and will enhance the cultural and socio-economical environment if suitable measures to integrate the heritage site into the proposed project are carried out.

2.1.5 If, due to site constraints and other factors, only preservation in part is possible, this must be fully justified with alternative proposals or layout designs which confirm the impracticability of total preservation.

2.1.6 Total destruction must be taken as the very last resort in all cases and shall only be recommended with a meticulous and careful analysis balancing the interest of preserving local heritage as against that of the community as a whole. Assessment of impacts on heritage sites shall also take full account of, and follow where appropriate, paragraph 4.3.1(c), item 2 of Annex 10, items 2.6 to 2.9 of Annex 19 and other relevant parts of the Technical Memorandum on Environmental Impact Assessment (EIA) Process (Technical Memorandum).

2.2 Mitigation Measures

2.2.1 It is always a good practice to recognize the heritage site early in the planning stage and site selection process, and to avoid it, i.e. preserve it *in-situ*, or leaving a buffer zone around the site with full justifications demonstrating the best practice of heritage conservation.

2.2.2 Mitigation is not only concerned with minimizing adverse impact on the heritage site but also should give consideration of potential enhancement if possible (such as to improve the access to the heritage site or enhance the landscape and visual quality of the heritage site).

2.2.3 Mitigation measures shall not be recommended or taken as *de facto* means to avoid preservation of heritage sites. They must be proved beyond all possibilities to be

the only practical course of action. Heritage sites are to be in favour of preservation unless it can be demonstrated that there is a need for a particular development which is of paramount importance and outweighs the significance of a heritage site.

2.2.4 If avoidance of the heritage site is not possible, amelioration can be achieved by minimizing the potential impacts and the preservation of the heritage site, such as physically relocating it. Measures like amendments of the sitting, screening and revision of the detailed design of the development are required to lessen its degree of exposure if it causes visual intrusion to the heritage site and affects the character and integrity of the heritage site.

2.2.5 A rescue programme, when required, may involve preservation of the historic building or structure together with the relics inside, and its historic environment through relocation, detailed cartographic and photographic survey or preservation of site of archaeological interest "by record", i.e. through excavation to extract the maximum data as the very last resort.

2.3 The Impact Assessment Report

2.3.1 A detailed description and plans should be provided to elaborate on the heritage site(s) to be affected. Besides, please also refer to paragraph 4.3.1(d), items 2.10 to 2.14 of Annex 19 and other relevant parts of the Technical Memorandum and the Guidance Notes, other appropriate presentation methods for mitigation proposals like elevations, landscape plan and photomontage shall be used in the report extensively for illustrating the effectiveness of the measures.

2.3.2 To illustrate the landscape and visual impacts on heritage sites, as well as effects of the mitigation measures, choice of appropriate presentation methods is important. These methods include perspective drawings, plans and section/ elevation diagrams, photographs on scaled physical models, photo-retouching and photomontage. These methods shall be used extensively to facilitate communication among the concerned parties.

2.3.3 The implementation programme for the agreed mitigation measures should be able to be executed and should be clearly set out in the report together with the funding proposal. These shall form an integral part of the overall redevelopment project programme and financing of the proposed redevelopment project. Competent professionals must be engaged to design and carry out the mitigation measures.

2.3.4 For contents of the implementation programme, reference can be made to Annex 20 of the Technical Memorandum and the Guidance Notes. In particular, item 6.7 of Annex 20 requires to define and list out clearly the proposed mitigation measures to be implemented, by whom, when, where, to what requirements and the various implementation responsibilities. A comprehensive plan and programme for the protection and conservation of the preserved heritage site, if any, during the planning and design stage of the proposed project must be addressed in details.

2.3.5 Supplementary information to facilitate the verification of the findings shall be provided in the report including but not limited to:

a. layout plan(s) in a proper scale illustrating the location of all heritage sites within the study area, the extent of the work area together with brief description

of the proposed works;

b. all the heritage sites within the study area should be properly numbered, cross-reference to the relevant drawings and plans.
c. an impact assessment cross-referenced checklist of all the heritage sites within the study area including heritage site reference, distance between the heritage site and work area, summary of the possible impact(s), impact level, summary of the proposed mitigation measure(s), as well as references of the relevant plans, drawings and photos; and
d. a full implementation programme of the mitigation measures for all affected heritage sites to be implemented with details, such as by whom, when, where, to what requirements and the various implementation responsibilities of individual parties.

* *This Guidelines for Cultural Heritage Impact Assessment was first set out in August 2008 based on the Criteria for Cultural Heritage Impact Assessment and revised subsequently in December 2008, July 2010, October 2010, March 2011, April 2011 and January 2012.*

**Annex 1**

## Guidelines for Archaeological Reports
**(As at April 2011)**

## I. General

1. All reports should be written in a clear, concise and logical style.
2. All the constituent parts (text, figures, photos and specialist reports (if any)) should provide full cross-reference. Readers should be able to find their way around the report without difficulty.
3. The reports should be submitted in A4 size and accompanying drawings of convenient sizes.
4. Draft reports should be submitted to the Antiquities and Monuments Office (AMO) for comments within two months after completion of archaeological work unless otherwise approved by AMO.
5. The draft reports should be revised as required by AMO and relevant parties. The revised reports should be submitted to AMO within three weeks after receiving comments from AMO and relevant parties.
6. At least 5 hard copies of the final reports should be submitted to AMO for record purpose.
7. At least 2 digital copies of the final reports in both Microsoft Word format and Acrobat (.PDF) format without loss of data and change of appearance compared with the corresponding hard copy should be submitted to AMO. The digital copies should be saved in a convenient medium, such as compact discs with clear label on the surface and kept in protective pockets.
8. Errors are the responsibilities of the author(s) and should so far as possible be identified and rectified before submission to AMO.
9. The guidelines which will be revised by the AMO of the Leisure and Cultural Services Department from time to time, where appropriate, and when required should be followed in the interest of professional practice.

## II. Suggested Format of Reports

1. Front page:
   - Project/Site name
   - Nature of the report
     e.g. (Draft/Final)
     Archaeological Investigation/Survey Report
     Archaeological Impact Assessment Report
     Watching Brief Report
     Rescue Excavation Report
     Post-excavation Report
   - Organization
   - Date of report

2. Contents list
   Page number of each section should be given.

3. Non-technical summary (both in English and Chinese with approximate 150 - 300 words each)
   This should outline in plain, non-technical language, the principal reasons for the archaeological work, its aims and main results, and should include reference to

authorship and commissioning body.

4. Introduction
This should set out background leading to the commission of the reports. The location, area, scope and date of conducting the archaeological work must be given. The location of archaeological work should be shown on maps in appropriate scales and with proper legends.

5. Aims of archaeological work
These should reflect the aims set in the project design.

6. Archaeological, historical, geological and topographical background of the site
Supporting aerial photos and maps (both old and present) in appropriate scales, with proper legends and with the site locations clearly marked on should be provided.

7. Methodology
The methods used including any variation to the agreed project design should be set out clearly and explained as appropriate.

8. Results
- The results should outline the findings, known and potential archaeological interests by period and/or type. Their significance and value with reference/inclusion of supporting evidence should be indicated. If more than one interpretation is possible, the alternatives should also be presented, at least in summary.
- The results should be amplified by the use of drawings and photographs.
- Tables summarizing features and artifacts by trench/grid/test pit together with their interpretation should be included.
- The method, sampling details, results and interpretation as well as appropriate supporting data of the analysis for the environmental materials, e.g. ecofacts identified and/or collected during the fieldwork should be included.
- For impact assessment, the likely effect of the proposed development on the known or potential archaeological resource should be outlined.

9. Conclusion
This should include summarization and interpretation of the result.

10. Recommendation
Recommendations on further work and the responsible party as well as a brief planning framework should be outlined.

11. Reference and bibliography
A list of all primary and secondary sources including electronic sources used should be given in full detail, including the title of the relevant material, its author(s), publisher, publication place and date.

12. Archaeological team
The director and members of the archaeological team and the author(s) of the report should be clearly specified.

13. Copyright and dissemination
The copyright of the report should be clearly identified. To facilitate future research

studies, please specify that the report can be made available to the public in the Reference Library of the Heritage Discovery Centre.

14. Supporting illustrations

They should be clearly numbered and easily referenced to the text. They should be scanned and saved in TIFF or JPEG formats.

A. Maps

A location plan of the project site should be included. Archaeological work locations, such as auger hole and test pit locations (with relevant coordinates certified by a qualified land surveyor), should be clearly shown on maps in appropriate scales, with proper legends, grid references (in 8 digits) and captions.

B. Drawings of test pits, archaeological features, special finds[1], selected representative samples from general finds

Drawings of all excavated test pits (at least one cross section of each test pit), all excavated archaeological features (both plan and cross section of each archaeological feature), all special finds identified in the excavation and selected representative samples from general finds (at least front view and section of each finds) should be included. All drawings should be clearly numbered and easily referenced to the text. The drawing scales stipulated below should be followed:

| | |
|---|---|
| Cross section and profile drawings of test pits | 1:20 |
| Archaeological feature drawings | 1:10 |
| Finds drawings | 1:1 |

If drawings of the above stated scales are not appropriate to be incorporated into the report under certain occasions, reduced copy of the drawings with the same scales are acceptable. Proper captions, legends and indication of reduced size should be given.

C. Photos of project site and the surrounding area, test pits, archaeological features, special finds, selected representative samples from general finds

Photos of project site and the surrounding area, all excavated test pits (at least one cross section of each test pit), all excavated archaeological features (both plan and cross section of each archaeological feature), all special finds identified in the excavation and selected representative samples from general finds (at least front view of each of the finds) should be included. All photos should be at least in 3R size with proper captions and scales. They should be clearly numbered and easily referenced to the text. They should be scanned and saved in TIFF or JPEG formats.

15. Supporting data in appendices

These should consist of essential technical details to support the result. These may include stratigraphic record of test pits and auger holes, records of general and special finds as well as ecofacts discovered with description, quantity and context number/stratigraphic sequence, result of laboratory testing, index of field archives.

[1] Special finds are sometimes known as small finds (小件) in Chinese or registered finds. Drawings and photos of the special/small/registered finds should be included in the archaeological report.

16. Other professional views/comments
This can reflect any issues/difficulties regarding the archaeological project observed/encountered by the archaeological team.

17. Comment and response
All comments and responses from AMO and relevant parties should be attached in full.

## III. Green Measures

1. All reports should be of single line spacing and printed on both sides of the paper.

2. Excessive page margins should be avoided. A top/bottom margin of 2 cm and left/right margin of 2.5 cm are sufficient.

3. Use of blank paper should be avoided as far as possible.

4. Suitable font type of font size 12 should be used generally in balancing legibility and waste reduction objective.

**Annex 2**

## Guidelines for Handling of Archaeological Finds and Archives

**(As at November 2011)**

## I. General Remark

1. The guidelines which will be revised by the Antiquities and Monuments Office (AMO) of the Leisure and Cultural Services Department from time to time, where appropriate, and when required should be followed in the interest of professional practice.

2. Please use the site code ( _____ )** for the archaeological project, namely _____. Licensee must use this unique site code for the whole project.

   ** If an archaeological project covers more than one archaeological site/location, licensee should contact the Central Archaeological Repository (CAR) at 2384 5446 or aciamoar@lcsd.gov.hk to obtain relevant site codes.

3. Licensee should contact the CAR at 2384 5446 or aciamoar@lcsd.gov.hk regarding the handover of archaeological finds and archives when post-excavation research and excavation report have been completed and accepted by the AMO.

4. If a huge quantity of similar general finds was discovered from a single archaeological project, licensee is advised to consult the AMO regarding the collecting strategy as early as possible.

5. For the preparation of archaeological finds and archives for long-term curation by the CAR, the guidelines as set out below should be followed.

6. If the licensee does not handle the finds and archives in accordance with this guidelines, the AMO may inform the project proponent to revise the relevant data. The arrangement of handover may subsequently be deferred.

## II. Archaeological Finds

7. Cleaning

   The excavated finds should be properly cleaned with water, except: (i) the finds are identified for scientific analysis; (ii) metal & organic objects (e.g. bone, wood, leather, textile objects and etc.) should not be cleaned with water. Licensee is advised to consult the AMO if in doubt.

8. Marking

   - The excavated finds should be cleaned before marking object number.
   - "Sandwich" technique[1] should be adopted for marking permanent object

[1] ***Steps for "Sandwich" technique***

1. First of all, the find number should be marked in appropriate area and size that does not impact important diagnostic or aesthetic parts of the find.
2. Clean the area to be marked.
3. Apply a thin coat of clear reversible lacquer on the area. Use white lacquer if the object is dark in colour. Let the base coat dry completely.
4. Use a permanent water-based ink to write the find number on top of the base coat. Let ink dry completely.
5. Apply a top coat of clear varnish.

number.

- Each special find should be marked with site code, context number and SF number, etc.
- Any representative samples selected from the general finds for discussion on the excavation report should be marked with site code, context number, sample number and bagged separately.
- The general finds should be marked with site code and context number.
- For the finds which are too small, organic objects (e.g. bone, wood, leather, textile objects and etc.) or have unstable surface, object number should not be marked on the object directly. These finds should be bagged separately and attached with a label containing information about the site code, context number, find number and description of find.

9. Labeling and bagging

- Two labels should be provided for each bag which contains finds, one is adhered on the surface of the bag while the other is kept inside the bag for easy reference.
- The label inside the bag should be kept separately with a smaller plastic bag so that the label can be kept much longer.
- Information about the site code, context number, test-pit number, object number (or bag number) and description of finds should be written clearly on the label.
- Finds under the same context should be bagged together. If those finds, however, have been categorized according to their typology, materials or characteristics, separate bagging is required.

10. Conservation

- To refit and reconstruct pottery vessels with appropriate adhesive. A heat and waterproof adhesive, e.g. product of H. Marcel Guest Ltd., is recommended.
- Any adhesives which are not reversible or would damage the finds should not be applied on the finds. Archaeologist is advised to consult the AMO if in doubt.

11. Finds register

A standard finds register, for both special finds and general finds, with information about the find's number, name, description, quantity, type, weight, dimensions and field data should be duly filled in. Licensee should contact the CAR at 2384 5446 or aciamoar@lcsd.gov.hk to obtain the standard finds register (in Excel format). Special finds and general finds should be inputted in individual register. Both hard & soft copies (in Excel format) of the duly completed register should be handed over.

12. Sample register of eco-facts

A clear sample register with information about the description of the sample, quantity, type and weight should be prepared for handover.

6. Let the marking dry completely before packing.

## III. Field Records and Finds Processing Records

13. Field records include field diary, site record for individual test pit/trench/square, context recording sheet, special finds recording sheet, soil sample & eco-facts sample recording sheet, map, survey sheet, photograph/ audio-visual records, etc.

14. Finds processing records include conservation record, measured drawings and photographs, laboratory reports, etc.

15. Measured drawing, both hard & soft copies (in pdf format), and photograph (in jpg format) of each special find should be handed over.

16. All the aforesaid records stated in paragraphs 12 to 14 should be handed over to the CAR when post-excavation research and excavation report have been completed. Please note:
    - all the field records should be submitted together with indexes.
    - the video footage should be submitted together with index describing the content of the video footage.
    - all the slides, colour/ black & white negatives or digital photographs should be submitted together with photo register.

## IV. Handover of Finds

17. Packing
    - Each special find should be packed and protected with tissue paper, bubble sheet or P.E. foam to avoid shocking when transporting to the repository. No packing material other than the aforesaid items should be used.
    - The general finds should be protected with bubble sheet or P.E. foam and packed in heavy duty plastic container.
    - The heavy duty plastic container, e.g. product of the Star Industrial Co., Ltd. (No. 1849 or 1852), is recommended.
    - For oversized finds, prior advice on packing method should be sought from the AMO.

18. Handover procedure
    - The licensee should make an appointment with the CAR for the handover and arrange to transport the finds and archives to the repository.
    - Prior to handover, licensee is required to supply with the aforesaid finds register, field records register and associated records to the CAR for checking at least three working days in advance. Exact date of handover will be arranged subsequently.
    - Handover forms for finds and archives should be signed by the representatives of the licensee and the AMO.

## Guidelines for Marine Archaeological Investigation (MAI)

The standard practice for MAI should consist of four separate tasks, viz. (1) Baseline Review, (2) Geophysical Survey, (3) Establishing Archaeological Potential and (4) Remote Operated Vehicle (ROV)/Visual Diver Survey/Watching Brief. Marine archaeologists should make reference to the standard and guidance of the Institute for Archaeologists and English Heritage to carry out MAI.

1. Baseline Review

1.1 A baseline review should be conducted to collate the existing information in order to identify the potential for archaeological resources and, if identified, their likely character, extent, quality and value.

1.2 The baseline review will focus on known sources of archive data. It will include:

(a) Geotechnical Engineering Office (GEO) – the Department holds extensive seabed survey data collected from previous geological research.

(b) Marine Department, Hydrographic Office - the Department holds a substantial archive of hydrographic data and charts.

(c) The Royal Naval Hydrographic Department in the UK – the Department maintains an archive of all survey data collected by naval hydrographers.

(d) Relevant government departments should be consulted in order to obtain the information of dredging history (if any) on the proposed project area. Area for sand dredging, mud disposal and allocated marine borrow area within Hong Kong should also be considered during the review.

1.3 The above data sources will provide historical records and more detailed geological analysis of submarine features which may have been subsequently masked by more recent sediment deposits and accumulated debris.

2. Geophysical Survey

2.1 Extensive geophysical survey of the study area should deploy high resolution boomer, side scan sonar, an echo sounder and high resolution multi beam sonar. The multi beam data must be presented as processed digital terrain models to facilitate the archaeological analysis. The data received from the survey would be analysed in detail to provide:

(a) exact definition of the areas of greatest archaeological potential.

(b) assessment of the depth and nature of the seabed sediments to define which areas consist of suitable material to bury and preserve archaeological material.

(c) detailed examination of the boomer and side scan sonar records to map anomalies in and on the seabed which may be archaeological material.

(d) detailed examination of the multi beam sonar data to assess the archaeological potential of the sonar contacts.

3. Establishing Archaeological Potential

3.1 The data examined during Task 1 and 2 will be analysed to provide an indication of the likely character and extent of archaeological resources within the study area. This would facilitate formulation of a strategy for investigation.

3.2 The results would be presented as a written report and charts. If there is no indication of archaeological material there would be no need for further work.

3.3 Charts should be presented at the most appropriate scale and show each survey contact. Its dimensions and exact location should also be shown.

4. Remote Operated Vehicle (ROV)/Visual Diver Survey/Watching Brief

4.1 Subject to the outcome of Tasks 1, 2 and 3, accepted marine archaeological practice would be to plan a field evaluation programme to acquire more detailed data on areas identified as having archaeological potential. The areas of archaeological interest can be inspected by ROV or divers. ROV or a team of divers with both still and video cameras would be used to record all seabed features of archaeological interest.

4.2 Owing to the heavy marine traffic in Hong Kong, the ROV/visual diver survey may not be feasible to achieve the target. If that is the case, an archaeological watching brief is the most appropriate way to monitor the dredging operations in areas of identified high potential to obtain physical archaeological information.

4.3 A sampling strategy for an archaeological watching brief would be prepared based on the results of Tasks 1, 2 and 3 to focus work on the areas of greatest archaeological potential. Careful monitoring of the dredging operations would enable immediate identification and salvage of archaeological material. If archaeological material is found, the AMO should be contacted immediately to seek guidance on its significance and appropriate mitigation measures would be prepared.

4.4 If Task 4 is undertaken, the results would be presented in a written report with charts.

**Report**

5. Five copies of the final report should be submitted to the AMO for record.

**Appendix J**

## Implementation Schedule of Recommended Mitigation Measures

| EIA Ref. | EM&A Ref. | Recommended Mitigation Measures | Objectives of the Measures & Main Concerns to Address | Who to implement the measure? | Location of the measure | When to implement the measure? | What standards or requirements for the measure to achieve? |
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**Appendix K**

## Requirements for EIA Report Documents

1. The Applicant shall supply the Director with the following number of copies of the EIA report and the executive summary:

   (i) 30 copies of the EIA report and 30 copies of the executive summary (each bilingual in both English and Chinese) as required under Section 6(2) of the EIAO to be supplied at the time of application for approval of the EIA report.

   (ii) When necessary, addendum to the EIA report and the executive summary submitted in item (i) above as required under Section 7(1) of the EIAO, to be supplied upon advice by the Director for public inspection.

   (iii) 20 copies of the EIA report and 50 copies of the executive summary (each bilingual in both English and Chinese) with or without Addendum as required under Section 7(5) of the EIAO, to be supplied upon advice by the Director for consultation with the Advisory Council on the Environment.

2. In addition, to facilitate public inspection of EIA report via EIAO Internet Website, the Applicant shall provide electronic copies of both the EIA report and executive summary prepared in Hyper Text Markup Language (HTML) (version 4.0 or later) and in Portable Document Format (PDF version 1.3 or later), unless otherwise agreed by the Director. For the HTML version, a content page capable of providing hyperlink to each section and sub-section of the EIA report and executive summary shall be included in the beginning of the document. Hyperlinks to figures, drawings and tables in the EIA report and executive summary shall be provided in the main text from where respective references are made. Graphics in the report shall be in interlaced GIF format unless otherwise agreed by the Director.

3. The electronic copies of the EIA report and the executive summary shall be submitted to the Director at the time of application for approval of the EIA report.

4. When the EIA report and the executive summary are made available for public inspection under Section 7(1) of the EIAO, the content of the electronic copies of the EIA report and the executive summary must be the same as the hard copies and the Director shall be provided with the most updated electronic copies.

5. To promote environmentally friendly and efficient dissemination of information, both hardcopies and electronic copies of future EM&A reports recommended by the EIA study shall be required and their format shall be agreed by the Director.