

ENVIRONMENTAL IMPACT ASSESSMENT ORDINANCE (CAP. 499)
SECTION 5(7)

ENVIRONMENTAL IMPACT ASSESSMENT STUDY BRIEF NO. ESB-279/2014

PROJECT TITLE: **DRAINAGE IMPROVEMENT WORKS NEAR FOUR VILLAGES IN YUEN LONG – SUNG SHAN NEW VILLAGE, TAI WO, LIN FA TEI AND HA CHE**
(hereinafter known as the “Project”)

NAME OF APPLICANT: **DRAINAGE SERVICES DEPARTMENT**
(hereinafter known as the “Applicant”)

1. BACKGROUND

- 1.1 An application (No. ESB-279/2014) 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 3 September 2014 with a Project Profile (No. PP-515/ 2014) (hereinafter referred as the “Project Profile”).
- 1.2 The Project comprises drainage improvement works near four villages in Yuen Long to improve the drainage conditions in the areas. The scope of works mainly consists of the following:
- (i) Sung Shan New Village – Upgrading of the existing stream to around 12m(W) x 3.5m(H) trapezoidal/ rectangular channel of length around 610m;
 - (ii) Tai Wo – Provision of a 1m(W) x 1.5m(H) open channel of length around 275m;
 - (iii) Lin Fa Tei – Provision of a 2m wide trapezoidal/ rectangular channel from upstream of Lin Fa Tei stream to Shui Tsan Tin stream and upgrading of existing Lin Fa Tei stream to 1m wide trapezoidal/ rectangular channel. Total length of around 1450m;
 - (iv) Ha Che - Upgrading of existing stream to 3 to 4.5m(W) x 2 to 3m(H) trapezoidal/ rectangular channel of length around 990m.
- 1.3 The proposed drainage works near the four villages are located less than 300m from the boundaries of existing “Conservation Areas” (“CA”) under the various Outline Zoning Plans. The Project locations are shown in Appendix A of this EIA Study Brief.
- 1.4 The Project is a designated project under Item I.1(b) of Part I, Schedule 2 the EIAO, i.e. A drainage channel or river training and diversion works which discharges or discharge into an area which is less than 300m from the nearest boundary of an existing or planned (i) site of special scientific interest; (ii) site of cultural heritage; (iii) marine park or marine reserve; (iv) fish cultural zone; (v) wild animal protection area; (vi) coastal protection area; or (vii) conservation area.
- 1.5 Pursuant to section 5(7)(a) of the EIAO, the Director of Environmental Protection (the Director) issues this EIA Study Brief to the Applicant to carry out an EIA study.
- 1.6 The purpose of this EIA study is to provide information on the nature and extent of environmental impacts arising from construction and operation of the Project and related activities taking place concurrently. This information will contribute to decisions by the Director on:

- (i) the acceptability of adverse environmental consequences that are likely to arise as a result of the Project;
- (ii) the conditions and requirements for the design, construction and operation of the Project to mitigate against adverse environmental consequences; 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/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 wildlife habitats;
- (v) to identify any negative impacts on sites of cultural heritage and to propose measures to mitigate these impacts;
- (vi) to identify and evaluate any potential landscape and visual impacts and to propose measures to mitigate these impacts;
- (vii) to propose the provision of infrastructure or mitigation measures to minimise pollution, environmental disturbance and nuisance during the construction and operation of the Project;
- (viii) to investigate the feasibility, effectiveness and implications of the proposed mitigation measures;
- (ix) 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 potentially affected uses;
- (x) to identify, assess 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;
- (xi) to design and specify environmental monitoring and audit requirements; and
- (xii) 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 EIA Study Brief is to scope the key issues of the EIA study and to specify the environmental issues that are required to be reviewed and assessed in the EIA report. The Applicant has to demonstrate in the EIA report that the criteria in the relevant sections of the Technical Memorandum on Environmental Impact Assessment Process of the EIAO (hereinafter referred to as the “TM”) are fully complied with.

3.2 The Scope

3.2.1 The scope of this EIA study shall cover the Project mentioned in section 1.2 of this EIA Study Brief. The EIA study shall address the likely key issues described below, together with any other key issues identified during the course of the EIA study:

- (i) the potential air quality impacts on air sensitive receivers during the construction phase of the Project, including fugitive dust emission arising from the handling and transportation of soils and spoil materials;
- (ii) the potential noise impacts arising from Powered Mechanical Equipment (PME) used during the construction phase of the Project to the Noise Sensitive Receivers (NSRs) in the vicinity;
- (iii) the potential ecological impacts arising from works within and adjacent to the existing stream courses, in particular loss of aquatic, riparian and wetland habitats, disturbance to associated wildlife and deterioration in water quality due to sedimentation and re-suspension of pollutants;
- (iv) the potential water quality impacts caused by site run-off and any other potential release to the aquatic environment due to works activities during construction, especially during rainy season;
- (v) the potential waste management issues and impacts arising from the construction of the Project, including handling and disposal of construction and demolition materials, some chemical waste, general refuse and contaminated sediments from construction of drainage improvement works;
- (vi) the potential land contamination caused by car workshops and open storage area located close to the works sites;
- (vii) the potential landscape and visual impacts during construction and operation of the Project, including establishment of work areas, stockpile of construction materials, erection of temporary structures, potential loss of trees and vegetation, etc;
- (viii) the potential cultural heritage impacts caused by the Project;

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

3.3 Consideration of Alternatives

3.3.1 Background and History of the Project

The Applicant shall provide information on the background and history of the Project, including the purpose and objectives of the Project, and describe the scenarios with and without the Project.

3.3.2 Consideration of Alternative Alignment, Design and Layout

The Applicant shall present in the EIA report the consideration of alternative alignment, design and layout of the Project with a view to avoiding or minimizing any adverse environmental impacts during construction and operation of the Project. Factors or constraints affecting the alignment, design and layout of the Project shall be stated.

3.3.3 Consideration of Alternative Construction Methods and Sequences of Works

Taking into consideration of the combined effect with respect to the severity and duration of the construction impacts to the affected sensitive receivers, the EIA study shall explore different construction methods, access roads for heavy vehicles and sequences of works of the Project with a view to avoiding or minimizing adverse environmental impacts during construction of the Project. A comparison of the environmental benefits and disbenefits of applying different construction methods and sequences of works shall be included in the EIA study.

3.4 Technical Requirements

The Applicant shall conduct the EIA study to address the environmental aspects of the Project as described in section 3.2 above. The assessment shall be based on the best and latest information available during the course of the EIA study. The Applicant shall include in the EIA report details of the construction and operational programme and the methodologies for assessing the environmental impacts of the Project. The Applicant shall clearly state in the EIA report the time frame and works programmes of the Project and other concurrent projects, and assess the cumulative environmental impacts from the Project and the interacting projects as identified in the EIA study.

The EIA study shall include the following technical requirements on specific impacts.

3.4.1 Air Quality Impact

3.4.1.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing air quality impact as stated in Annexes 4 and 12 of the TM respectively.

3.4.1.2 The assessment area for air quality impact assessment shall be defined by a distance of 500 metres 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 assessment area as well as areas where air quality may be potentially affected by the Project. The assessment shall be based on the best/ latest available information at the time of the assessment.

- 3.4.1.3 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.
- 3.4.1.4 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.
- 3.4.1.5 The assessment of the air quality impact arising from the construction of the Project shall follow the detailed technical requirements given in Appendix B of this EIA Study Brief.

3.4.2 Noise Impact

- 3.4.2.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing noise impact as stated in Annexes 5 and 13 of the TM.
- 3.4.2.2 The assessment area for the noise impact assessment shall generally include areas within 300 metres from the boundary of the Project site. The assessment area could be reduced accordingly if the first layer of noise sensitive receivers (NSRs), closer than 300 metres from the outer Project limit, provides acoustic shielding to those receivers at distances further away from the Project. The assessment area shall be expanded to include NSRs at distances over 300 metres from the Project which are affected by the construction and operation of the Project.
- 3.4.2.3 The noise impact assessment for construction of the Project shall follow the detailed technical requirements given in Appendix C of this EIA Study Brief.

3.4.3 Ecological Impact

- 3.4.3.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing ecological impact as stated in Annexes 8 and 16 of the TM.
- 3.4.3.2 The assessment area for the purpose of this ecological impact assessment shall include all areas within 500 metres distance from site boundary of the Project, including the ecologically important stream at Cheung Po, and the associated access road/ facilities as well as the area likely to be impacted by the Project. For aquatic ecology, the assessment area shall be the same as the water quality impact assessment described in section 3.4.4.2.
- 3.4.3.3 The ecological impact assessment for construction of the Project shall follow the detailed technical requirements given in Appendix D of this EIA Study Brief.
- 3.4.3.4 If any fish ponds are identified to be affected by the Project through on-site survey, the Applicant is required to perform a fisheries impact assessment.

3.4.4 Water Quality Impact

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

3.4.4.2 The study area for this water quality impact assessment shall include areas within 500 metres from the site boundary of the Project and shall cover the Deep Bay 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.

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

3.4.5 Waste Management

3.4.5.1 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.

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

3.4.6 Land Contamination Impact

3.4.6.1 The Applicant shall follow the guidelines for evaluating and assessing potential land contamination issues as stated in Sections 3.1 and 3.2 of Annex 19 of the TM.

3.4.6.2 The land contamination assessment for the Project shall follow the detailed technical requirements given in Appendix G of this EIA Study Brief.

3.4.7 Landscape and Visual Impacts

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

3.4.7.2 The study area for the landscape impact assessment shall include areas within a distance of 100 metres from the site boundary of the Project while the study area for the visual impact assessment shall be defined by the visual envelop of the Project.

3.4.7.3 The landscape and visual impact assessment for the construction and operation of the Project shall follow the detailed technical requirements given in Appendix H of this EIA Study Brief.

3.4.8 Impact on Cultural Heritage

3.4.8.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing the cultural heritage impacts as stated in Annexes 10 and 19 of the TM respectively.

3.4.8.2 The applicant shall engage a qualified archaeologist to conduct an archaeological review based on the best available information to identify whether there is any archaeological potential. The review shall take into account the results of previous archaeological impact assessment and relevant data.

3.4.8.3 If archaeological potential is identified and the necessity for further investigation is confirmed due to changes of scope of works, alignments or etc., an Archaeological Impact Assessment (AIA) shall be carried out to ascertain the archaeological impact caused by the Project.

3.4.8.4 The cultural heritage impact assessment shall include built heritage impact assessment (BHIA).

3.4.8.5 Details of the technical requirements of the AIA and BHIA are shown in Appendix I.

3.4.9 Summary of Environmental Outcomes

3.4.9.1 The EIA report shall contain a summary of all mitigation measures proposed and a summary of the 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 and environmental benefits of the environmental protection measures recommended.

3.4.10 Environmental Monitoring and Audit (EM&A) Requirements

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

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

3.4.10.3 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 all the EIA study recommendations and mitigation measures with reference to the implementation programme 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.
- 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 Applicant for this EIA Study Brief during the course of the 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-515/2014), 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 the additional issues, if any, that the EIA study must also address. If the changes to the Project fundamentally alter the key scope of this EIA Study Brief, the Applicant shall apply to the Director for a fresh EIA study brief.

7. LIST OF APPENDICES

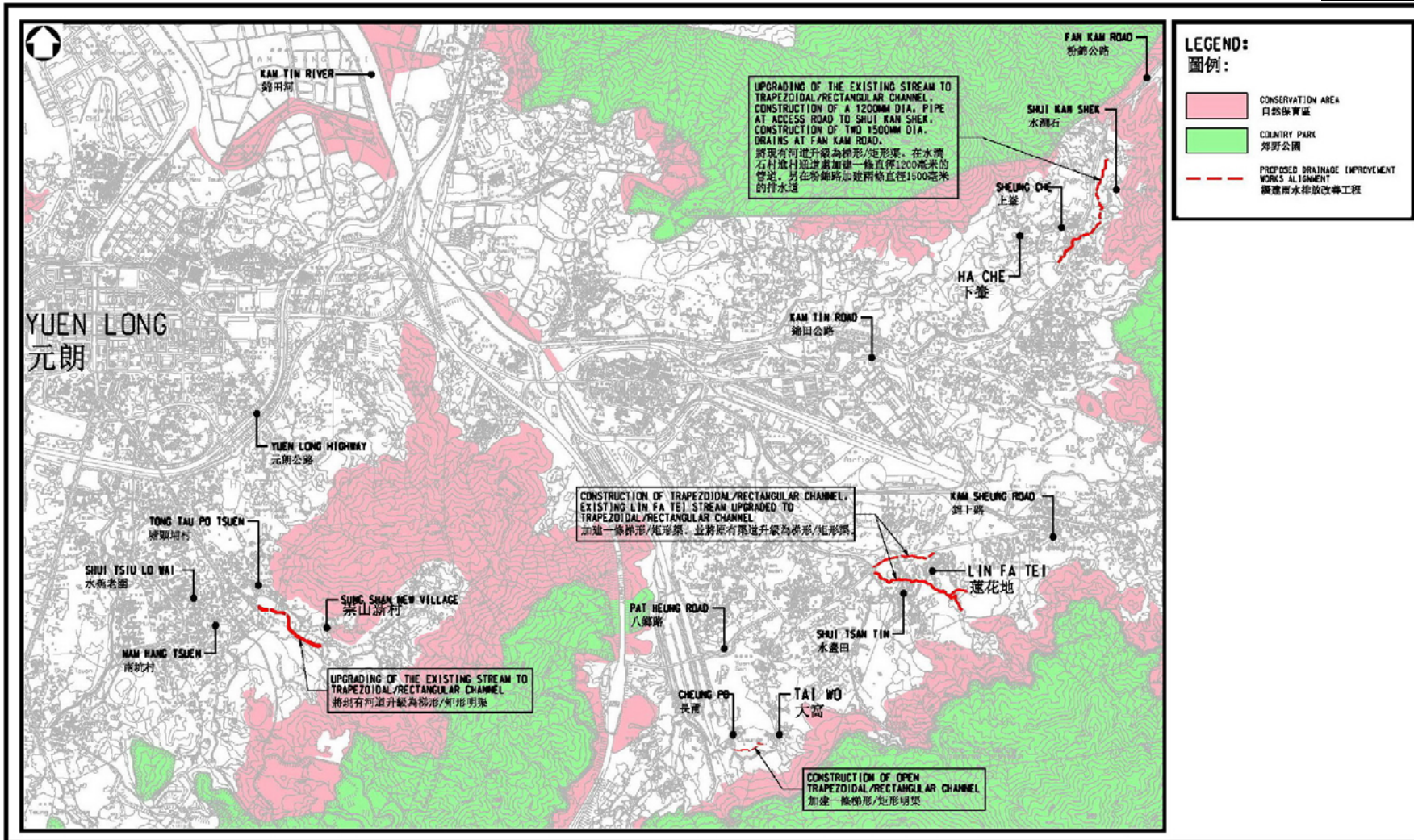
7.1 This EIA Study Brief includes the following appendices:

- Appendix A – Project Location Plan
- Appendix B – Requirements for Air Quality Impact Assessment
- Appendix C – Requirements for Noise Impact Assessment
- Appendix D – Requirements for Ecological Impact Assessment
- Appendix E – Requirements for Water Quality Impact Assessment
- Appendix F – Requirements for Assessment of Waste Management Implications
- Appendix G – Requirements for Land Contamination Assessment
- Appendix H – Requirements for Landscape and Visual Impact Assessment
- Appendix I – Requirements for Cultural Heritage Impact Assessment
- Appendix J – Implementation Schedule of Recommended Mitigation Measures
- Appendix K – Requirements for EIA Report Documents

--- END OF EIA STUDY BRIEF ---

October 2014
Environmental Assessment Division
Environmental Protection Department

Appendix A



Project Title: Drainage Improvement Works near Four Villages in Yuen Long – Sung Shan New Village, Tai Wo, Lin Fa Tei and Ha Che
(This figure is prepared based on Figure 1.1 of Project Profile No. PP- 515/ 2014)

工程項目名稱：元朗的四個區域雨水排放系統改善工程 - 崇山新村、大窩、蓮花地和下峯
(本圖是根據工程項目簡介 PP- 515/ 2014 圖則編號 1.1 編製)

EIA Study Brief No. : ESB - 279/2014
環評研究概要編號 :

Appendix A: Project Location Plan
附錄 A: 工程項目位置圖



Appendix B**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 construction and operational stages 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 construction methods/phasing programmes, and alternative operation modes to minimize the air quality impact during construction and operation 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 construction and operational stages of the Project.

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

- (i) Identification and description of existing, planned and committed ASRs that would likely be affected by the Project, including those earmarked on the relevant Outline Zoning 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 a table providing the 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 pollution emission sources, including any nearby emission sources which are likely to have impact related to the Project based on the analysis of the construction and operation activities in section 1 above. Confirmation regarding the validity of the assumptions adopted and the magnitude of the activities (e.g. volume of construction material handled, etc.) shall be obtained from the relevant government departments/authorities and documented.
- (iii) Identification of relevant emissions from any concurrent projects which shall be taken into account as contributing towards the overall cumulative air quality impact. The impact as affecting the existing, committed and planned ASRs within the assessment area shall be assessed, based on the best/ latest 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 within 500m from the Project boundary 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 sections 4 to 6 below when carrying out the quantitative assessment.
- (iii) 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 emissions.

4. Quantitative Assessment Methodology

- (i) The Applicant shall apply the general principles enunciated in the air quality modelling guidelines in Appendix B-1 while making allowance for the specific characteristic of the Project. This specific methodology must be documented in such level of details, preferably assisted with tables and diagrams, to allow the readers of the EIA report to grasp how the model has been set up to simulate the situation under study without referring to the model input files. Detailed calculations of air pollutants emission rates for input to the modelling shall be presented in the EIA report. The Applicant must 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 the specific modelling details should be sought.
- (ii) The Applicant shall identify the key/representative air pollution parameters (types of pollutants and averaging time concentrations) to be evaluated and provide explanation for selecting such parameters for assessing the impact from the Project.
- (iii) The Applicant shall calculate the overall cumulative air quality impact at the ASRs identified under Section 2 above 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 buffer distance requirements to be determined properly.

5. Mitigation Measures for Non-compliance

The Applicant shall propose remedies and mitigation measures where the predicted air quality impact exceeds the criteria set in Section 1 of Annex 4 in the TM. These measures and any constraints on future land use planning shall be agreed with the relevant government departments/authorities and documented. The Applicant shall demonstrate quantitatively whether the residual impacts after incorporation of the proposed mitigation measures will comply with the criteria stipulated in Section 1 of Annex 4 in the TM.

6. Submission of Model Files

All input and output file(s) of the model run(s) shall be submitted to the Director in electronic format together with the submission of the EIA report.

Appendix B-1**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 judgement 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;
- (ii) Guidelines on Assessing the 'Total' Air Quality Impact (Revised);
- (iii) Guidelines on the Use of Alternative Computer Models in Air Quality Assessment (Revised);
- (iv) Guidelines on the Estimation of PM_{2.5} 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 C**Requirements for Noise Impact Assessment**

The noise impact assessment shall include the following:

1. Provision of Background Information

The Applicant shall provide background information relevant to the Project, including relevant previous or current studies.

2. Identification of Noise Sensitive Receivers

(a) The Applicant shall refer to Annex 13 of the TM when identifying the NSRs. The NSRs shall include existing NSRs and planned/committed noise sensitive developments and uses earmarked on the relevant Outline Zoning 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. Photographs of existing NSRs shall be appended to the EIA report.

(b) The Applicant shall select assessment points to represent the identified NSRs for carrying out quantitative noise assessment described below. A map showing the locations and descriptions such as name of building, use, and floor of the selected assessment points shall be given. For planned noise sensitive land uses without committed site layouts, the Applicant should use the relevant planning parameters to work out representative site layouts for operational noise assessment purpose.

3. Provision of an Emission Inventory of the Noise Sources

The Applicant shall provide an inventory of noise sources including representative construction equipment for the purpose of carrying out the construction noise assessment. Confirmation of the validity of the inventory shall be obtained from the relevant government departments/ authorities and documented in the EIA report.

4. Construction Noise Assessment

(a) The Applicant shall carry out assessment of noise impact from construction (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. The criteria in Table 1B of Annex 5 of TM shall be adopted in the assessment.

(b) To minimize the construction noise impact, alternative construction methods to replace percussive piling and blasting shall be proposed as far as practicable.

(c) If the unmitigated construction noise levels are found exceeding the relevant criteria, the Applicant shall propose practicable direct mitigation measures (including movable barriers, enclosures, quieter alternative methods, rescheduling and restricting hours of operation of noisy tasks) to minimize the impact. If the mitigated noise levels still exceed the relevant criteria, the duration of the noise exceedance at the affected NSRs shall be given.

- (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). If recommendation of road traffic diversion is made, the possible side effects and constraints shall be similarly addressed as required under section 5. 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 shall be explicitly stated in the EIA report.
- (e) The assessment shall cover the cumulative noise impacts due to the construction works of the Project and other concurrent projects identified during the course of the EIA study.

5. Assessment of Side Effects and Constraints

The Applicant shall identify, assess and propose means to minimize any side effects and to resolve any potential constraints due to the inclusion of any recommended direct mitigation measures.

Appendix D**Requirements for Ecological Impact Assessment (Terrestrial and Aquatic)**

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.
2. The assessment area for the purpose of terrestrial ecological assessment shall include all areas within 500 metres from the Project boundary and any associated access road/facilities as well as the areas likely to be impacted by the Project. For aquatic ecology, the assessment area shall be the same as the water quality impact assessment described in section 3.4.4.2 in the Study Brief.
3. In the ecological impact assessment, 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 and associated works shall avoid or minimize impacts on recognized sites of conservation importance and other ecological sensitive areas. The assessment shall identify and quantify as far as possible the potential ecological impacts arising from the construction and operation of the Project and associated works.
4. The assessment shall include the following major tasks;
 - (i) review the findings of relevant studies/surveys and collate all available information on the ecological characters of the assessment area;
 - (ii) evaluate the information collected and identify any information gap relating to the assessment of potential ecological impacts to the aquatic and terrestrial environment, and determine the ecological field surveys and investigations that are needed for an impact assessment as required in the following sections;
 - (iii) carry out any necessary field surveys of at least 6 months covering wet season and investigations to fill in the information gaps identified, and to fulfill the objectives of the EIA study;
 - (iv) establish an ecological profile of the assessment area based on data of relevant previous studies/surveys and results of ecological field surveys. Major information to be provided shall include:
 - (a) description of the physical environment;
 - (b) habitats maps of suitable scale (1:1000 to 1:5000) showing the types and locations of habitats in the assessment area;
 - (c) ecological characteristics of each habitat type such as size, vegetation type, species present, dominant species found, species richness and abundance, community structure, seasonal patterns, inter-dependence of the habitats and species, and presence of any features of ecological importance;

- (d) representative colour photographs 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 the various habitats with special attention to those wildlife groups and habitats with conservation interests, including but not limited to:
- (a) Natural and man-made habitats including streams, watercourses, agricultural land, woodland and others, in particular the Cheung Po Ecologically Important Stream (EIS);
 - (b) Breeding egrets and herons at egrettries;
 - (c) Other wildlife associated with the habitats mentioned-above, including but not limited to freshwater fishes and invertebrates, hepertofauna, odonates, wetland-dependent birds; and
 - (d) any other habitats and wildlife groups identified as having special conservation interests by this study.
- (vi) describe all recognized sites of conservation importance within and in the vicinity of the Project and assess whether these sites will be affected by the Project and associated works;
- (vii) using suitable methodology to identify and quantify as far as possible any direct, indirect, on-site, off-site, primary, secondary and cumulative ecological impacts on the wildlife groups and habitats, such as destruction of habitats, reduction of species abundance/ richness, loss of roosting, breeding and feeding grounds, reduction of ecological carrying capacity, loss in ecological linkage and function, habitat fragmentation and any other possible disturbance cause by the Project; and in particular the following:
- (a) ecological impacts of loss of habitats of conservation interest in particular natural streams with riparian vegetation due to the construction and operation of the Project;
 - (b) indirect ecological impacts as a result of the potential hydrological disruption, change in sedimentation rate or deterioration of the water quality in the streams/watercourses and other wetland habitats in the vicinity due to surface runoff, drainage and effluent discharge, etc. during construction and operation phases;
 - (c) noise, dust, traffic and other human disturbance to adjacent habitats in particular Cheung Po EIS and wildlife during construction of the Project;

- (d) potential indirect impact on breeding egrets and herons due to loss of or disturbance to roosting and feeding grounds during the construction and operation phases;
 - (e) potential impact on movement corridor of wildlife between streams and adjacent habitats; and
 - (f) cumulative impacts due to other planned and committed development projects in or near the project site.
- (viii) evaluate the significance and acceptability of the ecological impacts identified using well-defined criteria;
- (ix) recommend practicable mitigation measures (such as ecologically friendly channel design, restriction of works at specified season or time, adoption of appropriate construction methods and programme, etc.) to avoid, minimize and/or compensate for the adverse ecological impacts identified;
- (x) evaluate the 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;
- (xi) determine and quantify as far as possible the residual ecological impacts after implementation of the proposed mitigation measures;
- (xii) evaluate the severity and acceptability of the residual ecological impacts using well-defined criteria. If off-site mitigation measures are considered necessary to mitigate the residual impacts, the guidelines and requirements laid down in the TM shall be followed; and
- (xiii) review the need for and recommend any ecological monitoring programme required.

Appendix E**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 and assess any water quality impacts arising from the construction and operation of the Project.
3. The assessment shall include, but not be limited to the following:
 - (i) the water quality impacts of the site run-off 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 Practice Note 1/94; and
 - (ii) the water quality impacts on the sensitive receivers which may be affected by the Project such as water courses and the Ecologically Important Stream at Cheung Po.
4. The Applicant shall address water quality impacts due to the construction phase and operational phase 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 might be affected by the Project;
 - (ii) characterize water quality of the water systems and sensitive receivers, which might 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 landuse 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 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 of water bodies, change of catchment types or areas, erosion or sedimentation due to the Project and any other hydrological changes in the study 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 sediment and sediment release or re-suspension from works into water bodies;
- (viii) provide an emission inventory on the quantities and characteristics of those existing and future pollution sources in the study 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 its/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 within the study 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 infrastructure upgrading or provision, contingency plan, water pollution prevention and mitigation measures to be implemented during construction and operation stages, including emergency sewage discharge in the case of sewage treatment works and sewage pumping stations, so as to reduce the water quality impacts to within standards. Requirements to be incorporated in the Project contract document shall also be proposed;
- (xiii) investigate and develop best management practices to reduce storm water and non-point source pollution as appropriate;
- (xiv) evaluate the need of operational maintenance works such as maintenance desilting/ dredging at different operation stages of the Project. The cumulative water quality impacts arising from maintenance desilting/ dredging and other interfacing projects within the study area shall be assessed with reference to the frequency and rate of maintenance desilting/ dredging required; and
- (xvi) 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.

Appendix F**Requirements for Assessment of Waste Management Implications**

The assessment of waste management implications shall cover the following:

1. Analysis of Activities and Waste Generation

- (i) The Applicant shall identify the quantity, quality and timing of the wastes arising as a result of the construction and operational activities of the Project based on the sequence and duration of these activities, e.g. any dredged/ excavated sediment/mud, construction and demolition (C&D) materials and other wastes which will be generated during construction and operational stages. The Applicant shall adopt appropriate design, general layout, construction methods and programme to minimise the generation of public fill/inert C&D materials and maximize the use of public fill/inert C&D materials 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 that can be taken in the 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 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 the result of the assessment in item (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 and the disposal outlets for the wastes identified; and
- (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;
 - wastewater discharge; and
 - public transport.

3. Excavation/Dredging and Dumping

- (i) The Applicant shall identify and quantify all excavation/ dredging, excavated/ dredged 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 a permit granted under 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 any serious contamination of sediment/mud which requires special treatment/disposal is confirmed, the Applicant shall identify the most appropriate treatment and/or disposal arrangement and demonstrate its feasibility. The Applicant shall provide supporting document, such as agreement by the relevant facilities management authorities, to demonstrate the viability of any treatment/disposal plan.

- (ii) The Applicant shall identify and evaluate the best practical excavation/dredging 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.

Appendix G**Requirements for Land Contamination Assessment**

The land contamination assessment shall cover the following:

(i) The Applicant shall identify the potential land contamination site(s) within the entire Study Area and, if any, within the boundaries of all 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) 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).

(iv) 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.

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

Appendix H**Requirements for Landscape and Visual Impact Assessment**

1. The Applicant shall describe, appraise, analyse and evaluate the existing and planned landscape resources and character of the assessment 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 assess the visual impacts of the Project. Clear illustration including mapping of visual impact is 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 with regard to views from ground level, sea level and elevated vantage points;
 - (iii) description of the visual compatibility of the Project with the surrounding and the planned setting, and its obstruction and interference with the key views of the study areas;
 - (iv) description of the severity of visual impacts in terms of distance, nature and number of sensitive receivers. The visual impacts of the Project with and without mitigation measures shall be included so as to demonstrate the effectiveness of the proposed mitigation measures;
3. The Applicant shall evaluate the merits of preservation in totality, in parts or total destruction of existing landscape and the establishment of a new landscape character area. In addition, alternative location, layout, design, built-form and construction method that will avoid or reduce the identified landscape and visual impacts shall be evaluated for comparison before adopting other mitigation or compensatory measures to alleviate the impacts. 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. The Applicant shall recommend mitigation measures to minimize adverse effects identified above, including provision of a master landscape plan.
4. The mitigation measures shall also include the preservation of vegetation, transplanting trees in good condition and value, provision of screen planting, re-vegetation of disturbed lands, compensatory planting, design of structure, provision of finishes to structure, colour scheme and texture of material used and any measures to mitigate the impact on the existing and planned land use and visually sensitive receivers. Parties shall be identified for the on-going management and maintenance of the proposed mitigation works to ensure their effectiveness throughout the construction phase and operation phase of the Project, associated works, supporting facilities and essential infrastructures. A practical programme and funding proposal for the implementation of the recommendation measures shall be provided.

5. Annotated illustration materials such as colour perspective drawings, plans and section/elevation diagrams, annotated oblique aerial photographs, photographs taken at vantage points, and computer-generated photomontage shall be adopted to fully illustrate the landscape and visual impacts of the proposed pumping station which is a newly added above ground structure. In particular, the landscape and visual impacts of the Project with and without mitigation measures from representative viewpoints, particularly from views of the most severely affected visually sensitive receivers (i.e. worst case scenario), shall be properly illustrated by computer-generated photomontage so as to demonstrate the effectiveness of the proposed mitigation measures.
6. All computer graphics shall be compatible with Microstation DGN file format. The Applicant shall record the technical details such as system set-up, software, data files and function in preparing the illustration, which may need to be submitted for verification of the accuracy of the illustration.

Appendix I**Requirements for Cultural Heritage Impact Assessment**1. **Built heritage impact assessment (BHIA)**

The Applicant shall conduct a built heritage impact assessment (BHIA), taking the results of the previous studies 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 and to assess the direct and indirect impacts on built heritage items. The impacts include visual impact, impacts on the fung shui/visual corridor of the historic buildings and structures through change of water-table, vibration caused by the Project. Assessment of impacts on cultural heritage shall also take full account of, and allow where appropriate, the Guidelines for Landscape and Visual Impact Assessment of Annex 18 of the TM. The Applicant shall demonstrate that all reasonable efforts have been made to avoid or keep the adverse impacts of built heritage items to the minimum through modification of design of the Project, or use of latest construction / engineering techniques. For those built heritage items that might still be directly and indirectly affected by the Project, the Applicant shall recommend practicable mitigation measures and monitoring to avoid or keep the adverse impact to the minimum. A checklist including all the affected sites of cultural heritage, impacts identified, recommended mitigation measures as well as the implementation agent and period shall also be included in the EIA report.

2. **Archaeological impact assessment (AIA)**

The Applicant shall engage qualified archaeologist(s) to conduct an archaeological impact assessment (AIA), taking the results of previous studies and other background of the site into account, to evaluate the archaeological impact imposed by the Project and its associated works. The scope of the AIA shall be submitted to the Antiquities and Monuments Office and the Director prior to the commencement of the assessment for consideration. In case the existing information is inadequate or where the assessment area has not been adequately studied before, the archaeologists shall conduct archaeological investigations to assemble data. The archaeologists shall obtain licences from the Antiquities Authority prior to the commencement of archaeological investigations. Based on existing and collected data, the Applicant shall evaluate whether the proposed developments and works associated with the Project are acceptable from archaeological preservation point of view. In case adverse impact on archaeological heritage cannot be avoided, appropriate mitigation measures should be designed and recommended in the EIA report.

3. The Applicant shall draw necessary reference to relevant sections of the “Guidelines for Cultural Heritage Impact Assessment” at Appendix I-1 for detailed requirement.

Appendix I-1**Guidelines for Cultural Heritage Impact Assessment**

(as at 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; and
 - (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.
- b. 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.
- c. 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.*

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?

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 bilingual (in both English and Chinese) executive summary 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 bilingual (in both English and Chinese) executive summary 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. To facilitate public inspection of EIA report via EIAO Internet Website, the Applicant shall provide electronic copies of both the EIA report and the executive summary prepared in HyperText Markup Language (HTML) (version 4.0 or later) and in Portable Document Format (PDF version 1.3 or later). For the HTML version, a content page capable of providing hyperlink to each section and sub-section of the EIA report and the executive summary shall be included in the beginning of the document. Hyperlinks to figures, drawings and tables in the EIA report and the 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.
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.