

APPENDIX 1A:

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

ENVIRONMENTAL IMPACT ASSESSMENT STUDY BRIEF NO. ESB-093/2001

1. Background

- 1.1 An application (No. ESB-093/2001) for an Environmental Impact Assessment (EIA) study brief under section 5(1) of the Environmental Impact Assessment Ordinance (EIAO) was submitted by the Applicant on 6.12.2001 with a project profile (No. PP-155/2001)
- 1.2 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 for the Project.
- 1.3 The Project Profile (No. PP-155/2001) proposed to construct and operate a submarine outfall which will extend from western boundary of the Sewage Treatment Works (STW) site with a short distance offshore (i.e., about 40m). The project also proposed to reconstruct the Peng Chau as a biological treatment works incorporating nitrification, nitrogen removal and disinfection with a design capacity of 3,250 m³/day on the existing site at Tai Lei Island.
- 1.4 The scope of the Project comprises:
 - (i) Construction of a new STW adjacent to the existing STW comprising secondary treatment with nitrification, denitrification and disinfection;
 - (ii) Construction and operation of submarine outfall and emergency overflow;
 - (iii) Provision of deodorization facilities;
 - (iv) Provision of associated sludge treatment facilities;
 - (v) Modified existing clarifiers to storm tanks;
 - (vi) Extend inlet pumping main; and
 - (vii) Demolish of the existing rotating biological contactor.
- 1.5 The purpose of the EIA study is to provide information on the nature and extent of environmental impacts arising from the construction and operation of the Project and related activities that 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;
- (ii) the conditions and requirements for the detailed design, construction and operation of the Project 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 for carrying out the Project;
- (ii) to consider alternative including the location of the submarine outfall and emergency overflow as detailed in Section 3.3 below, with a view to avoiding and minimizing the potential environmental impacts including coral community; to compare the environmental benefits and dis-benefits of each of the different options; to provide reasons for selecting the preferred option(s) and to describe the part of environmental factors played in the selection;
- (iii) to identify and describe elements of community and environment likely to be affected by the Project and/or likely to cause adverse impacts to the Project, including natural and man-made environment and the associated environmental constraints;
- (iv) to identify and quantify emission sources and determine the significance of impacts on sensitive receivers and potential affected uses;
- (v) to identify and quantify any potential impacts from point and non-point pollution sources on the identified water systems and sensitive receivers during the construction and operation stages;
- (vi) to identify and quantify any potential impact to marine ecology, including the coral community, and to propose measures to mitigate these impacts;
- (vii) to propose the provision of mitigation measures so as to minimize pollution, environmental disturbance and nuisance during 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 environmental impacts (i.e. after practicable mitigation) 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;
- (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 the identified environmental impacts and cumulative effects and reduce them to acceptable levels;

- (xi) to investigate the extent of the secondary environmental impacts that may arise from the proposed mitigation measures and to identify constraints associated with the mitigation measures recommended in the EIA study, as well as the provision of any necessary modification; and
- (xii) to design and specify environmental monitoring and audit requirements to ensure the effective implementation of the recommended environmental protection and pollution control measures;

3. Detailed Requirements of the EIA Study

3.1 The purpose of this study brief is to scope the key issues of the EIA study. The Applicant has to demonstrate in the EIA report that 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 fully complied with.

3.2 The Scope

3.2.1 The scope of this EIA study covers the project mentioned in section 1.3 and 1.4 above. The EIA study shall address the likely key issues described below, together with any other key issues identified during the course of the study:

- (i) the potential water quality impact and ecological impact, in particular the coral community at the coast of Tai Lei Island during construction of submarine outfall and upgrading of the STW.
- (ii) the potential water quality impact and ecological impact, in particular the coral community at the coast of Tai Lei Island due to the outfall discharges; the discharge of untreated or partially treated sewage during emergency arising from the operation of the STW;
- (iii) the potential odour and noise impacts associated with the construction, operation and demolition works of the sewage treatment work to the sensitive receivers;
- (iv) the marine archaeological value of the area that have a potential to be affected by the project.

3.3 Consideration of Alternative Locations

3.3.1 Consideration of Alternative Locations

The Applicant shall consider alternative locations of submarine outfall and emergency overflow such as locating them to the south of the site, with an aim to avoid potential water quality impact and impact to coral communities at the coast of Tei Lei Island from the proposed project. Having regard to the cumulative effects of the construction period and the severity of the construction impacts to the affected sensitive receivers, the EIA study shall also explore alternative sequences of works

for the proposed project, with a view to avoiding prolonged adverse environmental impacts to the maximum practicable extent. The Applicant shall also compare the environmental impacts, environmental benefits and dis-benefits of each of possible options, and provide reasons for selecting the final preferred option including the environmental factors considered in the selection.

3.3.2 Selection of Preferred Scenario

Taking into consideration of the findings in Sections 3.3.1 above, the Applicant shall recommend with justifications the adoption of the preferred sewage treatment configuration, location of submarine outfall and emergency overflow that will avoid or minimize adverse environmental effects arising from the Project, in particular the impacts water quality in the vicinity and ecology particular to the coral community in the vicinity of the area.

3.4 **Technical Requirements**

The Applicant shall conduct the EIA study to address all environmental aspects of the activities as described in the scope as set out above. 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 section 1 of Annex 4 and Annex 12 of the TM respectively. The assessment shall be based on the best available information at the time of the assessment.

3.4.1.2 The assessment area for the air quality impact assessment shall generally be defined by a distance of 500 m from the boundary of the project work sites, yet it may be extended depending on the circumstances and the scale of the Project.

3.4.1.3 The Applicant shall assess the air pollutant concentrations with reference to relevant sections of the Guidelines for Local-Scale Air Quality Assessment Using Models issued by the Modelling Section, Air Policy Group, Environmental Protection Department, HKSAR dated March, 2000 or other methodology as agreed by the Director.

3.4.1.4 The air quality impact assessment shall include the followings:

Background and Analysis of Activities

- (i) Provide background information relating to air quality issues relevant to the project, e.g. description of the types of activities during operation stage of the project such as emission of odour from the proposed Sewage Treatment Works (STW).
- (ii) Give an account, where appropriate, of the consideration/measures that had been taken into consideration in the planning of the project to abate the air pollution impact. That is, the Applicant should consider alternative modes of operation to minimize the operational air quality impact.

- (iii) Present the background air quality levels in the assessment area for the purpose of evaluating the cumulative operational air quality impacts.

Identification of ASRs and Examination of Emission/Dispersion Characteristics

- (i) Identify and describe representative existing and planned/committed air sensitive receivers (ASRs) that would likely be affected by the Project, including those earmarked on the relevant Outline Zoning Plans, Development Permission Area Plans, Outline Development Plans and Layout Plans. The Applicant shall select the assessment points of the identified ASRs such that they represent the worst impact point of these ASRs. A map showing the location and a description including the name of the buildings, their uses and height of the selected assessment points shall be given. The separation distances of these ASRs from the nearest emission sources should also be given.
- (ii) Provide an exhaustive list of air pollutant emission sources, including any nearby emission sources which are likely to have impact on the Project based on the analysis of the constructional and operational activities of the project in (i) above. Confirmation of the validity of the assumptions and the magnitude of the activities (e.g. volume of construction materials handled etc.) shall be obtained from the relevant government department/authorities and documented.

Operational Air Quality Impact

- (i) The Applicant shall calculate the expected air pollutant concentrations including odour levels at the identified ASRs. Calculations for the expected impact shall be based on an assumed reasonably worst case scenario under normal operating conditions. The evaluation shall be based on the strength of the emission sources identified in (v) above. The Applicant shall follow (ix) to (xiii) below when carrying out the quantitative assessment.

Quantitative Assessment Methodology

- (i) The Applicant shall apply the general principles enunciated in the modelling guidelines (paragraph 3.4.1.3 above) while making allowance for the specific characteristic of each project. This specific methodology must be documented in such level of details (preferably with tables and diagrams) to allow the readers of the assessment report to grasp how the model is set up to simulate the situation at hand without referring to the model input files. Details of the calculation of the emission rates of air pollutants for input to the modelling shall be presented in the report. The Applicant must ensure consistency between the text description and the model files at every stage of submission. In case of doubt, prior agreement between the Applicant and the Director on the specific modelling details is advised. Applicant is advised to obtain prior agreement of the general methodology from the Director before commencement of the assessments.
- (ii) The Applicant shall, based on the nature of the activities analyzed in (v) above, identify the key/representative air pollutant parameters (types of pollutants and the averaging time concentration) to be evaluated and provide

explanation for choosing these parameters for the assessment of the impact of the project.

- (iii) The Applicant shall calculate the 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 and pollution contours, for comparison with relevant air quality standards and examination of the land use implications of these impacts. Plans of suitable scale should be used for presentation of pollution contour for determining buffer distances required.

Mitigating Measures for Non-compliance

- (i) The Applicant shall propose remedies and mitigating 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 that the resultant impacts after incorporation of the proposed mitigating measures will comply the criteria stipulated in section 1 of Annex 4 in the TM.

Submission of Model Files

- (i) All input and output file(s) of the model run(s) shall be submitted to the Director in electronic format.

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 respectively.

3.4.2.2 The noise impact assessment shall include the followings:

- (i) Determination of Assessment Area

The noise impact assessment shall include all areas within 300m from the project boundary. Subject to the agreement of the Director, the assessment area could be reduced accordingly if the first layer of noise sensitive receivers, closer than 300m from the project boundary, provides acoustic shielding to those receivers located further away.

- (ii) Provision of Background Information

The Applicant shall provide all background information relevant to the project including relevant previous and current studies. Unless involved in the planning standards, no existing noise levels are particularly required.

- (iii) Identification of Noise Sensitive Receivers

- (a) The Applicant shall refer to Annex 13 of the TM when identifying the noise sensitive receivers (NSRs). The NSRs shall include all existing ones and all planned or committed noise sensitive developments and uses

earmarked on the relevant Outline Zoning Plans, Outline Development Plans and Layout Plans.

- (b) The Applicant shall select assessment points to represent all identified NSRs for carrying out quantitative noise assessment described below. The assessment points shall be agreed with the Director prior to the quantitative noise assessment. A map showing the location and description including name of building, use, and floors of each and every selected assessment point shall be given.

(iv) Provision of an Emission Inventory of the Noise Sources

The Applicant shall provide an inventory of noise sources including construction equipment for construction and demolition noise assessment and fixed plant equipment for operational noise assessment. Confirmation of the validity of the inventory shall be obtained from the relevant government departments/authorities.

(v) Construction / Demolishing Noise Assessment

- (a) The Applicant shall carry out assessment of noise impact from construction (excluding percussive piling) of the project during day time, i.e. 7 a.m. to 7 p.m., on weekdays other than general holidays in accordance with the methodology stipulated in paragraphs 5.3. and 5.4 of Annex 13 of the TM. The criteria in Table 1B of Annex 5 of the TM shall be adopted in the assessment.
- (b) To minimize the construction noise impact, alternative construction methods to replace percussive piling shall be proposed as far as practicable.
- (c) If the unmitigated construction noise levels are found to exceed the relevant criteria, the Applicant shall propose practicable direct mitigation measures (including movable barriers, enclosures, quieter alternative methods, re-scheduling and restricting hours of operation of noisy task(s) to minimize the impact. If the mitigated noise levels still exceed the relevant criteria, the duration of the noise exceedance shall be given.
- (d) In case the Applicant would like to evaluate whether construction works in restricted hours as defined under the Noise Control Ordinance (NCO) are feasible or not in the context of programming construction works, reference should be made to the relevant technical memoranda issued under the NCO. Regardless of the results of construction noise impact assessment for restricted hours, the Noise Control Authority will consider a well-justified Construction Noise Permit (CNP) application, once filed, based on the NCO, the relevant technical memoranda issued under the NCO, and the contemporary condition/situations of adjoining land uses and any previous complaints against construction activities at the site before making his decision in granting a CNP. This aspect should be explicitly stated in the noise chapter and the conclusions and recommendations chapter in the EIA report.

(vi) Operational Noise

- (a) The Applicant shall analyze the scope of the proposed system to identify noise sources for the purpose of noise impact assessment.
- (b) The Applicant shall calculate the expected noise using standard acoustic principles. Calculations for the expected noise shall be based on assumed plant inventories and utilization schedule for the worst case scenario. The Applicant shall calculate the noise levels taking into account of correction of tonality, impulsiveness and intermittency in accordance with the Technical Memorandum for the Assessment of Noise from Places other than Domestic Premises, Public Places or Construction Sites.
- (c) The Applicant shall present the existing and future noise levels in Leq (30 mins) at the NSRs at various representative floor levels (in mPD) on tables and plans of suitable scales. Quantitative assessment at the NSRs for proposed fixed noise source(s) shall be carried out and compared against the criteria set out in Table 1A of Annex 5 of the TM.

(d) Proposals for Noise Mitigation Measures

The Applicant shall propose direct technical remedies in all situations where the predicted noise level exceeds the criteria set out in Table 1A of Annex 5 of the TM to protect the affected NSRs. Specific reasons for not adopting certain direct technical remedies in the design to reduce the noise to a level meeting the criteria in the TM or to maximize the protection for the NSRs should be clearly quantified and laid down. The total number of dwellings and other noise sensitive element that will be benefited by the provision of direct technical remedies should be provided.

The total number of dwellings and other noise sensitive elements that will still be exposed to noise above the criteria with the implementation of all recommended direct technical remedies shall be quantified.

In case where a number of the NSRs cannot all be protected by the recommended direct technical remedies, the Applicant shall consider alternatives to reduce the impacts.

(vii) 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 arising from the inclusion of any recommended direct technical remedies.

3.4.3 Water Quality Impact

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

3.4.3.2 The assessment area for this water quality assessment shall cover all water bodies and sensitive receivers with the radius of 1 km from the project site as shown in figure 2.

- 3.4.3.3 The Applicant shall identify and analyze all physical disruptions of marine water system arising from the construction and operation of the proposed project.
- 3.4.3.4 The Applicant shall include in the water quality impact assessment of the following major tasks:
- (i) Collect and review relevant background information on the existing and planned water system(s).
 - (ii) Characterise water and sediment quality based on existing information collected during the last 5 years or the more recent information collected from appropriate site surveys/tests.
 - (iii) Identify and analyse existing, planned/committed activities and beneficial uses related to the water system and identify all water sensitive receivers. The Applicant shall refer to those development and uses earmarked on the relevant OZPs, ODPs and Layout Plan.
 - (iv) Identify the pertinent water quality objectives and establish appropriate water quality criteria or standards for the water system(s) and all the sensitive receivers.
 - (v) Evaluate the possible impacts arising from the construction (including dredging and filling works), demolition and operation phases, including sewage discharge, on nearby water bodies and sensitive receivers, including corals.
 - (vi) Review and recommend the best alignment option of the submarine outfall to avoid important coral habitats identified in the ecological survey.
 - (vii) Identify, analyse all existing and future water and sediment pollution sources, including discharges from the submarine outfall and emergency discharges. Field investigation and laboratory tests shall be conducted as appropriate. Establishment and provision of an emission inventory on the quantities and characteristics of all these pollution sources.

Impact Assessment

- (viii) Predict and quantify, by initial dilution mathematical models or other similar technique approved by the Director, the near-field impacts on the water system and the sensitive receivers, due to the discharges from the submarine outfall and emergency discharges during operation. Possible impacts include changes in water quality and the effects on the marine ecology due to such changes. All modelling input data and results shall be submitted in digital media to the Director.
- (ix) Quantitative sedimentation impact assessments via simple mathematical modelling and or desktop calculations shall be required if some important coral communities and/or sensitive ecological habitats are found within the assessment areas.
- (x) Dredging and Dumping

- (a) To identify all dredging, transportation and disposal activities and requirements and to estimate the quantities of sediments which require different types of disposal. Potential dumping ground to be involved shall also be identified. Any seriously contaminated sediment which requires special treatment and/or disposal arrangement in accordance with WBTC No. 3/2000 shall be identified by both chemical and biological tests. If the presence of such sediment is confirmed, the Applicant shall identify the most appropriate treatment and/or disposal arrangement and demonstrate its feasibility.
 - (b) To identify and evaluate the best practicable dredging methods to minimise dredging and dumping requirements and demand for fill sources based on the criterion that existing marine mud shall be left in place and not to be disturbed as far as possible.
 - (c) To evaluate and recommend the most suitable mud dredging and disposal methods and mitigation measures to minimise WQ impacts.
- (xi) Predict and quantify the cumulative impacts due to other construction activities within a radius of 2 km around the project including Peng Chau helipad, etc.
 - (xii) Propose effective and upgrading of provision, water pollution prevention and mitigation measures to be implemented during the construction, demolition and operation stages so as to reduce the water quality impacts to within acceptable levels of standards. Requirements to be incorporated in the project contract document shall also be proposed.
 - (xiii) Different configurations to reduce the possibility of emergency discharges of untreated or partially treated sewage shall be investigated and proposed as appropriate.
 - (xiv) Evaluate and quantify of residual impacts on the water system(s) and the sensitive receivers with regard to the appropriate water quality criteria, standards or guidelines.

3.4.4 Waste Management Implications

3.4.4.1 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.

3.4.4.2 The assessment of waste management implications shall cover the following:

- (i) Analysis of Activities and Waste Generation

The Applicant shall identify the quantity, quality and timing of the waste arising, as a result of the construction, demolition and operation activities, based on the sequence and duration of these activities.

- (ii) Proposal for Waste Management

- (a) Prior to considering the disposal options for various types of wastes, in particular the sludge arising from the operation of the Sewage Treatment Works opportunities for reducing waste generation and on-site or off-site re-use shall be fully evaluated.
- (b) Having taken into account all 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 options for each type of waste described in details. The disposal method recommended for each type of wastes shall take into account the result of the assessment set out in (c) below.
- (c) The impact caused by handling, collection, and disposal of wastes shall be addressed in detail and appropriate mitigation measures proposed.

3.4.5 Ecological Impact (Marine)

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

3.4.5.2 The assessment area for the marine ecological impact assessment shall be the same as the assessment area for the Water Quality Impact Assessment, or area likely to be impacted by the project. The aim shall be to protect, maintain or rehabilitate the natural environment. The assessment shall identify and quantify as far as possible the potential ecological impacts associated with the project, including the potential impacts to the sensitive ecological habitats around the waters of Tai Lei Island.

3.4.5.3 Impacts on Corals

- (i) the assessment of impacts on corals shall include the following tasks:
 - (a) review and incorporate the findings of relevant previous studies/surveys, including those specific to the coral communities documented within the assessment area and collate all the available information regarding the ecological characters of the assessment area;
 - (b) evaluate the information collected and identify information gap relating to the assessment of potential impacts on corals;
 - (c) carry out necessary ecological field surveys, including underwater dive surveys and investigations to verify the information collected, fill the information gaps identified and fulfill the objectives of the EIA study;
 - (d) using suitable methodology, e.g. Rapid Ecological Assessment, identify and quantify as far as possible the seabed substrate type, species composition and cover of the hard and soft coral assemblages and the associated epibenthic fauna and flora of the survey sites. Representative photographs and/or video footage shall be taken and used for description, identification, validation and reporting purposes. Based on the results of the underwater surveys, assess and evaluate using well-defined criteria the ecological significance of the survey sites;

- (e) present all relevant survey findings including previous surveys conducted in relevant studies together with surveys carried out under this study;
- (f) assess ecological impacts on corals, both during the construction and operational phase, including dredging operation, wastewater discharge and waste disposal. The assessment shall include detailed prediction and evaluation on the change in water quality, in particular suspended solids, and the extent of sediment plume dispersion during the construction phase. The difference in discharge volume and sewage quality as result of the commissioning of the Project (including the emergency conditions) should be taken into account, in particular change of salinity, turbidity, temperature and sedimentation, etc.. The significance and acceptability of the predicted impacts shall be evaluated using well-defined criteria;
- (g) assess the cumulative impacts of any nearby development on the corals;
- (h) identify precautionary and appropriate mitigation measures for protection of corals in the assessment area. Impacts on coral communities around Tai Lei Island should be avoided. Alternative outfall location, alignment, design, and construction method that would avoid or reduce the impacts shall be considered;
- (i) review the need for and recommend appropriate coral monitoring programme. Consideration should be given to monitoring of coral communities identified as vulnerable to direct and indirect adverse impacts. Use of a quantitative survey methodology, e.g. underwater quantitative video transect technique with random or fixed placement of transects, should be considered.

3.4.5.4 The assessment shall include the following:

- (i) review the findings of relevant studies and collate all the available information regarding the ecological characters;
- (ii) evaluate the information collected and identify any information gap relating to the assessment of potential ecological impacts to the aquatic environment;
- (iii) carry out necessary field surveys, the duration of which shall be at least 4 months, and investigations to verify the information collected in (ii), fill the information gaps identified and fulfill the objectives of the EIA study;
- (iv) establish the general ecological profile and describe the characteristics of each habitat found; major information to be provided shall include:
 - (a) description of the physical environment;
 - (b) habitat 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, type, species present, dominant species found, species diversity and abundance,

- community structure, seasonality and inter-dependence of the habitats and species, and presence of any features of ecological importance;
- (d) representative color photos of each habitat type and any important ecological features identified;
 - (e) investigate and describe the existing wildlife uses of various habitats with special attention to those habitats with conservation interests;
 - (f) species found that are rare, endangered and/or listed under local legislation, international conventions for conservation of wildlife/habitats or red data books;
- (v) describe all recognized sites of conservation importance in the assessment area and how these sites will be affected by the proposed development;
 - (vi) using suitable methodology, identify and quantify as far as possible, any direct, indirect, on-site, off-site, primary, secondary and cumulative ecological impacts such as destruction of habitats, reduction of species abundance/diversity, loss of feeding and breeding grounds, reduction of ecological carrying capacity and habitat fragmentation; and in particular the following:
 - (a) impact of habitat disturbance associated with dredging works for the outfall construction;
 - (b) impact on marine organisms associated with the discharges at the outfall;
 - (vii) evaluate the significance and acceptability of the ecological impacts identified using well-defined criteria.
 - (viii) recommend all possible alternatives and practicable mitigation measures to avoid, minimize and/or compensate for the adverse ecological impacts identified;
 - (ix) evaluate the feasibility and effectiveness of the recommended mitigation measures and define the scope, type, location, implementation arrangement, subsequent management and maintenance of such measures;
 - (x) determine and quantify 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; and
 - (xii) review the need for and recommend any ecological monitoring programme.

3.4.6 Impact on Cultural Heritage

- 3.4.6.1 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.

3.4.6.2 The Applicant shall engage a qualified marine archaeologist to review available information to identify whether there is any possible existence of sites or objects of cultural heritage, for example shipwreck, within an areas 10 metres on either side of the preferred alignment of the proposed submarine outfall and any seabed areas that would be affected by the marine works of the Project. If found, a Marine Archaeological Investigation (MAI) is required within the said area. The MAI shall be carried out by a qualified marine archaeologist who shall obtain a License from the Antiquities and Monuments Ordinance (Cap. 53). The requirements of the MAI are set out in Annex A.

3.4.7 Illustration Materials

3.4.7.1 The Applicant shall submit design proposal in the form of cross sectional plans, perspective drawings and photomontages, where appropriate, that covers the form and external finishes of the proposed treatment works, and provision of landscape design proposals.

3.4.8 Summary of Environmental Outcomes

3.4.8.1 The EIA report shall contain a summary of the key environmental outcomes arising from the EIA study, including the population and environmentally sensitive areas protected, environmentally friendly designs recommended, key environmental problems avoided, compensation areas included and the environmental benefits of environmental protection measures recommended.

4. Environmental Monitoring and Audit (EM&A) Requirements

4.1 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.

4.2 Subject to the confirmation of the EIA study findings, the Applicant shall comply with the requirements as stipulated in Annex 21 of the TM. The Applicant shall propose real-time reporting of monitoring data for the Project through a dedicated Internet website accessible to the public.

4.3 The Applicant shall prepare a project implementation schedule containing all the EIA study recommendations and mitigation measures with reference to the implementation programme.

5. Duration of Validity

5.1 This EIA study brief is valid for 36 months after the date of issue. If the EIA study does not commence within this period, the Applicant shall apply to the Director for a fresh EIA study brief before commencement of the EIA study.

6. Report Requirements

- 6.1 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.
- 6.2 The Applicant shall supply the Director with the following number of copies of the EIA report and the executive summary:
- (i) 50 copies of the EIA report in English and 80 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 6.2 (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 in English 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.
- 6.3 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.
- 6.4 In addition, to facilitate the public inspection of the EIA Report via the EIAO Internet Website, the applicant shall provide electronic copies of both the EIA Report and the Executive Summary Report prepared in HyperText Markup Language (HTML) (version 4.0 or later) and in Portable Document Format (PDF version 4.0 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 the Executive Summary Report shall be included in the beginning of the document. Hyperlinks to all figures, drawings and tables in the EIA Report and Executive Summary shall be provided in the main text from where the respective references are made. All graphics in the report shall be in interlaced GIF format unless otherwise agreed by the Director.
- 6.5 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.
- 6.6 When the EIA Report and the Executive Summary are made available for public inspection under s.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.
- 6.7 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.

7. Other Procedural Requirements

- 7.1 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.
- 7.2 If there is any key change in the scope of the Project mentioned in Sections 1.3 and 1.4 of this EIA study brief and in Project Profile (No. PP-155/2001), 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 the EIA study brief, the Applicant shall apply to the Director for a fresh EIA study brief.

--- END OF STUDY BRIEF ---

Jan 2002
Environmental Assessment and Noise Division,
Environmental Protection Department

Appendix I

Guidelines for Marine Archaeological Investigation (MAI)

The standard practice for MAI should consist of four separate tasks, i.e., (1) Baseline Review, (2) Geophysical Survey, (3) Establishing Archaeological Potential and (4) Remote Operated Vehicle (ROV)/Visual Diver Survey/Watching Brief.

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.
- 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 and an echo sounder. The data received from the survey would be analyzed 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 on the seabed which may be archaeological material.

3. Establishing Archaeological Potential

- 3.1 The data examined during Tasks 1 and 2 will be analyzed to provide an indication of the likely character and extent of archaeological resources with 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, subject to the agreement of the Antiquities and Monuments Office (AMO).

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 the works on 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.

5. Report

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

[Appendix B](#) | [Figure 1](#) | [Figure 2](#)

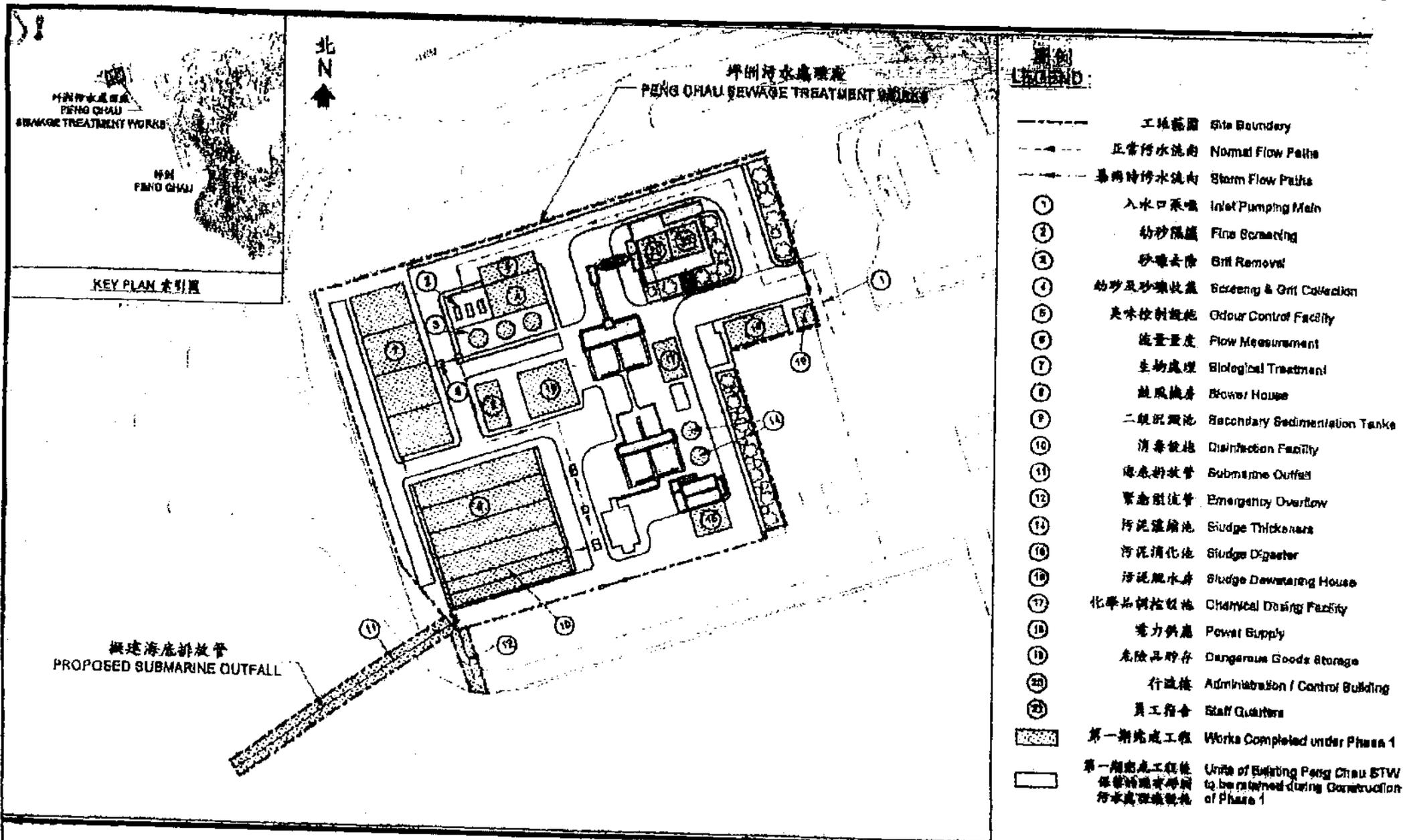


Figure 1
Location of the Peng Chau Sewage Treatment Works

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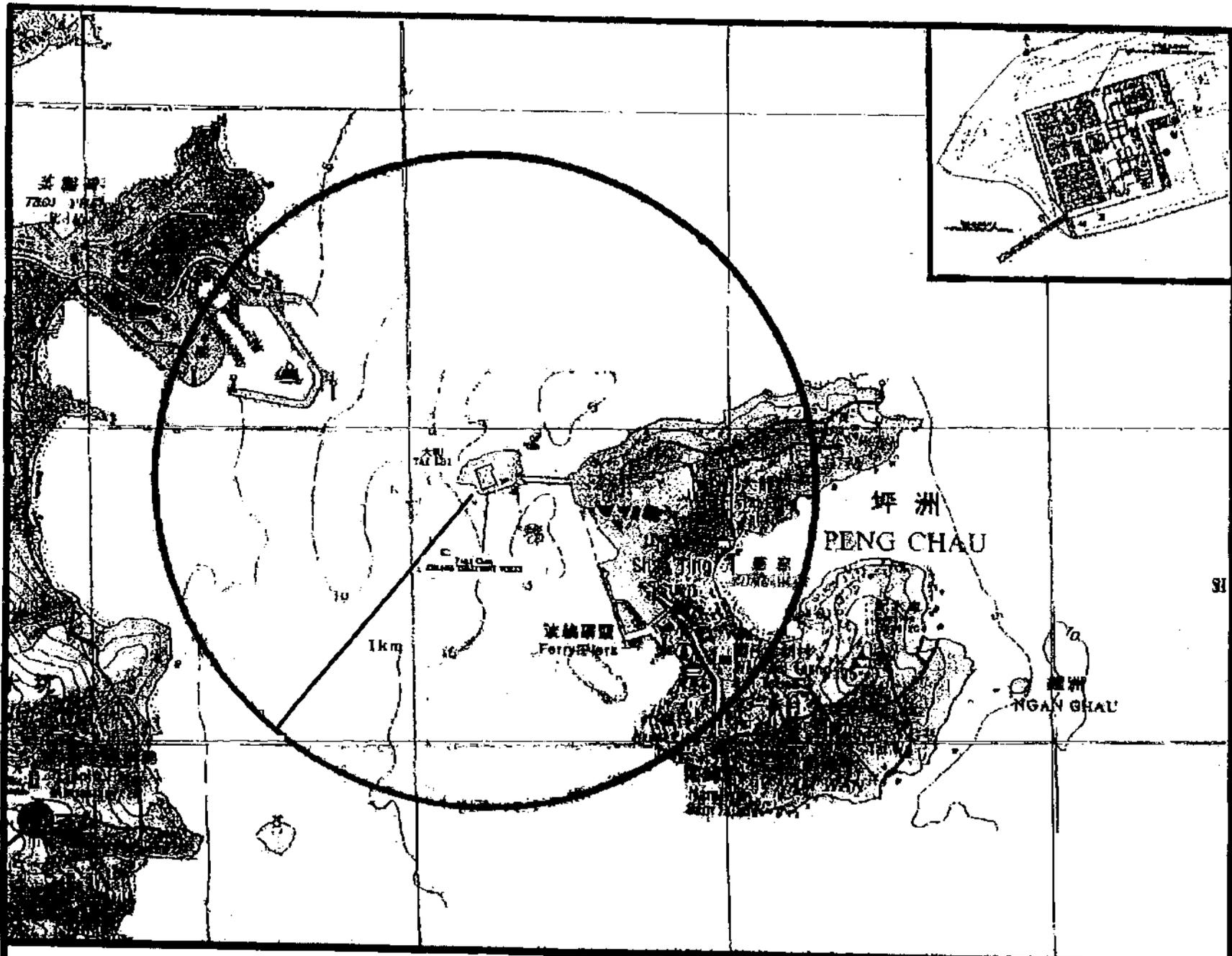


Figure 2
The assessment Area for water quality Assessment

