TECHNICAL MEMORANDUM

on Environmental Impact Assessment Process

(Environmental Impact Assessment Ordinance, Cap. 499, S.16)

Hong Kong Environmental Protection Department

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TECHNICAL MEMORANDUM
ON ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

(ENVIRONMENTAL IMPACT ASSESSMENT ORDINANCE, CAP. 499, S.16)

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1. PRELIMINARY

1.1 Citation and Commencement

1.1.1 This technical memorandum is issued under section 16 of the Environmental Impact Assessment Ordinance (the Ordinance). It may be cited as the Technical Memorandum on Environmental Impact Assessment Process.

1.2 Application and Scope

1.2.1 This technical memorandum sets out the principles, procedures, guidelines, requirements and criteria for:

(a) the technical content of a project profile;

(b) the technical content of an environmental impact assessment study brief or environmental impact assessment report;

(c) deciding whether a designated project is environmentally acceptable;

(d) deciding whether an environmental impact assessment report meets the requirements of the environmental impact assessment study brief;

(e) deciding whether the Director will permit an applicant to apply directly for an environmental permit under section 5(9), (10) or (11) of the Ordinance;

(f) resolving conflicts on the content of the environmental impact assessment study brief and the environmental impact assessment report;

(g) taking advice from other authorities;

(h) deciding what is a material change, addition or alteration to an environmental impact or to a designated project;

(i) the issue of environmental permits;

(j) the imposition of environmental monitoring and audit requirements for designated projects as conditions in environmental permits.

1.2.2 The Technical Memorandum on the Environmental Impact Assessment Process is a guide for the Director in deciding on matters under sections 5, 6, 8, 10, 12, 13 and 14 of the Ordinance. The Director is the Director of Environmental Protection. He will follow this technical memorandum as appropriate according to the circumstances of a case.

1.3 Interpretation

1.3.1 This technical memorandum uses standard scientific terms. Where the Ordinance defines a term, that term applies.

2. PROJECT PROFILE

2.1 Purpose of a Project Profile

2.1.1 The purpose of the project profile is to enable the Director to determine:

(a) the scope of the environmental issues associated with a designated project which shall be addressed in the environmental impact assessment (EIA) study, together with the technical and procedural requirements that the EIA Study shall meet; or

(b) whether the applicant can proceed directly to apply for an environmental permit.

2.2 Specified Information in Project Profile

2.2.1 A project profile shall contain the specified information listed in Annex 1 or Annex 2 as appropriate. Annex 1 applies to designated projects, and Annex 2 applies to material changes to designated projects. In the case of specified information which is not applicable to the proposed project, the project profile shall contain an explicit statement to that effect. The descriptions and statements of applicability of the items should be sufficient for the Director to identify what issues are relevant and what matters the EIA study shall address.

3. ENVIRONMENTAL IMPACT ASSESSMENT (EIA) STUDY BRIEF

3.1 The EIA study brief sets out the purposes and objectives of the EIA study, the scope of environmental issues which shall be addressed, the requirements that the EIA study shall need to fulfil, and the necessary procedural and reporting requirements. Where appropriate, the methodologies or approaches that the EIA study needs to follow, or the matters that the EIA study shall take into account, may be prescribed.

3.2 In setting out the scope of the issues to be addressed, the Director shall have due regard to the factors listed in Annex 3, other guidelines and criteria laid down in this technical memorandum, and the following criteria in limiting the scope of the EIA study:

(a) the scope of issues must be relevant to the project by virtue of its type, scale and location, or the likely emissions, discharges, waste generation, destruction, alteration or environmental changes that may result from the project;

(b) previous relevant EIA and environmental studies have identified such issues as being of relevance to the project and of having the potential for causing adverse environmental impacts;

(c) the issues under consideration have been causes of environmental complaints in the past;

(d) experiences on actual implementation of similar projects, scientific researches or overseas experiences show that a particular aspect of the project has potential to cause serious environmental effects.

3.3 The EIA study brief shall define the purposes, objectives and detailed requirements of the study and indicate the scope of issues, the timeframe of environmental issues if appropriate, and the framework in which the applicant shall carry out an EIA study to meet the requirements laid down in this technical memorandum. The study brief may stipulate the geographic and temporal boundaries of the assessment.

3.4 The EIA study brief may set out issues relating to the combined impacts of the entire project or the cumulative impacts of the existing, committed and planned developments in the vicinity of the project, but such issues shall be limited to those that may have a bearing on the environmental acceptability of the project. Such assessment shall be based on the best available information at the time of the assessment. Such information shall be that which the applicant has access to or is as provided or referred to by the Director in the EIA study brief.

3.5 The EIA study brief shall be limited to those issues for which compliance with the guidelines or criteria in this technical memorandum has not been demonstrated or where there are doubts about their compliance with the guidelines or criteria in this technical memorandum.

3.6 Where necessary, the Director may prescribe in the EIA study brief the assessment methodologies which are necessary for sound assessment of certain issues listed in the brief.

3.7 The EIA study brief may cover more than one designated project. The applicant shall state in the project profile the number and types of designated projects that shall be covered by the same EIA study.

3.8 The EIA study brief shall set out the duration of the validity of the study brief.

3.9 The Director shall specify the number of EIA reports and executive summaries and other reporting requirements, including any necessary appendix report, for the purpose of submission of the report for approval, for the public exhibition of the report, for the submission to the Advisory Council on the Environment where applicable, and for depositing the EIA report and the executive summary in the register. The number of reports required shall be governed by the size of population that may be affected by the project, the number of government departments that may be involved in reviewing the EIA report, and the likely extent of interest that the public may have on the project. As a general guidance, the number of reports normally required to be made available by the applicant free of charge is given below:

(a) for the purpose of review of the EIA report by the Director and other relevant departments, 30 copies of the EIA report and 50 copies of the executive summary may be required;

(b) for the purpose of public inspection of the report and the deposition of the report in the register, 40 copies of the EIA report and 80 copies of the executive summary may be required;

(c) for the purpose of consultation with the Advisory Council on the Environment, 20 copies of the EIA report and 50 copies of the executive summary may be required; and

(d) the number of reports as required by the relevant District Boards or other government consultative bodies.

3.10 In the case of an unusually complex project or a project that arouses strong public interest, the number of the EIA report and the executive summary specified in the brief may be larger than indicated above.

3.11 Subject to the payment by the interested parties of the full costs of printing the EIA report and executive summary, the applicant is required to make additional copies available to interested parties.

4. ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT

4.1 General

4.1.1 An EIA report shall comprise a document or series of documents providing a detailed assessment in quantitative terms, wherever possible, and in qualitative terms of the likely environmental impacts and environmental benefits of the project. The requirements for the EIA report shall be set out in accordance with this technical memorandum. The EIA report shall be produced in accordance with the EIA study brief issued by the Director to the applicant.

4.2 Objectives and Contents of an EIA Report

4.2.1 The project-specific study objectives and the detailed scope of any required EIA study shall be set out in a study brief issued by the Director. Typical study objectives may include the following:

(a) to describe the proposed project(s) and associated works together with the requirements and environmental benefits for carrying out the proposed project(s);

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

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

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

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

(f) to propose the provision of infrastructure or mitigation measures to minimize pollution, environmental disturbance and nuisance during construction, operation (or decommissioning) of the project(s);

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

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

(i) to identify, assess and specify methods, measures and standards, to be included in the detailed design, construction, operation (or decommissioning) of the project(s) which are necessary to mitigate these residual environmental impacts and cumulative effects and reduce them to acceptable levels;

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

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

4.2.2 The contents of an EIA report shall fully meet the purposes and objectives set out in the EIA study brief issued by the Director, and shall adequately address all the issues set out in the EIA study brief.

4.2.3 Unless indicated otherwise in the EIA study brief, the contents of an EIA report shall normally include the items listed in Annex 11.

4.3 General Approaches and Methodologies for Assessment

4.3.1 The general principles that the Director shall use in evaluating the assessment methodologies are described below:

(a) Description of the Environment: the characteristics of the environment shall be described in a way sufficient for identification and prediction of environmental impacts. Where necessary, baseline environmental surveys shall be carried out to determine the existing environmental conditions on the site and in all environs likely to be affected by the proposed project. The issues described in the EIA study brief shall be investigated and would typically include existing water and sediment quality, air quality, the existing noise environment, ecology, the cultural heritage and the man-made environment. These surveys shall normally include the site of the project, its access, and any other areas likely to be impacted during construction and operation (or decommissioning). The type and duration of baseline surveys shall be such that there will be adequate information taking account of natural variation to define the existing conditions. This information shall form the basis for predicting and evaluating the impacts from the project so that the study objectives can be met. Where appropriate, results from past studies can be used.

(b) Impact Prediction: the guidelines on assessment methodologies are given in Annexes 12 to 19. The assessment methodologies proposed shall be relevant to the issues to be addressed, shall have been used successfully in similar situations or be demonstrated as acceptable by recognised national/international organisations, and shall be capable of:

(i) identifying potential impacts which may be harmful or beneficial to the environment;

(ii) identifying receivers, habitats or resources which are vulnerable to change;

(iii) defining the project/environment interactions;

(iv) examining the chain of events or "pathways" linking cause with effect;

(v) describing and predicting the reasonable case scenario and/or the worst case scenario, or such scenarios as required in the EIA study brief; and

(vi) predicting the likely nature, extent and magnitude of the anticipated changes and effects such that an evaluation, in quantitative terms as far as possible, can be made with respect to the criteria described in Annexes 4 to 10 inclusive.

(c) Impact Evaluation: an evaluation of the anticipated changes and effects shall be made with respect to the criteria described in Annexes 4 to 10 inclusive, and in quantitative terms as far as possible. The methodologies for evaluating the environmental impact shall be capable of addressing the following issues:

(i) the existing or projected environmental conditions without the project in place;

(ii) the projected environmental conditions with the project in place and the sum total of the environmental impacts taking into account all relevant existing, committed and planned projects;

(iii) a differentiation between the environmental impact caused by the project and that caused by other projects, and to what extent the project aggravates or improves the existing or projected environmental conditions;

(iv) the environmental impact during different phases of construction and development of the project; and

(v) the evaluation of the seriousness of the residual environmental impacts (see Section 4.4.3).

(d) Impact Mitigation: the methodologies proposed for mitigation shall give priority to avoidance of impacts. The assessment methods shall be capable of:

(i) identifying and evaluating mitigation measures in order to avoid, reduce or remedy the impacts;

(ii) assessing the effectiveness of mitigation measures; and

(iii) defining the residual environmental impacts, which are the net impacts remaining with the mitigation measures in place.

4.3.2 For issues described in Annexes 12 to 19, the Director shall evaluate the assessment approaches and methodologies in accordance with the guidelines in these annexes, unless otherwise stated in the study brief. For issues that are not fully covered in these Annexes, the Director shall apply the above general principles.

4.3.3 Where applicable, the applicant shall be required to evaluate the environmental impacts resulting from the project over a period of time, through interactions among different environmental pollutants or emissions, or in combination with other existing, committed and proposed developments. Any such requirements shall be clearly set out in the study brief and are only limited to those that may have a bearing on the environmental acceptability of the project. The assessment methodologies shall allow for the assessment and evaluation of the cumulative environmental effects if the following circumstances apply:

(a) the impacts arising from the project are predicted to extend beyond the boundaries of the project or over a long period of time;

(b) there may be interactions between the environmental impacts of the project, affecting the sum total of its environmental impacts; or

(c) there may be interactions between the environmental impacts of the project and the environmental impacts of other developments, resulting in accumulation of impacts and affecting the sum total of their environmental impacts.

4.4 The Review of the EIA Report

The EIA report shall be reviewed according to the following steps:

4.4.1 Compliance with the Study Brief and Technical Memorandum: The coverage and approaches adopted in the EIA report shall be reviewed against the EIA study brief and the guidelines in this technical memorandum.

4.4.2 Quality of the EIA Report: The quality of the EIA report shall be reviewed having regard to the guidelines in Annex 20 and in Section 4.3. The report shall be considered as adequate if there are no omissions or deficiencies identified which may affect the results and conclusions of the assessment. In particular, the following factors shall be considered:

(a) whether the scope and extent of the project as presented in the EIA report covers all the phases and key sequences of the project which the application under consideration is intended to cover;

(b) whether the information and descriptions in the EIA report are factually correct;

(c) whether the assessment methodologies adopted in the EIA report are consistent with the methodologies set out in Annexes 12 to 19 inclusive and with the general principles laid down in Section 4.3, and whether the evaluation of the predicted impacts are consistent with the criteria listed in Annexes 4 to 10 inclusive. Where specific methodologies are not listed in the annexes or where the methodologies for certain issues can only be established on a case-by-case basis, the Director will assess whether the proposed methodologies are consistent with the methodologies adopted for Hong Kong projects having similar issues or with methodologies accepted by recognised national/international organisations;

(d) whether the identification and descriptions of the potential environmental impacts in the EIA report are complete and whether all applicable criteria in Annexes 4 to 10 inclusive have been considered;

(e) whether the assumptions and methodologies used are sound and adequate;

(f) whether adverse environmental effects are avoided to the maximum practicable extent;

(g) whether the assessment has considered and compared the environmental benefits and disbenefits of various scenarios with or without the project;

(h) whether lessons learned from other similar projects are incorporated into the project;

(i) whether the report has sufficiently defined all environmental protection requirements and measures necessary to avoid or reduce the adverse environmental impacts to within the applicable standards or criteria;

(j) for impacts where there are no applicable quantitative standards or criteria, whether the report has defined the best practicable mitigation measures that shall be adopted for the project;

(k) whether the report has assessed and determined the feasibility, practicability, programming and effectiveness of the recommended mitigation measures;

(l) whether the report has adequately addressed the need for environmental monitoring and audit, and if it is considered to be necessary, whether it has sufficiently defined the required environmental monitoring and audit programme; and

(m) whether the report has listed out in a schedule the environmental protection requirements and mitigation measures that the applicant is prepared to implement.

4.4.3 Evaluation of the Residual Environmental Impacts: The residual environmental impacts refer to the net environmental impacts after mitigation, taking into account the background environmental conditions and the impacts from existing, committed and planned projects. When evaluating the residual environmental impacts (the net impacts with the mitigation measures in place), the following factors shall be considered:

(a) the importance of the residual environmental impacts in terms of the following factors:

(i) effects on public health and health of biota or risk to life : If the impacts may cause adverse public health effects and/or adverse impacts to the health of rare and/or endangered species or pose an unacceptable risk to life and/or survival of a wildlife species, they are considered as key concerns;

(ii) the magnitude of the adverse environmental impacts: Magnitude refers to the scale of the adverse environmental impacts. If the

impacts are major, they are considered as key concerns. The extent to which the project would trigger or contribute to any cumulative environmental impacts when considered in conjunction with the existing or potential impacts from other projects shall also be considered;

(iii) the geographic extent of the adverse environmental impacts: Widespread environmental impacts are of greater concern than localised adverse environmental impacts. The extent to which adverse environmental impacts may occur in areas away from the site for the designated project, including the long range transportation of pollutants shall also be considered;

(iv) the duration and frequency of the adverse environmental impacts: Normally more weight shall be given to long term, persistent and/or frequent environmental impacts in determining a project's environmental acceptability. Future adverse environmental impacts as well as their likelihood shall also be considered;

(v) the likely size of the community or the environment that may be affected by the adverse impacts: Those adverse impacts affecting larger numbers of people or greater areas of ecosystem shall be considered of greater importance;

(vi) the degree to which the adverse environmental impacts are reversible or irreversible: Irreversible adverse environmental impacts shall be considered as key concerns. The planned decommissioning or rehabilitation activities that may influence the degree to which the adverse environmental impacts are reversible or irreversible may be considered;

(vii) the ecological context: More weight shall be given to those adverse environmental impacts that occur in areas or regions that are ecologically fragile and/or rare or undisturbed or which have little resilience to imposed stresses;

(viii) the degree of disruption to sites of cultural heritage: Which means what disruptions would be caused to the site which would affect its archaeological, historical and/or palaeontological significance;

(ix) international and regional importance: Those adverse impacts which affect an issue of international or regional concern shall be regarded as important; and

(x) both the likelihood and degree of uncertainty of adverse environmental impacts: If the adverse environmental impacts are uncertain, they shall be treated more cautiously than impacts for which the effects are certain and the precautionary principle shall apply..

(b) the degree of compliance with relevant established principles and criteria as listed below:

(i) standards and criteria laid down in the ordinances and regulations applicable at the time of processing of the applications;

(ii) any guidelines, standards and criteria laid down in Annexes 4 to 10 in this technical memorandum;

(iii) criteria and guidelines, other than (i) and (ii), published and adopted in Hong Kong in the conduct of EIA and in the application of the EIA process; and

(iv) where the matters are outside the jurisdiction of the Director and where there are no applicable ordinances and regulations, the principles, guidelines and criteria published by relevant authorities in Hong Kong.

4.5 Approval of the EIA Report

4.5.1 After the public inspection of the report and, if required, the consultation with the Advisory Council on the Environment, the EIA report shall be approved with or without conditions if

(a) the requirements in the EIA study brief have been met;

(b) the quality of the report meets the requirements as set out in Section 4.4 and the results and conclusions are technically sound and reliable;

(c) it addresses relevant environmental issues raised by the public and the Advisory Council on the Environment during the public inspection period; and

(d) all relevant environmental principles and criteria laid down in this technical memorandum can be met and the residual environmental impacts are within the relevant criteria, unless with sound environmental justifications and without long term serious environmental implications.

4.5.2 In case the report requires certain amendments but such amendments will not affect the validity of the assessment and the overall results and conclusions of the report, the Director may approve the report with conditions.

5. PERMISSION TO PROCEED DIRECTLY TO APPLY FOR AN ENVIRONMENTAL PERMIT

5.1 The Director will permit an applicant to proceed directly for an environmental permit if the conditions set out in section 5(9) (a) and (b) of the Ordinance are satisfied. The environmental impact is considered to be adequately assessed in an EIA report in the register if the project is covered by that EIA report, the environmental impact of the project has been demonstrated to comply with the guidelines and criteria adopted in that report, and the mitigation measures have been defined.

5.2 For a material change to an exempted project, the Director will permit the applicant to proceed directly to apply for an environmental permit if the conditions laid down in section 5(10) of the Ordinance are satisfied. If the environmental impact cannot be determined or if there are serious doubts or uncertainties on whether the mitigation measures can reduce the impacts to meet the criteria or guidelines, an EIA study shall be required to particularly address such issues.

5.3 By definition, the projects listed in the Schedules of the Ordinance have potential for causing adverse environmental impacts. Section 5(11) of the Ordinance applies to those projects which are proved beyond doubt that the environmental impact of the project falls well within the guidelines and criteria laid down in this technical memorandum and the effectiveness of the mitigation measures has been demonstrated in practice. For the purpose of determining whether the environmental impact is likely to be adverse, it refers to the environmental impact of the project without mitigation measures in place. The Annexes 3 to 10 and other relevant factors in this technical memorandum shall be used to determine whether the environmental impact of the project is likely to be adverse. If the environmental impact of the project requires detailed assessment to evaluate and confirm its acceptability, the Director will require an EIA study to be undertaken to particularly address such issues.

6. MATERIAL CHANGE TO A DESIGNATED PROJECT OR TO AN ENVIRONMENTAL IMPACT

6.1 The definition of "material change" in the Ordinance shall be used for a material change to a designated project. The material change shall refer to significant changes only. As a matter of principle, an environmental impact is considered to be adverse if any factor listed in Annex 3 applies and the criteria in Annexes 4 to 10 may be violated. As a general rule, changes under the following circumstances are regarded as material changes to a designated project:

(a) a change to physical alignment, layout or design of the project causing an environmental impact likely to affect existing or planned community, ecologically important areas or sites of cultural heritage;

(b) a physical change resulting in an increase in the extent of reclamation or dredging affecting water flow or quality likely to affect ecologically important areas , or disrupting sites of cultural heritage;

(c) an increase in pollution emissions or discharges or waste generation likely to violate guidelines or criteria in this technical memorandum without mitigation measures in place;

(d) an increase in throughput or scale of the project leading to physical additions or alterations that are likely to violate the guidelines or criteria in this technical memorandum without mitigation measures in place; or

(e) a change resulting in physical works that are likely to affect a rare, endangered or protected species, or an important ecological habitat, or a site of cultural heritage.

6.2 The environmental impact of a designated project, for which an environmental permit has been issued, is considered to be materially changed if the environmental performance requirements set out in the EIA report for this project may be exceeded or violated, even with the mitigation measures in place.

7. ISSUING ENVIRONMENTAL PERMIT

7.1 The Director will grant an environmental permit to the applicant if an EIA report covering the project has been approved with or without conditions under this Ordinance. For cases where permission is given to the applicant under section 5(9), 5(10) or 5(11) of the Ordinance to proceed directly to apply for environmental permit, the Director will grant an environmental permit if

(a) the applicant satisfies the conditions of approval under section 5(12) of the Ordinance that relate to the issue of environmental permit; and

(b) is prepared to implement the mitigation measures recommended in the previously approved EIA report referred to by the applicant, or the mitigation measures described in the project profile.

7.2 The Director will use the following criteria in determining the conditions to be imposed in an environmental permit:

(a) the mitigation measures set out in the project profile or the findings and conclusions of the approved EIA report, whichever is applicable;

(b) the conditions of approval of the EIA report;

(c) the conditions of approval for proceeding directly with the application for environmental permit;

(d) the advice given to him by other relevant authorities on matters within their jurisdiction as listed in Section 9 of this technical memorandum, or

(e) the measures that are necessary to meet the guidelines, standards or criteria laid down in this technical memorandum; and

the Director will follow any advice received from the Secretary under Section 10 of this technical memorandum.

7.3 In addition, the following principles shall be followed when setting the conditions:

(a) conditions which would be imposed through other applicable ordinances or regulations shall not normally be imposed in environmental permits issued under the Environmental Impact Assessment Ordinance;

(b) conditions may be imposed in addition to the requirements laid down in other applicable ordinances upon the advice of the relevant authorities, but this must be in accordance with section 10(8) of the Ordinance. There shall be adequate justification in the EIA report to demonstrate the need for such conditions to reduce the cumulative impacts of the project to avoid the violation of other applicable ordinances or exceedances of any applicable criteria, standards, guidelines or principles as defined in accordance with this technical memorandum.

7.4 Although the requirement for the EIA study for an industrial estate shall relate to the overall environmental impact of the entire estate, the Hong Kong Industrial Estates Corporation (HKIEC) is not held responsible for the EIA studies for individual industrial factories listed as designated projects in the Ordinance. For an environmental permit to be issued to the HKIEC, the Director shall not set conditions that are not within the control of the Corporation. The mitigation measures to be implemented by the HKIEC shall be laid down in the EIA report. The conditions to be set in the environmental permit for an industrial estate shall not relate to individual factories and shall only be restricted to:

(a) the site formation, reclamation or the construction of the infrastructure of the industrial estate; or

(b) any mitigation measures for which it is the sole responsibility of the Hong Kong Industrial Estates Corporation or within the control of the corporation to implement during the operational phase.

7.5 The principles and criteria laid down in Section 7.4 shall apply to other statutory Corporations similarly empowered by law with providing land for multiple private developments.

7.6 Any refusal of environmental permit shall only be on environmental grounds in accordance with the ordinance and this technical memorandum, not on land use grounds.

8. ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

8.1 The environmental permit may impose requirements for monitoring the environmental impacts of the project for verification of predictions or the effectiveness of measures to mitigate its environmental impacts, whether such impacts occur within or outside the physical boundary of the project. The environmental permit may also impose requirements for the formulation of environmental audit requirements, including any necessary compliance and post-project audit programme, in order to review the environmental monitoring data, assess compliance with regulatory requirements, policies and standards, and identify any remedial works required to redress unacceptable or unanticipated environmental impacts. In determining the need for and the scope of the environmental monitoring and audit programme, the Director shall have regard to the findings and recommendations in an approved EIA report.

8.2 In cases where any exceedances are likely to be limited either in time, space or magnitude and no environmentally sensitive uses shall be adversely affected in the long term, the Director may allow the issue of an environmental permit subject to appropriate conditions.

8.3 Generally implementation of a full environmental monitoring and auditing programme shall be required under the following circumstances:

(a) the project has the potential of causing environmental impacts which are or are likely to be prejudicial to the health or well being of people, the flora, fauna or ecosystem if the recommended mitigation measures are not properly implemented;

(b) the project is situated in any area of high conservation value;

(c) the project involves mitigation measures of which the effectiveness may require a long period to establish, e.g. compensatory planting of trees or mangroves;

(d) the project involves an unproven technology;

(e) the project involves unproven mitigation measures;

(f) an otherwise familiar or routine mitigation measure is proposed for a new or unfamiliar environmental setting;

(g) the analysis is based on a new technique or model, or there is other uncertainty about design assumptions and/or the conclusions; or

(h) project scheduling is subject to change such that significant environmental impacts could result.

8.4 The contents of a full environmental monitoring and auditing programme can include but are not limited to, the items listed in Annex 21.

9. TAKING ADVICE FROM OTHER RELEVANT AUTHORITIES

9.1 The Director shall take the advice from the following authorities on the matters prescribed below:

Director of Agriculture and Fisheries	on	Nature conservation, ecological assessment, agriculture, animal and plant health, fisheries
Director of Planning	on	Visual and landscaping aspects
Director of Marine	on	Marine matters
Director of Electrical & Mechanical Services	on	Hazards associated with fuel gas dangerous goods, electromagnetic field
Director of Health	on	Human health matters
Director of Urban Services and Director of Regional Services	on	Collection of domestic waste and public cleansing
Director of Fire Services	on	Transport, handling and storage of dangerous goods
Secretary for Broadcasting, Culture and Sport	on	Antiquities and monuments
Director of Drainage Services	on	Drainage matters
Director of Civil Aviation	on	Civil aviation matters
Director of Water Supplies	on	Developments or works within water gathering grounds or in the vicinity of waterworks installations
Commissioner for Transport	on	Traffic and transport matters

10. RESOLVING CONFLICTS UNDER SECTION 16(1)(f) OF THE ORDINANCE

10.1 The Director may seek and be authorised to follow the advice of the Secretary for cases referred to the Secretary by the Director under the following circumstances:

(a) where there is likely to be unresolved conflicts on the content of the EIA study brief or the EIA report under section 16(1)(f) of the Ordinance;

(b) where there is disagreement regarding the EIA findings and conclusions of the report between the Director and other Authorities listed under section 9 of this technical memorandum which requires resolution under section 16(1)(f) of the Ordinance; or

(c) where the mitigation measures described in the EIA report lead to conflicts which require resolution under section 16(1) of the Ordinance;

10.2 In giving such advice, the Secretary shall ensure that the effect of his advice is to protect the environment.

10.3 Where the Secretary gives advice following the request under section 10.1, the Director is required to follow such advice.

11. USE OF PREVIOUSLY APPROVED EIA REPORTS

11.1 Where a previous EIA report was prepared and deposited in the register, the applicant may make reference to or use the results of that report in his submissions. The applicant shall state in the project profile or the EIA report whether or not:

(a) the relevant findings of the report are still valid;

(b) the project is covered by that report, or is similar in nature, scale and locational characteristics of a project covered by that report; and

(c) necessary additions, amendments and adjustments have been made to take into account any changes in the environment, assessment criteria and methodologies, or in the nature, scale, location and design of the project.

11.2 Neither any previous submission nor prior approval of such material shall prejudice the need for an individual submission to fulfil the requirements either set out in this technical memorandum or under the Ordinance.

12. HAZARD ASSESSMENT

12.1 Hazard Assessment (HA) shall be conducted for projects if, and only if, risk to life is a key issue with respect to Hong Kong Government Risk Guidelines. Reference shall also be made to Section 4.4.3 (a) (i) in so far as risk to life is concerned. The need for a HA and its technical requirements and procedures shall be considered by the Director subject to the advice of the authorities stated in Annex 22. The Risk Guidelines are set out in Annex 4 and Figure 1.

ANNEX 1 - PROJECT PROFILE FOR DESIGNATED PROJECTS

Use of the following checklist for preparing a project profile shall ensure that most of the important environmental factors of a proposed project are to be considered by the Director in deciding what matters an EIA study shall address or whether the applicant can proceed directly to apply for an environmental permit.

2. If the applicant feels that additional or alternative types of information would also be useful, this information shall also be provided in the profile. The information shall include all existing and planned pollution sources or sensitive receivers or sensitive parts of the natural environment to the best knowledge of the applicant at the time of the submission. The provision of details may vary from case to case.

3. Wherever appropriate, the information shall be accompanied by plans, process flowcharts, diagrams, illustrations and other information which may assist in deciding what matters an EIA study shall address and what requirements an EIA study shall meet, or whether an applicant can proceed directly to apply for an environmental permit.

BASIC INFORMATION

Project title

Purpose and nature of the project

Name of project proponent

Location and scale of project (include plans) and history of site

Number and types of designated projects to be covered by the project profile

Name and telephone number of contact person(s)

OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

How will the project be planned and implemented ? (consultant, contractor or in-house)

What is the project time-table ? (e.g. for appointment of consultants, finalizing of design, commencement of construction, commissioning and operation)

Are there any interactions with broader programme requirements or other projects which shall be considered ?

POSSIBLE IMPACT ON THE ENVIRONMENT

Outline any processes involved, including process flow diagrams, site plans, storage requirements, and information on emissions and discharges

Describe the environmental impacts or issues that may arise during the construction, operation or decommissioning of the project, where applicable:

- gaseous emissions
- dust
- odour
- noisy operations
- night-time operations
- traffic generation
- liquid effluents, discharges, or contaminated runoff
- generation of waste or by-products
- manufacture, storage, use, handling, transport, or disposal of dangerous goods, hazardous materials or wastes

- risk of accidents which would result in pollution or hazard
- disposal of spoil material, including potentially contaminated material
- disruption of water movement or bottom sediment
- unsightly visual appearance
- ecological impacts

MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

a. Outline existing and planned sensitive receivers and sensitive parts of the natural environment which might be affected by the proposed project, such as:

- residential developments
- temporary housing areas
- educational institutions, including schools, kindergartens and nurseries
- health care facilities, including hospitals, clinics, and homes for the aged
- places of worship, including temples, churches, amphitheatre
- agricultural areas
- water courses, nullahs and confined bodies of water
- beaches, gazetted or otherwise
- water catchment areas and gathering grounds
- ground-water resources
- marine water resources including those for industrial uses, recreational uses or fisheries activities such as fishing grounds, shellfish harvesting/culture areas, fish spawning and nursery areas or fish culture zones
- industries which are sensitive to pollution
- airsheds with limited capacity to disperse pollution
- areas of conservation value, including Country Parks, Special Areas, Marine Reserves, Marine Parks, Ramsar Site, Sites of Special Scientific Interest and ecologically significant areas such as woodland, wetland and other wildlife habitats
- places of high visual value
- sites of cultural heritage

b. Outline the major elements of the surrounding environment and existing and/or relevant past land use(s) on site which might affect the area in which the project is proposed to be located, such as:

- existing pollution blackspots
- nearby existing and/or discontinued industrial operations
- nearby trunk roads, and primary or secondary distributors
- nearby noisy commercial, community or recreational activities
- aircraft noise, helicopter noise, rail noise
- existing or planned waste handling, treatment and disposal facilities
- potentially hazardous installations
- noisy or dusty open storage uses
- existing and past land uses of the project site and environs

ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED IN THE DESIGN AND ANY FURTHER ENVIRONMENTAL IMPLICATIONS

a. Describe measures to minimize environmental impacts, including the following:

- pollution control technology
- source control
- waste management systems and practices
- potential for waste and wastewater minimization
- risk mitigation measures and accident emergency response plans
- acoustic barriers and insulation
- buffer zones and landscaping
- different siting of activities
- site layout and building design
- retention of natural environmental features
- control of construction work practices

- application of the Deep Bay Guidelines for dredging, reclamation & drainage works
- application of Chapters 9 and 10 of the Hong Kong Planning Standards & Guidelines (version available at the time the Ordinance comes into force)

b. Comment on the possible severity, distribution and duration of environmental effects, where applicable:

- beneficial and adverse effects
- short and long term effects
- secondary and induced effects
- cumulative effects
- transboundary effects

c. Comment on any further implications, such as :

- history of similar projects
- public consultation to date
- public interest and political sensitivity

USE OF PREVIOUSLY APPROVED EIA REPORTS

Where a previous EIA report was prepared for a project of similar nature and the subject EIA report has been approved by the Director and deposited in the register under the Ordinance, the applicant may make reference to or use the results of that EIA report. The following information is to be provided:

- state the title of the approved EIA Report
- state the date of its approval
- state what environmental aspects of the project were addressed in that approved EIA report
- refer to the findings on environmental impacts, and state the relevance of such findings to this project
- state the measures recommended in the approved EIA report and their relevance to this project

ANNEX 2 - PROJECT PROFILE FOR MATERIAL CHANGE TO A DESIGNATED PROJECT

Use of the following checklist for preparing a project profile shall ensure that most of the significant environmental factors of a proposed development are able to be considered by the Director in deciding what matters an EIA study shall address.

2. If the applicant feels that additional or alternative types of information would also be useful, this information shall also be provided in the profile. The information should include all existing and planned pollution sources and sensitive receivers to the best knowledge of the applicant at the time of the submission.

3. Wherever appropriate, the information shall be accompanied by plans, process flowcharts, diagrams, illustrations and other information which may assist in deciding whether an applicant can proceed directly to apply for an environmental permit, or what matters an EIA study shall address and what requirements an EIA study shall meet.

BASIC INFORMATION

Project description

Nature of the project, and the proposed addition, modification or alteration

Name of project proponent

Location of project (include plans)

Name and telephone number of contact person(s)

Proposed addition, modification and alteration

What is the time-table for the addition, modification or alteration (e.g. for appointment of consultants, finalizing of design, commencement of construction, commissioning and operation)

POSSIBLE IMPACT ON THE ENVIRONMENT

Comment on any activities associated with the proposed addition, modification or alteration which may result in environmental impacts, either during the construction or operation (or decommissioning) of the addition, modification or alterations.

(a) description of the environmental changes arising from the changes, additions or alterations;

(b) description of how the environment and the community might be affected by the above change;

(c) description of the findings or recommendations of any previous EIA report or environmental studies;

(d) description of possible environmental impacts arising from the proposed addition, modification or alteration;

(e) description on how these modification, addition or alteration deviate from or invalidates the previous assumptions in previous EIA reports.

DESCRIPTIONS OF MITIGATION MEASURES

(a) description on how the currently adopted measures address the likely environmental impacts arising from the changes;

(b) description of additional measures proposed to deal with such changes and whether this technical memorandum's requirements can be met.

USE OF PREVIOUSLY APPROVED EIA REPORTS

Where a previous EIA report was prepared for the project or a project of similar nature and the subject EIA report has been approved by the Director and deposited in the register, the applicant may make reference to or use the results of that EIA report. The following information is to be provided :

- Title of the approved EIA report
- Time of its approval
- Whether the EIA report is approved under the EIA Ordinance or by other means
- The environmental aspects of the project that have been addressed in that approved EIA report
- The findings with regard to environmental impacts, and the relevance of such findings to this project
- The measures recommended in the approved EIA report and their relevance to this project

ANNEX 3 : FACTORS FOR CONSIDERATION IN IDENTIFYING ADVERSE ENVIRONMENTAL IMPACTS

Environmental Changes	Effects Resulting from Environmental Changes
(a) negative effects on the quality and/or quantity of the biophysical environment including - marine waters, - surface water, - groundwater, - soil, - land, - air, - marine bottom sediments	(a) negative effects on human health, including increases in mortality or morbidity, and/or decreases in personal well-being
(b) emissions, discharges or releases to the environment, including - persistent and/or toxic chemicals, - sediments, - biological or microbial agents, - nutrients, - agricultural wastes, - domestic or industrial liquid/ semi-solid/solid wastes, - electromagnetic field, - noise, - gaseous emissions, dust, odour, - thermal energy	(b) disruptions to normal learning, sleeping, and communication activities
(c) threats to, loss of, or damage to flora and fauna and/or their habitats including habitat fragmentation	(c) reduction of the quality or quantity of recreational opportunities, amenities or perceived aesthetics
(d) disruption of food webs	(d) loss of, or damage to commercial species or renewable or non-renewable resources
(e) negative effects on the health of biota including flora and fauna	(e) foreclosure of future resource use or production
(f) the removal of resource materials from the environment	(f) reduction in biodiversity and/or extinction of species in the area/region concerned
(g) reduction in productivity of operations involved in primary or secondary production	(g) loss of or risk to human lives
(h) changes to existing landscapes	(h) effects of deposits on materials, material corrosion and damage including nuisance and discomfort, reduction in visibility
(i) obstruction of migration, or passage of wildlife	(i) disruption to social activities
(j) negative effects on the protection of cultural heritage	(j) temporary or permanent loss of recreational area
	(k) acute and chronic toxicity effects on biota due to discharge of pollutants
	(l) bioaccumulation and biomagnification of toxic substances in biota especially on commercial food supplies
	(m) long term and short term change on population size of biota including mortality, reproduction, maturity and distribution
	(n) temporal and spatial cumulative effects resulting from environmental changes

ANNEX 4 : CRITERIA FOR EVALUATING AIR QUALITY IMPACT AND HAZARD TO LIFE

1. Air Quality Impact

1.1 The criteria for evaluating air quality impact include the following:

(a) meet the Air Quality Objectives and other standards established under the Air Pollution Control Ordinance;

(b) meet hourly Total Suspended Particulate concentration of 500 microgrammes per cubic metre measured at 298°K (25°C) and 101.325 kPa (one atmosphere) for construction dust impact assessment;

(c) meet 5 odour units based on an averaging time of 5 seconds for odour prediction assessment;

(d) for air pollutants not established under the Air Pollution Control Ordinance nor above: meet the standards or criteria adopted by recognized international organizations such as WHO or USEPA as to be agreed with the Director of Environmental Protection.

2. Hazard to Life

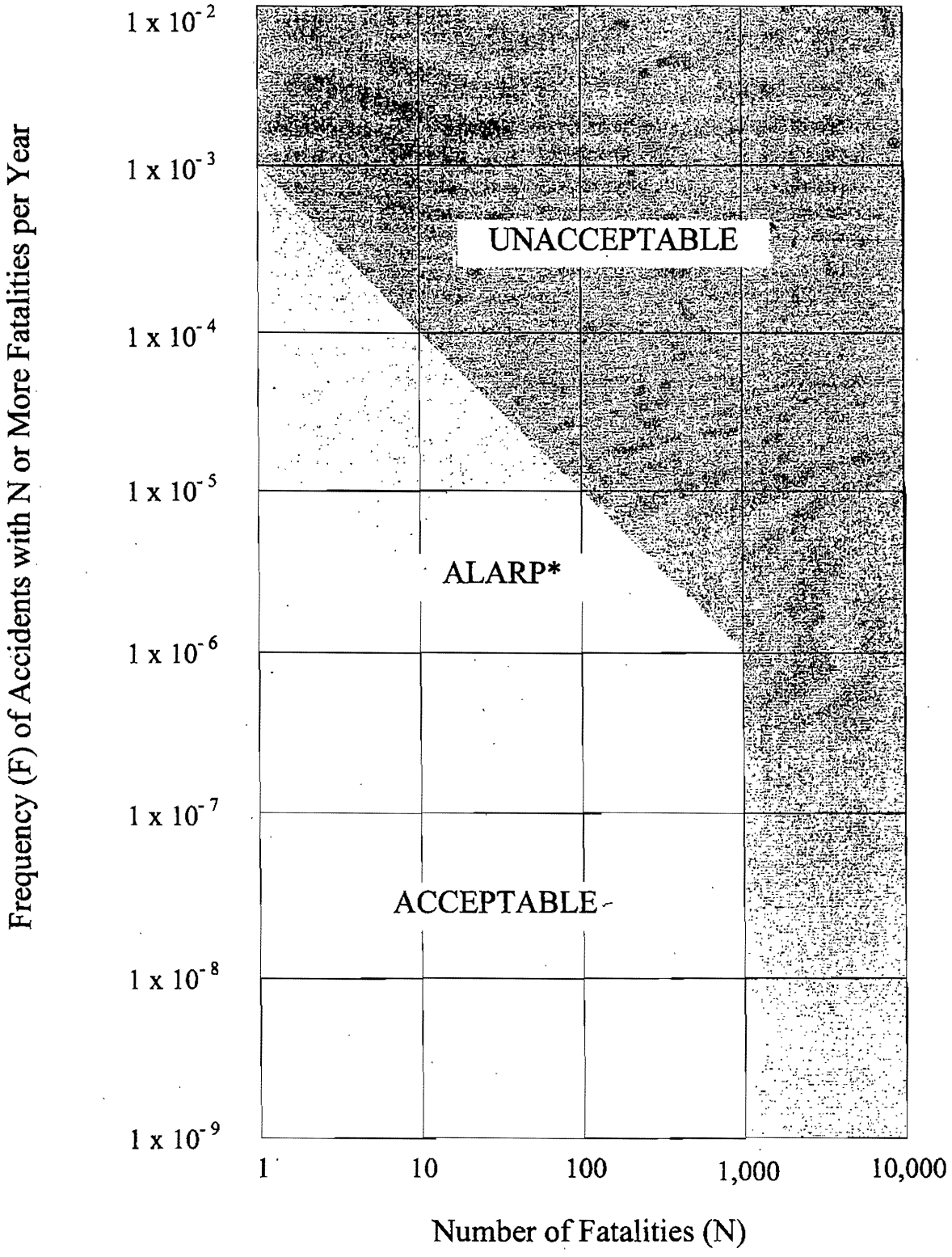
2.1 The criterion for hazard to human life is to meet the Risk Guidelines, as shown in Figure 1.

Figure 1 : RISK GUIDELINES

1. INDIVIDUAL RISK GUIDELINE FOR ACCEPTABLE RISK LEVELS

Maximum level of off site individual risk should not exceed 1 in 100000 per year, ie. 1×10^{-5} / year

2. SOCIETAL RISK GUIDELINES FOR ACCEPTABLE RISK LEVELS



* ALARP Means As Low As Reasonably Practicable. Risk within ALARP Region Should Be Mitigated To As Low As Reasonably Practicable

ANNEX 5 : CRITERIA FOR EVALUATING NOISE IMPACT

Summary of Noise Criteria

Table 1 gives a summary of criteria for evaluating noise impact of designated projects. The Director would apply these criteria in the following manner:

(a) noise criteria laid down in relevant technical memoranda issued under the Noise Control Ordinance must be met;

(b) noise criteria, as listed in Table 1A, for planning and design of designated projects, shall be met, unless it can be demonstrated by the applicant that the residual noise impact would not have long term, serious adverse implications for the environment and community. The Director would normally use the criteria listed in Section 4.4.3 of this technical memorandum to evaluate whether there would be long term, serious adverse environmental implications;

(c) noise criteria, as listed in Table 1B, for construction or decommissioning of designated projects, shall be met as far as practicable. All practicable mitigation measures shall be exhausted and the residual impacts are minimised;

(d) for noise matters not fully listed in the annex, the criteria for evaluating such noise impacts shall be determined on a case by case basis;

(e) wherever such terms exist in the relevant technical memoranda issued under the Noise Control Ordinance, the definitions of such terms shall apply to this technical memorandum.

Table 1 : A Summary of Noise Criteria

Table 1A

Noise Standards for Planning Purposes

Noise Sources / Noise Standards / Common Uses	Aircraft Noise (Noise Exposure Forecast:NEF)		Helicopter Noise L_{max} dB(A) 0700 to 1900 Hours	Road Traffic Noise Peak Hour Traffic L_{10} (1 hour) dB(A)	Rail Noise	Fixed Noise Sources
	Kai Tak Airport	New Chek Lap Kok Airport				
• All domestic premises including temporary housing accommodation	30	25	85	70	(a) (See Note 3) The appropriate Acceptable Noise Levels shown in Table 3 of the Technical Memorandum for the Assessment of Noise from Places Other than Domestic Premises, Public Places or Construction Sites and (b) L_{max} (2300 - 0700 hours) = 85dB(A)	(a) 5 dB(A) below the appropriate Acceptable Noise Levels (ANL) shown in Table 3 of the Technical Memorandum for the Assessment of Noise from Places Other than Domestic Premises, Public Places or Construction Sites, or (b) the prevailing background noise levels (For quiet areas with level 5 dB(A) below the ANL)
• Hotel and hostels	30	25	85	70		
• Offices	30	30	90	70		
• Educational institutions including kindergartens, nurseries and all others where unaided voice communication is required	30	25	85	65		
• Places of public Worship and courts of law	30	25	85	65		
• Hospitals, clinics, convalescences and homes for the aged, diagnostic rooms, wards	30	25	85	55		

Notes:

(1) The above standards apply to uses which rely on opened windows for ventilation

(2) The above standards should be viewed as the maximum permissible noise levels assessed at 1 m from the external facade

(3) Rail noise is under the control of the Noise Control Ordinance and shall comply with the Acceptable Noise Levels laid down in the Technical Memorandum for the Assessment of Noise from Places other than Domestic Premises, Public Places or Construction Sites

Table 1B

Noise Standards for Daytime Construction Activities

Uses	Noise Sources / Noise Standards	0700 to 1900 hours on any day not being a Sunday or general holiday Leq (30 mins) dB(A)	1900 to 0700 hours or any time on Sundays or general holiday
•	All domestic premises including temporary housing accommodation	75	(See Note 3)
•	Hotels and hostels	75	
•	Educational institutions including kindergartens, nurseries and all others where unaided voice communication is required	70 65 (During examinations)	

Notes:

(1) The above standards apply to uses which rely on opened windows for ventilation.

(2) The above standards shall be viewed as the maximum permissible noise levels assessed at 1 m from the external facade.

(3) The criteria laid down in the relevent technical memoranda under the Noise Control Ordinance for designated areas and construction works other than percussive piling may be used for planning purpose. A Construction Noise Permit (CNP) shall be required for the carrying out of the construction work during the period.

Table 2 : Suitable Window Types for Noise Insulation

Suitable window type when the estimated noise level will exceed the relevant standard by β value.

window types / Exceedance over standard / Noise source	I	II	III
Rail Traffic	$\beta < 5$	$5 \leq \beta < 10$	$\beta \geq 10$
Road Traffic	$\beta < 10$	$10 \leq \beta < 15$	$\beta \geq 15$
Aircraft	-	$\beta < 10$	$\beta \geq 10$
Helicopter	$\beta < 5$	$5 \leq \beta < 10$	$\beta \geq 10$

NOISE INSULATION PERFORMANCE AND WINDOW TYPES

I - openable well-gasketted window, 6mm pane, or transmission loss (TL) of 28dB or above in 250 Hz octave-band and sound transmission class (STC) 31 or above

II - openable well-gasketted window, 8mm pane, or TL of 32 dB or above in 250 Hz octave-band and STC 34 or above

III - openable well-gasketted windows, 12 mm laminated pane, or TL of 33 dB or above in 250 Hz octave-band and STC 38 or above

ANNEX 6 : CRITERIA FOR EVALUATING WATER POLLUTION

1. General Criteria

1.1 The Aquatic Environment

1.1.1 Criteria for protection of the aquatic environment against water pollution include consideration of all the aquatic components: **water quality, hydrology, bottom sediments,** and **ecology**.

1.2 The Water Quality Objectives (WQOs)

1.2.1 Under the Water Pollution Control Ordinance (WPCO), the Water Quality Objectives (WQOs) are established in terms of measures of physical, chemical and biological water quality in each WCZ to achieve the required level of protection of the beneficial uses. Based on the beneficial uses, the WQOs can be broadly categorised as follows:

(a) Aesthetic Enjoyment: criteria concerning these aesthetic characteristics are general and descriptive. They depend on subjective senses of sight, smell, taste and touch. Criteria include, without limitation,:

- not to cause discolouration of water;
- not to cause visible matters on the water surface;
- not to cause tainting of seafood.

(b) Human Health: criteria concerning the quality of water for abstraction of water for potable water supply and irrigation, waters for bathing and other recreational purposes; and contamination of seafood. Key criteria include:

- to limit the maximum levels of E.coli and other pathogenic indicators in waters where shellfish are harvested, in mariculture zones, or in waters used for bathing and other recreational proposes;
- to prevent concentration of substances that will accumulate in water, sediment or biota, from reaching the levels that are harmful to human health.

(c) Aquatic Life: criteria concerning protection of the water quality to maintain the integrity and balance of the aquatic ecosystem. Criteria include:

- not to alter the natural properties e.g. turbidity, temperature, salinity, pH and dissolved oxygen of the water to such an extent that will upset the maintenance and the balance of primary and secondary production;
- not to cause alteration of the hydrology or increases in nutrient inputs that lead to eutrophication or objectionable algal growth;
- to prevent concentration of persistent, bio-accumulative and toxic substances from reaching harmful levels;
- not to alter the physical environment e.g. hydrology and sedimentation, that lead to aggravation of water pollution.

(d) Industrial Use: criteria concerning prevention of deleterious chemicals, floatables, settleable matters, and biological growths affecting important industrial uses of the water such as that for cooling systems or for shipping.

1.3 The Mixing Zone Criteria

1.3.1 It is not always necessary to meet all water quality criteria in all areas to protect the integrity of the aquatic environment. The Authority under the WPCO may allow for the receiving water quality not to meet water quality criteria. These areas e.g. water near the sewage outfall discharge, are subjected to greater impacts and are called mixing zones. A mixing zone is therefore a region of a waterbody where initial dilution of a pollution input takes place and where water quality criteria can be exceeded. The WQOs must be met at the boundary of a mixing zone. The characteristics of a mixing zone such as the size, siting, shape, quality, depend on the assimilative capacity of the receiving system and are determined on a case-by-case basis. In general, the criteria for acceptance of a mixing zone are that:

(a) it must not impair the integrity of the water body as a whole;
(b) it must not interfere with the migratory pathways of important species to a degree which is damaging to the ecosystem;
(c) it must not endanger sensitive uses e.g. beaches, breeding grounds, or diminish beneficial uses;
(d) it must not result in the accumulation of substances to such levels as to produce significant toxic effects in human or aquatic organisms;
(e) within a mixing zone the following basic water quality criteria shall be met

- materials not in such concentrations that settle to form objectionable deposits;
- floating debris, oil, scum, and other matter not in such concentrations that form nuisances; and
- substances not in such concentrations that produce objectionable colour, odour, taste, or turbidity.

1.4 Waters under Stressed Conditions

1.4.1 A water body is defined as stressed if the existing water quality is in breach of or likely to breach the water quality objectives or that necessary to protect the beneficial uses designated for that particular water body. A water body under stress must be protected against further degradation, using the following criteria:

(a) activity must not contribute to, increase or perpetuate stressed conditions;

(b) activity must not retard recovery of the water body if level of pollution from other sources decrease.

1.5 Cumulative Impacts

1.5.1 Cumulative impacts occur when multiple inputs of pollutants enter the same aquatic environment, leading to overlapping zones of exposure, or where there is cumulative reduction in assimilative capacity such as due to reclamations. Cumulative impact over a period of time shall also be considered. Criteria for evaluation are based on identification of all the pollution inputs and their impact zones, and the determination of the assimilative capacity of the water body that encompasses all or most of the overlapping zones of influence.

2. Activity / Project Specific Criteria

These criteria are to supplement and to be considered in conjunction with the General Criteria.

2.1 Waste Discharges

2.1.1 Criteria for control of waste discharges are outlined in the Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters (TM) issued under section 21 of the Water Pollution Control Ordinance. The TM sets the limits that make effluents acceptable for discharge. These limits on the physical, chemical and microbial quality of the effluents are imposed in licences issued under the Water Pollution Control Ordinance by the relevant authority. For large discharges or discharges into sensitive areas e.g. stressed water, criteria for discharges shall be determined on the basis of the assimilative capacity of the receiving water body and more stringent standards than those stipulated in the TM may apply.

2.2 Dumping of Wastes

2.1.2 Criteria for acceptability and control of dumping of wastes in the aquatic environment are governed by the Dumping at Sea Ordinance. The criteria laid down in the annexes to the London Dumping Convention also apply.

2.3 Stormwater Runoff

2.3.1 Criteria for control of diffuse pollution shall be based on measures to control pollution at source and to abate pollutants in the stormwater runoff. These criteria are to be met through the implementation of Best Management Practices (BMPs) which include, but not be limited to:

(a) erosion and sedimentation control;
(b) runoff quantity and quality control;
(c) identification and elimination of point source discharges;
(d) prevention of "first flush" pollution;
(e) elimination of discharges into poor flushing areas except artificial wetlands designed for pollution abatement.

2.4 Toxic and Prohibited Substances

2.4.1 The criteria are that there shall be no threat to ecological and human health and that pollution must be controlled at source by pollution prevention, pretreatment, and recycle and reuse. Substances that are toxic, persistent and accumulative in water, sediment or biota, and that cannot be rendered harmless by dilution, dispersion and other natural processes of the aquatic system and for which no numerical water quality criteria are available must be controlled vigorously at source with the ultimate aim to achieve complete elimination. Discharges of substances of high-level radioactivity are prohibited.

ANNEX 7 : CRITERIA FOR EVALUATING WASTE MANAGEMENT IMPLICATIONS

1. General

1.1 The criteria for assessing waste management implications are:

(a) provide adequate, environmentally acceptable waste handling, storage, collection, transfer, treatment and disposal facilities to deal with waste arising from the development;

(b) meet all the relevant requirements under the Waste Disposal Ordinance and its Regulations;

(c) provide proper handling, storage, collection and disposal of waste generated during construction phase in accordance with the requirements of the Waste Disposal Ordinance and the Dumping at Sea Ordinance;

(d) provide adequate facilities to facilitate waste reduction and explore beneficial use of waste generated, taking into account :

- the quantity of waste arising;
- the physical and chemical nature of the waste materials;
- all practicable on site measures to render the waste acceptable for beneficial use;
- the availability of outlets for beneficial use of the waste in Hong Kong;
- the environmental effect in any waste reduction practice and additional handling of waste for beneficial use;

(e) explore alternatives which generate minimal amount of waste through design modifications and programming of works;

(f) for residential and community developments close to existing landfills, adequate safety and precautionary measures to avoid or minimise the risks due to landfill gas (LFG) migration or leachate contamination. In particular, for development or re-development that is within 250 m of the edge of waste, a landfill gas hazard assessment is typically required to assess the risk associated with LFG and, where necessary, design adequate precautionary / protection measures to render the proposed development as safe as reasonably practicable.

ANNEX 8 : CRITERIA FOR EVALUATING ECOLOGICAL IMPACT

Ecological impact refers to the effect on a habitat or species due to direct or indirect changes in the environment brought about by a project. Besides magnitude and scale, the significance of an ecological impact is also related to the asserted importance of the habitat or species to be affected. In general, the impact on an important habitat or species will be more significant in comparison to other less important ones.

2. The following are some general criteria that can be used for evaluation of the significance of an ecological impact and the ecological importance of a site/habitat or a species. These criteria are not exhaustive and may carry different weight in different cases.

Table (1) Evaluating the significance of an ecological impact

Criteria	Remarks
Habitat quality	The impact will be more significant if ecologically important habitats are affected. The criteria used for evaluating the ecological importance of a site / habitat are shown in Table (2). Examples of habitat types that are considered as important in the territory are listed in Note below.
Species	The impact will be more significant if ecologically important species are affected. The criteria used for evaluating the ecological importance of a species are shown in Table (3).
Size/Abundance	The impact will be greater if larger area of a habitat or greater numbers of organisms are affected. (e.g. The impact of indiscriminate clearance of woodland is more severe than that of selective felling of trees at the same site.)
Duration	Long term impacts are usually more significant than short term ones.
Reversibility	Permanent and irreversible impacts are usually more significant than temporary and reversible ones.
Magnitude	Usually the greater the magnitude of the environmental changes (e.g. increase in pollution loads, decrease in food supply), the more significant is the impact.

Note : Important habitat types in the territory

1. mature native woodland larger than one hectare
2. undisturbed natural coastal area larger than one hectare or longer than 500 metres in linear measurement
3 intertidal mudflats larger than one hectare
4 established mangrove stands of any size
5. brackish or freshwater marshes larger than one hectare
6 established seagrass bed of any size
7 natural stream courses and rivers longer than 500 metres
8. established coral communities of any size
9. other habitats found to have special conservation importance by documented scientific studies

Table (2) Evaluating a site / habitat

Criteria	Remarks
Naturalness	Truly natural habitats (i.e. not modified by man) are usually highly valued. However, most areas of the territory have been modified. Generally, those habitats less modified will tend to be rated higher.
Size	In general larger area of habitat(s) shall be more valuable than smaller ones, all else being equal.
Diversity	The more diverse the species assemblages and communities of a site, the higher is its conservation value.
Rarity	Rarity can apply to habitats as well as species. The presence of one or more rare habitats and species will give a site higher value than those without rarity.
Re-creatability	Habitats which are difficult to be re-created naturally or artificially are usually valued higher.
Fragmentation	In general, the more fragmented habitat, the lower is its value.
Ecological linkage	The value of a habitat increases if it lies in close proximity and/or links functionally to a highly valued habitat of any type.
Potential value	Certain sites, through appropriate management or natural processes, may eventually develop a nature conservation interest substantially greater than that existing at present. Factors limiting such potential being achieved shall be noted.
Nursery/breeding ground	Such areas are very important for the regeneration and long term survival of many organisms and their populations
Age	Ancient natural or semi-natural habitats are normally highly valued. For some habitats such as woodlands, older ones are normally valued much higher than recent ones.
Abundance/Richness of wildlife	In general sites supporting more wildlife will be rated higher.

Table (3) Evaluating species found within a site / habitat

Criteria	Remarks
Protection status	Species listed under local legislation and international conventions for conservation of wildlife shall be given special attention. References shall also be made to those protected by law in China, especially Guangdong Province.
Distribution	Species with restricted distribution (locally or regionally) will be rated higher than those more widespread ones. More weight shall be given to species which are endemic to Hong Kong or South China.
Rarity	Normally the rarer the species, the more value it has. However care shall be taken in assessing exotic weeds, escaped cultivars or captive species, vagrants and introduced species which have lower value. Greater weight shall be given to those which are internationally rare, then to regionally rare (within South China) and finally locally (within Hong Kong) rare species. Reference could be made to Red Data Books and species lists of international conventions for conservation of wildlife.

ANNEX 9 : CRITERIA FOR EVALUATING FISHERIES IMPACT

The following table is some general criteria that can be used for evaluation of fisheries impact of a proposed development:

Criteria	Conditions under which the fisheries impacts of a proposed development would be rated higher.
Nature of impact	Impacts are permanent, irreversible or long term.
Size of affected area	The area of fisheries habitats, fishing grounds or aquaculture sites affected constitutes a high proportion of the total area of fisheries habitats, fishing grounds or aquaculture sites in Hong Kong.
Loss of fisheries resources / production	The loss of fisheries resources / production (including capture fisheries and aquaculture production) constitutes a high proportion of total fisheries resources / production in Hong Kong.
Destruction and disturbance of nursery and spawning grounds	Nursery and spawning grounds of commercially important species are disturbed or destroyed, affecting the recruitment of juveniles and hence the adult population in future.
Impact on fishing activity	Large number of fishermen or fishing vessels with high dependence on the affected area (expressed as % time spent fishing in the area or % fishing income or fisheries production derived from the area) are affected.
Impact on aquaculture activity	Large number of aquaculturists or aquaculture farms are affected.

ANNEX 10 : CRITERIA FOR EVALUATING VISUAL AND LANDSCAPE IMPACT, AND IMPACT ON SITES OF CULTURAL HERITAGE

1. Criteria for Assessment of Visual and Landscape Impact

1.1 The evaluation of landscape and visual impact may be classified into five levels of significance based on type and extent of the effects concluded in the EIA study:

(a) The impact is beneficial if the project will complement the landscape and visual character of its setting, will follow the relevant planning objectives and will improve overall and visual quality;

(b) The impact is acceptable if the assessment indicates that there will be no significant effects on the landscape, no significant visual effects caused by the appearance of the project, or no interference with key views;

(c) The impact is acceptable 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;

(d) The impact is unacceptable if the adverse effects are considered too excessive and are unable to mitigate practically;

(e) The impact is undetermined if significate 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. Criteria for Assessment of Impact on Sites of Cultural Heritage

2.1 The criteria for evaluating impact on sites of cultural heritage include:

(a) The general presumption in favour of the protection and conservation of all sites of cultural heritage because they provide an essential, finite and irreplaceable link between the past and the future and are points of reference and identity for culture and tradition.

(b) Adverse impacts on sites of cultural heritage shall be kept to the absolute minimum.

ANNEX 11: CONTENTS OF AN ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT

EXECUTIVE SUMMARY IN ENGLISH AND CHINESE

- Summary of main issues, findings, conclusions and recommendations

INTRODUCTION

- Background of the project
- Purpose of the EIA study
- The approach

DESCRIPTION OF THE PROJECT

- Key project requirements
- Site location and site history
- Nature, scope and benefits of the project
- Size or scale, shape and design of the project
- Project timetable and phasing of the project
- Means by which the project will be implemented
- Any related projects
- Type, scope, scale, frequency and duration of the construction, operational or decommissioning (if relevant) activities
- Background and history of the project, including considerations given to different options, and the project's different siting or alignment
- Description of scenarios with or without the project

ENVIRONMENTAL LEGISLATION, POLICIES, PLANS, STANDARDS AND CRITERIA

- Applicable environmental ordinances and regulations
- Applicable government environmental policies and plans
- Applicable environmental standards and criteria
- Other references

DESCRIPTION OF THE ENVIRONMENT

- Baseline environmental conditions
- Environmental trends

DESCRIPTION OF ASSESSMENT METHODOLOGIES

- Assessment methodologies, assumptions and criteria, including sample calculations and input and output files of a typical model run for all mathematical modelling

IDENTIFICATION OF ENVIRONMENTAL IMPACTS

- Potential environmental impacts including the types, characteristics and estimated quantities of emissions, discharges, wastes, potential risks, disturbances or displacement associated with the activities relating to the project during construction, operation and decommissioning phases
- Description of resources or receivers which are vulnerable to change or environmental impacts

PREDICTION AND EVALUATION OF ENVIRONMENTAL IMPACTS

- Prediction of environmental impacts (including beneficial or adverse; direct or indirect; short term or long term; reversible or irreversible; transboundary; cumulative)
- Evaluation of predicted environmental impacts against applicable environmental legislation, policies, plans, standards and criteria

MITIGATION OF ADVERSE ENVIRONMENTAL IMPACTS

- Measures to eliminate, reduce or remedy adverse environmental impacts

DEFINITION AND EVALUATION OF RESIDUAL ENVIRONMENTAL IMPACTS

- Definition and evaluation of net environmental impacts with mitigation measures in place

ENVIRONMENTAL MONITORING AND AUDIT

- Need for and scope of monitoring and audit
- Environmental monitoring and audit requirements, if found to be necessary, and the related environmental monitoring and audit programme

CONCLUSIONS AND RECOMMENDATIONS

SCHEDULE OF RECOMMENDED MITIGATION MEASURES

- A schedule of all mitigation measures recommended in the EIA report, listing out what the mitigation measures are, by whom, when, where and to what requirements, and including the key environmental monitoring and audit requirements

APPENDIX - Responses to comments received

ANNEX 12 : GUIDELINES FOR AIR QUALITY ASSESSMENT

1. General

1.1 This annex describes the commonly adopted approaches and methodologies for assessment of air quality impact arising from designated projects. The methodologies may vary from case to case, depending on the nature of air quality issues and the latest development in methods and techniques.

2. Determination of Air Sensitive Receiver

2.1 Any domestic premises, hotel, hostel, hospital, clinic, nursery, temporary housing accommodation, school, educational institution, office, factory, shop, shopping centre, place of public worship, library, court of law, sports stadium or performing arts centre shall be considered to be a sensitive receiver.

2.2 Any other premises or place with which, in terms of duration or number of people affected, has a similar sensitivity to the air pollutants as the aforelisted premises and places shall also be considered to be a sensitive receiver.

3. Assessment Methodology

The air quality assessment shall take into consideration the following aspects:

3.1 Identification of Emission Characteristics

It involves the identification of emission characteristics for major sources (including new source(s) proposed in the EIA study, if any) within the study area including, but not limited to, the following elements:

(a) emission rates, exit velocity and exit temperature as a function of load, time and air pollutants emitted for maximum, average and nominal operating/design conditions;

(b) location, height of emission, grade level above mean sea level and physical dimensions of emission points, areas, volumes and lines;

(c) anticipated growth changes over the time horizon of the EIA study.

3.2 Description of Study Area

The study area for assessing air quality impact may vary from case to case and the EIA study brief may prescribe the study area. It involves the description of the topographical and man-made features which may affect the dispersion characteristics of air pollutants within the study area. This includes terrain height, locations and dimensions of physical obstruction, existing and potential land use, existing and potential building downwash, building wake, street canyon or cavity effects within the study area.

3.3 Description of Sensitive Receivers

It involves the description of locations, height, grade level, dimension of sensitive receivers and impact area.

3.4 Baseline Study

It involves the description of the existing air quality based on, but not limited to, existing air quality monitoring on-site or quality assured measured data which can be obtained from government agencies, companies or instructions. The baseline study involves a discussion of background air quality value due to uninventoried sources and contributions from outside the study area and description of the method used for determining this value.

3.5 Meteorological Conditions

Assessment shall use the recent representative sequential hourly meteorological data obtained from on-site observation, government agencies, companies or institutions. It also involves a discussion of meteorological variations due to difference between the monitoring site and the study area as well as within the study area. Meteorological conditions due to topographic / land use influences shall be identified and discussed.

3.6 Impact Prediction and Assessment

(a) Assessment results shall provide information on the worst case meteorology; areas of maximum impacts in the study area and cumulative impacts due to background and identified sources.

(b) Presentation of assessment results shall be assisted by summary tables and contour map of pollutant concentration.

(c) Assessment results shall be compared with acceptable air quality standards as defined according to Annex 4.

ANNEX 13 : GUIDELINES FOR NOISE ASSESSMENT

1. General

1.1 The annex describes the commonly adopted approaches and methodologies for assessment of noise impacts arising from designated projects. The methodologies may vary from case to case, depending on the nature of noise issues and the latest development in methods and techniques.

2. Potential Noise Sources

2.1 The potential noise sources could be, but not limited to, the following:

(a) road traffic noise

(b) fixed noise sources (including, but not limited to, general industrial noise sources, concrete batching plants, pump houses, electricity sub-stations, gas pressure reduction plants, rock crushing plants, quarries, railway depots/marshalling yards, airport facilities, wholesale markets, bus depots/termini, open car/lorry parks, vehicle pounding areas, refuse handling areas, abattoirs, container terminals, sand depots, public cargo working areas, multi-purpose terminals, fire stations, ambulance depots, tram depots)

(c) construction noise (including noise from powered mechanical equipment and vehicle movement on haul roads)

(d) rail noise

(e) aircraft noise

(f) helicopter noise

3. Noise Sensitive Receivers

3.1 The potential noise sensitive receivers could be, but not limited to, the following:

(a) Residential Uses
- all domestic premises including temporary housing

(b) Institutional Uses
- educational institutions including kindergarten and nurseries
- hospitals
- medical clinics
- homes for the aged
- convalescent homes
- places of public worship
- libraries
- courts of law
- performing arts centres
- auditoria
- amphitheatres

(c) Others
- hostels
- country parks

4. Noise Tolerant Uses

4.1 The potential noise tolerant uses could be, but not limited to, the following:

(a) multi-storey carparks
(b) multi-storey markets
(c) offices (with acoustic insulation)
(d) godowns
(e) community uses (eg. sports complexes, community centres), or
(f) commercial centres/premises

5. Assessment Methodology

Road Traffic Noise

5.1 The commonly accepted method in Hong Kong for the assessment of road traffic noise is based on the procedures given in the UK Department of Transport document "The Calculation of Road Traffic Noise". The road traffic noise is presented in terms of noise levels exceeded for 10% of the one-hour period for the hour having the peak traffic flow [L_{10}(1h) dB(A)]. Predictions shall normally be based on the design traffic conditions or the maximum traffic projections within 15 years upon operation of the roadworks or occupation of the noise sensitive receivers or uses, whichever appropriate, and shall take into consideration future (both committed and planned) as well as existing roadworks and land uses.

Fixed Noise Sources

5.2 The assessment shall be based on standard acoustic principles. For assessment point and correction of tonality, impulsiveness and intermittency, reference shall be made to the Technical Memorandum on Noise from places other than Domestic Premises, Public Places or Construction Sites, issued under the Noise Control Ordinance. The noise levels shall be calculated using assumed plant inventories and utilisation schedule.

Construction Noise

5.3 The assessment shall be based on standard acoustic principles. In case the proponent or consultant would like to assess whether a Construction Noise Permit (CNP) could be issued or not in the context of programming construction works, reference should be made to the relevant technical memoranda issued under the Noise Control Ordinance (NCO): the Technical Memorandum on Noise from Percussive Piling, the Technical Memorandum on Noise from Construction Work other than Percussive Piling, and the Technical Memorandum on Noise from Construction Work in Designated Areas. Where no sound power levels can be found in the Technical Memoranda, reference shall be made to BS 5228 Part I or noise emission levels measured in previous projects in Hong Kong.

However, whether the Noise Control Authority would issue a CNP would depend on the application submitted according to the procedures laid down in the relevant technical memoranda issued under the NCO rather than this assessment exercise.

Noise from Vehicle Movement on Haul Roads

5.4 The assessment of noise from the movement of vehicles on-site shall be based on the methodology recommended in the British Standard BS 5228 Part I, Noise Control on Construction and Open Site, 1984.

Rail Noise

5.5 The assessment methodology shall be agreed with the Director of Environmental Protection prior to the commencement of the assessment.

Other Technical Memoranda under the Noise Control Ordinance (NCO)

5.6 The assessment of noise shall be made reference to any other relevant technical memoranda under the NCO that are in force at the time of assessment.

6. Consideration of Mitigation Measures

6.1 Where the predicted noise impacts exceed the applicable noise criteria, direct mitigation measures as shown below shall be considered and evaluated in an appropriate manner :

(a) alternative land use arrangement
(b) alternative siting
(c) screening by noise tolerant buildings
(d) setback of buildings
(e) decking over
(f) extended podium
(g) building orientation
(h) treatment of source
(i) alternative alignment
(j) noise barrier/enclosure
(k) special building design
(l) architectural features/balcony
(m) open-textured road surfacing

6.2 Upon exhaust of direct mitigation measures, indirect mitigation measures in the form of window insulation and air-conditioning is often the "last resort" in an attempt to abate the residual impact from noise sources not controlled under the Noise Control Ordinance, such as aircraft, road traffic and helicopter, because it will practically deprive the receivers of outdoor activities and an "open-window" life style. If a compromise is necessary when there are overriding constraints on the location and design of a development, which prevent full compliance with the appropriate noise standards laid down in Annex 5, an attempt shall be made to maximize the proportion of receivers protected, using noise mitigation measures at sources or building layout designs of the development. The remaining unprotected receivers shall be insulated using the suitable window types described in Table 2 of Annex 5. The acoustic insulation shall also require the provision of air-conditioning systems because of the warm and humid climate in Hong Kong.

6.3 If additional mitigation measures are required on the planned land uses even after adoption of all practicable direct measures on the roads, the practicality of these additional mitigation measures shall be evaluated and confirmed.

ANNEX 14 : GUIDELINES FOR ASSESSMENT OF WATER POLLUTION

1. General

1.1 The annex describes the commonly adopted approaches and methodologies for assessment of water pollution arising from designated projects. The methodologies may vary from case to case, depending on the nature of the water quality issues and the latest development in methods and techniques. The assessment shall be quantitative wherever possible.

2. Aquatic System subject to Water Pollution Impact

2.1 In identifying and evaluating water pollution impacts of the aquatic environment, the following aspects shall be considered:

(a) **water quality** as characterized by:

(i) physical and chemical features such as temperature, salinity, conductivity, pH, colour, suspended solid, floatable, turbidity, oil and grease, and organic material concentration measured by TOC, COD or BOD,
(ii) eutrophication related factors measured by dissolved oxygen, nutrients and chlorophyll-a,
(iii) harmful or toxic substances including ammonia, heavy metals, PCB, PAH, pesticides, and radionuclides, and
(iv) pathogenic micro-organisms and viruses indicators e.g. E.coli;

(b) **Hydrology** including factors concerning currents, tidal flows, drainage, erosion, sediment deposition and other physical phenomena;

(c) **Bottom sediments** characterized in terms of physical, chemical and microbiological properties and constituents, including parameters such as particle size, pH, organic contents, nutrients, sulphide, and toxic substances such as heavy metals, pesticides and antifouling paints; and

(d) **Ecology** including flora and fauna composing of bacteria, phytoplankton, zooplankton, benthic organisms, coral, shellfish, fish, mangroves, wetland and other aquatic biota.

3. Beneficial Uses Sensitive to Water Pollution

3.1 Existing or potential beneficial uses that are sensitive to water pollution shall include, but not be limited to:

(a) areas of ecological or conservation values including marine conservation areas, existing or gazetted proposed marine parks and marine reserves, sites of special scientific interest (SSSI), existing or gazetted proposed country parks and special areas, wetlands, mangroves and important freshwater habitats;
(b) areas for abstraction of water for potable water supply;
(c) water abstraction for irrigation and aquaculture;
(d) fish spawning grounds, fish culture zones, shellfish harvesting/culture site and brackish/freshwater fish ponds;
(e) beaches and other recreational areas;
(f) water abstraction for cooling, flushing and other industrial purposes;
(g) areas for navigation/shipping including typhoon shelters, marinas and boat parks.

4. Assessment Approach

4.1 Assessment shall rely on the concept of **assimilative capacity** of the receiving water body and water quality objectives. Assimilative capacity will vary with the characteristics of each site and with the type and number of discharges or activities or affected beneficial uses. Quantification of the assimilative capacity of the receiving environment shall take into account physical processes, as well as all chemical, biochemical and biological processes. Sensitive receivers based on beneficial uses shall be identified and the water quality impact shall be assessed with reference to the Water Quality Objectives or criteria covered in Annex 6. Assimilative capacity of a water body is regarded as exceeded if the water quality objectives (WQOs) for the most sensitive target of the beneficial uses to be protected for that water body are exceeded.

4.2 In evaluating water pollution impacts, both point and non-point sources of water pollutants shall be considered. Non-point pollutants refer to those substances which can be introduced into the receiving water body as a result of urban or rural runoff. Point sources are related to specific discharges from municipal or industrial facilities.

5. Assessment Methodology

5.1 Assessment methodology shall be site- and activity-specific. Assessment framework shall include the following elements:

Identification of Impact-causing Factors

5.2 It involves the identification and characterization of the impact-causing factors associated with a project. Information shall be based on specific features of the project, including coastline and river modifications, construction activities such as dredging and dumping, quality and quantity of wastewater and thermal discharges, changes in land-use and drainage, oil and chemical spills, maritime wastes, waste disposal facilities and leachates, and non-point pollution sources. Emphasis shall be placed on activities or pollutants that will result in nutrient enrichment leading to eutrophication or structural changes in biological community, bathometry change, reduction in flushing or assimilative capacities, loss or modification of aquatic habitats, and threat to ecological and human health from exposure to toxic substances, pathogens and biotoxins.

Determination of the Impact Boundary

5.3 An essential first step in assessing the impact of an activity on the water body is the determination of the impact boundaries. The impacted area can be divided into the near-field and far-field. The near-field includes the initial dilution and the mixing zones and is basically determined by physical processes such as the hydrodynamic processes. The far-field is more difficult to determine and depends on water transport, biological processes, geochemical processes, and physio-chemical processes. Estimating the impact area has to be carried out at the early stage of the assessment but may have to be revised in the light of information that emerges during the assessment process.

Baseline Study

5.4 It involves the description of the existing quality and quantity (as appropriate) of the receiving aquatic environment, with emphasis on the quality parameters related to the water pollutants arising from an activity and the parameters relating to the affected beneficial uses. Field surveys shall be carried out to supplement existing information in situation when existing data are out dated or insufficient. Baseline study involves the development of a survey and sampling programme which shall cover aspects of meteorological, geological, hydrological factors, physio-chemical characteristics, biology and beneficial uses. Sampling programmes

to provide information for environmental assessments must be carefully designed to meet identified objectives and shall be directed to potential problems. The baseline study must consider changes that may arise from seasonal and climatic changes, other natural changes such as sedimentation and ecological succession, and impacts from other current or proposed development in the area.

Impact Prediction and Assessment

5.5 Assessment shall make use of the scientific knowledge of near-field and far-field transport and dispersion of pollutants coupled with modelling and measurements obtained from the baseline study. Both construction and operation (or decommissioning as appropriate) aspects of the project shall be considered. Assessment shall be based on quantitative techniques which can range from the use of simple mass balance approaches to sophisticated computer models. In situations involving various degrees of complexity and uncertainty, numerical or probabilistic modelling approaches are useful. It shall be noted that the use of models requires acquisition of good comprehensive baseline and monitoring data. Models to be selected must be well proven and be satisfactorily calibrated and verified with field data. The modelling capabilities and approach shall meet the relevant government requirements being in force.

5.6 Assessment of biological effects shall include the organismic as well as community or ecosystem level. Factors governing the availability and accumulation and transformation of pollutants shall be considered.

5.7 The predictions will provide information which can used as the basis for determining whether the aquatic resources and beneficial uses are at risk, or that the assimilative capacity will be exceeded as a result of implementation of the project.

5.8 While impact prediction can be assisted by the uses of checklists, matrices, flow-charts and networks analyses, they do not assess the nature, magnitude or significance of the impacts.

Mitigation Measures

5.9 Mitigation shall aim to avoid, reverse, minimize, or compensate for an impact. Consideration shall also be given to opportunity to enhance existing conditions. The principles shall be to prevent rather than to rectify and to eliminate environmental damage at source. The approach shall be to minimize the risk of harm to human health and the ecosystem, to minimize the risk of impairment to the beneficial uses, to prevent pollution at source and to apply the most suitable technical solutions to prevent and rectify pollution problems.

Monitoring

5.10 Monitoring is generally conducted to gather information about compliance with regulations and licence requirements, model verification, and trends. Monitoring is required whenever there is uncertainty about the level, extent or duration of impacts, or the effectiveness of proposed mitigation measures. Monitoring provides the information for the validation process and the feedback needed for verifying the predictions and improving the monitoring programme as well as to justify any later changes to a project.

6. Activity/Project Specific Guidelines

Waste Discharges

6.1 Waste discharges shall be pretreated to levels sufficient to protect the sewerage system

downstream and the receiving water. The near-field and far-field effects shall be addressed by quantitative modelling techniques. Model for predicting the physical, chemical and biological processes which determine the transport and fate of pollutants associated with outfalls shall include initial dilution, effects of stratification, advection towards shore, coliform die-off, dissolved oxygen depletion, dissolution of metals, particles settling, biochemical conversion and bioaccumulation of trace contaminants.

6.2 Discharges into inland waters where there are little base flows to provide sufficient dilution and dispersion are normally required to be treated to secondary level as a minimum. However, secondary treatment may result in high levels of dissolved nutrients in a form which may stimulate algal blooms and further treatment to remove nutrients may be required. Secondary or tertiary sewage treatment plants are complex and are often faulty due to operation, repair and maintenance problems. On-site treatment systems are therefore discouraged and connection to public sewers leading to a municipal treatment system is always the preferred solution. Discharge into public sewerage systems must not overload the hydraulic capacities nor contain substances that will cause damage to the sewerage systems.

6.3 Pollutants of major concerns include floatables, pathogens, particulates, toxic substances and nutrients. The predictability of the fate of toxic substances in the receiving water body are uncertain and source control is the only feasible means of control. Toxic substances that may interfere with or pass through the treatment processes must be eliminated or controlled at source. Wastes that contain pathogens shall be discharged a sufficient distance from shellfish harvesting, mariculture, beaches and other water-contact areas. The use of disinfection shall be carefully evaluated as it can result in increase in effluent toxicity and has its own adverse effects on the marine environment. If disinfection by chlorination is unavoidable, de-chlorination facilities shall be provided.

6.4 On-site treatment and disposal facilities shall include adequate and appropriate stand-by and other provisions to prevent and minimise breaking down of the facilities, to facilitate rapid repair and to avoid by pass of waste discharge. By-pass outfall designed to cope with an emergent situation shall be located away from any sensitive receivers as far as possible.

6.5 For collection of waste discharge to a public sewer which is the generally preferred approach, impacts on the downstream public sewerage, sewage treatment and disposal facilities shall be assessed as follows:

(a) The assessment shall cover all sewage collection, treatment and disposal facilities affected by the project. The actual extent will depend on the quality and quantity of wastewater discharged, the capacity of the sewerage systems, and the assimilative capacity and water quality objectives of the receiving water bodies.

(b) The assessment shall take into account wastewater discharges into the same sewerage systems under consideration from all existing sources, and committed and planned developments to be implemented within the same time frame of the project.

(c) Prediction, assessment and evaluation of impacts shall be based on the established principles and guidelines available in Hong Kong.

(d) The capacity of the sewage treatment and disposal facilities and sensitivity of the receiving water bodies may limit the quality and quantity of wastewater that could be discharged into a sewerage system and this may render connection of the project to the nearest sewerage system not acceptable. In such circumstances, connection to sewerage systems outside the catchment area where the project is located or on-site treatment and disposal will be required.

(e) Wastewater discharges from the project shall not cause over-loading or deterioration to the service conditions of any sewage collection, treatment or disposal facility.

(f) The Director shall take advice from the Director of Drainage Services on the scope and programme of all recommended mitigation if diversion of flows or addition, alteration, disruption, or modification to any existing public sewage collection, treatment or disposal facility is involved.

Breakwaters, Reclamations and Other Works Involving Coastline and Bathometry Modifications

6.6 Assessment shall focus on the impacts on overall reduction in assimilative capacity of the affected flow channels, hydrology, sedimentology, and water quality of the water body behind and outside the structures (e.g. typhoon shelter) . Modelling shall be used to quantify these effects. The structures shall be designed to avoid creation of water stagnation, to prevent entry and accumulation of pollutants from waste discharges and contaminated runoff in the poor flushing areas, and to prevent sediment accumulation and contamination.

Dredging, Sand Filling, and Dumping

6.7 Simulation modelling can be used to determine the short-term as well as the long-term fate of sediment. The size of the plume depends on type of dredging equipment use, quantities of sediment suspended and hydrodynamic conditions at the sites. The nature of the sediment is the first factor to consider to predict sediment suspension. When toxic or harmful constituents are present in the sediment, the chemical effects are important and shall be addressed. Contaminants in the sediments shall be determined and analysed by bulk sediment, elutriate and pore water tests. In some special circumstances, assessment on the effects such as toxicity and bioaccumulation may be necessary. The principle in managing contaminated sediments is to minimize disturbance and isolate them from contact with the aquatic environment. Dredging of contaminated sediments shall be avoided as far as possible and a survey and sampling of contamination of bottom sediments shall be undertake before dredging. Mud disposal proposal must include detailed assessment of the characteristics of the sediment, objective comparison of all alternatives for disposal and careful selection of site and disposal methods, careful selection of dredging method and equipment, and in accordance with the guidelines adopted by the contracting parties of the London Dumping Convention.

Thermal Discharges

6.8 Assessment shall be based on mathematical model studies using plume model to characterize the near-field and hydrodynamic and advection-diffusion model to characterize the far-field to predict the extent of the impacted area which can be defined by criteria based on temperature rise and the residual of biocides used. Intake site shall avoid spawning grounds and beach areas and shall be located away from polluted water. The combined effects of thermal discharge and other discharges may result in a complexity of plumes with the possibility of additive or synergistic effects of different pollutants. Mitigation shall include heat reduction by cooling towers or beneficial uses of the heat, installation of diffusers, and minimisation of the use of anti-fouling agents by using only effective doses or by the use of alternative means of control.

Toxic Substances

6.9 Toxic substances can be classified into five subcategories: a) nonmetallic inorganic toxicants (e.g. ammonia, cyanide); b) heavy metals and submetallic inorganic substances (e.g. mercury, cadmium); c) easily degradable organic toxicants (e.g., volatile phenols, benzene); d) refractory organic substances (e.g., DDT, PCB, PAH); and e) radionuclides. Techniques for assessing potential human health risks involve critical pathways, specific activities and mass

balances approaches. All these approaches require detailed knowledge of sources, transport, diffusion, flushing times, sinks, etc. to allow calculation of probable concentrations to be expected in the system and ultimately of human exposures. The effects of toxic substances on ecological systems are more difficult to evaluate than human health effects. The two techniques however involve the same fundamental principles. Basic elements for consideration in ecological health risk assessment include the types of stress, level of ecological organization, ecosystem type, spatial and temporal scales at which the effect of concern occurs. Assessment shall aim to quantify the routes, transformations, and sources of toxic substances released to the aquatic environment, to determine the bioavailability and bioaccumulation of the toxic substances and to determine the relationship between exposure to toxic contaminants and effects.

6.10 The most effective and viable approach is to reduce at source the amount of these substances entering the sewer or discharging to the environmental waters. The four basic source control alternatives are pollution prevention, pretreatment, recycle and reuse.

Non-point Pollution Sources and Stormwater Discharges

6.11 Non-point or diffuse sources include all inputs that are not point sources. Assessment shall aim at identifying all the sources including erosion from construction sites; runoff from urban areas; erosion from agricultural lands, roads; runoff from livestock farms; runoff from land contaminated by fertilizers, pesticides, and herbicides; and, atmospheric deposition. Prediction of impacts can be made by diffuse pollution models ranging from simple statistical routines and screening models to the more sophisticated continuous models. These diffuse pollution models simulate the generation and movement of water and its pollution content from the sources to the points of discharge into the receiving water, and can interface with receiving water quality models to assess the impact of non-point source pollution on the aquatic environment.

6.12 The strategy to control non-point source pollution is to prevent or minimize the potential of pollutants coming into contact with rainfall or runoff. The most common source reduction measures include elimination of expedient connections, prevention of illegal dumping of wastes, coverage of chemical storage areas, prevention and containment of spills, minimization of chemical applications, catch basin cleaning, erosion control, and landuse control. Devices designed to control pollution in a drainage system include, minimization of directly-connected impervious areas, provision of swales, filter strips, infiltration basins and trenches, detention facilities, and artificial wetlands.

ANNEX 15 : GUIDELINES FOR ASSESSMENT OF WASTE MANAGEMENT IMPLICATIONS

1. General

1.1 The annex describes the commonly adopted approaches and methodologies for assessment of waste management implications arising from the project. The methodologies may vary from case to case, depending upon the nature of wastes and the latest development in methods and techniques.

2. Uses with Special Requirements for Waste Disposal

2.1 The uses that need special requirements for waste disposal shall be, but not be limited to, the following:

(a) Offensive Trades:

as declared under the Public Health and Municipal Services Ordinance, section 48.

(b) Chemical Waste Producing Industries:

. electricity and gas generation
. metal finishing
. plastic electroplating
. printed circuit board production and electronics
. film processing and development laboratories
. tannery and leather finishing
. textile (including dyeing, bleaching and finishing)
. chemical processing and formulation
. land transport and shipping
. manufacture of professional and scientific equipment

(c) Livestock Rearing: pigs, chickens, ducks, geese, pigeons and quails

(d) Community Facilities with Special Requirements for Waste Disposal:

. abattoirs
. hospitals/clinics and other health care premises
. markets
. other community facilities which generate radioactive waste, use ozone depleting substances or include incinerators may need special attention in the EIA processes.

3. Waste Management

3.1 Prior to considering the disposal options for various types of wastes, opportunities for reducing waste generation shall be fully evaluated taking into account the following factors:

- avoiding or minimising waste generation through changing the design approach in the project planning stage;
- adopting better management practices on site to reduce cross contamination and promote waste segregation during construction stage;
- reusing or recycling waste materials in other construction activities in the construction stage;
- diverting waste to other construction sites or to the public dumps for beneficial use in the construction stage;

- using recycled materials for construction as far as practicable in the construction stage;
- installing appropriate facilities for segregation of various types of wastes during the operational stage; and
- arranging and facilitating collection of wastes by the appropriate waste recyclers as far as practicable in the operational stage.

3.2 Having taken into account the factors in section 3.1 above, the types and quantities of the wastes generated as a consequence shall be estimated and the disposal options for each type of waste described in detail. The disposal method recommended for each type of wastes shall be based on the result of the assessment in section 3.3 below.

3.3 The impact caused by handling (including labelling, packaging & storage), collection, and disposal of wastes shall be addressed in detail. This assessment shall cover but not be limited to the following areas:

- potential hazard;
- air & odour emission;
- noise;
- wastewater discharge; and
- public transport.

When large quantities of wastes are identified, the impact on the capacity of waste collection, transfer and disposal facilities, especially the existing or strategic solid waste disposal facilities have to be assessed.

3.4 In addition to the waste management practices recommended for the project, the handling, collection and disposal of wastes, in particular livestock and chemical wastes, shall have to comply with the Waste Disposal Ordinance, and the Dumping at Sea Ordinance.

ANNEX 16 : GUIDELINES FOR ECOLOGICAL ASSESSMENT

1. Introduction

1.1 This annex describes the general approach and methodology for assessment of ecological impact arising from a project or proposal.

1.2 An ecological assessment is part of an EIA study for a designated project which may have an impact on the natural environment including existing flora, fauna and wildlife habitats. The term "ecology" includes both marine and terrestrial ecology. The main objective of ecological assessment is to provide sufficient and accurate ecological data to allow a complete and objective identification, prediction and evaluation of the potential ecological impacts. The methodology used may vary from case to case depending on the natural environment to be affected and the nature and scale of the project.

2. The Need for Ecological Assessment

2.1 The procedures for determining the need for ecological assessment are outlined in Appendix A. The key factors to be considered are described in Notes 1 to 3 attached to Appendix A.

3. General Principle

3.1 The guiding principle for ecological assessment shall be that:

(a) areas and/or habitats of ecological importance (e.g. those listed in Note 1 and 2 of Appendix A) shall be conserved as far as possible. Any project that is likely to result in adverse ecological impacts in areas of ecological importance shall not normally be permitted unless the project is necessary; it has been proven that no other practical and reasonable alternatives are available, and, adequate on-site and/or off-site mitigation measures are to be employed;

(b) both on-site and off-site impacts shall be identified and evaluated;

(c) both on-site and off-site mitigation measures shall be considered as integral parts of the EIA process;

(d) a project proponent is required to mitigate any adverse environmental impacts arising from his project and to implement the necessary on-site and off-site measures to limit the impacts to within established criteria. Off-site mitigation measures shall only be considered, however, when the potential for providing adequate on-site measures has been exhausted;

(e) any off-site measures shall be determined during the EIA study in accordance with the guidelines laid down in this technical memorandum, in particular this annex and Annex 8.

4. The Scope and Content of Ecological Assessment

4.1 An ecological assessment shall consist of 5 parts of equal importance:

(a) provision of comprehensive and accurate information on the ecological baseline;

(b) identification and prediction of potential ecological impacts;

(c) evaluation of the significance of the impacts identified;

(d) recommendations of effective and practicable alternatives and mitigation measures; and

(e) recommendations of the need for and the scope of an appropriate monitoring and audit programme.

5. Assessment Methodology

5.1 Ecological Baseline Information

5.1.1 The main objective of the baseline study of an ecological assessment is to provide adequate and accurate ecological baseline information of the proposed development and its vicinity for

(a) evaluation of the ecological importance of the flora, fauna and habitats found;

(b) identification, prediction and evaluation of impacts; and

(c) formulation of appropriate mitigation measures and monitoring programme.

5.1.2. The baseline study shall include at least the following:

5.1.2.1 Review of existing information

Existing information regarding the proposed development site and its vicinity shall be reviewed. Such information includes both published materials (books, journals, reports, registers, etc.) and those made available by government and non-government bodies.

The accuracy and usefulness of the ecological information obtained must be carefully evaluated and verified before adopting its use in the ecological assessment report. Aspects such as time of survey (is the information out of date ?), methodology, etc., shall be taken into account. Unless the information obtained is determined to be still valid, they shall be verified by on-site survey(s).

5.1.2.2 Habitat survey

A habitat map of suitable scale showing the various habitats of the site and its surrounding area (500 m from the site boundary or the area likely to be impacted by the project) shall be prepared. Characteristics of each habitat type shall be fully described with such information as species list, dominant flora and fauna found, presence of species of conservation importance, etc. Any habitat features of particular value to various ecological groups shall also be identified and described. Important habitats (Note 2 of Appendix A) shall be highlighted and described. Colour photos of each habitat type and any features of ecological importance identified shall be provided.

To ensure that the baseline information obtained are accurate, reproducible and can be easily verified, the methodology used must be clearly stated in the ecological assessment report. The methods employed must be sound and scientific. References shall be made to those standardized or accepted internationally. Results of survey shall be recorded in specifically designed standard forms as appropriate. Data obtained shall be quantified and statistical analysis shall be applied wherever appropriate.

5.1.2.3. Description of recognized sites of conservation importance

All recognized sites of conservation importance (Note 1 of Appendix A) within, and in the vicinity of the proposed development site should be described. Whether these sites will be affected by the proposed development or not shall be assessed.

5.1.3 All field surveys carried out must not cause any unnecessary stress or damage to the existing habitats and wildlife. Relevant permits for collecting specimens must be obtained from the Agriculture and Fisheries Department prior to the surveys.

5.1.4 An ecological baseline survey of a longer duration with regard to seasonal variations may be required if the area in question is likely to be supporting species of conservation importance (Note 3 of Appendix A) which exhibit distinct seasonal patterns or when information on the site is inadequate. As sensitive wildlife groups shall be surveyed at the appropriate season(s) of a year, the actual duration of such survey shall depend on the wildlife groups of importance to be surveyed. The duration of an ecological baseline survey required shall be defined in the EIA study brief issued under the Ordinance.

5.2 Impact Identification and Prediction

5.2.1 Based on the project profile and ecological baseline information gathered, the ecological assessment shall identify and predict potential ecological impacts caused by the proposed development. There may be direct or primary impacts such as loss of habitats and loss of species. However many ecological impacts are induced or secondary such as loss of feeding grounds. Hence an ecosystem perspective highlighting the existing key relationships between different species and the surrounding environment shall be adopted.

5.2.2 An overlay of the project layout on the habitat map of the site (section 5.1.2.2) shall be prepared to provide an overview of the impacts to local habitats.

5.2.3 All potential impacts, including direct, indirect, on-site, off-site, primary, secondary, induced, additional, synergistic, cumulative impacts, etc. shall be listed out. Suitable methodology such as checklists (descriptive, scaling, etc.), matrices, networks, features mapping, etc. shall be used and clearly stated whenever applicable. Predictions must be made with sound scientific basis.

5.3 Evaluation of Impacts

5.3.1 Impact significance is a product of the magnitude and scale of an impact and the asserted importance of the species or habitat(s) likely to be affected. However, it shall be noted that evaluating nature conservation interest is a difficult and complex process. Value or professional judgement are involved. Nevertheless the conservation value of a site or species and hence the significance of an impact shall be evaluated as systematically as practicable using well defined criteria. The general criteria used are shown in Annex 8.

5.4 Impact Mitigation

5.4.1 The general policy for mitigating impacts on important habitats and wildlife, in the order of priority, are :

(a) Avoidance

Potential impacts shall be avoided to the maximum extent practicable such as adopting suitable alternatives (e.g. change of site, design, construction method, alignment, layout, programme, etc.). In extreme cases when the ecological assessment identifies some very serious impacts which could not be mitigated, the "no-go" alternative may be the only realistic option and shall be included and assessed against all other options.

(b) Minimizing

Unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc.

(c) Compensation

The loss of important species (e.g. trees) and habitats (e.g. woodland) may be provided elsewhere (on-site or off-site) as a compensation. Enhancement and other conservation measures shall always be considered, whenever possible.

5.4.2 All mitigation measures recommended shall be feasible to implement within the context of Hong Kong. The effectiveness of the proposed mitigation measures shall be carefully evaluated and the significance of any residual impacts after implementing them shall be clearly stated.

5.4.3. From an ecological point of view, mitigation measures for ecological impact shall preferably be carried out on-site, and well in advance of the works rather than off-site, and after the completion of works.

5.4.4 Where off-site mitigation measures are involved, they shall be considered along with other alternatives e.g. change of site, layout, etc., including modifying or abandoning the project.

5.4.5 The need for and the type and scope of the off-site ecological mitigation measures to be adopted for a particular project shall be determined according to the following guidelines:

(a) all possible design measures and all practicable on-site ecological mitigation measures shall be fully investigated in the EIA study and exhausted to minimise the loss or the damage caused by the project to the ecological habitats or species;

(b) with the on-site ecological mitigation measures in place, the residual impacts on ecological habitats or species shall be defined, quantified and evaluated according to the methods and criteria laid down in this annex and Annex 8. Before off-site ecological mitigation measures are to be adopted, the EIA study needs to confirm that it is necessary to mitigate the residual ecological impacts based on ecological considerations set out in this Annex and Annex 8, and that such residual impacts arise from the Project in question;

(c) if the residual ecological impacts require mitigation and all practicable on-site ecological mitigation measures have been exhausted, off-site ecological mitigation measures shall be provided;

(d) the off-site mitigation measures shall be on a "like for like" basis, to the extent that this is practicable. That is to say, any compensatory measures to be adopted for mitigating the residual ecological impacts must be directly related to the habitats or species to be protected. Either the same kind of species or habitats of the same size shall be compensated, or the project proponent shall demonstrate that the same kind of ecological function and capacity can be achieved through the measures to compensate for the ecological impacts. For example, the loss of a natural woodland shall be compensated by the replanting of native trees to form a woodland of a similar size where possible;

(e) the off-site ecological mitigation measures shall only be implemented within the boundaries of Hong Kong, and must be technically feasible and practicable;

(f) the extent of such mitigation measures shall be limited to what is necessary to mitigate the residual ecological impacts arising from the project; and

(g) any proposed off-site mitigation measures shall not require further EIA study for their implementation. Their feasibility, constraints, reliability, design and method of construction, time scale, monitoring, management and maintenance shall be confirmed during the EIA study.

5.5 Ecological Monitoring and Audit Programme

5.5.1 The purposes of ecological monitoring and audit are :

(a) to verify the accuracy of the predictions of the ecological assessment study;

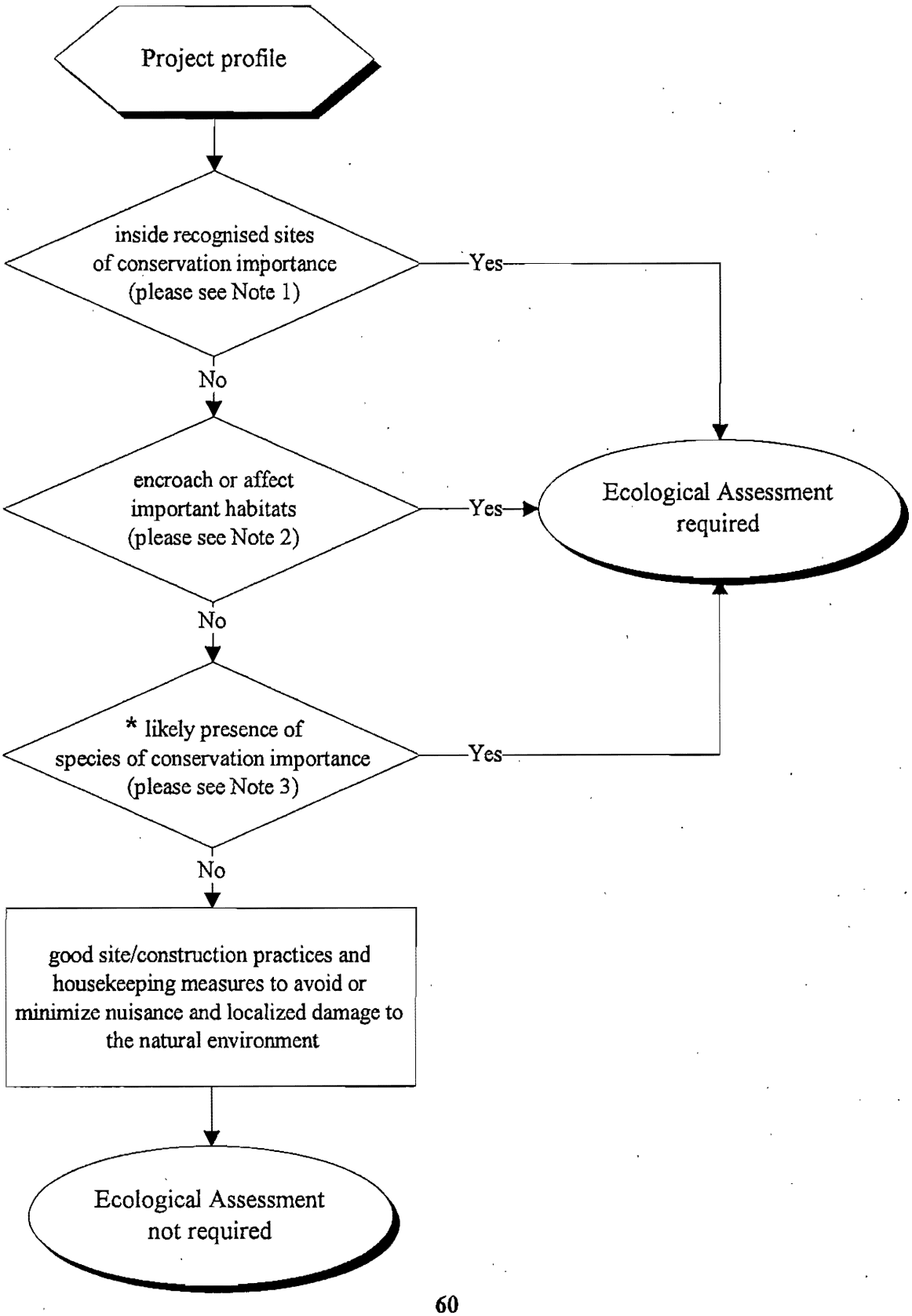
(b) to detect any unpredicted ecological impacts arising from the proposed development;

(c) to monitor the effectiveness of the mitigation measures; and

(d) to recommend action plans in response to unpredicted impacts, and/or failed mitigation.

Appendix A

The flow chart below summarizes the general procedures in determing the need for an ecological assessment for a designated project. * A literature review and/or a preliminary site visit may be required for checking the "likely presence of species of conservation importance."



Note 1 : Recognized Sites of Conservation Importance

1. existing or gazetted proposed Special Areas
2. existing or gazetted proposed Country Parks
3. existing or gazetted proposed Marine Reserves
4. existing or gazetted Marine Parks
5. restricted areas listed under the Wild Animals Protection Ordinance Chapter 170
6. Sites of Special Scientific Interest
7. Ramsar Site
8. Inner Deep Bay and Deep Bay Buffer Zones
9. any other areas declared by the Government as having special conservation importance

Note 2 : Important Habitats Where an Ecological Assessment Will Be Necessary

An ecological assessment will be needed if a proposed development will affect

1. over one hectare of woodland
2. over one hectare/500 metres of undisturbed natural coast
3. over 0.5 hectare of intertidal mudflats
4. established mangrove stands of any size
5. over 0.5 hectare of freshwater or brackish marshes
6. established seagrass (*Zostera* or *Halophila* or *Ruppia* species) bed of any size
7. over 100 metres of natural stream courses and rivers of significant length
8. over one hectare wetlands (as defined by the Ramsar Convention) other than those mentioned in 2 to 7 above
9. established coral communities of any size
10. other habitats considered as having special conservation importance by documented scientific studies

Note 3 : Species of Conservation Importance

An ecological assessment will be needed if the proposed development will affect habitats supporting significant population of wild fauna or flora that are :

1. listed in IUCN Red Data Books or those of the South China region;

2. listed in international conventions for conservation of wildlife;

3. endemic to Hong Kong or South China;

4. listed under local legislation :
   (a) Forestry Regulation (under Forests and Countryside Ordinance Cap. 96);
   (b) Wild Animals Protection Ordinance Cap. 170;
   (c) Animals and Plants (Protection of Endangered Species) Ordinance Cap. 187;
   (d) Other relevant Ordinances or Regulations such as Marine Parks and Marine Reserves Regulation (under Marine Parks Ordinance Cap. 476);

   (References shall also be made to species protected by legislation in China, especially the Guangdong Province.)

5. considered as rare in the territory or having special conservation importance by scientific studies other than those listed above.

ANNEX 17 : GUIDELINES FOR FISHERIES IMPACT ASSESSMENT

1. General

1.1 These guidelines describe the general approach and methodology used in conducting a fisheries impact assessment study. The general approach and methodology may vary from case to case, depending on the nature of the fisheries issues and the latest development in methods and techniques.

1.2 A fisheries impact assessment is part of an environmental impact assessment (EIA) study for a proposed development which may affect fishing and aquaculture activities, fisheries resources and habitats, and aquaculture sites (gazetted marine fish culture zones, fish ponds and oyster beds). It aims at providing sufficient and accurate data to allow a complete and objective predictions and evaluation of the potential fisheries impacts.

2. Determination on the Need for Fisheries Impact Assessment

2.1 The types of development projects may require a fisheries impact assessment include:

(a) development projects listed in Schedule 2 of the Environmental Impact Assessment Ordinance and involving seabed, foreshores and fish ponds that may affect fishing and aquaculture activities, fisheries resources and habitats, and aquaculture sites; or

(b) development projects listed in Schedule 2 of the Environmental Impact Assessment Ordinance and with direct or indirect discharges of any kind of pollutants which may affect fishing and aquaculture activities, fisheries resources and habitats, and aquaculture sites.

3. Fisheries Impact Assessment Study

3.1 A fisheries impact assessment study shall consist of 5 parts of equal importance:

(a) Provision of comprehensive and accurate baseline information on fisheries;

(b) Prediction of potential fisheries impacts;

(c) Evaluation of the significance of the impacts predicted;

(d) Recommendations of cost-effective and practicable alternatives and mitigation measures;

(e) Recommendations of an appropriate monitoring programme.

3.2 Fisheries Baseline Information

3.2.1 A fisheries assessment study shall provide adequate and accurate baseline data of a proposed development site and its adjacent area of probable impact (the study area) for accurate prediction and evaluation of fisheries impacts. The baseline study shall include at least the following:

(i) Review and Collation of Existing Information

Existing information regarding the study area shall be reviewed. Such information includes both published and unpublished materials. Useful information could also be obtained from consultation of local fishermen/aquaculturists, marine and fisheries biologists, and non-government organizations and relevant government departments.

The accuracy and usefulness of the fisheries information obtained must be carefully evaluated before adopting it in the EIA report. Aspects such as time of survey (is the information out of date ?), methodology, etc. shall be taken into account. If there are doubts, they shall be verified by on-site survey(s).

(ii) Field Surveys

Based on the results of (i) above, the study shall identify data gap and determine if there is any need for field surveys. The primary aim of the field surveys is to fill the data gap and to gather adequate information for subsequent fisheries impact prediction and evaluation, formulation of proposed mitigation measures and monitoring requirements. If field surveys are considered necessary, the study shall recommend appropriate methodology, duration and timing for the field surveys. the field surveys and laboratory analysis must be undertaken by suitably trained and competent personnel with adequate knowledge in fisheries and laboratory works. The data obtained shall be quantified and statistical analysis shall be applied wherever appropriate.

3.2.2 Fisheries information required for fisheries impact assessment shall include, but not be limited to -

(i) level of fisheries resources and composition of commercially important species in the study areas;

(ii) the level and pattern of fishing activity and fisheries production in the study area;

(iii) sites of fisheries importance such as nursery and spawning grounds of commercially important species of fish, crustaceans, molluscs and other marine organisms, and seasonal occurrence of juvenile and spawning stocks in the study area;

(iv) aquaculture activity in the study area.

3.3 Prediction of Impacts

3.3.1 Based on the project profile and fisheries baseline information gathered, the fisheries impact study shall predict potential fisheries impacts caused by a proposed development. All potential impacts, including direct, indirect, long term, short term, on-site, off-site, primary, secondary, tertiary, induced, additional, synergistic, cumulative impacts, etc, shall be listed out. Suitable methodology such as checklists (descriptive, scaling, etc.), matrices, networks, features mapping, etc, shall be used and clearly stated whenever applicable. the nature and extent of impacts on

aquaculture and capture fisheries shall be described and quantified.

3.3.2 Prediction of impacts on fisheries shall take into account, but not exclusively rely upon, assessments for water quality and ecological impacts.

3.4 Evaluation of Impacts

3.4.1 The significance of the predicted impacts of a proposed development on aquaculture and capture fisheries shall be evaluated as systematically as practicable using well defined criteria. The general criteria used are presented in Annex 9.

3.5 Proposing Mitigation Measures

3.5.1 The general policy for mitigating impacts on fisheries, in order of priority, are:

(i) Avoidance

Potential impacts shall be avoided to the maximum extent practicable such as adopting suitable alternatives (e.g. change of site, design, construction method, alignment, layout, programme, etc.). In extreme cases when the fisheries impact assessment study identifies some very serious but unmitigatable impacts, the "no-go" alternative which may be the only realistic option shall be included and assessed against all other options.

(ii) Minimizing

Unavoidable impacts shall be minimized by taking appropriate and practicable measures such as confining works in specific area or season, restoration (and possibly enhancement) of disturbed fisheries resources and habitats, etc.

(iii) Compensation

When all possible mitigation measures have been exhausted and there are still significant residual impacts or when the impacts are permanent and irreversible, consideration shall be given to off-site compensation. It may include enhancement of fisheries resources and habitats elsewhere.

3.5.2 All mitigation measures recommended shall be practicable and cost-effective within the context of Hong Kong. The effectiveness of the proposed mitigation measures shall be carefully evaluated and the significance of any residual impacts after implementing them shall be clearly stated.

3.6 Recommendation for Monitoring and Audit Programme

The purpose of fisheries monitoring and audit are:

(i) to verify the accuracy of the predictions of the fisheries impact assessment study;

(ii) to detect any unpredicted fisheries impacts arising form the proposed development; and

(iii) to monitor the effectiveness of the mitigation measures.

ANNEX 18: GUIDELINES FOR LANDSCAPE AND VISUAL IMPACT ASSESSMENT

1. General

1.1. Landscape and visual impact assessment shall be directed towards the predicting and judging the significance of the effects that new development may have on landscape character and visual amenity. This annex describes the general approach and methodology for assessment of landscape and visual impacts. The methodology may vary from case to case, depending on the nature of the issues. However, it must be admitted that such an assessment involves subjective judgement and preference. The perception and aspiration of the community on particular landscape features must be taken into account.

2. Study Process

2.1 A landscape and visual impact assessment shall cover the following:

(1) defining the scope and contents of the study;

(2) a baseline study to provide for a comprehensive and accurate description of the baseline landscape and visual character;

(3) a review of the relevant planning and development control framework;

(4) impact studies to identify the potential landscape and visual impacts and predict their magnitude and potential significance; and

(5) recommendations on mitigation measures and implementation programme.

3. Scope and Contents

3.1 In setting the scope of the study, the following aspects shall be considered:

- limits of the study area;
- stages in the project life-cycle;
- key issues to be addressed;
- level of details required for baseline studies;
- principal viewpoints to be covered;
- system to be used for judging impact significance;
- alternatives;
- other development if cumulative impacts are to be assessed.

4. Baseline Study

4.1 The baseline study shall at least cover the following aspects:

(1) physical aspects such as geology, landform, drainage, soil, climate, including micro-climate;

(2) human aspects such as cultural features, landscape history, buildings and settlements, people affected and their perception of the landscape character; and

(3) aesthetic aspects such as the views available, visual amenity and visual character.

4.2 The baseline study shall present an appraisal of the landscape and visual resource of the study area. It shall focus particularly on the sensitivity of the landscape and visual system and its ability to accommodate change.

5. Review of the Planning and Development Control Framework

5.1 Plans or planning studies such as development statements, outline development plans, outline zoning plans, layout plans or planning briefs, and lease conditions may contain guidelines and control on urban design concept, building height profile, designated view corridors; specific design elements including areas of high landscape value, coastal protection areas, landmarks and monuments, special design areas and open space network; and other design specifications that may affect the architectural form of the project. A review of these documents shall provide an insight to the future outlook of the area affected and the ways the project can fit into the wider environment.

6. Landscape Impact Assessment Study

6.1 Landscape impact assessment shall assess :

. direct impacts upon specific landscape elements;

. more subtle effects upon the overall pattern of landscape elements that give rise to landscape character, and local and regional distinctiveness;

. impacts upon acknowledged special interests or values such as areas of high landform with special landscape significance.

6.2 Examples of special landscape features which may contribute to the landscape character of a site, an area or a region include:

- areas of distinctive landscape character	- e.g. the "genius loci" or characteristics patterns and combinations of landform and land coverage creating a sense of place;
- valued landscape	- e.g. country parks, protected coastline, areas of high landscape value, woodland, scenic spots;

- other conservation interest	- e.g. Nature Reserves, SSSIs, designed buffer zones, wetlands, historic landscapes, sites or buildings of culture heritage;
- specific landscape elements	- e.g. hilltops, ridgeline, coastline, river valleys, woodlands, ponds.

7. Visual Impact Assessment Study

7.1 Visual impact assessment shall identify and predict the type and extent of visual impacts relating to:

- visual compatibility with surroundings	- e.g. massing, height, shape, proportion and rhythms of building elements, colour and material used;
- visual obstruction	- e.g. blocking of views towards existing landscape features; or existing/planned view corridors towards landmarks and notable features;
- improvement of visual quality	- e.g. clearance of visual obstruction and blight, appealing design features that enhance attractiveness of the landscape; and
- glare from direct or reflected sunlight or man-made light source	- e.g. uncomfortable eye feeling caused by light interference from structures faced with mirror or polished materials or from direct light sources generated from the proposed development.

7.2 In assessing visual impacts, it is important to cover all possible viewpoints. If this is not practicable, key viewpoints shall be selected on major routes e.g. roads, walkways, footpaths and hiking tracks; and at activity nodes e.g. residential areas, important public open spaces and landmarks etc. The location of these viewpoints shall be typical.

7.3 When considering views from a main route, it will be more effective to have a sequence of views recording the changing visual events along the route.

8. Mitigation Measures

8.1 Mitigation is not only concerned with damage reduction but shall include consideration of potential landscape visual enhancement. Wherever possible design that would enhance the landscape and visual quality shall be adopted.

8.2 Alternative design that would avoid or reduce the identified impacts on landscape, or that would make the project visually compatible with the setting shall be thoroughly examined before adopting other mitigation or compensatory measures to alleviate the impacts.

8.3 Possible measures that may mitigate or compensate the impacts include:

- remedial - e.g. screen painting, facade treatment, colour scheme and texture of materials used; and

- compensatory - e.g. landscape treatment, compensatory planting, creation of interesting landscape or visual features.

8.4 A practical programme and funding proposal for the implementation of the recommended mitigation measures shall be worked out. These shall be integrated with the overall development programme and costing of the whole project.

9. Presentation Methods

9.1 To illustrate the landscape and visual impacts of a project, 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.

9.2 The technical details of preparing the illustrations shall be recorded. To facilitate verification of the accuracy, the Authority will reserve the right to examine the full details.

ANNEX 19: GUIDELINES FOR ASSESSMENT OF IMPACT ON SITES OF CULTURAL HERITAGE AND OTHER IMPACTS

1. General

1.1 The annex describes the commonly adopted approaches and methodologies for assessment of impact on sites of cultural heritage and other environmental issues. The methodologies may vary from case to case, depending on the nature of the issues and the latest development in methods and techniques.

2. Impact on Sites of Cultural Heritage

2.1 There is no quantitative standard in deciding the relative importance of these sites, but in general, sites of unique archaeological, **historical or architectural value will be considered as highly significant.**

Baseline Study

2.2 A baseline study shall be conducted

(a) to compile a comprehensive inventory of places, buildings, sites and structures of architectural, archaeological and historical value within the proposed project area; and

(b) to identify possible threats of, and their physical extent, destruction in whole or in part of sites of cultural heritage arising from the proposed project.

Methodology

2.3 The best information shall be assembled for the assessment of the identified sites of cultural heritage. The entry point shall be the Antiquities and Monuments Office, public libraries and archives and tertiary institutions.

2.4 The assessment shall provide detailed geographical, historical, archaeological, ethnographical and other cultural data. Published papers, records, archival and historical documents as well as oral legends shall also be consulted.

2.5 In cases where the above sources of information prove to be inadequate or where the proposed project area has not been adequately studied before, field surveys and site investigations shall be conducted to assemble the necessary data.

Impact Assessment

2.6 Preservation in totality will be a beneficial impact and will enhance the cultural and socio-economical environment if suitable measures to integrate the sites of cultural heritage into the proposed project are carried out.

2.7 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.

2.8 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 the archaeological, historical, architectural and other cultural values as against that of the community as a whole.

2.9 Assessment of impacts on sites of cultural heritage shall also take full account of, and follow where appropriate, the Guidelines for Landscape and Visual Impact Assessment at Annex 18.

Mitigation Measures

2.10 Mitigation measures shall not be recommended or taken as *de facto* means to avoid conservation and preservation of sites of cultural heritage. They must be proved beyond all possibilities to be the only practical course of action.

2.11 Designs, layouts, external treatments, colour and texture of materials, but not limiting to such, shall be worked out for the integration of the sites of cultural heritage to be preserved in whole or in part into the proposed project.

2.12 For total destruction, a comprehensive and practical rescue plan must be worked out. This is also applicable to sites of cultural heritage where only partial preservation is proposed.

2.13 Annex 18 also applies.

2.14 A practical programme and funding proposal for the implementation of the recommended mitigation measures shall be included as part of the assessment. These shall form an integral part of the overall development programme and financing of the proposed project. Competent professionals must be engaged to design and carry out the mitigation measures.

3. Potential Contaminated Land Issues

3.1 For all development and redevelopment projects listed under Schedule 2, Part I and Schedule 3, the applicant who is preparing an EIA report as stipulated in Clause 6 of the Environmental Impact Assessment Ordinance, shall give consideration to historical land uses which have the potential to cause or have caused land contamination. Such uses include, but are not limited to, the following:

(a) oil installations including oil depots and petrol filling stations
(b) gas works
(c) power plants
(d) shipyards/boatyards
(e) chemical manufacturing/processing plants
(f) steel mills/metal workshops
(g) car repairing and dismantling workshops
(h) dumping ground and landfill

3.1.1 If the above land uses are identified, the applicant shall submit, as part of the EIA report, a Contamination Assessment Plan (CAP) to the Director for endorsement prior to conducting a contamination assessment of the site.

3.1.2 Based on an endorsed CAP, the applicant shall conduct a contamination assessment and compile a Contamination Assessment Report (CAR) for the Director's review. During the preparation of the CAR, if land contamination is confirmed, a Remediation Action Plan (RAP) shall be prepared. the RAP and the CAR shall be submitted as a combined report to the Director for approval, referencing the corresponding CAP.

3.1.3 Upon approval of the CAR/RAP, the applicant shall clean up the contaminated site according to the approved RAP, prior to any development or redevelopment of the site.

3.1.4 The preparation of CAP, CAR, or CAR/RAP reports shall be based on the relevant published Practice Note for Professional Persons or guidelines issued by the Director.

3.2 For all decommissioning projects as designated under Schedule 2, Part II, the above requirements apply regardless of the historical land use.

3.3 For development or re-development projects adjacent to landfill, the applicant shall note the following additional specific requirements when the need for a landfill gas (LFG) hazard assessment is confirmed:

(a) carry out a LFG hazard assessment to evaluate the degree of risk associated with the proposed development;

(b) design suitable precautionary / protection measures to render the proposed development as safe as reasonably practicable;

(c) ensure that the precautionary / protection measures will be implemented and constructed in accordance with the design;

(d) establish a maintenance and monitoring programme for ensuring the continued performance of the implementation protection measures.

The LFG hazard assessment shall be carried out and completed for submission to the Director for vetting at the early planning stage of the project. The early completion of the assessment study will ensure that the identified protection measures be considered and incorporated in to the overall design process for the proposed development.

ANNEX 20: GUIDELINES FOR THE REVIEW OF AN EIA REPORT

1. General Approach

Organisation of the Information

1.1 Is information logically arranged in sections ?

1.2 Is the location of information identified in an index or table of contents ?

1.3 When information from external sources has been introduced, has a full reference to the source been included ?

Presentation of Information

1.4 Has information and analysis been offered to support all conclusions drawn ?

1.5 Has information and analysis been presented so as to be comprehensive to the non-specialist using maps, tables and graphical material as appropriate ?

1.6 Are all the important data and results discussed in an integrated fashion within the information ?

1.7 Has superfluous information (ie information not needed for the decision) been avoided ?

1.8 Has the information been presented in a concise form with a consistent terminology and are there logical links between different sections ?

1.9 Have prominence and emphasis been given to severe adverse impacts, to substantial environmental benefits, and to controversial issues ?

1.10 Is the information objective ?

Public Concerns

1.11 Does the information identify and address the main concerns of the general public and special interest groups (clubs, societies etc) who may be affected by the project.

1.12 Does the information take account of the main concerns of the relevant statutory or advisory bodies.

2. Description of the Project

Features of the Project

2.1 Are the purpose(s) and objectives of the project explained ?

2.2 Are the nature and status of project decision(s), for which the EIA study is undertaken, clearly indicated ?

2.3 Is the estimated duration of the construction phase, operational phase and, where appropriate, decommissioning phase given, together with the programme within these phases ?

2.4 Is the design and size of the project described, using diagrams, plans and/or maps as necessary ?

2.5 Are the methods of construction described ?

2.6 Are the nature and methods of production or other types of activity involved in operation of the project described ?

2.7 Has the land taken up by the project site(s), construction sites, and any associated access arrangements, auxiliary facilities and landscaping areas, been clearly shown on a scaled map?

2.8 For a linear project, has the land corridor, vertical and horizontal alignment and need for tunnelling, and earthworks been described ?

2.9 Have the uses to which the project will be put been described and the different land use areas demarcated ?

Residues and Emissions

2.10 Have the types and quantities of waste matter, energy (noise, vibration, light, heat, radiation etc) and residual materials generated during construction and operation of the project, and the rate at which these will be produced, been estimated ?

2.11 Have the ways in which it is proposed to handle and/or treat these wastes and residual materials prior to release/disposal been indicated, together with the routes by which they will eventually be disposed of to the environment ?

2.12 Have any special or hazardous wastes which will be produced been identified as such and the methods for their disposal been described, as regards their likely main environmental impacts?

2.13 Have the means by which the quantities of residuals and wastes were estimated been indicated and has uncertainty been acknowledged and ranges provided where appropriate ?

3. Background and History of the Project

3.1 Where appropriate does the information include reference to the consideration of the project's siting or alignment by the project proponent ?

3.2 Are the reasons for selecting the proposed project or its siting and alignment, and the part environmental factors played in the selection, adequately described ?

3.3 Have the main environmental impacts of different siting or alignment options been compared clearly and objectively with those of the proposed project and with the likely future environmental conditions in the absence of the project ?

4. Description of the Environment

Description of the Area Occupied by and Surrounding the Project

4.1 Have the areas expected to be significantly affected by the various aspects of the project been indicated with the aid of suitable maps ?

4.2 Have the land uses on the site(s) and in the surrounding areas been described ?

4.3 Has the affected environment been defined broadly enough to include any potentially significant effects occurring away from the immediate areas of construction and operation ?

Baseline Conditions

4.4 Have the components of the environment potentially affected by the project been identified and described sufficiently for the prediction of impacts ?

4.5 Were the methods used to investigate the affected environment appropriate to the size and complexity of the assessment task ?

4.6 Has a prediction of the likely future environmental conditions in the absence of the project been developed ?

4.7 Have existing technical data sources, including local records and studies carried out for environmental agencies and/or interest groups been searched ?

4.8 Have local, regional and national plans and policies been reviewed and other data collected as necessary to predict future environmental conditions ?

4.9 Have relevant departments and agencies holding information on baseline environmental conditions been approached ?

5. Description of Impacts

5.1 Have the direct and indirect/secondary effects of constructing, operating and, where relevant, after use or decommissioning of the project been considered (including both positive and negative effects) ?

5.2 Does the information include consideration of whether effects will arise as a result of "consequential" development ie whether additional development, which it would be difficult to resist, will be included in the area, leading to further environmental effects ? For a project with multiple stages, are the impacts caused by overlapping of different stages considered and determined ?

5.3 Have the above types of impacts been investigated in so far as they affect the following:

- air and climate;
- water and soils;
- noise;
- landscape;
- ecology;
- historic and cultural heritage;
- land use;
- impacts on people and communities;
- impacts on agriculture and fisheries activities.

5.4 If any of the above are not of concern in relation to the specific project and its location is this clearly stated in the information ?

5.5 Is the investigation of each type of impact appropriate to its importance for the decision, avoiding unnecessary information and concentrating on the key issues ?

5.6 Are impacts which may not be themselves significant, but which may contribute incrementally to a significant effect considered ?

5.7 Does the information include a description of the methods/approaches used to identify impacts and the rationale for using them ?

5.8 If the nature of the project is such that accidents are possible which might cause severe damage within the surrounding environment, has an assessment of the probability and likely consequences of such events been carried out and the main findings reported ?

Magnitude of Impacts

5.9 Are impacts described in terms of the nature and magnitude of the change occurring and the nature (location, number, value, sensitivity) of the affected receiver ?

5.10 Has the timescale over which the effects will occur been predicted such that it is clear whether impacts are short, medium or long term, temporary or permanent, reversible or irreversible?

5.11 Where possible, have predictions of impacts been expressed in quantitative terms ? Otherwise, have qualitative descriptions been defined ?

5.12 Where quantitative predictions have been provided is the level of uncertainty attached to the results described ?

Data and Methods

5.13 Have the methods used to predict the nature, size and scale of impacts been described and are they appropriate to the importance of each projected impact ?

5.14 Are the data used to estimate the size and scale of the main impacts sufficient for the task, are they clearly described and have their sources been clearly identified ?

6. Mitigation

Description of Mitigating Measures

6.1 Has the mitigation of significant negative impacts been considered and, where feasible, have specific measures been proposed to address each impact ?

6.2 Have the reasons for choosing the particular type of mitigation, and the other options available, been described ?

6.3 Where mitigating measures are proposed, has the significance of any impact remaining after mitigation been described ?

6.4 Where appropriate, do mitigation methods considered include modification of project design, construction and operation, the replacement of facilities/resources, and the creation of new resources, as well as "end-of-pipe" technologies for pollution control ?

6.5 Is it clear to what extent the mitigation methods will be effective ?

6.6 Where the effectiveness is uncertain or depends on assumptions about operating procedures, climatic conditions, etc, or where there is a risk that mitigation will not work, is this made clear and has data been introduced to justify the acceptance of the assumptions ?

Implementation of Mitigation Measures

6.7 Have details of how the mitigation measures will be implemented and function over the time span for which they are necessary been presented ? Does the report list out clearly what mitigation measures would be implemented, by whom, when, where and to what requirements ? Is the responsibility for implementing the recommended mitigation measures clearly defined ?

Environmental Effects of Mitigation

6.8 Have any adverse environmental effects of mitigation measures been investigated and described ?

6.9 Has the potential for conflict between the benefits of mitigating measures and their adverse impacts been considered ?

7. Evaluation of Residual Impacts

7.1 Have the available standards, assumptions and criteria which can be used to evaluate the impacts been discussed ?

7.2 Have the predicted impacts been compared to the available standards and criteria ?

7.3 Have the residual impacts, which are the net impacts with the mitigation measures in place, been described and evaluated against the available Government policies, standards and criteria ?

7.4 Have the residual impacts been discussed and evaluated in terms of the impact on the health and welfare of the local community and on the protection of environmental resources ?

7.5 Have the magnitude, location and duration of the residual impacts been discussed in conjunction with the value, sensitivity and rarity of the resource ?

7.6 Where there are no generally accepted standards or criteria for the evaluation of residual impacts, have alternative approaches been discussed and, if so, is a clear distinction made between fact, assumption and professional judgement ?

7.7 Have the residual impacts, if any, arising from the implementation of the proposed mitigation measures, been considered ?

8. Environmental Monitoring and Audit Proposals

8.1 If impacts are uncertain, have monitoring arrangements been proposed to check the environmental impacts resulting from the implementation of the project and their conformity with the predictions made ?

8.2 Does the scale of any proposed monitoring arrangements correspond to the potential scale and significance of deviations from expected impacts ?

8.3 Is the need for and the scope of the monitoring and audit requirements defined in the report ?

8.4 Does the report contain an Environmental Monitoring and Audit programme, as prescribed in Annex 21, if it is found to be needed ?

9. Difficulties Compiling the Information

9.1 Have any gaps in the required data been indicated and the means used to deal with them in the assessment been explained ?

9.2 Have any difficulties in assembling or analysing the data needed to predict impacts been acknowledged and explained ?

10. Executive Summary

10.1 Does the executive summary contain at least a brief description of the project and the environment, an account of the main mitigation measures to be implemented by the developer, and a description of any remaining or residual impacts ?

10.2 Have technical jargons been avoided as far as possible in the executive summary ?

10.3 Does the executive summary present the main findings of the assessment and cover all the main issues ?

10.4 Does the executive summary include a brief explanation of the overall approach to the assessment ?

10.5 Does the executive summary provide an indication of the confidence which can be placed in the results ?

10.6 Is the executive summary presented in both English and Chinese ?

ANNEX 21: CONTENTS OF AN ENVIRONMENTAL MONITORING AND AUDIT (EM&A) PROGRAMME

This annex describes the commonly adopted approaches for carrying out an EM&A programme. The following are the key steps in an EM&A programme:

Environmental Monitoring

(a) the systematic collection of environmental data through a series of repetitive measurements. A number of different monitoring activities are identified below:

(i) **Baseline Monitoring** refers to the measurement of environmental parameters during a representative pre-project period for the purpose of determining the nature and ranges of natural variation and to establish, where appropriate, the nature of change;

(ii) **Impact Monitoring** involves the measurement of environmental parameters during project construction and implementation so as to detect changes in these parameters which can be attributed to the project; and

(iii) **Compliance Monitoring** unlike the previous monitoring activities, takes the form of periodic sampling and/or continuous measurement of environmental parameters, levels of waste discharge or process emissions to ensure that regulatory requirements are observed and standards met. (Surveillance and inspection may also form a part of this activity but need not necessarily involve measurement of a repetitive activity).

(b) the organization and interpretation of the environmental monitoring data to establish a record of change associated with the implementation of a project or the operation of an organisation;

(c) the process of verification that all or selected parameters measured by an environmental monitoring programme are in compliance with regulatory requirements, internal policies and standards, and established environmental quality performance limits;

(d) the comparison of project impact predictions with actual impacts for the purpose of assessing the accuracy of predictions;

(e) the assessment of the effectiveness of the environmental management systems, practices and procedures;

(f) event and action plans shall be included and linked to the environmental quality performance. The determination of the degree and scope of any necessary remedial measures in case of exceedance of compliance, for which environmental monitoring forms the basis, or the recommendation of environmental controls and operations in the event that the organisation's environmental objectives are not achieved;

(g) for projects which are assessed to have potential impacts on nearby fish culture zones, the part of EM&A programme to address such impacts shall be approved by Director of Agriculture & Fisheries (DAF). A copy of the manual as well as the regular and summary reports shall be made available to DAF; and

(h) the environmental monitoring and audit work shall be carried out by qualified personnels.

Environmental Quality Performance Limits

For the purpose of environmental monitoring and audit, environmental quality performance limits are normally in the form of a set of action / limit levels, which are defined as:

(i) **Action Levels** - the levels beyond which there is an indication of a deteriorating ambient environmental quality. Appropriate remedial actions may be necessary to prevent the environmental quality from going beyond the limit levels, which would be unacceptable.

(ii) **Limit Levels** - the levels stipulated in relevant pollution control ordinances, this technical memorandum, or the Hong Kong Planning Standards and Guidelines, or other appropriate criteria established by the Director of Environmental Protection for a particular project, beyond which the works shall not proceed without appropriate remedial action, including a critical review of plant and work methods.

In addition to the action/limit levels, a trigger level below the action level may be set up to provide early warning of deteriorating environmental quality that may exceed the action level.

Environmental Monitoring and Audit Documentation

For the purpose of EM&A, the following documents are normally required by the Director:

(a) **EM&A Manual**

The Manual shall be a stand-alone document and shall include the following:

(i) project background including organisation and programme;

(ii) purpose of the manual;

(iii) an implementation schedule, summarizing all recommended environmental mitigation measures with reference to the programme for their implementation. The measures shall include those identified at detailed design, contract preparation, construction, and operation stages of the project;

(iv) drawings showing all environmentally sensitive receivers;

(v) an EM&A programme for the construction of the project including:

- responsibility for EM&A work;
- EM&A organization and management structure;
- EM&A methodology;
- equipment to be used and calibration required;
- locations, parameters, frequency and duration for baseline, impact and compliance monitoring;
- environmental quality performance limits (Action and Limit levels);
- Event-Action plans and decision audit flow charts;
- procedures for reviewing the monitoring results;
- compliance audit procedures and follow-up;

(vi) implementation programme and impact prediction review procedures;

(vii) site inspection, deficiency and action reporting procedures;

(viii) complaint/consultation procedures; and

(ix) reporting format and procedures.

(b) **Baseline Monitoring Report**

The report shall include at least the following:

(i) drawings showing locations of the baseline monitoring stations;

(ii) monitoring results (in both hard and diskette copies) together with the following information:

- monitoring methodology;
- equipment used and calibration details;
- parameters monitored;
- monitoring locations (and depth);
- monitoring date, time, frequency and duration;

(iii) details on influencing factors, including:

- major activities, if any, being carried out on the site during the period;
- weather conditions during the period;
- other factors which might affect the results;

(iv) determination of the action and limit levels for each monitoring parameter and statistical analysis of the baseline data;

(v) revisions for inclusion in the EM&A Manual.

(c) **Regular and Summary EM&A Reports**

The results and findings of each audit shall be documented in regular EM&A reports prepared by the Applicant. EM&A reports shall include at least the following :

(* Where applicable, items which have already been included in the EM&A Manual need not be repeated in each EM&A report unless there are substantial amendments.)

(i) 1-2 pages executive summary;

(ii) * basic project information including a synopsis of the project organisation, programme and management structure, and the work undertaken during the month;

(iii) * a brief summary of EM&A requirements including:

- all monitoring parameters;
- environmental quality performance limits;

- Event-Action Plans;
- environmental mitigation measures, as recommended in the EIA report;
- environmental requirements in contract documents.

(iv) advice on the implementation status of environmental protection, mitigation and pollution control measures, as recommended in the project EIA report, summarised in the updated implementation schedule;

(v) * drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;

(vi) monitoring results (in both hard and diskette copies) together with the following information:

- monitoring methodology;
- equipment used and calibration details;
- parameters monitored;
- monitoring locations (and depth);
- monitoring date, time, frequency, and duration;

(vii) graphical plots of trends of monitored parameters over the past four reporting periods for representative monitoring stations annotated against the following:

- major activities being carried out on site during the period;
- weather conditions during the period; and
- any other factors which might affect the monitoring results;

(viii) a summary of non-compliance (exceedances) of the environmental quality performance limits;

(ix) a review of the reasons for and the implications of noncompliance including review of pollution sources and working procedures;

(x) a description of the actions taken in the event of noncompliance and deficiency reporting and any follow-up procedures related to earlier noncompliance;

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

(xii) a summary record of notification of summons, successful prosecutions for breaches of environmental protection/pollution control legislation, and actions taken to rectify such breaches;

(xiii) a forecast of the works programme, impact predictions and monitoring schedule for the next three months; and

(xiv) comments, recommendations and conclusions for the monitoring period.

ANNEX 22 : RELEVANT AUTHORITIES FOR HAZARD ASSESSMENT

Source of Risk	Authority
The manufacture, storage, use, or transport of dangerous goods (DGs):	
- Fuel gas DGs (Note 1)	DEMS
- Other DGs (Note 2)	DEP

Notes :

1. Defined in the Gas Safety Ordinance (Cap. 51).

2. Defined in the Dangerous Goods Ordinance (Cap. 295), but not covered by the Gas Safety Ordinance (Cap. 51).