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For information by circulation

**Guidance Notes on
Environmental Impact Assessment Ordinance Process**

PURPOSE

This paper reports to Members on the updating of the Guidance Notes (GNs) on Environmental Impact Assessment Ordinance (EIAO) Process.

BACKGROUND

2. At the 257th ACE meeting on 20 March 2023 on “*Optimising the Environmental Impact Assessment Ordinance Process*” (ACE Papers 3/2023 and 4/2023), we briefed Members on the review results and recommendations on the proposed amendments to Schedules 2 and 3 of the EIAO¹, revisions to the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM) and various enhancement initiatives to optimise the EIAO process.

3. The EIAO (Amendment of Schedules 2 and 3) Order 2023 and the revised EIAO-TM were subsequently passed by the Legislative Council on 29 June 2023 and took effect on 30 June 2023. With the revised EIAO-TM, the assessment methodologies adopted in EIA studies have become more transparent, consistent and efficient, resulting in a more streamlined and expedited EIAO process.

4. In order to provide technical guidance to project proponents and relevant stakeholders to carry out EIA studies in accordance with the requirements of the EIAO-TM, EPD has prepared a set of 14 GNs for their reference. Subsequent to the revisions made to the EIAO-TM as a result of the EIAO review, we have updated six of the existing GNs and prepared two new GNs (see **Annex A**).

¹ Schedule 2 of EIAO refers to designated projects requiring EP; Schedule 3 of the EIAO refers to major designated projects requiring EIA reports.

UPDATED / NEW EIAO GNs

5. The key features of the six updated GNs and the two new GNs are summarised below :

Updated GNs

- (a) **Ecological Baseline Survey for Ecological Impact Assessment [GN 7/2023]** – The GN is revised to set clear on the purpose of baseline survey, and to specify the duration of ecological baseline survey of at least 6 months and up to 12 months depending on the scale and complexity of the project. To facilitate project proponents to opt to conduct advance ecological baseline survey, the GN specifies the relevant requirements in Appendix B of Annex 16 of EIAO-TM on the optimal time of the year, minimum survey frequency and optimal time of the day for conducting surveys of the major faunal and floral groups relevant to the specific project.
- (b) **Preparation of Landscape and Visual Impact Assessment Under the Environmental Impact Assessment Ordinance [GN 8/2023]** – The GN is revised to emphasise the need for landscape impact assessment and/or visual impact assessment (VIA) should be considered independently following the approach as set out Annex 18 of the EIAO-TM. On VIA, the assessment requirements are aligned with the prevailing practice guides for applications under the Town Planning Ordinance on key public viewing points, identification of permanent impacts and updated consideration factors for assessing visual impact.
- (c) **Preparation of Construction Noise Impact Assessment Under the Environmental Impact Assessment Ordinance [GN 9/2023]** – The GN is revised to facilitate qualitative assessment of construction noise to be conducted during the EIA stage with a view to estimating the level of construction noise impact and suggesting appropriate mitigation measures; and include provision through the EP condition to require the submission of a detailed quantitative assessment (i.e. Construction Noise Management Plan) during the construction stage of the designated project. The assessment requirements for different scenarios being considered and prediction of construction noise impact are also updated.
- (d) **Methodologies for Terrestrial and Freshwater Ecological Baseline Surveys [GN 10/2023]** – The GN is updated to include the survey and sampling methods for dragonflies, fireflies, freshwater invertebrates and fish. Habitat types in Hong Kong and the definition of each category according to the “Terrestrial Habitat Map of Hong Kong 2021” are clearly listed in the GN for reference.

- (e) **Methodologies for Marine Ecological Baseline Surveys [GN 11/2023]** – The GN is updated to specify a land-based theodolite tracking survey for study of fine-scale cetacean behaviour and movement patterns. In addition to visual method, an underwater Passive Acoustic Monitoring (PAM) is also included as a supplementary survey method to detect the acoustic signals and associated activity levels of vocalizing cetaceans including dolphins and porpoises.

- (f) **Road Traffic Noise Impact Assessment Under the Environmental Impact Ordinance [GN 12/2023]** – The GN is revised to illustrate with typical examples of minor road improvement works that generally would not cause adverse traffic noise impact on a noise sensitive receiver and hence no material change to a road project. It also updates the requirements on quantitative assessment and the use of traffic noise model on road traffic noise impact assessment. Where the predicted noise impacts exceed the applicable noise criteria, project proponents should consider and evaluate the need of direct mitigation measures, such as treatment of source, application of low noise road surfacing.

New GNs

- (g) **Methodologies for Fisheries Baseline Surveys [GN 15/2023] [New]** – This is a new GN to specify the methodologies for fisheries baseline surveys including the fisheries baseline surveys duration of at least 6 months and up to 12 months to cover the dry and wet seasons as well as the transitional periods depending on the nature of the project and/or the importance in fisheries resources/production within the study area. Consultation with the fisheries communities at the early stage when formulating the survey methodologies is suggested.

- (h) **Preparation of Fixed Noise Sources Impact Assessment Under the Environmental Impact Ordinance [GN 16/2023] [New]** – This is a new GN on fixed noise sources impact assessment as required in the EIA study brief to cater for different stages of the EIA process of a DP (i.e. during the EIA stage, pre-tender stage of DP or EP submission stage). The requirements of the submission of Fixed Noise Sources Management Plan in Environmental Permit are specified. In addition to the necessary steps on identification, prediction and evaluation of fixed noise sources impact, the GN also specifies the consideration of direct mitigation measures, such as avoidance of direct line of sight to noise sensitive receivers, the use of quieter plant and/or quieter designs, consideration on operation time.

STAKEHOLDERS CONSULTATION

6. There has been a continuous engagement between the EPD and the relevant stakeholders and EIA practitioners throughout the EIAO review exercise. To solicit views / comments from the stakeholders on the updated / newly prepared EIAO GNs, an online EIAO Users Liaison Groups Meeting was held on 19 July 2023. With a total of 245 participants (from the government departments, private sectors and public corporations, environmental consultants, contractors and environmental professional institutions) attended the meeting, many positive and constructive views were received and suitably incorporated in updating the GNs. Majority of the participants welcomed the optimisation of the EIAO-TM and the revised technical guidelines to improve the efficiency of environmental impact assessment process. The key comments received during the consultation are summarised in **Annex B**.

7. We will continue to work closely with the stakeholders and relevant professional bodies via the EIAO Users Liaison Groups to gather views from them on the application of the GNs.

ADVICE SOUGHT

8. Members are invited to note the updated EIAO GNs.

Environmental Protection Department
January 2024

Annex A

Updated/ New EIAO GNs

**Environmental Impact Assessment Ordinance, Cap.499
Guidance Note**

Ecological Baseline Survey for Ecological Impact Assessment
(This guidance note supersedes EIAO Guidance Note No. 7/2010 with immediate effect)

Important Note :

The guidance note is intended for general reference only. You are advised to refer to and follow the requirements in the Environmental Impact Assessment Ordinance (Cap 499) and the Technical Memorandum on Environmental Impact Assessment (EIA) Process. Each case has to be considered on individual merits. This guidance note serves to provide some good practices on EIA and was developed in consultation with the EIA Ordinance Users Liaison Groups and the Advisory Council on the Environment. This guidance note may be subject to revision without prior notice. You are advised to make reference to the guidance note current to the date. Any enquiry on this guidance note should be directed to the EIA Ordinance Register Office of EPD on 27th Floor, Southorn Centre, 130 Hennessy Road, Wan Chai, Hong Kong. (Telephone: 2835-1835, Faxline: 2147-0894), or through the EIA Ordinance web site (www.epd.gov.hk/eia)

1 Purpose

- 1.1 As stipulated in Section 5.1.1 of Annex 16 of the Technical Memorandum on EIA Process (EIAO-TM), the objective of the baseline study of an ecological assessment is to provide adequate and accurate ecological baseline information. The ecological baseline survey forms an important part of the baseline study to:
 - (a) provide first hand, specific and updated information on the existing ecological characters of the proposed development site and its vicinity;
 - (b) verify information obtained from the review of existing information (Section 5.1.2.1 of Annex 16 of EIAO-TM); and
 - (c) fill existing information gaps.
- 1.2 This guidance note aims at providing the general guidelines for conducting an ecological baseline survey in order to fulfil the requirements stipulated in the TM in respect of ecological assessment for a proposed development. It should be read in conjunction with EIAO Guidance Note (GN) No. 10/2023: *Methodologies for Terrestrial and Freshwater Ecological Baseline Surveys* and GN No. 11/2023: *Methodologies for Marine Ecological Baseline Surveys*, which provide the generally adopted methodologies for conducting ecological baselines surveys for Ecological Impact Assessment.

2. Underlying Principles

- 2.1 The purpose of baseline survey is to obtain a general overview of the existing ecological function / habitat characteristics of the study site to facilitate subsequent ecological assessment. Collection of a great deal of data with little focus does not facilitate subsequent ecological assessment, hence it would not be necessary or appropriate to gather very detailed ecological information in the baseline study. Before conducting the baseline surveys, major faunal and floral groups that are considered relevant and susceptible to the impact arising from the designated project should be identified,

through a review on the findings of relevant studies/surveys based preferably on published data of recognized sources, as the focal points of the survey. In addition, efforts should be focused on locations or target taxa groups on which the impacts are likely to be significant.

- 2.2 Unlike academic research, the ecological baseline survey aims at collecting ecological data through sampling with reasonable efforts. The actual sampling effort would generally depend on the physical size of the site, diversity of the habitats, flora and fauna, seasonal variation of the target taxa groups under study and availability of existing ecological baseline information. The project proponent, in consultation with environmental consultants where applicable, should determine the appropriate amount of sampling efforts in each case based on their professional judgement and actual site situations, such that the data obtained are representative to address both spatial and temporal variations. The general sampling efforts (e.g. number and frequency of sampling, locations and timing of surveys, duration of survey, etc.) and methods should be briefly described in the EIA report.
- 2.3 Survey methods used should be scientifically robust and appropriate for the habitats and target taxa groups under study. Standardized survey methods should be applied wherever appropriate so that results can be compared with those arising from other EIA studies. If the methods used vary from accepted methods in order to meet the specific needs of a study, the justifications and reliability of the results should be clearly presented in the EIA report. The surveys should also be carried out by personnel with adequate knowledge and field experience of the target taxa groups to be surveyed.
- 2.4 Besides recording the species of the target taxa groups at the site through sampling, the dominant flora and fauna as well as any species of conservation importance should also be noted. The ecological baseline survey should also aim at providing insight into the ecological functions and importance of the habitats in question. For instance, during a bird survey, any notable behaviour such as feeding, roosting or breeding of the birds and the associated habitats and vegetation where they show such behaviours should be recorded. In fact, any special species-habitat relationships observed during the survey should be included, as such information is relevant and essential for subsequent impact identification, evaluation and mitigation.
- 2.5 In essence, an ecological baseline survey aims at revealing the ecological profile of the study area to facilitate the subsequent impact assessment and, if necessary, formulation of mitigation measures and monitoring programme. The EIA study brief (SB) may also stipulate additional requirements on the ecological baseline survey taking into account the nature of the project, site conditions and valid concerns of the public. However, as each survey has its specific constraints and, probably, unique circumstances, it may not be possible nor appropriate to specify every single detail (e.g. the exact numbers, dates, routes, methodology, etc.) in the EIA SB. Further investigations to address specific issues may be required during the course of the EIA study and be presented in the EIA report.

3 Duration of Survey

- 3.1 Section 5.1.4 of Annex 16 of EIAO-TM states that an “ecological baseline survey” shall

be of at least 6-month and up to 12-month duration.

- 3.2 Referring to Figure 1 of Annex 16 of EIAO-TM, the duration of an ecological baseline survey should be commensurate with the scale and complexity of the proposed development at hand, and take into account the diversity of habitats and/or presence of species with marked seasonality in the study area. Representative information could be obtained in a reasonable period of time if appropriate survey and sampling methods are adopted. An unnecessarily long ecological baseline survey may not yield useful additional information but may impose difficulties on the project proponent in terms of costs, programming and project implementation.

4. Seasonality

- 4.1 Hong Kong has a sub-tropical climate and hence does not have four distinct seasons. Typically, Hong Kong has a wet hot “summer” and a dry cool “winter”. (The average monthly temperature and rainfall are shown in Figures 1 and 2.) These two periods may be simply referred as “wet” season (April to October) and “dry” season (November to March). However, April and October are regarded by some ecologists as transitional months, the weather of which may not be typical for wet season and may vary from year to year. These considerations should be taken into account when designing survey programme and interpreting survey results.
- 4.2 In the marine environment, there are also seasonal variations. During the wet season, the discharge of the Pearl River makes the western waters remarkably low in salinity (can be lower than 10 parts per trillion (ppt)) while the eastern waters remain oceanic (salinity generally above 30 ppt). In the dry season when the freshwater discharge is much reduced, most of our waters are of rather uniformly high salinity. There are also some differences in water temperature and consequently dissolved oxygen levels between the two seasons. The range can be from under 10°C to over 30°C, and from less than 2 mg/L of dissolved oxygen in wet season to over 8 mg/L in dry months.
- 4.3 Different wildlife groups may differ in their activities and hence conspicuousness at different times of the year, as a result of difference in breeding seasons, migratory behaviour, or physiological changes (e.g. low temperature restricts activity of poikilotherms but not homeotherms). Therefore, to obtain good results, a target taxa group should be surveyed at the time of the year when the group is more active, conspicuous or easy to be identified.

Figure 1. Monthly means of air temperature in Hong Kong for the period 1991-2020

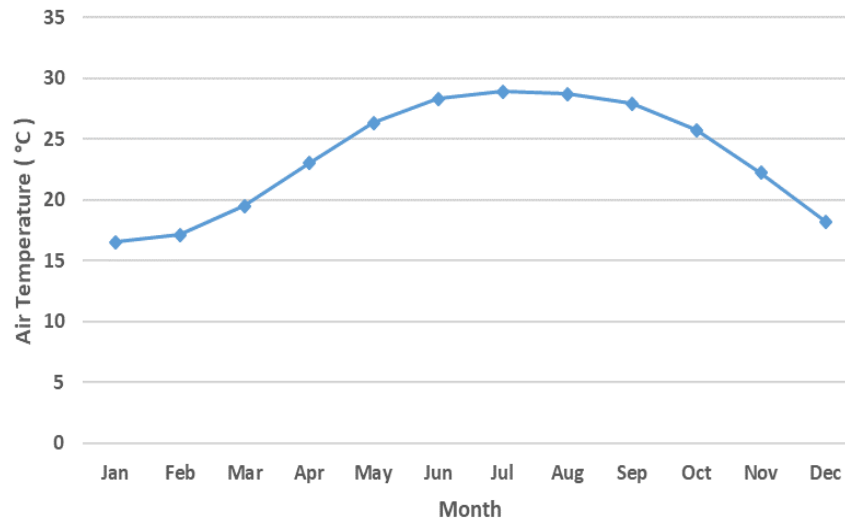
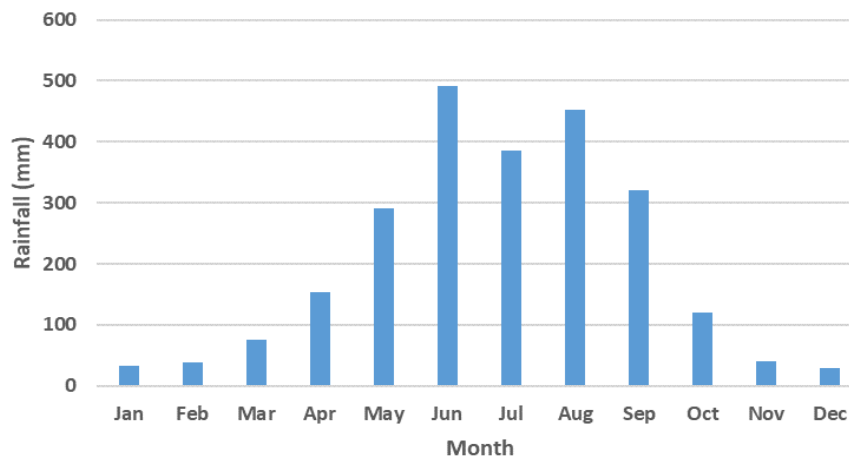


Figure 2. Monthly means of rainfall in Hong Kong for the period 1991-2020



Data Source : Hong Kong Observatory Almanac, Hong Kong Observatory (2023)

- 4.4 The recommended optimal time of the year/day for the major faunal and floral groups that are usually included in ecological baseline surveys are provided in Appendix B of Annex 16 of EIAO-TM. The figure serves as a reference for the period of a year when different faunal or floral groups are generally more conspicuous. The actual timing of survey may need to be adjusted if a target species has special seasonal or diurnal pattern (e.g. egretty should be surveyed during the breeding season of egrets and herons between March and August) or for special habitat types where certain target species groups are expected.

Types of Survey Period

- 5.1 On the basis of the factors described in Section 3.2 above, three types of ecological survey periods are provided in the Figure 1 of Annex 16 of EIAO-TM, i.e. 6-month, 9-month or 12-month. More specific considerations in respect of the determination of different survey durations are given below:

- (a) 6-month survey
 - ◆ The study area consists of low to moderate diversity of common habitats.
 - ◆ Limited species with marked seasonality is known from the study area.
 - ◆ The 6-month period should provide reasonable amount of information on wildlife use of the study area.
 - ◆ Sufficient surveys in the wet season are necessary if there are stream courses or wetlands in the study area.

- (b) 9-month survey
 - ◆ The study area consists of relatively diverse habitats.
 - ◆ Seasonal patterns in wildlife use of the study area is known.
 - ◆ Sufficient surveys in the wet season are necessary if there are streams courses or wetlands in the study area.

- (c) 12-month survey
 - ◆ The study area consists of diverse habitats including important habitat types as listed in TM Annex 8.
 - ◆ Target species with marked seasonality is known to be present in the study area.

5.2 The above requirements could vary from case to case depending on the actual scale and complexity of the designated project. If a planning application has to be made in parallel, the project proponent is reminded of the Town Planning Board Guidelines for Application for Developments within Deep Bay Area under Section 16 of the Town Planning Ordinance (TPB PG-No. 12C (Revised May 2014)), which also has a special requirement for field investigation normally covering a period of not less than 12 months.

6. Survey Programme

- 6.1 The project proponent and environmental consultants shall make sure that the entire duration of survey is well covered to take into account the temporal variations and seasonality, if any, of different target taxa groups.

- 6.2 To fulfil the requirements of TM in providing adequate and accurate ecological baseline information (Section 5.1 of Annex 16 of EIAO-TM), the surveys or samplings for individual target taxa groups should be conducted at appropriate timing and frequencies. Reference should be made to Appendix B of Annex 16 of EIAO-TM. However, for taxa groups which fluctuate greatly in abundance (e.g. birds) or are difficult to detect (e.g. some cryptic or secretive species), higher survey frequencies at appropriate time during the survey period are recommended. There should also be adequate samplings/surveys at larger or more diverse sites to ensure that the data obtained are representative.

7. Ecological Survey Results

- 7.1 According to Section 5.1.3 of Annex 16 of EIAO-TM, results of all relevant field surveys, the names and relevant experience of the persons leading and conducting the surveys, shall be documented in field survey reports prepared, checked and signed by relevant professionals or experts. Such information should be included as an Appendix in the ecology chapter of the EIA report in the following format:

Faunal/floral group under study	Key surveyor		
	Full Name	Brief description of relevant experience	No. of years of relevant experience

- 7.2 According to Section 5.1.6 of Annex 16 of EIAO-TM, the information gathered from the ecological baseline surveys shall be valid for 36 months upon their completion, after which the information should be verified through field surveys to confirm its validity for the purpose of ecological impact assessment. This is to ensure the representativeness of the ecological data, especially when there is substantial time gap between the completion of the surveys and the formal submission of the EIA report.
- 7.3 A verification survey should aim to identify notable habitat changes, whether due to natural causes or human influence, in order to confirm that the previously completed survey results are still valid and suitable for the impact assessment.

(a) Habitat verification

Broad-brush field surveys should be conducted to determine if there have been significant changes to the previously surveyed habitats. Updated literature review should also be conducted to ascertain if there have been any new reports of significant ecological findings. If there are no significant changes to the habitats and new ecological findings are absent, the previous surveys results should be considered still valid for the purpose of ecological impact assessment of the project concerned.

(b) Follow-up surveys

In the event that significant changes to the previously surveyed habitats are detected and/or new significant ecological findings have been reported, a fresh round of ecological baseline surveys with the same scope as specified in the EIA SB should be carried out.

Agriculture, Fisheries and Conservation Department
in conjunction with Environmental Protection Department

Date of Issue : December 2023

Environmental Impact Assessment Ordinance, Cap.499
Guidance Note

Preparation of Landscape and Visual Impact Assessment
Under the Environmental Impact Assessment Ordinance

(This guidance note supersedes EIAO Guidance Note No. 8/2010 with immediate effect)

Important Note :

The guidance note is intended for general reference only. You are advised to refer to and follow the requirements in the Environmental Impact Assessment Ordinance (Cap 499) and the Technical Memorandum on Environmental Impact Assessment (EIA) Process. Each case has to be considered on individual merits. This guidance note serves to provide some good practices on EIA and was developed in consultation with the EIA Ordinance Users Liaison Groups and the Advisory Council on the Environment. This guidance note is subject to revision without prior notice. You are advised to make reference to the guidance note current to the date. Any enquiry on this guidance note should be directed to the EIA Ordinance Register Office of EPD on 27th Floor, Southorn Centre, 130 Hennessy Road, Wan Chai, Hong Kong. (Telephone: 2835-1835, Faxline: 2147-0894), or through the EIA Ordinance web site (www.epd.gov.hk/eia)

1. Purpose

- 1.1 This guidance note (GN) advises on the requirements in vetting Landscape and Visual Impact Assessment (LVIA) of designated projects (DPs) under the Technical Memorandum on EIA Process (EIAO-TM) for the Environmental Impact Assessment Ordinance (EIAO). The main aim is to facilitate practitioners to prepare LVIA and to satisfy their own Quality Management System prior to making submissions under the EIA Ordinance.
- 1.2 This GN is applicable to all EIA reports submitted under the EIAO unless otherwise specified in the EIA study brief. It is advisory in nature and is not intended to supersede the relevant Annexes of the EIAO-TM.
- 1.3 The considerations in identifying environmental impacts, criteria for evaluating landscape and visual impacts, contents of EIA report, guidelines for LVIA, guidelines for the review of an EIA report, contents of Environmental Monitoring and Audit Programme are respectively detailed in Annexes 3, 10, 11, 18, 20 and 21 of the EIAO-TM.
- 1.4 This GN should not be considered as a prescriptive set of rules or an exhaustive manual of methods/techniques. It does not obviate the need for the compliance of all the requirements in the relevant Annexes of the TM and the EIA study brief issued for the project. The main determining factor for endorsement of a LVIA is the quality and accuracy of the LVIA prepared by the proponent of the DP.
- 1.5 The coverage of this GN includes those types of DP that may create significant landscape and visual impacts. The level of information required for individual LVIA and hence the application of relevant parts of this GN are dependent on the type of DP and the landscape and visual context in which the DP is located.

2. Approach to LVIA

- 21 LVIA shall be directed towards predicting and judging of the magnitude and significance of the effects that new development/redevelopment may have on landscape and visual resources, landscape with distinctive character and visual amenity. The need for landscape impact assessment (LIA) and visual impact assessment (VIA) should be considered independently following the approach as set out in Annex 18 of the EIAO-TM.
- 22 LVIA should be an independent and informed professional assessment of the impacts from a DP. It should be based on the reasonable case scenario and/or where there is uncertainty the worst case scenario. Both positive and negative landscape and visual impacts should be given due consideration in the process.
- 23 It is recognised that, unlike other impact assessments, LVIA relies more upon experienced professional judgment and less on quantitative measurements. Hence, it is important to adopt a structured and systematic approach in LVIA to facilitate the public to understand the potential landscape and visual impacts arising from the DP.
- 24 In assessing the significance of impacts in LVIA, it is necessary to differentiate between judgment on the significance of change, which involves a greater degree of subjective opinion, and measurement of magnitude of change, which is normally a more objective and quantifiable task. Assessment should always be supported by quantified data, clear evidence, logical deduction, reasoned argument and informed judgment.
- 25 Based on the best information available at the time of the assessment, LVIA might report the main concerns on landscape and visual issues raised by interested parties¹.
- 26 Information in the LVIA should be consistent with that used for other impact assessments covered by the same EIA report such as:
- noise assessment in respect of the location, extent and size of noise barriers/enclosures,
 - ecological impact assessment in respect of the quantification of landscape features and the potential impacts on them, and
 - assessment of waste management implications, e.g. in respect of potential loss of topsoil, vegetation removal and other landscape resources.

¹In general, interested parties may include:

- Advisory Council on the Environment (ACE)
- Advisory Committee on the Appearance of Bridges and Associated Structures (ACABAS),
- Country and Marine Parks Board (C&MPB),
- District Councils (DCs),
- Harbourfront Commission
- Town Planning Board (TPB), and
- Public comment from consultation forum (if any/applicable as stated in para. 3.1(b)).

27 For easy understanding, annotated illustrative materials such as computer-generated photomontages, oblique aerial photographs, photographs, plans, elevations and section drawings should be extensively used to convey the findings of LVIA to the readers. Descriptive text should provide a concise and reasoned argument.

28 As LVIA involves appraisal of landscape and visual resources, professional judgment of impact significance and formulation of sensible mitigation measures, it is therefore recommended that professional landscape architects, planners and/or urban designers, or other competent persons be appointed to carry out the full scope of LVIA as identified in the EIA study brief.

3. Points to Note in Undertaking LVIA

31 Background of DP and Options

- (a) Subject to the requirements of the EIA study brief, the background of the DP should include a broad description of the alternative option(s) / alignment(s) / design(s) which have been examined in related studies. The potential landscape and visual impacts of alternative options considered should be broadly stated and the rationale for the recommended option should be clearly explained.
- (b) Comments collected from previous consultation, if any, with relevant advisory bodies including those listed in section 2.5 above and the general public on landscape and visual aspects of the project should be summarised together with a discussion on how their comments have been addressed in the EIA report. If there is no previous consultation or no comment has been received on landscape and visual aspects, this should be clearly stated.

32 Project Description

- (a) All works that may give rise to significant landscape and visual impacts should be clearly annotated on plans such as:
 - location plan including phasing boundary where applicable,
 - details of all structures/buildings (in terms of length, width and height in mPD),
 - layouts, plans, sections and elevations, and
 - extent of temporary works area.

Descriptive text should generally be confined to supplement understanding of the illustrative materials.

- (b) For construction phase, some impacts may be temporary in nature, but can be significant if left unattended. The LIA should include, where applicable, consideration of permanent works and also major temporary works undertaken during the construction stage. Construction works may include the following:

- reclamation (temporary and/or permanent),

- site formation including slope works,
 - temporary works including vegetation clearance,
 - haul road,
 - borrow areas, and
 - dumping grounds.
- (c) For operation phase, both LIA and VIA should include, where applicable, consideration of major impacts at operation of the project, particularly the following features, which are also prominent in the landscape and visual context:
- viaducts,
 - retaining structures,
 - vent shafts,
 - tunnel portals,
 - cutting and filling,
 - embankments,
 - any mitigation measures such as noise barriers/enclosures, and
 - ancillary buildings.

33 Assessment Area

- (a) For the LIA, the assessment area should include areas within 100 m from the work limit of DP, unless specified in the EIA study brief.
- (b) For the VIA, the assessment area, unless specified in the EIA study brief, should be up to the visual envelope (VE) or zone of visual influence (ZVI) which should be determined according to the scale of the DP, its distance and potential visibility from the selected viewing points, and the actual site and surrounding topographical conditions by ground inspection¹. The defined VE must be shown on plan.
- (c) In order to define the VE, cross-sectional drawings shall be prepared to demonstrate the various degree of visibility in the VE. Such information is generally not required to be included in the VIA but should be kept by the applicant for verification upon request by the Planning Department.

34 Baseline Study

- (a) Baseline conditions are not static and may change over time according to the planning framework. The Baseline Study aims to capture the existing condition at the time of EIA preparation for predicting the future outlook of the assessment area.
- (b) The Baseline Study should include a brief account of the landscape and visual characters and resources of the assessment area as appropriate, focusing particularly on the sensitivity of the landscape and visual system and their ability to accommodate change.

¹ Technically speaking, when the viewer is at a distance equal to three times of the height of a structure/building, the viewer will tend to see it as part of a group rather than a single structure/building. Thus, the boundary of VE could be considered in accordance with such technical assumption.

- (c) Landscape resources (LRs) should be quantified as far as practicable for LIA, with respect to special landscape features. Landscape character of the project area and its relationship with the adjacent areas should be addressed. Landscape character areas (LCAs) and key landscape elements within the assessment area should be identified and annotated on plan. Some projects may require a broad tree and/or vegetation survey to be carried out.
- (d) A broad-brush tree/vegetation survey should normally be prepared as an integral part of the landscape baseline study. Such broad-brush survey could be quantified as far as practicable by estimation supported with on-site survey unless there are site constraints (e.g. accessibility) within the assessment area, rather than detailed survey of individual trees, such that it could assist a brief account of the landscape characters and resources of the assessment area for LIA purpose at the time of EIA preparation. Unless specified elsewhere in the EIA study brief, a detailed tree survey to fulfill the requirements as stipulated in the Development Bureau Technical Circular (Works) No. 4/2020, or Lands Administration Office, Lands Department Practice Note No. 6/2023 for Tree Preservation and Removal Proposals is not necessary for the preparation of LIA.
- (e) Besides vegetation, other LRs such as special topographical or geological features, reservoirs, streams and other water bodies, etc. should be investigated as part of the Baseline Study for LIA.
- (f) Visual resources such as key public views, viewing corridors/viewing directions, harbour and ridgelines, and visual characters should also be identified on plans for VIA.
- (g) Key public viewing points (VPs)² should be identified and justified with their locations clearly shown on plans for VIA.
- (h) Annotated oblique and aerial photographs, photographs taken at key public VPs and relevant maps/plans with short notes should be used to illustrate the existing baseline conditions.

35 Scope of Impacts

- (a) LIA should comprise assessments of the impacts both on LRs and LCAs, which is created by the combination of LRs and built developments.
- (b) VIA should identify and predict the type and extent of permanent impacts from

² Visual impact should take into account views from key strategic and popular local VPs. VPs could be kinetic or static, including key pedestrian nodes, popular areas used by the public or tourists for outdoor activities, recreation, rest, sitting-out, leisure, walking, sight-seeing, and prominent travel routes where travellers' visual attention may be caught by the DP. It is not practical to protect private views without stifling development opportunity and balancing other relevant considerations. From public interest consideration, it is far more important to protect public views. Generally, VPs should cover all four cardinal directions and include short- to long- range views. Selection of VPs could also be referred to Chapter 11 on Urban Design Guidelines in the Hong Kong Planning Standards and Guidelines (HKPSG), the Explanatory Statements of relevant statutory plans, adopted outline development plans and layout plans, and completed planning studies available for public reference.

changes in visual composition, visual obstruction and visual change.

- (c) The presentation of landscape and visual impacts in construction³ and operation stages should preferably be in table form covering items as specified in section 3.6 below.
- (d) Extent of work limits including temporary works areas should be presented on plan. The duration of construction impact should be stated.
- (e) For DP under Schedule 3 of the EIA Ordinance, if the LVIA could include a list of all DPs under Schedule 2 within the assessment area with an assessment of the potential landscape and visual impacts from all DPs and non-DPs within the assessment area, further LVIA is not required for the application of environmental permit (EP) for the DPs under Schedule 2. If detailed information for the DPs under Schedule 2 is not available at the time of EIA study, the LVIA for the DP under Schedule 3 should contain a broad assessment of the potential landscape and visual impacts arising from all DPs and non-DPs within the assessment area with a recommendation to carry out further detailed LVIA's before the application of EP for the DPs under Schedule 2.

3.6 Impact Assessment

- (a) LVIA should take into account existing/planned/approved land uses as the baseline conditions. All direct impacts on existing/planned/approved land uses, and on future outlook of the area should be discussed.
- (b) Landscape impacts should be quantified based on landscape dynamics i.e. different conditions at different planning horizons should be provided when considering the magnitude of change.
- (c) Impact of the DP on LRs including special landscape features and on the LCAs should be assessed. Where situations warrant, it may be necessary to evaluate the merits of preservation in totality, in parts or total destruction of existing landscape and the establishment of a new LCA.
- (d) VIA should be made for identified key public VPs.
- (e) LVIA should be determined in significance thresholds, which are made up of two components, namely magnitude of change to baseline conditions due to the DP and sensitivity of LRs, LCAs and viewers. An evaluation matrix with brief visual appraisal shall be derived for judging impact significance. Broadly speaking, magnitude of change relates to parameters of the DP in the context of baseline conditions while sensitivity refers to properties of LRs, LCAs and viewers. The following are some common but non-exhaustive factors normally considered in deriving the magnitude of change and sensitivity in assessing landscape and visual impacts:

³ Applicable to LIA only.

(i) Factors affecting the magnitude of change for assessing landscape impacts include:

- compatibility of the project with the surrounding landscape,
- duration of impacts under construction and operation phases,
- scale of development, and
- reversibility of change.

(ii) Factors affecting the sensitivity for evaluation of landscape impacts include:

- quality of LRs and LCAs,
- importance and rarity of special landscape elements,
- ability of the landscape to accommodate change,
- significance of the change in local and regional context, and
- maturity of the landscape.

(iii) Factors affecting the magnitude of changes for assessing visual impacts include:

- Visual composition – Impacts on visual balance, compatibility, harmony, unity or contrast,
- Visual obstruction – Impacts on condition, quality and character of visual resources, and
- Visual change – Impacts on changes with direct sightlines (considering degree of visibility and viewing distance) to the existing and future public views by comparing before and after the proposed development.

(iv) Factors affecting the sensitivity of viewers for evaluation of visual impacts include the type of viewers and value of existing views (if applicable).

(f) Landscape impacts should be classified depending on whether the impacts are adverse/beneficial, short term/long term, irreversible/reversible and cumulative/residual impacts. Separate assessment should be made for construction phase and operation phase impacts. Assessment of landscape impacts should include presentation of the following in a matrix format:

- LRs / LCAs,
- Sources of impact,
- Type of impacts: impact on LRs and impact on LCAs,
- Magnitude of change: negligible, slight, moderate or substantial,
- Landscape sensitivity: low, medium or high,
- Significance thresholds of potential landscape impact (before mitigation);
- Mitigation measures, and
- Significance thresholds of landscape impact (after mitigation measures)

established) at the operation stage.

- (g) Similarly, visual impacts should be classified depending on whether the impacts are adverse/beneficial. Assessment should be made for operation phase impacts. Assessment of visual impacts should include presentation of the following in a matrix format:
- Location of VPs/viewers,
 - Type and approximate number of viewers,
 - Description of existing view and degree of visibility of DP (such as glimpse, partial view, vista, open view, and panorama view),
 - Viewer sensitivity: low, medium or high,
 - Source of impact,
 - Minimum viewing distance of viewers
 - Magnitude of change: negligible, slight, moderate or substantial,
 - Mitigation measures, and
 - Significance thresholds of visual impact (after mitigation measures established).
- (h) For some DPs such as transport projects, different sections may create different landscape and visual impacts. The LVIA should contain assessments and mitigation measures specific to each section and the LRs, LCAs and viewers affected.
- (i) In order to illustrate the landscape and visual impacts and to demonstrate the effectiveness of the proposed landscape and visual mitigation measures, photomontages at selected representative public VPs shall be prepared to illustrate existing conditions and the proposed development with and without mitigation measures at the operation stage.
- (j) Applicants may consult the Planning Department on the proposed selection of suitable representative public VPs for the preparation of the photomontages after the preliminary assessment.

3.7 Recommendation of Design and Mitigation Measures and Implementation Programme

- (a) Design that would enhance the landscape and visual quality shall be encouraged and adopted.
- (b) Alternative alignment(s), design(s) and construction method(s) that would avoid or reduce the identified impacts on landscape, and/or visual amenity shall be thoroughly examined before adopting other mitigation measures to alleviate the impacts.
- (c) Solid mitigation measures that are practical and viable to implement rather than design intent should be proposed.

- (d) For projects involving Schedule 2 DPs, the agreement from relevant parties should be sought in respect of the responsibility of funding, implementation, management and maintenance of the proposed mitigation measures prior to their inclusion into the LVIA. It should be noted that any “grey” areas in these aspects would affect the implementation and/or the effectiveness of the mitigation measures during the operation phase. Unless these issues have been resolved, the effects of these mitigation measures should be discounted in the LVIA.
- (e) Project boundaries should be clearly indicated on all scaled plans including mitigation plans, which can indicate any off-site mitigation measures. Land matters arising from such measures should be fully resolved prior to inclusion of any off-site mitigation measures into the LVIA. In addition, the locations and types of VPs/viewers should also be annotated on mitigation plans to facilitate assessment of impacts.
- (f) In addressing environmental monitoring and audit, a schedule should be prepared to show the implementation details and the parties responsible for all the mitigation measures from design stage to operation stage.
- (g) A practical programme for implementation of the recommended mitigation measures shall be worked out to ensure timely completion of the mitigation measures.
- (h) While design that would enhance the landscape and visual quality shall be encouraged and adopted, architectural design and landscaping arrangement would normally be revised or further developed in the detailed design stage. Flexibility would be allowed for project proponents to enhance the landscape and visual design at later stages of the project.

3.8 Noise Barriers / Enclosures

- (a) Given the fact that using noise barriers/enclosures as a means to reduce adverse noise impact have their own impact on the visual amenity, they should not be widely adopted as the only way to reduce traffic noise. Alternative ways for mitigation and good environmental land-use transport planning should firstly be explored.
- (b) The choice of colours, design and materials of the noise barriers/enclosures should be compatible with the surrounding buildings and development context.
- (c) If there is insufficient space to screen the noise mitigation structures by design features, integrating with boundary walls, or landscape plantings, efforts should be made in the design of the overall form and surface treatment of the structures to make them to become features of aesthetic value in order to give character to the area.
- (d) To ensure good and innovative design, it is advisable to seek early advice from the ACABAS and agreement with relevant implementation and maintenance

departments.

3.9 Presentation Materials

- (a) All illustration materials should be clearly annotated to facilitate understanding of the LVIA.
- (b) Colour photos should be used to show LRs, special landscape elements, LCAs and key public views.
- (c) Mapping of landscape impacts and visual impacts should be made in colour.
- (d) If possible, computer-generated photomontages should be prepared to illustrate LVIA and the mitigation effects. In preparing the photomontage from key public VPs, the following should be considered :
 - where necessary, it shall include photomontages to illustrate the effect of the proposed mitigation measures at close range,
 - the main associated features of the DP such as viaducts, retaining structures, noise barriers, catenary system, tunnel portals, vent shafts, cuttings, embankments, lighting poles and associated buildings, etc. as in the case of road project should be reflected in the photomontages,
 - public VPs shall be taken at practical human eye level for realistic presentation of views and at representative locations, hence photomontages taken with distorted (e.g. wide or panoramic) angles should be avoided.
 - the overall impact of the DP on the adjacent setting should be shown, and
 - photomontages shall be presented at a minimum of A4 size.
- (e) Computer graphics shall be in a common format compatible with desktop computers. In addition, technical details such as system set-up, software, data files and functions in preparing the illustrations shall be recorded as these may need to be submitted for verification of the accuracy of the illustrations.
- (f) Other illustrative materials shall be legible and of suitable sizes, preferably no larger than A3 size, can be used to supplement photomontages to facilitate easy understanding of the DP by the public:
 - oblique and aerial photographs showing the general setting of DP in relation to the surrounding setting,
 - plans, cross-sections and elevations showing important details of the DP, and
 - 3-dimensional illustrations or computer-aided drawings.

3.10 Conclusion of LVIA

- (a) The conclusion should briefly recap the impacts of the DP. Areas where the landscape and/or visual impacts remain significantly adverse after exhaustive mitigations should be clearly highlighted and the justifications for such cases should be put forward.

- (b) All mitigation measures should be summarised and a comparison with quantification should be made on the net gain/loss of landscape resources affected by the DP.
- (c) The impacts on individual LRs, LCAs or VPs should be clearly stated as to how they are synthesized to arrive at the overall impact of the DP.

Urban Design and Landscape Section
Special Duties Division,
Planning Department
in conjunction with Environmental Protection Department

Date of Issue : December 2023

**Environmental Impact Assessment Ordinance, Cap.499
Guidance Note**

**Preparation of Construction Noise Impact Assessment
Under the Environmental Impact Assessment Ordinance**

(This guidance note supersedes EIAO Guidance Notes No. 9/2004 and 9/2010 with immediate effect)

(Important Note :

The guidance note is intended for general reference only. You are advised to refer to and follow the requirements in the Environmental Impact Assessment Ordinance (Cap 499) and the Technical Memorandum on Environmental Impact Assessment (EIA) Process. Each case has to be considered on individual merits. This guidance note serves to provide some good practices on EIA and was developed in consultation with the EIA Ordinance Users Liaison Groups and the Advisory Council on the Environment. This guidance note may be subject to revision without prior notice. You are advised to make reference to the guidance note current to the date. Any enquiry on this guidance note should be directed to the EIA Ordinance Register Office of EPD on 27th Floor, Southorn Centre, 130 Hennessy Road, Wan Chai, Hong Kong. (Telephone: 2835-1835, Faxline: 2147-0894), or through the EIA Ordinance web site (www.epd.gov.hk/eia)

1. Purpose

- 1.1 This guidance note (GN) serves to provide some good practices to the practitioners on the preparation of Construction Noise Impact Assessment (CNIA) of Environmental Impact Assessment (EIA) studies for designated projects (DPs) under the Environmental Impact Assessment Ordinance (EIAO).
- 1.2 This GN is applicable to all EIA reports where CNIA is required unless otherwise specified in the EIA study brief. It is advisory in nature and is not intended to supersede the relevant Annexes of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM).
- 1.3 The considerations in identifying adverse environmental impacts, criteria for evaluating construction noise impact, contents of an EIA report, guidelines for CNIA, guidelines for the review of an EIA report, contents of Environmental Monitoring and Audit (EM&A) Programme are detailed in Annexes 3, 5, 11, 13, 20 and 21 of the EIAO-TM respectively.
- 1.4 This GN should not be considered as a prescriptive set of rules or an exhaustive manual of methods/techniques. It does not obviate the need for the compliance with all the requirements in the relevant Annexes of the EIAO-TM and the EIA study brief of the project.
- 1.5 The coverage of this GN includes those types of DP that may cause construction noise impacts. The level of information required for individual CNIA and hence the application of relevant parts of this GN is dependent on the type of DP and the surrounding situation in which the DP is located.
- 1.6 This GN is not intended for the assessment of construction noise during restricted hours [i.e. 1900 to 0700 hours on any day not being a general holiday AND at any time on a general holiday as defined under the Noise Control Ordinance (NCO) (Cap. 400)] and construction noise from percussive piling, which is controlled under section 6 of the NCO. For cases where the project proponent would like to evaluate the feasibility of construction

work during restricted hours in the context of construction works programming, a CNIA for the above should be carried out. Regardless of the results of the CNIA for restricted hours, the Noise Control Authority will consider an application under the NCO based on the prevailing condition / situations of adjoining land uses. The CNIA at EIA stage is meant to demonstrate that practical and feasible approaches can be found.

- 1.7 This GN is not intended for the assessment of structural / ground borne construction noise, i.e. noise generated by the construction work transmitted primarily through the ground and the structural elements of the building. In case there is likely structural/ ground borne noise affecting noise sensitive receivers (NSRs), the assessment methodology / model for structural / ground borne noise shall be agreed with the Director of Environmental Protection (the Director) prior to obtaining the empirical parameters required in the ground borne noise model or proceed with the assessment.

2. **Construction Noise Impact Assessment Methodology**

- 2.1 The CNIA should evaluate the construction noise impacts (excluding percussive piling) of a project during daytime, i.e. 0700 to 1900 hours on any day not being a Sunday or general holiday in accordance with the criteria and guidelines set out in Annexes 5 and 13 of the EIAO-TM, and the EIA study brief issued under the EIA Ordinance.
- 2.2 Construction programme formulated during EIA stage is usually subject to significant changes in detailed design stage. Moreover, construction noise impacts can be significantly reduced by adopting quieter construction methods and equipment. Hence, it is considered more realistic and efficient to conduct quantitative CNIA at later stage of the project when project implementation details are available. To streamline the preparation of CNIA in EIA stage, the project proponent shall, unless otherwise agreed by the Director, conduct a qualitative assessment to demonstrate that no adverse construction noise impact would be associated with the project by committing to adopt quieter construction methods and equipment during all construction stages. In such case, the project proponent should demonstrate no adverse construction noise impact associated with the project by firstly identifying the major noise sources/activities, then propose the corresponding quieter construction methods (typical examples are provided in **Appendix A**), and commit to submit a Construction Noise Management Plan (CNMP) to the Director during pre-tender stage, if any, and before commencement of the project. The CNMP should include a quantitative CNIA, proposed adopted quieter construction methods and equipment, recommended noise mitigation measures and a proposed construction noise impact monitoring and audit programme for the project. It should be prepared with reference to the latest plant inventories and, in any case, to be submitted during pre-tender stage for inclusion in the tender document, if any, and before commencement of the project implementation. Any technical constraint that would hinder the use of these quieter construction methods and equipment should be evaluated and clearly recorded in the assessment. The submission of a CNMP during the pre-tender stage, if any, and before commencement of the project implementation will be imposed as a condition in the environmental permit.
- 2.3 Sections 5.3 and 5.4 of Annex 13 of the EIAO-TM stipulate the assessment methodology for construction noise impact. The assessment shall be based on standard acoustic principles. Reference could be made to the relevant technical memoranda issued under the NCO or international standards. Paragraphs 3 to 5 below provide a general reference on the considerations given in adopting construction noise mitigation measures and the

methodology for quantitative CNIA.

3 Identification of Construction Noise Impact

Identification of Assessment Area and Noise Sensitive Receivers (NSRs)

3.1 The assessment area is usually within 300 m from the project boundary. However, if warranted, impacts outside 300 m should also be considered (e.g. noisy rock breaking site formation activities affecting nearby school).

3.2 Regarding identification of NSRs in the CNIA, the approach would be specified in the EIA study brief of the project and examples of NSRs are given in Annex 13 of the EIAO-TM.

3.3 All NSRs, including existing and planned within the assessment area should be identified. Assessment points, representing all identified NSRs, shall be agreed with the Director prior to conducting the noise assessment. However, it may not be necessary to include planned/committed NSRs that will definitely not yet be ready for occupation before completion of the concerned construction work.

Inventory of Noise Sources

3.4 Construction noise impact mainly originates from the use of powered mechanical equipment (PME). The emission inventory of the noise source is a list of PME that would be used to carry out various construction activities for the project. It must be noted that different PME will be used during different stages of the construction work, e.g. site clearance, excavation, earthwork, road pavement, etc. Confirmation of the validity of the inventory shall be obtained from the client government work departments or the project proponent's construction professionals. Where necessary, the construction contractor should also be consulted.

3.5 The PME list must be realistic, practical and practicable in completing the works within the construction works schedule. It should not be artificially or arbitrarily developed to fit in with the noise criteria without any regard to the practicability. It is therefore important that the necessary number and types of PME is included in this list.

3.6 The project proponent should note and take into account of the following when preparing the PME list:-

- a hand held pneumatic drill/breaker (or a few of them) could not possibly handle large volume of rock excavation (e.g. site formation in rocky terrain). Large machine such as drilling rigs or excavator mounted breakers are more commonly used;
- while large diameter bore piling is usually quieter than percussive piling, it may also involve noisy rock breaking activities when encountering rock boulders or rock strata. Chisel or even rock drills may be required;
- for many construction works, concreting would be required, hence, concrete lorry mixer, vibratory poker and crane are usually included in the PME list;
- if work sites are isolated and scattered in small clusters, lorry or even dump truck would be required to deliver construction materials;
- dump truck instead of lorry would be required for disposal of excavated materials offsite, delivery of filling materials or asphalt concrete; and
- filling materials will require compaction, thus relevant PME such as compactor and roller need to be included.

4 Prediction and Evaluation of Construction Noise Impact

Phases of Construction

- 4.1 The project proponent should identify representative phases of construction that would have noticeable varying construction noise impact on existing NSRs within the assessment area for agreement of the Director before commencing the CNIA.

Scenarios

- 4.2 The project proponent shall, unless otherwise agreed by the Director, conduct a qualitative assessment to demonstrate that no adverse construction noise impact would be associated with the project by committing to adopt quieter construction methods and equipment during all construction phases (typical examples are attached in **Appendix A**). Alternatively, if a detailed quantitative CNIA is to be carried out in the EIA study, the project proponent should assess the construction noise impact of unmitigated scenario and mitigated scenario at different phases of construction of the project with respect to criteria set out in Annex 5 of the EIAO-TM.

Prediction of Noise Impact

- 4.3
- (a) The assessment should cover the cumulative construction noise impact resulting from the construction works of the project and other concurrent projects identified during the course of the EIA study on existing NSRs within the assessment area.
 - (b) The potential construction noise impact under different phases of construction shall be assessed by estimating the total number of dwellings, classrooms and other NSRs that will be exposed to noise impact exceeding the criteria set out in Annex 5 of the EIAO-TM.
 - (c) The project proponent should, as far as practicable, formulate a reasonable construction programme so that no work will be required in restricted hours as defined under the NCO.

5 Mitigation of Construction Noise Impact

Direct Mitigation Measures

- 5.1 The project proponent should consider and evaluate the possible application of all direct mitigation measures including but not limited to, quieter alternative methods (e.g. use of non-explosive chemical expansion agent, non-percussive construction method, etc.) and equipment (e.g. use of bored piles, and press-in piler for sheet piles, to replace percussive piling), movable barriers, enclosures, re-scheduling, restricting hours of operation of noisy tasks, etc. The feasibility, practicability, programming and effectiveness of the recommended mitigation measures shall be assessed. Any direct mitigation measures recommended should be well documented in the CNIA. Specific reasons for not adopting certain direct mitigation measures should be clearly substantiated and documented in the CNIA.

- 5.2 Some commonly used and quantifiable direct mitigation measures are listed below:

- use of quieter PME;
- use of quieter alternative construction method; and
- use of noise barriers / enclosure.

- 5.3 It must be noted that reduction of percentage on-time is not a viable mitigation measure for PME. In particular, it should not be considered as a direct way to mitigate the construction noise after the assessment found exceedance in the unmitigated construction noise levels. Nonetheless, for some PME which only operate for a short period of time in 30 minutes (e.g. concrete lorry mixer in case of concreting and dump truck in case of disposal of excavated materials in roadside), a reasonable reduction in percentage of operating-time within a given period (i.e. percentage on-time) to reflect the actual situation could be accepted as a basic assumption for the assessment when involving these PME.
- 5.4 In the EIA study brief, there would be a requirement to identify, assess and minimize any side effects and resolve potential constraints arising from the inclusion of any recommended direct mitigation measures. For example, secondary impact such as safety, firefighting and obstruction in relation to temporary noise barrier should not be ignored.
- 5.5 Quieter PME refer to those PME which could deliver the same output but having a sound power level lower than that stipulated in the Technical Memorandum on Noise from Construction Work other than Percussive Piling (GW-TM). The common source of such information could be found in EPD's Quality Powered Mechanical Equipment System, EPD's list of "Sound power levels of other commonly used PME", or international standard / certification, e.g. EC directives on outdoors equipment or Germany's Blue Angel Label. However, the consultants should also confirm that the quoted PME are readily available for use in the local construction market.
- 5.6 As stated in paragraph 3.4 above, the project proponent's construction professionals and if necessary the construction contractor should be consulted in the preparation of the PME list. Sometimes, consultants would propose alternate PME, which are not necessarily viable, to replace those noisier counterparts, for example:-
- a lorry to replace dump truck (dump truck has a tilting bin but a lorry does not);
 - an air compressor with a lower air flow rate to replace the one with higher flow rate (this could be viable only when the nature and requirement of works do not need higher air flow);
 - a breaker with lower sound power level to replace a noisier one [the hand held pneumatic percussive breaker commonly used in the local construction industry is the one of 37 kg (CNP 026) and pneumatic breaker, hydraulic breaker and electric breaker lighter in weight and quieter may not perform the same duty]; and
 - a hand held pneumatic rock drill cannot replace the output of a hydraulic crawler mounted rock drill.
- 5.7 Use of noise barriers is a possible solution to mitigate construction noise. In general, a 5 dB(A) reduction for movable PME, 10 dB(A) for stationary PME and about 15 dB(A) for enclosed PME can be assumed depending on the actual design. The viability of using barriers depends on whether there is sufficient space available. Another concern is safety. A temporary barrier might not be suitable for erecting along a lane closure in highway as the barrier might be knocked down by vehicles. It might also be not possible to enclose large and moving PME, e.g. excavator & dump truck, etc. If there is only one nearby NSR, the consultant could explore the possibility of locating the barrier near the NSR to optimize the mitigation package.
- 5.8 It must be noted that reduction in number of PME is not a viable mitigation measure for

construction noise impact arising from PME. This should never be considered as a direct way to mitigate the construction noise and there will also be practical problem in the implementation. Nonetheless, some PME for different activities need not be assessed together, as in reality they would not be operated at the same time, e.g. road milling and road paving at the same location. They can be assessed separately by grouping.

- 5.9 Site formation or rock excavation by means of non-percussive quieter construction methods such as chemical expansion agent or pulse plasma rock fragmentation shall be considered as far as practicable, and use of excavator-mounted breaker or blasting with explosives shall be kept in minimum. Any technical constraint that would hinder the use of these quieter construction methods shall be evaluated and clearly documented in the assessment. In case it is unavoidable to carry out rock blasting with explosive means, it shall be carried out, as far as practicable, during daytime, i.e. 0700 to 1900 hours on any day not being a Sunday or general holiday, and with implementation of the best practicable noise mitigation measures. In addition to quieter construction methods for site formation, to minimize the construction noise impact, alternative non-percussive piling construction methods (such as bored piles, and press-in piler for sheet piles, to replace percussive piling) shall be proposed as far as practicable.
- 5.10 Other mitigation measures, such as good site practice, etc. which are not quantifiable should not be taken into account in working out the mitigated noise levels.
- 5.11 Common mitigation measures for alleviating construction noise impacts have been briefly discussed above. Some examples of projects which had successfully adopted quieter measures are listed below for reference:-
- tunnel boring machine replace "cut and cover" for tunneling, e.g. Shatin Central Link project, which had greatly reduced the number of NSRs being affected;
 - use of concrete crushers instead of excavator mounted breakers in the demolition of Yau Ma Tei Carpark Building of the Central Kowloon Route project;
 - adaptation of pulse plasma rock fragmentation technology instead of dill and break method using excavator-mounted breaker for rock breaking in Lam Tei Quarry;
 - chemical agent (non-explosive blasting) to replace rock drilling/breaking, e.g. in a North Point residential site;
 - hydraulic press-in method to replace drop/ vibrating hammer for construction of the temporary retaining wall for Tai Wai Station;
 - "cut and lift method" for demolishing bridge structures in lieu of traditional "breaking up" method, e.g. a footbridge over Tuen Mun Road near Sham Tseng, where the main span of the footbridge was cut and lifted off in short sections for disposal off-site. This will reduce the duration of on-site works;
 - acoustic doors at tunnel portals to prevent noise outbreak, e.g. South Island Line, Tseung Kwan O - Lam Tin Tunnel;
 - use of water as blast ballast in the excavation of the construction adit of the West Island Line; and
 - acoustic enclosure to enclose the vertical shaft at King George V Memorial Park for the construction of West Island Line project and at the Ho Man Tin Ventilation Shaft for the Central Kowloon Route project.
- 5.12 The above list is not exhaustive and it should be considered on a case-by-case basis. The project proponent should also make reference to other methods listed on Quieter Construction Methods EPD's website

https://www.epd.gov.hk/epd/misc/construction_noise/contents/index.php/en/home2/quiet-construction-methods.html).

- 5.13 Should the works involve the work processes (e.g. concrete removal, demolition, foundation works, general building works, road works, tunneling and pipe installation) as mentioned on the above website, or the use of conventional PME for which quieter options are available (e.g. excavator/loader, bulldozer, excavator mounted breaker, piling machines), the project proponent should evaluate the practicability of adopting the quieter alternative as given on the website. Any technical constraint that would hinder the use of these quieter alternatives should be evaluated and clearly recorded in the CNIA.
- 5.14 The project proponent should involve the construction professionals at an early stage and encourage development and implementation of innovative noise mitigation measures. In general, these more noise innovative mitigation measures should be considered when:
- there are residual impacts after implementation of noise mitigation measures;
 - the work site is close to NSRs;
 - there are NSRs on all sides of the site; or
 - same noisy construction activities would continue at the same location for a long period of time.

6 Requirement of CNMP

- 6.1 The submission of a CNMP can be imposed under the EP, particularly for the EIA studies only having undergone qualitative assessment as mentioned in paragraph 2.2 of this GN. The CNMP shall typically include the following information:
- Detailed CNIA
 - Construction works programme and construction methodology;
 - PME list for the construction work;
 - Construction noise impact assessment; and
 - List of noise mitigation measures to be adopted.
 - The conditions to be incorporated in the tender document (if any) include the recommended mitigation measures and the relevant requirement for the submission of an updated CNMP, should there be any change to the construction noise mitigation measures and/or plant inventory recommended in the submitted CNMP.
- 6.2 Under the EP, the CNMP usually needs to be submitted to the Director no later than 2 months before the issuance of the tender of the project, if any, and before commencement of the project implementation. If there is any change to the construction noise mitigation measures and/or plant inventory recommended in the submitted CNMP, an updated CNMP should be submitted to the Director, no later than one month before the implementation of any of such change.
- 6.3 The CNMP / updated CNMP shall include an implementation schedule clearly listing out the mitigation measures, the implementation party, location and timing of implementation. The CNMP / updated CNMP shall be prepared and checked by Certified Noise Modelling Professional as recognized by the Hong Kong Institute of Qualified Environmental Professionals Limited or equivalent as meeting the requirements given in this GN. The

CNMP / updated CNMP shall then be certified by the Environmental Team (ET) Leader, verified by the Independent Environmental Checker (IEC) as conforming to the relevant information and recommendations of the approved EIA report. All mitigation measures recommended and requirements specified in the CNMP / updated CNMP shall be fully implemented.

- 6.4 The CNIA contained in the CNMP / updated CNMP shall follow the principles mentioned in paragraph 4 of this GN. In proposing the mitigation measures, the project proponent shall make reference to the principles given in paragraph 5 of this GN, and include the quieter construction methods identified in the EIA process.
- 6.5 During the course of preparation of the CNMP / updated CNMP, the project proponent should involve the construction professionals as early as possible. For large scale projects, the project proponent is encouraged to prepare the CNMP as early as possible so as to avoid causing any delay on the tendering process, if any, and project implementation as mentioned in paragraph 6.2 above.

7 **Conclusion**

- 7.1 This document attempts to provide good practices for general reference in preparing a CNIA. Though it is expected that the guidelines could be followed for most of the situations, one should always exercise sound professional judgment on the appropriateness, practicability, feasibility and acceptability of the proposals and recommendations made in the CNIA.

Environmental Protection Department

Date of Issue: December 2023

Typical Quieter Construction Methods / Equipment

Processes	Conventional Practices	Alternative Quieter Construction Methods / Equipment
Tunneling (large scale)	Cut and cover method using excavator-mounted breaker	Use of tunnel boring machine
Laying or replacement of large diameter pipe	Cut and cover method using excavator-mounted breaker	Pipe jacking using micro tunnel boring machine
Rehabilitation of underground pipe	Cut and cover method using excavator-mounted breaker	Quiet pipe rehabilitation methods (e.g. Cured-in-place-pipe lining, Ribline spiral wound method)
Site formation (concrete or rock breaking)	Drill and break method using excavator-mounted breaker	<ul style="list-style-type: none"> - Use of hydraulic splitter, hydraulic crusher/ quieter type saw (e.g diamond wire saw, noise reducing diamond blade saw) - Non-explosive chemical expansion agent (soundless chemical demolition agent) - Pulse plasma rock fragmentation technology
Piling (sheet pile / H-beam pile)	Percussive piling (e.g. percussive hammer, vibration hammer)	Use of silent piling such as hydraulic press-in method
Piling for foundation works	Percussive piling	Large diameter bored piling
Building / structure demolition (Large scale)	Excavator-mounted breaker	<ul style="list-style-type: none"> - Use of hydraulic crusher - Non-explosive chemical expansion agent (soundless chemical demolition agent) - Use of quieter type saw (e.g diamond wire saw, noise reducing diamond blade saw)
Building / structure modification works	Excavator-mounted breaker	<ul style="list-style-type: none"> - Use of quieter type saw (e.g diamond wire saw, diamond blade saw) - Robot-type hydraulic crusher or handheld concrete crusher

Processes	Conventional Practices	Alternative Quieter Construction Methods / Equipment
Road works (Concrete compacting)	Vibratory Poker	Self-compacting Concrete or Rubber Head Poker Vibrator
Building works (Superstructure)	In-situ construction	Use of pre-casting and prefabrication technology
Formwork Installation	Timber formwork by hammer and drilling	Modular lightweight formwork

Purpose-built Noise Enclosure

The project proponent could evaluate the practicability to provide the best mitigation measures in the form of purpose-built noise enclosure to cover the equipment as fully as possible. The noise enclosure should also be internally lined with sound absorbing materials such as mineral wool. Any opening or gap in the enclosure will tend to compromise the noise reduction effect and should therefore be minimized. Where access and forced ventilation is required for the enclosure, proper acoustic door and suitably designed silencers fitted with the air intake and outlet should be installed.

**Environmental Impact Assessment Ordinance, Cap.499
Guidance Note**

Methodologies for Terrestrial and Freshwater Ecological Baseline Surveys
(This guidance note supersedes EIAO Guidance Note No. 10/2010 with immediate effect)

Important Note :

The guidance note is intended for general reference only. You are advised to refer to and follow the requirements in the Environmental Impact Assessment Ordinance (Cap 499) and the Technical Memorandum on Environmental Impact Assessment (EIA) Process. Each case has to be considered on individual merits. This guidance note serves to provide some good practices on EIA and was developed in consultation with the EIA Ordinance Users Liaison Groups and the Advisory Council on the Environment. This guidance note may be subject to revision without prior notice. You are advised to make reference to the guidance note current to the date. Any enquiry on this guidance note should be directed to the EIA Ordinance Register Office of EPD on 27th Floor, Southorn Centre, 130 Hennessy Road, Wan Chai, Hong Kong. (Telephone: 2835-1835, Faxline: 2147-0894), or through the EIA Ordinance web site (www.epd.gov.hk/eia/)

1. Purpose

This guidance note (GN) aims at introducing some methodologies in conducting terrestrial and freshwater ecological baseline surveys¹ for reference. This GN should be read in conjunction with EIAO Guidance Note No. 7/2023: *Ecological Baseline Survey for Ecological Assessment*, which provides general guidelines for conducting an ecological baseline survey. It should be noted that the purpose of this GN is not intended to provide detailed prescriptions of recommended methods. Instead, it provides the general concepts and considerations for various standard survey methods normally applied in ecological impact assessments studies and the methods described below are by no means exhaustive. Ecological surveyors should take into consideration the scope of the project, nature of the study area, and specific requirements stated in the EIA study brief to choose the most appropriate methods in order to obtain accurate and representative baseline information for ecological impact assessment.

2. Survey Methodology

2.1 There are a wide range of surveys or sampling methods for investigating different types of habitats, flora and fauna groups. Each method has its own merits and limitations. In addition, each site to be studied has its specific condition, which may render certain survey methods more suitable. Sometimes, it may be necessary to use a combination of different methods or even specifically designed methods in some extreme cases. Taking into account the findings of literature review and preliminary investigations, site conditions, ecological components to be studied and type of impacts expected, the most appropriate survey methodology should be determined. Typical methods of terrestrial and freshwater baseline survey and adopted by some previous EIA examples are presented in Section 3 to Section 11 below, and summarized in the [Appendix 1](#).

2.2 Ecological surveys employing different methods and conducted at different times may result in variation owing to the inherently dynamic nature of natural ecosystems. Where appropriate, it is

¹ Survey methodology for marine ecological baseline survey is covered by a separate Guidance Note No. 11/2023.

advisable to adopt standard survey methodologies, which are widely accepted so that baseline information gathered could be easily verified and results of different EIA studies compared.

2.3 Attention should be drawn to Section 5.1.3 of Annex 16 of the Technical Memorandum on EIA Process (EIAO-TM) that all field surveys carried out must not cause unnecessary stress or damage to the existing habitats and wildlife. Relevant permits under the Forests and Countryside Ordinance (Cap. 96), the Wild Animals Protection Ordinance (Cap. 170) or the Fisheries Protection Ordinance (Cap. 171) for collecting specimens and setting up traps must be obtained from the Agriculture, Fisheries and Conservation Department (AFCD) prior to the survey. As a general principle, the ecological surveyors should avoid taking specimens in a manner that will damage or endanger the survival of any species. For instance, if a plant specimen is required for identification or record purpose, only a small portion of a plant individual should be collected with the main stem and root system remaining intact. All animals trapped or collected alive should be released immediately after identification unless in circumstances where voucher specimens must be kept for scientific purpose.

2.4 Diurnal and seasonal variations in activities of different faunal groups should always be taken into account to ensure that the survey results are representative. The recommended optimal survey time for different faunal groups are given in Appendix B of Annex 16 of EIAO-TM.

3. Terrestrial Habitat Survey

The purpose of a terrestrial habitat survey is to identify, based on sampling method, different types of habitats found within a study area and to delineate their coverage. The results are usually consolidated in form of a habitat map with various legends showing the locations of different types of habitats on the map. The habitat map could be further annotated with target notes, which provide further information on specific locations with conservation interest or ecological importance.

3.1 Habitat Types in Hong Kong

A habitat is the environment where a species relies upon for food, shelter, protection and mates. Habitats are mainly classified based on physical characteristics and biological components may also be taken into account. The “Terrestrial Habitat Map of Hong Kong 2021” available on the Hong Kong Biodiversity Information Hub (www.bih.gov.hk) provides 21 types of habitat categories, which serves as a good reference for preparation of habitat maps. Please refer to the [Appendix 2](#) for the definition of each habitat category.

3.2 Aerial Photos Interpretation

Aerial photos can provide useful basic information on habitat type/land use of the study area. Through interpretation of an updated aerial photo, the general conditions (e.g., vegetation cover, land use) of the study area and its vicinity could be readily visualized and translated into a preliminary habitat map. However, in local context, some habitats (e.g. shrubland/grassland) would be subject to high mapping error during the interpretation. With the advancement in technology, use of small unmanned aircrafts² (SUA) has become more widely adopted. SUA provides an effective way to collect high quality images and is particularly useful in areas

² The use of small unmanned aircraft is subject to control under the Small Unmanned Aircraft Order (Cap. 488G).

difficult to be assessed.

3.3 Ground Truthing

Ground truthing should be carried out to confirm individual habitat types as revealed by aerial images. This refers to surveying the study area by direct observation on ground, which is necessary for verifying habitat types that are otherwise not readily distinguishable through aerial images, and those that are categorised by the presence of certain fauna and flora.

4. **Vegetation and Higher Plant Species Survey**

Vegetation and plant species surveys are usually conducted in conjunction with the general habitat surveys to reveal vegetation diversity and identify plant species of conservation concern. A more direct approach is to produce a plant species list by direct observation (and subsequent identification in the herbarium if necessary) while surveying representative parts of the study area. The dominant plant species should be reported for such information is a useful indication of the habitat quality. In addition, the presence of rare, protected and threatened plant species and other species of conservation concern should be noted as they are usually the main focus. More attention should be given to the locations, which will be directly affected by the proposed development. In certain circumstances where collection of quantitative data is essential (e.g. establishment of quantitative baseline for subsequent monitoring), the use of quadrats and transect are simple and widely adopted methods.

5. **Terrestrial Mammal Survey**

Terrestrial mammals vary widely in ease of observation and different survey methods may be applied for different species. Conspicuous and large mammals may simply be counted by direct observation. However, mammals in Hong Kong which are of conservation concern are mostly secretive and nocturnal. Other techniques such as searching for traits, trapping, camera trapping, bat detectors or mist netting (for bats) can be employed where necessary for surveying mammals which are difficult to observe directly.

5.1 Searching for Signs

Signs such as dung, feeding signs, footprints, burrows and dens are evidence of the presence of mammals. For any observed burrow and den, it is also important to assess whether they are still active or have long been abandoned. Mammal tracks, which can often be found in wet or muddy areas near ponds and streams where animals come to feed or drink, or associated feeding signs such as partially eaten vegetation or carcasses may provide evidence of signs of mammals. However, as not many local mammals can be reliably detected by these signs, this method may need to be supplemented by other survey efforts.

5.2 Camera Trapping

Infrared flash camera is a camera in which the animal itself triggers the shutter by a sensor which detects body heat. They are found to be the most popular and effective systems, as

they will take picture quicker, last longer on a set of batteries and most importantly, would not scare animals in the study area. Camera traps are placed at representative locations in the study area and the infrared sensor of the camera would be triggered by any passing warm-blooded animals. The animals could then be identified from the photos taken. Moreover, relative abundance, distribution and activity patterns for various species could also be revealed from the records taken. This sampling method could be used to detect cryptic terrestrial species that are difficult to observe and trap directly. However, it is less accurate and efficient in surveying arboreal and flying species or those live underground most of the time.

5.3 Surveys for Bats

In general, prime attention of bat surveys should be given to their roosting or breeding sites. It could be done by active searching along transect lines with direct counting (e.g. counts at winter roosting site and maternity colonies, or when they are leaving their roost (e.g. nightly emergence counts and dispersal counts.)), preferably in daytime, in order to determine community composition, species richness, and abundance. If roosting or breeding sites could not be identified, surveying efforts may be directed toward potential commuting, foraging, and drinking sites of bats. Bat detectors/ ultrasonic detectors of hand-held type are also widely used as effective indirect survey tools for bat surveys by recording the species-specific echolocation calls produced by bats when they are flying. In certain circumstances where collection of bat population is required (e.g. roost census) and where site condition allows, static bat recorder may be used. However, there are some species that are difficult to detect with bat detectors because they produce quiet or low amplitude echolocation calls, have very directional calls or sometimes use their eyes or ears rather echolocation. Therefore, a combination of surveys methods may have to be adopted.

6. **Bird Survey**

Identification of bird species can be done visually or aurally by recognition of unique songs and calls. In addition to identifying the bird species under observation, it is also important to record any notable behaviours of the bird such as feeding, nesting, or breeding and the associated habitats where it has such behaviour. Survey carried out at different seasons and time of the day will significantly affect the survey results. In general, early mornings and dusk are usually the best time of the day for bird survey unless some nocturnal species or behaviours are to be studied. Survey season for bird is often a matter of concern particularly when the target bird species are migratory. Moreover, tide level may also have an influence on bird distribution in coastal habitats.

6.1 Point Count

Point count provides an estimation of the relative abundance of each species present. Counts are undertaken from fixed locations for a fixed period of time (e.g. 2 to 20 minutes). The locations could be laid out systematically or selected randomly within the study area. A well-spaced sample series of points in an area provide more representative data. Counting should be started a few minutes after arrival of the observers to allow birds to settle down from any disturbance caused. To generate indices of relative abundance of various bird species, all birds seen or heard should be counted from the fixed point up to a distance where birds are still detectable or within a fixed distance from the observer.

6.2 Transect Count

Transect count is more suitable for large open areas of relatively uniform habitat. Transects should be randomly selected as far as practicable and to avoid possible influences from the linear features such as road and river on the bird populations. All birds seen or heard on either sides of the transects are identified and counted up to a distance where birds are still detectable or within a fixed distance from the observer.

6.3 Mist-netting

Standard lengths and types of mist nets are erected in standard locations for a fixed period of time and individual birds are caught, identified and counted. It is often combined with ringing exercise where all birds caught are identified, physical dimensions measured, weighed, ringed and with the estimated age and sex recorded. This survey method is adopted to gather demographic information of bird populations and to monitor the long-term changes. The mist net could also be applied to survey birds in situations where direct bird observation is impractical. However, as the method is potentially intrusive to the birds and can only be practised by qualified ringers, it has seldom been applied in ecological impact assessment studies in Hong Kong.

7. **Herpetofauna (Amphibians & Reptiles) Survey**

The activities of amphibians and reptiles are highly seasonal and are influenced by the variation of weather even on a daily basis due to their ectothermic and cryptic nature. It is more fruitful to survey them during their active periods. Amphibians are usually most active just after dusk during their breeding seasons while many diurnal reptiles such as skinks or lizards are active in mid-morning. However, many other nocturnal reptiles such as certain snakes, geckos and most turtles would only be active at night time. In this connection, the target taxa groups should be surveyed at appropriate time of the day.

Most amphibians and reptiles would go into hibernation during the cold and dry winter season. They would be under-estimated if surveys are carried out during this time. On the other hand, some species such as Hong Kong Newt and Brown Wood Frog mainly breed in winter. As such, the target taxa groups should be surveyed at appropriate seasons in order to collect a representative baseline for assessment. Indeed, many reptiles such as snakes and lizards are timid, secretive, fast-moving and cryptically coloured which render survey on reptiles difficult and therefore reptiles tend to be under-represented in ecological surveys in general. More intensive surveys with appropriate or species specific survey methodologies would rectify such limitation.

7.1 Active Searching

An effective way to survey amphibians and reptiles is by active searching, particularly during the daytime. This method is applicable for both nocturnal and diurnal species. The study area should be actively searched by the ecological surveyors for potential breeding areas of amphibians (e.g. streams, marshes, small water pools, water channels) and suitable microhabitats for both amphibians and reptiles (e.g. stones, pond bunds, crevices, leaf litter/debris, rotten log). It would also be necessary to examine or uncover these places deliberately to search for the eggs and tadpoles of amphibians in aquatic habitats or to reveal the presence of the amphibians and reptiles hiding under these covers. Active searching can

be applied along a transect line or in general surveys of the whole site with focus on suitable microhabitats.

For night surveys, when the nocturnal species of amphibians and reptiles come out of their hiding places, searching could be carried out in exposed areas of their potential habitats on the ground, along the path or the pond/stream bank. For frogs and toads, nocturnal auditory detection of mating calls at their breeding sites could be considered an efficient method to find out the species present, particularly the more vocal species, and their estimated abundance.

7.2 Cover Boards

Cover board is an artificial cover object that attracts and allows various species of amphibians and reptiles to use it as a refuge. Cover board can be made of sheet of 1 m x 1 m woody materials of at least 1 cm thick or other appropriate size. Various types of natural wood can be used but use of plywood or chemically treated wood is not recommended. Cover board is especially useful for sampling of fossorial species and in habitats with limited natural covers.

7.3 Netting

For larvae and tadpoles of amphibians, D-framed net with fine mesh size of about 1-mm mesh size should be used for active searching near suitable microhabitats like dense vegetation and rock cleavage to catch species dislodged or swim out of from the substrates.

8. **Butterflies and Dragonflies Survey**

Life cycles of metamorphic butterflies and dragonflies consist of distinct stages. Their characteristics and habitat requirements change at different stages of the life cycle. The survey methods for butterflies and dragonflies vary depending on the site conditions and the stages of life cycle. The activity of butterflies and dragonflies is also strongly influenced by weather conditions and time of the day. To obtain representative information, survey should be conducted during daytime and under fine weather when most butterflies and dragonflies are active. While it is difficult to detect butterfly larvae, it should be noted that some butterfly species only rely on certain plant species as their specific larval food source. When such plant species is recorded in the survey location, it may be worthwhile checking whether the corresponding butterfly species is also present in the vicinity. The survey of dragonfly larvae is covered in the section on stream invertebrate survey.

8.1 Transect Count

A transect route with an imaginary belt of certain width, which should be approximately 5 m, is fixed within the study area. During the survey, all butterflies or dragonflies observed within the belt are identified and counted. The route selected should encompass different habitats within the study area as far as possible. For survey of dragonflies along a stream, the transect belt should cover vegetation of the riparian zone. A pair of binoculars with short focal length could significantly assist in the identification.

8.2 Point Count

Point count is a method to survey canopy butterflies and hill-topping butterflies. For example,

Papilio agestor and *Hypolimnas misippus* are two examples in Hong Kong that have the behaviour to aggregate on hilltops or tree canopies. Point count should be conducted at different fixed locations along a transect line near the potential habitats of the target species for a fixed period of time of 10 to 15 minutes. Since point count method only emphasizes on certain target species, it may lead to bias in the survey result. Therefore, it should be supplemented with other survey methods.

8.3 Netting

Netting may be needed for collecting specimens to confirm the identification of adult butterflies and dragonflies observed along transects or during area-based surveys. The traditional 'butterfly net' is used to collect butterflies and a more rigid one is used for dragonflies.

9. **Fireflies Survey**

Survey of fireflies is generally undertaken by direct observation along randomly selected transects in the potential habitats of fireflies, taking into account the active periods of crepuscular and nocturnal species. Fireflies can be detected by the lights they emit while they are in flight, on the ground or on plants. Flightless adults and larvae can also be found by searching the ground. During the surveys, fireflies occurring on both sides of a transect route should be counted by the ecological surveyors. Where site situation permits, any lighting devices (e.g. headlamps, torches, etc.) should be switched off most of the time to enhance detection of fireflies. Alternatively, the lighting devices should be switched off at sufficient intervals to allow detection of fireflies before the surveys progress along the transects. Netting may be needed to confirm the identification of flying adults observed during the surveys.

10. **Freshwater Fish Survey**

Fish sampling should be carried out at a time of year when the stream is not flooding and the weather is not too cold that the fishes become inactive. Sampling of freshwater fish could be conducted actively by pursuing fish, or in passive ways, which rely on fish swimming into a net or a trap. The habitat to be surveyed would determine the most suitable surveying technique. Other factors to be considered include water depth and clarity, presence of aquatic or emergent vegetation or speed of the current. Since different freshwater fish species have different behavioural patterns, both day-time and night-time surveys should be conducted. For example, *Pseudobagrus trilineatus* is one of the nocturnal species in Hong Kong that inhabits hill streams, marshes and ponds. Freshwater fish in reservoir or fishponds have seldom been the focus of ecological impact assessment and sampling methods in such habitats are therefore not covered in this GN.

10.1 Bankside Counts

Direct counting along stream bank or pond bank is a simple method to survey fish in shallow, slow-moving streams with clear water and minimal vegetation. Suitable observation points are chosen within the study area. Observation points should be scattered among the study area as to cover as much water body as possible. Counting of fish should be started a few minutes after arrival at each observation point to minimize the effects of disturbance. Direct counting of fish with a pair of binoculars should be made for a fixed period of time (e.g. 10

minutes). The fish is identified as far as possible and the number recorded. However, this method is not applicable to surveying fish in deeper water, turbulent areas, turbid water or stream with dense riparian and aquatic vegetation.

10.2 Trapping

Pot traps of about 3-mm mesh size with baits such as pieces of meat for predatory species and bread for omnivorous/ herbivorous species could be used for fish trapping. Pots traps will be placed at representative spots at the sampling site for a fixed period of time (e.g. 20 minutes). During this period, disturbance to the sampling water body should be avoided. The species and number of fish trapped is recorded. In some occasions, appropriate trap will be set overnight for trapping nocturnal fish species.

10.3 Netting

D-framed hand net of about 3-mm mesh size could be used to search for fish in microhabitats such as deep/turbid waters or vegetation.

10.4 Cast Netting

Cast net is a net circle in shape with weight around the perimeter. It can be used to sample fish in river mouth with shallow water. Casting of net is usually done from the bank or a boat. It requires a lot of practices and skills to control the distance to cast and to maximize the size of the net in the air before it touches the water surface. One type of cast net is equipped with a purse line around the perimeter, which is used to close the net after casting to improve catching efficiency. However, cast net does not work well in stream with rocky substratum and high flow.

11. **Freshwater Invertebrates Survey**

Selection of surveying methods for freshwater invertebrates in water bodies such as ponds, marshes or streams depends largely on the characteristics of the habitats, especially the texture of substrates (hard or soft) and the flow of the water. In Hong Kong, most streams are made up of boulders and gravels with accumulated sediment, and rarely with bedrock or pure sand substrates, while many ponds and marshes are abandoned farmland or fishponds with muddy bottom. Various direct searching and collecting techniques for these aquatic habitats are available to provide valuable baseline information on the freshwater invertebrates. The freshwater invertebrates collected should be identified as far as possible (generally to Family level and supplemented by morphospecies where needed). A comprehensive key for identification purpose is available in Dudgeon (1999).

11.1 Kick Sampling

Kick sampling is a relatively quick method to survey benthic invertebrates in shallow fast-flowing streams. A D-frame net of 0.5 mm mesh size is placed in water with the net mouth facing the water current, invertebrates in the stream bed are dislodged by kicking and disturbing the substrate for a fixed time period (e.g. 3 minutes) and are subsequently caught in the net. Each kicking location should be 10 m away from the previous one and the sampling should start from downstream and proceed upstream to avoid disturbance from the

previous kicking.

11.2 Individual Stone Sampling

Individual stones could be searched for invertebrates by rolling and brushing them in front of a net in order to obtain brief information of stream invertebrates in qualitative term.

11.3 Netting

Netting is used to collect stream invertebrates in deeper slow-flowing streams, riparian habitats or within stream substrate. The method can also be applied to survey aquatic invertebrates in standing water or freshwater wetland. Dip netting involves using a simple dip net to disturb the stream substrate and search among debris, aquatic and emergent vegetation to retrieve invertebrates from the habitats. It is important to ensure that different water depths are surveyed by skimming the nets at depths. Sweep netting which includes trailing vegetation and trailing roots along the stream bank could also be applied. The net contents should then be brought back to the laboratory for sorting, identification and counting.

Agriculture, Fisheries and Conservation Department
in conjunction with Environmental Protection Department

Date of Issue: December 2023

Typical methods of terrestrial and freshwater baseline survey and adopted by some previous EIA examples

Type of habitats	Survey methodology	Reference paragraphs in GN No. 10/2023	EIA examples (EIA No.)
Terrestrial Habitat	Habitat Types in Hong Kong	3.1	<ul style="list-style-type: none"> • Most EIAs would carry out Terrestrial Habitat Survey.
	Aerial Photos Interpretation	3.2	
	Ground Truthing	3.3	
Vegetation and Higher Plant Species	Direct Observation	4	<ul style="list-style-type: none"> • Revised Trunk Road T4 in Sha Tin (AEIAR-231/2021) • Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021)
	Quadrats and Transect	4	<ul style="list-style-type: none"> • Yuen Long Barrage Scheme (AEIAR- 228/2021) • Drainage Improvement Works Near Four Villages in Yuen Long - Sung Shan New Village, Tai Wo, Lin Fa Tei and Ha Che (AEIAR-229/2021)
Terrestrial Mammal	Searching for Signs	5.1	<ul style="list-style-type: none"> • Revised Trunk Road T4 in Sha Tin (AEIAR-231/2021) • Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021)
	Camera Trapping	5.2	<ul style="list-style-type: none"> • Yuen Long Barrage Scheme (AEIAR- 228/2021) • Improvement of Yuen Long Town Nullah (Town Centre Section) (AEIAR-223/2020)
Terrestrial Mammal (Bat only)	Active search along transect line to identify any roosting or breeding site	5.3	<ul style="list-style-type: none"> • Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021) • Development at San Hing Road and Hong Po Road, Tuen Mun (AEIAR-227/2020)
	Bat detectors / ultrasonic detectors of hand-held type	5.3	<ul style="list-style-type: none"> • Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021) • Yuen Long Barrage Scheme (AEIAR- 228/2021)

Type of habitats	Survey methodology	Reference paragraphs in GN No. 10/2023	EIA examples (EIA No.)
	Static recorder	5.3	<ul style="list-style-type: none"> Rarely used
Bird	Point Count	6.1	<ul style="list-style-type: none"> Drainage Improvement Works Near Four Villages in Yuen Long - Sung Shan New Village, Tai Wo, Lin Fa Tei and Ha Che (AEIAR-229/2021) Development at San Hing Road and Hong Po Road, Tuen Mun (AEIAR-227/2020)
	Transect Count	6.2	<ul style="list-style-type: none"> Revised Trunk Road T4 in Sha Tin (AEIAR-231/2021)³ Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021)
	Mist-netting	6.3	<ul style="list-style-type: none"> Development of Lok Ma Chau Loop (AEIAR-176/2013)
Herpetofauna (Amphibian & Reptiles)	Active Searching	7.1	<ul style="list-style-type: none"> Revised Trunk Road T4 in Sha Tin (AEIAR-231/2021) Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021)
	Cover Boards	7.2	<ul style="list-style-type: none"> Rarely used
	Netting	7.3	<ul style="list-style-type: none"> Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021) Yuen Long Barrage Scheme (AEIAR- 228/2021)
Butterflies and Dragonflies	Transect Count	8.1	<ul style="list-style-type: none"> Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021) Yuen Long Barrage Scheme (AEIAR- 228/2021)
	Point Count	8.2	<ul style="list-style-type: none"> Kai Tak Multi-purpose Sports Complex (AEIAR-204/2017) Outlying Islands Sewerage Stage 2 - South Lantau Sewerage Works (AEIAR-210/2017)

Type of habitats	Survey methodology	Reference paragraphs in GN No. 10/2023	EIA examples (EIA No.)
	Netting	8.3	<ul style="list-style-type: none"> Development at San Hing Road and Hong Po Road, Tuen Mun (AEIAR-227/2020) Decommissioning of West Portion of The Middle ASH Lagoon at Tsang Tsui, Tuen Mun (AEIAR- 186/2015)
Fireflies	Transect Count	9	<ul style="list-style-type: none"> Expansion of Sha Tau Kok Sewage Treatment Works (AEIAR-207/2017) Port Shelter Sewerage, Stage3 - Sewerage Works at Po Toi O (AEIAR-206/2017)
	Netting	9	<ul style="list-style-type: none"> Development at San Hing Road and Hong Po Road, Tuen Mun (AEIAR-227/2020) Decommissioning of West Portion of The Middle ASH Lagoon at Tsang Tsui, Tuen Mun (AEIAR- 186/2015)
Freshwater Fish	Bankside Counts	10.1	<ul style="list-style-type: none"> Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021) Yuen Long Barrage Scheme (AEIAR- 228/2021)
	Trapping	10.2	<ul style="list-style-type: none"> Yuen Long Barrage Scheme (AEIAR- 228/2021) Development at San Hing Road and Hong Po Road, Tuen Mun (AEIAR-227/2020)
	Cast Netting	10.3	<ul style="list-style-type: none"> Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021) Yuen Long Barrage Scheme (AEIAR- 228/2021)
Freshwater Invertebrates	Kick Sampling	11.1	<ul style="list-style-type: none"> Housing Site in Yuen Long South (AEIAR- 215/2017) Hung Shui Kiu New Development Area (AEIAR-203/2016)
	Individual Stone Sampling	11.2	<ul style="list-style-type: none"> Rarely used

Type of habitats	Survey methodology	Reference paragraphs in GN No. 10/2023	EIA examples (EIA No.)
	Netting	11.3	<ul style="list-style-type: none"> • Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021) • Yuen Long Barrage Scheme (AEIAR- 228/2021)

Habitat Types in Hong Kong

Habitat	Definition
Woodland	Rural lands mainly covered by tree species.
Shrubland	Rural lands mainly covered by shrub species.
Grassland	Rural lands mainly covered by grass species.
Rural plantation	Rural lands mainly covered by woody plants and the top canopy is dominated by manually planted species in an organized and systematic way.
Marsh/reed bed	Lands, including abandoned agricultural land, covered with shallow waters and dominated by hydrophytes seasonally or all year round.
Mangrove	Coastal lands covered by true mangrove plant species.
Seagrass bed	Coastal lands covered by seagrass species.
Soft shore	Coastal lands of fine-grained sediment (i.e. sand, silt or finer particles) between high and low tide marks.
Natural rocky shoreline	Coastal lands of rocks between high and low tide marks.
Bare rock/soil	Natural open rock faces or disturbed lands, or "badlands" denuded of vegetation.
Natural watercourse	Rivers and streams experiencing natural flow patterns in unchanneled watercourse beds and banks.
Modified watercourse	Channelized rivers and streams, which are often without natural banks and beds, and are not subject to natural flow patterns (e.g. drainage channels and nullahs).
Reservoirs	Artificial lake used as a source of water supply.
Artificial hard shoreline	Man-made intertidal hard shore habitats (e.g. seawalls, jetties, groins and piers).
Artificial ponds	Small artificial water bodies constructed for the aquaculture purpose (e.g. gei wai and fishponds).
Agricultural land	Lands currently under cultivation, and lands not currently under land cultivation and yet to transform into other habitats such as marsh/reed bed.
Green urban area	Urban lands undergone artificial greening for various purposes (e.g. golf area courses, urban parks, and vegetation on the roadside).
Other urban area	Lands occupied by urban, other highly modified habitats (e.g. quarry, landfill) or industrial storage/containers.
Woody shrubland	Rural lands covered by mixture of wood and shrub species, which each of them occupies at least 1/3 of the coverage.
Shrubby grassland	Rural lands covered by mixture of shrub and grass species, which each of them occupies at least 1/3 of the coverage.
Mixed barren land	Rural lands covered by mixture of grass and bare rock/ soil, which each of them occupies at least 1/3 of the coverage.

Source: Hong Kong Biodiversity Information Hub
(<https://bih.gov.hk/en/feature-studies/index-id-7.html>)

**Environmental Impact Assessment Ordinance, Cap.499
Guidance Note**

Methodologies for Marine Ecological Baseline Surveys

(This guidance note supersedes EIAO Guidance Note No. 11/2010 with immediate effect)

Important Note :

The guidance note is intended for general reference only. You are advised to refer to and follow the requirements in the Environmental Impact Assessment Ordinance (Cap 499) and the Technical Memorandum on Environmental Impact Assessment (EIA) Process. Each case has to be considered on individual merits. This guidance note serves to provide some good practices on EIA and was developed in consultation with the EIA Ordinance Users Liaison Groups and the Advisory Council on the Environment. This guidance note may be subject to revision without prior notice. You are advised to make reference to the guidance note current to the date. Any enquiry on this guidance note should be directed to the EIA Ordinance Register Office of EPD on 27th Floor, Southorn Centre, 130 Hennessy Road, Wan Chai, Hong Kong. (Telephone: 2835-1835, Faxline: 2147-0894), or through the EIA Ordinance web site (www.epd.gov.hk/eia/)

1. Purpose

Further to the *EIAO Guidance Note No. 10/2023: Methodologies for Terrestrial and Freshwater Ecological Baseline Surveys*, this guidance note (GN) aims at introducing some general methodologies for marine ecological baseline surveys. It should be noted that the purpose of this GN is not intended to provide detailed prescriptions of recommended methods. Instead, it provides the general concepts and considerations for various standard survey methods normally applied in ecological impact assessments studies and the methods described below are by no means exhaustive. It is acknowledged that each method has its own merits and limitations and the environmental consultant responsible for the surveys should choose the most suitable one on a case-by-case basis using his/her professional judgement. Typical methods of marine ecological baseline survey and adopted by some previous EIA examples are presented in Section 2 to Section 4 below, and summarized in the Appendix. This GN should be read in conjunction with EIAO Guidance Note No. 7/2023: *Ecological Baseline Survey for Ecological Assessment*, which provides general guidelines for conducting an ecological baseline survey.

2. Intertidal Habitats

The distribution and abundance of intertidal shore communities (i.e., rocky, sandy and muddy shores) are commonly surveyed using the transect method. Quantitative information such as species richness and diversity, abundance and density can be obtained from the transect method. The number of transects and replicates of quadrat and core sampling will depend on the objectives of the survey study. Reference should be made to previous studies on the number of samples to be taken as the number of samples can be site-specific.

In addition to the above-mentioned, suitable qualitative surveys are useful to facilitate the smooth implementation of the quantitative surveys and help to audit the survey findings. For example, undertaking an initial observation along the shore could find out the species present and their occurrence and hence facilitate the determination of representative sites for conducting the

quantitative surveys. Also, a walk-through / active-search survey along the transect during or after a quantitative sampling could help to assess whether the sampling exercise has collected representative data (e.g. the number and type of species encountered) and whether the sampling effort is deemed adequate.

Factors, such as the weather, season and exposure of the shore will affect the distribution and abundance of intertidal organisms and hence timing of the survey is important. In general, it is desirable to carry out the survey during suitable ebbing tides. For assessing rocky shores it is important to also assess the profile (e.g. presence of rock pools) of the shore and other important abiotic factors (e.g., exposure, season etc). When comparisons are required between the same type of shores, standard reference tidal levels should also be recorded (e.g. metre (m) above Chart Datum).

2.1 Line Transect

The line transect is one method to assess the distribution and abundance of flora and fauna along the shore. Transect lines are set up seaward and perpendicular to the shore (on a representative site). At regular intervals along the line transect, quadrats are placed on the shore. All flora and fauna found within the quadrat are identified and counted. For sessile organisms, the percentage cover within the quadrat can be estimated.

For sandy and muddy shores, animals living within the sediment are also collected and the core sampling method is used. Cores are pushed into the sediment and then lifted out. Fauna within the sediment are assessed for species diversity, abundance and density, after screening with sieves of suitable size.

2.2 Belt Transect

The belt transect method involves surveying a contiguous area along a line transect. It may be considered as a widening of the line transect or a continuous line of quadrats. As with the line transect, information of fauna and flora identified within the belt is recorded. Core sampling on soft shores can also be conducted along the belt transect.

3. **Sub-tidal Habitats**

Suitable methodology is required for assessing the nature of the seabed substrate, the species composition, their percentage cover and abundance in the surveyed area.

3.1 Soft-bottom Benthos

Grab Sampling

Sampling for benthos is undertaken from boats, and equipment such as grabs are commonly used. The choice and design of the grab contribute to its efficiency in collecting benthic samples at different excavated depths and, in minimising disturbance of the sediment surface which would result in a loss of surface fauna. Benthic samples are sieved, generally onboard the boat, to separate the fauna from the sediment for subsequent sorting and analysis in the laboratory. The number of replicate samples to be taken at each sampling station is a

compromise between the best possible representation of species and the time required to collect and process the samples within the availability of sea time and study duration.

3.2 Hard-bottom Communities: Coral Assemblages and Associated Species

There are several methods available to quantify coral cover and associated species, for example, fishes, invertebrates and macroalgae, and to estimate their abundance and diversity in a systematic and repeatable fashion. Identification of the location and composition of local coral communities should be carried out as the first step to any ecological baseline survey, especially in areas where no prior information has been gathered. Transect lines are employed as a direct measure of coral cover and associated species or as a guide when using quadrats or video techniques. Transects are typically laid parallel to the shore in pre-determined depth zones which correlate with changes in the composition of the hard-bottom community. Sufficient replication is required for both individual transects and identified zones to assess how representative the data are and the natural variation of the community surveyed.

3.2.1 Qualitative Reconnaissance (spot-check) Dives

Prior to conducting a detailed survey of an area, initial ‘spot-check’ dives are commonly conducted within the identified survey area to identify locations of coral communities (including hard corals, octocorals and black corals) and their composition. In general, it is desirable that spot-check dives should cover the whole project area and its immediate vicinity. Flora and fauna associated with coral communities within the survey area, for example, fishes, invertebrates and macroalgae should also be recorded.

3.2.2 Semi-quantitative Surveys

Rapid Ecological Assessment (REA)

Rapid Ecological Assessment involves ‘semi-quantitative’ swim-surveys allowing for assessment and classification of survey areas. The field data are collected by divers experienced in the underwater identification of sessile benthic taxa, swimming down-current along coral communities or identified sections of coastline on SCUBA from haphazardly-chosen starting points. The number of transects to be laid and the placement of each transect should be based on site environment and findings from the initial “spot-check” dives. A minimum of two belt transects (1 m wide (on each side of the transect) x 100 m long) should be surveyed at each site. REA surveys provide information on the assessment of relative cover of coral and other major sessile benthic groups, as well as an inventory of sessile benthic taxa used to define community types.

3.2.3 Quantitative Surveys

(a) *Line Intercept Transect Method*

The Line Intercept Transect is one method used to assess the sessile benthic

community of coral reefs. The community is characterized using life form categories, which provide a morphological description of reef community. These categories are recorded on data sheet by divers who swim along lines, which are placed roughly parallel to the reef crest (if present) at depths of 3 m and 10 m at each site, dependent on the extent of reef development. It is a reliable and efficient sampling method for obtaining quantitative percentage cover data.

(b) Belt Transects – Quadrat or Photo-quadrat

Quantitative assessment of coral cover and associated species can be carried out with the use of frame quadrats laid along transects. Survey work can be carried out *in situ* with the surveyor recording percentage cover of coral species and associated species within each quadrat or photographs of each quadrat can be taken and analyzed at a later time. These methods are commonly conducted along permanently marked transects and most useful for assessing demographic questions relating to population dynamics (e.g. growth, mortality) and temporal change. When carrying out photo-quadrat surveys a special quadrat frame with an underwater camera attached at a fixed height is used to take photographs of contiguous quadrats along transect lines. The photographic images provide a permanent record of change in coral cover and associated species of the surveyed sites.

(c) Underwater Video Transect Method

Underwater video sampling provides highly precise quantitative estimate of coral cover and abundance of associated species. The video technique in combination with independent sampling, i.e., no need to establish permanent transects, has proven to be a statistically powerful methodology for comparison of univariate and multivariate parameters in repeat surveys of identified sites of moderate – high coral cover (normally >20 %). This method involves the recording of standardized belt transects using a number of replicate transects of pre-determined length and filmed from a standardized height (approx. 40 cm). Video footage is subsequently analyzed to extract quantitative data on coral and other associated species using a point sampling method.

4. Cetaceans

Cetaceans commonly sighted in local waters are the Finless Porpoise and the Indo-Pacific humpback dolphin (locally known as the Chinese White Dolphin). Quantitative estimates of the population size of these marine mammals can be determined based on visual observations however, the sighting efficiency for the animals depends on a number of factors, such as weather and the species being surveyed. The frequently used survey methods for estimating the abundance and distribution of cetaceans are systematic line transect surveys and photo-identification. For study of fine-scale behaviour and movement patterns, a land-based theodolite tracking survey should be carried out at a land location with appropriate height and distance from the sea area of interest. In addition to visual method, acoustic signals and associated activity levels of vocalizing cetaceans

(including dolphins and porpoises) can be investigated using Passive Acoustic Monitoring (PAM). PAM employs suitable underwater acoustic devices which can effectively detect and classify acoustic signals of dolphins and porpoises. The continuous and extended operational time (weeks to months) of PAM devices allow analyses of cetacean activities at various spatiotemporal resolutions (diel, daily, monthly and/or seasonal, etc.)

4.1 Line Transect Survey

The line transect survey requires a minimum of 2 persons (but preferably 3 persons for rotation of duty to minimise fatigue) on a boat following a fixed route (i.e. transects) in a survey area. Along the transect, one observer searches for the animal continuously through binocular, while the other observer searches with unaided eye and records the time, position of the boat and current climate etc. Once cetaceans have been sighted, information such as the time, group size and perpendicular distance between the vessel and the animals are recorded. Data collected from boat surveys are analyzed to estimate the density and abundance of the observed cetaceans in the surveyed area, using specialized computer programme such as DISTANCE.

Aerial (helicopter) surveys are conducted similar to boat surveys in the area which is difficult to be covered by boat. An additional observer may be required to follow the transect line directly below the helicopter.

4.2 Photo-identification

Photographs are taken on the unique features (such as nicks, scars and distinctive colour patterns) of a sighted cetacean for identification. For Chinese White Dolphin, the animal can be identified from the unique features on its back and dorsal fin, whereas for the finless porpoise, photo-identification may not be practical. Information obtained from such technique provides information on the home range of an individual and contributes to assessing the population size of the species in the area/region.

4.3 Land-based Theodolite Tracking

Land-based theodolite tracking survey obtains fine-scale information on the time of day and movement patterns of dolphins. A digital theodolite with 30-power magnification and 5-s precision was used to obtain the vertical and horizontal angle of each dolphin and vessel position. Angles were converted to geographic coordinates (latitude and longitude). This method delivers precise positions of multiple spatially distant targets in a short period of time. The technique is fully non-invasive, and allows for time and cost-effective descriptions of dolphin habitat use patterns at all times of daylight.

4.4 Underwater Passive Acoustic Monitoring (PAM)

Passive Acoustic Monitoring (PAM) is carried out using suitable static acoustic devices (click detectors/sound recorders) which can effectively detect acoustic signals emitted by the target cetaceans. The deployment locations of the acoustic devices should be carefully planned to collect representative acoustic data of the study area as far as possible. The acoustic devices should be securely attached to firm underwater structures and operate at the recommended height above the seafloor. Operation of the acoustic devices should be

either continuous or in duty cycle without compromising the data resolution. Following retrieval of raw data, processing and verification of acoustic data are performed to screen and confirm positive detections. Quantitative analysis is then carried out to compare positive detections per unit effort among spatial and/or temporal samples.

Agriculture, Fisheries and Conservation Department
in conjunction with Environmental Protection Department

Date of Issue : December 2023

Typical methods of marine ecological baseline survey and adopted by some previous EIA examples

Type of habitats	Survey methodology	Reference paragraphs in GN No.7/2023	EIA examples (EIA No.)
Intertidal Habitat	Line Transect	2.1	<ul style="list-style-type: none"> • Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021) • Hong Kong Offshore LNG Terminal (AEIAR-218/2018)
	Belt Transect	2.2	<ul style="list-style-type: none"> • Pier Improvement at Tung Ping Chau (AEIAR-226/2020) • Pier Improvement at Lai Chi Wo (AEIAR-225/2020)
Sub-tidal Habitats (Soft-bottom Benthos)	Grab Sampling	3.1	<ul style="list-style-type: none"> • Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021) • Pier Improvement at Tung Ping Chau (AEIAR-226/2020)
Sub-tidal Habitats (Hard-bottom Communities: Coral Assemblages and Associated Species)	Qualitative Reconnaissance (spot-check) Dives	3.2.1	<ul style="list-style-type: none"> • Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021) • Pier Improvement at Tung Ping Chau (AEIAR-226/2020)
	Semi-quantitative Surveys (i.e. Rapid Ecological Assessment (REA))	3.2.2	<ul style="list-style-type: none"> • Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021) • Pier Improvement at Tung Ping Chau (AEIAR-226/2020)
	Quantitative Surveys - Line Intercept Transect Method	3.2.3(a)	<ul style="list-style-type: none"> • Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021)
	Quantitative Surveys - Belt Transects – Quadrat or Photo-quadrat	3.2.3(b)	<ul style="list-style-type: none"> • Rarely used
	Quantitative Surveys - Underwater Video Transect Method	3.2.3(c)	<ul style="list-style-type: none"> • Peng Chau Sewage Treatment Works Upgrade (AEIAR-079/2004)

Type of habitats	Survey methodology	Reference paragraphs in GN No.7/2023	EIA examples (EIA No.)
			<ul style="list-style-type: none"> Feasibility Study for Housing Development at Whitehead & Lee On in Ma On Shan, Shan Tin (AEIAR-068/2002)
Cetaceans	Line Transect Survey	4.1	<ul style="list-style-type: none"> Hong Kong Offshore LNG Terminal (AEIAR-256/2018) Expansion of Hong Kong International Airport into a Three-Runway System (AEIAR-223/2014)
	Photo-identification	4.2	<ul style="list-style-type: none"> Rarely used
	Land-based Theodolite Tracking	4.3	<ul style="list-style-type: none"> Expansion of Hong Kong International Airport into a Three-Runway System (AEIAR-223/2014)
	Underwater Passive Acoustic Monitoring (PAM)	4.4	<ul style="list-style-type: none"> Hong Kong Offshore LNG Terminal (AEIAR-256/2018) Expansion of Hong Kong International Airport into a Three-Runway System (AEIAR-223/2014)

**Environmental Impact Assessment Ordinance, Cap. 499
Guidance Note**

**Road Traffic Noise Impact Assessment
Under the Environmental Impact Assessment Ordinance**

(This guidance note supersedes EIAO Guidance Note No. 12/2010 with immediate effect)

Important Note :

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1. Purpose

- 1.1 This guidance note (GN) serves to provide general reference for practitioners to prepare Road Traffic Noise Impact Assessment (RTNIA) for designated projects (DPs) under the Environmental Impact Assessment Ordinance (EIAO).
- 1.2 This GN is advisory in nature and is designed to facilitate practitioners to prepare the RTNIA. It should not be construed in any way as to supersede the relevant requirements in the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM). The principles set out in the EIAO-TM are to avoid (which should be given the highest priority) and minimize the potential adverse environmental impacts by alternative land use arrangements, alignments, siting and other measures, and should be followed when preparing the RTNIA.

2. Road Project or Road Improvement Work which Requires an Environmental Permit under the EIAO

- 2.1 The following two categories of road projects or road improvement works would require an environmental permit (EP) for construction and/or operation under the EIAO (and hereafter called “road project” in this GN):
 - (i) “A carriageway for motor vehicles that is an expressway, trunk road, primary distributor road or district distributor road”, as defined under item A.1, Part I, Schedule 2 to the EIAO; and
 - (ii) A material change to an exempted project would require an EP under section 9(4) of the EIAO. Material change, under Schedule 1 to the EIAO, “means a physical addition or alteration to a designated project which results in an adverse environmental impact as defined in the technical memorandum”. Under section 6.1 of the EIAO-TM, material change shall only refer to significant changes which cause an adverse environmental impact. An environmental impact is considered to

be adverse if any factor listed in Annex 3 of the EIAO-TM applies and the criteria in Annexes 4 to 10 of the EIAO-TM may be violated.

2.2 In general, the following road improvement works would not cause significant change of noise impact on a nearby noise sensitive receiver (NSR) as it would not affect the design capacity of the concerned road section and not significantly reduce the distance between the alignment of the main carriageway and the nearby NSR:

- Minor works authorized under section 4 of the Roads (Works, Use and Compensation) Ordinance (Cap. 370);
- Improvement of road auxiliaries, e.g. parapet wall, road repair and maintenance work;
- Addition of a lay-by, cycle track, noise barrier, noise enclosure;
- Decking over or converting into an underpass; and
- Improvement of a road junction or roundabouts.

2.3 To determine whether the traffic noise impact due to a road improvement project/works would be considered significant as mentioned in paragraph 2.1(ii) above, detailed information with respect to factors such as change of nature of road, change of alignment, change of traffic capacity or traffic composition, etc. would normally be required. The traffic noise impact would be considered significant if the traffic noise level with the road project would be greater than that without the road project at the design year (i.e. worst assessment year within 15 years after commencement of the road project) by 1.0 dB(A) or more.

2.4 In considering whether the road improvement works would require an EP, the project proponent should make reference to the EIAO and the EIAO-TM for detailed consideration. The project proponent is advised to provide the following information for determination of whether such works should be considered causing adverse environmental impact:

- whether there is any change on the nature of road, e.g. changed from a local road to a district distributor road;
- whether there is any alignment (horizontal or vertical) change of the road;
- description on the extent of the road improvement works;
- layout plan showing the road and representative nearby NSRs without modification;
- layout plan showing the road and representative nearby NSRs with modification (with the modified parts shaded);
- the prevailing traffic flow before the modification;
- the predicted maximum traffic flow within 15 years after the completion of modification;
- the predicted maximum traffic flow at that particular year if no modification is carried out; and
- the calculation of the following traffic noise levels at the worst affected NSRs:
 - (i) the prevailing overall noise level before the modification;
 - (ii) the predicted overall noise level for the maximum traffic projection within 15 years after the completion of modification; and
 - (iii) the predicted overall noise level at that particular year if no modification is carried out.

The overall noise level refers to the total noise together with noise from other roads in the vicinity.

3. Approach to RTNIA

- 3.1 Section 4.4.1 of the EIAO-TM stipulates that the requirements set out in the EIA study brief and EIAO-TM shall be complied with.
- 3.2 Whilst the relevant noise standards for road traffic noise and guidelines for RTNIA are stipulated in Annexes 5 and 13 of the EIAO-TM, the EIA study brief spells out the purpose and objectives of the EIA study, and sets out the scope of the environmental issues to be addressed, procedural and reporting requirements to be fulfilled and where appropriate, methodologies or approaches to be followed. The formulation of the EIA study brief is guided by section 3 of the EIAO-TM.

4. Major provisions and paragraphs in EIAO and EIAO-TM

- 4.1 The following are some points to note for general reference only. They should be read in conjunction with the EIAO, EIAO-TM and EIA study brief for the project, if any.

4.2 Assessment Area

- 4.2.1 According to section 3.3 of EIAO-TM, the EIA study brief may stipulate the geographic and temporal boundaries of the assessment. An area within 300 m from the project boundary would usually be specified as the assessment area for RTNIA. This area may be reduced or extended in accordance with the prevailing situation to ensure that the assessment of the road traffic noise impact on NSRs is adequate, and there would not be unacceptable road traffic noise impact on NSRs.

4.3 Identification of Noise Sensitive Receivers

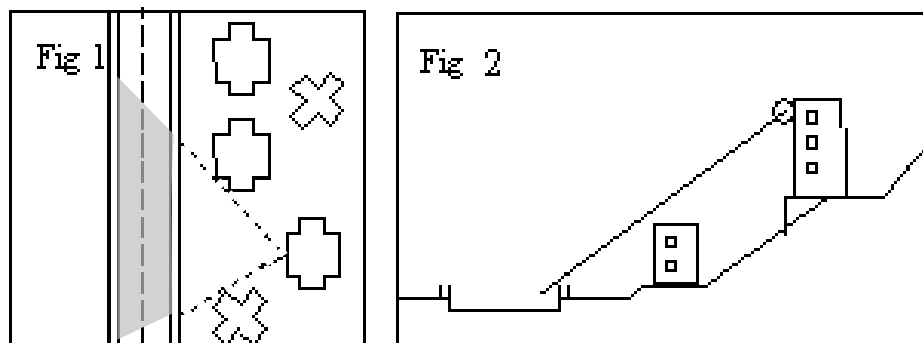
- 4.3.1 NSRs are defined under section 3 of Annex 13 of EIAO-TM and the NSRs should include existing, committed and planned uses at the time of the submission. According to section 3.5 of the EIAO-TM, the assessment shall be based on the best available information at the time of the assessment. Project proponents may need to consult relevant authorities, e.g. Planning Department, regarding the latest land use planning in the vicinity of their proposed project(s).
- 4.3.2 “Planned use”, as defined under Schedule 1 to the EIAO, means the land use proposed in the draft or approved plans prepared under the Town Planning Ordinance (Cap.131) or any other land use plans published by the Government. In this connection, the current Outline Zoning Plan (OZP), Development Permission Area Plans, Outline Development Plan, Layout Plan, any other statutory plans and any approved rezoning requests or section 16 applications for noise sensitive developments shall be referred to in searching for planned NSRs. Usually, zonings designated as “Residential”, “Commercial/Residential”, “Comprehensive Development Area”, “Village Type Development”, “Government, Institution or Community” and “Other Specified Uses (Comprehensive Development and Wetland Enhancement Area)” with allowed noise sensitive uses in the plans would be

considered as NSRs. The practitioner is required to note that there may be noise sensitive development in other types of zoning.

- 4.3.3 Photos of the existing NSRs should be taken and recorded in the RTNIA report for reference.

4.4 Selection of Assessment Points

- 4.4.1 Section 4.1.1 of the EIAO-TM requires a detailed assessment in quantitative terms and in qualitative terms of the likely environmental impacts and environmental benefits of the project. To this end, it is essential to ensure that sufficient assessment points which are able to represent all identified NSRs, and which are vulnerable to the change as stated in section 4.3.1(b)(ii) of the EIAO-TM, are selected. Examples in Figures 1 & 2 show some situations where NSRs behind the front layer of NSRs may not be protected against excessive road traffic noise impact.



Normally, the assessment points should be selected such that there exists at least one assessment point able to represent the noise level at each affected sensitive façade of every identified NSR for mitigated and unmitigated scenarios. For NSRs located close to or identified to be affected by the project but with no representative assessment point, detailed explanation should be provided to justify why they are not being included as assessment points (e.g. single aspect building, etc.).

- 4.4.2 For committed or planned NSRs where no development scheme is available, a practicable assumption for RTNIA should usually be made. Such assumption together with any constraints identified and mitigation measures required on the committed or planned land uses, such as setback of building, building orientation, extended podium, acoustic windows/balconies, etc. should be evaluated and confirmed with relevant parties including the Planning Department and Lands Department as per section 6.2 of Annex 13 of EIAO-TM, or concerned developers, e.g. the Hong Kong Housing Authority or Hong Kong Housing Society.

4.5 Determination of Assessment Year

- 4.5.1 Section 5.1 of Annex 13 of the EIAO-TM states that predictions shall normally be based on the design traffic conditions or the maximum traffic projections within 15 years upon operation of the road works or occupation of the noise sensitive receivers or uses, whichever appropriate. For example, for a Schedule 3 EIA project consisted of planned roads and residential developments, the starting year of the 15 years period should be either the commencement year of the road operation or the latest occupation year of the planned NSRs, whichever is the later. Alternatively, assessment of noise impact may also

be based on the maximum design traffic conditions/carrying capacity (*the design/capacity flow is defined under Transport Planning and Design Manual as the maximum volume of vehicles using the road without the traffic density becoming such as to cause unreasonable delay, hazard or restriction to the drivers freedom to manoeuvre, the design/capacity flow should be consulted or agreed with the relevant authority*) as the worst-case scenario according to section 4.3.1(b)(v) of the EIAO-TM.

- 4.5.2 There may be concerns that a speed lower than the specified speed limit should be adopted for RTNIA, as the specified speed limit may not be reached for the design or maximum traffic flow because of the speed/flow characteristics for the concerned sections of the road project. For such situations, the appropriate speed limit, with the relevant supporting information (*confirmed with the relevant authority*) on speed/flow relationship, should be adopted. In such circumstances, evaluations have to be made to assess whether there would be situations where the maximum road traffic noise impact occurs at a time other than the traffic reaching the maximum flow.

4.6 Validity of Traffic Data

- 4.6.1 According to section 4.4.2(b) of EIAO-TM, one of the factors for determining whether the quality of the EIA report would be adequate is to consider whether the assumptions, information and descriptions in the EIA report are appropriate and factually correct. Hence, it is essential to ensure the traffic data were reasonable and suitable for the purpose of the RTNIA. In this connection, the project proponent or the consultant need to consult and agree with the relevant authority, i.e. the Transport Department, on the adopted traffic data. The project proponent is required to spell out clearly in the EIA report the assumptions made for the traffic modeling in deriving the predicted traffic data. The project proponent could also make reference to the previously approved EIA reports according to section 11 of the EIAO-TM, in particular for relevant traffic data adopted for other planned or committed roads when considering cumulative impact stipulated under section 4.3.1(c)(ii) of the EIAO-TM.

4.7 Consideration of Noise Mitigation Measures

- 4.7.1 Section 4.3.1(d) of the EIAO-TM states that priority should be given to avoidance of impacts before considering measures to reduce or remedy the impacts. In this connection, due regards should be given to explore alternative options such as alternative alignment, alternative siting, alternative land use arrangement or building layout, and other practical options, etc.
- 4.7.2 Section 6.1, Annex 13 of the EIAO-TM states that where the predicted noise impacts exceed the applicable noise criteria, direct mitigation measures, such as treatment of source, application of low noise road surfacing, alternative land use arrangement, setback of buildings and screening by noise tolerant buildings, etc., shall be considered and evaluated in an appropriate manner. It should be noted that the road traffic noise impact can be alleviated or avoided by many approaches and the approach to avoid adverse traffic noise impacts through land use planning should be given priority. Examples of these approaches are:
- road alignment, i.e. providing distance separation between the noise sensitive receiver and the road;
 - traffic composition and volume, i.e. using traffic planning and management to

- control vehicle movements and type of vehicles at different time of the day; and
- line-of-sight, i.e. using noise-tolerant buildings and alternative building orientation to reduce the angle of view of noise sensitive receiver on road traffic and the exposed area of a development.

4.7.3 In evaluating the predicted noise impact, section 4.3.1(c)(ii) of the EIAO-TM requires the evaluation of 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. According to section 3.5 of the EIAO-TM, the assessment shall be based on the best available information at the time of the assessment. Project proponents shall consult and agree with relevant authorities, e.g. the Planning Department, regarding the latest land use planning in the vicinity of their proposed project(s).

4.7.4 Section 4.3.1(c)(iii) of the EIAO-TM, requires the differentiation of the environmental impact caused by the project from other projects, and to what extent the project aggravates or improves the existing or projected environmental conditions.

4.7.5 According to section 4.4.3(a)(ii) of the EIAO-TM, it is also required to consider 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.

4.7.6 Taking into the principles set out above, direct mitigation measures should be considered or proposed on the project road(s) under the subject DP if there would be adverse road traffic noise impact. If the NSRs are also affected by noise from other existing roads, direct mitigation measures are required to reduce the noise from the project road(s) to a level that it:

- (i) is not higher than the standard laid down in Annex 5 of the EIAO-TM; and
- (ii) has no significant contribution to the overall noise compared to other existing roads, if the cumulative noise level, i.e. noise from the project road(s) under the subject DP together with other existing roads, exceeds the standard.

4.7.7 It is considered that there will not be significant contribution to the cumulative road traffic noise impact (i.e. summation of road traffic noise from the project road(s) under consideration and the road traffic noise level due to roads other than the project road(s)) if noise from the project road(s) would not cause the overall road traffic noise level to increase by 1.0 dB(A) or more. Some examples on the situations are as follows:

Example 1: noise level from other existing roads = 75 dB(A)

Measures should be considered to mitigate the noise from the project road(s) to a level of about 68 dB(A) if the NSRs involved are residential premises.

Example 2: noise level from other existing roads = 78 dB(A)

Measures should be considered to mitigate the noise from the project road(s) to meet the planning standard of 70 dB(A) for residential use.

The direct mitigation measures listed under section 6.1 of Annex 13 of the EIAO-TM should be fully explored and evaluated with a view to reducing the traffic noise level at the NSRs concerned to the level meeting the relevant noise standard. Also, the feasibility, practicability, programming and effectiveness of the recommended mitigation measures should be assessed in accordance with section 4.4.2(k) of the EIAO-TM.

- 4.7.8 When considering barrier as noise mitigation measure, reference should be made to the “Guidelines on Design of Noise Barriers” jointly published by the EEPD and the Highways Department. The project proponent should specify the details of the barrier, e.g. form, height and configuration (and colour scheme if possible) in the EIA report.
- 4.7.9 Following the guiding principles set out in the LC Paper (no. CB(1)755/02-03(01)) prepared by ETWB in January 2003, sections of barriers proposed to protect existing NSRs should be differentiated from those for protection of future NSRs as the latter is only required to be constructed before the occupation of the planned NSRs. To facilitate the phased implementation of the barriers under this principle, a barrier inventory showing intended NSRs (i.e. existing NSRs and different planned NSRs) to be protected by different barrier sections (by how many dB(A) reduction) should be provided.
- 4.7.10 Section 4.4.2(f) and (k) of the EIAO-TM, also indicated that the mitigation measures considered should be practicable. In so far as practicability is concerned, consideration should be given to a number of factors including but not limited to engineering constraints, acoustic effectiveness (including noise levels and details with respect to the extent of the mitigation measure concerns and the NSRs intended to be protected), fire safety considerations, sightline and road safety considerations, landscape and visual impact, and public objections, etc.

4.8 Consideration of Indirect Mitigation Measures

- 4.8.1 Section 6.3 of Annex 13 of the EIAO-TM states that 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 ameliorate the residual traffic noise impact.
- 4.8.2 On the eligibility testing criteria for indirect noise mitigation measures, the testing criteria are set out as below:
- (i) the predicted overall noise level from the road project together with other road traffic noise in the vicinity must be above the standard laid down in Annex 5 of the EIAO-TM;
 - (ii) the predicted overall road traffic noise level is at least 1.0 dB(A) more than the prevailing road traffic noise level, i.e. the total road traffic noise level existing before the works to construct the road were commenced; and
 - (iii) the contribution to the increase in the predicted overall road traffic noise level from the road project must be at least 1.0 dB(A).

4.9 Useful Points to Note in Conducting RTNIA

- 4.9.1 For some situations that site measurement is required to obtain the road traffic noise level, the consultant is required to agree the procedures and requirements with the Director of Environmental Protection (Director) prior to the commencement. **Annex I** briefly summarises the procedures and requirement to be met.

Environmental Protection Department

Date of Issue: December 2023

Procedures and Requirement on Measurement of Road Traffic Noise

The following only highlights the essential elements to be noted when measuring noise from an actual flow of traffic flow on a road. It is required to refer to the standard acoustic procedures and requirements.

1. Physical or weather conditions

- Measurements are only to be made when the road surface in the measurement area is dry;
- The average wind speed is not more than 2 m/s in the direction from the road to the assessment point;
- The wind speed at the microphone in any direction should not exceed 10 m/s;
- Wind shield is to be used.

2. Measuring equipment

- The equipment and the calibration device should shall be agreed with the Director;
- Class 1 equipment complying with IEC 61672-1 or 61672-2 or the equivalent is required;
- Immediately prior to and following each session of work the overall sensitivity of the electroacoustical system should be checked using an acoustic calibrator generating a known sound pressure at a known frequency. Measurements may be accepted as valid only if calibration levels agree within 1dB.
- To ensure overall measurement precision, within twelve months immediately prior to the measurement the overall system should have been directly compared with an independent reference system.
- Similarly, the output level of the acoustic calibrator should also have been checked by direct comparison with an independent reference device.

3. Measurement location:

- It is to be close to the road or at the required locations and other traffic (i.e. road traffic noise from road not under concern) or extraneous noise (e.g. construction noise) do not influence the measured noise;
- At 1.2 m above the road surface and no reflecting surfaces (other than the ground) within 15m of the microphone position;
- Unobstructed to the road under concern and should normally be not less than 4m but not more than 15 m from the nearside edge of the carriageway.

4. Measurement period

- The minimum measurement period (T_{\min}) to obtain a valid measurement is as follows:

$$T_{\min} = (4000/q + 120/r) \text{ min, where } q \text{ is traffic flow/hr and } > 100 \text{ veh/hr;}$$

$$\text{and } r \text{ is sampling rate and } > 5 \text{ samples/min}$$

and T_{\min} should not be less than 5 minutes

5. Traffic counts

- The measurements of traffic flow and composition should be concurrent with measurements of the traffic noise;
- The following data should be obtained for each bound of the carriageway;
 - The total no. of vehicles;
 - % of heavy vehicles (e.g. lorry, container truck, public light bus and bus);
 - Average traffic speed for each bound of carriageway (in case of different traffic speed limits for heavy vehicles, the average traffic speed for heavy vehicles should also be included).

6. Measurement report

To ensure the proper record and quality measurement, a report shall at least contain the following information:

- Date and time of the measurement;
- Personnel carrying out the measurement and the equipment used;
- Weather conditions (e.g. wind speed, any fog, rain, etc.);
- Locations of the measurement points;
- Traffic data, i.e. no. of vehicles passing over the measurement period, hourly traffic flow, % of heavy vehicles and average traffic speed, for each bound of each of the carriageway under consideration;
- Result of the measurement, attaching the printout of the noise measurement result from the sound level meters (SLM) with the serial number and model number of the SLM;
- Site survey photos showing the measurement points and surrounding environment;
- Survey maps showing the noise measurement point; and
- Any observation made by the personnel taking the measurement.

**Environmental Impact Assessment Ordinance, Cap.499
Guidance Note**

Methodologies for Fisheries Baseline Surveys

(Important Note :

The guidance note is intended for general reference only. You are advised to refer to and follow the requirements in the Environmental Impact Assessment Ordinance (Cap 499) and the Technical Memorandum on Environmental Impact Assessment (EIA) Process. Each case has to be considered on individual merits. This guidance note serves to provide some good practices on EIA and was developed in consultation with the EIA Ordinance Users Liaison Groups and the Advisory Council on the Environment. This guidance note may be subject to revision without prior notice. You are advised to make reference to the guidance note current to the date. Any enquiry on this guidance note should be directed to the EIA Ordinance Register Office of EPD on 27th Floor, Southorn Centre, 130 Hennessy Road, Wan Chai, Hong Kong. (Telephone: 2835-1835, Faxline: 2147-0894), or through the EIA Ordinance web site (www.epd.gov.hk/eia)

1. Purpose

- 1.1 As stipulated in Section 3.2 of Annex 17 of the Technical Memorandum on EIA Process (EIAO-TM) , the objective of the baseline study of fisheries assessment is to provide adequate and accurate fisheries baseline information of the study area for accurate prediction and evaluation of fisheries impacts. The fisheries baseline survey forms an important part of the baseline study to:
 - (a) provide specific and updated fisheries information of a proposed project site and its vicinity;
 - (b) verify information obtained from the review of existing fisheries information; and
 - (c) fill existing information gaps.
- 1.2 This guidance note (GN) aims at providing general guidelines for conducting fisheries baseline survey so as to fulfil the requirements stipulated in the EIAO-TM in respect of fisheries impact assessment for a proposed project. For the purpose of these guidelines, “field survey”, “fisheries survey” or similar terms appeared in Annex 17 of the EIAO-TM and EIA study briefs for fisheries assessment would be collectively referred to as “fisheries baseline survey”.
- 1.3 Fisheries baseline surveys, where deemed necessary, may include sampling-based field surveys for obtaining information on fisheries resources as well as observation-based surveys and interview surveys for obtaining other fisheries-related information. Other surveys for collecting additional baseline information may also be required if the need is identified in the course of the EIA study. The project proponent, in consultation with environmental consultants where applicable, should determine the appropriate type of survey and methodology to be adopted in each case based on their professional judgement. The project proponent is also suggested to consult the fisheries communities at the early stage when formulating the survey methodologies. The methodology for fisheries baseline survey with justification should be appropriately presented in the EIA report for audit purpose.

2. Fisheries Resources Survey

Survey Programme

- 2.1 Baseline survey on fisheries resources can be conducted by collecting data through field sampling. The survey requirements in respect of type and duration of survey, frequency of sampling and number of replicates would generally depend on factors such as the nature of the proposed project, size of the project site and the broader study area, presence of sites of fisheries

importance, seasonal variation of the fisheries resources under study, valid concerns of the public and availability of existing fisheries baseline information. It should be noted that a survey conducted over only a short period of time within the year may not be able to show representative seasonal conditions, whereas an unnecessarily long fisheries baseline survey may extend the EIA study period without yielding additional information essential to the assessment.

- 2.2 Hong Kong has typically a wet season and a dry season with seasonal changes in the physicochemical and biological parameters of the marine environment. Fisheries baseline survey should take into account the seasonality and cover the wet and dry seasons as well as the transitional periods where necessary to capture the main characteristics and seasonal variations of the fisheries resources of interest.
- 2.3 The project proponent, in consultation with environmental consultants where applicable, should consider the factors mentioned above as well as other factors deemed relevant to devise an appropriate survey programme for each case based on their professional judgement. In all cases, there should be adequate survey effort to ensure that the data obtained are scientifically robust and representative to address spatial and seasonal differences.

Survey Period

- 2.4 Baseline survey for fisheries resources should be carried out for an appropriate duration of at least 6 months and up to 12-month to cover the dry and wet seasons as well as the transitional periods where necessary taking into consideration of factors such as the nature of the project and the fisheries resources of interest. Sampling should be conducted for a minimum of 3 replicates per season/period and evenly arranged (e.g. monthly) over each season/period.

Survey Method

- 2.5 For the purpose of obtaining sampling-based baseline information on fisheries resources, suitable field survey methods should be used to collect representative samples of pelagic and demersal fisheries resources at the project site and in its vicinity. The surveys should be carried out by personnel with adequate knowledge of marine science and fisheries and experience in field survey. A variety of methods are available for the study of commercial fisheries resources including fish, crustacean and cephalopod. The general methods described under paragraph 2.6 below are commonly applied in fisheries resources studies and are by no means exhaustive. The project proponent should adopt suitable methods based on professional judgement. Consideration should also be given to the compatibility of the planned survey methods with those of any relevant surveys conducted by other parties that may provide reference data for supporting the impact assessment. Reference may be made to the relevant fisheries surveys or monitoring programmes implemented by the Agriculture, Fisheries and Conservation Department (AFCD) if found suitable.
- 2.6 For each survey method described below, specification of the sampling gear (such as length, height and mesh size) should be appropriate for the target fisheries resources and habitats. The conditions of the specific site (e.g. substrate type, depth, wave exposure, accessibility) for deploying a sampling gear should be suitable for the operation of that gear.

(a) Survey for general fisheries resources

Survey for general fisheries resources should be conducted to collect representative samples of pelagic and demersal fisheries resources with the following three methods.

Gillnetting

Gillnets are long rectangular panels of netting with diamond-shaped mesh that are held vertically in the water column and often anchored to the sea floor at either end. Fish and crustaceans swim into the net and are entangled by the gill covers, fins and spines. This sampling gear is selected for its ability to capture pelagic or demersal fisheries resources of relatively high diversity depending on the size and depth of deployment of the nets.

Cage-trapping

Cage traps are mainly in form of cages or baskets made with metal or plastic mesh and designed to have one or more openings for the entrance of catch. They are usually set on the bottom singly or in rows, connected by ropes or buoys on the surface. Baits can be used to lure marine organisms into the cage. This sampling gear is selected for its ability to capture demersal fisheries resources. Inlet shape and mesh size of the cage vary with target catch, hence different types of trap targeting fish and crustaceans (e.g. rabbitfish trap and crab trap) should be used.

Longlining

The longline set up commonly consists of a single mainline with baited hooks attached at intervals to attract fish catch. Longlines can be set for pelagic or demersal fishing, depending on the objectives of the survey.

(b) Survey for zooplankton

Plankton towing with a plankton net is a standard method of zooplankton survey for assessing the distribution, abundance and diversity of zooplankton including eggs and larvae of commercial fish and crustaceans. A typical plankton net comprises a nylon-gauze cone attached to a metal frame, a mouth fitted with a collar or mouth-reducing cone, a cod-end with a sampling bucket, and a flow meter attached to measure the volume of water sampled. The mesh size of the net should be commensurate with the characteristics of the target plankton group. The net is usually deployed in a single oblique tow to a depth of several meters off the seabed and towed towards the water surface. During each sampling, replicate tows should be conducted.

(c) Survey for juvenile fisheries resources

Survey for juvenile fisheries resources should be conducted with appropriate methods such as purse seining, beaching seining and cage trapping taking into consideration of the condition of the survey sites (e.g. habitat type, water depth). Types of sampling gear and their specification (such as length, height and mesh size) should be suitable for the target groups of juveniles.

Data Analysis

- 2.7 All samples collected from the surveys for general or juvenile fisheries resources should be analysed by season/period for species composition (including a complete species list), size (total length, standard length and fork length as appropriate), abundance, biomass in weight, yield per unit effort (YPUE), catch per unit effort (CPUE), species diversity and estimated commercial value of fisheries species where applicable.
- 2.8 All samples collected from the surveys for zooplankton should be analysed by season/period for species composition (including a complete species list), abundance in density, species diversity and estimated commercial value of fisheries species where applicable.

- 2.9 Additional parameters should also be analysed if considered appropriate to the proposed project and the fisheries resources of interest.

3. Observation-based survey

- 3.1 Observation-based survey (usually on a boat) can gather specific information of the fishing operations in the study area. While reference can be made to the results of relevant fisheries surveys conducted by the AFCD in respect of the level and pattern of fishing activities in different parts of Hong Kong waters, an observation-based survey, if deemed necessary, can provide further details of fishing activities in the study area, such as vessel type, size, operating time and location of the fishing vessels. The data collected from the survey can reveal what, when and where fishing operations specifically take place in the study area as well as how fishing operations may be affected by the proposed project, thus offering insights on formulating effective measures to minimize impact on fishing activity especially for projects of larger scale or higher complexity.
- 3.2 To ensure that sufficient baseline information on fishing operation is available for performing a fisheries impact assessment, the project proponent should determine the appropriate survey effort (such as duration and frequency) for the observation-based survey in each case based on professional judgement, taking into account the nature of the proposed project, the actual site situation and any existing baseline information. For projects affecting water areas in large size or with significant fishing activities, monthly surveys for an appropriate duration up to 12 months should be conducted. Timing of survey should cover periods when fishing activities often take place taking into account the different modes of operation of fishing vessels.

4. Interview Survey

- 4.1 Interview survey may be conducted to collect fisheries related information, such as fisheries production, fishing activities and aquaculture practices from local fishermen, fish farmers or other target study groups with a view to obtaining specific baseline information relevant to the fisheries assessment to be conducted.
- 4.2 The project proponent should determine the appropriate survey method, including but not limited to face-to-face interviews, phone interviews and mailed questionnaires, and deploy relevant questions that can achieve the objectives of the survey.

5. Other Surveys

- 5.1 In addition to the types of surveys stipulated in paragraphs 2, 3 and 4 above, other surveys, including but not limited to site visit to fish ponds and fish culture zones as well as dive survey for habitats important to fisheries resources and artificial reefs, may be conducted for supporting the assessment of fisheries impacts where necessary. The project proponent should propose appropriate methodology for such surveys.

6. Fisheries Survey Results

- 6.1 According to Section 3.2.1(ii) of Annex 17 of EIAO-TM, results of all relevant field surveys, the names and relevant experience of the competent personnel undertaking the surveys, shall be documented in field survey reports prepared, checked and signed by relevant professionals or experts.

Agriculture, Fisheries and Conservation Department
in conjunction with Environmental Protection Department

Date of Issue: December 2023

**Environmental Impact Assessment Ordinance, Cap.499
Guidance Note**

**Preparation of Fixed Noise Sources Impact Assessment
Under the Environmental Impact Assessment Ordinance**

(Important Note :

The guidance note is intended for general reference only. You are advised to refer to and follow the requirements in the Environmental Impact Assessment Ordinance (Cap 499) and the Technical Memorandum on Environmental Impact Assessment (EIA) Process. Each case has to be considered on individual merits. This guidance note serves to provide some good practices on EIA and was developed in consultation with the EIA Ordinance Users Liaison Groups and the Advisory Council on the Environment. This guidance note may be subject to revision without prior notice. You are advised to make reference to the guidance note current to the date. Any enquiry on this guidance note should be directed to the EIA Ordinance Register Office of EPD on 27th Floor, Southorn Centre, 130 Hennessy Road, Wan Chai, Hong Kong. (Telephone: 2835-1835, Faxline: 2147-0894), or through the EIA Ordinance web site (www.epd.gov.hk/eia)

1. Purpose

- 1.1 This guidance note (GN) serves to provide some good practices to the practitioners on the preparation of Fixed Noise Sources Impact Assessment (FNIA) of designated projects (DPs) under the Environmental Impact Assessment Ordinance (EIAO).
- 1.2 This GN is applicable to EIA reports where FNIA is required, unless otherwise specified in the EIA study brief. It is advisory in nature and is not intended to supersede the relevant Annexes of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM).
- 1.3 The considerations in identifying adverse environmental impacts, criteria for evaluating fixed noise sources impact, contents of an EIA report, guidelines for FNIA, guidelines for the review of an EIA report, contents of Environmental Monitoring and Audit (EM&A) Programme are detailed in Annexes 3, 5, 11, 13, 20 and 21 of the EIAO-TM respectively.
- 1.4 This GN should not be considered as a prescriptive set of rules or an exhaustive manual of methods/techniques. It does not obviate the need for the compliance with all the requirements in the relevant Annexes of the EIAO-TM and the EIA study brief of the project.
- 1.5 The coverage of this GN includes those types of DP that may cause fixed noise sources impacts. The level of information required for individual FNIA and hence the application of relevant parts of this GN is dependent on the type of DP and the surrounding situation in which the DP is located.
- 1.6 Regardless of the results of the FNIA, fixed noise sources are controlled under the Noise Control Ordinance (Cap. 400). Upon the receipt of noise complaints, the Environmental Protection Department (EPD) will conduct investigations and assessments based on the prevailing condition and situations of adjoining land uses. The FNIA at EIA stage is only meant to demonstrate that practical and feasible approaches are available.

2. **Fixed Noise Sources Impact Assessment Methodology**

- 2.1 The FNIA should evaluate the fixed noise sources impacts of the project in accordance with the criteria and guidelines given in Annexes 5 and 13 of the EIAO-TM, and the EIA study brief issued under the EIAO.
- 2.2 To streamline the preparation of FNIA at EIA stage, the project proponent shall, unless otherwise agreed by the Director of Environmental Protection (the Director), conduct a qualitative assessment to demonstrate that no adverse fixed noise sources impact would be associated with the project by committing to adopt quieter plant and/or quieter designs during design and implementation stages. In such case, the project proponent should firstly identify the major fixed noise sources/activities and their preliminary locations, then propose the corresponding design measures, and commit to submit a Fixed Noise Sources Management Plan (FNMP) to the Director for approval during the pre-tender stage, if any, and before commencement of the project implementation. The FNMP should contain a quantitative fixed noise sources impact assessment, accounting all design measures including noise mitigation measures (if required), and a fixed noise sources commissioning test plan. In any case, the FNMP shall be submitted before commencement of the project implementation. The submission of FNMP during the pre-tender stage, if any, and before commencement of the project implementation will then be imposed as a condition in the environmental permit (EP).
- 2.3 Section 5.2 of Annex 13 of the EIAO-TM stipulates the assessment requirements for fixed noise sources impact. Reference could be made to the relevant technical memoranda issued under the NCO or international standards. Paragraphs 3 to 5 below also provide a general reference on the considerations given in adopting fixed noise sources mitigation measures and the methodology for FNIA.

3 **Identification of Fixed Noise Sources Impact**

Identification of Assessment Area and Noise Sensitive Receivers (NSRs)

- 3.1 The assessment area is usually within 300 m from the project boundary. However, if warranted, impacts outside 300 m should also be considered (e.g. airport, theme park, amusement park, etc.).
- 3.2 Regarding the identification of NSRs for the FNIA, the approach would be specified in the EIA study brief for the project and examples of NSRs are given in Annex 13 of the EIAO-TM.
- 3.3 All NSRs, including existing, committed and planned within the assessment area shall be identified. Assessment points, representing all identified NSRs, shall be agreed with the Director prior to conducting the FNIA.

Inventory of Noise Sources

- 3.4 Fixed noise sources impact mainly originates from the use of machinery plant or activities from or nearby the project. The emission inventory of the fixed noise sources is a list of such plant or activities. It must be noted that different plant or activities may be operated or carried out at different periods of time during a day, e.g. chiller systems may be operated continuously, while some ventilation system may only be operated in daytime and evening

period, etc. Confirmation of the validity of the inventory and the operational details shall be obtained from the relevant professionals representing the project proponent or relevant parties responsible for those plant or activities. Where necessary, the agency or contractor should also be consulted.

- 3.5 The inventory and their operational details must be realistic and practicable. They should not be artificially or arbitrarily developed to fit in with the noise criteria without any regard to the practicability and feasibility of the project requirements.
- 3.6 For DPs where noise sensitive uses are proposed, project proponents shall usually be required to evaluate the fixed noise sources impacts upon planned NSRs for which existing, committed or planned fixed noise sources may be involved. Project proponents shall identify the premises with significant existing, committed or planned fixed noise sources based on best available information at the time of assessment.
- 3.7 All the above assumptions, validations and considerations shall be included and properly documented in the FNIA.

4 Prediction and Evaluation of Fixed Noise Sources Impact in FNIA

- 4.1 The project proponent could then conduct a qualitative assessment in the EIA study to demonstrate that no adverse fixed noise sources impact would be associated with the project by committing to adopt quieter plant and/or quieter designs during operation stage. Alternatively, if a quantitative FNIA is to be carried out in the EIA study, the project proponent should assess the fixed noise sources impact of the Project, with respect to the procedures as stipulated in the EIAO-TM, in particular to the criteria and methodology set out in Annex 5 and Annex 13 of the EIAO-TM.
- 4.2 *Prediction of Noise Impact in the EIA Study*
- (a) The assessment should address the cumulative fixed noise sources impact resulting from the operation of the project and other significant existing, committed or planned fixed noise sources, if applicable, identified during the course of the EIA study on NSRs within the assessment area.
 - (b) The potential fixed noise sources impact to existing, committed or planned NSRs shall be addressed taking into account the preliminary design, presumed operation mode, identified mitigation measures, if necessary, of the planned fixed noise sources. Project proponents shall explicitly spell out in the EIA report that a FNMP, with quantitative assessment, would be submitted in a later stage of the project.

5 Mitigation of Fixed Noise Sources Impact

Direct Mitigation Measures

- 5.1 The project proponent shall consider and evaluate the possible application of all direct mitigation measures including but not limited to the mitigation measures set out in Annex 13 of the EIAO-TM, quieter plant or quieter designs (e.g. use of acoustic screen, silencer, enclosure), etc. The feasibility, practicability and effectiveness of the recommended mitigation measures shall be assessed and confirmed with the relevant responsible parties and be spelt out in the EIA report as appropriate. Specific reasons for not adopting certain direct mitigation measures should be clearly substantiated and documented in the FNIA.

5.2 Listed below are some commonly used direct mitigation measures:

- layout design / level difference / proper orientation to avoid direct line of sight to NSRs;
- use of quieter plant and/or quieter designs;
- consideration on operation time (e.g. avoid night time or early morning operation); and
- use of acoustic screen, silencer / enclosure.

5.3 It must be noted that the calculation of maximum allowable sound power level of the proposed fixed noise sources is not valid to demonstrate compliance in the quantitative assessment stage. Project proponents are required to gather noise emission information regarding the actual fixed plant, or equivalent, that would be implemented in the project for detailed assessment.

5.4 The project proponent should get the early involvement of relevant professionals and encourage the development of innovative noise mitigation measures. In general, more innovative noise mitigation measures should be considered when:

- the fixed noise sources are close to NSRs;
- there are NSRs surrounding the fixed noise sources; or
- noisy plant/activities would continue at the same location for a long period of time.

6 **Requirement of FNMP**

6.1 The submission of a FNMP can become a condition of EP for EIA studies, particularly those having only undergone qualitative assessment as mentioned in paragraph 2.2 of this GN. The FNMP shall typically include the following information:

- Detailed FNIA
 - List of fixed noise sources proposed or in the vicinity of the project;
 - Established noise emission data of the existing, committed or planned fixed noise sources (e.g. catalogues of the proposed model type of the fixed plant, site measurement of existing/similar fixed noise sources/activities, etc.)
 - Quantitative FNIA for representative NSRs; and
 - Noise mitigation measures to be adopted, if any and their associated practicability, feasibility and acceptability.
- Relevant clauses for tender document, which include the layout, requirements of the planned fixed plant, operation and mitigation measures, if any.

6.2 Under the EP, the FNMP usually needs to be submitted to the Director for approval no later than 2 months before the issuance of tender of the project, if any, and before commencement of project implementation. Such FNMP shall be included in the tender document, if any. If there is any change to specifications of planned fixed plant, layout design, operation modes, mitigation measures, or any other factors that could have implications on the fixed noise sources impact as concluded in the approved FNMP, an updated FNMP shall be submitted to the Director for approval, no later than one month before the implementation of any such change.

- 6.3 The FNMP / updated FNMP shall include an inventory of noise sources, a layout plan indicating the locations of all existing, committed or planned fixed noise sources and the associated noise mitigation measures. The FNMP / updated FNMP shall be prepared and checked by Certified Noise Modelling Professional as recognized by the Hong Kong Institute of Qualified Environmental Professionals Limited or equivalent as meeting the requirements given in this GN. The FNMP / updated FNMP shall be certified by the ET Leader and verified by the IEC as conforming to the relevant information and recommendations of the approved EIA report. All mitigation measures recommended and requirements specified in the FNMP / updated FNMP shall be fully implemented.
- 6.4 The FNIA contained in the FNMP / updated FNMP shall follow the principles mentioned in paragraph 4 of this GN and in Annex 13 of the EIAO-TM. In proposing the mitigation measures, the project proponent shall make reference to the principles given in paragraph 5 of this GN, and include the quieter plant and/or quieter designs identified in the approved EIA report.
- 6.5 During the course of preparation of the FNMP / updated FNMP, the project proponent should involve the relevant professionals as early as possible. For large scale projects, the project proponent is encouraged to prepare/update the FNMP as early as possible so as to avoid causing any delay on the tendering process, if any, and project implementation as mentioned in paragraph 6.2 above.

7 **Conclusion**

- 7.1 This document attempts to provide good practices and procedures for general reference in preparing a FNIA. Though it is expected that the guidelines could be followed for most of the situations, one should always exercise sound professional judgment on the appropriateness, practicability, feasibility and acceptability of the proposals and recommendations made in the FNIA.

Environmental Protection Department

Date of Issue: December 2023

Gist of Public Comments on the Draft EIAO Guidance Notes

	Public Comments Received	General Responses by Environmental Protection Department
1.	The transitional arrangement on the use of prevailing or updated/new EIAO Guidance Notes (GNs) for on-going EIA studies should be explained.	<p>The GNs are intended for general reference and for facilitating stakeholders in complying with the requirements of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM).</p> <p>Transitional arrangement on the use of prevailing or updated/new EIAO Guidance Notes (GNs) would follow the same transitional arrangement for revised EIAO-TM as explained in para.27 of LegCo Brief on EIAO-TM (see Annex B1). In short, prevailing GN could only be adopted for on-going EIA studies with technical assessments commenced and the assessment methodologies have been agreed based on the prevailing EIAO-TM before 30 June 2023.</p> <p>Hence, the updated/new EIAO GNs can be implemented with immediate effect to facilitate stakeholders in complying with the requirements of the updated EIAO-TM.</p>
2.	It is not certain that the updated EIAO GN would have an implication on current EM&A mechanism under existing Environmental Permits (EPs).	In general, the EIAO GNs are more related to the assessment methodologies of individual assessments. Therefore, adverse implication to the EM&A of existing EPs is not anticipated.

	Public Comments Received	General Responses by Environmental Protection Department
3.	There are enquiries on (a) the differences between the new Construction Noise Management Plan and Noise Management Plan under individual EP, and (b) the technical requirements for the preparation of the new Construction Noise/Fixed Noise Sources Management Plan.	<p>In order to streamline the process of noise impact assessment during the preparation of the EIA report, it is stipulated in the revised EIAO-TM and the updated EIAO GNs that project proponents are allowed to conduct qualitative assessment of construction noise/fixed noise sources during the EIA stage; and through the EP condition to require the submission of a detailed quantitative assessment (i.e. Construction Noise Management Plan/ Fixed Noise Sources Management Plan) before the issuance of the tender of the project, if any, and before commencement of the project implementation.</p> <p>The above requirements are different from the Noise Management Plan required under individual Environmental Permit, which will provide a flexible means for project proponents to revise the noise mitigation measures proposed during the construction stage.</p>
4.	There is an enquiry on whether professional/expert qualification(s) is required for certification of ecological baseline survey.	It is stated in S.5.3.1 of Annex 16 that the results of all relevant field surveys, the names and relevant experience of the persons leading and conducting the surveys, shall be documented in field survey reports prepared, checked and signed by relevant professionals or experts.
5.	The finalized GNs should be uploaded to the EIAO Register Website as soon as possible.	Agreed.

File Ref.: Ax(55) to EP 1/P/03

LEGISLATIVE COUNCIL BRIEF

Environmental Impact Assessment Ordinance
(Cap. 499)

ENVIRONMENTAL IMPACT ASSESSMENT ORDINANCE (AMENDMENT OF SCHEDULES 2 AND 3) ORDER 2023

TECHNICAL MEMORANDUM ON ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

INTRODUCTION

The Chief Executive has announced in the 2021 Policy Address that the Government will review the existing statutory and administrative arrangements relating to land development, including the environmental impact assessment (“EIA”) process under the Environmental Impact Assessment Ordinance (Cap. 499) (“the Ordinance”). Based on the experience gained since its operation in 1998 and taking on board the recent technological development, we have reviewed the EIA mechanism with a view to optimising the EIA procedures, improving the operational efficiency, and focusing more on environmental performance. The Secretary for Environment and Ecology (“SEE”), pursuant to section 4(2) of the Ordinance, has made the Environmental Impact Assessment Ordinance (Amendment of Schedules 2 and 3) Order 2023 (“the Order”) to amend Schedules 2 and 3 to the Ordinance at **Annex A**.

A

2. Pursuant to section 16(1) of the Ordinance, SEE has also issued the revised Technical Memorandum on Environmental Impact Assessment Process (“EIAO-TM”) at **Annex B**, which was published in the Gazette pursuant to section 16(5) of the Ordinance.

B

JUSTIFICATIONS

3. The purpose of the Ordinance, which came into operation in 1998, is to provide for assessment of the impact on the environment of certain projects for protecting the environment, so as to avoid, minimise and control the adverse impact on the environment of designated projects (“DPs”) through the application of the statutory EIA process and the environmental permit (“EP”) mechanism. The Ordinance serves as an essential platform for striking a balance between the need of environmental protection and development.

4. Nevertheless, there is feedback that the EIA studies take too long to complete. In addition, there are views that certain criteria and guidelines for EIA studies are not clear or specific enough. Over time, certain DPs under the Ordinance have become outdated and new DPs should be added.

5. Upon review, the Environmental Protection Department (“EPD”) recommended four major enhancement initiatives, namely establishing a Centralised Environmental Database, amending the lists of DPs under the Ordinance, revising the requirements for technical assessments in the EIAO-TM, and facilitating direct applications for EP. It is expected that by adopting these enhancement initiatives, the EIA process can be optimised and standardised, the quality of EIA studies can be enhanced and the time required for the entire EIA process can be reduced to 18 months for typical projects and 24 months for major or complicated projects (i.e. aim to achieve about 50% reduction in time) while maintaining the current statutory public inspection period.

Schedules 2 and 3 to the Ordinance

6. Section 4(1) of the Ordinance provides that the projects listed in Schedules 2 and 3 to the Ordinance are DPs. Project listed as DPs are project which are likely to have a significant impact on the environment. Schedule 2 covers development and infrastructural projects such as roads, airports, reclamation, waterways and drainage works, etc. Schedule 3 covers engineering feasibility studies of major development/redevelopment projects. Under section 4(2) of the Ordinance, SEE may by order published in the Gazette amend the lists of DPs in Schedules 2 and 3 to the Ordinance.

Technical Memorandum on Environmental Impact Assessment Process

7. Under section 16(1) of the Ordinance, SEE may issue technical memorandums setting out principles, procedures, guidelines, requirements and criteria in respect of certain processes under the Ordinance.

8. As stipulated in section 16(4) of the Ordinance, the Director of Environmental Protection shall be guided by all applicable technical memorandums when deciding on matters under sections 5, 6, 8, 10, 12, 13 and 14 of the Ordinance.

9. Under section 16(5) of the Ordinance, the technical memorandum is to be published in the Gazette and laid on the table of the Legislative Council (“LegCo”) at the next sitting after its publication.

THE ORDER

10. To implement the enhancement initiative of amending the lists of DPs under the Ordinance referred in paragraph 5 above, EPD proposes the following amendments to Schedules 2 and 3 to the Ordinance through the Order.

Amendment of Schedule 2

11. Schedule 2 to the Ordinance is to be amended with the following main objects:
- (a) to provide clearer definitions for DPs listed in that Schedule;
 - (b) to add new items to that Schedule as DPs in response to social development and scientific and technological progress;
 - (c) to remove from that Schedule certain DPs from which adverse environmental impacts would not be anticipated by adopting standard mitigation measures;
 - (d) to adjust the criteria for being listed in that Schedule as DPs that may cause adverse environmental impacts;
 - (e) to provide that some essential facilities and some minor works for the management or protection of environmentally sensitive areas (e.g. country parks) are not DPs listed in that Schedule; and
 - (f) to make minor textual amendments to ensure consistency and clarity.

Amendment of Schedule 3

12. EPD has reviewed all of the 25 EIA reports of DPs under Schedule 3 which were approved under the Ordinance in the past 25 years. Projects with a development scale of less than 50 hectares were mainly small-scale residential development projects together with associated supporting facilities and generally do not involve other large-scale infrastructure facilities and/or works that may lead to adverse cumulative environmental impact.

13. For urban development projects with a scale larger than 50 hectares, in addition to the proposed land development plan, they usually involve other large-scale infrastructure projects such as reclamation, new roads, sewage treatment facilities. Conducting EIA studies will enable the assessment of potential cumulative environmental impacts at various stages of the development and the derivation of appropriate environmental planning and green measures.

14. In view of the above, the two DPs in Schedule 3 to the Ordinance will be merged and the original threshold will be amended from 20 hectares to 50 hectares to make the EIA process more effective and focused.

15. Furthermore, it is also found that the area of the DPs alone can sufficiently reflect the environmental impact of the proposed development. Hence, the population threshold of 100 000 can be removed. In addition, since some privately-proposed urban development or redevelopment projects may not be subject to technical feasibility studies, the reference to “engineering feasibility study” in Schedule 3 to the Ordinance will be removed in order to catch all relevant urban development projects.

A

16. The aforementioned amendments have been reflected in the Order at **Annex A**.

TECHNICAL MEMORANDUM ON ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

17. Based on past experience of conducting EIA studies, and in response to the development of engineering design and construction, we will adopt the main principles and directions set out below, to revise and update the technical assessment guidelines and requirements in the EIAO-TM:

- (a) Establish standard practices for conducting various technical assessments in the EIA, clearly define the methods and scope of various baseline surveys and environmental assessments;
- (b) Avoid overlapping with other environmental legislation;
- (c) When evaluating the environmental impact of DPs, take into consideration the overall environmental conditions in Hong Kong and the improvements that would be brought by the Government's strategic plans and policies on environmental protection to make the evaluation more comprehensive and realistic; and
- (d) Amend the text to make the requirements and guidelines for various technical assessments clearer and to avoid unnecessary misunderstandings.

18. In accordance with the above principles and directions, the technical assessment guidelines in the EIAO-TM has been revised in respect of the following impact assessments:

Air quality impact assessment

- (a) Since construction dust is regulated by the Air Pollution Control Ordinance (Cap. 311), and construction dust can be effectively controlled by water spraying, there is no need to conduct quantitative simulation and evaluation of construction dust. If necessary, the project proponent will be required to conduct environmental monitoring and audit during the construction period to ensure that the dust level meets the relevant standards.
- (b) EPD will provide territory-wide background emission data for the "Pollutants in the Atmosphere and their Transport over Hong Kong" ("PATH") modelling system and air quality modelling results derived from PATH to enhance the accuracy and consistency of air quality modelling and shorten the time required for air quality impact assessment.

Water quality impact assessment

- (c) EIA studies generally use water quality indicators as the assessment standard. However, as the water quality in Hong Kong is affected by the southwest monsoon wind and the Pearl River, the background inorganic nitrogen content in some waters is higher than the water quality objectives in summer. Therefore, we will make reference to the European Union's framework in designating acceptable sewage treatment levels for new urban sewage treatment facilities, as an alternative assessment standard for inorganic nitrogen indicators in environmental impact assessment, e.g. the acceptable level of discharge into western waters is secondary treatment with nitrogen removal and disinfection, while discharge into enclosed bay areas such as Tolo Harbour or Deep Bay is secondary treatment with nitrogen and phosphorus removal and disinfection to prevent water eutrophication and other problems.
- (d) EPD will provide territory-wide background pollution data, as well as hydrodynamic and water quality modelling results to enhance the accuracy and consistency of water quality modelling and shorten the time required for water quality impact assessment.
- (e) Preventive and mitigation measures as set out in the Sewerage Manual of the Drainage Services Department to prevent or minimise emergency sewage discharges/bypasses will be required to be adopted, and a water quality monitoring program for unavoidable maintenance situations will also be required.

Noise impact assessment

- (f) In practice, project proponents may not be able to determine the detailed construction methods or construction machinery at the planning and design stage. Therefore, we will (i) allow a qualitative assessment of construction noise to be carried out during the EIA with a view to estimating the degree of construction noise impact and suggest appropriate mitigation measures; and (ii) through the EP require the project proponent to acquire information on the list of construction machinery or construction methods and submit a detailed quantitative assessment before construction so as to ensure that the relevant construction noise can comply with the relevant standards.
- (g) EPD will provide online simulation application tools for construction noise and road traffic noise impact assessment to facilitate related noise impact assessments.
- (h) Introduce and implement innovative noise mitigation designs (such as acoustic windows and balconies) as mitigation measures for road traffic noise when planning residential developments.

Waste management and land contamination assessments

- (i) Strengthen the management of construction waste by requiring that dump trucks used for transportation of construction waste should be equipped with real-time tracking devices to monitor the delivery and disposal of construction waste.
- (j) Standardise the requirements for land contamination surveys so that project proponents can conduct land contamination surveys early.
- (k) Provide guidelines to allow project proponents to explore the most appropriate solution based on the “source-pathway-receptor” model when considering land contamination remediation options.
- (l) Provide guidelines on methods for dealing with naturally occurring pollutants, e.g. construction projects in areas with high background arsenic levels, such that more cost and environmentally effective strategies to control pollutant transmission through pathway or receptor control methodologies can be devised to avoid unnecessary treatment and disposal of large quantities of naturally occurring arsenic-containing soil.

Ecological and fisheries impact assessments

- (m) Standardise ecological and fisheries survey methods, frequencies, modes and timing so that project proponents can conduct baseline surveys in advance and complete the EIA process earlier, and require the minimum baseline survey period to be increased from four months to six months, which may be extended to cover a full year period when necessary.
- (n) Require all ecological and fisheries survey reports to be prepared, reviewed and signed by relevant professionals/experts in the field to ensure that the survey results are recognised.
- (o) In assessing ecological impacts, the local or regional distribution of relevant habitats and species, and the linkages between habitats or populations at different locations shall be considered.

Landscape, visual and cultural heritage impact assessments

- (p) Revise the guidelines for landscape and visual impact assessments to align with the relevant guidelines for applications submitted under the Town Planning Ordinance (Cap. 131) to avoid duplication of assessment work, and streamline the relevant requirements so as to focus more on projects with potentially significant landscape and visual impacts.

- (q) Revise the guidelines for impact assessment of cultural heritage sites to avoid overlapping with landscape and visual impact assessment requirements.

19. The aforementioned amendments of the EIAO-TM have been reflected in the revised EIAO-TM at **Annex B**.

B

LEGISLATIVE TIMETABLE

20. The legislative timetable of the Order is as follows –

Publication in the Gazette	5 May 2023
Tabling at the LegCo	10 May 2023
Commencement of the Order	30 June 2023

21. As regards the revised EIAO-TM, section 16(12) of the Ordinance provides that a technical memorandum is not subsidiary legislation. A technical memorandum is to be published in the Gazette and laid on the table of the LegCo at the next sitting after its publication pursuant to section 16(5) of the Ordinance. Section 16(10) of the Ordinance provides that a technical memorandum issued under section 16 of the Ordinance is to come into operation on the expiry of the period for debate of the technical memorandum in the LegCo. We will table the revised EIAO-TM in the LegCo on 10 May 2023, the same date when the Order is tabled in the LegCo.

IMPLICATIONS OF THE ORDER AND THE REVISED EIAO-TM

22. It is expected that the Order and the revised EIAO-TM will bring long-term environmental benefits to our community as a whole. With the implementation of the Order, the lists of DPs will be more clearly defined and become better aligned with technological advancement and development needs in recent years. As regards the revised EIAO-TM, the methodologies for conducting various technical assessments in the EIA process will be further standardised to enhance consistency, efficiency and quality. The overall EIA process will be streamlined and the delivery of DPs could be expedited to benefit our community.

23. With regard to sustainability and economic implications, the Order and the revised EIAO-TM will help balance environmental protection and development needs, thereby fostering social and economic development in a sustainable manner.

24. Concerning civil service implications, additional manpower resources are not required to implement the Order and the revised EIAO-TM. It is expected that the Order and the revised EIAO-TM will enhance efficiency of project developments and technical assessments by relevant departments (i.e. conducting EIA for projects with genuine environmental concerns; implementing standard mitigation measures for DPs

from which adverse environmental impacts would not be anticipated; and carrying out focused and standardised technical assessments) in the long run.

25. The Order and the revised EIAO-TM do not affect the current binding effect of the Ordinance and the subsidiary legislation thereunder. They are in conformity with the Basic Law, including the provisions concerning human rights. They have no financial, family, productivity or gender implications.

26. EPD has prepared for implementing transitional arrangement for handling EPs for DPs. For cases which were originally DPs but cease to be DPs after the Order has come into operation, project proponents may surrender the whole or a part of the EP under the established mechanism of the Ordinance.

27. In respect of the revised EIAO-TM, transitional arrangement for the on-going EIA studies at the planning or drafting stage has also been prepared for implementation by EPD. For on-going EIA studies in which technical assessments have already commenced and the assessment methodologies have been agreed based on the prevailing EIAO-TM, the project proponents shall follow the agreed methodologies or the technical requirements as stipulated in the issued EIA study brief. Project proponents may opt to apply for a fresh EIA study brief if necessary.

PUBLIC CONSULTATION

28. EPD conducted an extensive public engagement exercise on the overall approach and scope for the review of the EIA process in order to collect views and suggestions from stakeholders and the public between March and June 2022. Three online meetings with professional institutes, key project proponents and relevant organisations, and four online public forums, were held. Overall, the views received during the consultation period were positive and constructive.

29. The Panel on Environmental Affairs of LegCo was consulted on 28 March 2022 and 12 December 2022 in respect of, inter alia, proposed amendments of the list of DPs in Schedules 2 and 3 to the Ordinance and proposed amendments of the EIAO-TM. The Panel supported the proposed amendments of the list of DPs in Schedules 2 and 3 to the Ordinance and amendments of the EIAO-TM. EPD also consulted the Advisory Council on the Environment on 7 March 2022 in respect of, inter alia, proposed amendments of the list of DPs in Schedules 2 and 3 to the Ordinance and proposed amendments of the EIAO-TM and obtained their full support on 20 March 2023 on the review results and proposed recommendations including amendments of the list of DPs in Schedules 2 and 3 to the Ordinance and amendments of the EIAO-TM. Two stakeholder workshops were arranged for members of the EIAO Users Liaison Groups on 9 and 16 March 2023. Comments from the public and relevant stakeholders received in the course of the review exercise have been duly considered during the preparation of the amendments of the list of DPs in Schedules 2 and 3 to the Ordinance and the revised EIAO-TM.

PUBLICITY

30. The Order and the revised EIAO-TM were published in the Gazette on 5 May 2023 and a press release was issued on the same day. A spokesperson will be available to answer media and public enquiries.

ENQUIRIES

31. For any enquiries on this brief, please contact Ms. Clara U at 2835 1837.

**Environment and Ecology Bureau
Environmental Protection Department
May 2023**