**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 surveys[1] 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 aircrafts[2] (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

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**Appendix 1**

**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 | • 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 | • Revised Trunk Road T4 in Sha Tin (AEIAR-231/2021)<br>• Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021) |
| | Quadrats and Transect | 4 | • Yuen Long Barrage Scheme (AEIAR- 228/2021)<br>• 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 | • Revised Trunk Road T4 in Sha Tin (AEIAR-231/2021)<br>• Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021) |
| | Camera Trapping | 5.2 | • Yuen Long Barrage Scheme (AEIAR- 228/2021)<br>• 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 | • Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021)<br>• Development at San Hing Road and Hong Po Road, Tuen Mun (AEIAR-227/2020) |
| | Bat detectors / ultrasonic detectors of hand-held type | 5.3 | • Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021)<br>• 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 | • Rarely used |
| Bird | Point Count | 6.1 | • Drainage Improvement Works Near Four Villages in Yuen Long - Sung Shan New Village, Tai Wo, Lin Fa Tei and Ha Che (AEIAR-229/2021)<br>• Development at San Hing Road and Hong Po Road, Tuen Mun (AEIAR-227/2020) |
| | Transect Count | 6.2 | • Revised Trunk Road T4 in Sha Tin (AEIAR-231/2021)[3]<br>• Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021) |
| | Mist-netting | 6.3 | • Development of Lok Ma Chau Loop (AEIAR-176/2013) |
| Herpetofauna (Amphibian & Reptiles) | Active Searching | 7.1 | • Revised Trunk Road T4 in Sha Tin (AEIAR-231/2021)<br>• Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021) |
| | Cover Boards | 7.2 | • Rarely used |
| | Netting | 7.3 | • Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021)<br>• Yuen Long Barrage Scheme (AEIAR- 228/2021) |
| Butterflies and Dragonflies | Transect Count | 8.1 | • Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021)<br>• Yuen Long Barrage Scheme (AEIAR- 228/2021) |
| | Point Count | 8.2 | • Kai Tak Multi-purpose Sports Complex (AEIAR-204/2017)<br>• Outlying Islands Sewerage Stage 2 - South Lantau Sewerage Works (AEIAR-210/2017) |

[3]

| Type of habitats | Survey methodology | Reference paragraphs in GN No. 10/2023 | EIA examples (EIA No.) |
|---|---|---|---|
| | Netting | 8.3 | • Development at San Hing Road and Hong Po Road, Tuen Mun (AEIAR-227/2020)<br>• Decommissioning of West Portion of The Middle ASH Lagoon at Tsang Tsui, Tuen Mun (AEIAR- 186/2015) |
| Fireflies | Transect Count | 9 | • Expansion of Sha Tau Kok Sewage Treatment Works (AEIAR-207/2017)<br>• Port Shelter Sewerage, Stage3 - Sewerage Works at Po Toi O (AEIAR-206/2017) |
| | Netting | 9 | • Development at San Hing Road and Hong Po Road, Tuen Mun (AEIAR-227/2020)<br>Decommissioning of West Portion of The Middle ASH Lagoon at Tsang Tsui, Tuen Mun (AEIAR- 186/2015) |
| Freshwater Fish | Bankside Counts | 10.1 | • Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021)<br>• Yuen Long Barrage Scheme (AEIAR- 228/2021) |
| | Trapping | 10.2 | • Yuen Long Barrage Scheme (AEIAR- 228/2021)<br>• Development at San Hing Road and Hong Po Road, Tuen Mun (AEIAR-227/2020) |
| | Cast Netting | 10.3 | • Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021)<br>• Yuen Long Barrage Scheme (AEIAR- 228/2021) |
| Freshwater Invertebrates | Kick Sampling | 11.1 | • Housing Site in Yuen Long South (AEIAR- 215/2017)<br>• Hung Shui Kiu New Development Area (AEIAR-203/2016) |
| | Individual Stone Sampling | 11.2 | • Rarely used |

| Type of habitats | Survey methodology | Reference paragraphs in GN No. 10/2023 | EIA examples (EIA No.) |
|---|---|---|---|
| | Netting | 11.3 | • Sai O Trunk Sewer Sewage Pumping Station (AEIAR-230/2021)<br>• Yuen Long Barrage Scheme (AEIAR- 228/2021) |

**Appendix 2**

**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)