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1.1 Introduction

Ecological Impact Assessment (EcIA) is the process of identifying, quantifying and evaluating the potential effects of development-related or other proposed actions on relevant habitats, species and ecosystems (relevant ecological features). The assessment approach applied is based upon recognised good practice Guidelines for Ecological Impact Assessment in the UK and Ireland published by the Chartered Institute of Ecology and Environmental Management (CIEEM) (2018). The aims of this EcIA are to:

- identify relevant ecological features (i.e. designated sites, habitats, species or ecosystems) which may be impacted;
- provide a scientifically rigorous and transparent assessment of the likely ecological impacts and resultant effects of the Proposed Development. Impacts and effects may be beneficial (i.e. positive) or adverse (i.e. negative);
- facilitate scientifically rigorous and transparent determination of the consequences of the Proposed Development in terms of national, regional and local policies relevant to nature conservation and biodiversity, where the level of detail provided is proportionate to the scale of the development and the complexity of its potential impacts; and
- set out what steps would be taken to adhere to legal requirements relating to the relevant ecological features concerned.

The principal steps involved in the CIEEM approach can be summarised as:

- ecological features that are both present and might be affected by the Proposed Development are identified (both those likely to be present at the time works begin, and for the sake of comparison, those predicted to be present at a set time in the future) through a combination of targeted desk-based study and field survey work to determine the relevant baseline conditions;
- the importance of the identified ecological features is evaluated to place their relative biodiversity and nature conservation value into geographic context, and this is used to define the relevant important ecological features[1] that need to be considered further within the EcIA process;
- the changes or perturbations predicted to result as a consequence of the Proposed Development (i.e. the potential impacts), and which could potentially affect relevant important ecological features are identified and their nature described. Established best-practice, legislative requirements or other incorporated design measures to minimise or avoid impacts are also described and are taken into account;
- the likely effects (beneficial or adverse) on relevant important ecological features are then assessed, and where possible quantified;
- measures to avoid or reduce any predicted significant effects, if possible, are then developed in conjunction with other elements of the design (including mitigation for other environmental disciplines). If necessary, measures to compensate for effects on features of nature conservation importance are also included;
- any residual effects of the Proposed Development are reported; and
- scope for ecological enhancement is considered.

[1] The term 'important ecological features' used in the CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2018) is equivalent to the term 'relevant ecological features' used throughout this EcIA and can refer to habitats, species and/or ecosystems and their functions or services.

In line with the CIEEM guidelines the terminology used within the EcIA draws a clear distinction between the terms 'impact' and 'effect'. For the purposes of the EcIA these terms are defined as follows:

- impact – actions resulting in changes to an ecological feature. For example, demolition activities leading to the removal of a building utilised as a bat roost; and
- effect – outcome resulting from an impact acting upon the conservation status or structure and function of an ecological feature. For example, killing/ injury of bats and reducing the availability of breeding habitat as a result of the loss of a bat roost may lead to an adverse effect on the conservation status of the population concerned.

1.2 Sensitivity/ Importance

A key consideration in assessing the effects of any development on flora is to define the areas of habitat and the species that need to be considered. This requires the identification of a potential zone of influence, which is defined as those areas and resources that may be affected by biophysical changes caused by project activities, however remote from a site.

In identifying these receptors, it is important to recognise that a development can affect flora and fauna directly (e.g. the land-take required) and indirectly, by affecting land beyond the development site (e.g. through noise generation or hydrological impacts). The approach that has been undertaken for this assessment is to identify 'sensitive ecological receptors' (species and habitats that are both valued and could be affected by the Proposed Development) and separately, to consider legally protected species. The factors influencing the categorisation of how a receptor is valued is explained in more detail below, with examples provided in **Table 1** below.

It is impractical for an assessment of the effects of a development to consider every species and habitat that may be affected; instead, it should focus on valued ecological receptors. CIEEM guidelines (2018) state that detailed assessment is not required for ecological features that are "*sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable*".

The sensitivity of species populations and habitats is assessed with reference to:

- their importance in terms of 'biodiversity conservation' value (which relates to the need to conserve representative areas of different habitats and the genetic diversity of species populations);
- any social benefits that species and habitats deliver (e.g. relating to enjoyment of flora and fauna by the public); and
- any economic benefits that they provide.

Both species' populations and habitats have been valued using the following scale: Very High, High, Medium, Low, Very Low and Negligible.

The approach taken in this assessment is that a species population that is considered to be of Medium or greater importance in biodiversity conservation terms is considered to be a sensitive receptor. If a species population is considered to be of Low or Very Low value, the Proposed Development will not have a significant effect on the receptor in question. Exceptions are if the species population has been identified as having high social or economic value or if the species is legally protected. A similar approach is adopted for habitats. In addition, the role that these ecological features play in the wider ecosystem is also considered when attributing value, for example the Eurasian beaver (*Castor fiber*) plays an important role in modifying the environment around them, resulting in increased habitat for other wetland species and reduced flooding risk.

Ecological features have been valued using the scale set out in **Table 1** below, with examples provided of criteria used when defining the level of value.

Table 1: Scale of Nature Conservation Value

Value of Receptor	Examples
International (Very High)	An internationally important site in a European context e.g. Special Protection Area (SPA), Special Area of Conservation (SAC), Ramsar (or a site proposed for, or considered worthy of such a designation). A regularly occurring substantial population of an internationally important species (listed on Annex IV of the Habitats Directive).
National (High)	A nationally designated site e.g. Site of Special Scientific Interest (SSSI), or a site proposed for, or considered worthy of, such designation and important in Great Britain. A viable area of a habitat type listed in Annex 1 of the Habitats Directive or smaller areas of such habitat which are essential to maintain the viability of a larger whole. A regularly occurring substantial population of a nationally important species, e.g. listed on Schedules 5 & 8 of the 1981 Wildlife and Countryside Act.
Regional (Medium)	Regional areas of internationally or nationally important habitats which are degraded but are considered readily restored, and which are important within the Flow Country/ Caithness and Sutherland context. A regularly occurring, locally significant population of a species listed as being nationally scarce. A regional-scale important population or area of a species or habitat listed on the Scottish Biodiversity List (SBL) or local Biodiversity Action Plan (BAP) e.g. areas of woodland included on the Ancient Woodland Inventory (AWI) of semi-natural origin.
Local (Low)	Viable areas of priority habitat identified in the LBAP or smaller areas of such habitat which are essential to maintain the viability of a larger habitat as a whole, and which are important in the Highlands context. Non-statutory designated areas e.g. Local Nature Reserve (LNR), Environmentally Sensitive Area (ESA), Scottish Wildlife Trust (SWT) reserve or areas of woodland listed on the AWI as being of plantation origin. A regularly occurring, substantial population of a nationally scarce species, including species listed on the UK and Local BAPs. Areas of nationally important habitats which are degraded and have little or no potential for restoration. Areas of groundwater dependent terrestrial ecosystem (GWDTE) habitats such as flushes (such as M6 and M23), which are uncommon within the local area. A good example of a common or widespread habitat in the local area, e.g. those listed as broad habitats on the LBAP. Species of national or local importance, but which are only present very infrequently or in very low numbers within the subject area.

Less than Local (Very Low)	Areas of habitat which have value to the local environment, or populations of regularly occurring common species of local conservation interest, and which are important at the site level. Areas of GWDTE habitats which are common within the local area, such as MG10 rush pasture. Local areas of heavily modified or managed vegetation of low species diversity or low value as habitat to species of nature conservation interest. Common and widespread species. Areas of limited ecological value, which are not representative of semi-natural habitat and do not support wildlife of conservation interest.

1.3 Characterising Potential Ecological Impacts

When describing potential impacts (and where relevant the resultant effects) reference is made to the following characteristics:

- beneficial/ adverse:
    - beneficial (i.e. positive) - a change that improves the quality of the environment, or halts or slows an existing decline in quality e.g. increasing the extent of a habitat of conservation value; or
    - adverse (i.e. negative) - a change that reduces the quality of the environment. e.g. destruction of habitat or increased noise disturbance.
- magnitude - the 'size', 'amount' or 'intensity' of an impact - this is described on a quantitative basis where possible;
- spatial extent - the spatial or geographical area or distance over which the impact/ effect occurs;
- duration - the time over which an impact is expected to last prior to recovery or replacement of the resource or feature. The likely duration of the impact should be quantified (e.g. 2 weeks duration; 5 to 10 years). Consideration has been given to how this duration relates to relevant ecological characteristics such as a species' lifecycle. However, it is not always appropriate to report the duration of impacts in these terms. The duration of an effect may be longer than the duration of an activity or impact;
- reversibility - i.e. is the impact temporary or permanent. A temporary impact is one from which recovery is possible or for which effective mitigation is both possible and enforceable. A permanent effect is one from which recovery is either not possible, or cannot be achieved within a reasonable timescale (in the context of the feature being assessed); and
- timing and frequency - i.e. consideration of the point at which the impact occurs in relation to critical life-stages or seasons.

Impacts can be permanent or temporary; direct or indirect; adverse or beneficial and can be cumulative. Impacts can vary according to scales of size, extent, duration, timing and frequency of impacts. These factors are brought together to assess the magnitude of the impact on the 'conservation status' of the particular valued receptors, and on the 'integrity' of the habitats that support them:

- integrity is the coherence of the ecological structure and functions of a site or habitat that enables it to sustain its plant and animal communities and populations; and
- conservation status is the ability of a habitat, a plant or animal community or population to maintain its distribution and/ or extent / size.

Conservation status is therefore largely determined by the extent to which integrity is maintained. It follows that habitats may or may not be valued ecological receptors in their own right. Wherever possible, the

magnitude of the impact is quantified. Professional judgement is then used to assign the effects on the receptors to one of four classes of magnitude, as defined in **Table 2** below.

Table 2: Magnitude of Impact

Magnitude	Definition
High	A permanent or long-term effect on the integrity of a site or conservation status of a habitat, species assemblage/ community, population or group. If adverse, this is likely to threaten its sustainability; if beneficial, this is likely to enhance its conservation status.
Medium	A permanent or long-term effect on the integrity of a site or conservation status of a habitat, species assemblage/ community, population or group. If adverse, this is unlikely to threaten its sustainability; if beneficial; this is likely to be sustainable but is unlikely to enhance its conservation status.
Low	A short-term but reversible effect on the integrity of a site or conservation status of a habitat, species assemblage/ community, population or group that is within the range of variation normally experienced between years.
Negligible	A short-term but reversible effect on the integrity of a site or conservation status of a habitat, species assemblage/ community population or group that is within the normal range of annual variation.

1.4 Determining the Significance of Effects

The significance of an effect is determined through a standard method of assessment based on professional judgement and available evidence, considering the sensitivity (nature conservation and conservation status) of the ecological receptor and the characterisation of the impact, in a reasoned way.

For each ecological feature only those characteristics relevant to understanding the ecological consequences (effect) of the impact and its relative significance are described, based on the project description and the assumption that standard industry best practice would be applied (e.g. implementation of standard dust suppression and pollution prevention measures).

Significant effects include those which result from impacts on the structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution). CIEEM (2018) states that: "*For the purposes of EcIA a 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' (i.e. relevant ecological features) or for biodiversity in general … In broad terms, significant effects encompass impacts on the structure and function of defined application sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution)*."

In considering effects on conservation status, reference is made to relevant available guidance on the current conservation status of the ecological feature under consideration. Effects will either be:

- not significant (i.e. no ecologically meaningful effect on conservation status); or
- significant (i.e. an ecologically meaningful effect on conservation status).

Such judgments will be based, wherever possible, on quantitative evidence. However, where necessary the professional judgment of an experienced ecologist has been applied and explained.

Table 3 below details the significance criteria that have been used in assessing the effects of the Proposed Development. Major and Moderate effects are considered significant in the context of the EIA Regulations.

Table 3: Significance of Effect

Significance	Definition
Major	Significant effect, as the impact is likely to result in a long term significant negative effect on the conservation status of the feature.
Moderate	Significant effect, as the impact is likely to result in a medium term or partially significant negative effect on the conservation status of the feature.
Minor	The impact is likely to have a negative effect on the feature at an insignificant level by virtue of its limited duration and/ or extent, but there will probably be no effect on its conservation status. The level of effect would be Minor and Not Significant.
Negligible	No material effect. The effect is assessed to be Not Significant.

1.5 Application of the Mitigation Hierarchy

The identification and specification of mitigation proposals in this assessment has been undertaken with regard to the principles of the mitigation hierarchy i.e.:

1. avoid ecological features where possible;

2. reduce (minimise) the magnitude of the potential impact e.g. through iterative design and/ or advance commitment to sensitive methods or timing of working (sometimes termed as embedded mitigation or mitigation by design);

3. mitigate the potential effect through the application of additional proven measures, such that the residual effect realised is reduced in magnitude (non-embedded mitigation); and

4. compensate for significant residual effects, e.g. by providing suitable habitats elsewhere. Proposals should achieve appropriate compensation in a reasonable timeframe and be legally enforceable.

This hierarchy requires the highest level to be applied where possible. Only where this cannot reasonably be adopted should lower levels be considered. Where it is reasonably practicable to do so then attempts have been made to avoid potential impacts. Where impacts cannot be avoided then efforts have been made to limit the magnitude of the potential impact and to mitigate the resultant effects through the provision of appropriate measures. Where effects cannot be mitigated to a level where they are not significant then compensatory measures have been employed to (as far as is reasonably possible) offset any remaining adverse effects.

1.6 References

CIEEM (2018) *Guidance for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.2 Updated April 2022*. CIEEM, Winchester.

Ratcliffe (1977) *A Nature Conservation Review*. Cambridge University Press.