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Transport Infrastructure Ireland

TII Publications



Biodiversity Impact Assessment of National Road, Greenway and Active Travel Projects – Literature Review

RE-ENV-01111

September 2025

RE Research

Technical

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TII Publication Title	<i>Biodiversity Impact Assessment of National Road, Greenway and Active Travel Projects – Literature Review</i>
TII Publication Number	<i>RE-ENV-01111</i>

Activity	<i>Research (RE)</i>	Document Set	<i>Technical</i>
Stream	<i>Environment (ENV)</i>	Publication Date	<i>September 2025</i>
Document Number	<i>01111</i>	Historical Reference	<i>N/A</i>

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TII Publications



Activity:	Research (RE)
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1. Introduction

Transport Infrastructure Ireland (TII) is developing a Standard Document for Biodiversity Impact Assessment of National Road, Greenway and Active Travel Projects. This will replace the existing guidelines, of which the second edition was published in 2009 [1]. The requirement for the new standard was set out in TII's Biodiversity Plan [2].

The first steps in producing the Standard are (i) familiarisation with TII publications; (ii) familiarisation with legislation pertaining to biodiversity; and (iii) to undertake a literature review. The literature review was to comprise a review and summary of key references selected by TII and up to ten additional documents.

2. Method

2.1 TII Publications

Other than those included in the key references, the TII publications pertaining to project management were downloaded and reviewed but not summarised. These are as follows:

- Implementation and Use of TII Publications (Standards) Documentation (GE-POL-01030) (available at: <https://publications.tii.ie/document/?id=2932>);
- Project Management Guidelines (PE-PMG-02041) (available at: <https://publications.tii.ie/document/?id=3015>);
- Project Manager’s Manual for Major National Road Projects (PE-PMG-02042) (available at: <https://publications.tii.ie/document/?id=3027>);
- Project Manager’s Manual for Minor National Road Projects (PE-PMG-02043) (available at: <https://publications.tii.ie/document/?id=3071>);
- Project Manager’s Manual for Greenway Projects (PE-PMG-02047) (available at: <https://publications.tii.ie/document/?id=3200>);
- Environmental Planning of National Road and Greenway Projects (RE-ENV-07008) (available at: <https://publications.tii.ie/document/?id=3229>);
- Project Appraisal Guidelines (all relevant units).

2.2 Legislation & Policy

The main conventions, Directives and national law that relates to wildlife or biodiversity protection and environmental impact assessment were reviewed and briefly summarised, focussing on the aspects which are potentially of relevance to Biodiversity Impact Assessment (BIA). Other environmental legislation identified for review was treated similarly. Since national, local and regional policies on wildlife and biodiversity are also relevant to BIA, these were also identified, reviewed and briefly summarised.

2.3 Key & Additional References

The Key References and Additional References were reviewed in detail and summarised, focusing on the aspects that are relevant to BIA and especially the more difficult areas of the topic, such as ecological value, embedded mitigation, impact significance and cumulative effects. The references were then linked as well as possible to the main steps and requirements of EIA as stated in the Directive, to help with the preparation of the Standard, which is likely to broadly follow the same process.

3. Results

3.1 Legislation and Policy

A summary of the legislation and policy that is or could be relevant to Biodiversity Impact Assessment (BIA) in Ireland is provided in Appendix A.

The primary requirement for BIA arises from Article 14 of the Convention on Biological Diversity which requires “*environmental impact assessment of ...proposed projects that are likely to have significant adverse effects on biological diversity with a view to avoiding or minimizing such effects*”. It defines ‘Biological diversity’, or biodiversity, as “*the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems*”.

In the EU, this is implemented through the EIA Directive (and in turn the transposing legislation of its Member States). This was subject to an amendment in 2014, and now requires an assessment of the likely significant effects of certain projects on the environment including biodiversity, as defined in the Convention, but “*with particular attention to species and habitats protected under [the Habitats] Directive 92/43/EEC and [the Birds] Directive 2009/147/EC*”. The EIA Directive defines the projects that must be subject to an EIA. It does not define ‘likely significant effects’, other than to say that the description of such effects “*should take into account the environmental protection objectives established at Union or Member State level which are relevant to the project*” which implies these objectives are relevant to determining significance.

In the preamble to the 2014 amending Directive, there is some guidance on the intended outcome of avoidance and mitigation measures, stating that these should “*contribute to avoiding ... any net loss of biodiversity, in accordance with the Union’s commitments in the context of the Convention [on Biological Diversity] and the objectives and actions of the Union Biodiversity Strategy*”.

A second form of BIA is derived from Articles 6(3) and 6(4) of the Habitats Directive and the implementing legislation. This is a staged assessment which addresses ‘likely significant effects’ only on Natura 2000 sites, and their qualifying interests, and could therefore be regarded as a component of BIA. The EIA Directive makes clear that duplicate assessments under the EIA and Habitats Directives are not required i.e. the assessments can be joined. The meaning of ‘likely significant effect’ under the Habitats Directive has been defined by the courts. Essentially it means ‘a risk, in the absence of mitigation, of negative implications for the conservation objectives of any Natura 2000 site’ [3] [4]. Such sites generally benefit from having site specific conservation objectives for all their qualifying/special conservation interests, which greatly aids the assessment.

The rest of the legislation and policy pertaining to biodiversity and water quality, and the biodiversity action plans, essentially provide the environmental protection objectives which should be taken into account when describing the likely significant effects of the Project. These range from the simple, such as not killing protected species, to the complex, such as maintaining or restoring ‘favourable conservation status’, ‘achieving good ecological status’, ‘seeking to address no net loss of biodiversity’, and restoring farmland birds using a farmland bird index with a start date set in the future.

A key recent development (2023) is that the National Biodiversity Action Plan now has as statutory underpinning, meaning that, *inter alia*, public authorities must have regard to it, and any associated guidelines, when carrying out their duties. Many of the targets set therein are derived from State level commitments under EU law on biodiversity protection and restoration, so public authorities should now contribute to achieving these commitments and are required to report on their progress.

3.2 Key & Additional References

3.2.1 Overview

The Key & Additional References cover a wide range of topics and all stages of the construction of road projects (but not other types of transport projects except generically). However, some topics which are important to BIA received little attention, e.g. biodiversity as a resource, and others much more, e.g. mitigation techniques. The documents were a mixture of those produced before and after the 2014 amendments to the EIA Directive (which introduced the word 'biodiversity' into the EIA Directive and subsequently the transposing legislation in 2019). A summary of the relevant parts of each document is provided in Appendix B.

One of the documents explains the basic processes of SEA, EIA and AA and the differences between them [5]. Five of the documents reviewed cover part or whole EIA process in detail, including the preparation of Environmental Impact Assessment Reports, and were produced after the 2014 amendment to the EIA Directive [6] [7] [8] [9] [10]. These are designed to cover all disciplines and all development types and are therefore generic; however, they do make clear that 'biodiversity' should be interpreted broadly, and that it is not just an assessment of effects on certain species, even though particular emphasis is required on those listed under the Birds and Habitats Directive. One of these documents [7] makes clear that the 'significance' of effects should be based on scientific or policy thresholds, where these exist. A further document covers the whole EIA process, focussed on roads in Ireland but was produced before the 2014 amendment [11] and may not describe current requirements.

One document describes how to combine or make biodiversity assessments more efficient under SEA, EIA and AA [12]. It offers useful, but complex, step-by-step guidance for what it calls Integrated Biodiversity Impact Assessment (IBIA); however, it has not been widely adopted as a specific process even though many of the steps therein are undertaken in practice. Another document provides guidance on integrating climate change and biodiversity into EIA [13], which again uses a broad definition of biodiversity, while explaining that sites, habitats and species protected by the Habitats and Birds Directives and targets set in the EU Biodiversity Strategy must be considered. It stresses the importance of understanding the cumulative effects of projects on biodiversity.

One document covers the TII publications system [14]. Other TII publications for different disciplines set out what should be done at each phase and stage of TII specified infrastructure projects, and the differences between a 'standard' and 'technical guidelines'. These serve as a guide for the BIA Standard, including what should be done at what stage [15] [16] [17] and to help understand the interactions between these and biodiversity. Several TII Standards make demands on the BIA and may therefore expand the scope of the BIA beyond the statutory requirements for a particular project. These include undertaking an 'ecological network analysis' to inform the landscape design [18] [19] and the mapping of invasive alien plant species [20] [21]. It will therefore be important to replicate or refer to these requirements in the BIA Standard.

Three of the documents are specific to Ecological Impact Assessment and cover the whole process [1] [22] [23], with one of these (the NRA Guidelines) being specific to roads in Ireland [1] and another (the DMRB) to roads in the UK [22]. The CIEEM Guidelines [23] and the DMRB have been updated since the 2014 amendments while the NRA Guidelines have not. The CIEEM Guidelines are comprehensive, however, they do not fully grasp the need to assess effects on biodiversity, in a broad sense, and the guidance could be clearer on how to determine and value Important Ecological Features, on how to judge if an effect is significant, and the reason for assigning a level of significance on a geographic scale.

The DMRB presents a combination of the CIEEM approach and the multi-factor (matrix) approach to determining significance of effects, see [7] for an explanation of the multi-factor approach.

It defines a significant effect as one which undermines the conservation objectives for a feature but then makes no reference to the conservation objectives in its method for determining significance. The CIEEM guidelines warn against using a matrix approach for assessing the significance of ecological impacts.

A further document [24] provides some clarity on significant effects for habitats and species listed in the Habitats and Birds Directive, by linking significance more clearly with favourable conservation status. Three more provide information on the environmental protection (conservation) objectives which may be relevant to determining impact significance, one for water [25], one for freshwater pearl mussel [26] and one for biodiversity [27]. One [28] provides three definitions of significance, one for EIA, another for AA and a third for planning decisions. All three are quoted in the CIEEM guidelines without distinguishing between them.

A few of the documents [29] [26] [30] are specific to Appropriate Assessment under the Habitats Directive, however, given that both assessments should judge significance based on effects on the conservation objectives of ecological features, there is some crossover. One of these [30] provides useful guidance on using the source-pathway-receptor model to identify features for inclusion in the assessment, and another three provide information on the area which may need to be included in a BIA based on animal behaviour [31] [32] [33].

Several documents are or include guidelines for undertaking surveys and classifying habitats which can be used to inform BIA. These include guidelines on surveys for habitats [34], vegetation [35] [36], freshwater pearl mussel [37], a number of protected species [38], birds [39], Barn Owl [40] [41], and bats [42] [31] [43] [44]. One document covers the lifespan of ecological data, which is limited to one to three years, unless validity checks are made [45].

Many of the documents reviewed deal with mitigation, or measures to prevent or reduce, likely significant effects from projects on biodiversity, especially during the construction stage. These include for trees [46], Barn Owl [40] [47], Otter [48], Badger [49], bats [50] [51] [43] [44] [52], and all wildlife [53] [24]. A few provide detailed designs to support the implementation of mitigation measures, including mammal fencing [54], mammal underpasses [55] [56], watercourse crossings [57]. One document covers the restoration of a habitat (raised bog) which could be used to inform compensation measures [58] and others deal with management measures which could be employed during the operation of roads, for example [59].

A further topic covered in the review is Biodiversity Net Gain (BNG), the concept of providing more biodiversity through development than is lost. Biodiversity Net Gain is not mandatory, or even fully committed to, in policy in Ireland. Nevertheless, the idea is taking hold [2] [60]. It currently exists as a parallel assessment to ecological impact assessment. There is no possibility that the BNG assessment could replace BIA however there is overlap and opportunities for efficiencies by integrating parts of these processes [61] [62]. One method uses a standard calculator [63] however BNG is wider than this [61] [62]. Importantly, BNG encompasses a wide definition of biodiversity, just as BIA should. The method for valuing habitats is different to that described for EIA; rather than attempting to give a value of a geographic scale, BNG approaches tend to value habitats based on 'distinctiveness' with the most natural having high distinctiveness and the most modified having the low distinctiveness, regardless of how much there is in a particular region.

3.2.2 Links to Key Stages in EIA

Annex IV of the EIA Directive provides a description of the information to be included in an EIAR, these are provided in

Table 3.1 Table 3.1 along with other requirements of the EIA Directive and the key references associated with each stage derived from the literature review.

Table 3.1 - Links to key Stages in EIA

Step/Ref	Requirement	Key References
Screening	Determining the need for an EIA	[6]
Scoping	Determining what should be within the scope of an EIA	[7]
1	Description of the project	[6] [7] [8] [9] [10] [11]
2	A description of the reasonable alternatives	[8] [9] [10] [11] [15]
3	A description of the relevant aspects of the current state of the environment	Appendix A Table A.1, Table A.2, Table A.4 - Domestic Legislation pertaining to Biodiversity & Water Quality Table A.4, A.1.5 [1] [4] [8] [9] [13] [18] [19] [20] [21] [23] [24] [30] [34] [35] [36] [37] [38] [40] [41] [42] [45] [61] [62] [63]
4	A description of the factors ...likely to be significantly affected by the project: ...biodiversity (for example fauna and flora),...	As above
5	A description of the likely significant effects of the project on the environment resulting from,	[1] [7] [8] [9] [10] [13] [22] [23] [24] [27] [28]
	a) the construction and existence of the project, including, where relevant, demolition works;	
	b) the use of natural resources, in particular land, soil, water and biodiversity,	[8]
	c) the emission of pollutants, noise, vibration.....	[17]
d) the cumulation of effects with other existing and/or approved	[1] [8] [9] [13] [22] [23]	
The description of the likely significant effects on [biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC and interactions with other factors] should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the project.	[1] [7] [8] [9] [10] [13] [22] [23] [24] [27] [28] [51] [61] [62] [63]	

Step/Ref	Requirement	Key References
	This description should take into account the environmental protection objectives established at Union or Member State level which are relevant to the project.	[13] [23] [24] [25] [26] [27]
6	A description of the forecasting methods or evidence, used to identify and assess the significant effects....	[31] [32] [33]
7	A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment	[8] [10] [18] [19] [20] [21] [23] [24] [40] [46] [47] [48] [49] [50] [51] [53] [54] [55] [56] [57] [58] [59] [61] [62] [63]
8	A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters...	[8]
Art 2	Ensure that coordinated and/or joint procedures are fulfilling the requirement [the EIA and Habitats Directive]	[9] [12]

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Appendix A – Legislation & Policy

A.1 Legislation

A.1.1 International Conventions

Table A.1 provides an overview of the International Conventions which are relevant to biodiversity impact assessment to which Ireland is party.

Table A.1 - International Conventions on Biodiversity

Convention	Description
Convention on Wetlands of International Importance 1971 (the Ramsar Convention)	Parties to the convention including Ireland are required to designate qualifying wetland sites (Ramsar sites) with particular regard to their importance as wildfowl habitat and to promote the wise use of wetlands.
Convention Concerning the Protection of the World Cultural and Natural Heritage 1972 (the World Heritage Convention (WHC))	Parties to the convention are required to put forward features and sites of outstanding cultural or natural importance to be considered for designation by the World Heritage Committee, which maintains a list of those accepted as World Heritage Sites. Countries may also have a 'tentative' list of sites which may be put forward for designation in the future.
Convention on the Conservation of Migratory Species of Wild Animal 1979 (the CMS or Bonn Convention)	Parties are required to conserve migratory species and their habitats by providing strict protection for endangered migratory species; concluding multilateral agreements for the conservation and management of migratory species which require or would benefit from international cooperation; and by undertaking cooperative research activities. An environmental treaty under the aegis of the United Nations Environment Programme with trans-global parties.
Convention on the Conservation of European Wildlife and Natural Habitats 1979 (the Bern Convention)	Parties are required to protect all wild plant and animal species and their natural habitats; to increase cooperation with each other; and to afford special protection to the most vulnerable or threatened species (including migratory species). Applies to Europe only.
Convention on Biological Diversity 1992 (one of the 3 Rio Conventions arising from the 1992 Earth Summit)	Parties are required to develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity. This is the convention which gave rise to Ireland's National Biodiversity Action Plan. It provides a definition of biodiversity and the requirement to assess the likely significant adverse effects of projects on biodiversity.
The United Nations Economic Commission for Europe (UNECE) Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, The Aarhus Convention	Gives rights to citizens to receive environmental information that is held by public authorities and to participate in environmental decision making, as well as rights in relation to access to justice.

A.1.2 European Directives

Table A.2 provides a brief overview of the relevant European Directives, Regulations and Law.

Table A.2 - European Directives and Regulations for Biodiversity & Water Quality

Directive/Regulation	Description
Directive 79/409/EEC on the conservation of wild birds 1979, as amended in 2009 by Directive 2009/147/EC, (the Birds Directive)	The Birds Directive is part implementation of the Bern Convention. Member States are required to provide general protection to all wild birds. This aspect is implemented, in effect, by the Wildlife Act 1976 in Ireland. The Directive also requires the designation of protected sites for rare or vulnerable species and migratory species of bird to form a European network of protected sites. The original 1979 Directive was amended in 2009 to become Council Directive 2009/147/EC on the Conservation of Wild Birds (codified version).
Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora 1992 (the Habitats Directive)	The Habitats Directive is part implementation of the Bern Convention (see above). Member States are required to implement legislation to designate a network of protected sites (Natura 2000) and maintain their ecological integrity. Certain species are also strictly protected through this Directive. In Ireland, the Directive is implemented by the European Communities (Birds and Natural Habitats) Regulations 2011, as amended and, in the context of national roads and greenway projects, the Appropriate Assessment process is laid down in Part XAB of the Planning and Development Act 2000, as amended. It requires an assessment of Plans and Projects which may have an adverse effect on the integrity of Natura 2000 sites and provides strict protection for certain species.
Directive 2000/60/EC establishing a framework for the community action in the field of water policy 2000 (the Water Framework Directive)	Member States must implement legislation to designate, monitor and maintain or improve the ecological status of river basins and coastal waters. This includes impact assessments, management plans and pollution control measures. The Water Framework Directive is transposed into Irish law by, inter alia, six separate sets of Regulations. <ol style="list-style-type: none"> i. European Communities (Water Policy) Regulations, 2003, as amended; ii. European Communities Environmental Objectives (Surface Waters) Regulations, 2009, as amended; iii. European Communities Environmental Objectives (Groundwater) Regulations, 2010, as amended; iv. European Communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations, 2011; v. European Union (Water Policy) Regulations, 2014; and, vi. European Union (Good Agricultural Practice for Protection of Waters) Regulations, 2022, as amended.
Directive 2004/35/EC on environmental liability with regard to the prevention and remediation of environmental damage 2004 (the Environmental Liability Directive)	The Environmental Liability Directive seeks to achieve the prevention and remediation of environmental damage: specifically, damage to habitats and species protected by EC law, and other habitats and species designated by Member States, damage to water resources, and land contamination which presents a threat to human health. This is implemented by the European Communities (Environmental Liability) Regulations 2008, as amended.

Directive/Regulation	Description
<p>Directive 2008/56/EC establishing a framework for community action in the field of marine environmental policy (the Marine Strategy Framework Directive (MSFD))</p>	<p>The Marine Strategy Framework Directive aimed to achieve good environmental status for Europe’s seas by the year 2020. Each Member State will need to develop a marine strategy which aims to protect and preserve the marine environment, prevent its deterioration or, where practicable, restore marine ecosystems in areas where they have been adversely affected. Each Member State also needs to phase out pollution to ensure that there are no significant negative impacts on or risks to marine biodiversity, marine ecosystems, human health or legitimate uses of the sea. The MSFD is implemented in Ireland by the European Communities (Marine Strategy Framework) Regulations 2011, as amended.</p>
<p>Regulation (EU) No 1143/2014 on the prevention and management of the introduction and spread of invasive alien species (the Invasive Alien Species Regulation) 2014 as amended, together with Commission Implementing Regulation (EU) 2016/1141 and Implementing Regulation (EU) 2019/1262</p>	<p>The Invasive Alien Species Regulation is for the purpose of preventing harm to biodiversity arising from alien, invasive species in the European Union and it became law in all Member States on 1st January 2015, without the need to transpose the regulation into domestic law. The regulations include the requirement for the European Commission to publish a list of invasive species of Union concern (through commission implementing regulations) and require Member States to prevent intentional and unintentional introduction and spread of these species, set up a surveillance system for early detection and implement eradication or management measures to prevent or control the spread of such species. The initial list of species was published in 2016, with 37 species in total, including grey squirrel, signal crayfish, muntjac deer and the Asian hornet, and was updated in 2019, with an additional 17 species added, including the common Myna, New Zealand flatworm, the pumpkinseed fish, the striped eel catfish, tree-of-heaven and 12 other plant species, including grasses. There are now 54 invasive alien species of Union concern.</p>
<p>Regulation (EU) 2024/1991 on nature restoration 2024 and amending Regulation (EU) 2022/869 (the Nature Restoration Law)</p>	<p>Requires Member States to have in place a plan for the restoration of biodiversity. It is focused on the habitats listed under the Habitats Directive and the habitats of species listed under the Habitats and Birds Directive, and restoring or maintaining these in a good condition and therefore contribute to reaching or maintaining favourable conservation status, and then not allowing this to deteriorate except for certain reasons which can include, outside of Natura 2000 sites, renewable energy projects, national defence projects or another <i>‘plan or project of overriding public interest for which no less damaging alternative solutions are available’</i> and, inside Natura 2000 sites, a plan or project authorised in accordance with Article 6(4) of the Habitats Directive.</p> <p>It also includes targets for urban biodiversity, rivers and floodplains (including removing artificial barriers), pollinator populations, biodiversity in agricultural systems (including farmland bird populations), rewetting peatlands, forest ecosystems (including forest bird populations).</p>

Table A.3 - European Directives and Regulations for the Environment

Directive/Regulation	Description of Relevant Aspects
<p>Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment 1985, as amended in 1997 (Council Directive 97/11/EC), 2003 (2003/35/EC) and 2009 (2009/31/EC), codified in 2011 (2011/92/EU) and amended again in 2014 (2014/52/EU) (the EIA Directive).</p>	<p>Member States are required to assess the environmental effects of public and private developments and other projects which are likely to have significant effects on the environment before consent is given. The assessment must include the significant effects on biodiversity, with particular reference to the species and habitats protected under the Birds and Habitats Directives. The Directive is implemented through various pieces of legislation including the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018, the Roads Act 1993, as amended, and the European Union (Roads Act 1993) (Environmental Impact Assessment) (Amendment) Regulations 2019 (S.I. No. 279 of 2019). Additional regulations apply to environmental impact assessments for agriculture, forestry, water management and so on.</p>
<p>Directive 1999/31/EC on the landfill of waste, as amended by Directive (EU) 2018/850 (the Landfill Directive).</p>	<p>Member States are required to reduce the amount of waste going to landfill and otherwise regulate the depositing of waste in landfill sites.</p>
<p>Directive (EU) 2016/2284 on the reduction of national emissions of certain atmospheric pollutants, as amended by Directive (EU) 2024/299</p>	<p>Member States are required to limit their annual national emissions of the pollutants sulphur dioxide (SO₂), nitrogen oxides (NO_x), non-methane volatile organic compounds (NMVOC), ammonia (NH₃) and fine particulate matter (PM_{2,5}) to below certain thresholds.</p>
<p>Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (the SEA Directive).</p>	<p>Sets out the procedure for undertaking Strategic Environmental Impact Assessments of Plans and Programmes, including transport plans, in a similar way to that described under the EIA Directive. It requires assessments of the likely significant effects of the Plan or Programme on the environment, to be presented in an environmental report. The report must set out the relevant environmental protection objectives, established at international, community or member state level, describe the way these have been taken into account during the preparation of the Plan and assess the likely significant effects on the environment on, inter alia, biodiversity, flora and fauna.</p>
<p>Directive 2002/49/EC relating to the assessment and management of environmental noise, as amended by Regulation (EC) No 1137/2008, Commission Directive (EU) 2015/996, Regulation (EU) 2019/1010, Regulation (EU) 2019/1243, Commission Directive (EU) 2020/367 and Commission Delegated Directive (EU) 2021/1226 (the Environmental Noise Directive).</p>	<p>Applies to environmental noise that humans are exposed to, including transport noise, and requires Member States to produce action plans for the management of such noise.</p>

Directive/Regulation	Description of Relevant Aspects
Directive 2006/118/EC on the protection of groundwater against pollution and deterioration, as amended by Commission Directive 2014/80/EU (the Groundwater Directive).	Directive for preventing pollution and ensuring the good chemical status of groundwater, with the aim of protecting human health and associated surface waters, dependent ecosystems and wetlands. Member States are required to set threshold values. This is a 'daughter' Directive of the Water Framework Directive, the other being the Environmental Quality Standards Directive (EQSD).
Directive 2006/21/EC on the management of waste from extractive industries as amended by Regulation (EC) No 596/2009.	Directive for managing waste associated with mining and other land-based extractive industries, with the aim of preventing pollution and accidents and harm to humans and the environment including flora and fauna.
Directive 2007/60/EC establishing a framework for the assessment and management of flood risk (the Floods Directive)	<p>The Floods Directive establishes a framework for the assessment and management of flood risks to reduce the negative consequences of flooding on human health, economic activities, the environment and cultural heritage in the European Union.</p> <p>Member States are required to assess the risk of flooding within each river basin district, including the adverse consequences of future floods on the environment, and produce flood risk management plans, which must take into account <i>inter alia</i> the environmental objectives of the Water Framework Directive 2000/60/EC, e.g. at least good ecological and chemical status of surface waters, and nature conservation.</p>
Directive 2008/50/EC on ambient air quality and cleaner air for Europe, as amended by Commission Directive (EU) 2015/1480 (the Ambient air Quality Directive).	Aims to avoid, prevent and reduce harmful effects of poor air quality on both human health and vegetation and natural ecosystems. The Directive covers sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter (PM10 and PM2,5), lead, benzene, carbon monoxide and ozone, and sets limits for these (with exceptions PM10 arising from winter-sanding or salting of roads). Air Quality Plans are required for areas which exceed any limit value. Limits are provided for the protection of vegetation and natural ecosystem for sulphur dioxide, oxides of nitrogen and ozone.
Directive 2008/105/EC on environmental quality standards in the field of water policy, as amended by Directive 2013/39/EU, (the EQSD).	Sets the environmental quality standards for 33 substances in water. A daughter Directive of the Water Framework Directive.
Directive 2008/98/EC on waste, as amended by Commission Regulation (EU) No 1357/2014, Commission Directive (EU) 2015/1127, Council Regulation (EU) 2017/997, Directive (EU) 2018/851 and Regulation (EU) 2023/1542 (the Waste Framework Directive).	Aims to prevent or reduce the adverse impacts of the generation and management of waste, including hazardous waste, on human health and the environment. It provides a waste hierarchy, with disposal being the last resort unless this is the best overall environmental outcome, and requires Member States to ensure that waste management is carried out without harming the environment, or risks to <i>inter alia</i> plants, animals, the countryside and places of special interest.

Directive/Regulation	Description of Relevant Aspects
Regulation (EC) No. 1107/2009 concerning the placing of plant protection products on the market, as amended by Council Regulation (EU) No 518/2013, Regulation (EU) No 652/2014, Regulation (EU) 2017/625, Commission Regulation (EU) 2017/1432, Commission Regulation (EU) 2018/605, Regulation (EU) 2019/1009, Regulation (EU) 2019/1381, Commission Regulation (EU) 2021/383, Commission Regulation (EU) 2022/1438.	Regulates the sale, use and control of pesticides (and other plant protection products) and prohibits the use of those which would have an unacceptable effect on, <i>inter alia</i> , the environment, defined as ' <i>waters (including ground, surface, transitional, coastal and marine), sediment, soil, air, land, wild species of fauna and flora, and any interrelationship between them, and any relationship with other living organisms</i> '.
Directive 2009/128/EC establishing a framework for Community action to achieve the sustainable use of pesticides, as amended by Regulation (EU) No 652/2014, Commission Directive (EU) 2019/782 and Regulation (EU) 2019/1243	Establishes a Framework for the sustainable use of pesticides by reducing the risks and impacts of pesticide use on human health and the environment. It is complimentary to the Birds, Habitats, and Water Framework, Directives, and Regulation (EC) No. 1107/2009 described above. Member States are required to produce National Action Plans for monitoring and reducing the use of plant protection products and ensure that measures to protect the aquatic environment are adopted. TII provides detailed advice on the legislation governing the Use of Plant Protection Products and Sustainable Use of Pesticides in its IAPS management technical guidance document: https://publications.tii.ie/document/?id=3075
Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances (the Seveso-III Directive)	Aims to prevent major accidents which involve dangerous substances and limit their consequences for human health and the environment however it does not apply to the transport of dangerous substances by road, rail, inland waterways, sea or air, being limited to the establishments where such substances are made or stored. It indicates that in the event of a major accident the Environmental Liability Directive normally applies.
Regulation (EU) 2021/1119 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 (the 'European Climate Law').	Establishes a Framework for the reduction of greenhouse gas emissions with a binding target of net zero by 2020 and an aim for negative emissions thereafter, as well as requiring Member States to adopt and implement national adaptation strategies and plans.

A.1.3 Domestic Legislation

Table A.4 provides a brief overview of the domestic legislation pertaining to wildlife protection and Table A.5 provides a brief overview of domestic planning and environmental legislation.

Table A.4 - Domestic Legislation pertaining to Biodiversity & Water Quality

Legislation	Description or Relevant Aspects
Wildlife Act 1976, as amended.	The principal national legislation for the protection of wildlife and the control of activities that may adversely affect wildlife. Also seeks to conserve a representative sample of important ecosystems and regulate game resources. It makes licences mandatory for certain activities which may interfere with ecosystems and regulates the possession, trade and movement of wildlife. Areas of importance for wildlife may be protected under the Act, either as Nature Reserves, Refuges for Fauna, or by way of management agreements.
Wildlife (Amendment) Act 2000, 2010, 2012, 2023.	The Wildlife (Amendment) Acts amend the Wildlife Act, 1976 and have standalone provisions. Amendments to the Act include the strengthening the protection of wild plants, birds and animals (2000). Standalone elements include the designation and protection of Natural Heritage Areas (NHAs) and improving the conservation of wildlife and their habitats while ensuring Ireland’s compliance with international biodiversity agreements. The Wildlife (Amendment) Act 2023 requires a review of raised and blanket bog habitats including their status as Natural Heritage Areas which includes consideration of restoration potential to a favourable conservation condition and creates a new biodiversity duty for public bodies that requires them to have regard to <i>inter alia</i> the objectives and targets in the National Biodiversity Action Plan and any associated guidelines and provide an annual report on its progress. It provides a legal definition of biodiversity ‘as the variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part and includes diversity within species, between species and of ecosystems’.
Inland Fisheries Acts 1959 to 2017.	Regulates fishing and fisheries, and the taking of fish, oysters and other sea molluscs. It provides protections for spawning beds, young and breeding fish from injury and disturbance and prohibits obstructing the passage of migratory fish. The 2010 amendment established Inland Fisheries Ireland and dissolved the central and regional fisheries boards.
Local Government (Water Pollution) Acts 1977 to 2007.	Generally, prohibits pollution of water unless under licence (trade or sewage effluent), gives powers to local authorities to require measures to control or prevent water pollution, requires those who have caused accidental pollution to report it to the local authority, enables the government to request local authorities to produce a water quality management plan, to establish a water quality control authority and to set water quality standards.
Flora (Protection) Order 2022.	This is the most up to date legislation regarding protected plant species in Ireland and supersedes three earlier versions of the Order. The Order lists the plant species protected under Section 21 of the Wildlife Act 1976, which makes it illegal to cut, damage, or uproot these species or to interfere with their habitats and seeds.

Legislation	Description or Relevant Aspects
European Communities (Water policy) Regulations, 2003, as amended.	Along with five other sets of Regulations, transpose into law the Water Framework Directive (2000/60/EC), requiring the management of water quality on a river basin scale. Three River Basin Districts (RBDs) were identified for this purpose. Two are shared with Northern Ireland, with one wholly within the Republic which covers most of the country. It requires local authorities to establish environmental objectives but does not provide the quality standards, for which see the European Communities Environmental Objectives (Surface Waters) Regulations 2009.
European Communities (Environmental Liability) Regulations 2008 to 2015.	Transposes EU Directive 2004/35/CE on environmental liability with regard to the prevention and remedying of environmental damage, establishing a framework of environmental liability based on the 'polluter-pays' principle, to prevent and remedy environmental damage. The Irish Environmental Protection Agency has been designated as the competent authority for all aspects of these Regulations, and it includes liability for damage to protected species and natural habitat of the kinds listed in the Birds and Habitats Directive.
European Communities Environmental Objectives (Surface Waters) Regulations 2009.	Further implementation of the Water Framework Directive, which sets out the environmental objectives for surface waters, including the achievement of good ecological and chemical status, and implements the EQSD.
The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009.	Regulations which set environmental quality objectives for the SACs and cSACs which are designated for Freshwater Pearl Mussel, requires sub-basin management plans with programmes of measures to achieve these objectives, and sets out the duties of public authorities with respect to these. The overall objective is to achieve the favourable conservation status for freshwater pearl mussels. It includes criteria for assessment and the objectives, which include 'no artificially elevated levels of siltation'. The Regulations apply to the National Roads Authority and the relevant local (roads) authorities.
European Communities Environmental Objectives (Groundwater) Regulations, 2010, as amended.	Further implementation of the Water Framework Directive (and Groundwater Directive), which sets out the environmental objectives for groundwater.
European Communities (Good Agricultural Practice for Protection of Waters) Regulations, 2010.	Further implementation of the Water Framework Directive, which regulates agricultural practice with the aim of reducing pollution of water.
European Communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations, 2011.	Further implementation of the Water Framework Directive, which requires laboratories undertaking tests to be in accordance with the EN ISO/IEC-17025 standard and sets approaches for <i>inter alia</i> quality assurance.
European Communities (Marine Strategy) Framework Regulations, 2011, as amended.	Instrument which transposes into law the Marine Strategies Framework Directive. This is the European wide initiative to protect and preserve the marine ecosystems of all Member States and achieve Good Environmental Standards (GES) in the marine environment by 2020.

Legislation	Description or Relevant Aspects
European Communities (Birds and Natural Habitats) Regulations 2011 to 2021.	A collection of regulations which consolidates all previous acts relating to the EU Habitats Directive and the EU Birds Directive. The Habitats Directive is the main piece of EU legislation governing the protection and conservation of habitats and organisms (excluding birds) deemed to be threatened and of EU wide importance. It establishes SACs or Special Areas of Conservation where habitats and/or wildlife present are deemed to be ecologically valuable. The EU Birds Directive conserves wild bird populations in Europe by protecting not only the birds but also by their habitats through the creation of Special Protection Areas (SPAs).
European Union (Water Policy) Regulations 2014.	Further implementation of the Water Framework Directive. Provides for the establishment and composition of a Water Policy Advisory Committee and transfer powers of powers from local authorities to the Environmental Protection Agency.
The Heritage Act 2018.	Amends the Wildlife Act 1976 by creating discretionary powers for the government to allow burning of uncultivated land in March and the cutting of roadside hedgerows in August and provides additional exemptions for cutting roadside vegetation for reasons of road safety, as well as giving additional powers to the police to enforce wildlife legislation, including fixed penalties.
Water Environment (Abstractions and Associated Impoundments) Act 2022, and Water Environment (Abstractions and Associated Impoundments) Regulations 2024.	The primary purpose of the Act is to provide for a modern registration, licensing and control regime for water abstractions. The legislation transposes requirements under the EU Water Framework Directive for controls over, and the prior authorisation of, abstraction of surface water and groundwater, and impoundment of surface water, and responds to infringement proceedings initiated by the European Commission.

Table A.5 - Domestic Legislation for Planning and the Environment

Legislation	Description of Relevant Aspects
Roads Acts 1993 to 2023.	Classifies roads and cycleways, establishes the National Roads Authority, and sets out the requirements for EIA and the preparation of an EIAR for the construction of motorways, busways, service areas and public roads, and improvements i.e. it implements the EIA Directive for these types of Projects. It stipulates that An Bord Pleanála will take the EIAR into account before approving the proposed road development. It sets out criteria for approving a proposed road development. It requires landowners and occupiers to ensure that vegetation, water soil and other materials do not cause a hazard to road users and enables the roads authority to serve a notice compelling the landowners and occupiers to preserve or cut back vegetation, and prevent water, soil and other materials flowing or falling onto the road. It also gives power to the roads authority to construct drains on any land. This legislation will also be amended by the Planning and Development Act 2024.
Waste Management Acts 1996 to 2011.	Deals with the management of waste, including the preparation of waste management plans and gives powers to local authorities to deal with waste that is causing or may cause pollution.
The Planning and Development Acts, 2000 to 2022.	Consolidate all previous planning laws and sets out the basic framework for managing development. It protects natural and architectural heritage and formalises in law the requirement for Environmental Impact Statements and Appropriate Assessments. It establishes powers for planning authorities to set objectives for the conservation and improvement of natural heritage. Amendments include Part 5 of the Planning and Development (Amendment) Act 2018, which brings marine spatial planning and development into the Planning and Development Act.
Planning and Development Regulations 2001 to 2024.	A collection of regulations relating, <i>inter alia</i> , to the submission of planning applications. Regulations include protocols for producing environmental impact assessment reports relating to works consisting of or incidental to the carrying out of development. Amends the Planning and Development Act to that effect and is technically part of that Act.
The Planning and Development (Strategic Infrastructure) Act 2006.	<p>Amends and forms part of the Planning and Development Acts, 2000 to 2022 and amends other legislation.</p> <p>Enables planning applications to be made directly to An Bord Pleanála for strategic infrastructure development. Strategic infrastructure development includes:</p> <p>(f) any scheme or proposed road development referred to in section 215 of the Planning and Development Acts, 2000 to 2004 (note the decision-making powers were already transferred to the Board for motorway, busway or protected road schemes by the Planning and Development Act 2000 and, further, proposed road development requiring EIA will no longer be considered SID under the Planning and Development Act of 2024).</p> <p>(g) any proposed railway works referred to in section 37(3) of the Transport (Railway Infrastructure) Act 2001</p> <p>The Act makes clear that <i>inter alia</i> the environmental impact assessment and effects on European sites must be considered by the board when determining the application.</p>

Legislation	Description of Relevant Aspects
	The Act also led to the formation of a division within An Bord Pleanála to deal with strategic infrastructure development applications.
European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018.	Partially implements the EIA Directive in Ireland, including the 2014 amendment to the Directive for planning and development, by amending the Planning and Development Act 2000. Applies to strategic infrastructure and marine developments as these are included in the Planning and Development Act.
European Union (Roads Act 1993) (Environmental Impact Assessment) (Amendment) Regulations 2019 which amend The Roads Acts 1993 to 2019.	The Regulations partially transpose the 2014 amendments to the EIA Directive by amending the Roads Act, including the need to identify, describe and assess the direct and indirect significant effects on biodiversity, with particular attention to species and habitats protected under the Habitats and Birds Directives. Further information on the application of the Regulations is provided in TII's publication RE-ENV-07008 Environmental Planning of National Road and Greenway Projects February 2023 https://publications.tii.ie/document/?id=3229 [64].
Transport (Railway Infrastructure) Act 2001, as amended.	Includes the requirement to prepare an Environmental Impact Assessment for new railways, which was updated in 2021 by the European Union (Railway Orders) (Environmental Impact Assessment) (Amendment) Regulations 2021 to take into account the 2014 amendments to the EIA Directive. This Act will also be amended by the Planning and Development Act 2024.
Climate Action and Low Carbon Development Acts 2015 to 2021.	Sets out the national climate objective to pursue and achieve, by no later than the end of the year 2050, the transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy, and the requirement to produce a Climate Action Plan for achieving the climate objective, which must pay regard to the need to restore and protect biodiversity; and a National Climate Change Adaptation Framework.

A.1.4 European, National, Regional and Local Policy

Table A.6 provides a summary of the policy which pertains to biodiversity protection.

Table A.6 - European, National, Regional and Local Policy on Biodiversity

Policy	Description of Relevant Aspects
European policy -EU Biodiversity Strategy to 2030.	See document summaries.
Project Ireland 2040: National Planning Framework.	The National Planning Framework is the national spatial strategy for Ireland. It includes policy objectives which are to be incorporated into lower tier plans, such as Local Development Plans. One of these (no. 58) to provide integrated planning for green infrastructure and ecosystem services, another (no. 59) is to enhance the conservation status and improve the management of protected nature conservation sites and protected species and to protect and restore biodiversity through the planning system. The National Planning Framework replaced the National Spatial Strategy for the Republic of Ireland (NSS) (2002). It mandates that all applications for development that is likely to have significant effects on the environment are accompanied by the minimum of an ecological impact assessment report.
Project Ireland 2040: National Development Plan 2018 – 2027.	The National Development Plan sets out the priorities for infrastructure and investment projects and spending. These are informed by the policy objectives of the National Planning Framework and are designed to achieve those objectives. The 10 National Strategic Outcomes described in the Plan include (no. 7) enhanced amenity and heritage, which includes protection and enhancement of biodiversity through the National Development Plan, specifically, implementing the National Biodiversity Action Plan 2017 – 2021, support for local biodiversity action plans and the restoration of peatlands.
Draft Revised National Planning Framework.	An update to the 2018 NPF which includes policies on biodiversity conservation and enhancement, these include supporting the preparation of the National Restoration Plan (no. 83), supporting the conservation, enhancement, mitigation and restoration of biodiversity (no. 84), asking planning authorities to seek to address no net loss of biodiversity in their development plans (no. 84), and enhancing the conservation status and improving the management of protected areas and protected species (no. 86).
National Peatlands Strategy 2015.	A strategy for all of Ireland’s peatlands which contains a series of actions and principles relevant to sectors and users of peat and peatlands. It includes the principle of responsible management, rehabilitation and restoration of peatlands by Coillte and Bord na Móna.
Regional Spatial & Economic Strategies (RSES).	There are three Regional Spatial and Economic Strategies for Ireland: Northern and Western Region, Eastern and Midland Region and Southern Region. These cover a 12-year period from 2020, implement the National Planning Framework at the Regional level and inform the preparation of the lower tier plans i.e County and City Development Plans. The Regional Spatial Strategies are quite variable.

Policy	Description of Relevant Aspects
	That for the Southern Region, for example, restates the requirement for an ecological impact assessment for proposed development; supports only development which has no adverse effect on the integrity of Natura 2000 sites and no net loss of biodiversity; seeks to protect, manage and improve the coherence of the Natura 2000 network; requires development plans to include objectives to protect (proposed) Natural Heritage Areas and ecological networks/corridors; requires local authorities to implement and monitor the actions in the National and local biodiversity action plans; and asks local authorities to enhance natural heritage, where possible. It also has policies on invasive species and pollinators (through support of the All-Ireland Pollinator Plan 2015 – 2020). In contrast, that for the Northern and Western Region has more limited polices which include ensuring no net loss of biodiversity arising from development under the strategy and the conservation and protection of designated sites. The Regional Spatial and Economic Strategies replaced the Regional Planning Guidelines.
County, City, and Town development plans and local area plans.	Building on the guidance set out in the now superseded Regional Planning Guidelines, local authorities have prepared development plans. These typically include polices for the protection of natural heritage, including protected sites, protected species, areas of biodiversity value, wetlands, woodlands and trees. New Development Plans will now be required to meet with the requirements of the National Planning Framework and the Regional Spatial and Economic Strategies, and these are in preparation.

A.1.5 Biodiversity Action Plans

A.1.5.1 EU Biodiversity Strategy 2030

Published in 2020, the EU Biodiversity Strategy 2030 lays the foundations for the Nature Restoration Law, with targets set out in the Strategy replicated or expanded upon in the Law. It has targets for protecting more land, managing that land, and restoring habitats and species, and includes proposals for a global framework goal for all the world’s ecosystems to be restored, resilient, and adequately protected by 2050, and a commitment to the net-gain principle for nature.

A.1.5.2 Ireland’s National Biodiversity Action Plan 2023-2030

Ireland’s National Biodiversity Plan is now in its 4th iteration. It has five strategic objectives, which are:

- Objective 1 - Adopt a Whole of Government, Whole of Society Approach to Biodiversity
- Objective 2 - Meet Urgent Conservation and Restoration Needs
- Objective 3 - Secure Nature’s Contribution to People
- Objective 4 - Enhance the Evidence Base for Action on Biodiversity
- Objective 5 - Strengthen Ireland’s Contribution to International Biodiversity Initiatives

The Plan includes a number of Outcomes, Targets and Actions. The targets include:

- By 2030, trends in the status of the protected habitats and species under the Habitats and Birds Directives are improving.

- By 2030, in line with the EU Biodiversity Strategy, habitats and species under the Habitats and Birds Directives show no deterioration in conservation trends and status and at least 30% of those not in favourable status will reach that status or show a positive trend.
- By 2030, in line with the EU Biodiversity Strategy, the decline of pollinators is halted and reversed.
- By 2025, there is significant progress to restore and rewet raised bog and blanket bog protected areas.
- By 2027, protection and restoration measures detailed in Ireland’s third RBMP will be implemented to ensure that our natural waters are sustainably managed, that freshwater resources are protected so that there is no further deterioration; and where required, Ireland’s rivers, lakes and coastal water bodies are restored to at least good ecological status.
- By 2026, Ireland is meeting all requirements for its transitional, coastal, and marine environment under the Water Framework Directive (WFD) and the Marine Strategy Framework Directive (MSFD), thereby achieving and maintaining High or Good Ecological Status and Good Environmental Status, respectively.
- By 2030, Invasive Alien Species IAS are controlled, managed, and where possible, eradicated.
- By 2027, implementation of a National Restoration Plan [for Biodiversity] has begun.

And it includes an action for “All Public Authorities and private sector bodies move towards no net loss of biodiversity through strategies, planning, mitigation measures, appropriate offsetting and/or investment in Blue-Green infrastructure” by 2030.

The National Biodiversity Action Plan now has a statutory underpinning; with all public bodies now required to have regard to the Plan.

A.1.5.3 All-Ireland Species Action Plans

The National Parks and Wildlife Service and the Northern Ireland Environment Agency have produced a series of All-Ireland Species Action Plans (SAPs) to enhance the conservation status of a number of priority plant and animal species, and the habitats in which they reside. The primary objective of the SAPs is to provide a framework which allies the biodiversity initiatives of Ireland and Northern Ireland and coordinate cross-border conservation efforts for these species. In brief, the SAPs propose several actions which will safeguard and promote effective management of the nominated species and place a duty on Regional and Local Planning Authorities to consider these conservation strategies within Area Plans, Development Plans and Local Biodiversity Action Plans. Each SAP should be read in parallel with other country specific action plans, which are detailed within the individual documents. The status of these action plans, which were published in 2005, is unclear and are assumed to be defunct (the last iteration of Ireland’s National Biodiversity Action Plan makes no mention of them).

A.1.5.4 All-Ireland Pollinator Plan

The All-Ireland Pollinator Plan contains six objectives for the conservation of pollinators in Ireland, including making public land more pollinator friendly and conserving rare pollinators.

The All-Ireland Pollinator Plan (AIPP) is a collaborative framework aimed at creating a landscape where pollinators can thrive. It was first launched in 2015 by the National Biodiversity Data Centre and has since evolved into a more ambitious plan for 2021-2025. The AIPP is a shared plan of action to restore pollinator populations to healthy levels.

Transport Infrastructure Ireland has been a member of the Steering Group for the AIPP since its inception in 2015, promoting the objectives of the AIPP and the management of its roadside landscapes in a pollinator-friendly way.

In 2019, the AIPP working with partners Transport Infrastructure Ireland, Iarnród Éireann, Translink and the Department of Infrastructure Northern Ireland, published the Pollinator-friendly management of: Transport Corridors guidelines on how transport corridors can be managed in a pollinator-friendly way. The AIPP transport guidelines outline the potential for linear transport corridors to have a positive impact on biodiversity and contribute to ecological connectivity throughout the Irish countryside.

A.1.5.5 Local Biodiversity Action Plans

There are also local biodiversity action plans and heritage plans, which include biodiversity, for Ireland. These set the priorities for action at the local level and often include habitats and species which are not listed as priorities nationally. All Local Authorities are required to have an adopted Biodiversity Action Plan by the end of 2026.

Appendix B – Document Summaries

Ref	Publication Title	Summary
[1]	<p>National Roads Authority, 2009. Guidelines for Assessment of Ecological Impacts of National Roads Schemes. National Roads Authority, Dublin</p> <p>The Ecology Guidelines</p> <p>https://www.tii.ie/media/kzldoawo/guidelines-for-assessment-of-ecological-impacts-of-national-road-schemes.pdf</p>	<p>Guidance which is specific to the planning and design of national roads from 2009 which predates the 2014 amendments to the EIA Directive and is therefore out of date. It provides the topic detail for ecology/biodiversity and is therefore highly relevant to the development of the new guidelines. It is based on a document produced in 2006 but which was then updated to take into account IEEM's 2006 version of its Guidelines for ECIA in the UK (the predecessor to [23]). It was written to align with the NRA's (2000) National Roads Project Management Guidelines ('NRPMG') and the predecessors to [10] and [11].</p> <p>It has an Introduction and chapters on The Natural Environment and the Ecological Impact Assessment process, followed by chapters on what should be included, with respect to the Natural Environment, in the Constraints Study (Stage 2), the Route Corridor Selection Study (Stage 3) and the Environmental Impact Statement (Stage 4). It does not include guidance on surveys, which are set out in [38] or species-specific guidance which is again provided by other NRA publications.</p> <p>The Natural Environment chapter provides a brief overview of the designated sites, fisheries, waters, trees and species which receive protection in Ireland, as well as red data book species.</p> <p>The Ecological Impact Assessment chapter defines EcIA and key terms such as ecological resources (sites, habitats, species, etc), receptors (the resources affected), of value (those of importance at a particular geographic scale), impact types (habitat loss, etc)</p> <p>It describes the EcIA process, including scoping (deciding what information is required to inform the assessment), understanding a road project (including construction activities and programme and operational activities) and its likely direct and indirect impacts, establishing the zone of influence, identifying the ecological resources within that zone, determining the requirements for further survey based upon valued ecological receptors (aka Key Ecological Receptors), valuing ecological resources on a geographic scale (with Table 1 providing examples),</p> <p>It includes guidance on early consultation with the prescribed bodies, the need for professional ecologists to undertake the assessment, the need for contextual information (distribution and abundance) to determine the value of ecological resources, and the iterative nature of assessments.</p> <p>On ecological value (or importance), the guidelines lead on the geographic scale of importance, with designation or inclusion on a list being a reason, along with contextual information, to ascribe a particular level of value/importance to a resource. In other words, you first find out the list (if any) on which the resource appears and then assign it a level of geographic importance based upon that, informed by contextual information.</p> <p>In the examples given, only protected sites, habitats and species are listed as being of National or International Importance. It refers to the 1% criteria for species populations at each geographic scale but only for protected and red list species.</p>

Ref	Publication Title	Summary
		<p>There is no reference to the Ratcliffe criteria although rarity, naturalness, diversity and intrinsic are invoked for some resources that might be of value at the County or Local levels (in Table 1 and Table 2). Later, it makes clear that sites meeting the criteria for designation should be treated as though designated, and that large populations and assemblages of species can be important or more important than individual species. Further, restoration potential, ecological function, social value, and perhaps financial value should be considered. Road safety and animal welfare may need to be considered separately for non-KERs or KERs not significantly affected.</p> <p>Section 3.4.1 and Table 2 make clear that “<i>In the context of national road projects, ecological [receptors] of below ‘Local Importance (higher value)’ should not be selected as ‘key ecological receptors’ for which detailed assessment is required</i>” and suggests that such receptors are not material to decision making. The examples given for receptors below this threshold are “(i) Sites containing small areas of semi-natural habitat that are of some local importance for wildlife; (ii) Sites or features containing non-native species that are of some importance in maintaining habitat links. (emphasis added)”.</p> <p>It distinguishes between avoidance and mitigation measures that are identified at an early stage, are certain to be delivered, highly likely to succeed and are incorporated into the design of the development, and therefore form part of the unmitigated project and those which measures which are not – additional mitigation measures. It describes habitat translocation as additional ‘mitigation’.</p> <p>It makes clear that “<i>The impact assessment should be undertaken in relation to baseline conditions within the zone of influence at the time of the proposed activities, in the absence of the project</i>”.</p> <p>54 pages excluding appendices.</p>
[2]	TII 2023 Biodiversity Plan https://www.tii.ie/media/odmhe5su/biodiversity-plan.pdf	<p>The biodiversity plan for Transport Infrastructure Ireland. It provides a definition of biodiversity (essentially, all life on earth), and provides the rationale for a biodiversity plan. It makes clear that more than compliance with European and national biodiversity legislation is required to address biodiversity loss. TII recognises the potential of its operations to impact on biodiversity. The plan sets out TII’s vision for biodiversity which is “<i>transport infrastructure Ireland will contribute to the recovery of biodiversity as a local and national level while developing and maintaining a safe and reliable transport infrastructure network</i>”. It identifies five key policy areas for biodiversity. These are 1. biodiversity is fully integrated into all TII operations and processes; 2.</p> <p>TII transport corridors will promote habitat connectivity across the wider landscape and will contribute to the wider enhancement of ecosystem services; 3 new projects will be developed with no net loss of biodiversity and will strive for a net gain in biodiversity; 4. legacy impacts on biodiversity from existing infrastructure will be identified and addressed; 5. all TII activities will comply with relevant biodiversity legislation.</p>

Ref	Publication Title	Summary
		<p>The plan includes five objectives, one of which is to develop and update a biodiversity standard and associated technical documents, and another is to embrace biodiversity accounting methodologies and strive for net gain. The objectives are supported by a set of actions divided into short term, medium term, and long term, including an overarching standard for biodiversity impact assessment, supported by topic specific standards, and technical documents covering, for example, surveying habitats and monitoring the effectiveness of mitigation measures. It includes a commitment to developing a biodiversity accounting metric to be used on all new projects, with the aim of achieving no net loss of biodiversity on all projects by 2025 and a net gain on all new projects by 2030.</p> <p>12 pages</p>
[5]	<p>Office of the Planning Regulator, 2021. Environmental Assessments and Planning in Ireland. Office of the Planning Regulator, Dublin.</p> <p>https://www.opr.ie/wp-content/uploads/2022/10/Planning-Leaflet-11-Environmental-Assessments-and-Planning-in-Ireland.pdf</p>	<p>A sixteen-page summary document which explains the basic process of SEA, EIA and AA, with references to more detailed guidance. It reiterates the requirements of the EIA Directive for biodiversity, making clear that an EIA must identify, describe and assess the direct and indirect effects of a proposed project on, inter alia, 'biodiversity, with particular emphasis on species and habitats protected under EU Directives' and the interaction of effects on other environmental effects with biodiversity. It makes clear that EIA is a broad assessment, and AA is a specific assessment, which only considers the effects on designated sites. It defers to [9] for more detailed information on EIA.</p>
[6]	<p>EC 2017 Environmental Impact Assessment of Projects: Guidance on Screening. European Commission, Luxembourg.</p> <p>https://circabc.europa.eu/ui/group/3b48eff1-b955-423f-9086-0d85ad1c5879/library/a9f8a19a-fba5-440f-abf2-29d3f9ed7a63/details?download=true</p>	<p>Provides guidance on screening for EIA, i.e. the process of determining whether a Project listed in Annex II of the EIA Directive is likely to have significant environmental effects (and therefore whether an EIA is required). The criteria for determining whether significant effects are likely, and the requirement for EIA are laid down in Annex III of the EIA Directive. These include the characteristics of the project, its location and the type and characteristics of the potential impact, including its magnitude and spatial extent (e.g. the area or size of the population likely to be affected), for the project on its own and cumulatively with other projects.</p> <p>Most Member States have set thresholds against these criteria [including Ireland, see Schedule 5 of the Planning and Development Regulations 2001, as amended] but also allow for EIA of sub-threshold developments if these are likely to have significant effects on the environment [see Schedule 7A of the Planning and Development Regulations 2001, as amended, which sets out the information required to inform this decision]. The screening process therefore captures all development projects which are likely to have a significant effect on the environment [the PDA requires the CA to have regard to the likely significant effects on designated sites, nature reserves, refuges, any feature which whose conservation is an objective of a (draft) Development Plan and pNHAs]. The screening of projects included in the Annexes and above the set thresholds is a straightforward process.</p>

Ref	Publication Title	Summary
		<p>Measures to avoid or reduce (but not compensate) can be included in the information provided to determine the screening decision and this information can affect the screening decision (to avoid unnecessary EIAs for projects that have no significant environmental impacts). Assessments undertaken under other EU Directives must be taken into account. It provides a checklist for screening. For biodiversity, the checklist is based on proximity to protected areas, wetlands, forests, and areas used by protected species. And a checklist of criteria for evaluating the significance of environmental impacts which includes both relative criteria (e.g. will there be a large change in environmental conditions? will the impact extend of a large area) and absolute criteria (e.g. is there a risk that environmental standards will be breached? And is there are a risk that protected sites, areas, features will be affected?).</p> <p>Infers that LSE under the Habitats Directive (which cannot take into account mitigation) is a likely significant effect under the EIA Directive and the project should be screened in for EIA which may not be correct.</p> <p>62 pages excluding annexes.</p>
[7]	<p>EC 2017 Environmental Impact Assessment of Projects: Guidance on Scoping. European Commission, Luxembourg.</p> <p>https://circabc.europa.eu/ui/group/3b48eff1-b955-423f-9086-0d85ad1c5879/library/38742302-d9d2-41e1-85de-aa88653ebe7c/details?download=true</p>	<p>Guidance on the process of identifying the content and extent of the information to be submitted to the Competent Authority under the EIA process. It states that <i>“it is good practice to carry out Scoping even if it is not required by legislation: Developers should endeavour to include a Scoping stage in their work programme for EIA, so that all of the concerns can be identified and addressed during the Scoping stage”</i>. It sets out the type of information to be submitted by the developer to inform a scoping opinion, which is again based on Annex III of the EIA Directive, and who and how to consult.</p> <p>It states that <i>Scoping is primarily focused on identifying the most significant effects, to be assessed in-depth at a later stage, and on determining the scope and level of detail of information to be provided in the EIA Report; however, it may also address other additional matters.</i></p> <p>The scoping report should be similar in format to an EIA report, but much less detailed.</p> <p>The guidance has a section on identifying significant effects and includes a checklist. The checklist includes (i) Influx of people to an area, either temporarily or permanently? (ii) Introduction of alien species? Loss of native species or genetic diversity? (iii) Loss of biodiversity-rich / protected areas?</p> <p>A guiding principle is that the resulting assessment of environmental information presented in the EIAR is focused on <i>those issues that are important for decision-making regarding the Project, and are not burdened with irrelevant detail about less significant issues.</i> Emphasis added.</p> <p>It admits there is no consensus on how to define significant effects and states that several methods can be used, and that <i>all assessment methods should define clear thresholds or criteria for determining whether an impact is significant, based on the characteristics of an impact, in a clear and unambiguous manner that can be understood by anyone reading the EIA Report.</i></p>

Ref	Publication Title	Summary
		<p>It goes on to state that <i>Thresholds are generally derived from scientific knowledge and are frequently included in regulatory standards and thresholds should be based on legal requirements or scientific standards that indicate a point at which a given environmental effect becomes significant. And that If no legislation or scientific standards are available, the EIA practitioners can then evaluate impact significance in a more subjective way by using the multi-criteria analysis method.</i> The multi-criteria analysis method is basically the matrix approach which uses magnitude and sensitivity.</p>
[8]	<p>European Commission, 2017. Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report. European Commission, Luxembourg.</p> <p>https://publications.europa.eu/resource/cellar/2b399830-cb4b-11e7-a5d5-01aa75ed71a1.0001.03/DOC_1</p>	<p>This guidance was published after the 2014 amendment to the EIA Directive and is therefore up-to-date.</p> <p>It provides an overview of the legislative requirements, i.e. the provisions of Article 5(1), 5(3) and Annex IV, and practical guidance on the preparation of an EIAR, covering project description; describing the baseline scenario (the current <u>and</u> future status of the environment); environmental factors (including biodiversity); impacts related to risks of major accidents and disasters (e.g. peat slides); use/availability of natural resources including biodiversity (which is in addition to an assessment of effects on those resources and should focus on the efficiency of resource use); assessing effects on the environment, including cumulative effects (arising from other effects from the same project and other projects in the same area); assessment of alternatives; mitigation (avoid, prevent, reduce) and compensation measures (offsetting) (which should also be considered when comparing alternatives); monitoring; the quality of an EIAR including the use of experts (checklists are provided); and consultations and decision-making. It also considers links with other assessments including those under the Habitats Directive and Water Framework Directive.</p> <p>On describing the baseline, it states that “<i>Data collection efforts are focused on those aspects of the environment most likely to be significantly impacted.... the EIA Directive [requires that] only the ‘relevant aspects’ be investigated.</i>”</p> <p>On Impacts related to biodiversity (arising from Article 3 (b) and Annex IV point 4) it makes clear that this should be much broader than simply looking at the impacts on flora and fauna individually; biodiversity “<i>refers to the interactions and variety of, and variability within, species, between species, and between ecosystems</i>” but at the same time “<i>particular attention being paid to species and habitats protected under the Habitats Directive and the Birds Directive</i>”. Examples of issues to be addressed include “<i>the degradation of ecosystem services, the loss and degradation of habitats, the loss of species diversity, and the loss of genetic diversity</i>”. It refers to inter alia [13] and [23], although only in passing for the latter.</p> <p>On significant effects, it states that that the assessment is limited to only those effects that are “<i>likely to have a significant or important enough impact on the environment to merit the costs of assessment, review, and decision-making and assessment of significance should be based on clear and unambiguous criteria</i>”.</p>

Ref	Publication Title	Summary
		<p>The criteria should be based on the characteristics of the impacts (e.g. magnitude) and the value of the resource affected (e.g. sensitivity) and “developed for each project individually” through a collaborative approach, and each significance determination should be substantiated using a transparent methodology.</p> <p>On mitigation measures, it states that “The EIA Report should clearly describe the adverse impact each measure is intended to avoid, mitigate or compensate when implemented. It should also describe the effectiveness of such measures, their reliability and certainty, as well as the commitment to ensuring their practical implementation and monitoring of the results”.</p> <p>90 pages excluding Annexes</p>
[9]	<p>Department of Housing, Planning and Local Government, 2018. Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment. Office of the Planning Regulator, Dublin</p> <p>https://assets.gov.ie/44535/34aa9919f24243b79454994bc06476e1.pdf</p>	<p>These Guidelines are aimed at competent authorities i.e. those making planning decisions.</p> <p>They provide an overview of the EIA Directive as amended in 2014, with a description of the changes introduced by the 2014 amendment, including the replacement of ‘flora and fauna’ with ‘biodiversity’ as one of the environmental factors and the requirement to consider major accidents and disasters. It provides guidelines for EIA screening, EIA scoping, the EIAR, the EIA, monitoring conditions, and an outline of 171A the Planning and Development Act.</p> <p>The guidance for preparing an EIAR references Article 5 of the Directive, which sets out what must be included in an EIAR.</p> <p>It reiterates that biodiversity (with particular attention to species and habitats protected under the Habitats and Birds Directives) is a factor which must be identified, described and assessed in the EIA process and goes on to explain that ‘biodiversity is a natural resource that includes flora and fauna’, that this is wider than ‘animal and plant life in a particular zone or time’ and that it includes ‘the interactions and variety of, and variability within, species, between species and between ecosystems’.</p> <p>The guidance also explains the overlap and differences between EIA and AA, confirming that (i) the AA considers only ‘the implications for a designated conservation site in view of the [specific and narrow] conservation objectives set for that site’; (ii) the EIA is a broader assessment; (iii) that, when relevant, the conclusions of the AA should be incorporated into the EIA and (iv) that these assessments should be carried out in a joint/co-ordinated way to streamline the process.</p> <p>The Guidelines states that the EIAR must assess the ‘Baseline Scenario’ which the Guidelines equate to the ‘do nothing scenario’; defining this as the current state of the environment and how this is likely to evolve without the proposed project but having regard to the cumulative effects of “existing and approved [but not constructed] projects”. The assessment of the baseline scenario requires the collection and examination of “relevant” data and that what is relevant should be identified at an early stage, which may require expert input. It states that the data is likely to come from existing datasets but may also require surveys and research, which must require only reasonable time and effort.</p>

Ref	Publication Title	Summary
		<p>The Guidelines confirm that there is no definition of likely significant effect in the Directive but notes that three aspects of an effect must be considered – ‘likely’ ‘significant’ and ‘on the environment’.</p> <p>The Guidelines state that “<i>The ‘likelihood’ of effects refers to the effects that are planned to take place and those that can be reasonably foreseen to be consequences of normal construction and operation of the project</i>” which it takes from the draft version of the EPA Guidelines [10]. However, effects arising from major accidents and disasters must also be considered.</p> <p>“<i>Significance’ considers whether or not a project’s impact can be determined to be unacceptable in its environmental and social contexts</i>” which it takes from the EC Guidelines [8], referring to the EPA guidelines for further definitions.</p> <p>The Guidelines refer to Article 3 of the Directive to define the Environment, which includes “<i>Biodiversity, with particular attention to species and habitats protected under the Habitats and Birds Directives</i>” and the interaction between biodiversity and other environmental factors.</p> <p>The Guidelines state that “<i>effects are not [only] to be considered in isolation but [also] cumulatively</i>”. They point out that an insignificant effect can become significant when considered with other effects, and vice versa. Further, that cumulative effects can arise from multiple effects from a single project and from that project and existing and approved projects “<i>in the same area</i>”.</p> <p>The Guidelines are quiet on mitigation, being addressed mainly at screening stage, where they make clear that the developer may describe measures to avoid or mitigate and the screening opinion must make reference to mitigation/design measures, and then go on to say that such measures could usefully be set out in a summary table and in the Non-Technical Summary in the EIAR. They also make clear that compensation must not be considered at screening.</p> <p>50 pages excluding appendices which replace previous guidelines with the same title published in 2013.</p>
[10]	<p>Environmental Protection Agency, 2022. Guidelines on the information to be contained in Environmental Impact Assessment Reports. Environmental Protection Agency, Johnstown Castle.</p> <p>https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf</p>	<p>These guidelines are aimed at developers and the document is <u>statutory</u> which means regard must be had to these guidelines in the preparation of EIARs and, by competent authorities, in considering EIARs.</p> <p>They provide guidance on what should be included in an EIAR in Ireland. These are general guidelines and not specific to biodiversity and have the purpose of improving the quality of EIARs and facilitating compliance with the EIA Directive and are focused on developers who produce EIARs. They aim to improve focus, improve clarity and reduce time, effort and expense.</p> <p>The document has three parts (i) the role of EIARs and fundamental considerations; (ii) key activities in preparing and EIAR; and (iii) guidance on how to present information.</p>

Ref	Publication Title	Summary
		<p>An EIAR is defined in the Planning and Development Act as “a report of the effects, if any, which proposed development, if carried out, would have on the environment and shall include the information specified in Annex IV of the Environmental Impact Assessment Directive”. Note that this definition is not restricted to significant effects.</p> <p>Like other guidance documents, it describes the environmental factors that must be considered in an EIA, including biodiversity, as listed in Article 3 (1) of the Directive, and the content of an EIAR as described in Article 5(1) of the Directive</p> <p>It provides an overview of the EIA process including, if there are excessive adverse effects, the redesign of the project, or the identification of mitigation measures to reduce adverse effects to insignificant effects, prior to undertaking the main written assessment, see Figure 2.2 of the Guidelines.</p> <p>The guidelines provide these fundamental principles when preparing an EIAR:</p> <ul style="list-style-type: none"> • Anticipating, predicting, avoiding and reducing significant [adverse] effects (through consideration of alternatives at an early stage which must be presented in the EIAR transparently and objectively, and with evidence). • Assessing and mitigating effects. • Maintaining objectivity. • Ensuring clarity and quality (including the use of standardised effect descriptions and adherence to the Directive). • Providing relevant information to decision makers. • Facilitating better consultation. <p>The Guidelines describe the sequential steps/stages in preparing an EIAR, which are based on the steps set out in Annex IV of the EIA Directive:</p> <ul style="list-style-type: none"> • Stage 1: Screening (whether an EIA is required) • Stage 2: Scoping (what information should be included in the EIAR, based on what is likely and significant) • Stage 3: Consideration of Alternatives (a brief description of the range of alternatives considered and their environmental effects and the reasons for selecting one, with reference to any SEA but at the Project level and including the ‘do nothing’ option).

Ref	Publication Title	Summary
		<ul style="list-style-type: none"> • Stage 4: Project Description (including its location, physical characteristics, operational characteristics, and residues and emissions, and optionally, avoidance measures that have been integrated into the Project, in enough detail for the competent authority to complete its EIA). • Stage 5: Baseline Description (the current state of the environmental characteristics, and the likely future receiving environment, which may be changed by natural processes or other projects, sufficient to enable assessment of all types of effects, and with methods documented). • Stage 6: Assessment of Impacts/Effects (the main purpose of EIA, with reference to Annex IV (5) of the Directive perhaps using the criteria in Annex III of the Directive (which relates to screening). • Stage 7: Mitigation and Monitoring (measures to avoid, prevent, reduce, off-set, monitor and remediate significant effects on the environment). • Residual Effects and Conclusions (not given in the list of the Directive but positioned here in the text, these are the final predicted or intended effects after the mitigation has been implemented, described in the same way as Stage 6, there should not be a conclusion section as this is covered by residual effects). <p>On Stage 5 baseline description, the Guidance encourages the use of published references and a detailed evaluation of the existing environment by specialists, with the need for new surveys determined on case-by-case basis, with references to standards/classification, supporting records and descriptions of methodologies. For a complete baseline description, the Guidelines suggest for each environmental factor the description should include its context, character, significance [status] and sensitivity to change [vulnerability] and it must be sufficient to inform a reliable assessment but not include irrelevant information (informed by scoping). The information should be grouped under standard headings, based on the environmental factors in the Directive and the suggested topic headings (for biodiversity see below). It poses these questions to help determine the need for surveys and research (data sufficiency) and/or the need to acknowledge gaps in then information.</p> <ul style="list-style-type: none"> • <i>Is the information necessary for identification of the main effects available?</i> • <i>Is the information necessary for assessment of the main effects available?</i> • <i>Is the information focused on effects which are likely and significant?</i> <p>On Stage 6 assessment of effects, the process must be documented [show your workings], some uncertainty is unavoidable and should be made clear with reference to documents and approaches, the description must be precise and concise, and it must focus on the likely, significant effects.</p>

Ref	Publication Title	Summary
		<p>On Likelihood, the assessment should focus on effects that are likely to occur which may equate to ‘a reasonably foreseeable worst-case scenario’ however it must also consider effects arising from major accidents and disasters. On Significance, this is usually understood as the importance of the outcome of the effects as determined by scientific/objective and social/subjective concerns. The Guidelines provide standard terminology for describing effects; quality (positive, neutral, negative), Significance (imperceptible to profound on a 7-point scale), Extent, Context, Probability (Likely or Unlikely), Duration (Momentary to Permanent on a 7-point scale, Reversible), Frequency. They also provide standard terminology for types of effects (indirect, cumulative etc). However, it also says that where specific definitions for a topic exist these should be used in preference to the standards given above. A checklist is provided to help ensure the assessment is sufficient, Table 3.5, p 55. The interaction between effects on different environmental factors must also be assessed and could be presented in a matrix.</p> <p>The position of mitigation at Stage 7 seems at odds with earlier statements; but this is the remaining measures which were not ‘designed-in’ through the consideration of alternatives. The Guidelines refer to Annex IV (7) and the mitigation hierarchy, identify several types of mitigation (i) those that are fully incorporated into the design and operation of the Project (which is the most effective option) (ii) those that respond to exceedances detected by monitoring (iii) mitigation by avoidance (often as part of consideration of alternatives) (iv) mitigation by prevention (usually technical measures used to limit the source of effects) and (v) mitigation by reduction (technical measures to limit the exposure of the receptor). Offsetting is also described – measures to deal with significant adverse effects which cannot be sufficiently mitigated. The effects of mitigation and offsetting need to be assessed individually and cumulatively. Monitoring may also be required to confirm the assessment of effects and inform mitigation, but this should not be heavily relied upon as it may change the Project and is not a substitute for the EIA. Monitoring and remedial actions should be described in the EIAR. All mitigation, monitoring and remedial actions must be firm commitments. The Guidelines make a distinction between compliant and non-compliant effects, the former being effects “<i>that are in accordance with legislation, appropriate guidelines or accepted</i>” and indicates that mitigation is only required for non-complaint effects, Figure 3.6.</p> <p>The Guidelines go on to provide further guidance on the EIAR and next steps following its submission to the Competent Authority.</p> <p>The prescribed environmental factors including biodiversity must all be addressed in an EIAR. The guidance gives these potential topic headings for biodiversity (at scoping stage).</p> <ul style="list-style-type: none"> • Habitats • Breeding/Feeding/Roosting Areas • Routes and landscape features

Ref	Publication Title	Summary
		<ul style="list-style-type: none"> • Mammals/Birds/Fish/Invertebrates/Reptiles • Vascular plants/bryophytes/lichens/fungi • Population Stability • Population Management • Critical Resources • Terrestrial/Aquatic/Marine • Seasonality • Existing Management • Ecosystem Services • Legal protection <p>[some are rarely used in practice, for example ‘critical resources’, and others which are not listed are commonly used, for example ‘designated sites’. There is also no specific reference to the species and habitats protected under the Birds and Habitats Directives which is a requirement of the amended Directive].</p> <p>71 pages excluding appendices</p>
[11]	<p>National Roads Authority, 2008. Environmental Impact Assessment of National Road Schemes – A Practical Guide. 2nd ed. National Roads Authority, Dublin.</p> <p>https://www.tii.ie/media/jodyduf/environmental-impact-assessment-of-national-road-schemes-practical-guide.pdf</p>	<p>Guidance which is specific to roads from 2008 predating the 2014 amendments to the EIA Directive and is therefore out of date. It does not provide specific guidance on biodiversity (or flora and fauna).</p> <p>It summarises the four phases [which are no longer applied as described here] for planning roads based on the National Roads Project Management Guidelines. Phase 1 initial planning; Phase 2 constraints study; Phase 3 Route Corridor Selection; Phase 4 includes EIA. It makes clear that Phases 2 and 3 should help avoid significant adverse environmental impacts and consider alternatives and that road planning is an iterative process. It has chapters on Screening; Scoping; the Proposed Development, Receiving Environment and Impacts, Description of Mitigation Measures, Consultation & Notification, and Environmental Policy. The guidelines provide an overview of the EIA process but do not provide guidance on the assessment methodologies for particular topics in an Environmental Impact Statement (now EIAR).</p> <p>Box 7 provides a format for specialist studies to be included in an EIS. It suggests the “<i>Description of Likely Impacts</i>” should include both the ‘do-nothing’ and ‘worst-case’ scenarios, and that mitigation measures (including avoidance measures) follow that description.</p>

Ref	Publication Title	Summary
		<p>Later it suggests that that the ‘do-minimum’ scenario i.e. minimal maintenance and improvement of an existing section of road should also be considered as part of understanding of the evolution of the baseline environment.</p> <p>Due to the way roads may be built (Design & Build), it suggests impacts can be assessed based on maximum design limits, and mitigation can be a performance standard to be met, rather than an actual design and the mitigation measures to be implemented.</p> <p>Box 11 reproduces the EPAs ‘Glossary of Impacts’ including Quality (positive, negative, neutral), Significance (Imperceptible to Profound), Duration (Short- to Long-etc), and Types (Cumulative, Residual, etc). This differs from the geographic based approach that is often used for EclA.</p> <p>It suggests that significance is based on the characteristics of the impacts and the sensitivity of the receptor; which is similar to the matrix approach often used in EIA, although no matrix is provided.</p> <p>It provides some guidance on cumulative impacts (incremental changes caused by other past, present and reasonably foreseeable actions together with the road project), indirect impacts (not a direct result of the project, possibly far away, or as a result of complex pathway), impact inter-relations (reactions of impacts within a project and impacts under one topic which has impacts for another topic) and residual impacts (impacts that can’t be mitigated). Residual impacts should be described using the EPAs terms in Box 11. The mitigation measures can be gathered together in a Schedule of Environmental Commitments and grouped based on Design, Construction and Operation stages, with mitigation at construction stage also set out in an Environmental Operating Plan by the contractor.</p> <p>It provides guidance on Avoidance (achieved primarily through consideration of alternative routes and designs), Reduction (measures to reduce the effect of the impact on the receiving environment), Remedy (limiting the extent of unavoidable significant adverse effects by undertaking remedial works such as landscaping) and Compensation (creating or restoring a comparable (to the one affected) environmental feature elsewhere).</p> <p>Appendix 4 includes a DoEHLG guidance checklist to help decide if effects will be significant. It suggests that a significant effect is one “<i>that ought to be considered and to have an influence on the development consent decision</i>”.</p> <p>80 pages excluding appendices.</p>
[12]	Environmental Protection Agency, 2013. Integrated Biodiversity Impact Assessment – Streamlining AA, SEA and EIA Processes:	The purpose of IBIA is “ <i>to ensure that the relevant processes required under the different EU directives and national law connect effectively and efficiently in order to provide a holistic approach to biodiversity impact assessment, optimise time and resources, and avoid unnecessary duplication of efforts</i> ”.

Ref	Publication Title	Summary
	<p>Practitioner’s Manual. Environmental Protection Agency, Johnstown Castle.</p> <p>https://www.epa.ie/publications/research/biodiversity/STRIVE_90_web.pdf</p>	<p>The Guidance is based on the 1985 version of the EIA Directive and the current versions of the SEA and Habitats Directives, although many of the other references are also now superseded by updated guidance.</p> <p>It references the definition of biodiversity in the 1992 Convention and defines Biodiversity Impact Assessment as “a decision-support tool to help biodiversity-inclusive development planning and implementation. It aims at ensuring that development proposals integrate biodiversity considerations and are legally compliant, and include mechanisms for the conservation of biodiversity (with the aim of no net loss of biodiversity), result in sustainable use of biodiversity resources, and provide fair and equitable sharing of the benefits arising from use of biodiversity. It makes clear that the BIA process needs to consider fulfilment of legal requirements, make effective use of scientific knowledge and integrate with other concerns during the planning process.</p> <p>It provides three dimensions to the definition of biodiversity a) quality of the environment b) native species c) habitats and interdependent associations of species therein and says that this is determined by national and international law.</p> <p>Like other documents, it describes the narrower focus of AA compared to EIA, and the commonalities between AA, EIA and SEA. It identifies the opportunity to integrate SEA and AA at the Plan level and EIA and AA at the Project level and links five stages of SEA/EIA with five stages of AA. Some key points include:</p> <ul style="list-style-type: none"> • “The location, extent, physical characteristics, qualifying interests and conservation objectives of both SACs and SPAs represent minimum data requirements in IBIA”. • “An efficient IBIA process is dependent on effective consultation, as this is often the only way of rapidly identifying key issues”. • “A landscape or ecosystem-based biodiversity impact assessment approach should be promoted (i.e. that which addresses ecological integrity and connectivity between designated areas), in order to protect not only the qualifying interests of Natura 2000 areas but also their ecological coherence through the protection of national designations, non-designated areas and species, and the environmental resources (e.g. water, soils, air and climate) that support them”. • “In the context of IBIA, the provision of baseline information entails a comprehensive account of all biodiversity-relevant data”. <p>Includes step by step guidance.</p> <p>67 pages excluding appendices</p>

Ref	Publication Title	Summary
[13]	<p>European Commission 2013 Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment. European Commission, Luxembourg.</p> <p>https://op.europa.eu/en/publication-detail/-/publication/3ed0e578-7f24-4073-81c9-f279c6d4b3cf/language-en</p>	<p>Pilot guidance which was based on the 2012 proposed amendments to the EIA Directive that were subsequently adopted and therefore the guidance remains current. It states that there is evidence that biodiversity is not being systematically integrated into EIA.</p> <p>The proposal/amendment introduced clear references to biodiversity (replacing flora and fauna) and to species and habitats protected under Council Directive 92/43/EEC8 (the ‘Habitats Directive’) and Directive 2009/147/EC9 (the ‘Birds Directive’). It introduced additional elements of biodiversity to be considered within the screening criteria for Annex II projects — ‘population quality and quantity and ecosystem degradation and fragmentation’. It also proposed that the EIA report should cover “<i>biodiversity and the ecosystem services it provides</i>”, and clear references to disaster risk management.</p> <p>It identifies (i) the long-term and cumulative nature of effects; (ii) complexity of the issues and cause-effect relationships; and (iii) uncertainty as significant challenges to addressing (climate change and) biodiversity in EIA. It deals with the interaction between climate change and biodiversity loss.</p> <p>It recommends that the EIA takes into account (i) sites included in Natura 2000; (ii) species and habitats covered by the birds and habitats Directives; (iii) habitats covered by Article 10 of the Habitats Directive; and (iv) the EU 2020 Biodiversity Strategy which includes actions to halt the loss of biodiversity and restore biodiversity and ecosystem services. The latter includes Action 7 which relates to planning practices “<i>ensure ‘no-net-loss’ of biodiversity and ecosystem services</i>”.</p> <p>Later, it makes clear that “<i>For biodiversity, key concerns should focus on ensuring ‘no-net-loss’ and should outline how EIA can support this goal</i>” and “<i>EIA should focus on ensuring ‘no-net-loss [of biodiversity]... and avoiding effects from the start, before considering mitigation, with compensation being used as a last resort</i>”. On the latter, it states that “<i>compensation will not always be possible: there are cases where a development proposal can be rejected on grounds of irreversible damage to, or irreplaceable loss of, biodiversity</i>”.</p> <p>Table 9 provides a list of key questions that could be asked when identifying biodiversity concerns.</p> <p>It provides guidance on understanding the evolution of the baseline; identifying alternatives (including the ‘zero option’) and mitigation measures (at an early stage, incorporated into the design or methods of construction or operation), the mitigation hierarchy, the precautionary principle, assessing significant effects; monitoring and adaptive management (good practice). It does not attempt to define significance, nor refer to a geographic frame of reference for evaluation (although it does refer to the local context when determining impact significance).</p>

Ref	Publication Title	Summary
		<p>For assessing significant effects, it states that there are three fundamental issues that should be considered when addressing climate change and biodiversity: (i) the long-term and cumulative nature of effects; (ii) the complexity of the issues and cause-effect relationships; and (iii) the uncertainty of projections. It advises practitioners to (i) recognise cumulative effects early on in the EIA process; (ii) pay attention to the evolving baseline; (iii) distinguish between magnitude, [sensitivity] and significance and use significance criteria (appearing to endorse a matrix approach but also stating that significance criteria can be developed from existing legislation, policy and [government] guidance documents and/or using an ecosystem based approach; (iv) where possible, use causal chains or network analysis; (v) address the complexity of climate change and biodiversity and understand the cause-effect relationship they have with each other, as well as with other issues assessed within an EIA; and (vi) describe the sources of uncertainty, characterising its nature using everyday language.</p> <p>It does not deal with biodiversity as a resource or provide any detail on how to tackle major accidents and disasters.</p> <p>41 pages excluding Annexes</p>
[14]	<p>Transport Infrastructure Ireland, 2016. Introduction to the TII Publications System. Transport Infrastructure Ireland, Dublin. https://publications.tii.ie/document/?id=2924</p>	<p>Provides an overview of the TII publications system, including the distinction between ‘Standards’ and ‘Technical Guidance’. Standards must be followed whereas Technical Guidance includes research, items that may be developed into standards later and updates for practitioners. It explains how the Standards are divided in to ‘Activities’ and then ‘Streams’. It goes on to explain the coding system for the documents, the standard information to be included in each document, and how the website on which the publications are found works.</p> <p>16 pages.</p>
[15]	<p>Transport Infrastructure Ireland, 2020. Landscape Character Assessment (LCA) and Landscape and Visual Impact Assessment (LVIA) of Specified Infrastructure Projects - Overarching Technical Document. Transport Infrastructure Ireland, Dublin. (PE-ENV-01101) https://publications.tii.ie/document/?id=3078</p>	<p>Guidance on undertaking LCA and LVIA for use by landscape professionals but also as a reference for e.g. biodiversity professionals.</p> <p>It states that the Landscape Mitigation Plan shall have regard to, <i>inter alia</i>, the All-Ireland Pollinator Plan and the National Biodiversity Plan, and that it should show measures proposed for the mitigation of, <i>inter alia</i>, ecological effects. Assessments and interactions with biodiversity should also be considered.</p> <p>The guidance describes the overall process of both LCA and LVIA and then it sets out where (section 3) and how (section 6) LCA and/or LVIA applies to the different phases and stages of TII specified infrastructure projects.</p> <p>It also sets out thresholds below which the guidelines may not apply, or only partially apply. There is a distinction made between TII and National Transport Authority projects and associated project stages, which are similar but differ.</p>

Ref	Publication Title	Summary
		<p>It sets out, for a major project, the link between phases and stages and LCA and/or LVI, which can be summarised as follows:</p> <ul style="list-style-type: none"> • Phase 0: Scope and Pre-Appraisal – none. • Phase 1: Concept and Feasibility – none. • Phase 2: Option Selection - baseline LCA and LVIA as part of Stages 1, 2 and 3 options assessment. The assessment should be proportionate to each Stage to allow for the assessment of likely effects and for comparison and ranking of the options. The LCA carried out at Phase 2 is intended for use at Phase 3 but could be further refined. The NCA and LVIA increase in detail or are further refined as the project moves through the three stages. • Phase 3: Design and Environmental Evaluation – detailed LVIA as a chapter in an EIAR or stand-alone equivalent, plus Landscape Mitigation Strategy and Non-technical summary. This may be an iterative process as the design evolves. In essence, this leads to and includes the detailed final assessment of the final design road project. • Phase 4: Statutory Processes – Respond to FIR etc, prepare statements of evidence, present at oral hearing, review planning obligations. Ideally no further assessment would be needed at this stage. • Phases 5 – 7: none. <p>81 pages excluding appendices</p>
[16]	<p>Transport Infrastructure Ireland, 2020. Landscape Character Assessment (LCA) and Landscape and Visual Impact Assessment (LVIA) of Proposed National Roads - Standard. Transport Infrastructure Ireland, Dublin. (PE-ENV-01102) https://publications.tii.ie/document/?id=3079</p>	<p>The LCA and LVIA Standard for proposed national roads, which is to be used in conjunction with the Overarching Technical Document [15]. It sets out what must be done for both LCA and LVIA at each Phase of a TII Road Project with a budget in excess of €5m or requiring an EIA.</p> <p>It Includes a diagram (Figure 11) showing how the mitigation hierarchy is applied for landscape at each project Phase, as follows:</p> <ul style="list-style-type: none"> • Phase 0/1 & 2 – avoid & minimise. • Phase 3/4 - minimise. • Phase 5 – screen & integrate & repair. • Phase 6 – repair & compensate/enhance. <p>It sets out what steps should be undertaken at each Phase and Stage for TII Major Projects and TII Minor Projects, as outlined above for [15] but in much more detail.</p>

Ref	Publication Title	Summary
		<p>For Phase 3, it uses the EPA Guidelines approach [10] for assessing the significance of effects i.e. a matrix-based sensitivity and magnitude adapted for landscape. It also gives the requirements for a Landscape Strategy Report and a Landscape Mitigation Plan. The Strategy must identify the location and objective of mitigation measures such as retained trees/hedgerows, reconnecting severed hedges, green bridges, etc and the Mitigation Plan must illustrate the items included in the Strategy. It encourages the use of native species while noting that non-native, non-invasive species which have an ecological value may be more appropriate in urban areas.</p> <p>81 pages excluding appendices</p>
[17]	<p>Transport Infrastructure Ireland, 2022. Air Quality Assessment of Proposed National Roads - Standard (PE-ENV-01107). Transport Infrastructure Ireland, Dublin</p> <p>https://publications.tii.ie/document/?id=3218</p>	<p>The Air Quality Standard for TII Projects, which has a similar structure to the LCA and LVIA Standard, setting out what needs to be done at each Phase and Stage for the Air Quality Assessment (AQA).</p> <p>It has a role for the 'Biodiversity Practitioner' which should confirm the sensitive designated habitats and appropriate critical loads to be included in the AQA, and use the outputs from the AQA in the assessment of effects on biodiversity.</p> <p>At Phase 2, Stage 1, designated habitats should be identified, these include Ramsar sites, European sites, Natural Heritage Areas, Ancient Woodland, Veteran Trees, etc. which are sensitive to nitrogen deposition.</p> <p>At Phase 2, Stage 2, Step 4, these is a quantitative assessment of impacts on designated habitats, which involves collaborative working between ten AQ and the biodiversity practitioners. The AQ specialist should provide calculated concentrations and compare these with the critical loads for each designated habitat for the baseline, do nothing, and do something scenarios. It is for the biodiversity practitioner to determine the significance of the effect when total deposition would be >1% of the critical load, and assumed to be insignificant of <1%. There are five factors that the biodiversity practitioner must consider:</p> <ul style="list-style-type: none"> • <i>“Factors such as the nature of site management;</i> • <i>Other factors such as regular flooding in maintaining a suitable habitat;</i> • <i>The degree of sensitivity of fauna to relatively subtle changes in botanical composition;</i> • <i>Whether nitrogen or phosphorus is the key limiting nutrient; and</i> • <i>The extent of the sensitive designated site that is negatively affected shall be taken into consideration.”</i> <p>It goes on to say that <i>“Where significant effects are determined, site survey information is required to determine if the sensitive habitat of relevance is actually present in the affected area and to inform potential mitigation measures that may be required”</i>.</p>

Ref	Publication Title	Summary
		<p>[It does not mention the conservation objectives for the sensitive habitats but of course these must be considered for European sites, and that these could include restoration of habitats in areas where these are not currently present].</p> <p>At Phase 3, it notes that predictions of concentrations at sensitive designated habitats should be provided in the EIAR and again the biodiversity practitioner is to determine if impacts are significant.</p> <p>61 pages excluding appendices</p>
[18]	<p>Transport Infrastructure Ireland, 2012. Guidelines on the Implementation of Landscape Treatment on National Road Schemes in Ireland. Transport Infrastructure Ireland, Dublin. (GE-ENV-01103)</p> <p>https://publications.tii.ie/document/?id=2895</p>	<p>A supplement to [19] which provides more practical information on landscape treatments for new roads. This also relies on information to be contained in the biodiversity section of an EIAR including:</p> <ul style="list-style-type: none"> • details of the baseline ecology data of the various habitats and supporting soils within the zone of influence of the road scheme; • the habitat types found within the zone of influence of the proposed national road development project should be categorised in accordance with A Guide to Habitats in Ireland (Fossitt, 2000) down to Level 3; • provide the necessary information to facilitate the identification of landscape treatments and appropriate native species and species mixes to use; • any measures required to mitigate or compensate for significant impacts on the natural environment including any “vegetation to be retained”, specialised works and the restoration of connectivity; • a tabulated list of vegetation which can be retained during construction; • locations and methods for ‘specialised works’ that may be warranted in order to mitigate likely significant impacts on an ecological resource valued at a high geographical frame of reference; • details of mitigation measures required to fill ‘gaps’ in linear corridors, or to reconnect the former wildlife corridors, in the landscape, in order to restore connectivity for species; • locations for the provision of wildlife crossing structures (such as mammal underpasses), mammal-resistant fencing and tall vegetation to divert flying animals; • the use of sensitive light standards and the strategic placement of landscape treatments and light standards in order to avoid or reduce the potential for significant impacts of lighting on species of bats or birds.

Ref	Publication Title	Summary
		<p>The remainder of the guidance covers procurement, the role of the employer’s representative during construction, quality and environmental systems, and the requirement for a landscape maintenance and habitat management manual. It has an Appendix on native plants.</p> <p>29 pages excluding appendices.</p>
[19]	<p>Transport Infrastructure Ireland, 2006. A Guide to Landscape Treatments for National Road Schemes in Ireland. Transport Infrastructure Ireland, Dublin. (GE-ENV-01102)</p> <p>https://publications.tii.ie/document/?id=2896</p>	<p>Guidance on (ecological) landscaping alongside new roads and how it can be used to mitigate and compensate for effects on, <i>inter alia</i>, biodiversity, or contribute positively to its conservation, and connect existing habitats together. It promotes the appropriate use of native species, only occasional use of non-native species, and the disuse of fertiliser, herbicides and frequent cutting.</p> <p>It provides an overview of the legislation and policy context (including the EIA Directive, Habitats Directive, and the Convention on Biological Diversity), the principles and approach to landscape treatments (for a landscape masterplan), components of the roadside landscape (verges, embankments, cuttings, etc.), soil geographic factors (background information on soils and guidance on soil preparation, including translocation of turves), landscape treatments (practical information on grasslands, woodlands, hedgerows and trees).</p> <p>It promotes, <i>inter alia</i>, (i) the concept of ‘ecological infrastructure analysis’ to define ecological networks for the roadside landscape and using landscape treatments along the new road to decrease overall habitat fragmentation; (ii) basing the landscape design on existing native flora, topography, soils and geology; and (iii) preserving and integrating existing native plant communities or, if absent, basing the design on ‘potential natural vegetation’.</p> <p>It relies on information to be provided in the biodiversity chapter in the EIAR including:</p> <ul style="list-style-type: none"> • Identifying sites of local ecological importance to inform the use of natural colonisation; • Providing information on the species composition within the surrounding landscape, including their proportions, including for hedgerows; • Identifying rare species and communities so that these can be considered for use in the landscape treatments, including translocation; • Identifying non-native species that have significant local cultural importance so that these can be considered for use in the landscape treatments; • Providing information on soil types and distribution; • Habitat mapping and aerial photography which enables ‘ecological infrastructure analysis’ at the landscape scale;

Ref	Publication Title	Summary
		<ul style="list-style-type: none"> • Where to place fauna passages such as tunnels; • Identifying severed plots (field fragments) for compensatory habitat creation, considering their existing ecological value; and • Identifying mitigation and compensation measures. <p>104 pages excluding appendices.</p>
[20]	Transport Infrastructure Ireland, 2020. The Management of Invasive Alien Plant Species on National Roads - Standard . Transport Infrastructure Ireland, Dublin. (GE-ENV-01104) https://publications.tii.ie/document/?id=3076	Provides the standard for managing Invasive Alien Plant Species (IAPS) on national roads, setting out the strategies and processes that must be incorporated into the planning, construction practices and maintenance regimes of national roads. This also requires information to be presented in the EIAR including: <ul style="list-style-type: none"> • During habitat mapping, the perimeter of each IAPS infestation shall be surveyed using a recognised topographical survey technique with records submitted to the National Database; • All infestations of IAPS shall be noted as requiring specific treatment; • Appropriate control measures shall be prescribed and should detail the following: (i) The area requiring treatment (ii) The type of treatment required (iii) An assessment of the risk of re-infestation from surrounding land (iv) Costings of appropriate control strategies; • Specific management requirements to control the future spread of IAPS; and • An IAPS management plan (template provided). The remainder of the standard covers later stages – construction and post-construction. 13 pages excluding appendices
[21]	Transport Infrastructure Ireland, 2020. The Management of Invasive Alien Plant Species on National Roads - Technical Guidance . Transport Infrastructure Ireland, Dublin. (GE-ENV-01105) https://publications.tii.ie/document/?id=3075	Detailed guidance on the legislative framework, control strategies and the ecology, identification and treatment of Invasive Alien Plant Species IAPS. This also requires information to be presented in the EIAR including: <ul style="list-style-type: none"> • the presence [location] and abundance of IAPS must be documented as part of the general species composition data recorded, by qualified and experienced personnel; • data on the species present, scale of infestation and physical site conditions; and

Ref	Publication Title	Summary
		<ul style="list-style-type: none"> record any previous attempts at control or eradication [at this site], detailing the success or failure of the measures applied, if known. <p>Most of the rest of the guidance pertains to the construction phase.</p> <p>63 pages excluding appendices</p>
[22]	<p>Highways England 2020 Design Manual for Roads and Bridges LA 108 Biodiversity</p> <p>https://www.standardsforhighways.co.uk/tses/attachments/af0517ba-14d2-4a52-aa6d-1b21ba05b465?inline=true</p>	<p>Sets out the requirements for assessing and reporting the effects of highway projects on biodiversity in the UK, including Northern Ireland. This is a relatively short document. It states that it has been designed to meet the requirements of the Regulations derived from the European Nature Directives and the Water Framework Directive. However, whilst not referenced, it is principally aligned with the EIA Directive and designed to meet the requirement for EIA rather than AA or WFD. It references the CIEEM guidelines [23].</p> <p>It adopts CIEEM's definitions of a significant effect: <i>An effect that either supports or undermines biodiversity conservation objectives for biodiversity resources or for biodiversity in general and e.g. impacts on structure and function of defined sites, habitats, or species and the conservation status of habitats and species (including extent, abundance and distribution)</i>. However, this does not follow through into the assessment method and it instead adopts a matrix approach, and states that <i>Significant effects typically comprise effects that remain within the moderate, large or very large categories once mitigation has been taken into account</i>.</p> <p>It states that assessment must cover sites, habitats and species, and that specific features should be identified, which can be grouped.</p> <p>It provides an assessment methodology which covers (i) scoping (an initial assessment which covers baseline, opportunities for enhancement/net gain, mitigation measures, the zone of influence, the potential for significant effects, recommendations for further assessment); (ii) the study area (to include the project boundary, construction footprint, zone of influence, which may vary and should be established for each biodiversity resource and refined as the project progresses); (iii) the baseline scenario (both current and future baseline at the time of the project, based on desk study and field survey); (iv) significance criteria (based on magnitude and the importance of the resource, with magnitude expressed on a five point scale from no change to major change, adverse or beneficial, and based on extent, magnitude, frequency and/or timing and its effect on the integrity or key characteristics of a resource [there is no definition of the terms used to express the magnitude of impact, and, oddly, minor and major effects are related to permanent effects, whereas moderate and negligible effects are related to temporary effects]); (v) design and mitigation (mitigation hierarchy); (vi) reporting of environmental assessments; and (vii) monitoring.</p> <p>It includes a table of biodiversity resource importance (which the CIEEM Guidelines don't) using the CIEEM geographic scale.</p>

Ref	Publication Title	Summary
		<p>It equates the value of sites to the origin of the legislation providing protection (as does CIEEM). Any area of priority habitat or irreplaceable habitat is of national importance. The importance of a species population is determined by the effect of its loss on conservation status at the relevant geographic scale, or if the species has been identified in a regional or local (but not national?) strategy. There is no reference to other criteria for assessing nature conservation value.</p> <p>23 pages</p>
[23]	<p>Chartered Institute of Ecology and Environmental Management, 2022. Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.2. Chartered Institute of Ecology and Environmental Management, Winchester</p> <p>https://cieem.net/wp-content/uploads/2018/08/ECIA-Guidelines-2018-Terrestrial-Freshwater-Coastal-and-Marine-V1.2-April-22-Compressed.pdf</p>	<p>This is the standard reference for ecological impact assessment in the UK and Ireland. There have been minor updates since 2018. Previously there were separate guidelines for (i) Terrestrial, Freshwater and Coastal and (ii) Marine and Coastal, the former was published in 2016. The current version of the guidelines is broadly the same as the 2016 guidance.</p> <p>It covers scoping, establishing the baseline, important ecological features, impact assessment, mitigation etc and consequences for decision makers.</p> <p>On scoping, it states that “assessment should include potential impacts on each ecological feature determined as ‘important’ and “it is only necessary to describe in detail the impacts that are likely to be significant. Impacts that are either unlikely to occur, or if they did occur are unlikely to be significant, can be scoped out. For transparency, justification for scoping out any ecological impact should be provided. If in doubt, the potential impact should be assessed”.</p> <p>Box 3 covers significant effects, providing two explanations, stating that a significant effect is one that supports or undermines the conservation objective for an important feature (or at 5.24 biodiversity in general) and also stating that it is one that is sufficiently important to require assessment and reporting so that the decision maker is adequately informed of the environmental consequences of permitting a project. Elsewhere the guidance makes clear that the EclA should consider the significant ecological effects of a project in the light of relevant planning policies and legislation but also for species and habitats it advises assessing effects based on conservation status. It states that significant effects should be qualified with reference to an appropriate geographic scale.</p> <p>It provides guidance on which ecological features are important and should be subject to detailed assessment. It makes clear that these include features protected by law and policy and other features identified by the ecologist using criteria similar to those of Ratcliffe. The level of importance assigned to a feature is on a geographic scale. It refers to considering restoration and irreplaceable habitats.</p> <p>On embedded or designed in mitigation, it states that the efficacy and any potential knock-on effects of both embedded and non-embedded mitigation should be described.</p> <p>It states “it is only essential to assess and report significant residual effects that remain after mitigation measures have been taken into account.</p>

Ref	Publication Title	Summary
		<p><i>However, it is good practice for the EclA to make clear both the potential significant effects without mitigation and the residual significant effects following mitigation, particularly: a) where the mitigation proposed is experimental, unproven or controversial; or b) to demonstrate the importance of securing the measures proposed through planning conditions or obligations should always be assessed”.</i></p> <p>On cumulative effects, it states these should “<i>include the following types of future development within the same zone of influence: (i) proposals for which consent has been applied which are awaiting determination in any regulatory process (not necessarily limited to planning permission) (ii) projects which have been granted consent (not limited to planning permissions) but which have not yet been started or which have been started but are not yet completed (i.e. under construction) (iii) proposals which have been refused permission but which are subject to appeal and the appeal is undetermined (iv) to the extent that their details are in the public domain, proposed projects that will be implemented by a public body but for which no consent is needed from a competent authority (v) constructed developments whose full environmental effects are not yet felt and therefore cannot be accounted for in the baseline and (vi) developments specifically referenced in a National Policy Statement, a National Plan or a Local Plan (draft or adopted)”.</i> Elsewhere it states that cumulative effects should be included in the assessment of the baseline (Box 13).</p> <p>50 pages excluding appendices.</p>
[24]	<p>Conference of European Directors of Roads, 2018. Call 2013: <i>Roads and Wildlife - The Roads and Wildlife Manual</i>. Conference of European Directors of Roads, Brussels</p> <p>https://www.cedr.eu/download/Publications/2018/CR-2018-3-Call-2013-Roads-and-Wildlife-Manual.pdf</p>	<p>Starts with a chapter on Environmental Policy & Legislation for Road Planning. This provides an overview of the relevant directives and the SEA, EIA and AA processes. On EIA it states that “<i>It is important that consideration of the effects on biodiversity, flora and fauna in EIA are not limited only to European protected species or the interest features of designated areas”</i> and on the EIAR it states that “<i>It must clearly set out all the ecological information necessary for a planning decision to be made”</i>. Box 1-1 provides further guidance on what should be included in an EIAR including up to date survey information, cumulative effects, post-construction monitoring, effects of human disturbance, road casualty effect on species populations, wildlife movement, bat mitigation and relating impacts to acceptable levels under the <i>inter alia</i> Nature Directives. It makes clear that the EIAR should be complied by experts and provides guidance on gathering ecological information (desk study and surveys), describing the project characteristics, legal implications, and describing and predicting impacts. It endorses the geographic scale of importance approach of Refs 20 and 21, although defines them differently, makes clear that the EIAR must address the requirements of the Nature Directives, including habitats supporting important populations of birds and HD Article 10 habitats, and Favourable Conservation Status (FCS) for species of community interest as listed in the HD Annex II, IV and V and the BD Annex I.</p>

Ref	Publication Title	Summary
		<p>It defines an acceptable level of impact as one not breaching FCS (within the natural amplitude of species fluctuations) for all these species and makes clear that effects need to be quantified in order to relate them to acceptable levels/FCS. It provides some of the clearest guidance on how to consider effects on the species and habitats listed in the Nature Directives in EIA.</p> <p>The remaining chapters deal with various aspects of mitigation, covering strategies, bats, procurement & performance indicators, maintenance, and measuring performance.</p>
[25]	<p>River Basin Management Plan; The Water Action Plan 2024: A River Basin Management Plan for Ireland.</p> <p>https://www.gov.ie/pdf/303156/?page=null&lang=en</p>	<p>This is Ireland’s third river basin management plan and it covers groundwater, rivers, lakes, estuaries and coastal waters. It has the objective of reaching as close to full compliance as possible with the Water Framework Directive by 2027. It provides an overview of the Water Framework Directive and its links to other EU legislation including environmental impact assessment. The Plan has the objective of either protecting water bodies at a good or high status or restoring water bodies to at least good status. It makes clear that every public authority must exercise its functions in a manner which is consistent with the provisions of the WFD and that the objectives of this plan will be integrated into future policy statements. Ireland has one main river basin district, plus two which it shares with Northern Ireland. These are the Northwestern and Neagh Bann river basin districts. The main Ireland river basin district is divided into 46 catchment management units which are further divided into sub catchments. It provides an overview of the current water quality status in Ireland. It identifies water bodies at risk of not achieving their water quality objectives and the significant pressures acting upon these water bodies and it sets environmental objectives including basic and supplementary measures for the purpose of achieving the objectives of the WFD. It also describes the progress to date in achieving the objectives of the WFD and that specific environmental objectives for water bodies can be found on the website www.catchments.ie. It covers environmental objectives for protected areas including water dependent habitats and species and nutrient sensitive areas. There is a chapter describing the actions (or the programme of measures) that will be undertaken to ensure objectives are achieved. The programme of measures has three strategic aims; 1 reduce the diffuse loss and direct discharge of nitrogen and phosphorus compounds into waterways and groundwater, 2 restoring continuity and the natural functions of rivers and 3 targeting specific pressures. It states that restoring water quality to good or high status and ensuring that water quality does not deteriorate are both equal requirements of the WFD.</p> <p>There are three appendices which provide 1. Further information on the environmental measures to 2027. 2.A full list of Measures and 3. A correlation table with Water Framework Directive text, including Annex VII</p> <p>126 pages excluding Appendices</p>

Ref	Publication Title	Summary
[26]	Atkinson, S., Magee, M., Moorkens, E.A. & Heavey, M., 2023. Guidance on Assessment and Construction Management in <i>Margaritifera</i> Catchments in Ireland. https://e-mussels.eu/europe/conservation-guidelines	<p>Comprehensive guidance on how to deal with Freshwater Pearl Mussel FWPM during planning and development. The FWPM is one of the most demanding species of high river quality in the world and it is critically endangered. Ireland’s populations have declined dramatically and the conservation objectives for the species is therefore to restore it to favourable conservation status as required by the Habitats Directive. The guidance describes the kinds of work which damage its habitat including works which are remote from FWPM population, physical river works, changes in river flow, adding chemicals or nutrients, inputs of sediment and biotic factors (impacts on fish populations). AA is required for projects and plans that occur in FWPM catchment and the guidance sets out how an assessment should be undertaken to ensure compliance with the Habitats Directive, Wildlife Acts (1976 – 2023) and Environmental Liability Directive 2004/35/EC. It is overarching guidance and there will be guidance for all 27 SAC populations individually. It includes a map of <i>Margaritifera</i> Sensitive Areas in Ireland. There is information on <i>Margaritifera</i> ecology, causes of decline, legal protection, water quality regulation, the CEN Standard (European Document EN 16859:2017, Water quality -Guidance standard on monitoring freshwater pearl mussel (<i>Margaritifera margaritifera</i>) populations and their environment), activities requiring consent (ARC) i.e. those which could lead to damage, and an overview of the case law. It makes clear that a project that would prevent the restoration of <i>Margaritifera</i> should not be permitted. It recommends focussing on the operation stage first since this produces long-lasting effects, and then considering the construction stage. It has detailed guidance on the assessments under Article 6 (3) and (4) of the Habitats Directive of Plans and Projects on the populations of this species that occur in SACs and much briefer guidance for environmental impact assessment for those outside SACs (without referring much to the EIA process). It makes clear that an increase in hard surfaces such as a new road can result in “<i>significant changes to catchment hydrology. Natural flow regimes may be altered with resulting impact on downstream Margaritifera. Sediment and nutrient release, and pollutant load to waters is increased</i>”. Table 6.1 provides detail on mitigation measures relevant to conservation objectives, separately for maintain and restore.</p> <p>Whilst the guidance is specific to one Annex II species, the principles therein could be applied to other Annex II species.</p> <p>78 pages</p>
[27]	EU Biodiversity Strategy to 2030: Bringing nature back into our lives. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52020DC0380	<p><i>The EU’s biodiversity strategy for 2030 is a comprehensive, ambitious and long-term plan to protect nature and reverse the degradation of ecosystems. The strategy aims to put Europe’s biodiversity on a path to recovery by 2030, and contains specific actions and commitments.</i></p> <p>The strategy makes clear the importance of biodiversity, the need for its conservation and restoration, and its ongoing decline. It also makes the link between biodiversity and climate. It includes a number of key commitments and further guidance in the body of the text. These include:</p>

Ref	Publication Title	Summary
		<p><i>Legally protect a minimum of 30% of the EU's land area and 30% of the EU's sea area and integrate ecological corridors, as part of a true Trans-European Nature Network.</i></p> <p><i>it will be important to set up ecological corridors to prevent genetic isolation, allow for species migration, and maintain and enhance healthy ecosystems.</i></p> <p><i>Strictly protect at least a third of the EU's protected areas, including all remaining EU primary and old-growth forests.</i></p> <p><i>Significant areas of other carbon-rich ecosystems, such as peatlands, grasslands, wetlands, ... and seagrass meadows should also be strictly protected, taking into account projected shifts in vegetation zones.</i></p> <p><i>Member States will be responsible for designating the additional protected and strictly protected areas. Designations should either help to complete the Natura 2000 network or be under national protection schemes.</i></p> <p><i>Effectively manage all protected areas, defining clear conservation objectives and measures, and monitoring them appropriately.</i></p> <p><i>EU Nature Restoration Plan setting legally binding EU nature restoration targets including:</i></p> <ul style="list-style-type: none"> <i>i. no deterioration in conservation trends and status of all protected habitats and species by 2030 and at least 30% of species and habitats not currently in favourable status are in that category or show a strong positive trend.</i> <i>ii. The decline in pollinators is reversed.</i> <i>iii. At least 25,000 km of free-flowing rivers are restored</i>
[28]	BS42020: 2013 Biodiversity: Code of Practice for Planning and Development	<p>It provides recommendations for the approach to gathering, presenting and reviewing ecological information at key stage of the planning application process. It is divided into two sections, the first addresses professional practice and the second provides the recommendations for integrating biodiversity into planning. It has a series of Annexes A to H with Appendix A dedicated to impact significance. It uses the Convention's definition of biodiversity.</p> <p>In Section 2, it explains the iterative nature of design, the mitigation hierarchy, an 'Ecological Constraints and Opportunities Plan', and proportionality. It then proceeds through a series of Stages; Stage 1 Pre-application. Stage 2: Validation and Registration of a planning application. Stage 3: Decision Making. Stage 4: Determination and issue of planning permission. Stage 5: Implementation. Post-development.</p>

Ref	Publication Title	Summary
		<p>Stage 1 and Annex A are the most relevant to BIA. On the ecological impact assessment process, it simply defers to the CIEEM guidelines. It does provide some guidance on topics around this, including (i) the importance of a pre-application consultation to establish the type and level of supporting information required with the application, such as surveys and known constraints. (ii) the adequacy of ecological information (including the ecological processes upon which habitats and species depend) which should include a non-technical summary (iii) ecological reports which should be prepared “specifically with the aim of enabling the decision-maker to reach a sound and lawful determination of the application” and “should concentrate on identifying and addressing significant impacts” and provide “<i>a detailed description (ecological assessment) of how biodiversity could be affected by proposed development and the measures proposed to ensure significant adverse effects are addressed (e.g. avoided mitigated or compensated) and that opportunities for enhancement are maximized</i>”. (iv) ecological surveys, which should follow good practice guidelines, unless it is justified to deviate from these, and the records should be provided to the biological records centre. (v) non-technical summaries and a clear statement of losses and gains once the development is implemented. (vi) providing certainty and clarity to the decision-maker and applicant (using the word ‘will’) and (vii) identifying limitations.</p> <p>Annex A deals with significance. It provides three definitions.</p> <ol style="list-style-type: none"> 1. Significance under the EIA Regulations is “sufficiently important to require assessment and reporting so that the decision-maker is adequately informed as to the environmental consequences of permitting the project”. 2. Significance under the Habitat Regulations: an effect which could undermine the published conservation objectives of a European site or likely affect the local distribution and abundance of a European species. 3. Significance under planning policy: an effect that is sufficiently important to be given weight in the planning balance or to warrant the imposition of a planning condition. <p>92 pages</p>
[29]	<p>Bat Conservation Ireland, 2012. Bats and Appropriate Assessment Guidelines, Version 1, December 2012. Bat Conservation Ireland, www.batconservationireland.org. https://www.batconservationireland.org/wp-content/uploads/2013/09/BCIreland-AA-Guidelines_Version1.pdf</p>	<p>Guidance on how to address the potential effects of development as part of an Appropriate Assessment. It explains that Lesser Horseshoe bats are the only bat species listed on Annex II of the Directive that occurs in Ireland and therefore the only bat species which needs to be fully considered in AA. It covers Stage 1: screening (consider all SACs within 15km and the risk to bats, screen in all those within 6km no need for surveys); Stage 2 AA (surveys may be needed inside and outside the SAC, follow the mitigation hierarchy, clear conclusions on integrity) It briefly touches on Stage 3 alternative solutions (e.g. choosing another site >6km from the SAC); and Stage 4 IROPI (only likely to apply occasionally).</p>

Ref	Publication Title	Summary
		<p>There is a section on data collection and survey techniques and a list of SACs for which Lesser Horseshoe bat is Qualifying Interest feature.</p> <p>9 pages excluding appendices.</p>
[30]	<p>OPR Practice Note (PN) 01 PN01 “Appropriate Assessment Screening for Development Management”</p>	<p>Guidance produced by the Office of the Planning Regulator on undertaking the first stage of assessment under Article 6(3) of the Habitats Directive. It explains key concepts and provides a step-by-step methodology, templates and worked examples. Whilst it is focused on AA screening, some concepts crossover to assessments such as Biodiversity Impact Assessments, including the assessment of in - combination or cumulative effects, impact pathways and the Zone of Influence.</p> <p>The guidance makes clear that the assessment of cumulative effects should focus on projects that could act in combination with the project being assessed to affect the conservation objectives of a given site and feature, rather than those within a defined search area around the project being assessed. The projects to be considered cumulatively (for AA screening) are: Projects completed, Projects approved but not started or uncompleted, Projects proposed, i.e. for which an application for approval or consent has been made, including refusals subject to appeal and not yet determined, Proposals in adopted plans, and Proposals in finalised draft plans formally published or submitted for consultation or adoption. The assessment should not be restricted to projects of the same type.</p> <p>The guidance states that consideration of likely significant effects should be based on the Source-Pathway- Receptor model, and where there is no pathway, significant effects can be excluded. Sources of impact include emissions to air, loss of habitat, creating barriers. Receptors are ecological features. Pathways are links between Sources and Receptors.</p> <p>On the zone of influence, the guidance states this should be established on a case-by-case basis using the Source-Pathway-Receptor framework and not by arbitrary distances. It follows that the ZoI can only be fully known after an impact assessment is completed.</p> <p>21 pages excluding Appendices</p>
[31]	<p>Collins, J. (ed) 2023 Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition). The Bat Conservation Trust, London.</p> <p>https://www.bats.org.uk/resources/guidance-for-professionals/bat-surveys-for-professional-ecologists-good-practice-guidelines-4th-edition</p>	<p>A comprehensive guidance document for bat surveys, which exclude information on carrying out EclAs and exclude information on mitigation and compensation for significant effects on bats. It is specific to the UK, including Northern Ireland, and covers legislation, licensing for surveys, the biodiversity duty, national planning policy and the information that might be required to support a planning application, referencing BS42020. It references further guidance on how bats can be accounted for when planning BNG. Despite the stated exclusions, it provides a list of the types of impacts that can affect bats and emphasises that the unique combination of project and site will influence the type and nature of the potential impacts.</p> <p>There is information on bat ecology, including information on each species and their core sustenance zones CSZ.</p>

Ref	Publication Title	Summary
		Most of the rest of the document deals with planning and undertaking bat surveys of various kinds. There is also a section on preparing bat survey reports and a template is provided, which includes sections for evaluation (the findings should be placed in a legal and policy context) and impact assessment. 107 pages
[32]	Scottish Natural Heritage, 2016. Assessing Connectivity with Special Protection Areas (SPAs). Scottish Natural Heritage. https://www.nature.scot/sites/default/files/2022-12/Assessing_connectivity_with_special_protection_areas.pdf	Provides foraging ranges from nest sites and night roosts for selected species, with the implication that projects located beyond these distances are unlikely to affect the SPA population. 3 pages
[33]	NatureScot, 2022. Disturbance distances in selected Scottish bird species. NatureScot https://www.nature.scot/doc/disturbance-distances-selected-scottish-bird-species-naturescot-guidance	Provides distances over which selected species of birds are disturbed by human activity and recommends buffers to prevent significant disturbance. these range from 10-50m to 1000m. 10 pages
[34]	Fossitt, J, A, 2000. <i>A Guide to Habitats in Ireland</i> . The Natural Heritage Council, Kilkenny A Guide to Habitats in Ireland - Fossitt.pdf (npws.ie)	The standard classification system for <i>habitats</i> in Ireland which is similar in form and detail to the Phase 1 classification system used in Great Britain. The classification system does not explicitly include Annex I habitats which is a weakness of the system.
[35]	National Biodiversity Data Centre, 2022. Irish Vegetation Classification (Online). Available at: Irish Vegetation Classification - National Biodiversity Data Centre (biodiversityireland.ie) https://biodiversityireland.ie/projects/ivc-classification-explorer/	The standard classification system for <i>vegetation communities</i> in Ireland which is similar in form and detail to the NVC system used in Great Britain. This system enables the identification of community types which match Annex I habitats and is best used for classifying semi-natural habitat however it includes highly modified habitats such as agricultural grassland and conifer plantations. It is accompanied by software to aid identification of vegetation samples (relevés). 186 communities and 69 subcommunities.

Ref	Publication Title	Summary
[36]	Perrin, P.M., Barron, S.J., Roche, J.R. & O'Hanrahan, B, 2014. <i>Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland. Version 2.0. Irish Wildlife Manuals, No. 79.</i> National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin https://www.npws.ie/sites/default/files/publications/pdf/IWM79.pdf	This document describes how to survey upland vegetation, an overview of the habitat types, methods of data collection for monitoring their condition (similar to the JNCC's Common Standards Monitoring) and a provisional habitat classification system which is linked to the IVC [35].
[37]	Anon, 2004. <i>Margaritifera margaritifera. Stage 1 and Stage 2 survey guidelines.</i> Irish Wildlife Manuals, No. 12. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin https://www.npws.ie/sites/default/files/publications/pdf/IWM12.pdf	Detailed survey guidelines for FWPM divided into stages, Stage 1 presence/absence and Stage 2 population size. 11 pages.
[38]	National Roads Authority, 2009. <i>Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes.</i> National Roads Authority, Dublin https://cieem.net/wp-content/uploads/2019/07/Ecological-Surveying-Techniques-for-Protected-Flora-and-Fauna-during-the-Planning-of-National-Road-Schemes.pdf	A detailed guidance document on surveys for habitats and species groups, covering plants, fungi, terrestrial invertebrates, aquatic invertebrates, fish, amphibians, birds, and mammals. For each group, it also covers potential impacts of road projects, and mitigation, enhancement and compensation. 141 pages excluding appendices
[39]	G. Gilbert, D. Gibbons and J. Evans, 1998. <i>Bird Monitoring Methods – a manual of techniques for key UK species.</i> , RSPB., Sandy, Bedfordshire.	Standard reference for bird survey techniques.

Ref	Publication Title	Summary
[40]	Transport Infrastructure Ireland, 2021. Survey and Mitigation Standards for Barn Owls to inform the Planning, Construction and Operation of National Road Projects. Transport Infrastructure Ireland, Dublin. (PE-ENV-07005) https://publications.tii.ie/document/?id=3088	<p>Document which sets out standards in relation to barn owls during all stages of national road projects. It covers legislation, impacts, requirements of a barn owl specialist, and actions to be undertaken at each phase of development.</p> <p>At Phase 2, Stages 1 - 3, the requirements are to (i) collate existing records, including through consultation, and (ii) examine aerial photos and maps to identify potential breeding sites and foraging areas, with all information mapped and used to inform the selection of the preferred route. Surveys are optional at this stage and, if done, targeted on sites with a high probability of supporting this species.</p> <p>At Phase 3, surveys are undertaken. The standard provides specific methods for doing this. It defines the survey area (or zone of influence) as a 10km corridor centred on the preferred route and 5km from the start and end point. It sets out standards for mitigation and monitoring which should be clearly set out in the EIAR.</p> <p>25 pages.</p>
[41]	Transport Infrastructure Ireland, 2017. Barn Owl Surveying Standards for National Road Projects. Transport Infrastructure Ireland, Dublin. (RE-ENV-07005) https://birdwatchireland.ie/app/uploads/2019/04/Barn-Owl-Surveying-Standards-for-National-Road-Projects.pdf	Technical publication which covers surveys for barn owls much of which is replicated in the Standard [40].
[42]	National Roads Authority, 2006. <i>Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes</i> . National Roads Authority, Dublin https://www.tii.ie/media/vuul2s1f/best_practice_guidelines_for_the_conservation_of_bats_in_the_planning_of_national_road_schemes.pdf	Relatively brief guidance document. It covers legislation, bat behaviour and roost types, what should be done to inform the constraints study (a desk study of bat data, consultation and perhaps surveys, as advised by the ecologist), what should be done to inform the route corridor selection (a desk study of bat habitats and roosts within 1km or 3km, consultation, preliminary night time surveys in at a known roost of national importance or higher, if lesser horseshoe bats may be present, and in habitats likely to be important for bats), what should be done to inform the EIS (a detailed and comprehensive evaluation of the preferred route based on surveys) and the ways in which effects on bats can be mitigated and compensated. For the EIS, it provides an overview of the survey techniques which may be used but defers to the predecessor of [1] for the assessment of effects. Appendix 1 provides criteria for bat roosts of national or international importance however it provides criteria for the designation of SACs for lesser horseshoe bats and adds that ‘the largest’ roosts of this species and large Leisler’s bat roosts (in excess of 100) are of international importance.

Ref	Publication Title	Summary
		<p>32 pages excluding appendices.</p> <p>Under Lot 6 of TII's Standards Commission, it is planned to update this guidance and publish it as a TII's publication in order to, <i>inter alia</i>, fulfil TII's action under the Lesser Horseshoe Bat Species Action Plan.</p>
[43]	<p>Bat Conservation Ireland, 2010. Bats and Waterways: Guidance Notes for: Planners, engineers and developers. Bat Conservation Ireland, www.batconservationireland.org.</p> <p>https://www.batconservationireland.org/wp-content/uploads/2013/09/BCI_Guidelines_waterways.pdf</p>	<p>Short document covering the importance of waterways for bats, the places that they roost including bridges, the species of bats that occur in Ireland, and bats and the law (all Irish bats are protected species). It goes on to describe bat surveys of bridges and other structures, proving a grading system for roost potential and survey timings, and trees. There is guidance on what types of bridges are suitable for the installation of artificial roosts and where to put them, and a warning that major works to structures require a bat assessment in advance.</p> <p>8 pages</p>
[44]	<p>Bat Conservation Ireland, 2014. Bats in Buildings. Guidance Notes for: Planners, engineers, architects and developers. Bat Conservation Ireland, www.batconservationireland.org.</p> <p>https://www.batconservationireland.org/wp-content/uploads/2013/09/BCIrelandGuidelines_Building.pdf</p>	<p>A publication similar in style to [43]. It covers much the same topics, but this time focusing on buildings. There is table showing the places where different species can roost within a building. It explains the need for derogation licence should it be necessary to damage a roost.</p> <p>7 pages</p>
[45]	<p>Environmental Survey and Mitigation Guidance Chartered Institute of Ecology and Environmental Management, 2019. Advice Note – On the Lifespan of Ecological Reports and Surveys. Chartered Institute of Ecology and Environmental Management, Winchester</p> <p>https://cieem.net/wp-content/uploads/2019/04/Advice-Note.pdf</p>	<p>A short note setting out for how long ecological surveys are likely to be valid. For mobile species, this is just 12 months and for other features it is 18 months. However, the life of the surveys can be extended by a further year or 18 months, by undertaking a site visit and updating the desk study. After three years, most surveys will need to be updated, subject to professional judgement.</p> <p>1 page</p>
[46]	<p>National Roads Authority, 2006. <i>Guidelines for the Protection and Preservation of Trees, Hedges and Scrub Prior to During and Post</i></p>	<p>Provides guidance on protecting retained trees near new national roads schemes post Stage 4. It covers legislation, the requirements of trees, the ways trees can be damaged during construction, what should be done at pre-construction stage, protecting trees during construction, and post-construction monitoring. Despite the title, it has little to say about hedgerows and does not deal with scrub.</p>

Ref	Publication Title	Summary
	<p>Construction of National Road Schemes. National Roads Authority, Dublin</p> <p>https://www.tii.ie/media/neghtphi/guidelines-for-the-protection-and-preservation-of-trees-hedgerows-and-scrub.pdf</p>	10 pages
[47]	<p>Transport Infrastructure Ireland, 2021. The Interactions between Barn Owls and Major Roads: Informing Management and Mitigation. Transport Infrastructure Ireland, Dublin. (RE-ENV-07004)</p> <p>https://publications.tii.ie/document/?id=3089</p>	<p>Technical publication which covers barn owl mortality on roads, factors which influence collision, the use of motorway verges by small mammals, barn owl distribution, how barn owls respond to roads and a set of recommendations for mitigation. This document is a research document that informed the standard [40].</p> <p>100 pages excluding references and appendices</p>
[48]	<p>National Roads Authority, 2006. Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes. National Roads Authority, Dublin</p> <p>https://www.tii.ie/media/wsmlbxmv/guidelines-for-the-treatment-of-otters-prior-to-the-construction-of-national-road-schemes.pdf</p>	<p>Guidance document specific to otter post Stage 4. It covers impacts, legislation, pre-construction surveys, excluding otters including from their holts, undertaking site works in the vicinity of holts, providing safe passage at water crossings, and post construction monitoring and mitigation.</p> <p>15 pages.</p>
[49]	<p>National Roads Authority, 2006. Guidelines for the Treatment of badgers prior to the Construction of National Road Schemes. National Roads Authority, Dublin</p> <p>https://www.tii.ie/media/gtajacj2/guidelines-for-the-treatment-of-badgers-prior-to-the-construction-of-a-national-road-scheme.pdf</p>	<p>Guidance document specific to badger post Stage 4.</p> <p>It covers impacts, legislation, pre-construction surveys, excluding badgers including from their setts, constructing artificial setts, badger underpasses, fencing, working near setts and post construction monitoring and mitigation.</p> <p>15 pages.</p>
[50]	<p>National Roads Authority, 2006. <i>Guidelines for the Treatment of bats during the Construction of National Road Schemes</i>. National Roads Authority, Dublin</p>	<p>Guidance document specific to bats post Stage 4. It covers the felling of trees, the demolition of buildings, bridge re-structuring and post-construction monitoring.</p> <p>9 pages.</p> <p>[This guidance is proposed to be updated in the next few years.]</p>

Ref	Publication Title	Summary
	https://www.tii.ie/media/jbqo5x10/guidelines-for-the-treatment-of-bats-during-the-construction-of-national-road-schemes.pdf	
[51]	Marnell, F., Kelleher, C. & Mullen, E., 2022. <i>Bat Mitigation Guidelines for Ireland v2. Irish Wildlife Manuals, No. 134</i> . National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Dublin https://www.npws.ie/sites/default/files/publications/pdf/IWM134.pdf	Guidance document that is specific to bats. As well as mitigation, it covers legislation, roles and responsibilities, an introduction to bats, surveys, and predicting the impacts of development. The guidance is mainly practical and does not explain how to evaluate the importance of bat populations. However, it makes clear that the aim of mitigation should be to maintain the favourable conservation status of bats and provides guidance on assessing the scale of impacts using a three-point scale of low, medium, high (Table 4) and then, taking into account the rarity and population size, the conservation significance of the impact on an undefined scale of low to high (Figure 20). It also makes clear that mitigation and compensation should be proportionate to the impact. A report structure template is provided. 62 pages excluding appendices.
[52]	Roche N. and Aughney T., 2022. Bats and Heritage Structures. Bat Conservation Ireland, Dublin Ireland https://www.batconservationireland.org/wp-content/uploads/2022/11/BatsHeritageStructures_Final.pdf	Guidance on how to manage bats during management, restoration and maintenance works at heritage sites, which it defines as traditional, archaeological and historic sites, which may include buildings, bridges and other structures as well as trees and landscapes. There is information on bats, the legislation, finding a bat ecologist, the types of work which might affect bats, derogation licences, and mitigation measures. 27 pages
[53]	Infrastructure & Ecology Network Europe, 2022. Wildlife and Traffic – A European Handbook for Identifying Conflicts and Designing Solutions (Online). Available at: https://www.biodiversityinfrastructure.org/	A detailed description of the effects and mitigation measures for road projects in a European context it covers: <ol style="list-style-type: none"> 1. Ecological effects of infrastructure 2. Policy, strategy and planning 3. The mitigation hierarchy 4. Integration of infrastructure into the landscape 5. Solutions to mitigate impacts and benefit nature 6. Evaluation and monitoring 7. Maintenance It has a practical focus, setting out in detail what can be done to mitigate effects on wildlife.

Ref	Publication Title	Summary
		It describes the potential effects of roads etc on biodiversity and provides some guidance on cumulative effects, although it admits there is no clear and unified approach, but otherwise does not provide methodological guidance on the assessment of effects of projects on biodiversity.
[54]	Transport Infrastructure Ireland, 2018. Fencing - Mammal Resistant Fencing for Timber Post and Tension Mesh Fence. Transport Infrastructure Ireland, Dublin. (CC-SCD-00324)	Provides a diagram showing the standard construction of mammal resistant fencing.
[55]	Transport Infrastructure Ireland, 2018. Special Structures - Mammal Underpass General Layout. Transport Infrastructure Ireland, Dublin. (CC-SCD-02504)	Provides a diagram showing the standard construction of mammal underpasses.
[56]	Transport Infrastructure Ireland, 2018. Special Structures - Mammal Underpass Long section. Transport Infrastructure Ireland, Dublin. (CC-SCD-02505)	Provides a diagram showing the standard construction of mammal underpasses.
[57]	National Roads Authority, 2006. <i>Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes</i> . National Roads Authority, Dublin https://www.tii.ie/media/qy5el5mi/guidelines-for-the-crossing-of-watercourses-during-the-construction-of-national-road-schemes.pdf	Provides guidance during the detailed design stage and construction phase of national road schemes on how to construct watercourse crossings and avoid or minimise negative effects on the environment. It deals with new bridges, new culverts, in-stream works, temporary crossings, watercourse diversions, pollution prevention and maintenance. 11 pages
[58]	Mackin, F., Barr, A., Rath, P., Eakin, M., Ryan, J., Jeffrey, R. & Fernandez Valverde, F, 2017. <i>Best practice in raised bog restoration in Ireland. Irish Wildlife Manuals, No. 99</i> . National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin Best Practice in Raised Bog Restoration (npws.ie)	Provides background information on the extent, ecology, hydrology and threats to raised bogs in Ireland, as well as practical steps on its restoration, such as removing forestry and blocking drains. 51 pages

Ref	Publication Title	Summary
[59]	National Biodiversity Data Centre, 2019. <i>Pollinator-friendly management of: Transport Corridors. All-Ireland Pollinator Plan, Guidelines 9.</i> National Biodiversity Data Centre Series No. 20, Waterford. https://pollinators.ie/wp-content/uploads/2023/08/Transport-Corridors_actions-to-help-pollinators-2019-WEB.pdf	Identifies transport corridors as potential habitat for pollinators and sets out 21 actions which can be undertaken to promote pollinators within transport corridors, ranging from hedgerow management to wildflower meadow creation. 40 pages.
[60]	CIEEM Ireland Policy Group. 2024 Briefing Paper Biodiversity Net Gain in Ireland. https://cieem.net/wp-content/uploads/2023/12/BE-Position-Paper-Aug-2024.pdf	<p>Makes clear that there is currently no legislation or state-level policy requirement for biodiversity net gain in Ireland [although <i>seeking to address no net loss of biodiversity</i> is a draft policy in the draft Revised National Planning Framework] or Northern Ireland, and provides an overview of existing policy, with requirements for BNG now appearing in development plans, as well as other policy documents, and that BNG has already arrived in Ireland, albeit without standardisation of approach. The document provides: a review of approaches in Britain; criteria for a competent ecologist; an outline of the various approaches; guidance on how to incorporate BNG into other assessments; a discussion of irreplaceable habitats in Ireland; a review of developments for which BNG could be mandatory, optional or exempt; a discussion on the feasibility of ex-situ compensation, timescales for implementation and monitoring; sets out key considerations for habitat enhancement; and suggests potential enhancements for urban and sub-urban projects.</p> <p>It gives the following requirements for a competent ecologist for BNG assessments: (i) full member of CIEEM or equivalent; (ii) a minimum of three years of experience; (iii) demonstrable experience in any specialist surveys required and (iv) a qualification in ecology or related subject.</p> <p>The position statement categorises the approach described in CIEEMs ECIA Guidelines as essentially a qualitative assessment and the use of the Defra metric as a quantitative approach, describing these as two alternatives. It says that an advantage of the qualitative approach is that it allows different values to be put on the same habitat type depending on its local abundance. i.e. it allows for professional judgement.</p> <p>It makes recommendations for additions to an ECIA to incorporate a <i>qualitative</i> BNG approach however this varies little from the existing process and only covers IEFs, not biodiversity. It indicates that BNG assessments can be included in the ECIA rather than as a separate document.</p> <p>On irreplaceable habitats, it suggests this could vary rather than a defined characteristic of the habitat type [which appears to defy the usual definition].</p>

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		<p>It gives the following list <i>ancient woodland, active peatland, limestone pavements, freshwater springs/wetlands, coastal habitats (mudflats, saltmarshes, dunes), and perhaps the qualifying interests of designated sites</i> and makes the point that more widespread habitats could still be irreplaceable if they support a rare species in that location. Irreplaceable habitats should be identified early in the project design and that impacts on irreplaceable habitats cannot be offset to achieve BNG.</p> <p>The statement makes the case that large scale development could be subject to mandatory BNG, but that it will not always be feasible on-site for small to moderate scale developments, or to provide financial contributions to ex-situ [off-site] offsetting, until a system is developed by the state.</p> <p>BNG assessments should include a timeline for the implementation of [habitat creation and enhancement measures]. BNG sites should be clearly identified, protected and covered by a planning condition. It concludes that there is a <i>pressing need for national guidance on Biodiversity Net Gain in the Republic of Ireland and Northern Ireland.</i></p> <p>15 pages</p>
[61]	<p>Construction Industry Research and Information Association, 2019. <i>Biodiversity Net Gain – Good Practice Principles for Development. A Practical Guide</i>. Construction Industry Research and Information Association, London.</p> <p>https://cieem.net/wp-content/uploads/2019/02/C776a-Biodiversity-net-gain.-Good-practice-principles-for-development.-A-practical-guide-web.pdf</p>	<p>Provides the 10 principles for BNG and includes chapters on (a) What is BNG? (b) Guidance for Local Planning Authorities (c) The business case for BNG and (d) Implementing BNG good practice principles, including a section on Impact Assessment. This is followed by a series of Technical Notes covering (1) devolved government [of the UK] planning and biodiversity policy; (2) achieving BNG on sites with limited or no impact on biodiversity; (3) Irreplaceable habitats; (4) engaging stakeholders; (5) aligning BNG with the [UK] Development Consent Order; (6) aligning BNG with the [UK] EIA regulations; (7) aligning BNG with EclAs; (8) aligning BNG with the [UK] BREEAM assessments; (9) choosing a biodiversity metrics; (10) communicating BNG; (11) BNG, natural capital and ecosystem services</p> <p>It defines BNG as ‘<i>development that leaves biodiversity in a better state than before,working with [others] to support their priorities for nature conservation</i>’ and provides 10 good practice principles.</p> <p>In part d, on the biodiversity baseline, it stresses the need for a qualitative and quantitative assessment, for irreplaceable habitats and statutory designated sites to be identified; on assessing negative effects, it states that all ecological features should be included, with some subject to detailed assessment, making effects explicit, and to include landscape level effects for large projects; on measuring negative effects, it states that these should be quantified where possible, including temporary losses, indirect effects, legally protected species, cumulative effects, tracking of individual features and gives examples of using biodiversity units to quantify habitat loss; and on mitigation, applying the mitigation hierarchy.</p> <p>In T3, it gives examples of ancient woodland, active peatland and limestone pavements as irreplaceable habitats; habitats which if lost cannot be recreated elsewhere within a reasonable timeframe.</p>

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		<p>It goes on to explain that other habitats can be irreplaceable, and it can depend on location. Losses of these habitats cannot be offset to achieve BNG.</p> <p>In T6, it states that the mitigation hierarchy will need to be followed for significant effects, that mitigation measures relating to statutory designated sites, irreplaceable habitats and legally protected species need to be dealt with separately to measuring biodiversity net gains, that BNG should ideally be addressed across all relevant topics, and it implies that BNG should be included within an EIA.</p> <p>In T7, it seeks to add to the CIEEM Guidelines [23] by stressing the need to identify opportunities for BNG early, and again to undertake qualitative baseline assessments, quantitative baseline assessments, include all ecological features (not just those scoped in for detailed assessment), assess negative effects on ecosystems, ecological functions, habitats, species, populations and individuals, set out how these are addressed and over what timescales, and quantify negative effects, including direct, indirect, temporary, permanent and cumulative effects, that designs are predictions and data is needed from construction and [operation] stages to demonstrate net gain which would not otherwise occur, that BNG designs should be implemented early to reduce time lags between losses and gains, and that maintenance and monitoring are required.</p> <p>168 pages</p>
[62]	<p>BSI, 2021. Process for designing and implementing Biodiversity Net Gain — Specification. BS 8683:2021. British Standards Institute, London</p> <p>https://knowledge.bsigroup.com/products/process-for-designing-and-implementing-biodiversity-net-gain-specification?version=standard (requires payment)</p>	<p>The British Standard for Biodiversity Net Gain. The word ‘shall’ is used to denote requirements to meet the Standard in a similar way to TII standards.</p> <p>The introduction provides a definition of biodiversity which is, in essence, all life. The Standard aligns with four generic stages of development from preparation through to maintenance and management.</p> <p>It makes clear that BNG complements but does not replace EclA, and that the mitigation requirements arising from EclA must still be followed. The Standard provides a framework to ensure BNG principles are followed.</p> <p>On EclA, it says that this shall be undertaken in accordance with best practice guidelines, referencing those published by CIEEM, IEMA and BS42020. On BNG, it says this shall be in accordance with the good practice principles, and reiterates these, along with other good practice measures. It requires measurable and a qualitative target for BNG at the Preparation stage, as well as a quantitative and qualitative assessment of the biodiversity baseline, and a risk assessment of achieving BNG. The impact assessment is completed at the Design stage. Again, it makes clear that the baseline includes both a qualitative and quantitative (using a recognised method e.g. a metric) assessment.</p>

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		<p>The Impact Assessment must apply the mitigation hierarchy, and in a note, the Standard makes clear that this applies to all biodiversity not just high value features, and that evidence should be presented as to why measures to avoid biodiversity impacts could not be incorporated into the design and that the BNG outcomes would not have happened anyway. The qualitative assessment/target is wider than the condition assessment to inform the metric. It does not offer guidance on how to evaluate features or impact significance.</p> <p>The remaining Chapter covers the Implementation (Construction) and the Maintenance and Management stages.</p> <p>26 pages</p>
[63]	<p>Natural England, 2022. The Biodiversity Metric 3.1 (Online).</p> <p>Defra, 2024. The Statutory Biodiversity Metric. https://www.gov.uk/government/publications/statutory-biodiversity-metric-tools-and-guides</p>	<p>This guidance has now been superseded by the statutory metric. It describes a system for quantifying biodiversity based on habitats. Each habitat type has a level of Distinctiveness on a five-point scale (very low to very high). Most habitat parcels are then assigned a level of Condition again on a five-point scale (poor to good) using a standard set of condition assessments, and a level of strategic significance based on a three-point scale (low to high). These, plus the area of the habitat parcel, can be used to calculate that value of each parcel in 'Biodiversity Units'. The metric is used to calculate the baseline value of the site before development, what is left on the site after development, and the requirements to compensate for losses of biodiversity, using a series of multipliers. It has been developed for use in England only (although this has not stopped it being used elsewhere including in Ireland). Irreplaceable habitats are excluded from the metric, as these require bespoke compensation. Area habitats and linear habitats (hedgerows and watercourses) are treated differently. An MS Excel calculation tool is available.</p> <p>There are a series of principles and rules that must be followed when using the metric.</p>
[65]	<p>National Roads Authority, 2011. <i>Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes</i>. National Roads Authority. Dublin.</p>	<p>Replaced by [17].</p>



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