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9.0 BIODIVERSITY

9.1 Introduction

9.1.1 This chapter of the Environmental Impact Assessment Report (EIAR) provides an Ecological Impact Assessment (EcIA) of the likely significant effects of the Proposed Development (as presented in this EIAR Chapter 5: The Proposed Development) on the ecological environment.

9.1.2 The term biodiversity, a portmanteau of biological diversity, is defined as the total variety of life on earth; e.g. people, plants, animals, fungi, microorganisms and ecosystems as a whole. Ecology can be defined as 'the scientific study of living organisms and their relationship with each other and their environment' whilst nature conservation is concerned with 'maintaining a viable population of the country's characteristic fauna and flora and the communities which they comprise'. An EcIA is a process of identifying, quantifying, and evaluating the potential effects of a development-related action on habitats, species, and ecosystems.

9.1.3 This chapter follows the Guidelines for Ecological Impact Assessment in the UK and Ireland (Chartered Institute of Ecology and Environmental Management (CIEEM), 2019). The EcIA aims to:

- Identify and describe all potentially significant ecological effects associated with the Proposed Development;
- Set out mitigation measures required to ensure compliance with nature conservation legislation and to address any potentially significant ecological effects;
- Identify how mitigation measures will be secured;
- Provide an assessment of the significance of any residual effects; and
- Identify appropriate enhancement / compensation measures.

9.2 Methodology

Scope of Assessment and Study Area

Determining the Zone of Influence

9.2.1 The Zone of Influence (ZoI) for a project is the area over which ecological features may be subject to significant effects as a result of the proposed project and associated activities. The ZoI can extend beyond the boundary of a proposed project, for example where there are hydrological links extending beyond the Site boundary. Activities associated with the construction and operation (and where applicable, decommissioning and restoration) phases should be separately identified (where relevant). The ZoI will vary for different ecological features depending on their sensitivity to any identified impact. It is therefore appropriate to identify different ZoI for different features. The features affected could include habitats, species, and ecosystems (i.e., the processes on which they depend). ZoI are specified for different features, and types of potential impact.

9.2.2 As recommended by CIEEM (2019), professionally accredited or published studies have been used to determine ZoI. Having considered the Proposed Development, ZoI have been estimated for habitats, flora, and fauna (Table 1, Appendix 9A, refer to EIAR Volume II). In the context of determining the ZoI for potential pollution effects from the Proposed Development, a conservative approach has been adopted assuming that the ZoI includes all areas downstream of the Site.

Desk and Field Survey Areas

9.2.3 Desk study areas for the Proposed Development corresponded, as a minimum, to the ZoI of potentially significant effects for each ecological feature. In this chapter of the EIAR, the study area for cumulative effects includes at least the extent of the ZoI from the Site boundary.

Desk Study

9.2.4 A desk study was carried out on 30 March 2021 and updated until January 2023 to identify relevant nature conservation designations, and records of protected and notable habitats and species potentially relevant to the Proposed Development. The desk study areas were defined using a stratified approach based on the ZoI of the Proposed Development on different ecological features.

9.2.5 Accordingly, the desk study identified any site with international nature conservation designations within 15km of the Site, which include European sites (i.e., Special Protection Areas (SPA), Special Conservation Areas (SAC)) and Ramsar sites. The desk study also identified sites with national nature conservation designations within 2km of the Site such as National Heritage Areas (NHA) and proposed National Heritage Areas (pNHAs). Local non-statutory nature conservation designations and records of protected and notable habitats and species were also searched for within 2km of the Site.

9.2.6 Data sources consulted included the Environmental Protection Agency (EPA) maps website, National Parks and Wildlife Service (NPWS) Protected Sites in Ireland website, National Biodiversity Data Centre (NBDC) database, Ordnance Survey Ireland (OSi) maps and aerial photography, and the Irish Red Lists (including Marnell *et al.*, 2009; Regan *et al.*, 2010, King *et al.,* 2011, Lockhart *et al.*, 2012, Nelson *et al.*, 2011; Nelson *et al.*, 2019; Gilbert *et al*., 2021; Wyse Jackson *et al.*, 2016).

Field Surveys

9.2.7 An initial Preliminary Ecological Appraisal (PEA) was carried out within the Site and the immediate surrounding lands, where accessible (the survey area) on 23 March and 16 April 2021, in accordance with the Guidelines for Preliminary Ecological Appraisal (CIEEM, 2017). The survey area extended just beyond the Site's boundary to assess for the presence of protected species occurring within the ZoI and is shown on Figure 9.1 (refer to EIAR Volume III). The PEA comprised an inspection of habitats and a general assessment of the potential for those habitats to support protected species (e.g., bats, otter and badger) or other features such as invasive non-native species. A Preliminary Roost Assessment (PRA) of all trees and buildings within the survey area was also carried out following guidance published by the Bat Conservation Trust (BCT) (Collins, 2016). Any evidence of protected, notable, or invasive species were also recorded.

9.2.8 Where necessary, further ecological surveys during the most appropriate time of year were conducted for protected species to determine detailed status in order to inform mitigation measures. All surveys were recorded using a handheld mobile mapping device. Table 9.1 details the ecological surveys conducted. All surveys were carried out

during the appropriate season for such survey, during suitable weather conditions, and at suitable times of day.

9.2.9 Visits to the Site continued regularly for ecological survey until December 2022. On 14 October 2022 a final walkover of the Site was completed to confirm no significant changes had occurred that could alter the previously collected information and to ensure previous conclusions remain valid.

Table 9.1: Schedule of ecological surveys undertaken

SURVEY	DATE(S)	PERSONNEL
PEA (including habitat suitability assessments for protected species)	23/03/2021, 16/04/2021	L. Cappelli, A. Donnelly
Habitats and plants	16/06/2021	L. Cappelli, A. Donnelly
Bat Preliminary Roost Assessment (trees and structures)	23/03/2021, 16/04/2021	L. Cappelli, A. Donnelly
Otter and badger	23/03/2021, 16/04/2021	L. Cappelli, A. Donnelly
Amphibians	15/04/2021, 26/04/2021, 13/05/2021, 19/05/2021	L. Cappelli, A. Donnelly
Wintering birds	Monthly visits during winter months (October 2021 – March 2022, October – December 2022) See Appendix 9E	L. Cappelli, A. Donnelly
Breeding birds	16/04/2021, 20/05/2021, 15/06/2021	L. Cappelli, A. Donnelly

Habitats and Plants Survey

9.2.10 Survey for habitats and rare, protected, and invasive plants were carried out in the survey area. The habitats were classified according to *A Guide to Habitats in Ireland* (Fossitt, 2000). Notes were made for each habitat of dominant, typical, and notable plant species, and any relevant ecological characteristics (particularly where relevant to habitat condition), which reflect conditions at the time of survey. Habitats were also visually assessed to determine their potential value to nesting birds, invertebrates, and other taxa.

Preliminary Bat Roost Assessment

9.2.11 A ground-based PRA was conducted on buildings and trees within the survey area following guidance published by the BCT (Collins, 2016) (Table 9.1). The survey was carried out during daylight hours, and close-focusing binoculars were used to identify, from the ground, any suitable access features in buildings (e.g., gaps, cracks, crevices) and any potential roost features (PRF) in trees (e.g., cavities, trunk and branch splits, rot holes, knotholes, etc.).

9.2.12 The results were used to grade buildings and trees as having Negligible, Low, Moderate, or High suitability for roosting bats in accordance with the BCT guidance (Collins, 2016).

Otter Survey

9.2.13 An otter *Lutra lutra* survey was conducted along all waterbodies and watercourses (e.g. streams, ditches, etc.) within the survey area (refer to Table 9.1), which included areas within 150m of the Site boundary where necessary and where access allowed (as per National Roads Authority (NRA) (2008)). Disturbance of otter from construction works and temporary construction works compound areas is only likely to extend up to a

distance of 150m for any holts at which breeding females or cubs are present (NRA, 2008). Therefore, 150m from the Site encompassed the minimum distance for otter survey.

9.2.14 The survey followed guidance in published literature (Chanin, 2003; Liles, 2003) where appropriate to a site survey. Surveyors searched for otter refuge sites including holts and layups, and any other evidence of otter, such as spraints, slides, and footprints. Suitable terrestrial habitats (e.g., woodland) were also searched for evidence of otter.

Badger Survey

9.2.15 A badger *Meles meles* survey was conducted in the survey area (refer to Table 9.1), which included areas of potentially suitable habitat for badger within 150m of the Site (as per NRA (2006)). Disturbance of any breeding location of badger from construction works is only likely to extend up to a distance of 150m where blasting (not required for the Proposed Development) or pile driving will occur or up to 50m where other works will occur (NRA, 2006). Therefore, 150m from the Site encompassed the minimum distance for badger survey.

9.2.16 This survey followed guidance in published literature (Harris *et al*., 1989) as good practice for badger survey. All accessible habitats within 150m of the Proposed Development Site (and temporary construction works compounds) which were considered potential badger habitat were systematically checked for signs of badger activity or habitation. These signs include the presence of main, annex, subsidiary, and outlier setts, foraging evidence (e.g., snuffle holes), latrines, access runs and trails, hairs caught on wires and bushes, tracks, and prints.

Amphibian Survey

9.2.17 All suitable habitat for amphibians within the survey area (e.g., ponds, drainage ditches) were surveyed for smooth newt *Lissotriton vulgaris* and common frog *Rana temporaria* (Table 9.1). Surveys were carried out following guidance from the NRA's *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes* (NRA, 2009a) and an adapted version of UK published guidelines (English Nature, 2001 and Natural England, 2015). (Note: NRA is now Transport Infrastructure Ireland (TII), however NRA guidance is still relevant).

9.2.18 Smooth newt surveys of suitable water features were carried out at night using torches to determine the presence / absence of smooth newts and to count and sex adult smooth newts, where possible. Suitable water features were accessible and could be surveyed from the edges, therefore netting was not required. Searches for smooth newt eggs were also undertaken.

9.2.19 Having regard for the UK guidance on great crested newt *Triturus cristatus* (English Nature, 2001) in the absence of similar guidance for smooth newt, the smooth newt population size classes were estimated using the three categories of 'small' (maximum counts up to 10 newts), 'medium' (maximum counts between 11 and 100 newts), and 'large' (maximum counts of over 100 newts).

9.2.20 Common frog surveys for spawn were carried out within suitable water features in the survey area. The number of spawn clumps and their diameter were recorded if encountered. Any tadpoles, juvenile or adult frogs that were observed during survey were also recorded.

Breeding Bird Survey

9.2.21 Breeding bird surveys were conducted using adapted British Trust for Ornithology (BTO), Breeding Bird Survey (BBS) and Countryside Bird Survey (CBS) techniques and methodologies. Transects throughout the survey area were walked at a steady pace on three separate occasions and birds visually observed or heard were recorded, in addition to notes on their behaviour and territories (Table 9.1).

Wintering Bird Survey

9.2.22 A suite of wintering bird surveys was carried out within the study area comprising the Site and adjacent lands including the visible wetland habitats to the east and south, namely the former mine lagoon and tailings ponds. These surveys were carried out monthly between October 2021 and March 2022, and October and December 2022 (Table 9.1).

9.2.23 The survey method followed was derived from that of the Wetland Bird Survey (WeBS) as outlined by the BTO. The method employed, based on look-see methods described by Bibby *et al.* (2000), has been adapted for use at waterbodies and coastlines across the UK as part of the national waterbird monitoring scheme.

9.2.24 The surveyor stood at two vantage points, one overlooking the former mine tailings pond and one overlooking the former mine lagoon (the larger, deeper southern-most lagoon), and slowly scanned the survey area, comprising the water bodies themselves and associated vegetation, within and surrounding them. Opticron (ES 80 GA ED v3) telescope and Opticron MG 10x42 binoculars were used to identify species. The bird species present, their abundance, and activity were recorded during each survey visit.

Ecology Personnel

9.2.25 The Technical Team Lead for this Chapter is Dr Paul Lynas. A biography for Dr Lynas is presented in EIAR Appendix 1B (refer to EIAR Volume II). Similarly, a biography for each ecologist is presented in Appendix 9B (refer to EIAR Volume II).

Impact Assessment Methods

9.2.26 The method employed for assessment of impacts on ecological features is that recommended by CIEEM in Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2019). CIEEM is the leading professional membership body for ecologists in both the UK and Ireland. It provides advice to government upholds standards in professional conduct and promotes best practice. Guidance in CIEEM (2019) broadly agrees with guidance in EPA (2022) and guidance issued by NRA (NRA, 2009b) (now TII). The latter is commonly used in Ireland and provides detail on the use of a geographical scale of importance, which broadly concurs with CIEEM guidance.

Baseline Conditions

9.2.27 The assessment first establishes the ecological baseline conditions which are determined by obtaining data on potentially affected ecological features through targeted desk study and field survey. Ecological baseline conditions are those existing in the absence of a proposed project. The impact assessment determines how the conditions will change in relation to this baseline to facilitate a clear understanding of the effects of a project. Assessing the impacts of the Proposed Development and associated activities requires an understanding of the baseline conditions prior to and at the time of the project proceeding or specific activities taking place.

Valuing Ecological Features

9.2.28 An ecological feature is a site, habitat, or species with nature conservation importance. Only those ecological features that are 'important' and could be significantly affected by the project require detailed assessment – "*it is not necessary to carry out detailed assessment of ecological features that are sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable*" (CIEEM, 2019). This is consistent with the EIA Directive (Directive 2011/92/EU as amended by Directive 2014/52/EU) which requires investigation of likely significant effects, as accordingly emphasised by EPA (2022). NRA (2009b) prescribes a similar approach, stating that ecological features of less importance than Local (local higher) should not be subject to detailed assessment.

9.2.29 Existing data and criteria are considered when determining the importance of ecological features. Where these are lacking, it is necessary to apply professional judgment. Factors considered include:

- Rarity, endemicity, mobility and geographic range (particularly if this is changing);
- Size/ extent, rate of decline and vulnerability;
- Typicalness, species-richness, habitat structure and connectivity/ fragmentation;
- Function/ value to other features (e.g., habitats of notable species or buffers against impacts); and
- Restoration potential.

9.2.30 The importance of ecological features is described within a geographic scale. Examples of the types of ecological features which might fall into the importance categories are given in Table 9.2, which is adapted from CIEEM (2019) and NRA (2009b). For the purposes of this assessment 'Local' is the area within 5km of the Site.

Table 9.2: Geographic value criteria.

GEOGRAPHICAL RECEPTOR VALUE	CRITERIA / EXAMPLES
International (very high)	• Internationally designated nature conservation site (or candidate/ proposed international site), or site satisfying criteria for such designation, or feature essential to maintaining such sites. • Sustainable area (or part of a larger sustainable area) of best examples of Annex I habitat. • A regularly-occurring internationally-significant population (e.g. 1% of the national population, or potentially less for critical parts of wider populations or those at a critical life-cycle stage) of internationally important species listed on Annex I of the Birds Directive or Annex II of the Habitats Directive.
National (high)	• Nationally designated nature conservation site (or proposed such site), or site satisfying criteria for such designation. • Sustainable area of good quality Annex I habitat not deemed to be of international importance, or of national priority habitat, which is a significant proportion of the resource. • Regularly-occurring nationally significant population (e.g. 1% of the national population, or potentially less for critical

GEOGRAPHICAL RECEPTOR VALUE	CRITERIA / EXAMPLES
	parts of wider populations or those at a critical life-cycle stage) of species listed or protected under the Wildlife Acts or Red Data lists, or site supporting one.
County (medium)	• County designated nature conservation site (or proposed such site). • Sustainable area of Annex I habitat or national priority habitat not deemed to be of higher importance (e.g. lower quality, highly fragmented, small and/ or low restoration potential), or priority habitat under a Local Biodiversity Action Plan if this exists and applies at county level. • Regularly-occurring county significant population (e.g. 1% of county resource, or potentially less for critical parts of wider populations or those at a critical life-cycle stage) of species listed or protected under the Habitats/ Birds Directives, Wildlife Acts, Red Data lists or Local Biodiversity Action Plan (if this exists and applies at county level), or site supporting one.
Local (local higher)	• Priority habitat of insufficient size or quality for higher importance or degraded with low restoration potential. • Habitat providing significant biodiversity or important ecological corridors in a local context. • Small sustainable population of notable species not qualifying for higher importance or uncommon locally.
Site (local lower)	• Common, heavily-managed or modified habitat, and common and widespread species.

Source: Adapted from CIEEM (2019) and NRA (2009b).

Characterising Ecological Impacts

9.2.31 Impacts may occur during the construction, operational (including maintenance), and decommissioning phases of a development. They may be direct or indirect (also termed 'secondary'). Direct impacts are attributable to an action associated with a development. Indirect impacts are often produced away from a development or as a result of other initial impacts.

9.2.32 Under CIEEM (2018) guidance there is a distinction between impact and effect. An impact is an action on an ecological feature (e.g., hedgerow removal; loss of a bat roost). An effect is the outcome of that impact on an ecological feature (e.g., effect of hedgerow loss on breeding birds; effect of bat roost loss on the conservation status of the bat species).

9.2.33 Likely impacts of the Proposed Development (both positive and negative) are predicted for all significant ecological features; however only those impacts that are likely to be significant require detailed descriptions. Likely impacts are characterised by considering parameters shown in Table 9.3.

Table 9.3: Descriptions of potential impact parameters.

POTENTIAL IMPACT PARAMETER	DESCRIPTION
'Quality' of effects (i.e. positive vs negative)	Positive potential impact – a change that improves the quality of the environment or slows an existing decline in the quality of the environment. Negative potential impact – a change which reduces the quality of the environment, e.g., destruction of habitat, removal of species foraging habitat.
Magnitude or extent	Refers to size, amount, intensity, and volume of impact. Proportion of a population, or other measurable unit significantly impacted by an effect e.g., amount of habitat loss, % change to habitat area.
Extent	The spatial or geographical area over which the impact/ effect may occur under a range of conditions, e.g., noise transmission under water. Can be synonymous with magnitude for habitats.
Duration	Duration should be defined in relation to ecological characteristics (such as a species' lifecycle) as well as human timeframes. Effects may be described as short, medium or long-term and permanent or temporary. Short, medium, long-term and temporary are defined in months/ years.
Frequency and timing	Frequency refers to how often the effect will occur (e.g., once, rarely, occasionally, frequently, hourly, daily or constantly). Timing differs from frequency and is of particular relevance to biodiversity effects; the timing of an activity may result in a significant potential impact if it coincides with critical life-stages or seasons e.g., bird nesting season. Outside this period, similar actions may not cause significant impacts.
Reversibility	An irreversible effect is one from which recovery is not possible within a reasonable timescale or there is no reasonable chance of action being taken to reverse it. A reversible effect is one from which spontaneous recovery is possible or which may be counteracted by mitigation.

Source: CIEEM (2019)

Assessment of Cumulative Impacts

9.2.34 Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. More than one impact acting on a receptor simultaneously may have a cumulative impact that is greater than when the same impacts act in isolation. Combined impacts may entail the assessment of all the impacts of the Proposed Development upon a feature (e.g., impacts at the construction and operation stage), or the cumulative impacts of a variety of schemes that would affect the same area. The area affected may vary depending on the receptor being considered.

9.2.35 Cumulative effects are particularly important in EcIA as many ecological features are already exposed to background levels of threat or pressure and may be close to critical thresholds where further impact could cause irreversible decline. Effects can also make habitats and species more vulnerable or sensitive to change.

9.2.36 Under EPA (2022), effects are also categorised as likely or not likely, and note must be made of any transboundary effects (effects extending into other countries).

Assessment of Residual Impacts

9.2.37 After assessing the impacts of the Proposed Development, attempts should be made to mitigate (preferably by avoidance) ecological impacts. Once measures to avoid and mitigate ecological impacts have been finalised, assessment of the residual impacts should be conducted to determine the significance of their effects on ecological features. Any residual impacts that will result in effects that are significant, and proposed compensatory measures, will be the factors considered against ecological objectives (legislation and policy) in determining the outcome of the application.

Determining Ecologically Significant Effects

9.2.38 Significance is defined as the weight that should be attached to effects when decisions are made. For the purpose of EcIA, a 'significant effect' is an effect that either supports or undermines the integrity of biodiversity conservation objectives for ecological receptors. Conservation objectives may be specific (e.g., for a designated site) or broad (e.g., national/ local nature conservation policy) or more wide-ranging (enhancement of biodiversity). As per the CIEEM (2019) guidance, effects can be considered significant at a range of scales from International to Local.

9.2.39 For non-designated sites/ species integrity can refer to the maintenance of the conservation status of a species population at a specific location or geographical scale.

9.2.40 Significant effects are therefore those of sufficient importance to warrant assessment and reporting so that the decision maker is adequately informed of the environmental consequences of development. A significant effect does not however immediately or necessarily result in the refusal of planning permission for a development. For example, many projects with significant negative ecological effects can be lawfully permitted following EIA procedures as long as the mitigation hierarchy has been applied effectively as part of the decision-making process.

9.2.41 Broadly, significant effects encompass impacts on the structure and function of defined sites, habitats, or ecosystems, and the conservation status of habitats and species. According to CIEEM (2019) guidance, significant effects should be qualified with reference to an appropriate geographic scale. Whilst European case law is specific regarding significance in relation to European sites and Annexed habitats, the scale of significance of an effect may not be the same as the geographic context in which the feature is considered important. For example, an effect on a nationally important population may not be significant to the national population.

9.2.42 The level of significance of an impact on the ecological integrity of the receptor or resource depends upon all the factors described above. Initially, consideration of the impact on ecological integrity does not take account of recommendations for mitigation or compensation that might subsequently be described. Residual impacts and their level of significance are determined after applying mitigation or compensation measures.

<u>Limitations and Assumptions</u>

9.2.43 The aim of a desk study is to help characterise the baseline context of a proposed development and provide valuable background information that would not be captured by a single site survey alone. Information obtained during the course of a desk study is dependent upon people and organisations having made and submitted records for the area of interest. As such, a lack of records for a particular habitat or species does not necessarily mean that the habitat or species do not occur in the study area. Likewise, the presence of records for particular habitats and species does not automatically mean that these still occur within the area of interest or are relevant in the context of the

proposed development. Biological records can be received from a wide variety of sources and may or may not be comprehensive and accurate. However, if assessed in conjunction with a PEA and habitat survey, they can contribute to a robust ecological assessment of a site.

9.2.44 Where habitat boundaries coincide with discernible boundaries on recent aerial photographs (where available) the resolution is as determined by the accuracy of the aerial photographs. Otherwise, habitat mapping is as estimated in the field. Where areas of habitat are given, they are approximate and should be verified by measurement on site where required for design or construction.

9.2.45 No other limitations to constrain the surveys or findings presented within this chapter were encountered.

9.3 Regulatory and Policy Framework

Legislative Context

9.3.1 The following wildlife legislation is potentially relevant to the Proposed Development:

- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (the 'Habitats Directive');
- Directive 2009/147/EC on the conservation of wild birds (the 'Birds Directive');
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (as amended) (the 'Water Framework Directive');
- Regulation 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species (the 'Invasive Alien Species Regulations');
- Convention on Wetlands of International Importance ('Ramsar Convention');
- The Planning and Development Acts 2000 to 2022;
- European Communities (Bird and Natural Habitats) Regulations 2011-2021 (the 'Habitats Regulations');
- The Wildlife Acts 1976 to 2018 and the Wildlife (Amendment) Act 2000 (together known as the 'Wildlife Acts');
- Flora (Protection) Order 2022 S.I 235/2022 (the 'Flora Protection Order'); and
- EC Environmental Objectives (Surface Waters) (Amendment) Regulations 2019 (SI 77/2019)

9.3.2 The above legislation has been considered when planning and completing this EcIA using the methods described in Section 9.3, when identifying likely significant effects from the Proposed Development, as discussed in Section 9.5, and when proposing required mitigation, as discussed in Section 9.6. Compliance with legislation may require the obtainment of relevant protected species licences prior to the implementation of the Proposed Development.

Planning Policy and Guidance

9.3.3 The Project Ireland 2040 National Planning Framework (NPF) sets out the Government's planning policies for Ireland and how these should be applied. NPF sets out that to achieve sustainable development, the planning system must incorporate an environmental objective, which should include:

- Integrated planning for green infrastructure and ecosystem services;
- Enhancing the conservation status and improve the management of protected areas and protected species;
- Use natural resources prudently;
- Minimising waste and pollution; and
- Mitigating and adapt to climate change, including moving to a low carbon economy.

9.3.4 The National Biodiversity Plan 2017 – 2021 for Ireland outlines seven main objectives to meet commitments under the Convention on Biological Diversity (CBD) and EU Biodiversity Strategy. These objectives include:

- Mainstreaming biodiversity into decision-making across all sectors;
- Strengthening the knowledge base for conservation, management and sustainable use of biodiversity;
- Increasing awareness and appreciation of biodiversity and ecosystem services;
- Conserving and restore biodiversity and ecosystem services in the wider countryside;
- Conserving and restore biodiversity and ecosystem services in the marine environment;
- Expanding and improve management of protected areas and species; and
- Strengthening international governance for biodiversity and ecosystem services.

9.3.5 The 4th National Biodiversity Plan for the period of 2023-2027 is currently under development and a draft has been made available for public consultation. In it, six objectives address different themes to contribute to the vision of living in harmony with nature by the year 2050. These objectives are:

- Adopt a whole of government, whole of society approach to biodiversity;
- Meet urgent conservation and restoration needs;
- Secure nature's contribution to people;
- Embed biodiversity at the heart of climate action;
- Enhance the evidence base for action on biodiversity; and
- Strengthen Ireland's contribution to international biodiversity initiatives.

Local Area Development Plans

9.3.6 Other relevant policies that have been referred to in order to inform this EcIA include:

- Galway County Council Development Plan 2022-2028; and
- Galway County Heritage and Biodiversity Plan 2017-2022.

9.3.7 The local development plan for County Galway is contained within the Galway County Council's (GCC) County Development Plan 2022-2028 (CDP) (refer to Chapter 2: Policy, ES Volume I for details on planning policy). The CDP sets out the aims, policies, and objectives for topics such as development, green infrastructure, and natural heritage for County Galway in accordance with the Planning Acts. Strategic aims of this plan relative to the natural environment are set out in Chapter 10: Natural Heritage, Biodiversity & Green/Blue Infrastructure, and include:

- Conserve, manage, protect and enhance the special character of the County as defined by its natural heritage, biodiversity and green infrastructure;
- To ensure compliance with the requirements of relevant International, European Directives and National Legislation in relation to Natural Heritage, Biodiversity, Green/Blue Infrastructure and Climate Change;
- Ensure climate change considerations are taken into account in the Natural Heritage, Biodiversity and Green/Blue Infrastructure;
- Continue to implement actions of the National Heritage Plan and the National Biodiversity Plan and the current Galway County Heritage and Biodiversity Plan 2017-2022 in partnership with all relevant stakeholders and any successor to these documents;
- To promote the creation of an integrated and coherent green infrastructure network throughout County Galway in order to enhance connectivity, social inclusion, sense of place and the creation of wildlife corridors.

This Chapter of the CDP also includes specific policy objectives for a number of themes and environmental features, including: Natural Heritage and Biodiversity; Water Resources; Invasive Species; Trees etc.

9.4 Baseline Environmental Conditions and Constraints

Desk Study for the Proposed Development

Sites with Statutory Designations

9.4.1 A search for designated sites was carried out on 13 January 2023. There are thirteen international nature conservation designations located with 15km of the Site. None of these sites fall within the Site.

9.4.2 The Cloonprask / Barnacullia Stream is located approximately 13m east of the Site, the Mill Stream is located 250m to the north, and the Lisduff Stream is located approximately 510m south of the Site. These steams outflow to the Kilcrow River, which then outflows into Lough Derg.

9.4.3 There are no national nature conservation designations located within 2km of the Site.

9.4.4 A summary of the European designated sites is presented in Table 9.4. Statutory designated sites in relation to the Proposed Development are displayed in Figure 9.2 (refer to EIAR Volume III).

Table 9.4: Sites with statutory nature conservation designations.

DESIGNATED SITE	QUALIFYING INTERESTS	DISTANCE TO THE PROPOSED DEVELOPMENT
Slieve Aughty Mountains SPA [4168]	• Hen harrier *Circus cyaneus* [A082] • Merlin *Falco columbarius* [A098]	6.1km south-west
Ardgraigue Bog SAC [2356]	• Active raised bogs [7110] • Degraded raised bogs still capable of natural regeneration [7120] • Depressions on peat substrates of the *Rhynchosporion* [7150]	8.3km east
Barroughter Bog SAC [0231]	• Degraded raised bogs still capable of natural regeneration [7120] • Depressions on peat substrates of the *Rhynchosporion* [7150]	10.1km south-east, and 17.5km downstream of Cloonprask/ Barnacullia Stream and Lisduff Stream
Pollnaknockaun Wood Nature Reserve SAC [0319]	• Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]	11km south
Rosturra Wood SAC [1313]	• Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]	11.2km south
Lough Derg, North-east Shore SAC [2241]	• *Juniperus communis* formations on heaths or calcareous grasslands [5130] • Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210] • Alkaline fens [7230] • Limestone pavements [8240] • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsio*r (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] • *Taxus baccata* woods of the British Isles [91J0]	11.1km south-east, and 19km downstream of Cloonprask/ Barnacullia Stream and Lisduff Stream
Lough Derg (Shannon) SPA [4058]	• Cormorant *Phalacrocorax carbo* [A017] • Tufted duck *Aythya fuligula* [A061] • Goldeneye *Bucephala clangula* [A067] • Common tern *Sterna hirundo* [A193] • Wetland and waterbirds [A999]	11.1km south-east, and 19.2km downstream of Cloonprask/ Barnacullia Stream and Lisduff Stream
Lough Rea SPA [4134]	• Shoveler *Anas clypeata* [A056] • Coot *Fulica atra* [A125] • Wetland and waterbirds [A999]	11.5km west
Lough Rea SAC [0304]	• Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. [3140]	11.5km west
Cloonmoylan Bog SAC [0248]	• Active raised bogs [7110] • Degraded raised bogs still capable of natural regeneration [7120]	11.7km south

DESIGNATED SITE	QUALIFYING INTERESTS	DISTANCE TO THE PROPOSED DEVELOPMENT
	• Depressions on peat substrates of the *Rhynchosporion* [7150] • Bog woodland [91D0]	
Derrycrag Wood Nature Reserve SAC [0261]	• Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]	13.3km south
River Shannon Callows SAC [0216]	• *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils *Molinion caeruleae* [6410] • Lowland hay meadows *Alopecurus pratensis, Sanguisorba officinalis* [6510] • Alkaline fens [7230] • Limestone pavements [8240] • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] • Otter *Lutra lutra* [1355]	14.4km south-east
Middle Shannon Callows SPA [4096]	• Whooper swan *Cygnus cygnus* [A038] • Wigeon *Anas penelope* [A050] • Corncrake *Crex crex* [A122] • Golden plover *Pluvialis apricaria* [A140] • Lapwing *Vanellus vanellus* [A142] • Black-tailed godwit *Limosa limosa* [A156] • Black-headed gull *Chroicocephalus ridibundus* [A179] • Wetland and waterbirds [A999]	14.4km south-east

Sites with Non-Statutory Designations

9.4.5 There are no sites with non-statutory designations for nature conservation located within 2km of the Site. Sites with non-statutory designations for nature conservation are therefore not considered further in this chapter following this Section.

Ancient/ Long-established Woodland

9.4.6 There are no parcels of Ancient/ Long-established Woodland within 2km of the Site. Ancient/ Long-established Woodland is therefore not considered further in this chapter following this Section.

NBDC database

9.4.7 The NBDC dataset of records within 2km of the Site was obtained on 30 March 2021. CIEEM guidance recommends 1km as a minimum search area (CIEEM, 2017), however this has been expanded to account for species with long ranges/ territories, e.g., otter. A large number of records were received from the data request; to increase relevance only species of regional or international importance have been presented. This resulted in 303 records representing 85 species. These are presented in Table 2, Appendix 9C (refer to EIAR Volume II).

9.4.8 No records of protected or notable plants, bats, otter, reptiles, or fish were returned from the search of the NBDC databases.

9.4.9 Eight records of badger were returned by the NBDC database within the 1km quadrat that contains the Site. However, the exact locations of these badger records are not available on the NBDC database. Other protected mammal species returned by the NBDC database included hedgehog *Erinaceus europaeus* and Irish hare *Lepus timidus* subsp. *hibernicus*. Hedgehog was recorded approximately 1km from the Site. Irish hare was recorded within and adjacent the Tynagh Power Station Site.

9.4.10 Common frog *Rana temporaria* and smooth newt *Lissotriton vulgaris* records were returned by the NBDC database within 2km of the Site.

9.4.11 Thirty-eight notable bird species were returned by the NBDC database search within 2km of the Site. Four of these notable bird species are listed on Annex I of the Birds Directive, which are corncrake *Crex crex*, golden plover *Pluvialis apricaria*, kingfisher *Alcedo atthis*, and peregrine falcon *Falco peregrinus*. Of these notable species, 17 are Red-listed species (e.g., swift *Apus apus* and yellowhammer *Emberiza citrinella*) according to the Birds of Conservation Concern in Ireland (BOCCI) (Gilbert *et al.* 2021) and 20 are Amber-listed species (e.g., barn swallow *Hirundo rustica* and willow warbler *Phylloscopus trochilus*). There were also a further 39 Green-listed bird species returned by the NBDC database search (e.g., robin *Erithacus rubecula* and song thrush *Turdus philomelos*).

9.4.12 One record of a notable butterfly species, wood white *Leptidea* sp. was returned by the NBDC database search within the 10km hectad (a 10km x 10km square) that contains the Site. This butterfly was recorded in 1972 and the NBDC database does not provide the exact location of this record. There are two species of wood white butterfly in Ireland that cannot be reliably differentiated in the field, which are wood white *Leptidea sinapsis* and cryptic wood white *Leptidea juvernica*. Wood white is considered to be near threatened in Ireland. Cryptic wood white is found throughout Ireland and continental Europe, but absent from Britain.

Field Survey for the Proposed Development

Habitats

9.4.13 Habitats within the Site were classified according to Fossitt (2000). All habitats identified during the survey within the Site are described in greater detail in the following paragraphs and are shown in Figure 9.3 (refer to EIAR Volume III). Habitats are presented in order of Fossitt (2020) classification. The dominant habitats (ie. those habitat types occurring most in any one area) recorded are shown in Table 9.5. The areas relate to the dominant areas and are approximate only.

Table 9.5: Dominant Habitats Present in the Proposed Development Site.

DOMINANT HABITAT	APPROXIMATE AREA
Other artificial lakes and ponds (FL8)	**12 m^2**
Drainage ditches (FW4)	**206 m**
Semi-natural grassland (GS) mosaic	**2.22 ha**
Spoil and bare ground (ED2)	**2.36 ha**
Buildings and artificial surfaces (BL3)	**0.14 ha**
Mixed broadleaved woodland (WD1)	**0.58 ha**
Conifer plantation (WD4)	**0.21 ha**
Scrub (WS1)	**0.025 ha**

Other artificial lakes and ponds (FL8)

9.4.14 A small artificial pond of approximately 12m^2 is present in a depression in the centre of the larger parcel of grassland. The water is dark brown with submerged mosses and is dominated by yellow iris *Iris pseudacorus* and bulrush *Typha latifolia* fringing the edges. Other plant species at the edges of this habitat include rushes *Juncus* spp., common marsh-bedstraw *Gallium palustre*, cuckooflower *Cardamine pratensis*, horsetail *Equisetum* spp., meadowsweet *Filipendula ulmaria*, and sweet vernal-grass *Anthoxanthum odoratum*.

Drainage ditches (FW4)

9.4.15 A wet drainage ditch is present along the northern boundary of the Site within a narrow corridor of conifer plantation. It is approximately 5 to 10cm deep, with signs of stagnation and has a rusty colour with no instream vegetation, and the banks of the ditch are covered by mosses.

Semi-natural grassland (GS)

9.4.16 A large area of semi-natural grassland that is variably sloped and ranges from lowland wet grassland (GS4) to an upland grassland habitat similar to dry calcareous and neutral grassland (GS1) is present in the north of the site. Dominant grasses present are Yorkshire fog *Holcus lanatus,* sweet vernal-grass, and cock's-foot *Dactylis glomerata* and quaking-grass *Briza media*, and false oat-grass *Arrhenatherum elatius* and sedges *Carex* sp. are occasional. Forb species present include common spotted-orchid *Dactylorhiza fuchsia,* common sorrel *Rumex acetosa,* meadowsweet *Filipendula ulmaria*, ribwort plantain *Plantago lanceolata,* mouse-ear hawkweed *Pilosella officinarum*, dandelion *Taraxacum officinale* agg., devil's-bit scabious *Succisa pratensis*, cat's-ear *Hypochaeris radicata*, rough hawkbit *Leontodon hispidus,* germander speedwell *Veronica chamaedrys*, heath speedwell *Veronica officinalis*, bird's-foot-trefoil *Lotus corniculatus*, common milkwort *Polygala vulgaris*, with rare creeping buttercup *Ranunculus repens* and violets *Viola* sp. Mosses are frequent throughout the sward, and reindeer lichen *Cladonia rangiferina* is also occasionally present.

9.4.17 Ruderal species such as thistle *Cirsium arvense*, and scattered scrub consisting of bramble *Rubus fruticosus* agg., gorse *Ulex europaeus*, willow *Salix* spp., hawthorn *Crataegus monogyna* and blackthorn *Prunus spinosa* occasionally form a habitat

mosaic. There is also an area of more extensive bramble cover in the north-east of the Site.

9.4.18 A narrow belt of sloped ground present in the south of the site between the two areas of bare ground also supports species-rich grassland. Dominant grasses are red fescue, sweet vernal-grass, Yorkshire-fog, and cock's-foot. Additional species include sedges, quaking grass, bird's-foot-trefoil, ribwort plantain, common mouse-ear *Cerastium fontanum*, common sorrel, dandelion, oxeye *daisy Leucanthemum vulgare*, common daisy *Bellis perennis*, silverweed *Potentilla anserina*, common cottongrass *Eriophorum angustifolium,* rough hawkbit, cat's-ear*,* mouse-ear hawkweed, common-spotted orchid, kidney vetch *Anthyllis vulneraria*, willowherb *Epilobium* sp. and *Cladonia* lichen.

Spoil and bare ground (ED2)

9.4.19 There is an area of spoil and bare ground which was part of the historic closed Tynagh Mine site, located within the Site that comprises a rocky pebbled substrate. This habitat appears to be disturbed frequently as there is only 1 to 2% of vegetation cover in this area. The plants present at the edges of this habitat or sparsely throughout include bramble common bird's-foot-trefoil, colt's-foot *Tussilago farfara*, daisy, goat willow *Salix caprea,* kidney vetch, mouse-ear-hawkweed*,* oxeye daisy, and ribwort plantain*.* This habitat provides negligible value for wildlife.

Buildings and artificial surfaces (BL3)

9.4.20 Structures within the Site are limited to a single empty metal barn in the south of the Site, which provides negligible value for wildlife.

Mixed broadleaved woodland (WD1)

9.4.21 A parcel of young woodland approximately 6m to 8m tall is present in the north-east of the site and is composed of grey alder *Alder incus* with ground flora dominated by dense bramble.

Conifer plantation (WD4)

9.4.22 Part of a larger spruce *Picea sp.* plantation to the north of the Site is present in the north-west corner. The plantation is an even-aged stand 20m to 30m tall and has no understorey or ground flora.

Scrub (WS1)

9.4.23 A small area of willow scrub is situated at western boundary of the site, with ground flora dominated by bramble.

Plants

9.4.24 No protected or notable plants were identified within the Site. Protected plants are therefore not considered further in this EIAR chapter following this Section.

Invasive Species

9.4.25 No invasive species were identified within the Site. Invasive species are therefore not considered further in this EIAR chapter following this Section.

Bats (Habitat Suitability and Preliminary Roost Assessment)

9.4.26 The empty industrial shed/barn on Site is of corrugated metal construction and is assessed as having Negligible suitability for roosting bats.

9.4.27 No trees were identified to have bat roost suitability within the Site or within 50m of the Site.

9.4.28 The woodland, conifer plantation and scrub on site offer limited commuting or foraging habitat, while the areas of grassland, and bare ground provide negligible habitat for foraging and commuting bats. Bats are therefore not considered further in this chapter following this section.

Otter

9.4.29 No evidence of otter (e.g., tracks, holts etc.) was identified within 150m of the Site. No suitable habitat to support otter exists within the Site. Furthermore, there is limited potential habitat for otter within 150m of the Site. Otter is therefore not considered further in this chapter following this section.

Badger

9.4.30 No badger setts were identified within the Site or within 150m of the Site. No evidence (e.g., tracks, scat, snuffle holes) of badger were present within the Site, although an unidentified mammal trail and push-through was identified approximately 5m to the west of the Site. Badger is therefore not considered further in this EIAR chapter following this section.

Other protected mammals

9.4.31 No evidence of other protected mammals was recorded within the Site or within 150m of the Site. Hedgehog and Irish hare may be present on the site given that suitable habitat exists and records of both species from locations close to the site were returned from the NBDC.

Amphibians

9.4.32 Smooth newt was identified within the small pond and an estimated maximum count of 25 individuals was recorded. Eight of these were males and the remaining were likely females or juveniles. No smooth newt eggs were identified during survey.

No common frogs or spawn were observed on Site.

Wintering Birds

9.4.33 There is suitable habitat for wintering birds within the Site, and a large former mine lagoon and the former mining tailings pond situated to the south and east of the Site, respectively, provide further habitat for wintering birds.

9.4.34 A suite of wintering bird surveys was carried out within a study area comprising the Site and adjacent lands comprising the visible wetland habitats of the former mine lagoon and tailings ponds. These surveys were carried out monthly on six occasions between October 2021 and March 2022, and monthly on three occasions between October and December 2022.

9.4.35 Surveys identified twelve species of bird within the study area. The October 2021 surveys recorded the largest number of individuals with 159 records; this included large roosts of lapwing *Vanellus vanellus*, golden plover and snipe *Gallinago gallinago.* A smaller roost of 13 wigeon *Mareca penelope* was recorded on a single occasion. In October 2022, 55 lesser black-backed gulls *Larus fuscus* and a single peregrine were observed, while in November 2022 6 lesser black-backed gulls and a single black-head gull *Chroicocephalus ridibundus* flew over the Site. It is worth noting that large roosts

were noted only during October 2021, and the November 2021 and January 2022 surveys recorded no birds.

9.4.36 Full details of the wintering bird surveys are presented in Appendix 9E: Wintering Bird Report (refer to EIAR Volume II).

Breeding Birds

9.4.37 Breeding bird surveys were carried out over three survey dates in April, May, and June 2021 (see Table 9.1). Surveys commenced between sunrise and one hour after sunrise. The specific survey start and end times were as follows:

- Survey 1 - 16/04/2021 Sunrise: 06:34, Start time: 06:35, End time: 10:00
- Survey 2 - 20/05/2021 Sunrise: 05:30, Start time: 06:00, End time: 09:09
- Survey 3 - 15/06/2021 Sunrise: 05:10, Start time: 05:50, End time: 09:00

9.4.38 During the breeding bird surveys of the Site and surrounding areas, a total of 163 individual birds were recorded comprising 24 species. Four species of conservation concern for breeding in Ireland (goldcrest *Regulus regulus*, greenfinch *Chloris chloris*, meadow pipit *Anthus pratensis*, and willow warbler *Phylloscopus trochilus*) were recorded displaying breeding behaviours, see Figure 9.4. Meadow pipit is Red-listed, and goldcrest, greenfinch and willow warbler are Amber-listed (Gilbert *et al.*, 2021). The following territories were determined within the Site and surrounding area: 13 probable breeding territories of willow warbler, one probable breeding territory of meadow pipit, two possible breeding territories of goldcrest, one possible territory of greenfinch, and three possible breeding territories of willow warbler. No bird nests were recorded.

Other Protected and Notable Species

9.4.39 Common lizard *Zootoca vivipara* may be present within the Site, however no lizards were incidentally recorded during site surveys. Two notable butterfly species were incidentally recorded within the survey area to the west of the Site boundary - marsh fritillary *Euphydryas aurinia* (vulnerable, Annex II; EU Habitats Directive) and wood white, which is presumed to be the near-threatened wood white *Leptidea sinapsis* on a precautionary basis. Suitable habitats for these invertebrates, such as species-rich grassland, are present within the Site, and devil's-bit scabious, which is a key larval food plant for marsh fritillary, was also identified throughout the Site.

Lands adjacent to the Proposed Development Site

9.4.40 Lands immediately adjacent to the north of the Proposed Development Site were also surveyed as part of the assessment, see Survey Area in Figure 9.1 (refer to EIAR Volume III).

9.4.41 Habitats within this area include improved grassland, conifer plantation, scrub, reed and large sedge swamps, and spoil and bare ground.

9.4.42 The area of grassland habitat includes one improved agricultural grassland field that is grazed by cattle and horses. It also includes a grassland mosaic that ranges from lowland wet grassland to an upland grassland habitat similar to dry calcareous and neutral grassland.

9.4.43 There is a mixed broadleaved woodland that is approximately 6 to 8m tall and dominated by grey alder *Alnus incana* with bramble in the understorey. There is also a conifer plantation with an even-aged stand of spruce *Picea* sp. that is approximately 20 to 30m

tall. Scrub habitat is scattered throughout parts of the grassland habitat and there is an area of dense gorse scrub and willow scrub.

9.4.44 The spoil and bare ground is part of the former historic mine works, but it has slightly higher vegetation cover and is located on an elevated platform.

9.4.45 No invasive species or protected or notable plants were found in this area. No trees or structures were identified with suitability for supporting roosting bats and no evidence was found of mammal activity. There is limited suitable habitat for protected mammal species such as otter, badger, red squirrel or pine marten.

9.4.46 Marsh fritillary and wood white were incidentally recorded in the species-rich grassland in the south of this area.

Summary of Significant Ecological Features

9.4.47 As per the impact assessment methodology in Section 9.3, significant ecological features are considered to be those valued at Local Importance (local higher) or higher. Ecological features valued at Site Importance (local lower) or of negligible value are not considered significant features and are not carried forward for impact assessment. Table 9.6 summarises all significant ecological features identified within the ZoI of potentially significant impacts.

Table 9.6: Evaluation of Significant Ecological Features.

FEATURES	HIGHEST ECOLOGICAL VALUATION WITHIN ZOI	AT RISK OF LIKELY SIGNIFICANT EFFECTS?	SIGNIFICANT ECOLOGICAL FEATURE?
Designated Sites			
European sites (SAC, SPA)	International	No	Yes
National sites (NHA, pNHA)	National	No	Yes
Habitats and Flora			
Other artificial lakes and ponds (FL8)	Site (local lower)	Yes	No
Drainage ditches (FW4)	Site (local lower)	No	No
Semi-natural grassland (GS)	Local higher	Yes	Yes
Spoil and bare ground (ED2)	Negligible	No	No
Buildings and artificial surfaces (BL3)	Negligible	No	No
Mixed broadleaved woodland (WD1)	Site (local lower)	No	No
Conifer plantation (WD4)	Site (local lower)	No	No
Scrub (WS1)	Site (local lower)	Yes	No
Protected and Notable Species			
Other Protected Mammals	Local (local higher)	No	Yes
Amphibians	County (medium)	Yes	Yes
Wintering birds	Local (local higher)	Yes	Yes
Breeding birds	Local (local higher)	Yes	Yes

FEATURES	HIGHEST ECOLOGICAL VALUATION WITHIN ZOI	AT RISK OF LIKELY SIGNIFICANT EFFECTS?	SIGNIFICANT ECOLOGICAL FEATURE?
Marsh fritillary	County (medium)	Yes	Yes
Other Protected and Notable Species	Local (local higher)	Yes	Yes

9.5 Predicted Impacts

Do Nothing Scenario

9.5.1 In the absence of the Proposed Development, no significant changes in habitats or habitat condition are likely to occur under the current site management regime. Should the spoil and bare ground continue to be disturbed frequently, vegetation cover will remain low with negligible suitability for wildlife. Without management, the species-rich grassland is likely to scrub over and eventually succeed to woodland, resulting in loss of grassland biodiversity and potential loss of habitat for important invertebrates.

Introduction to Types of Impacts

9.5.2 The Proposed Development could have a range of potential impacts upon significant ecological features during its construction and/ or operational phases. A distinction is often made between direct and indirect impacts. Direct impacts occur where the changes to an ecological feature are directly attributable to an action associated with a given development, such as the felling of a tree with a bat roost contained within. Indirect impacts usually arise as a 'knock-on' effect of a development and would include aspects such as disturbance to bat activity as a result of habitat loss.

Construction Phase

9.5.3 A number of construction phase impacts have the potential to disturb protected species. Likely significant effects to biodiversity from the Proposed Development include habitat loss for breeding birds, invertebrates and smooth newt, pollution of habitats from contaminated surface-water runoff, and noise and visual disturbance to breeding or foraging bird species.

9.5.4 Several factors influence the potential significance (of impacts), including the time of year when likely significant effects occur, and the potential for unforeseen events such as extreme weather. A summary of the potential construction phase impacts is provided in Table 9.7.

Table 9.7: Types of potential construction phase impacts.

POTENTIAL IMPACT	DURATION	DIRECT (D) OR INDIRECT (I)
Loss of habitats to development	Permanent	D
Physical damage/ disturbance to breeding or resting sites of protected species (e.g. nesting birds)	Difficult to predict duration of population-scale impacts due to absence of scientific data for many protected species	D and I
Pollution of habitats from contaminated surface-water runoff	Temporary-to short term, but could cause permanent loss of susceptible species	D and I
Mortality or injury of protected species in construction areas	Temporary to short-term	D

POTENTIAL IMPACT	DURATION	DIRECT (D) OR INDIRECT (I)
Air quality and dust deposition	Temporary to short-term	I
Noise and visual disturbance	Temporary to short-term	D
Artificial lighting	Temporary to short-term	I

Operational Phase

9.5.5 Operational impacts consider the future impacts of the Proposed Development throughout its lifetime. Likely significant effects to ecological receptors are most significant throughout the initial years of operation.

9.5.6 A summary of the types of likely operational phase impacts is outlined in Table 9.8.

Table 9.8: Types of potential operational phase impacts.

POTENTIAL IMPACT	DURATION	DIRECT (D) OR INDIRECT (I)
Artificial lighting	Permanent	I
Disruption or displacement of protected species commuting routes	Permanent	D
Noise and visual disturbance to protected species	Permanent	D
Air quality impact	Permanent	I

Decommissioning Phase

9.5.7 Effects arising from the process of decommissioning of the Proposed Development are considered to be of a similar nature and duration to those arising from the construction process.

Construction Phase Impacts

European Sites

9.5.8 There are thirteen European sites within 15km of the Site, the closest of which is Slieve Aughty Mountains SPA, 6.1km south-west of the Site. There is a hydrological connection of over 17km to Barroughter Bog and over 19km to Lough Derg via the Cloonprask/ Barnacullia Stream and Mill Stream to the east and north and the Lisduff Stream to the south which are located approximately 13m, 250m, and 510m from the Site, respectively.

9.5.9 A Screening for Appropriate Assessment (AA) has been prepared in parallel by AECOM on behalf of the Applicant to inform the competent authority when determining whether the Proposed Development will have likely significant effects on any European sites, considering the Proposed Development alone and in-combination other plans and projects. It concluded there will be no likely significant effects to any European site either alone or in combination with any other plans or projects (including that of the Submitted Development Ref: 21/2192 – refer to EIAR Chapter 1), as a result of the construction phase of the Proposed Development.

9.5.10 Full details in presented in Appendix 9D (refer to EIAR Volume II).

Habitats

9.5.11 All habitats on Site are of Negligible and Site ecological value, except for semi-natural grassland (GS) which is assessed to be of Local (local higher) value due to the species richness of the habitat, the presence of notable species such as orchid which are uncommon locally, and its potential for being an important ecological corridor in a local context.

9.5.12 The construction phase of the Proposed Development is likely to result in the partial or potentially entire loss of semi-natural grassland and impacts could be significant at Local (higher) geographic scale in the absence of mitigation. Removal of this grassland will decrease biodiversity across the site, remove a potentially important local ecological corridor and potentially remove habitat which is likely to support a variety of invertebrates, including the Annex II-listed marsh fritillary.

Other Protected Mammals

9.5.13 Protected mammals potentially present on Site include Irish hare and hedgehog, although habitat for these species is limited. Potential impacts of the construction phase of the Proposed Development on these species include loss of habitat, and disturbance from construction activities. Impacts could be significant at Local (higher) geographic scale in the absence of mitigation.

Amphibians

9.5.14 A medium-sized breeding population of smooth newt was found in a small pond within the Site, approximately 50m north of the Proposed Development construction/operation footprint. Construction of the Proposed Development may impact this nationally protected species through loss of terrestrial and breeding habitat, injury or mortality of breeding newts and hibernating newts in the grassland to be removed, and pollution of the waterbody (if retained) via contaminated surface run-off resulting in the potential loss of the site population. Impacts could be significant at the County (medium) geographic scale in the absence of mitigation.

Wintering birds

9.5.15 Twelve species of bird were recorded during the wintering bird surveys, although overall, low irregular numbers of birds were recorded on site, with a total of 267 individuals across all nine surveys. The overwhelming majority of those birds were recorded on the single occasion in October 2021, and 55 lesser black-backed gulls were observed in October 2022. The other surveys recorded few birds, if any. Species were mainly associated with the tailings pond situated to the east of the Site or the former mine lagoon to the south-east of the Site, and only several birds were actually observed flying over the Site. Their irregular use of the Site and surrounding habitat suggested these are sub-optimal habitats, and not those on which wintering bird populations are dependent.

9.5.16 A number of species recorded in the surveys are of conservation concern in Ireland. These include the red-listed golden plover, kestrel, lapwing and snipe (Gilbert *et al*., 2021). Seven species recorded are amber-listed: black-headed gull, common gull *Larus canus*, lesser black-backed gull, mallard *Anas platyrhynchos*, teal *Anas crecca*, cormorant *Phalacrocorax carbo* and wigeon) (Gilbert *et al*., 2021).

9.5.17 The construction phase of the Proposed Development may disturb wintering birds adjacent to the site. Although the wintering birds comprise of a number of Red-listed and Amber-listed species, they are only present irregularly and in low numbers. If birds

were to be displaced during the construction phase of the Proposed Development, only small numbers of individuals and not large concentrations of wintering birds, inconsequential at the population level, would be impacted. Furthermore, birds would only be disturbed during periods of construction activities, i.e., daylight hours. Even if birds are displaced, alternative habitat is present in the wider landscape, including the former Tynagh Mine lagoon to the south of the Site, and Lough Rea and Lough Derg further afield. The wetland areas currently being used within the former mine are already highly contaminated and further contamination from the site arising through runoff will be minor and will not impact wintering birds. Therefore, impacts are not expected to be significant and mitigation is not required.

Breeding Birds

9.5.18 During breeding bird surveys, 24 species of bird were observed within or adjacent to the site, including four species of conservation concern for breeding in Ireland displaying breeding behaviour, namely meadow pipit, goldcrest, greenfinch and willow warbler.

9.5.19 Meadow pipit is Red-listed, and goldcrest, greenfinch and willow warbler are Amber-listed on the Birds of Conservation Concern in Ireland list (Gilbert *et al.*, 2021).

9.5.20 Impacts to breeding birds during construction include habitat loss, disturbance and injury to adults and their eggs, young and nests, and could be significant at Local (higher) geographic scale in the absence of mitigation. At particular risk is meadow pipit which is considered likely to be breeding on Site. Removal of the grassland on Site to facilitate the Proposed Development will remove the habitat suitable for this species and is likely to displace the breeding pair. Removal of other habitats on Site is likely to disturb or displace other species of breeding birds.

9.5.21 During construction, there will be habitat loss, an increase of lighting, noise, and visual disturbance. A temporary increase of such impacts during the breeding season could cause abandonment of some territories or nests.

9.5.22 Subject to population-level impacts which are difficult to predict, duration of these likely impacts could last from being temporary (i.e., during construction phase) or permanent if breeding birds are lost from the Site. However, given the common species in question and the alternative habitats in the surrounding areas, these impacts are not expected to be significant and mitigation, other than checks before vegetation removal, is not required.

Marsh Fritillary

9.5.23 Adult Marsh fritillary butterfly, a vulnerable Annex II-listed species, was recorded flying throughout the Site within the semi-improved grassland. The species is likely to breed on Site and the larval food plant, devil's-bit scabious is present across the Site.

9.5.24 Potential impacts of the construction phase of the Proposed Development on these butterflies include loss of habitat and potential injury or mortality of larvae which may be present within the grassland. Marsh fritillary larvae hibernate between late September and February or early March and become chrysalises in April/May and emerge as adult butterflies two to three weeks later. During this time, larvae are particularly susceptible to disturbance and habitat destruction. Marsh fritillary is a European protected species and it is an offence to deliberately capture, injure or kill any such species. With the case of this butterfly, these sentiments apply to the species at any stage of its life-cycle whether that be as an egg, larvae, chrysalis or as an adult butterfly.

9.5.25 For marsh fritillary butterfly, impacts could be significant at County (medium) geographic scale in the absence of mitigation.

Other Protected and Notable Species

9.5.26 Common lizard is potentially present on Site but was not recorded incidentally during surveys. Impacts to lizard during the construction phase are habitat loss, and injury or mortality of hibernating lizards and these could be significant at Local (higher) geographic scale in the absence of mitigation.

9.5.27 Another butterfly species was recorded outside the Site boundary, again to the west of the Site, but is also likely to be found on Site within the semi-improved grassland. The Wood white, which is presumed to be the wood white *Leptidea sinapsis* on a precautionary basis is not protected, but near-threatened. It's larval food plant is also present across the Site.

9.5.28 Impacts to butterflies during the construction phase are habitat loss and disturbance of larvae and eggs and these could be significant at Local (higher) geographic scale in the absence of mitigation.

Operational Phase Impacts

European Sites

9.5.29 Air quality modelling has concluded that the Proposed Development will not give rise to significant adverse air quality effects on sensitive habitats or species within European sites (EIAR Chapter 7: Air Quality and Climate, Volume I and Appendix 7A, EIAR Volume II).

9.5.30 The Screening for AA concluded there will be no likely significant effects to any European site as a result of the operational phase of the Proposed Development.

9.5.31 Full details in presented in Appendix 9D (refer to EIAR Volume II).

Habitats

9.5.32 There are no operational phase impacts predicted that would impact habitats present on Site.

Other Protected Mammals

9.5.33 There are no operational phase impacts predicted that would impact mammals such as hedgehog and Irish hare.

Amphibians

Smooth newt is unlikely to be impacted during the operation phase.

Wintering Birds

9.5.34 There are no potential impacts from the operational phase of the Proposed Development that are predicted to impact wintering birds. Birds within the survey area are already acclimated to noise and disturbance from the adjacent power station and the industrial Sperrins Galvansing works and as such, the addition of an OCGT would have no discernible or predicted effect on the low number of birds currently using the Site and surrounding areas.

Full details in presented in Appendix 9E (refer to EIAR Volume II).

Breeding Birds

9.5.35 There are no operational phase impacts predicted that would impact breeding birds, which are also likely to be accustomed to noise and disturbance.

Marsh fritillary

9.5.36 There are no operational phase impacts predicted that would impact the marsh fritillary.

Other Protected and Notable Species

9.5.37 Common lizard and butterflies are not expected to be impacted by the operational phase of the Proposed Development.

Decommissioning Impacts

9.5.38 The Proposed Development will be decommissioned after 25 years. Effects arising from the process of decommissioning of the Proposed Development are considered to be of a similar nature and duration to those arising from the construction process and therefore have not been considered separately in this chapter.

9.5.39 A Decommissioning Plan (including a Decommissioning Environmental Management Plan) would be prepared and agreed with the relevant authority at that time. The Decommissioning Environmental Management Plan will consider in detail all likely environmental risks on the Site and contain guidance on how risks can be removed or mitigated. Decommissioning activities will be conducted in accordance with the appropriate guidance and legislation at the time of the Proposed Development's closure.

9.5.40 However, the operational requirements of the Proposed Development will inevitably change during its design life and it will be subject to regular reviews to identify potential modifications and amendments that would allow the asset to have a future sustainable use beyond 25 years.

9.6 Mitigation and Enhancement Measures

9.6.1 In this section, the mitigation measures that will be employed by the contractor during construction as secured by the oCEMP (refer to EIAR Volume II, Appendix 5A) and final CEMP when agreed prior to construction, are described. The primary ecological mitigation requirement comprises the commission of an Ecological Clerk of Works (ECoW) to oversee and advise both contractors and site operators during times of major work within particularly sensitive ecological windows (i.e., breeding bird season, vegetation clearance).

Approach to the Identification of Ecological Constraints

9.6.2 The Proposed Development must consider and engage the following mitigation hierarchy where there is potential for impacts on relevant ecological receptors. The following principles underpin EcIA.

1. Avoidance: seek options that avoid harm to ecological features (e.g., locating to an alternative site);
2. Mitigation: negative effects should be avoided or minimised through mitigation measures, either through the design of the project or subsequent measures that can be guaranteed (e.g., through a condition or planning obligation);
3. Compensation: where there are significant residual negative ecological effects despite the mitigation proposed, these should be offset by appropriate compensatory

measures e.g., by providing suitable habitats elsewhere on the client-owned parts of the wider site; and

4. Enhancement: seek to provide net benefits for biodiversity over and above requirements for avoidance, mitigation, or compensation.

9.6.3 This hierarchy requires the highest level to be applied where possible. Only where this cannot reasonably be adopted should lower levels be considered. The rationale for the proposed mitigation and/ or compensation will be provided with planning applications, including sufficient detail to show that these measures are feasible and would be provided.

Habitats

9.6.4 There will be unavoidable loss of semi–natural grassland (up to approximately 2.2 ha) and scrub (up to approximately 0.025 ha) to facilitate the Proposed Development. The scrub habitat is of Site (Local lower) ecological value and consists of a small stand of willow. This habitat is likely to return naturally to the Site through succession if areas are left unmanaged following construction, and mitigation measures for this small area of scrub are not considered necessary. Construction will minimise loss of all natural habitats and seek to use all remaining existing hardstanding areas as storage areas / set down areas before incorporating natural habitats. On completion of the Proposed Development, any undeveloped areas of bare ground will be left without planting or landscaping to colonise naturally in order to replicate the existing habitats which would be lost. The grassland will be managed for the lifetime of the development for biodiversity. The semi-natural grassland is rated as being Local value (Local – Higher). Loss of the species-rich grassland on site will likely reduce biodiversity on Site and clearance of this habitat will likely impact a range of fauna including invertebrates.

Other Protected Mammals

9.6.5 Although not observed on Site, hedgehog and Irish hare may be present and mitigation is recommended to safeguard these protected species. Checks for mammals must be undertaken prior to vegetation removal.

Amphibians

9.6.6 Robust mitigation is required to protect smooth newt from impacts arising from construction works on Site. The pond supporting the newt population must remain intact and untouched by potential pollution. This will require a full suite of pollution prevention measures during the construction phase, including silt fencing around the pond to prevent sediment runoff into the pond, and a buffer of at least 10m between the pond and construction works and refuelling of machinery and plant. A detailed list of all measures are provided in the Outline CEMP within EIAR Appendix 5A (refer to EIAR Volume II).

9.6.7 Removal of the grassland and scrub on Site may potentially injure or kill hibernating newts and therefore should only be removed following checks of these habitats for newts. These areas will be cleared in stages – firstly by cutting back vegetation to around 5 - 10 cm to facilitate easier and more effective searches for newts and following searches this vegetation can be removed entirely.

9.6.8 Should any amphibians (smooth newt and common frog) be discovered that could be at risk of being disturbed by the construction of the Proposed Development, the ECoW should be alerted immediately. Consultation through the ECoW should be made with NPWS who will advise on the best course of action. A disturbance licence may need to

be sought before further action can proceed. An experienced ECoW should also supervise any further works involving amphibians, which would likely be a condition of the licence.

9.6.9 Internal roadways will be hard surfaced with drainage systems to manage runoff (draining to the south towards the existing Tynagh Power Station) and pollution risk during the operational phase, which will reduce the likelihood of pollution entering the pond.

Wintering Birds

9.6.10 Due to the lack of expected impacts on wintering birds, no specific mitigation measures are required. Construction activities will be carried out during the daytime, and thus there will be no disturbance to birds at night, allowing wintering birds to use the Site during the night.

Breeding Birds

9.6.11 Any removal of vegetation should be restricted to the non-breeding season (i.e., carried out from September to February inclusive), unless carried out under the supervision of a suitably experienced ECoW who must survey the vegetation and ground for breeding birds immediately prior to removal. If nests are found, work must stop immediately until birds fledge and cease to return to the nest and the ECoW will advise the contractor of any exclusion zones around potential or confirmed nests.

Marsh Fritillary

9.6.12 The grassland on site is suitable for the protected marsh fritillary. Removal of this habitat must be completed following checks for larvae of marsh fritillary between August and September when larval webs on devil's-bit scabious are conspicuous and before larvae begin to hibernate. Vegetation clearance must be completed in late spring / early summer (as advised at the time by the ECoW) when adults are on the wing. Should larval webs be found in the area of grassland to be removed, works should be halted and further advice sought from an Ecological Clerk of Works and relevant consultees.

9.6.13 Consultation with NPWS should be completed as soon as marsh fritillary breeding has been confirmed within the Proposed Development boundary as specific licensing requirements may be necessary. They will be able to advise on this aspect, as dependent on findings, licensing will be required or not and programming of any such work and necessary mitigation with have to be carefully considered as a result of the licence.

9.6.14 Post construction, areas of bare ground not required for the operation of the Site, will be allowed to recolonise naturally to form new areas of grassland for butterflies. The ECoW will monitor this colonization and advise on whether larval food plants should be also planted for the marsh fritillary.

Other Protected and Notable Species

9.6.15 Recolonisation of the bare ground on Site will provide alternative habitat for common lizard which is potentially present on Site. Removal of the grassland and scrub on Site may potentially injure or kill hibernating lizards and therefore the same mitigation measures to protect hibernating smooth newt as outlined above also apply to lizard.

9.7 Residual Effects

9.7.1 With the implementation of mitigation measures outlined above, residual impacts to semi-natural grassland, protected mammals, breeding birds, amphibians, lizard, marsh fritillary and other notable species are not significant.

9.8 Cumulative Effects

9.8.1 The cumulative impact of the Proposed Development on the surrounding environment has been considered in relation to a range of plans and projects in the vicinity of the Site, including existing developments, permitted developments and developments for which planning has been applied, but not yet granted.

Planning Application Search

9.8.2 A search was conducted of relevant planning applications within the vicinity of the Site, using the An Bord Pleanála Online Planning System and the Galway County Council Online Planning System. The search was limited to the five-year period preceding the date of issue of this EIAR (due to the typical five-year lifetime of planning permissions).

9.8.3 No applications were identified as having the potential to act together causing cumulative effects with the Proposed Development as they are all small-scale developments, except for the Submitted Development Ref: 21/2192 to the south of the Site. The site of this Proposed OCGT is located on a brownfield site of existing hardstanding currently utilised as a car park, warehouse and administrative building. There will be no loss of habitat and the Submitted Development Ref:21/2192 will have no impacts on significant ecological features.

9.8.4 'Submitted Development Ref: 21/2192' relates to planning application Ref. 21/2192 (submitted as an application to Galway County Council in November 2021, and currently awaiting determination by ABP under Ref. PL07.313538) – that is a separate 299MW OCGT development and project to that of the Proposed Development which is for a 350MW facility. Submitted Development Ref: 21/2192 proposes to demolish the existing Tynagh Power Station site workshop, administration building and car park, relocate these items to the brownfield lands to the immediate north of the Tynagh Power Station facility and develop a separate OCGT plant on the western part of the Power Station Site. Submitted Development Ref: 21/2192 is currently awaiting determination by An Bord Pleanála (PL 07.313538) following a Third Party appeal against Galway County Council's decision to grant permission. Subject to planning approval being obtained for the Submitted Development Ref: 21/2192, the Applicant intends to build out and operate both Submitted Development Ref: 21/2192 and the Tynagh North OCGT.

9.8.5 Current operations close enough to have a cumulative effect such as the nearby Sperrin Galvanising process works have also been examined to determine whether dust or air quality from both sites could act in combination with one another.

9.8.6 However, given the size, scale, distance, and nature of other planning applications for minor works, new dwellings, and other operating industrial plants, none will combine with the existing application to cause cumulative impacts. A full list is contained within EIAR Chapter 19: Cumulative Effects of this EIAR.

9.8.7 Following the consideration of all other projects and plans in the surrounding environment, it has been determined that none will act cumulatively with the current project to cause significant environmental impacts. The likelihood of adverse effects on biodiversity is negligible and not significant.

Summary of Cumulative Impacts

9.8.8 The scale and location of each of these plans and projects have been considered cumulatively with each other and the construction and operation of the Proposed Development. Any impacts arising would not cause significant effects to any ecological receptors over those already identified and considered in each assessment.

9.9 Summary of Likely Significant Effects

9.9.1 Table 9.9 summarises the geographic scale of likely impact significance at construction and operation for the Proposed Development on ecological receptors. A combined residual impact significance, and cumulative impact significance is also provided.

9.9.2 Residual impacts are not significant.

Table 9.9: Summary of Impacts from the Proposed Development.

ECOLOGICAL FEATURE	HIGHEST VALUATION	CONSTRUCTION PHASE		OPERATION PHASE		MITIGATION PROPOSED	RESIDUAL IMPACT SIGNIFICANCE	CUMULATIVE RESIDUAL IMPACT SIGNIFICANCE
		IMPACTS	SIGNIFICANCE	IMPACTS	SIGNIFICANCE			
Designated Sites								
European (SAC, SPA, Ramsar, pSPA)	International	None	Not significant	None	Not significant	No	Not significant	Not significant
National sites (ASSI)	National	None	Not significant	None	Not significant	No	Not significant	Not significant
Non-statutory designated sites (SLNCI)	County	None	Not significant	None	Not significant	No	Not significant	Not significant
Long-established Woodland	National	None	Not significant	None	Not significant	No	Not significant	Not significant
Habitats								
Other artificial lakes and ponds (FL8)	Site (local lower)	Pollution	Site	None	Not significant	No	Not significant	Not significant
Drainage ditches (FW4)	Site (local lower)	None	Not significant	None	Not significant	No	Not significant	Not significant
Semi-natural grassland (GS)	Local higher	Habitat loss	Local	None	Not significant	Local	Not significant	Not significant
Spoil and bare ground (ED2)	Negligible	None	Not significant	None	Not significant	No	Not significant	Not significant
Buildings and artificial surfaces (BL3)	Negligible	None	Not significant	None	Not significant	No	Not significant	Not significant
Mixed broadleaved woodland (WD1)	Site (local lower)	None	Not significant	None	Not significant	No	Not significant	Not significant
Conifer plantation (WD4)	Site (local lower)	None	Not significant	None	Not significant	No	Not significant	Not significant

ECOLOGICAL FEATURE	HIGHEST VALUATION	CONSTRUCTION PHASE		OPERATION PHASE		MITIGATION PROPOSED	RESIDUAL IMPACT SIGNIFICANCE	CUMULATIVE RESIDUAL IMPACT SIGNIFICANCE
		IMPACTS	SIGNIFICANCE	IMPACTS	SIGNIFICANCE			
Scrub (WS1)	Site (local lower)	Habitat loss	Not significant	None	Not significant	No	Not significant	Not significant
Protected and Notable Species								
Other Protected Mammals	Local (local higher)	Mortality or injury Disturbance / displacement	Local	None	Not significant	**Yes**	Not significant	Not significant
Amphibians	County (medium)	Mortality or injury Disturbance / displacement	County	None	Not significant	**Yes**	Not significant	Not significant
Wintering birds	Local (local higher)	None	Not significant	None	Not significant	No	Not significant	Not significant
Breeding birds	Local (local higher)	Mortality or injury Disturbance / displacement	Site	None	Not significant	**Yes**	Not significant	Not significant
Marsh fritillary	County (medium)	Mortality or injury Disturbance / displacement	County	None	Not significant	**Yes**	Not significant	Not significant
Other Protected and Notable Species	Local (local higher)	Mortality or injury Disturbance / displacement	Local	None	Not significant	**Yes**	Not significant	Not significant

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