6.0 BIODIVERSITY

6.1 INTRODUCTION

This chapter presents a Biodiversity Impact Assessment of the proposed development, and should be read in conjunction with Chapter 2 (Description of the Proposed Development). Details of the assessment methodology and existing site conditions are presented, potential impacts are assessed, and mitigation measures are recommended, where required.

The potential impacts of the proposed development on European sites (sites designated as Special Areas of Conservation [SACs] or Special Protection Areas [SPAs] that form part of the Natura 2000 network) within the Zone of Influence (ZoI) of the proposed development have been evaluated. This appraisal is presented separately in the form of a Natura Impact Statement (NIS) (which accompanies the Planning Application documentation as a standalone document and is also included (as an abridged version) in Appendix 6-1 of this Chapter).

6.1.1 Proposed Development

The proposed development will consist of further development of the existing Drehid WMF, including extension of the existing landfill and development of additional waste treatment infrastructure and all associated works to provide for the acceptance of up to 440,000 TPA of non-hazardous waste material. Key impacts associated with the proposed development (in the absence of mitigation), relevant to the evaluation of ecological impacts, are summarised hereunder:

Construction Phase (timeframe ca. 18 months)

- Site clearance and excavation activities to facilitate the proposed development;
- The potential release of sediment laden water, nutrients and/or pollutants into nearby watercourses;
- Noise and disturbance during construction phase activities;

Operational Phase (timeframe: 25 years, however landfill will remain capped in situ)

- Noise and disturbance due to operational activities and maintenance works;
- Air emissions associated with the operation of the landfill.
- Waste (e.g. stormwater, foul water and leachate) produced during the operational phase of the proposed development.

Decommissioning Phase and Post Closure (timeframe ca. 12 months)

- Decommissioning will include the dismantling of infrastructure, minor excavation activities and the removal of waste offsite.
- Impacts during decommissioning are expected to be of similar type and magnitude to those anticipated during the construction phase, but generally of a shorter duration.

6.2 STATEMENT OF AUTHORITY

This chapter was prepared by Áine Sands B.Sc. (Hons), Senior Ecologist with TOBIN. Áine has seven years post-graduate experience in ecology and environmental consultancy. Áine has predominantly been involved in large public and private infrastructure projects where she has carried out numerous Screenings for Appropriate Assessments, Natura Impact Statements and Ecological Impact Assessments for proposed developments. Áine has a strong understanding of National and European legislation associated with biodiversity and is cognisant of relevant

rulings by the Court of Justice of the European Union (CJEU). Áine also has experience with undertaking ecological surveys for protected habitats and species.

In addition, Sinead O'Reilly (M.Res.) undertook the aquatic surveys and contributed to the chapter. Sinead O'Reilly is a Senior Ecologist with TOBIN Consulting Engineers. She holds an honours degree in Zoology from University College Dublin and Research Masters in Science in Freshwater Ecology from University of Glasgow. She is a qualified and experienced environmental consultant with twelve years' post-graduate experience in freshwater sciences and environmental consultancy in Ireland. Sinead has prepared and delivered annual research reports, research papers, Appropriate Assessments, Natura Impact Statements, invasive species reports, mammal survey reports and other relevant documents. Sinead has a strong technical background as a freshwater ecologist and has extensive field experience in all freshwater habitats across Ireland.

This chapter was senior reviewed by Joao Martins B.E. (Hons) M.Sc., Senior Ecologist with 13 years' relevant professional experience in freshwater ecology including monitoring of both lotic and lentic systems. Mr Martins has extensive experience of preparation of screenings for Appropriate Assessment (AA), Natura Impact Statements (NIS), Ecological Impact Assessments (EcIA) and Environmental Impact Assessment Reports (EIAR). He additionally has specific field survey experience of Invasive Alien Plant Species, Bat Activity, Habitats, Mammals, amongst others.

6.3 METHODOLOGY

6.3.1 Assessment Approach

The aims of this assessment were to:

- To obtain baseline ecological data and conditions at the proposed development site and surrounding environs;
- To determine the ecological value and sensitivity of the identified ecological receptors;
- To assess the significance of effects of the potential impacts, including direct, indirect and secondary impacts, and the significance of these impacts, which may result from the proposed development during construction, operation and/or decommissioning;
- To prescribe mitigation measures to avoid and/or reduce the identified impacts; and
- To identify any residual impacts post mitigation.

6.3.2 Legislation, Plans, Policies and Guidance

The following legislation have been considered in this chapter of the EIAR where relevant:

- European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011), as amended. With particular reference to the Third Schedule of the European Communities Regulations 2011 (S.I. No. 477 of 2011) which deals with invasive species;
- The EIA Directive 2011/92/EU, as amended by Directive 2014/52/EU;
- European Union (EU) (Environmental Impact Assessment and Habitats) (No. 2) Regulations 2015 (S.I. No. 320/2015);
- Environmental Liabilities Directive (2004/35/EC);
- Planning and Development (Amendment) Act 2010 (as amended);
- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, herein referred to as the Habitats Directive;
- Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds, herein referred to as the Birds Directive;
- The EU Water Framework Directive (2000/60/EC);

- The Wildlife Acts 1976 to 2020 (as amended), herein referred to as the Wildlife Acts;
- The Flora (Protection) Order 2022 (S.I. No. 235 of 2022);
- Relevant fisheries legislation up to and including the Inland Fisheries Acts 1959-2017, as amended.

The following plans and their objective and policies have also been considered in this chapter:

- The Kildare County Development Plan 2023-2029[1];
- Ireland 3rd National Biodiversity Action Plan, 2017 – 2021[2];
- Climate Action Plan 2023 (CAP23)[3].

All relevant policies and objectives relevant to biodiversity from the abovementioned plans have been considered within this assessment.

The potential for effects on nature conservation interests was assessed, taking into consideration the habitats and species that are likely to be affected by the proposed development. This approach included consideration (as appropriate) of the following guidance documents:

- Gilbert et al, (2021);Bird Species of Medium and High Conservation Concern Listed in the Publication Birds of Conservation Concern in Ireland (BoCCI) 2020 – 2026;
- SNH (2016). Assessing Connectivity with Special Protection Areas (SPAs);
- Fossitt (2000). A Guide to Habitats in Ireland. The Heritage Council;
- Environmental Protection Agency (EPA) (2022). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports;
- Charted Institute of Ecology and Environmental Management (CIEEM) (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester;
- NRA (2005). Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes;
- NRA (2006). Guidelines for the Treatment of Otters prior to the Construction of National Roads Schemes. National Roads Authority, Dublin;
- NRA (2008). Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes;
- NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes. (Revision 2, National Roads Authority);
- NRA (2010). Guidelines on the Management of Noxious Weeds and Non-Native Plan Species on National Roads;
- Transport Infrastructure Ireland (TII) (2020) The Management of Invasive Alien Plant Species on National Roads – Technical Guidance; and
- Smith, G et al., (2011). Best Practice Guidance for Habitat Survey and Mapping. Ireland's Heritage Council: Kilkenny, Ireland.

6.3.3 Consultations

Consultation with various state agencies and environmental Non-Governmental Organisations (NGOs) was undertaken in February 2022 to inform this EIAR. Ecologically associated state

[1] Accessed March 2023] via: https://kildarecoco.ie/AllServices/Planning/DevelopmentPlans/KildareCountyDevelopmentPlan2023-2029/
[2] Accessed [January 2023] via https://www.npws.ie/sites/default/files/publications/pdf/National%20Biodiversity%20Action%20Plan%20English.pdf
[3] Accessed [January 2023] via https://www.gov.ie/en/publication/7bd8c-climate-action-plan-2023/

agencies and NGO's, relevant to the proposed development, were contacted in order to obtain any additional information and data, which may be useful in informing this assessment. The following organisations were contacted:

- Development Application Unit (DAU);
- National Parks and Wildlife Service (NPWS);
- Bat Conservation Ireland (BCI);
- BirdWatch Ireland (BWI);
- Inland Fisheries Ireland (IFI);
- Irish Wildlife Trust (IWT);
- Irish Peatland Conservation Council (IPPCC); and
- Irish Native Woodland Trust (INWT).

At the time of writing this Chapter, no response was received from the DAU, NPWS, BWI, IPPC or INWT. The BCI and IWT responded and advised they did not have the capacity to review the details of the proposed development and did not provide any further commentary. Despite the lack of responses from the above mentioned state agencies and NGOs, it is considered that a robust assessment was undertaken using publicly available data and final conclusions were not hindered.

Correspondence in the form of a letter was received from IFI on the 1st April 2022. The letter highlighted the importance of the Cushaling/Figile catchment and emphasised potential impacts which should be managed. IFI noted that salmon spawning/recruitment occurred in the Figile River during winter 2021-2022 surveys, a relatively short distance downstream of the proposed development site, and noted that the Cushaling/Figile has the potential to provide important spawning grounds for the population of salmon designated within the River Barrow and River Nore SAC located downstream. IFI indicated however that salmon spawning has been impacted by works associated with historic commercial peat harvesting, and restoration of spawning recruitment throughout the river system is important.

IFI additionally noted specific issues with the upper reaches of the Figile River which rises near the proposed development site. It stated that almost all of this watercourse has been subject to modification causing significant hydromorphological degradation through the straightening, deepening and widening of the river, the installation of on line silt ponds and also a large length of the river has been culverted. It mentioned the impact of these modifications to fisheries waters, and that it has resulted in a complete loss of all fisheries habitat and a barrier to fish migration. IFI requested restoration works be carried out on the culverted channel, the use of the on line silt ponds to cease and that habitat restoration of this important watercourse be facilitated. IFI also noted concerns around the introduction of non-native fish species.

A response letter was issued to IFI on the 5th May 2022 stating that the issues raised in relation to the Figile River, located immediately downstream of the proposed development, relate to previous and current activities on the peatland areas and a separate project (Timahoe South Bog Rehabilitation Plan[4]) is underway to address the rehabilitation of the Timahoe South Bog outside of the proposed development boundary (these issues are identified and addressed in the project's Natura Impact Statement[5]). It also stated that, notwithstanding the above, a full suite of aquatic surveys, both within and downstream of the proposed development, will be undertaken to inform the EIA. In addition, stringent mitigation measures will be implemented and have been outlined in Section 6.8 of this chapter (and within Chapter 8 - Water), which will

[4] Accessed [December 2022] via https://www.bnmpcas.ie/wp-content/uploads/sites/18/2022/10/Timahoe-South-Rehab-Plan-_Final-v5.pdf
[5] Accessed [December 2022] via https://www.bnmpcas.ie/wp-content/uploads/sites/18/2022/10/BnM_1507C_Timahoe-South_NIS_Final_290822.pdf

ensure the protection of the Figile River during all works associated with the proposed development.

In addition, a site meeting was held between IFI, Bord na Móna and TOBIN (Sinead O Reilly) on the 10th January 2023, to discuss IFI's concerns around the current quality of the Cushaling River and anticipated impacts from the proposed development. During the meeting, all mitigation measures which will be implemented during all phases of the development were discussed, and emphasis was made on how the measures will ensure the protection of the watercourse and fisheries.

6.3.4 Study Area

The proposed development site, which is approximately 262 hectares (ha) in size, occurs within the Timahoe South Bog situated within the Bord na Móna landholding, which comprises a total of 2,544 ha (refer to Figure 1.1 in Chapter 1). The proposed development site, which is owned by Bord na Móna, was previously used, up to approximately thirty five years ago, for the production of sod peat for energy generation. Since the cessation of peat production, the fields of bare peat have recolonised with vegetation and have remained predominantly undisturbed.

The majority of the proposed development site occurs within the Barrow WFD Catchment (catchment ID_14), and is hydrologically connected via the Cushaling River (the Cushaling River name is retained for reference purposes, recognizing that it is part of the "Figile_010" Water Framework Directive river water body). In addition, a small area of the far north-eastern boundary of the proposed development site occurs within the Boyne WFD Catchment (catchment ID_07) and is hydrologically connected via the Mulgeeth Stream and the Blackwater (Longwood)_010.

Zone of Influence

The study area comprises all lands located within the zone of influence (ZoI) of the proposed development. The current guidance on ecological assessments (CIEEM, 2018) states that:

> *"The 'zone of influence' for a project is the area over which ecological features may be affected by biophysical changes as a result of the proposed project and associated activities. This is likely to extend beyond the project site, for example where there are ecological or hydrological links beyond the site boundaries" and that "The zone of influence will vary for different ecological features depending on their sensitivity to an environmental change."*

The ZoI has therefore been defined through a desk-based assessment with regard to the sensitivity of habitats and species possibly present/previously recorded in the locality of the proposed development site, areas with connectivity (physical, hydrological or ecological) to the proposed development site boundary and potential impacts which may arise.

The ZoI for various ecological receptors for which the proposed development could have potential impacts is outlined in Table 6-1 below.

Table 6-1: Zone of Influence Informing the Ecological Assessment

Ecological Feature		Potential Source(s) of Impact from Proposed Development	Potential Effect	ZoI (metres from proposed development site)	Rationale
Internationally Designated Sites (European Sites)		All activities during the construction, operational and decommissioning phases	• Habitat loss • Habitat fragmentation • Disturbance • Changes to key elements of the site (e.g., water quality) • Changes to population density and distribution	Individually assessed using the Source-Pathway-Receptor Model (OPR, 2021)	The Source-Pathway-Receptor model is a standard tool in environmental assessment, which allows the identification of impacts (the source), potential pathways (hydrological, physical, or ecological) and receptors (qualifying interests and/or special conservation interests) which may be negatively impacted (OPR, 2021). In order for an effect to occur, all three elements of this mechanism must be in place.
Nationally Designated Sites		All activities during the construction, operational and decommissioning phases	Negative impacts to the designated scientific interests	Individually assessed using the Source-Pathway-Receptor Model (OPR, 2021)	The Source-Pathway-Receptor model is a standard tool in environmental assessment, which allows the identification of impacts (the source), potential pathways (hydrological, physical, or ecological) and receptors (qualifying interests and/or special conservation interests) which may be negatively impacted (OPR, 2021). In order for an effect to occur, all three elements of this mechanism must be in place.
Habitats and Flora	Terrestrial habitats or plant species	Vegetation clearance within the proposed development site during the construction phase	Habitat loss	0 m (i.e. within proposed development site)	Habitat loss will only occur within the limits of the proposed development site boundary.
	Surface water dependent habitats or plant species	Water quality impacts during the construction, operational and	Habitat degradation from water quality impacts	Receiving watercourses within and downstream of	The extent of water quality impacts on downstream receiving watercourses will not be considered effective past the first water body of depositional nature (e.g. lake water body; transitional water body). Drainage

Ecological Feature		Potential Source(s) of Impact from Proposed Development	Potential Effect	ZoI (metres from proposed development site)	Rationale
		decommissioning phases		the proposed development site	occurs into the Barrow_14 and Boyne_07 catchments. The ZoI of water quality effects to the south will therefore include the Cushaling plus all surface water bodies downstream until the Barrow Suir Nore Estuary WFD transitional water body and to the north-east , the Mulgeeth Stream plus all the downstream waterbodies until the Boyne Estuary WFD transitional water body.
	Dust impacts	Dust impact from excavation activities during the construction phase.	Habitat degradation	50 m	The Institute of Air Quality Management guidelines (Holman *et al.,* 2014) indicate that an assessment will be required where there is 'an ecological receptor within 50m of the boundary of a site; or 50m of the route(s) used by construction vehicles'.
Mammals	Breeding or resting sites	Vegetation clearance, and disturbance from construction, operational and decommissioning related activities	Habitat loss	0 m (i.e. within proposed development site)	Habitat loss will only occur within the limits of the proposed development site boundary.
			Disturbance to breeding sites	150 m	The outer extent of the survey area for protected mammal species was defined with regard to the National Road Authority (NRA) guidance related to badger (NRA, 2005) and guidance related to otter (NRA, 2006) which state that noise impacts from construction works can impact breeding badger setts/otter holts within 150 m of a noise source. Other protected mammal species potentially present at the locality (e.g. hedgehog, *Erinaceous europaeus*) are likely to have a smaller ZoI, as impacts are predominantly

Ecological Feature		Potential Source(s) of Impact from Proposed Development	Potential Effect	ZoI (metres from proposed development site)	Rationale
					associated with habitat damage and will therefore be captured within the 150 m survey buffer.
Bats	Roosting and foraging/commuting sites	Vegetation clearance, and disturbance from construction, operational and decommissioning related activities	Habitat loss and loss of roosting sites	0 m (i.e. within proposed development site)	Habitat loss will only occur within the limits of the proposed development site boundary.
			Disturbance from artificial lighting	Area of light spill from the light source	The ZoI for impacts associated with artificial lighting, will be all illuminated areas from the overspill of proposed lighting.
Birds	Nesting/roosting sites and foraging habitat	Vegetation clearance, and disturbance from construction, operational and decommissioning related activities	Habitat loss (including loss of nest sites)	0 m (i.e. within proposed development site)	Habitat loss will only occur within the limits of the proposed development site boundary.
			Disturbance of nesting/roosting sites. Direct injury/mortality.	300 m	Cutts *et al.* (2013) notes that different types of disturbance *stimuli* are characterised by different avifaunal reactions. However as a general rule of thumb, a distance of 300 m can be used to represent the maximum likely disturbance distance for waterfowl. Notwithstanding, disturbance to bird species will be considered individually, where required.
Invertebrates	Resting and foraging habitat	Vegetation clearance, and disturbance from construction, operational and	Direct injury/mortality or loss of habitat	0 m (i.e. within proposed development site)	Habitat loss will only occur within the limits of the proposed development site boundary.

Ecological Feature		Potential Source(s) of Impact from Proposed Development	Potential Effect	ZoI (metres from proposed development site)	Rationale
		decommissioning related activities			
Amphibians and reptiles	Resting and foraging habitat	Vegetation clearance, and disturbance from construction, operational and decommissioning related activities	Direct injury/mortality or loss of habitat	0 m (i.e. within proposed development site)	Habitat loss will only occur within the limits of the proposed development site boundary.
Aquatic Species	Instream freshwater flora and fauna	Vegetation clearance, instream works and disturbance from construction, operational and decommissioning related activities	Habitat loss and injury/mortality	0 m (i.e. within proposed development site)	Habitat loss will only occur within the limits of the proposed development site boundary.
			Habitat degradation from water quality impacts	Receiving watercourses within and downstream of the proposed development site	The extent of water quality impacts on downstream receiving watercourses will not be considered effective past the first water body of depositional nature (e.g. lake water body; transitional water body). The ZoI of water quality effects to the south will therefore include the Cushaling plus all surface water bodies downstream until the Barrow Suir Nore Estuary WFD transitional water body and to the north-east , the Mulgeeth Stream plus all the downstream waterbodies until the Boyne Estuary WFD transitional water body.

6.3.5 Desk Study

An ecological desktop study of the proposed development was undertaken to inform the assessment. Principal sources of information utilised for the desktop assessment included:

- Existing relevant mapping and databases e.g. species and habitat distribution from the following sources:
  - the National Parks and Wildlife Services [NPWS] website via; https://www.npws.ie/ (Accessed October 2022);
  - the National Biodiversity Data Centre [NBDC] website via: https://biodiversityireland.ie (Accessed October 2022);
  - the Environmental Protection Agency [EPA] website via: https://gis.epa.ie/EPAMaps/ (Accessed October 2022);
  - The Water Framework Directive (WFD) Map Viewer via: https://www.catchments.ie/ (Accessed October 2022).
- Published and unpublished NPWS reports on protected habitats and species including Irish Wildlife Manual Reports, Species Action Plans and Conservation Management Plans which included, but are not limited to, the following:
  - Irish Wildlife Manuals No. 116, Checklist of Protected and Threatened (Nelson et al., 2022)
  - The Irish Red Data Book 1 Vascular Plants (Curtis & McGough, 1988);
  - Ireland Red List No. 5 Amphibians, Reptiles & Freshwater Fish (King et al., 2011);
  - Ireland Red List No. 3 Terrestrial Mammals (Marnell, 2009);
  - Threat Response Plan – Otter *Lutra Lutra* 2009-2011 (NPWS, 2009);
  - All-Ireland Species Action Plan – Bats (DEHLG, 2008); and
  - River Barrow and River Nore SAC (002162) Conservation Objectives (NPWS, 2011).
- A review of all NPWS designated site and their site synopsises for sites within the ZoI of the proposed development;
- Conservation Status Assessment Reports (CSARs), Backing Documents and Maps prepared in accordance with Article 17 of the Habitats Directive;
- A review of published data and documents from Bat Conservation Ireland (BCI), Botanical Society of Britain (BSBI) and Inland Fisheries Ireland (IFI);
- A review of Ordnance Survey maps and aerial photography in order to determine the broad habitats that occur within the study area and thus typical bird communities; and
- A review of relevant ecological reports, and rehabilitation plans previously completed for the study area.

6.3.6 Field Surveys

A range of ecological field surveys were undertaken within the study area on 26th January and 4th and 5th May 2022 by qualified and experienced TOBIN ecologists (refer to Table 1-2 in Chapter 1 – Introduction), in order to inform the impact assessment of the proposed development. The data collected was robust and allowed TOBIN to draw accurate, definitive and coherent conclusions on the possible impacts of the proposed development on ecological receptors. A description of the surveys undertaken are provided hereunder.

6.3.6.1 Habitat and Botanical Survey

Habitat and botanical surveys were carried out within the proposed development site on 4th and 5th of May 2022. The proposed development site was walked and all representative habitats were classified, while recording their botanical species assemblage, following methodologies outlined within the following guidelines: *'Best Practice Guidance for Habitat Survey and Mapping'* (Smith *et al.*, 2011) and '*Ecological Surveying Techniques for Protected*

Flora and Fauna during the Planning of National Road Schemes' (NRA, 2008). All habitats encountered during the site visit were classified in accordance with Fossitt (2000) with reference made to the '*Interpretation Manual of EU Habitats*' (EC, 2013), as appropriate. Reference was also made to guidance within the Cross & Lynn (2013) and Smith & Crowley (2020) documents.

The proposed development site was also searched for evidence of invasive plant species listed in Part 1 of the Third Schedule of S.I No. 477/2011 – European Communities (Birds and Natural Habitats) Regulations 2011. Species protected under Flora Protection Order, 2022 (S.I. No. 235/2022) or listed under the Irish Red Data List of Irish Plants were also searched for.

6.3.6.2 Fauna Surveys

A terrestrial mammal survey was carried out in line with guidance outlined in the NRA (2008) Guidance: *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*. Target survey for specific protected species was also undertaken and is discussed hereunder.

6.3.6.3 Badger

Badger surveys were undertaken within the footprint of the proposed development site, plus a 150 m buffer from the red line boundary. The survey followed methodologies outlined in '*Surveying Badgers'* (Harris *et al.,* 1989) and guidance outlined in the NRA guidance (NRA, 2005). Any evidence of badger activity such as setts, trails, latrines and feeding signs were recorded.

6.3.6.4 Otter

Otter surveys were undertaken along waterbodies (which included rivers, lakes, ponds and drainage ditches) within the proposed development site plus a 150 m buffer, to account for noise disturbance impacts, following methodologies outlined within the NRA (2006) guidelines, and Chanin (2003) '*Monitoring the Otter Lutra Lutra'*. Any evidence of otter such as tracks, spraints, couches, slides, feeding remains or holts, were recorded.

6.3.6.5 Other Mammal Surveys

No species-specific surveys were undertaken for other mammal species for which field signs are less frequent and/or reliable than other larger mammals. However, during all survey's attention was paid to search for activity signs such as searching soft muds for tracks, and to look for droppings. The desktop review indicates that other mammal species likely to occur within the study area include Irish hare (*Lepus timidus hibernicus*), hedgehogs (*Erinaceus europaeus*), pygmy shrew (*Sorex minutus*) and Irish stoat (*Mustela erminea hibernica*).

6.3.6.6 Birds

Ornithological activity was surveyed within the proposed development site following the Countryside Bird Survey guidelines CBS Manual, '*Guidelines for Countryside Bird Survey Participants*' (CBS, 2012). All birds' activity noted during the two walkover surveys (which were undertaken in winter (26th January) and within the breeding season (4th May) was recorded.

The surveyors walked along transects and birds were identified by sight and call and the location and activity were recorded using the British Trust for Ornithology species and activity codes[6].

[6] https://www.bto.org/our-science/projects/bbs/taking-part/download-forms-instructions

Due to the nature of the proposed development, no bird collision risk is anticipated. Therefore, the potential impacts anticipated from the proposed development relate with avifauna that uses the habitats present within the proposed development site, rather than flying over birds. To characterise the bird communities that use the proposed development site and wider areas, a robust desktop assessment of previous bird surveys (TOBIN, 2012; TOBIN, 2017; MKO, 2018; and BnM, 2022) was undertaken, complemented by field surveys carried out in 2022.

The methodology for the field surveys was adapted from the Countryside Bird Survey (CBS, 2012) and consisted on walking predefined transects representative of the habitats present within the proposed development site, and recording all birds observed. The bird surveys were conducted in two occasions (26th of January 2022; 5th of April 2022) to represent the bird communities locally present during the winter and breeding seasons, respectively.

6.3.6.7 Bats

A bat roost assessment of all trees and structures within the proposed development site was carried out in accordance with the NRA (2006) guidelines '*Best practice guidance for the Conservation of Bats in the Planning of National Road Schemes'* and Collins (2016) '*Bat surveys for Professional Ecologists: Good Practice Guidelines'*. The daytime ground level visual assessment was carried out in order to determine potential roost features in trees. An inspection of the existing Bord na Móna buildings was also undertaken.

The suitability of habitat features for bats, within the survey area, was assessed in accordance with Collins (2016), as described in Table 6-2. Where a potential roost feature was identified, the feature was then further investigated using an inspection bat endoscope.

Table 6-2: Guidelines for Assessing Potential Bat Roosts (Collins, 2016)

Suitability	Description/Roosting Habitats	Commuting and Foraging Habitat
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions, and/or suitable surrounding habitat likely to be used on a regular basis by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain potential roost features but with none seen from the ground or with features seen only with very limited roost potential.	Habitats, that could be used by small numbers of commuting bats such as gappy hedgerows or unvegetated streams, but are isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions, and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland, or water.

Suitability	Description/Roosting Habitats	Commuting and Foraging Habitat
	made irrespective of species conservation status, which is established after presence is confirmed).	
High	A structure with one or more potential roost sites that could be used that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions, and surrounding habitat.	Continuous high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edges. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses, and grazed parkland. Site is close to and connected to known roosts.

In addition, a manual, dusk activity survey was undertaken at the proposed development site on the 5th of May 2022. Weather during the survey was dry and calm with the temperature ranging between 7 and 8 degrees Celsius. The survey commenced at 20:48 (15 minutes prior to sunset) and ended at 23:03 (two hours post sunset). A transect route was walked along potential foraging and commuting routes, such as drainage ditches and along the edges of the bog woodland located within the proposed development site.

6.3.6.8 Smooth Newt

A smooth newt survey, which included visual daytime searching and egg inspection, as well as a torch lit survey was carried out at suitable habitat within the proposed development site, following methodologies outlined in Meehan (2013) and in the NRA (2008) guidelines. No trapping or net dipping, which requires a licence, was carried out. The visual daytime searching survey included the searching of water bodies looking for signs of newts (all life cycle stages). A smooth newt survey was undertaken along the drainage ditches and small ponds present within the proposed development site. Egg searching was also undertaken during this survey. The torch inspection began shortly after sunset, when smooth newt are most active, using a high-powered torch.

6.3.6.9 Marsh Fritillary

Targeted marsh fritillary (*Euphydryas aurinia*) surveys were also undertaken within the proposed development site following methodologies outlined in the NRA (2008) guidance. The survey included the search for suitable habitat for marsh fritillary, which is largely dependent on the presence of devil's bit scabious (*Succisa pratensis*), the species main food source (Phelan *et al.*, 2021).

6.3.6.10 Aquatic Surveys

A baseline aquatic ecological assessment was carried out on the Cushaling River immediately downstream of the proposed development. Aquatic surveys were not undertaken along the Mulgeeth Stream considering the morphology of the small stream and is unlikely to support any aquatic species.

Along the Cushaling, four survey sites were, where feasible, selected relevant to the proposed works area. Sites were selected based on their location within and outside the proposed development site boundary, available access, previous Q-Value Status from Environmental

Protection Agency (EPA) surveys, and stream order, giving a good representation of the overall aquatic ecology throughout the study area. The selection of the sampling sites also depended on the presence of riffle/ glide habitat from which samples could be collected. The sites were also deemed suitable based on suitable access available and were the river was wadable to allow for an aquatic habitat assessment and macroinvertebrate survey to be carried out. This enabled a good representation of the overall aquatic ecology within the study area. This assessment was carried out on 4th of May 2022. The location of the survey sites are illustrated on Figure 6-1 and the coordinates are listed Table 6-4 below.

The surveys included an aquatic assessment of the riverine habitat available to support fish and aquatic species, an assessment of the macroinvertebrate community and an analysis of the biological water quality of the watercourse. The purpose of the surveys was to assess the overall aquatic habitat value of the river downstream of the proposed development, and establish the importance of the Cushaling River downstream of the proposed development for fish species of conservation importance such as Atlantic salmon (*Salmo salar*), lamprey (*Lampetra spp.*) and white-clawed crayfish (*Austropotamobius pallipes*). Further details on the survey undertaken is provided hereunder.

Aquatic Habitat Assessment

The aquatic ecological assessment included a habitat assessment of the receiving watercourses within the study area. The habitat assessment of the watercourses followed methodologies outlined in the Environment Agency's Guidance '(EA, 2003) and the Heritage Council Guidance (Fossitt, 2000).

The riverine habitat was also assessed for its suitability to support protected aquatic species. A broad appraisal / overview of the upstream and downstream habitat at each site undertaken to evaluate the wider contribution to salmonid and lamprey spawning, assess if the water course could support salmonids and access the general fisheries habitat.

The surveys were undertaken to characterise the fisheries importance of the stream and connecting drainage channels to establish suitability for Atlantic salmon, lamprey and brown trout (*Salmo trutta*). These species are the only fish of conservation value that were considered likely to be present within the small and heavily modified channels in the study area. The surveys would help identify the presence of habitats capable of supporting the aforementioned species.

River habitat surveys and fisheries assessments were carried out utilising elements of the approaches in the River Habitat Survey Methodology (Environment Agency, 2003) and Fishery Assessment Methodology (O'Grady, 2006) and '*Ecology of the Atlantic Salmon'* (Hendry & Cragg-Hine, 2003). to broadly characterise the river sites (i.e. channel profiles, substrata etc.).

An evaluation of potential lamprey habitats within the study area was made with reference to methodologies outlined in *'Ecology of the River, Brook, and Sea Lamprey'* (Maitland, 2003) and also NPWS Irish Wildlife Manuals lamprey surveys (O'Connor, 2004; O'Connor, 2006; and O'Connor, 2007). An assessment of the habitat to support white-clawed crayfish was also undertaken following methodologies outlined in '*Guidance on Habitat for White-clawed Crayfish*' (Peay, 2002).

All sites were assessed in terms of:

- Stream width and depth and other physical characteristics.
- Substrate type, listing substrate fractions in order of dominance, i.e. bedrock, boulder, cobble, gravel, sand, silt etc.
- Flow type, listing percentage of riffle, glide and pool in the sampling area.

- In-stream macrophyte, bryophytes occurring and their percentage coverage of the stream bottom at the sampling sites.
- Riparian vegetation composition.

Each sampling site along the watercourse was described in terms of the important aquatic habitats and species recorded (i.e. based on their conservation value). This determined the ecological evaluation of each aquatic survey site and informed site-specific mitigation for the proposed development. Watercourse characteristics including bankside vegetation, substrate and flow rate were recorded onsite. A number of physical habitat variables were measured at each site. These included the percentage of overhead shade present, percentage of substrate type and instream cover, bank height and bank width. The percentage of riffle, glide and pool was also measured over each site surveyed.

Macroinvertebrate Survey

Semi-quantitative sampling of benthic (or bottom dwelling) aquatic macroinvertebrates was undertaken at the four selected sites using standard EPA kick-sampling methods (Toner *et al.,* 2005). Stone washings and vegetation sweeps were also undertaken, were possible, to ensure a representative sample of the fauna present at each site was collected. The Quality Rating (Q) System (Toner *et al.*, 2005) and the Small Streams Risk Score (SSRS – EPA, 2015) was used to obtain a water quality rating for each site.

Biological water quality was assessed by the Q-value methodology, following the Standard Operating Procedures of the EPA (2021). The Q value is used to determine the ecological status of the waterbody, which is an action required under the obligations set out in the EU Water Framework Directive. Under this Directive, all water bodies are required to meet good status within a certain time period. Ireland is now in the third cycle of the Water Framework Directive and therefore good status should be achieved in all water bodies by the end of this current cycle, i.e., 2024. If a waterbody is unlikely to achieve this status, then it is deemed to be At Risk.

In order to determine the biological quality of the river, the Q-scheme index is used whereby the analyst assigns a Biotic Index value (Q-Value) based on macroinvertebrate results. For the purpose of this assessment benthic invertebrates have been divided into five indicator groups according to tolerance of pollution, particularly organic pollution (Lucey *et al.*, 1999). The Biotic Index is a quality measurement for freshwater bodies that range from Q1 – Q5 with Q1 being of poorest quality and Q5 being pristine/unpolluted (see Table 6-3).

Table 6-3: Biotic Index scoring system for the Q-Scheme

Biotic Index	Quality Status	Quality Class
Q5, 4-5, 4	Unpolluted	Class A
Q3-4,	Slightly Polluted	Class B
Q3, 2-3	Moderately Polluted	Class C
Q2, 1-2, 1	Seriously Polluted	Class D

The Small Stream Risk Score (SSRS) is a biological risk assessment system for detecting potential sources of pollution in streams. The main aim of the SSRS is to support the programme of measures for the Water Framework Directive. The main objective of this directive is to ensure the achievement of good ecological status in all water bodies in the EU within a specified time period.

The SSRS method is a rapid field methodology for risk assessment that is based solely on Macroinvertebrate indicators of water quality and their well-understood response to pollution. Importantly the SSRS score indicates whether or not the stream is at risk from pollution and not the ecological health of the stream. The SSRS score ranges from 0-11.2.

SSRS surveys are designed to assist in the identification of diffuse sources of pollution and they are valuable in pinpointing the likely geographical location of the sources that are causing the main channel rivers in their failure to achieve good status. The SSRS will identify whether the water body in question is At Risk of not achieving good ecological status as required under the Water Framework Directive.

At the four suitable sampling sites, the biological water quality was assessed by the Q-scheme index methodology, following the Standard Operating Procedures of the EPA (2020), and Small Streams Risk Score (SSRS – Walsh, 2005). At each site, notes on the physical habitat were recorded. A semi-quantitative, two-minute macroinvertebrate kick-sample was collected from the riverbed, with the aim of targeting faster flowing riffle habitats where possible. A further one-minute hand search was carried out to locate macroinvertebrates that may have remained attached to the underside of the cobbles if possible. This sampling approach is sufficient to achieve a suitable representation of taxa for bioassessment. Due to the substratum (e.g. bedrock), flow conditions and heavy sediment present, it made kick-sampling difficult, and the abundance of macroinvertebrates collected was extremely low. It was necessary to spend a longer amount of time sampling the river to accumulate a sufficient diversity and abundance of macroinvertebrates. This sampling approach requires avoidance of obvious localized disturbance (e.g. cattle access points) which may adversely influence the sample taken. However, due to difficult access points along the river, one sampling site was taken at a cattle access point. This site is also an EPA sampling site.

The species assemblage list was used to assign a Biotic Index value (Q-Value, SSRS) to the sampled stream. It involved recording the taxa present at a suitable and attainable taxonomic resolution (i.e. genus or species) and their categorical relative abundance, determined using approximate counts. Once all taxa and their relative abundance were recorded, the sample was returned to the river.

Table 6-4: Locations of Survey Sites along the Cushaling River

Site Number	River	Distance Downstream of the Proposed Development Site	ITM (x)	ITM (y)
Site 1	Cushaling River	ca. 425m	673504	730820
Site 2	Cushaling River	ca. 1.4km	672902	731334
Site 3	Cushaling River	ca. 2.5km	671810	731318
Site 4	Cushaling River	ca. 2.8km	671496	731247

Figure 6-1: Aquatic Sampling Sites

6.3.6.11 Biosecurity Measures

Strict biosecurity measures were carried out during all surveys, with particular consideration made during the aquatic surveys. All equipment and PPE used was inspected and disinfected with 1% Virkon® solution prior to, and post-survey completion.

6.4 BASELINE EVALUATION CRITERIA

Ecological resources/receptors are evaluated following the NRA (2009) guidelines (Table 6-5), which set out the importance of the ecological resource/receptor in a geographic context. These guidelines are consistent with the approach recommended in CIEEM guidance (CIEEM, 2018).

The information gathered from desk studies and field surveys was used to carry out an impact assessment of the proposed development upon the identification of ecological receptors and classification of their ecological importance, according to the NRA guidelines (2009). Those features identified as being of high local importance or greater, are then given particular mention in the ecological evaluation as key ecological receptors (KERs) when considering the potential for likely significant effects and subsequent requirement for appropriate mitigation.

In addition, all potential impacts were assessed and characterised in accordance with the guidance produced by the EPA, *Guidelines on the information to be contained in Environmental Impact Assessment Report*' (EPA, 2022 - Table 6-6). Via this approach, a scientific and repeatable method was applied whereby all aspects of a potential impact were considered.

Table 6-5: Ecological Valuation Criteria

Importance	Ecological Valuation

International Importance	• European sites including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA), proposed Special Area of Conservation (pSAC), proposed Special Protection Area (pSPA), and/or Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended).
	• Features essential to maintaining the coherence of the Natura 2000 Network.
	• Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive.
	• Resident or regularly occurring populations (assessed to be important at the national level) of the following:
	  ○ Species of bird listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or
	  ○ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.
	• Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971).
	• World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972).
	• Biosphere Reserve (UNESCO Man & The Biosphere Programme).
	• Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).
	• Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).
	• Biogenetic Reserve under the Council of Europe.
	• European Diploma Site under the Council of Europe.
	• Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).

National Importance	• Site designated or proposed as a Natural Heritage Area (NHA).
	• Statutory Nature Reserve.
	• Refuge for Fauna and Flora protected under the Wildlife Acts.
	• National Park.
	• Undesignated site fulfilling the criteria for designation as an NHA, Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Acts; and/or a National Park.
	• Resident or regularly occurring populations (assessed to be important at the national level) of the following:
	  ○ Species protected under the Wildlife Acts; and/or
	  ○ Species listed on the relevant Red Data list.
	• Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive.

County Importance	• Area of Special Amenity. • Area subject to a Tree Preservation Order. • Area of High Amenity, or equivalent, designated under the County Development Plan.

Importance	Ecological Valuation

	• Resident or regularly occurring populations (assessed to be important at the County level) of the following:
	  ○ Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
	  ○ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
	  ○ Species protected under the Wildlife Acts; and/or
	  ○ Species listed on the relevant Red Data list.
	• Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.
	• County important populations of species or viable areas of semi-natural habitats or natural heritage features identified in the National or Local Biodiversity Action Plan (BAP), if these have been prepared.
	• Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.
	• Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.

Local Importance (Higher Value)	• Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared.
	• Resident or regularly occurring populations (assessed to be important at the Local level) of the following:
	  ○ Species of bird listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
	  ○ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
	  ○ Species protected under the Wildlife Acts; and/or
	  ○ Species listed on the relevant Red Data list.
	• Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality;
	• Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.

Local Importance (Lower Value)	• Sites containing small areas of semi-natural habitat that are of some local importance for wildlife. • Sites or features containing non-native species that are of some importance in maintaining habitat links.

Table 6-6: Description of Effects

Description of Effect	Definition
Quality of Effects	**Positive Effects** A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral Effects No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative/Adverse Effects A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).

Description of Effect	Definition
Significance of Effects	**Imperceptible** An effect capable of measurement but without significant consequences.
	Not significant An effect which causes noticeable changes in the character of the environment but without significant consequences.
	Slight Effects An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate Effects An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends
	Significant Effects An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment
	Very Significant An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
	Profound Effects An effect which obliterates sensitive characteristics
Describing the Extent and Context of Effects	**Extent** Describe the size of the area, the number of sites and the proportion of a population affected by an effect
	Context Describe whether the extent, duration or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)
Describing the probability of Effects	**Likely Effects** The effects that can reasonably be expected to occur because of the planned project if all mitigations measures are properly implemented.
	Unlikely Effects The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented
Duration and Frequency of Effects	**Momentary Effects** Effects lasting from seconds to minutes
	Brief Effects Effects lasting less than a day
	Temporary Effects Effects lasting less than a year
	Short-term Effects Effects lasting one to seven years
	Medium-term Effects Effects lasting seven to fifteen years.
	Long-term Effects Effects lasting fifteen to sixty years.
	Permanent Effects Effects lasting over sixty years
	Reversible Effects Effects that can be undone, for example through remediation or restoration
	Frequency of Effects Once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually

6.5 EXISTING ENVIRONMENT

The following sections provides a description of the baseline conditions for biodiversity within the ZoI of the proposed development. This section is divided into two sections; Output of Desktop Assessment and Output of Field Surveys.

6.5.1 Output of Desktop Assessment

This desktop assessment included an assessment of designates sites, data from ecological stakeholders and a review of ecological assessments from nearby projects. The findings of the desktop assessment are detailed hereunder.

6.5.1.1 Designated Conservation Sites

6.5.1.1.1 Sites of International Importance

The Birds Directive (2009/147/EC) and the Habitats Directive (92/42/EEC) put an obligation on EU Member States to establish the Natura 2000 network. The Natura 2000 network comprises sites of the highest biodiversity importance for rare and threatened habitats and species across the EU. In Ireland, the Natura 2000 network of European sites comprises SACs and SPAs, where SACs are selected for the conservation of Annex I habitats (including priority types, which occurrence is considered threatened) and Annex II species (other than birds). SPAs are selected for the conservation of Annex I birds and other regularly occurring migratory birds and their habitats.

As an initial approach, all European sites within a 15 km radius of the proposed development or where a hydrological link exists, were considered, to ensure a robust assessment. Additionally, the Source-Pathway-Receptor model (OPR, 2021) was then used to determine whether viable pathways for effects exists.

There are a range of European sites (i.e. SACs and SPAs) within the vicinity of the proposed development site. These European sites and their Qualifying Interests/Special Conservation Interest are listed in Table 6-7 and illustrated on Figure 6-2.

The proposed development does not overlap with the boundary of any European site. A viable source-pathway-receptor link, via hydrological connectivity, was identified between the proposed development and the River Barrow and River Nore SAC (002162), the River Boyne and Blackwater SAC (00229), the River Boyne and River Blackwater SPA (004232), the Boyne Coast and Estuary SAC (001959) and the Boyne Estuary SPA (004080), which are all located over 29 km downstream.

6.5.1.1.2 Sites of National Importance

Natural Heritage Areas (NHA) are the basic wildlife designation in Ireland. These areas are considered nationally important for the habitats present, or which hold species of plants and animals designated for protection. Under Irish legislation in the form of the Wildlife Acts (as amended), NHAs are legally protected from damage from the date they are formally proposed for designation.

Proposed Natural Heritage Areas (pNHA) were published on a non-statutory basis in 1995 and have not since been statutorily designated. Prior to statutory designation, pNHAs are subject to limited protection, including recognition of the ecological value of pNHAs by Planning and Licensing Authorities.

Three NHAs were identified within the vicinity of the proposed development site (Table 6-7 and Figure 6-2). However, no viable source-pathway-receptor link exists between the proposed development and the three NHA's.

There are twenty one pNHA's located within the vicinity of the proposed development site, as illustrated in Figure 6-2, and listed in Table 6-7. However, viable source-pathway-receptor links, via hydrological connectivity were only identified between the proposed development site and eleven pNHAs; Barrow Valley at Tankardstown Bridge pNHA (000858), Clohastia pNHA (000830), Barrow River Estuary pNHA, Barrow Valley at Tankardstown Bridge pNHA (000858), Clohastia pNHA (000830, Barrow River Estuary pNHA (000698), Waterford Harbour pNHA (000787), Duncannon Sandhill pNHA (001738), Trim pNHA (001357), Boyne Woods pNHA (001592), Crewbane Marsh pNHA (00553), Rossnaree Riverbank pNHA (001589), Dowth Wetland pNHA (001861), Boyne River Island pNHA (001862) and Boyne Coast and Estuary pNHA (001957).

Further details are provided in Table 6-7 below.

Other Sites of Nature Conservation

Other sites of nature conservation within the vicinity of the proposed development site are discussed hereunder:

- There are no National Parks located within 15 km of the proposed development site, in addition, no source-pathway-receptor link was identified between the proposed development and any National Park.
- Pollardstown Fen Nature Reserve is located approximately 15 km south of the proposed development site, however, no source-pathway-receptor link was identified between the proposed development and Pollardstown Fen Nature Reserve or any other Nature Reserve
- The Pollardstown Fen RAMSAR (Site Number: 474) site is located approximately 15 km south of the proposed development site, however, no source-pathway-receptor link was identified between the proposed development and Pollardstown Fen RAMSAR site or any other RAMSAR site
- The Ballynafagh Lake (Blackwood Lake) Wildfowl Sanctuary (WFS-30) is located approximately 5.7 km east of the proposed development site, however, no source-pathway-receptor link was identified between the Ballynafagh Lake (Blackwood Lake) Wildfowl Sanctuary or any other wildfowl sanctuary.

Table 6-7: Designated Conservation Sites potentially connected with the Proposed Development

Name	Qualifying Interests / Special Conservation Interests / Feature of Interest	Approximate Distance from the proposed development (km)	Source-Pathway-Receptor Link (Yes or No)
International Sites (European Sites)			
Ballnafagh Bog SAC (000391)	• Active raised bogs* [7110] • Degraded raised bogs still capable of natural regeneration [7120] • Depressions on peat substrates of the *Rhynchosporion* [7150]	Located approximately 3 km south-east of the proposed development site. There is no hydrological, physical or ecological	No – no viable pathway between the proposed development and the SAC

Name	Qualifying Interests / Special Conservation Interests / Feature of Interest	Approximate Distance from the proposed development (km)	Source-Pathway-Receptor Link (Yes or No)
		connectivity between the proposed development and the SAC.	
Ballynafagh Lake SAC (001387)	• Desmoulin's Whorl Snail (*Vertigo moulinsiana*) [1016] • Marsh Fritillary (*Euphydryas aurinia*) [1065] • Alkaline fens [7230]	Located approximately 5.5 km south-east of the proposed development site. There is no hydrological, hydrogeological, physical or ecological connectivity between the proposed development and the SAC.	No – no viable pathway between the proposed development and the SAC
The Long Derries, Edenderry SAC (000925)	• Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210]	Located approximately 7 km south-west of the proposed development site. There is no hydrological, physical or ecological connectivity between the proposed development and the SAC.	No – no viable pathway between the proposed development and the SAC
Mouds Bog SAC (002331)	• Active raised bogs* [7110] • Degraded raised bogs still capable of natural regeneration [7120] • Depressions on peat substrates of the *Rhynchosporion* [7150]	Located approximately 3 km south-east of the proposed development site. There is no hydrological, physical or ecological connectivity between the proposed development and the SAC.	No – no viable pathway between the proposed development and the SAC
Pollardstown Fen SAC (000396)	• Geyer's Whorl Snail (*Vertigo geyeri*) [1013] • Narrow-mouthed Whorl Snail (*Vertigo angustior*) [1014] • Desmoulin's Whorl Snail (*Vertigo moulinsiana*) [1016] • Calcareous fens with *Cladium mariscus* and	Located approximately 14 km south-east of the proposed development site. There is no hydrological, hydrogeological,	No – no viable pathway between the proposed development and the SAC

Name	Qualifying Interests / Special Conservation Interests / Feature of Interest	Approximate Distance from the proposed development (km)	Source-Pathway-Receptor Link (Yes or No)
	species of the *Caricion davallianae** [7210] • Petrifying springs with tufa formation (*Cratoneurion*)* [7220] • Alkaline fens [7230]	physical or ecological connectivity between the proposed development and the SAC.	
River Boyne and River Blackwater SAC (002299)	• River Lamprey (*Lampetra fluviatilis*) [1099] • Salmon (*Salmo salar*) [1106] • Otter (*Lutra lutra*) [1355] • Alkaline fens [7230] • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)* [91E0]	The SAC Is located approximately 30 km downstream of the proposed development site.	Yes – viable pathway via hydrological connectivity identified between the SAC and the proposed development. The SAC is designated for aquatic species which are sensitive to water quality impacts.
River Boyne and River Blackwater SPA (004232)	• Kingfisher (*Alcedo atthis*) [A229]	The SAC is located approximately 30 km downstream of the proposed development site.	Yes – viable pathway via hydrological connectivity identified between the SPA and the proposed development. The SPA is designated for kingfisher which feed on small fish and aquatic insects. Their food source within this SPA may be impacted by the proposed development.
River Barrow and River Nore SAC (002162)	• Desmouli''s whorl snail (*Vertigo moulinsiana*) [6210] • Freshwater pearl mussel (*Margaritifera margaritifera*) [1029] • White-clawed crayfish (*Austropotamobius pallipes*) [1092] • Sea lamprey (*Petromyzon marinus*) [1095] • Brook lamprey (*Lampetra planeri*) [1096]	The SAC is located approximately 40 km downstream of the proposed development site.	Yes – viable pathway via hydrological connectivity identified between the SAC and the proposed development. The SAC is designated for aquatic plant and species which are sensitive to

Name	Qualifying Interests / Special Conservation Interests / Feature of Interest	Approximate Distance from the proposed development (km)	Source-Pathway-Receptor Link (Yes or No)
	• River lamprey (*Lampetra fluviatilis*) [1099] • Twaite shad (*Alosa fallax*) [1103] • Atlantic salmon (*Salmo salar*) (only in fresh water) [1106] • Estuaries [1130] • Mudflats and sandflats not covered by seawater at low tide [1140] • Salicornia and other annuals colonizing mud and sand [1310] • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] • Otter (*Lutra lutra*) [1355] • Mediterranean salt meadows (*Juncetalia maritimi*) [1410] • Killarney fern (*Trichomanes speciosum*) [1421] • Nore freshwater pearl mussel [1990] (*Margaritifera durrovensis*) • Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] • European dry heaths [4030] • Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] • Petrifying springs with tufa formation (*Cratoneurion*)* [7220] • Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*)* [91E0]		water quality impacts.
Boyne Estuary SPA (004080)	• Shelduck (*Tadorna tadorna*) [A048] • Oystercatcher (*Haematopus ostralegus*) [A130] • Golden Plover (*Pluvialis apricaria*) [A140]	The SPA is located approximately 99 km downstream of the proposed development site.	Yes – viable pathway via hydrological connectivity identified between the SPA

Name	Qualifying Interests / Special Conservation Interests / Feature of Interest	Approximate Distance from the proposed development (km)	Source-Pathway-Receptor Link (Yes or No)
	• Grey Plover (*Pluvialis squatarola*) [A141] • Lapwing (*Vanellus vanellus*) [A142] • Knot (*Calidris canutus*) [A143] • Sanderling (*Calidris alba*) [A144] • Black-tailed Godwit (*Limosa limosa*) [A156] • Redshank (*Tringa totanus*) [A162] • Turnstone (*Arenaria interpres*) [A169] • Little Tern (*Sterna albifrons*) [A195] • Wetland and Waterbirds [A999]		and the proposed development. The SPA is designated for a number of waterbirds and waders which are sensitive to water quality impacts.
Boyne Coast and Estuary SAC (001957)	• Estuaries [1130] • Mudflats and sandflats not covered by seawater at low tide [1140] • Annual vegetation of drift lines [1210] • Salicornia and other annuals colonising mud and sand [1310] • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae)* [1330] • Embryonic shifting dunes [2110] • Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] • Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	The SAC is located approximately 102 km downstream of the proposed development site.	Yes – viable pathway via hydrological connectivity identified between the SAC and the proposed development. The SAC is designated for aquatic habitats which are sensitive to water quality impacts.
National Sites			
Hodgestown Bog NHA (001393)	Peatlands [4]	Located approximately 3.7 km east of the proposed development site There is no hydrological, hydrogeological, physical or ecological connectivity between the proposed development and the NHA.	No– no viable pathway between the proposed development and the NHA

Name	Qualifying Interests / Special Conservation Interests / Feature of Interest	Approximate Distance from the proposed development (km)	Source-Pathway-Receptor Link (Yes or No)
Carbury Bog NHA (001388)	Peatlands [4]	Located approximately 5 km north-west of the proposed development site. There is no hydrological, hydrogeological, physical or ecological connectivity between the proposed development and the NHA.	No– no viable pathway between the proposed development and the NHA
Black Castle Bog NHA (000570)	Peatlands [4]	Located approximately 15 km west of the proposed development site. There is no hydrological, hydrogeological, physical or ecological connectivity between the proposed development and the NHA.	No– no viable pathway between the proposed development and the NHA
Grand Canal pNHA (002104)	Canal System	Located approximately 3 km south-west of the proposed development site. There is no hydrological, hydrogeological, physical or ecological connectivity between the proposed development and the pNHA.	No– no viable pathway between the proposed development and the pNHA
Ballynafagh Lake pNHA (001387)	No Site Synopsis available	Located approximately 5.5 km south-east of the proposed development site. There is no hydrological, hydrogeological, physical or ecological connectivity between the proposed	No– no viable pathway between the proposed development and the pNHA

Name	Qualifying Interests / Special Conservation Interests / Feature of Interest	Approximate Distance from the proposed development (km)	Source-Pathway-Receptor Link (Yes or No)
		development and the pNHA.	
Ballynafagh Bog pNHA (000391)	No Site Synopsis available	Located approximately 6 km south-east of the proposed development site. There is no hydrological, hydrogeological, physical or ecological connectivity between the proposed development and the pNHA.	No– no viable pathway between the proposed development and the pNHA
The Long Derries, Edenderry pNHA (000925)	No Site Synopsis available	Located approximately 7 km south-west of the proposed development site. There is no hydrological, hydrogeological, physical or ecological connectivity between the proposed development and the pNHA.	No– no viable pathway between the proposed development and the pNHA
Royal Canal pNHA (002130)	Canal System	Located approximately 8.6 km north-west of the proposed development site. There is no hydrological, hydrogeological, physical or ecological connectivity between the proposed development and the pNHA.	No– no viable pathway between the proposed development and the pNHA
Ballina Bog pNHA (000390)	Peatlands	Located approximately 8.7 km north-west of the proposed development site. There is no hydrological, hydrogeological,	No– no viable pathway between the proposed development and the pNHA

Name	Qualifying Interests / Special Conservation Interests / Feature of Interest	Approximate Distance from the proposed development (km)	Source-Pathway-Receptor Link (Yes or No)
		physical or ecological connectivity between the proposed development and the pNHA.	
Mouds Bog pNHA (000395)	No Site Synopsis available	Located approximately 11 km south-east of the proposed development site. There is no hydrological, hydrogeological, physical or ecological connectivity between the proposed development and the pNHA.	No– no viable pathway between the proposed development and the pNHA
Pollardstown Fen pNHA (000396)	No Site Synopsis available	Located approximately 14 km south of the proposed development site. There is no hydrological, hydrogeological, physical or ecological connectivity between the proposed development and the pNHA.	No– no viable pathway between the proposed development and the pNHA
Donadea Wood pNHA (001391)	Woodland	Located approximately 14 km east of the proposed development site. There is no hydrological, hydrogeological, physical or ecological connectivity between the proposed development and the pNHA.	No– no viable pathway between the proposed development and the pNHA
Curragh (Kildare) pNHA (000392)	Lowland acid grassland	Located approximately 15 km south of the proposed development site. There is no hydrological, hydrogeological,	No– no viable pathway between the proposed development and the pNHA

Name	Qualifying Interests / Special Conservation Interests / Feature of Interest	Approximate Distance from the proposed development (km)	Source-Pathway-Receptor Link (Yes or No)
		physical or ecological connectivity between the proposed development and the pNHA.	
Barrow Valley at Tankardstown Bridge pNHA (000858)	No Site Synopsis available	Located approximately 70 km downstream of the proposed development site. The pNHA is hydrologically connected via the Figile and River Barrow.	Yes – viable pathway via hydrological connectivity identified between the pNHA and the proposed development.
Clohastia pNHA (000830)	No Site Synopsis available	Located approximately 120 km downstream of the proposed development site. The pNHA is hydrologically connected via the Figile and River Barrow.	Yes – viable pathway via hydrological connectivity identified between the pNHA and the proposed development.
Barrow River Estuary pNHA (000698)	No Site Synopsis available	Located approximately 120 km downstream of the proposed development site. The pNHA is hydrologically connected via the Figile and River Barrow.	Yes – viable pathway via hydrological connectivity identified between the pNHA and the proposed development.
Waterford harbour pNHA (000787)	No Site Synopsis available	Located approximately 160 km downstream of the proposed development site. The pNHA is hydrologically connected via the Figile and River Barrow.	Yes – viable pathway via hydrological connectivity identified between the pNHA and the proposed development.
Duncannon Sandhills pNHA (001738)	No Site Synopsis available	Located approximately 160 km downstream of the	Yes – viable pathway via hydrological connectivity

Name	Qualifying Interests / Special Conservation Interests / Feature of Interest	Approximate Distance from the proposed development (km)	Source-Pathway-Receptor Link (Yes or No)
		proposed development site. The pNHA is hydrologically connected via the Figile and River Barrow	identified between the pNHA and the proposed development.
Trim pNHA (001357)	No Site Synopsis available	Located approximately 43 km downstream of the proposed development site. The pNHA is hydrologically connected via the Blackwater (Longwood)_010 and the Boyne_150.	Yes – viable pathway via hydrological connectivity identified between the pNHA and the proposed development.
Boyne Woods pNHA (001592)	No Site Synopsis available	Located approximately 63 km downstream of the proposed development site. The pNHA is hydrologically connected via the Blackwater (Longwood)_010 and the Boyne_100.	Yes – viable pathway via hydrological connectivity identified between the pNHA and the proposed development.
Crewbane Marsh pNHA (00553)	No Site Synopsis available	Located approximately 72 km downstream of the proposed development site. The pNHA is hydrologically connected via the Blackwater (Longwood)_010 and the Boyne_170.	Yes – viable pathway via hydrological connectivity identified between the pNHA and the proposed development.
Rossnaree Riverbank pNHA (001589)	No Site Synopsis available	Located approximately 75 km downstream of the proposed development site. The pNHA is hydrologically connected via the	Yes – viable pathway via hydrological connectivity identified between the pNHA and the proposed development.

Name	Qualifying Interests / Special Conservation Interests / Feature of Interest	Approximate Distance from the proposed development (km)	Source-Pathway-Receptor Link (Yes or No)
		Blackwater (Longwood)_010 and the Boyne_170.	
Dowth Wetland pNHA (001861)	No Site Synopsis available	Located approximately 80 km downstream of the proposed development site. The pNHA is hydrologically connected via the Blackwater (Longwood)_010 and the Boyne_180.	Yes – viable pathway via hydrological connectivity identified between the pNHA and the proposed development.
Boyne River Island pNHA (001862)	No Site Synopsis available	Located approximately 83 km downstream of the proposed development site. The pNHA is hydrologically connected via the Blackwater (Longwood)_010 and the Boyne Estuary.	Yes – viable pathway via hydrological connectivity identified between the pNHA and the proposed development.
Boyne Coast and Estuary pNHA (001957)	No Site Synopsis available	Located approximately 90 km downstream of the proposed development site. The pNHA is hydrologically connected via the Blackwater (Longwood)_010 and the Boyne Estuary.	Yes – viable pathway via hydrological connectivity identified between the pNHA and the proposed development.

* indicates a priority habitat under the Habitats Directive

River Boyne And River Blackwater SAC
Mount Hevey Bog
Mount Hevey Bog SAC
Moleri
Royal Canal
Ballynabarny Fen
Rathmoylan Esker
Milltownpass Bog NHA
Rye Water Valley/Carton
Rye Water Valley/Carton SAC
Ballina Bog
The Long Derries, Edenderry SAC
The Long Derries, Edenderry
Carbury Bog NHA
Black Castle Bog NHA
Liffey Valley
Raheenmore Bog SAC
Raheenmore Bog
Donadea Wood
Hodgestown Bog NHA
Ballynafagh Lake SAC
Ballynafagh Lake
Ballynafagh Bog
Slade Of Saggart And Crooksling Glen
Daingean Bog NHA
Grand Canal
Mouds Bog SAC
Mouds Bog
Kilteel Wood
Liffey At Osberstown
Raheen Lough
Pollardstown Fen SAC
Pollardstown Fen
Red Bog, Kildare
Red Bog, Kildare SAC
Curragh (Kildare)
Liffey Bank Above Athgarvan
River Barrow And River Nore SAC
Poulaphouca Reservoir
Mountmellick SAC
Liffey Valley Meander Belt
Newtown Marshes
Wicklow Mountains SAC
Emo Court
Derries Wood
Ballinagee Wood
Clonreher Bog NHA
Dunlavin Marshes
Hollywood Glen
The Great Heath Of Portlaoise
Ridge of Portlaoise
Kilteale Hill
Derryvullagh Island
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Legend

- Application Boundary
- 15km Buffer from Proposed Development Site
- Special Areas of Conservation (SAC)
- Special Protection Areas (SPA)
- National Heritage Areas (NHA)
- proposed National Heritage Areas (pNHA)
- WFD - River Water Bodies

0 2.5 5 7.5 10
Kilometres

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Issue	Date	Description	By	Chkd.
D01	14/04/2023	Draft issue	S.P	R.A

Client: Bord na Móna

Project: Drehid Landfill Planning Application

Title: Designated Sites Map

Scale @ A3: 1:180,000

Prepared by: S.Pezzetta | Checked: R.Aherne | Date: April 2023

Project Director: D.Grehan

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Draft: D01

Figure 6-2

6.5.1.2 Data from Ecological Stakeholders/NGOs

The desktop assessment included a review of available data from ecological stakeholders and NGOs and the findings are summarised hereunder.

6.5.1.2.1 National Parks Wildlife Services

EU Habitats Directive Annex I habitat datasets published by NPWS every 6 year period, in compliance with Article 17 of the EU Habitats Directive, were downloaded from the NPWS website[7] and overlain on the proposed development site boundary using GIS software to examine the recorded presence of Annex I habitats within the boundary of the proposed development site. Datasets for the National Survey of Native Woodlands, Long Established Woodlands and the Irish Semi-natural Grassland Survey were also reviewed. Available GIS data was downloaded and reviewed in October 2022.

In addition, known records of protected and rare species records occurring within the 10 km Irish Grid square, N73, which encompasses the proposed development site, were supplied by the NPWS Scientific Unit. Flora Protection Order (FPO) species previously recorded within the 10 km grid square included historic records of bog orchid (*Hammarbya paludosa*) and meadow saxifrage (*Pyrola rotundifolia*). The Annex V lichen species, reindeer moss (*Cladonia portentosa*) was also previously recorded 4 km north of the proposed development site. Several records of common frog (*Rana temporaria*), pine marten (*Martes martes*) and Irish hare (*Lepus timidus hibernicus*) were also previously recorded within 2 km of the proposed development site.

6.5.1.2.2 National Biodiversity Data Centre

A search of the National Biodiversity Data Centre (NBDC) database[8] was undertaken for protected flora and fauna and species listed under the Third Schedule of the Birds and Natural Habitats Regulations (2011) within the 10 km Irish Grid square N73, which encompasses the proposed development site (refer to Table 6-8).

All bird species are protected in Ireland. Due to the large number of birds previously recorded within the N73 grid square, only bird species listed on Annex I of the EU Birds Directive (79/409/EEC) and bird species listed as being of high (Red listed) and medium (Amber listed) conservation concern in Ireland (as identified by Gilbert *et al.*, 2021) have been listed in Table 6-8, as these species are of higher conservation concern. However, consideration has been made to all recorded bird species within this assessment.

Table 6-8: Previous Records of Protected Fauna and Flora Species recorded within the 10km Grid Square N73

Species	Designation	Location in relation to the proposed development site
Birds[9]		
Barn Owl *(Tyto alba)*	Wildlife Acts, Birds of Conservation Concern – Red List	Previously recorded within the 10 km grid square which encompasses the proposed development site
Barn Swallow *(Hirundo rustica)*	Wildlife Acts, Birds of Conservation Concern – Amber List	
Black-headed Gull *(Larus ridibundus)*	Wildlife Acts, Birds of Conservation Concern – Amber List	

[7] Accessed [October 2022] via: https://www.npws.ie/maps-and-data/habitat-and-species-data/article-17
[8] Accessed [October 2022] via: https://maps.biodiversityireland.ie/Map
[9] Listed bird species include Annex I species, Red and Amber listed species only.

Species	Designation	Location in relation to the proposed development site
Common Coot *(Fulica atra)*	Wildlife Acts, Birds of Conservation Concern – Amber List	
Common Kestrel *(Falco tinnunculus)*	Wildlife Acts, Birds of Conservation Concern – Red List	
Common Kingfisher *(Alcedo atthis)*	Wildlife Acts, EU Bird Directive Annex I, Birds of Conservation Concern – Amber List	
Common Linnet *(Carduelis cannabina)*	Wildlife Acts, Birds of Conservation Concern – Amber List	
Common Redshank *(Tringatotanus)*	Wildlife Acts, Birds of Conservation Concern – Red List	
Common Snipe *(Gallinago gallinago)*	Wildlife Acts, Birds of Conservation Concern – Red List	
Common Starling (*Sturnus vulgaris*)	Wildlife Acts; Birds of Conservation Concern in Ireland – Amber list	
Common Swift (*Apus apus*)	Wildlife Acts; Birds of Conservation Concern in Ireland – Red list	
Corncrake *(Crex crex)*	Wildlife Acts, EU Bird Directive Annex I, Birds of Conservation Concern – Red List	
Eurasian Curlew *(Numenius arquata)*	Wildlife Acts, Birds of Conservation Concern – Red List	
Eurasian Teal *(Anas crecca)*	Wildlife Acts, Birds of Conservation Concern – Amber List	
Eurasian Woodcock *(Scolopax rusticola)*	Wildlife Acts, Birds of Conservation Concern – Red List	
European Golden Plover *(Pluvialis apricaria)*	Wildlife Acts, Birds of Conservation Concern – Red List	
Great Cormorant *(Phalacrocorax carbo)*	Wildlife Acts, Birds of Conservation Concern – Amber List	
Greylag Goose *(Anser anser)*	Wildlife Acts, Birds of Conservation Concern – Amber List	
Hen Harrier *(Circus cyaneus)*	Wildlife Acts, EU Bird Directive Annex I, Birds of Conservation Concern – Amber List	
Mallard *(Anas platyrhynchos)*	Wildlife Acts, Birds of Conservation Concern – Amber List	
Meadow Pipit *(Anthus pratensis)*	Wildlife Acts, Birds of Conservation Concern – Red List	
Merlin *(Falco columbarius)*	Wildlife Acts, EU Bird Directive Annex I, Birds of Conservation Concern – Amber List	
Mute Swan *(Cygnus olor)*	Wildlife Acts, Annex I, Birds of Conservation Concern – Amber List	
Northern Lapwing *(Vanellus vanellus)*	Wildlife Acts, Annex II, Birds of Conservation Concern – Red List	
Northern Shoveler *(Anas clypeata)*	Wildlife Acts, Annex II, III, Birds of Conservation Concern – Red List	
Northern Wheatear (*Oenanthe oenanthe*)	Wildlife Acts, Birds of Conservation Concern – Amber List	
Peregrine Falcon *(Falco peregrinus)*	Wildlife Acts, EU Bird Directive Annex I	
Red Grouse *(Lagopus lagopus)*	Wildlife Acts, Annex I, Birds of Conservation Concern – Amber List	

Species	Designation	Location in relation to the proposed development site
Red-footed Falcon *(Falco vespertinus)*	Wildlife Acts, Annex II, III, Birds of Conservation Concern – Red List	
Red-footed Falcon *(Falco vespertinus)*	Wildlife Acts, EU Bird Directive Annex I	
Spotted flycatcher *(Muscicapa striata)*	Wildlife Acts, Birds of Conservation Concern – Amber List	
Whinchat (Saxicola rubetra)	Wildlife Acts, Birds of Conservation Concern – Red List	
Whooper Swan *(Cygnus cygnus)*	Wildlife Acts, EU Bird Directive Annex I, Birds of Conservation Concern – Amber List	
Yellowhammer *(Emberiza citrinella)*	Wildlife Acts, Birds of Conservation Concern – Red List	
Amphibians and Invertebrates		
Freshwater White-clawed Crayfish *(Austropotamobius pallipes)*	Wildlife Acts, Annex II, V	Previously recorded within the Cushaling River ca. 12 km downstream of the proposed development site.
Marsh Fritillary *(Euphydryas aurinia)*	Wildlife Acts, Annex II	Previously recorded at a site located ca. 1.5 km north of the proposed development site.
Common Frog *(Rana temporaria)*	Wildlife Acts	Numerous recordings within the 10 km grid square which encompasses the proposed development site.
Smooth Newt *(Lissotriton vulgaris)*	Wildlife Acts	Previously recorded at a site located approximately 4 km west and at a site located 5 km east of the proposed development site.
Mammals		
Eurasian Badger *(Meles meles)*	Wildlife Acts	Numerous recordings within the 10 km grid square which encompasses the proposed development site.
Eurasian Pygmy Shrew *(Sorex minutus)*	Wildlife Acts	Previously recorded at a site located ca. 6 km south-east of the proposed development site.
Eurasian Red Squirrel *(Sciurus vulgaris)*	Wildlife Acts	Previously recorded at a site located ca. 800 m east of the proposed development site.
European Otter *(Lutra lutra)*	Wildlife Acts, Annex II, IV	Numerous recordings within proximity to the proposed development site, which includes evidence of otter recorded within the Cushaling River ca. 6.5 km downstream of the proposed development site.
Fallow Deer *(Dama dama)*	Wildlife Acts	Numerous recordings within proximity to the proposed development site with closest recording located ca. 200 m south of the proposed development site.

Species	Designation	Location in relation to the proposed development site
Irish Hare *(Lepus timidus* subsp. *Hibernicus)*	Wildlife Acts	Numerous recordings within the 10 km grid square which encompasses the proposed development site.
Irish Stoat *(Mustela erminea subsp. hibernica)*	Wildlife Acts	Previously recorded ca. 800 m east of the proposed development site.
Pine Marten *(Martes martes)*	Wildlife Acts	Live sighting of pine marten recorded immediately north of the proposed development site
Red Deer *(Cervus elaphus)*	Wildlife Acts	Closest record recorded ca. 6 km north-east of the proposed development site.
West European Hedgehog *(Erinaceus europaeus)*	Wildlife Acts	Closest record recorded ca. 3.5 km north-west of the proposed development site.
Pipistrelle *(Pipistrellus pipistrellus sensu lato)*	Wildlife Acts, EU Habitat Directive IV	Closest record recorded ca. 3.6 km north-west of the proposed development site.
Soprano Pipistrelle *(Pipistrellus pygmaeus)*	Wildlife Acts, EU Habitat Directive IV	Closest record recorded ca. 2.8 km north-west of the proposed development site.
Lesser Noctule *(Nyctalus leisleri)*	Wildlife Acts, EU Habitat Directive IV	Closest recording located ca. 4.8 km north-east of the proposed development site.
Brown Long-eared Bat (*Plecotus auritus*)	Wildlife Acts, EU Habitat Directive IV	Closest record recorded ca. 2.8 km north-west of the proposed development site.
Invasive Alien Plant/Fauna Species		
Japanese Knotweed *(Fallopia japonica)*	High Impact Invasive Regulation S.I. 477 (Ireland)	Previously recorded at a site located ca. 3 km south of the proposed development site.
Rhododendron ponticum	High Impact Invasive Regulation S.I. 477 (Ireland)	Previously recorded at a site located ca. 2.6 km south-east of the proposed development site.

6.5.1.2.3 Bat Landscape Tool

A review of the Bat Landscapes Tool[9] was utilised to determine the habitat suitability of the study area to support protected bat species. The bat 'habitat suitability' index is the research outcome of a study by Lundy *et al.* (2011) examining the relative importance of landscape and habitat associations across Ireland for bats. The 'habitat suitability' index ranges from 0 to 100 with 0 being least favourable and 100 being most favourable for various bat species. The results of the Bat Landscape Tool are also shown in Table 6-9 below. The habitat suitability score for all bat species for the proposed development location is 18.89.

A score of 18.89 lies within the second lowest rating (13.000001-21.333300) of the habitat suitability index for all bat species[9]. This rating suggests that there is limited suitable habitat and roosting sites for bats within the proposed development site. This however will be further investigated and confirmed during field surveys.

Table 6-9: Results of the Bat Landscape Tool

Species	Landscape Suitability
All Bat species	**18.89**
Soprano pipistrelle *(Pipistrellus pygmaeus)*	28
Brown long-eared bat *(Plecotus auratus)*	24
Common pipistrelle *(Pipistrellus pipistrellus)*	34
Lesser horseshoe bat *(Rhinolophus hipposideros)*	0
Lesser noctule *(Nyctalus leisleri)*	27
Whiskered bat *(Myotis mystacinus)*	18
Daubenton's bat *(Myotis daubentoniid)*	17
Nathusius's pipistrelle *(Pipistrellus nathusli)*	2
Natter's bat *(Myotis nattereri)*	20

6.5.1.2.4 Inland Fisheries Ireland

Inland Fisheries Ireland (IFI) has carried out electrofishing surveys within the Barrow catchment, including within the Figile sub-catchment, in 2015 and 2020. A summary of the results in both 2015 and 2020 is provided hereunder.

Figile River Fish Stock Survey 2015 (Delanty *et al.*, 2015)

Six sites were surveyed in the Figile catchment during July 2015 by IFI, with four sites (no. 66, no. 65, no. 63 and no. 64) located downstream of the proposed development site. Site no. 66 is located approximately 5.5 km downstream of the proposed development site. Fish species encountered included three-spined stickleback (*Gasterosteus aculeatus*), roach (*Rutilus rutilus*), perch (*Perca fluviatilis*), nine-spined stickleback (*Pungitius pungitius*), dace (*Leuciscus leuciscus*), stone loach (*Barbatula barbatula*), pike (*Esox lucius*), brown trout, roach x bream hybrid (*Rutilus rutilus X Abramis brama*), European eel (*Anguilla anguilla*), lamprey sp. and minnow (*Phoxinus phoxinus*).

Salmonid densities and distribution throughout the catchment were noted to be poor. Brown trout were only present at two of the survey sites while salmon were absent from all sites. The lower gradient nature and poor habitat in the river does not provide suitable spawning and nursery areas for salmonids. All sites surveyed were assigned a fish ecological status of 'Poor' or 'Bad'. Site no. 66 which is located approximately 5.5 km downstream of the proposed development site, was assigned 'Poor' status.

The findings of this IFI survey was used to inform TOBIN's aquatic surveys and the baseline assessment in this chapter.

Figile River Fish Stock Survey 2020 (IFI, 2020)

During the fish stock surveys, four sites were selected over the Figile sub-catchment in June-July 2020, with the closest site (No. 78– Ticknevin) located approximately 5.5 km downstream of the proposed development. Fish species encountered included three-spined stickleback, nine-spined stickleback, stone loach, pike and brown trout. All sites surveyed were assigned a fish ecological status: Site No. 78, located approximately 5.5 km downstream of the proposed development, was assigned a 'Moderate' fish ecological status in 2020; the other three sites located within the sub-catchment were assigned 'Poor' fish ecological status in 2020.

Similarly, the findings of this survey was used to inform TOBIN's aquatic surveys and the baseline assessment in this chapter.

IFI Consultation

Although the Cushaling River is not a designated Salmonid water, Inland Fisheries Ireland informed during EIA consultation that "*salmon spawning/recruitment occurs on the Figile River, with salmon spawning also recorded on the Cushaling (during winter 2021-2022), a relatively short distance downstream of the Drehid site*". IFI noted that the extent of "*salmon spawning on these systems is limited by hydromorphological/habitat damage to habitat undertaken to facilitate commercial peat harvesting*". IFI moreover stated that that the restoration of salmon spawning recruitment on the Figile/Cushaling and other rivers is important for improving salmon stocks in the Barrow River system as a whole.

6.5.1.3 Review of Previous Ecological Assessments

A review of past ecological surveys which were carried out in proximity to the proposed development was undertaken and are summarised hereunder.

Timahoe South Bog Rehabilitation Plan (BnM, 2022)

Bord na Móna have progressed the rehabilitation plan at Timahoe South Bog in order to achieve environmental stabilisation as part of Bord na Móna's Peatlands Climate Action Scheme (PCAS), and as required within the EPA IPC License (Ref. P0503-01) (BnM, 2022). The proposed rehabilitation area covers an area of 1,707ha which includes lands surrounding the proposed landfill extension site.

To inform the Rehabilitation Plan, ecological surveys have been undertaken within the site from 2009 – 2021. A summary of the main key findings of these surveys are summarised hereunder:

- During the habitat survey, only habitats of Local Importance were recorded. No Annex I habitats of the Habitat Directive were identified within the proposed development site.
- Several bird species were recorded during the surveys which were largely associated with the scrub and woodland habitat. No bird species listed Annex I of the Birds Directive were recorded during the surveys.
- Protected mammal species recorded included badger, pine marten, possible red squirrel and Irish hare.
- No non-native invasive plant species were recorded within the site during the surveys.

Drehid Waste Management Facility (TOBIN, 2017)

TOBIN undertook a suite of ecological surveys at the proposed development site in 2017 to inform a previous planning application within the site (TOBIN, 2017). A summary of the key findings is summarised below:

- During the habitat survey, only habitats of Local Importance were recorded. No Annex I habitats were identified within the proposed development site.
- During breeding bird surveys, no confirmed breeding bird species listed on Annex I of the Birds Directive or species of high (red listed) conservation concern were recorded within the proposed development site. A large corvid population of rook (*Corvus frugilegus*) and hooded crow (*Corvus cornix*) were recorded roosting in the Drehid area.
- Static and transect bat surveys were undertaken within the proposed development site, and a total of four bat species were recorded; common pipistrelle, soprano pipistrelle, Leisler and Daubenton's bat. The habitats identified during the site were considered to be of low habitat suitability for bats due to the lack of linear treelines features or true treelines. No potential roost features were recorded within the proposed development. The survey concluded that the proposed development site has both low habitat suitability and low roost potential for bats.

- Evidence of badger, tracks and foraging signs, were recorded within the proposed development site, however no setts were recorded.
- Numerous common frogs were recorded during within the proposed development site.
- No evidence or any other protected species was recorded during the surveys.

6.5.2 Output of Field Surveys

The findings of the ecological field surveys undertaken in January and May 2022 are detailed hereunder.

6.5.2.1 Habitats and Flora

All habitats were classified according to Fossitt (2000) during the ecological walkover of the proposed development site. The habitats within the proposed development footprint are described herein and illustrated in Figure 6-3. An assessment of the habitats was undertaken in accordance with the NRA (2009) guidelines.

6.5.2.1.1 Recolonised Cutover Bog (PB4)

The majority of the proposed development site comprises re-vegetated cutover bog. The proposed development site was previously used by Bord na Móna up to approximately thirty five years ago for production of sod peat for energy generation. Peat production then ceased onsite, with no peat extraction taking place nowadays. The areas of bare peat have then slowly recolonised with vegetation overtime.

The majority of the cutover bog habitat was dry with no sphagnum mosses (*Sphagnum Spp.*) present, however areas of pooling were recorded predominantly towards the southern boundary of the proposed development site. In the drier areas the habitat grades into scrub habitat. The habitat was dominated with ling heather (*Calluna vulgaris*), immature downy birch (*Betula pubescens*) and purple moor-grass (*Molina caerulea*). With frequent soft rush *(Juncus effusus),* sitka spruce (*Picea sitchensis*), dandelion *(Taraxacum vulgaria)* and bog cotton (*Eriophorum angustifolium)* and occasional tormentil (*Potentilla erecta),* gorse (*Ulex europaeus*), heath milkwort (*Polygala serpyllifolia*), wild strawberry (*Fragaria vesca*), dog violet (*Viola riviniana*) and sweet vernal grass (*Anthoxanthum odoratum).* Small pools and wetter areas were present in areas of the cutover bog habitat. In the wetter areas clumps of sphagnum mosses (*Sphagnum* Spp.) were present.

Several adult frogs were recorded within the waterlogged areas. Deer tracks, likely to be red deer (*Cervus elaphus*), were also frequently recorded throughout the habitat. Several passerine bird species and waders were heard calling throughout the habitat. Further details on the fauna species recorded within the proposed development site are outlined in Section 6.5.2.2. There was evidence of disturbance and vegetation clearance noted throughout the habitat.

Cutover bog habitats are generally considered to be lower conservation value habitats due to their disturbed and degraded nature (Smith & Crowley, 2020), however the cutover bog present within the proposed development site has re-vegetated with a wide variety of, albeit low value, plant species and supports a number of protected mammal and bird species. On this basis the habitat is assessed as being of Local Importance (higher value).

Photo 1: Recolonising Cutover Bog

6.5.2.1.2 Bog Woodland (WN7)

Large patches of bog woodland occur throughout the proposed development site. Particularly along the perimeter of the site. The habitat was dominated with downy birch and willow (*Salix spp.*) with tree heights ranging between 1-15 m. Occasional Scots pine (*Pinus sylvestris*) was also recorded within the woodland. Dead wood from fallen trees was also present within the woodland. The understory was dominated with ling, bracken and bramble with occasional soft rush, sweet vernal grass, dog violet, wild strawberry, heath milkwort and common nettle (*Urtica dioica)* also recorded. Similarly to the cutover bog habitat, areas of the bog woodland appeared to be disturbed due to past vegetation clearance and fire damage.

Red deer tracks were recorded throughout the bog woodland. A woodcock (*Scolopax rusticola)* was recorded roding over a patch of the woodland within the proposed development site. Further details on the fauna species recorded within the proposed development site are outlined in Section 6.5.2.2.

An assessment of the bog woodland was undertaken and followed the assessment criteria in Table 3 and Table 4 within the Irish Wildlife Manuals No. 69 (Cross & Lynn, 2013) and reference was made to the International Manual of European Habitats (European Commission, 2013).

Due to the disturbed nature of the woodland and the presence of negative indicator species such as bramble and bracken (> 10%) and sparse coverage of sphagnum mosses (<25%), the bog woodland within the proposed development site was considered not to correspond to the Annex I habitat bog woodland (91D0) . The habitat however has a good species diversity and supports protected species, such as badger, red deer and woodcock.

The habitat is assessed as being of being Local Importance (higher value).

Photo 2: Bog Woodland

6.5.2.1.3 Drainage Ditches (FW4)

Several heavily modified, large drainage ditches occur across and along the perimeter of the proposed development site. The drainage ditches are deep, with steep banks ranging between 1-5 m in height and approximately 3-6 m wide. The drainage ditches had either stagnant or slow flow of water, flowing in a south-westerly direction. The majority of drainage ditches drain towards the southern boundary of the proposed development into existing silt ponds, the silt ponds then drain into the Cushaling River. One drainage ditch located along the northern boundary of the proposed development site, flows in a north-easternly direction, flowing into the Mulgeeth Stream. Following the commencement of the construction works, drainage ditches along the eastern boundary which are currently hydrologically connected to the Cushaling, will be blocked and redirected towards the Mulgeeth Stream, further details on this is provided in Chapter 8 – Water.

The drainage ditches within the proposed development site were heavily loaded with peat sediment and the water was dark brown in colour (peat stained). Although the drains were assessed as having no fishery value but may likely support aquatic macroinvertebrates and amphibians, such as the common frog. Instream vegetation included common reed (*Phragmites australis*), bulrush (*Typha latifolia)*, soft rush, brooklime (*Veronica beccabunga),* water mint (*Menta aquatica*), watercress (*Nasturtium officinale),* duckweed (*Genus lemna*), starwort (*Callitriche spp.)* and water milfoil (*Myriophyllum spicatum).*

During the bat dusk survey, Daubenton's bat were recorded foraging along one of the drainage ditches located towards the western boundary of the proposed development site (further details on the bat surveys is provided in Section 6.3.6.7 of this Chapter).

Despite the sedimented nature of the drainage ditches, the habitats support a number of protected species such as frogs and Daubenton bats within the site. The habitat was therefore assessed as being of Local Importance (higher value).

Photo 3: Drainage Ditches

6.5.2.1.4 Buildings and Artificial Surfaces (BL3)

The existing and operational Drehid Waste Management Facility is situated immediately north-west of the proposed development site. The facility comprises administration and maintenance buildings, domestic wastewater treatment system, weighbridge, car parking, a non-hazardous waste facility and access roads. All existing buildings were assessed as having 'Negligible' bat roost potential during the roost inspection survey as per Collins (2016).

The existing buildings and artificial surface were assessed as being of Local Importance (lower value).

6.5.2.1.5 Dry Meadows and Grassy Verges (GS2)

A grassy verge was recorded along the western boundary of the proposed development site, particularly along the access roads. Plant species recorded within the habitat included Yorkshire fog (*Holcus lanatus*), perennial ryegrass (*Lolium perenne*), red clover (*Trifolium pratense*), cow parsley (Anthriscus sylvestris), common hogweed (*Heracleum sphondylium*) and trailing tormentil (*Potentilla anglica*).

Although, no protected butterfly or moth species were recorded during the surveys, its likely that this habitat may provide suitable habitat for species such as the small skipper (*Thymelicus sylvestris*) which has previously been recorded in Timahoe North Bog[10].

[10] Accessed (March 2023) via: https://butterflyconservation.ie/wp/report/butterfly-conservation-ireland-annual-report-2022/

The habitat was assessed as being of Local Importance (higher value) due to the potential of being valuable to lepidoptera species.

6.5.2.1.6 Scrub (WS1)

A small patch of scrub habitat was recorded within the proposed development site. The habitat was dominated with bramble, with abundant downy birch, nettles and bracken and occasional Scots pine perennial rye grass and dandelion.

The habitat was assessed as being of Local Importance (higher value).

6.5.2.1.7 Recolonising Bare Ground (ED3)

Areas of recolonising bare ground occurred in small area within the proposed development site. The areas had been cleared of vegetation and new vegetation has become recolonising the area.

Recolonising plant species recorded within the habitat include colts foot (*Tussilago farfara*), black medick (*Medicago lupulina*), ribwort plantain (*Plantago lanceolata)*, common nettle, red clover, gorse and Yorkshire fog.

The habitat was assessed as being of Local Importance (lower value).

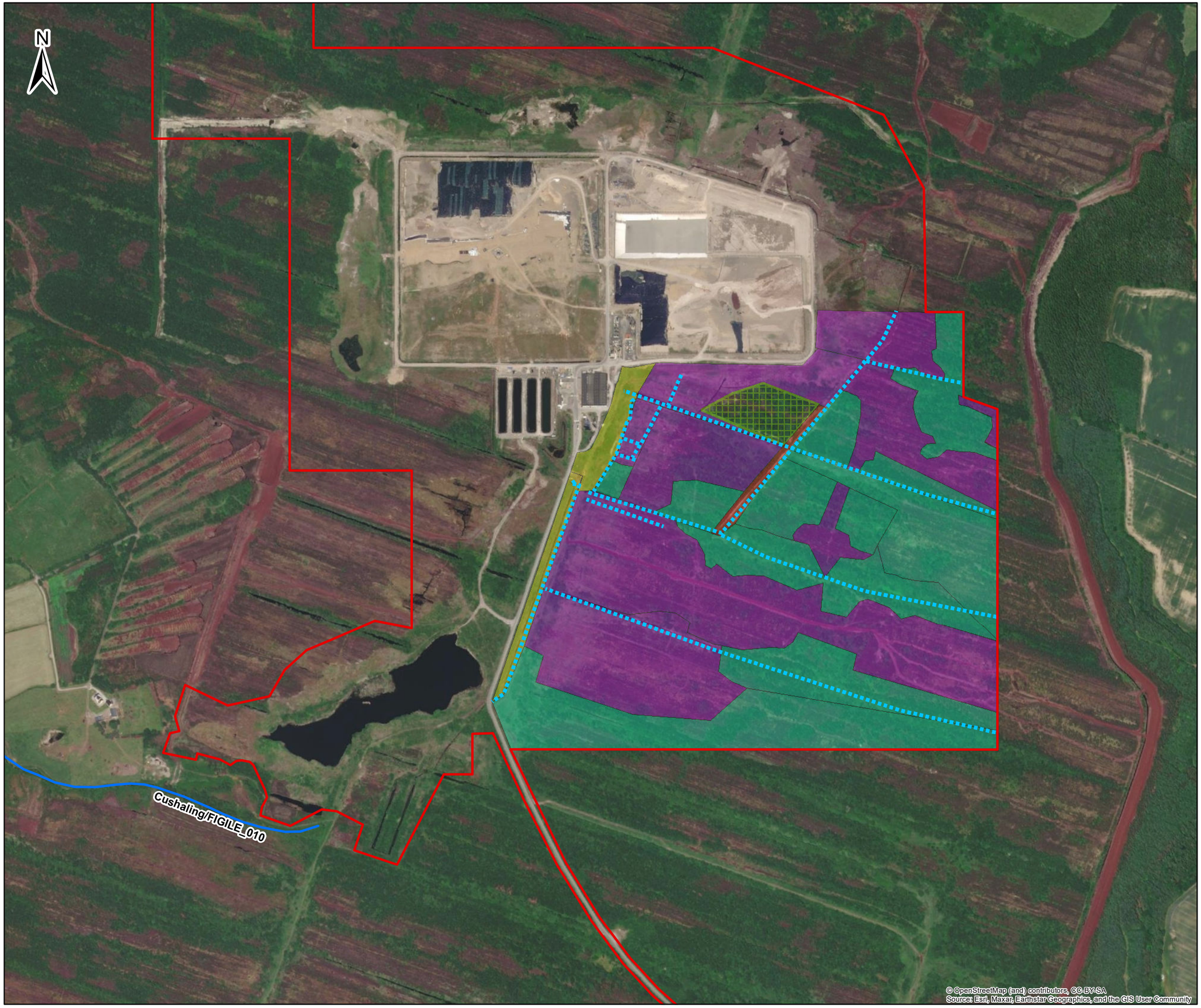
6.5.2.1.8 Depositing/lowland River (FW2)

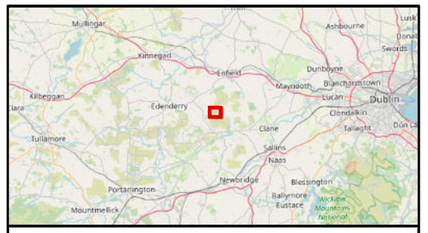
The proposed development drains into the Cushaling River located at the south-western corner of the proposed development site. A habitat assessment of the watercourses was undertaken within the watercourse at four locations as outlined in Table 6-4 above. The watercourse had a wetted width which ranged between 1-3.5 m with banks ranging between 0.2 m to 4 m in height. The river had a very slow velocity with an average depth which ranged between 20-40 cm. The substrate of the watercourse comprised mud and silt with some boulders (5%) and cobbles (15%) present further downstream. Very little instream vegetation was recorded within the watercourse. The characteristic of the river was channelled with evidence of historic modifications. The watercourse was assessed as having no suitable habitat to support protected aquatic species. Further details on the suitability of the watercourse to support protected aquatic species is described in Section 6.5.2.2.9.

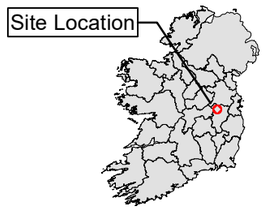
The habitat was assessed as Local Importance (higher value).

6.5.2.1.9 Protected and Invasive Plant Species

No plant species listed under the Flora Protection Order (FPO) or habitats protected under the EU Habitat Directive, were recorded within the survey area of the proposed development site. In addition, no invasive plant species listed in the Third Schedule of S.I No. 477 of 2011, European Communities (Bird and Natural Habitats) Regulations 2011 were identified within the proposed development site.







Legend

- Application Boundary

Habitats

- FW4 - Drainage ditches
- ED3 - Recolonising bare ground
- GS2 - Dry meadows and grassy verges
- PB4 - Cutover bog
- WN7 - Bog woodland
- WS1 - Scrub

0 100 200 300 400
Metres

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Issue	Date	Description	By	Chkd.
D01	12/01/2023	Draft issue	S.P	A.S

Client: Bord na Móna

Project: Drehid Landfill Planning Application

Title: Habitats Map

Scale @ A3: 1:8,000

Prepared by: S.Pezzetta | Checked: A.Sands | Date: January 2023

Project Director: D.Grehan

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Figure 6-2

Draft: D01

6.5.2.2 Fauna

Results of protected fauna species recorded during the field surveys is provided hereunder.

6.5.2.2.1 Badger

Badger and their setts are protected under the Wildlife Acts.

Evidence of badger, which included tracks (refer to Photo 4), snuffle holes and latrines were recorded in several locations throughout the proposed development site. However, no badger setts were recorded during the surveys. The cutover bog habitat is likely to be too waterlogged for badgers to establish setts within. It is likely that badgers may have their setts located in the nearby conifer plantations and forage within the cutover bog habitat within the proposed development site.

The local badger population is assessed as being of Local Importance (Higher Value).

Photo 4: Badger Tracks within the Proposed Development Site

6.5.2.2.2 Red Deer

Ireland has three species of deer which are well established in Ireland: red deer (*Cervus elaphus*), fallow deer (*Dama dama*) and sika (*Cervus nippon*).

Numerous deer tracks (slots) were recorded throughout the proposed development site. The tracks were roughly 9-11 cm in size and are therefore likely to be red deer tracks. A large population of red deer are likely to be foraging throughout the proposed development site.

The local red deer population were assessed as being of Local Importance (higher value).

6.5.2.2.3 Otter

Otters and their breeding and resting sites are protected under the Wildlife Acts and under the EU Habitat Directive.

All drainage ditches within the proposed development were surveyed for otter. No evidence of otter activity was recorded within the proposed development site. The drainage heavily loaded with peat sediment and have no fishery value. The drainage ditches are likely to be unfavourable for otter. An otter survey was also undertaken along the section of the Cushaling River, located within 150 m of the proposed development site. Similarly, no evidence of otter activity was recorded.

It is unlikely that otter use the proposed development site due to the existing disturbance from the existing landfill site and the unfavourable habitat present. Otter, however, have previously been recorded within the Cushaling River, approximately 6.5 km downstream of the proposed development site[9]. There is potential that otter may forage and commute along the Cushaling River which is hydrologically connected to the proposed development site. The River Barrow and River Nore SAC, which is located approximately 40 km downstream, is designated for otter.

The downstream population of otter was assessed as being of Local Importance (Higher Value) to International Importance.

6.5.2.2.4 Bats

All bat species and their roost sites are protected under the Wildlife Acts and Annex IV of the EU Habitat Directive. There is additional protection for lesser horseshoe bat (*Rhinolophus ferrumequinum*), which is listed as an Annex II species under the EU Habitat Directive.

A visual roost assessment survey and a bat activity survey (dusk) was undertaken within the proposed development site in May 2022. The surveys were undertaken in accordance with the Bat Conservation Trust Guidelines (Collins, 2016).

All trees within the proposed development site were assessed as having 'negligible' bat roost potential. The trees are of immature nature and lacked any cracks, crevices, knotholes or any suitable roost features. No potential bat roost sites were identified within the proposed development site. A bat roost assessment was also undertaken of the existing Bord na Móna buildings located immediately adjacent to the proposed development site. All buildings were assessed as having 'Negligible' bat roost potential.

A manual, dusk, bat activity survey was undertaken at the proposed development site on the 5th of May 2021. The transects focused on potential commuting and foraging routes which included drainage ditches and along the edges of the bog woodland. The results of the activity survey are listed Table 6-10.

Table 6-10: Bat Activity Survey Results

Time	Species	Location and Activity
21:15	Natters bat	Commuting along the edge of bog woodland towards the centre of the site
21:20	Leisler's Bat	Commuting overhead at the centre of the site
21:45	Soprano pipistrelle	Commuting and foraging edge of bog woodland towards the centre of the site
21:48	Soprano pipistrelle	Commuting along the edge of bog woodland
21:56	Common pipistrelle	Commuting along the edge of bog woodland

Time	Species	Location and Activity
21:59	Common pipistrelle	Commuting overhead towards the western boundary of the site
22:00	Soprano pipistrelle	Commuting overhead towards the western boundary of the site
22:01	Soprano pipistrelle	Commuting overhead towards the western boundary of the site
22:08	Common pipistrelle	Commuting overhead
22:09	Common pipistrelle	Commuting along the edge of bog woodland
22:12	Soprano pipistrelle	Commuting overhead
22:17	Soprano pipistrelle	Commuting overhead
22:20	Leisler	Commuting overhead
22:22	Daubenton	Commuting/foraging along drainage ditch
22:25	Common pipistrelle	Commuting overhead
22:30	Soprano pipistrelle	Commuting overhead
22:31	Soprano pipistrelle	Commuting overhead
22:35	Soprano pipistrelle	Commuting overhead
22:36	Soprano pipistrelle	Commuting overhead
22:38	Soprano pipistrelle	Commuting overhead
22:40	Soprano pipistrelle	Commuting overhead
22:43	Daubenton	Commuting/foraging along drainage ditch
22:45	Common pipistrelle	Commuting overhead
22:47	Leisler	Commuting overhead by entrance into the existing facility
22:48	Leisler	Commuting overhead by entrance
22:49	Leisler	Commuting overhead by entrance
22:50	Leisler	Commuting overhead by entrance

A total of five bat species were recorded during the dusk survey. Species most commonly recorded included soprano pipistrelle (*Pipistrellus pygmaeus*), closely followed by common pipistrelle (*Pipistrellus pipistrellus*). Both species are common and widespread in Ireland and were recorded commuting and feeding within the proposed development site. One natters bat (*Myotis nattereri*) was recorded, while Leisler's bat (*Nyctalus leisleri*) was recorded on six occasions. There were two records of Daubenton's bat (*Myotis daubentoniid*) along the large drainage ditch located towards the western boundary of the proposed development site. It is likely that Daubenton's bat forage along the drainage ditches present within the proposed development site. Bat abundance is considered relatively low at the proposed development site, with only one or two individual bats noted at each recording. There are no linear features, such as treelines or hedgerows, present within the proposed development site, which could provide important foraging/commuting routes for bat species.

The local bat population using the proposed development site and surrounding habitat is assessed as being of Local Importance (higher value).

6.5.2.2.5 Other Mammal Species

No evidence of any other protected mammal species was recorded during the field survey. There is potential, due to the suitable habitat present, that the proposed development site may support other small protected mammal species, such as Irish hare (*Lepus timidus hibernicus*), hedgehogs (*Erinaceus europaeus*), pygmy shrew (*Sorex minutus*) and Irish stoat (*Mustela erminea hibernica*).

The local small mammal population are assessed as being of Local Importance (Higher Value).

6.5.2.2.6 Birds

All wild birds and their nests and eggs are protected under the Wildlife Acts. A number of bird species are also protected under Annex I of the EU Birds Directive.

All bird species sighted or heard during the walkover surveys carried out in January (during the winter survey season) and May (during the breeding survey season) 2022 were recorded and are listed in Table 6-11.

Table 6-11: Bird Species Recorded During Walkover Surveys

Bird Species	Conservation Status (Gilbert et al., 2021)	Location Recorded and Activity
Lesser black-backed gull (*Larus fuscus*)	Amber	Large flock of lesser black-backed gulls flying over the existing landfill site.
Rook (*Corvus frugilegus*)	Green	Large flock recorded scavenging on the existing landfill site.
Hooded crow (*Corvus cornix*)	Green	Flock recorded scavenging on the existing landfill site.
Reed bunting (*Emberiza schoeniclus*)	Green	Sighted within the cutover bog habitat.
Barn swallow (*Hirundo rustica*)	Amber	Sighted flying through the site.
Snipe (*Gallinago gallinago*)	Red	Snipe were regularly flushed from grass during the surveys. Drumming snipe were also heard during the dusk survey.
Woodcock (*Scolopax rusticola*)	Red	A single woodcock recorded roding within the bog woodland habitat during the dusk activity bat survey.
Skylark *(Alauda arvensis)*	Amber	Heard calling within the cutover bog habitat.
Stonechat *(Saxicola torquate)*	Green	Sighted within the cutover bog habitat.
Cuckoo (*Cuculus canorus*)	Green	Heard calling within the proposed development site.
Wren (*Troglodytes troglodytes*)	Green	Heard calling within the proposed development site.
Grasshopper warbler (*Locustella naevia*)	Green	Heard calling within the proposed development site.
Linnet (*Carduelis cannabina*)	Amber	Heard calling within the proposed development site.
Pheasant *(Phasianus colchicus)*	Green	Heard calling within the proposed development site.
Kestrel (*Falco tinnunculus*)	Red	Sighted hunting (hovering) within the proposed development site.
Buzzard (*Buteo buteo*)	Green	Recorded on four occasions soaring over the proposed development site.
Mallard (*Anas platyrhynchos*)	Amber	Three mallards were recorded flying over the site

No bird species listed on Annex I of the EU Birds Directive were recorded within the proposed development site. The bird species recorded are common species typically found within the Irish countryside. Of note, however, are the recordings of three species of high conservation concern (Red Listed), which include snipe, woodcock and kestrel.

Numerous snipe were flushed from grass during both the winter and breeding walkover surveys. In addition, during the bat dusk activity survey, a number of snipe were heard drumming[11] within the proposed development site. It is, therefore, likely that snipe both breed and winter within the proposed development site.

A single woodcock was recorded roding[12] overhead, within the bog woodland habitat located towards the centre of the proposed development site. It is likely that woodcock breed within the proposed development site.

One single kestrel was recorded hunting within the proposed development site. While there was no evidence recorded of kestrel breeding behaviour within the site, it is likely that kestrel use the proposed development site as a hunting ground.

Five bird species of moderate conservation concern (Amber listed) were recorded and are likely to forage and nest within the proposed development site (Table 6-11).

The remaining recorded species are of low conservation concern (green listed) and are commonly recorded across the country. A large corvid population (mainly rook and hooded crow), along with lesser black-back gulls, were recorded foraging around the existing landfill site. The birds were observed scavenging on the waste or circling overhead.

The local breeding and wintering bird population likely to use the proposed development site is assessed as being Local Importance (higher value).

6.5.2.2.7 Herpetofauna and Reptile Species

The Wildlife Acts provides protection to Ireland's only reptile, common lizard (*Zootoca vivipara*) and two amphibian species, common frog (*Rana temporaria*) and smooth newt (*Lissotriton vulgaris*).

Several common frogs were recorded in the wetter areas of cutover bog during the surveys. The drainage ditches within the site are also likely to provide suitable habitat for frogs as they commonly breed within drainage ditches (Reid, *et al.,* 2013). The local common frog population was assessed as being of Local Importance (higher value).

Common lizard is a common species but difficult to observe, and occurs in a range of habitats, especially on moors and rocky habitats (NRA, 2008). Common lizard were not recorded during the surveys. There is no suitable habitat present for the protected reptile within the proposed development site.

Smooth newts are known to use a variety of water body types, such as garden ponds, natural pools, drainage ditches and quarry ponds (Meehan, 2013). A smooth newt survey was undertaken along the drainage ditches and small ponds present within the proposed development site. The drainage ditches were searched for smooth newts and their eggs during daylight and torch lit surveys. No smooth newts were recorded. The drainage ditches were

[11] Sound produced by snipe as part of their courtship display flights
[12] Breeding display flight

heavily loaded with sediment, with little instream vegetation present during the survey, which are sub-optimal conditions for smooth newts.

6.5.2.2.8 Insects and Lepidoptera Species

A number of butterflies were recorded during the survey which included three orange-tip (*Anthocharis cardamines*), numerous small white (*Pieris rapae*) and one small tortoiseshell (*Aglais urticae*). All three species are listed as Least Concern under the Ireland Red List of Butterflies (Regan *et al.*, 2010).

One Fox moth caterpillar (*Macrothylacia rubi*) was recorded within the proposed development site, near the western boundary of the proposed development. The caterpillar is the larvae of fox moth, which is listed as Least Concern under the Ireland Red List of Moths (Allen *et al.*, 2016).

The marsh fritillary butterfly is the only Irish insect listed on Annex II of the Habitat Directive. The protected butterfly occurs in colonies in different habitats including sand dunes, calcareous grassland, heath and bog habitat (Phelan et al., 2021). Marsh fritillary will generally lay eggs within and feed on the plant species devil's bit scabious (*Succisa pratensis*) (Phelan *et al.*, 2021). Although survey efforts focused on the identification of suitable habitat to support the protected species, no devils bit scabious was recorded within the site. In addition, no marsh fritillary in any form of its life cycle (i.e. nest, larvae, caterpillar or butterfly) was recorded. The disturbed nature of the proposed development site and lack of devil's bit scabious reflects the site unsuitability to support marsh fritillary.

Species of conservation interest such as the small skipper, forester moth (*Adscita statices*) and narrow-bordered five-spot burnet (*Zygaena lonicerae*) have all been recorded north of the proposed development site during surveys carried out outside of this assessment[13]. All three species are listed as Least Concern under the Ireland Red List of Butterflies (Regan *et al.*, 2010). The small skipper has previously been recorded in Timahoe North Bog, with the closest recording located approximately 1 km north of the proposed development site[11]. The small skipper is generally native to the UK, with Timahoe North being the only place in Ireland the butterfly has known to colonise. Although the small skipper was not recorded during the surveys, there is suitable habitat, such as grassy verges and areas of dry meadow grassland, which occurs within the proposed development site.

The local population of lepidoptera species was assessed as being of Local Importance (higher value), due to the presence of suitable habitat to support the species within the proposed development site.

6.5.2.2.9 Aquatic Species

A baseline aquatic ecological assessment was carried out within the Cushaling River, which included an assessment of the riverine habitat available to support fish and aquatic species, and assessment of the macroinvertebrate community. Kick sampling for macroinvertebrate was not undertaken within the drainage ditches due to the heavy fine sediment content of the drains' substrate.

[13] MKO (2018) Timahoe North Solar Farm, Environmental Impact Assessment Report – Appendix 6-11 Lepidoptera Management Plan (BnM)

6.5.2.2.9.1 Survey Results

All macroinvertebrate taxa recorded during the kick sampling surveys at the four sites are listed in Table 6-12 and the assemblage is discussed separately for each site. Table 6-12 also provides the classification of the macroinvertebrate species recorded at each site in terms of their pollution sensitivity.

Table 6-12: Macroinvertebrates Recorded during Kick Sampling at the four sites

Group/organism	Pollution sensitivity group	Functional Group	Relative Abundance			
			Site 1	Site 2	Site 3	Site 4
CASED CADDIS FLIES (Tricoptera)						
Limnephilidae	B	Filtering collector	2			1
Goeridae	B	Filtering collector		1		
BEETLES (Coleoptera)						
Dytiscidae	C	Predator	2	1		3
Great diving beetle larvae (*Dytiscus marginalis*)						
CRUSTACEANS (Crustacea)						
Amphipods (Gammaridae)						
Freshwater shrimp (*Gammarus duebeni*)	C	Shredder	50+	100+	7	50+
Isopoda (Asellidae)						
Freshwater hog louse (*Asellus aquaticus*)	D	Shredder	30+	100+	12	50+
Annelida						
Hirundinea	C	Predator				1
No. of different families			**4**	**4**	**2**	**5**
No. of organisms			**84+**	**202+**	**19**	**105+**

6.5.2.2.9.2 Site 1

Site 1, which was located on the Cushaling River, approximately 425 m downstream of the proposed development site (ITM coordinates: 673504, 730820) was the nearest accessible area to safely survey downstream of the proposed development site. The section of the river had a wetted width of 1 m and the banks were approximately 4 m in height. The river here had a very slow velocity and had an average water depth of 0.2 m, with a normal water level and a flat gradient. The characteristic of the river was channelled with evidence of historic modifications. No riffles or pools were recorded. The substrate of the watercourse comprised of mud and silt. No boulder, cobbles or gravel were present. No filamentous algae present and little to no instream vegetation recorded.

There was no evidence of fish present within the watercourse at Site 1. Two scoop tests were undertaken and were negative for the presence of lamprey. This sample site was regarded as having no suitable spawning or nursery habitat for salmonids or lamprey species. The site also had no suitable habitat to support white clawed crayfish.

Kick sampling results concluded that the site has a very poor diversity of macroinvertebrate present, with only four families recorded. Macroinvertebrate recorded included a large dominance of freshwater shrimp and freshwater hog louse, with scarce occurrence of cased caddisfly and great diving beetle larvae. Considering the macroinvertebrate assemblage at this site and using the EPA Freshwater Biology criteria from Toner et al. (2005), this sampling site is deemed to be Class C, Moderately polluted (Q3). This score was based on the lack of diversity of organisms recorded at the site – over 50% of the sample contained Asellus and over 30% containing Gammarus. Based on the diversity and abundance, the SSRS score for this sampling site is 0.8, putting it in the SSRS category of "At Risk".

6.5.2.2.9.3 Site 2

Site 2 of the Cushaling River is located approximately 1.4 km downstream of the proposed development site (ITM coordinates: 672902, 731334). The section of the watercourse was approximately 4 m wide with a wetted width of 1.5 m. Bank height was ranged from approximately 1 m on the left hand bank and 0.2 m on the right hand side. The average depth of the river was approximately 0.18 m. The substrate consisted of 5% boulder, 15% cobble, 40% gravel and 40% sand. There was no mud/silt present. The section of the river comprised of a slow moving glide, with no riffle or pools present. Instream macrophyte vegetation consisted of Brooklime and pond water-crowfoot (*Ranunculus peltatus*) and had a percentage cover of 20%. There was no filamentous algae present.

There was no evidence of fish present within the watercourse at Site 2. Two scoop tests were negative for the presence of lamprey. Despite the presence of some gravel and instream vegetation within the watercourse at Site 2, it was concluded that considering the highly modified and channelized nature of the watercourse, there is no potential for the site to support protected aquatic species such as lamprey, Atlantic salmon or white clawed crayfish.

Site 2 is the same sampling site used by EPA which was recently received a Q2-3 status of poor and at risk in 2019[14]. Macroinvertebrate species recorded during the kick sampling included four species, freshwater shrimp, cased caddisfly larvae (*Goera pilots*), freshwater hog louse and great diving beetle larvae.

Considering the macroinvertebrate assemblage at this site and using EPA freshwater biological monitoring criteria from Toner et al. (2005), this stretch of river is deemed to be 'Class C, Moderately polluted (Q3)'. Over 95% of this sample consisted of Gammarus and Asellus. This score was brought about by the diversity of organisms recorded at this site. Based on the species present and total numbers, this section of river was given a Q3 value and an SSRS score of 0.8 putting it in the SSRS category of "At Risk".

6.5.2.2.9.4 Site 3

Site 3 of the Cushaling River is located approximately 2.5 km downstream of the proposed development site (ITM coordinates: 671810, 731318). The section of the watercourse was approximately 3.5 m wide and had a wetted width of 3 m. The banks height ranged from 4-5 m in height. The average depth of the watercourse was 0.4 m and the river had a very slow velocity. The substrate comprised of silt/mud and leaf litter. No boulders, cobbles or gravel was present. In addition, no riffles or pools were recorded with the watercourse. Heavy shading from vegetation was noted along the section of the watercourse.

[14] Accessed [May 2022] via https://www.catchments.ie/data/#/waterbody/IE_SE_14F010061?_k=w7w8nk

There was no visual evidence of fish present within this section of river. Two scoop tests were negative for the presence of lamprey. The site was considered unsuitable for lamprey and salmonids due to the absence of holding pools, spawning gravels, instream vegetation, the low numbers of macroinvertebrates and the presence of heavy shading. Similarly, no suitable habitat to support white clawed crayfish was identified.

Kick sample results contained two macroinvertebrate species in low numbers (n=19). These species were Gammarus and Asellus. Using the EPA freshwater biological monitoring criteria from Toner et al. (2005), this stretch of river is deemed to be 'Class C, Moderately polluted (Q3)'. The SSRS score was 0 putting it in the SSRS category of "At Risk".

6.5.2.2.9.5 Site 4

Site 4 of the Cushaling River is located approximately 2.8 km downstream of the proposed development site (ITM coordinates: 671496, 731247), and is located immediate down stream of Dillions Bridge and also immediately down stream of another EPA sampling site for this river which was recently received a Q3 status of poor and at risk in 2019[15].

The bank width was approximately 4.5 m with a wetted width of 3.5 m. The bank height ranged between approximately 1-1.2 m in height. The average dept of this section of river was 0.35 m. There was no presence of riffles or holding pools. The flow was very slow in velocity and was of normal water level. This section of river was heavily shaded due to the adjacent tree lines present. There was no instream vegetation or filamentous algae present. The substrate predominantly comprised of mud/silt (60%) with some boulders (5%) rocks (20%) and sand (10%) also present.

There was no visual evidence of fish present within this section of river. A lamprey scoop test was carried out and was negative for the presence of juvenile lamprey. There is no suitable habitat to support salmonid, lamprey and white clawed crayfish within the section of the watercourse due to the absence of holding pools, spawning gravels, instream vegetation, the low numbers of macroinvertebrates and the presence of heavy shading.

Kick sample results contained five macroinvertebrate species, freshwater hog louse, great diving beetle larvae, freshwater leech (*Erpobdella testacea*), cased caddis and freshwater shrimp. Considering the macroinvertebrate assemblage at this site and using EPA freshwater biological monitoring criteria from Toner et al. (2005), this stretch of river is deemed to be 'Class C, Moderately polluted (Q3)'. Over 95% of this sample consisted of Gammarus and Asellus. This score was brought about by the diversity of organisms recorded at this site. Based on the species present and total numbers, this section of river was given a Q3 value and an SSRS score of 0 putting it in the SSRS category of "At Risk".

6.5.2.2.9.6 Overview of the Four Sites

The macroinvertebrate communities of the Cushaling River are in poor condition, with all sampling sites categorized as of "Poor" ecological status. The SSRS scores at all four of these sites were found to be at risk of not meeting "Good" ecological status.

Sites 1, 2 and 4 all contained high abundance of Gammarus and Asellus and overall low diversity and richness (Site 3 contained the lowest diversity, with only two species recorded). There was no evidence of the presence of Ephemeroptera or Plecoptera through any of the four samples

[15] Access [May 2022) via: https://www.catchments.ie/data/#/waterbody/IE_SE_14F010061?_k=w7w8nk

sites. Plecoptera are herbivores and are generally found in cold, well oxygenated, fast-moving streams (Feeley *et al.*, 2020).

Table 6-13: Classification of Macroinvertebrate Species Recorded at each Site in Terms of their Pollution Sensitivity (EPA methods)

Pollution indicator group	Site 1		Site 2		Site 3		Site 4	
	Number	% of total	Number	% of total	Number	% of total	Number	% of total
Group A (Most sensitive)	0	0	0	0	0	0	0	0
Group B (Less Sensitive)	0	0	0	0	0	0	0	0
Group C (Tolerant)	84+	100	202+	100	19	100	105+	100
Group D (Very Tolerant)	0	0	0	0	0	0	0	0
Total	84	100%	202	100%	19	100%	105	100%

No protected aquatic species were recorded at the four surveys sites. Fisheries suitability and value was taken into account during the aquatic surveys. Suitable spawning and nursery habitat for Salmonids and lamprey was accessed.

There was no visual evidence of fish present within any of the four sites surveyed. These sites had little value as Salmonids habitat due to the lack of holding pools, boulders, spawning gravels, the presence of heavy siltation and low energy nature of the modified watercourse present. Access for Salmonids from downstream was difficult given the modified nature of the river, presence of culverts, poor gradient and heavy siltation preventing migration upstream.

The four sites held poor quality spawning and nursery for salmonids given no presences of riffle and glide sequences and or a mixed substrata bed. There was no evidence of good spawning habitat that would be found in deeper glides and in pools where mixed gravels and small cobbles would be present. There was no evidence of holding pools or suitable boulders for larger fish.

Smaller gravel fractions are vital in structuring salmonid populations (Meredith et al., 2017; Hudy et al., 2010), being necessary for successful spawning and egg development, and there is generally a strong correlation between the availability of spawning substrata and the size of populations (Montgomery et al., 1999). Additionally, peat-based catchments such as that in the vicinity of the Bord Na Móna site are less productive than those flowing over other geologies (O'Grady, 2006), with reduced primary productivity, reduced macro-invertebrate communities, and, generally speaking, lower fish biomass (Richardson, 1993).

Stream gradient is known to be one of the principal determinants of juvenile salmonid production, with medium gradients most optimal in terms of successful recruitment and population persistence (Wood & Budy, 2009; O'Grady, 2006; Amiro, 1993; Kennedy & Strange,

1982). Due to the modification of this stream, the gradient is very low and not optimal for Salmonids.

Based on the very low macroinvertebrates present within these streams, there is a low abundance of fish food present within these streams to sustain salmonid populations.

The survey sites were not considered suitable for lamprey species. Suitable spawning habitat by way of finer, unbedded gravels were absent from all sites. Finer sediment accumulations suitable for larval (ammocoete) settlement were absent given the low-energy nature of the sites. Three of the four sites contained high levels of mud and wooden debris mud and lacked the deposition of fine, organic rich sediment required by larval lamprey (Goodwin et al., 2008; Aronsuu & Virkkala, 2014).

Habitat within the surveyed section of the Cushaling River was considered to be unsuitable to support any White-clawed Crayfish which require moderate to good water quality (Demers *et al.*, 2003). It also did not have potential of White-clawed crayfish due to unsuitable geology, the low energy of the channel and unsuitable habitat, especially lacking gravels for White-clawed crayfish hatchlings. There was also a lack of instream vegetation and suitable burrowing habitat required for White-clawed crayfish. As such there is no suitable availability of refuges for this species.

The section of the river located immediately downstream of the proposed development site was assessed as being unsuitable to support protected aquatic species.

6.6 SUMMARY OF ECOLOGICAL EVALUATION

Following a review of the existing environment presented above, Key Ecological Receptors (KERs) within the ZoI of the proposed development site were evaluated in accordance with the evaluation criteria set out in Table 6-5 and Table 6-6 above. Consideration of the existing baseline condition / population stability, conservation status, rarity and legal protection of the KERs was undertaken. A summary of the ecological valuation and identification of KERs is provided in Table 6-14.

In line with the NRA guidance (NRA, 2009), identified ecological features which are assessed as being below Local Importance (higher value) are not selected as KER's.

Table 6-14: Evaluation of Key Ecological Receptors

Site/Feature	NRA Ecological Value	KER	Rational for Inclusion as KER
Designated Sites			
River Barrow and River Nore SAC	International	Yes	A source-pathway-receptor link exists via hydrological connectivity between the proposed development site and the SAC.
River Boyne and River Blackwater SAC	International	Yes	A source-pathway-receptor link exists via hydrological connectivity between the proposed development site and the SAC.
River Boyne and River Blackwater SPA	International	Yes	A source-pathway-receptor link exists via hydrological connectivity between the proposed development site and the SPA.

Site/Feature	NRA Ecological Value	KER	Rational for Inclusion as KER
Boyne Estuary SPA	International	Yes	A source-pathway-receptor link exists via hydrological connectivity between the proposed development site and the SPA.
Boyne Coast and Estuary SAC	International	Yes	A source-pathway-receptor link exists via hydrological connectivity between the proposed development site and the SAC.
All other European Sites	International	No	No source-pathway-receptor link exists (see NIS for more detailed discussion in relation to European sites – SACs and SPAs)
Barrow Valley at Tankardstown Bridge pNHA, Clohastia pNHA, Barrow River Estuary pNHA, Waterford Harbour pNHA, Duncannon Sandhill pNHA, Trim pNHA, Boyne Woods pNHA, Crewbane Marsh pNHA, Rossnaree Riverbank pNHA, Dowth Wetland pNHA, Boyne River Island pNHA and Boyne Coast and Estuary pNHA.	National	Yes	A source-pathway-receptor link via hydrological connectivity exists between the proposed development site and the pNHA sites.
All other National Sites and designated areas.	National	No	No source-pathway-receptor link exists
Habitats and Flora			
Cutover bog	Local Importance (higher value)	Yes	Approximately 33.22 ha of the habitat will be permanently lost to facilitate the proposed development. The habitat was assessed as being of high Local Importance
Bog woodland	Local Importance (higher value)	Yes	Approximately 25.32 ha of the habitat will be permanently lost to facilitate the proposed development. The habitat was assessed as being of higher Local Importance
Drainage ditches	Local Importance (higher value)	Yes	Approximately 3585.47 m of the habitat will be permanently lost to facilitate the proposed development. The habitat was assessed as being of higher Local Importance
Buildings and artificial surfaces	Local Importance (lower value)	No	There will be loss of this habitat. There is no potential for impact to the artificial habitat which is of low ecological value.
Dry meadow and grassy verges	Local Importance (higher value)	Yes	Approximately 2.09 ha of this habitat will be lost to facilitate the proposed

Site/Feature	NRA Ecological Value	KER	Rational for Inclusion as KER
			development. The habitat was assessed as being of higher Local Importance.
Recolonising bare ground	Local Importance (lower value)	No	Approximately 0.79 ha of this habitat will be lost to facilitate the proposed development. The habitat was assessed as being of low ecological value and will not be considered further.
Scrub	Local Importance (higher value)	Yes	Approximately 1.96 ha of this habitat will be lost to facilitate the proposed development. The habitat was assessed as being of higher Local Importance.
Depositing/lowland River	Local Importance (higher value)	Yes	Potential for water quality impacts within the habitat during the construction phase of the proposed development. The habitat was assessed as being of higher Local Importance
Fauna			
Badger	Local Importance (higher value)	Yes	Potential for the construction works to result in the disturbance of foraging badger.
Red deer	Local Importance (higher value)	Yes	Potential for the construction works to result in the disturbance of red deer
Bat	Local Importance (higher value)	Yes	Potential for the construction works to result in the disturbance of bat species
Otter	Local Importance (higher value) to International Importance	Yes	Potential for indirect effects to otter located downstream of the proposed development
Other Mammal Species	Local Importance (higher value)	Yes	Potential for the construction works to result in the disturbance of other mammal species
Breeding and wintering bird species (non SCI[16] species)	Local Importance (higher value)	Yes	Potential for the construction works to result in the disturbance of breeding and wintering bird species
Frog	Local Importance (higher value)	Yes	Potential for the construction works to result in the disturbance of frogs within the area
Other herpetofauna and reptile species	Local Importance (higher value)	No	No suitable habitat to support other protected herpetofauna and reptile species identified within the ZoI of the proposed development.
Aquatic Species	Local Importance (higher value) to International Importance	Yes	Potential for indirect effects to aquatic species located downstream of the proposed development
Lepidoptera Species		Yes	Potential for indirect effects due to the loss of suitable habitat

[16] Special Conservation Interests

Site/Feature	NRA Ecological Value	KER	Rational for Inclusion as KER
	Local Importance (higher value)		

6.7 IMPACT ASSESSMENT

The following sections present the assessment of impacts (likely significant effects) on biodiversity within the ZoI of the proposed development. Likely significant effects are presented in relation to the construction, operational and decommissioning phases of the proposed development. The likely significant effects described in this section are the ecological impacts predicted due to the proposed development prior to the consideration of any appropriate mitigation measures (Section 6.8 for further details on mitigation measures). As per NRA guidance (NRA, 2009), likely significant effects have only been assessed for KERs as listed in Table 6-14. Residual effects describe potential effects that remain after all impacts and mitigation measures are considered.

6.7.1 Do Nothing Effects

If the proposed development does not take place (do nothing scenario) the existing baseline conditions detailed within Section 6.5.2 will remain. The proposed development site will continue to contain habitats that are typical of revegetating cutover bog. However, as the site is relatively dry and unmanaged, scrub encroachment will increase into the adjacent habitats. Fauna species will continue to use the site and the adjacent suitable habitats.

The principal contribution of ammonia to the Cushaling River is presently from the bog itself. The existing integrated constructed wetlands (ICW) controls the ammonia levels and all concentrations at monitoring station SW6 are below the AA-EQS. However, the proposed development and new ICW attenuation lagoons will result in reduce total ammonia concentrations discharging within the Cushaling River.

6.7.2 Assessment of Impacts on Designated Sites

6.7.2.1 European Sites

TOBIN prepared a Screening for Appropriate Assessment (AA) report which investigated the potential for the proposed development (construction, operational and decommissioning phases) to give rise to likely significant effects on European site(s), either alone or in-combination with other plans or projects. The screening assessment concluded, in light of best available scientific data, that there is potential for likely significant effects on the Qualifying Interests of the River Barrow and River Nore SAC (002162), the River Boyne and River Blackwater SAC (002299), the River Boyne and River Blackwater SPA (004232), the Boyne Estuary SPA (004080) and the Boyne Coast and Estuary SAC (001957) in view of their conservation objectives. A Natura Impact Statement (NIS) was therefore prepared to assess the potential for the proposed development to result in adverse effects on the integrity of these sites. The NIS identified the potential for adverse effects on the integrity of River Barrow SAC due to a potential degradation of water quality within the site during the construction, operation and decommissioning phases, in the absence of mitigation.

Potential effects on the European site due to a degradation of water quality was evaluated as **short-term, moderate, negative effects during the construction and decommissioning phases and long-term slight, negative effects during the operational phase,** on the European sites, at an **international scale**.

6.7.2.2 National Sites

Eleven pNHAs (Barrow Valley at Tankardstown Bridge pNHA, Clohastia pNHA, Barrow River Estuary pNHA, Waterford Harbour pNHA, Duncannon Sandhill pNHA, Trim pNHA, Boyne Woods pNHA, Crewbane Marsh pNHA, Rossnaree Riverbank pNHA, Dowth Wetland pNHA, Boyne River Island pNHA and Boyne Coast and Estuary pNHA) are hydrologically connected to the proposed development site via the Cushaling River and the River Barrow (located an excess of 70 km downstream). The above mentioned pNHAs predominantly occur within the same site boundaries as the River Barrow and Rive Nore SAC and thus potential effects from the proposed development site are also considered likely. For this reason, the mitigation measures suggested for the protection of the River Barrow and Rive Nore SAC, will also result in the protection of the pNHAs.

No viable source-pathway-receptor link was identified between the proposed development site and any other site of Natura Conservation. There is no potential for impacts.

6.7.3 Construction Phase Impacts

Impacts associated with the Construction Phase on the receiving environment are discussed hereunder.

6.7.3.1 Habitats and Flora

6.7.3.1.1 Habitat Loss

The proposed development site boundary is approximately 262 ha in size, however the total area of the proposed facility (i.e. landfill, buildings, settlement ponds, ICW etc.) which will result in permanent loss of habitat equates to approximately 63.5 ha. Habitats within the 63.5 ha of land proposed to be removed include approximately 33.23 ha of cutover bog, approximately 25.32 ha of bog woodland, approximately 1.96 ha of scrub habitat and approximately 2.09 ha of dry meadows and grassy verges. In addition, approximately 3,855 m (3.8 km) of the existing drainage ditches will be temporarily blocked and redirected around the eastern and southern boundary of the proposed development site, resulting a temporary loss of the habitat.

The majority of the aforementioned habitats which will be permanently lost and replaced with artificial surfaces, have been appraised as being of Local Importance (higher value). There were no habitats within the proposed development site of greater biodiversity value than Local Importance (higher value). In addition, no protected or rare plant species were recorded, and cutover bog, bog woodland and scrub habitat are common and widespread within Timahoe Bog.

The area of habitat which will be permanently lost (63.5 ha) equates to approximately 2.49% of the total landholding of Timahoe South Bog (2,544 ha).

Overall, permanent loss of habitats/vegetation within the proposed development site associated with the proposed construction phase, is evaluated as **permanent, slight, negative effect** on biodiversity, at a **local geographical scale**, considering the limited extent of habitat lost (2.48%) in the context of abundance of these habitats in the wider landscape.

6.7.3.1.2 Habitat Degradation as a Result of Surface Water Quality Impacts

It will be necessary to progressively clear the peat material from the proposed development site to facilitate formations for construction. Large volumes of peat and subsoil will be removed to allow construction of the hardstand areas, the landfill footprints, the attenuation lagoons and

access roads. The excavated peat will be utilised on site and used to screen the proposed facility, in the form of an earth berm.

Site clearance, excavation activities and the stockpiling of material have the potential to result in the runoff of sediment and ammonia, if not appropriately managed, which could result in an increase of suspended solids and nutrients depositing within nearby watercourses. There are several large drainage ditches occurring throughout the proposed development site, which are all hydrologically connected to the Cushaling River, which ultimately discharges into the River Barrow, located approximately 40 km downstream. Increased silt loading in watercourses can stunt aquatic plant growth, limit dissolved oxygen capacity and overall reduce the ecological quality of watercourses. There is also the potential for spills and leaks of oils, fuels and chemicals from storage areas or plant and equipment to impact on aquatic habitats.

The degradation of water quality could result in negative effects on aquatic habitats and vegetation within the Cushaling and Figile water bodies and further downstream within the River Barrow, which forms part of the River Barrow and River Nore SAC as well as within the Mulgeeth Stream and downstream within the River Boyne and River Blackwater SAC and SPA. Further details on surface water impacts are outlined in Chapter 8 – Water.

The construction works have the potential to result in a degradation of water quality which would result in **short-term, negative effects** on aquatic habitats and vegetation at **local to international scale**.

6.7.3.1.3 Habitat Degradation as a Result of Air Quality Impacts

Excavation activities, particularly within bare peat, can result in the temporary generation of dust from the construction phase of the proposed development. Dust is characterised as encompassing particulate matter with a particle size of between 1 and 75 microns (1- 75 µm).

The Institute of Air Quality Management provide guidelines; *'Guidance on the Assessment of Dust from Demolition and Construction'* (Holman *et al.*, 2014), which prescribes potential dust emission risk classes to ecological receptors. Following the guidance characterisation, considering the size of the proposed development, the scale of the earthworks were considered 'Large' (total site area >10,000 m^2). Dust may also be generated from trackout due to Heavy Duty Vehicle (HDV) movements from the site entrance. It is anticipated that HDV movement will range between 25-30 outward movements a day which equates to 'Medium' trackout movement (Holman *et al.*, 2014). The guidelines indicate that Medium trackout equates to dust occurring between 50-100 m from the site. The guidelines indicate that an assessment will be required where there is an ecological receptor within 50 m of the boundary of a site; or 50m of the route(s) used by construction vehicles'. There are no designated sites, protected habitats or protected plant species located within 50 m of the proposed development site or haul routes. Habitats within a 50 m radius of the proposed development site comprises habitat assessed as being of Local Important at lower and higher value.

Impacts from dust on these habitats would result in **short-term, slight, negative effects** on nearby vegetation at a **local geographical scale**.

6.7.3.1.4 Habitat Degradation as a result of the Introduction and spread of Invasive Plant Species

No invasive plant species were recorded within the proposed development site during the ecological surveys. There is potential, however, that the movement of construction vehicles and material to and from the site may result in the introduction of invasive species if not appropriately managed. The introduction of invasive plant species have the potential to

negatively impact habitats by shading and competitively excluding native plant species, providing less favourable habitats for native fauna (TII, 2020).

Impacts from the introduction of invasive plant species within the proposed development could result in long-term, **slight, negative effects** on habitats and fauna at a **local geographical scale**.

6.7.3.1.5 Peat Slippage

As noted in Chapter 7 – Soils, Geology and Hydrogeology, peat can be mobilized when disturbed, but given the flat topography of the proposed development site, the risk of peat slippage is considered unlikely. Landslide susceptibility within the proposed development site is mapped by GSI[17] as "Low", which considers topographic slope, soil type and concentration / dispersion of overland flow. There are no previous records of peat slides within the wider Timahoe Bog in the past.

6.7.3.2 Fauna

Potential construction phase impacts on fauna within the receiving environment is discussed hereunder.

6.7.3.2.1 Badger

Loss of Habitat

Although no badger setts were identified onsite, evidence of badger activity, including tracks and snuffle holes, were recorded frequently within the proposed development site boundary. It's likely that badger forage and commute within the proposed development site and likely return to setts located within the nearby, surrounding conifer woodlands, which could provide more favourable habitat to establish setts within. As the proposed development will result in a land take of approximately 63.5 ha, which equates to 2.49% of the Timahoe South Bog.

Considering the small area of habitat (which may be used for foraging) which will be lost (2.48%) and the availability of alternative habitat within the wider surrounding Timahoe Bog, the loss of potential foraging habitat to facilitate the proposed development will result in a **permanent, slight, negative effect** on the local badger population, at a **local geographic scale**.

Disturbance/displacement

Construction works can result in the disturbance of badger breeding sites located within 150 m of a construction works site (NRA, 2005). Although, as noted, no setts were recorded within 150 m of the proposed development site, there is potential for badger to forage within proximity to the proposed construction site. Nevertheless, badgers are nocturnal species and, therefore, are not likely to be active during the main construction works periods, which will be carried out during daylight hours.

Considering the absence of setts recorded within 150 m of the construction works area and the avoidance of construction works at night, disturbance to the local badger pollution is considered **unlikely**, resulting in **short-term**, **imperceptible negative effects**.

[17] Accessed [October 2022] via https://dcenr.maps.arcgis.com/apps/MapSeries/

6.7.3.2.2 Red deer

Loss of Habitat

Deer tracks were regularly observed throughout the proposed development site, which indicates that there is likely to be local population foraging within the site. The proposed construction works will result in a permanent loss of foraging habitat. As noted, the habitat lost equates to approximately 2.49% of the total landholding within Timahoe South Bog. Considering the small area of habitat loss and availability of similar alternative habitat within the surrounding habitat. The loss of 2.49% of available foraging habitat is likely to have a **permanent, slight, negative effect** on the local deer population.

Disturbance

The construction works are likely to temporarily disturb deer from nearby foraging habitats. However, deer are mobile species and are likely to move to alternative foraging sites during the construction phase, which exist in abundance within the wider landscape. Disturbance impacts to deer during the construction phase are likely to have a **short term, imperceptible negative effect** at a **local geographical scale**.

6.7.3.2.3 Bats

Loss of Habitats

No bat roosts were recorded within the proposed development site. All trees within the proposed development were assessed as having 'Negligible' bat roost potential, as per Collins (2016), due to the lack of suitable roost features. The clearance of vegetation to facilitate the proposed development will not result in the loss of bat roosting sites.

The proposed construction works will, however, result in a loss of drainage ditches and woodland, which are used by bats for foraging and commuting. The loss of the foraging/commuting routes will result in a **permanent slight, negative effect** on the local bat population, **at a local geographical scale**, considering the availability of alterative, similar habitat with the surrounding area.

Disturbance

There is potential that temporary construction lighting will be required during the construction works. The construction lighting has the potential to result in the illumination of the habitats within the proposed development site which may displace commuting/foraging bats from the habitat, and disturb bats feeding behaviours (Bat Conservation Ireland, 2010). The disturbance of bats within the area from temporary construction lighting, would result in a **short-term, slight, negative effect** on the local bat population at **a local geographical scale**.

6.7.3.2.4 Otter

Habitat Loss and Disturbance

The proposed development will not result in the loss of any suitable habitat for otter. No instream works will occur within the Cushaling River. The existing drainage ditches within the landfill location will be blocked and redirected. The drainage ditches are likely to provide only sub-optimal habitat considering the modified nature, high sediment/peat content and no fishery value. Considering the above, otter are also unlikely to forage or commute within, or in proximity to the proposed development site and therefore, disturbance impacts are unlikely.

Therefore disturbance impacts and the loss of 3,855 m of drainage ditches would result in **permanent, imperceptible, neutral effects** on the local otter population at a **local scale**.

Water Quality Impacts

During the construction phase of the proposed development, there is potential for the runoff of sediment and construction pollution to deposit within the Cushaling and River Barrow if not appropriately manged, resulting in indirect impacts on otter due to a degradation of water quality resulting in impacts on their feeding resources. Chanin (2003) notes that *'Otters are not directly affected by water quality and will forage in conditions that seem extremely unpleasant to humans, however, where deterioration in water quality leads to a deterioration in food supply there will clearly be an indirect effect'*.

A degradation of otter's feeding resources would therefore constitute a **short-term, slight negative effect** on otter from **local to international geographical scale**.

6.7.3.2.5 Other Mammal Species

There is potential that the proposed development site may support other small, protected mammal species, such as hedgehog, pygmy shrew, Irish stoat or Irish hare. However, considering the availability of similar habitat within the surrounding environment and the lack of evidence of these species presence within the site, it is considered that the proposed development site is unlikely to be an important site supporting significant numbers of these protected mammal species. Nevertheless, the proposed construction works have the potential to result in the loss of habitat and disturbance of such species, if they are present.

In relation to habitat loss, considering the abundance of alternative suitable habitat within the wider landscape, the potential impacts are likely to result in **permanent, imperceptible, negative effects**, on the local population, at a **local geographical scale**.

In relation to disturbance, given the mobile nature of the species, lack of evidence using the site and the availability of alternative habitat, the potential impacts are likely to result in **short-term, imperceptible, negative effects** on the local population, at a **local geographical scale**.

6.7.3.2.6 Birds

Habitat Loss

The construction of the proposed development will result in a land take, which is consequently likely to reduce the availability of habitat for the local bird species. Numerous bird species, which include passerines, waders and raptors, were recorded within the proposed development site. It is likely that the cutover bog, bog woodland and scrub habitats provide both foraging and nesting/roosting sites for the bird species, which loss would be considered permanent. However, the land take for these habitats as a consequence of the proposed development is relatively small (2.49% of the total landholding within Timahoe Bog) and there is similar, alternative habitat within the wider surrounding environment, which could be used by the bird species. The loss of the habitat is unlikely to significantly affect the abundance or distribution of the local bird population.

If the removal of vegetation within the proposed development site occurs within the breeding bird nesting season (1st March – 31st August inclusive), there is potential that nests and/or eggs will be lost. The loss of vegetation within the bird breeding season could result in **long-term/permanent, slight, negative effects** on breeding birds, at a **local geographical scale**.

Disturbance

Construction related noise and the physical presence of machinery and construction personnel is likely to result in the disturbance of birds from habitats located in close proximity to the proposed development site. Disturbance during the nesting season can also result in significant negative effects on the local bird population. Given the short-term nature of the construction works (approximately 12 months) disturbance to the local bird population will be short term. In addition, there is suitable, alternative habitat within the surrounding lands.

Disturbance associated with the construction phase is likely to result in **short-term slight, negative effects**, on the local bird population, at a **local geographical scale**.

6.7.3.2.7 Amphibians

Loss of Habitat

The drainage ditches within the proposed development site were identified as being suitable habitat for common frog. The proposed development will result in the blocking of the existing drains and rediverting them around the eastern and southern boundary of the proposed development site, which will result in a short-term loss and degradation of suitable habitat for common frog. There is also potential that common frogs may use the drainage ditches as spawning sites. If construction works within the drainage ditches occur during the frog's spawning season (March–June inclusive), there is potential that spawn will be impacted. Impacts to frogs and their spawn are likely to result in **long-term/permanent, negative effects** on the local frog population at a **local geographical scale**.

6.7.3.2.8 Aquatic Species

Water Quality Impacts

The drainage ditches within the proposed development site were assessed as having no fishery value, mainly due to their high sediment loads, which provide unsuitable habitat for protected aquatic species, such as lamprey, Atlantic salmon and white-clawed crayfish.

The proposed development site is hydrologically connected to the Cushaling and, thus, there is potential for indirect impacts on the watercourse. During surveys of the Cushaling River, no protected aquatic species, nor suitable habitat in their support, was recorded within the surveyed section of the watercourse (ca. 2.8 km downstream of the proposed development site). However, there is potential that protected aquatic species may occur further downstream within the catchment. The River Barrow and River Nore SAC is designated for nine aquatic species which includes, but not limited too, all three lamprey species, white-clawed crayfish and Atlantic salmon. This SAC is also designated for a population of Nore pearl mussel (*Margaritifera durrovensis*), which presence is restricted to the River Nore (Moorkens, 2014), and a population of freshwater pearl mussel (*Margaritifera margaritifera*) located within the Aughavard, Ballymurphy and Mountain catchments (EHLG, 2010). The populations of Nore pearl mussel and freshwater pearl mussel do not occur in the surveyed reaches, downstream of the proposed development, and therefore, will not be impacted.

The proposed construction works have the potential to result in the degradation of aquatic habitat within the Cushaling catchment, which could result in indirect impacts of protected aquatic species present within the watercourse and its water quality. The release of concrete into a watercourse has the potential to alter pH levels of the waterbody and is highly toxic to aquatic life. The degradation of water quality during the construction works has the potential to

result in **short-term, moderate, negative effects** on the aquatic species from **local to International scale**.

6.7.3.2.9 Lepidoptera Species

Loss of Habitat

The small skipper butterfly, the forester moth and the narrow-bordered five-spot burnet have been recorded in the wider area in Timahoe North Bog. Additionally, the orange-tip, small white and one small tortoiseshell butterflies have been recorded during walkover surveys within the proposed development site boundary. The construction of the proposed development will result in the loss of approximately 2.09 ha of dry meadow and grassy verges habitat, which was identified as potentially being suitable habitat for these lepidoptera species.

Loss of suitable habitat could potentially negatively affect the populations of these species including the small population of small skipper which has recently colonised in Ireland.

Habitat loss has the potential to have a **permanent, slight, negative effects** on lepidoptera populations, at a **Local geographical scale**.

6.7.4 Operational Phase Impacts

Impacts associated with the Operational Phase of the receiving environment are discussed hereunder.

6.7.4.1 Habitats and Flora

6.7.4.1.1 Habitat Degradation - Surface Water Quality Impacts

Stormwater Drainage

During the operational phase, all stormwater will be collected via drains and gullies, which will include grit interception traps and fuel/oil interceptors. The outfall from the grit trap and oil interceptor will be discharged to surface water attenuation lagoons for further treatment. The overflow from these attenuation lagoons will then be diverted through proposed ICWs to provide an additional treatment, prior to discharge to a nearby bog drainage channel which ultimately slowly drains to the Cushaling River located approximately 800 m south-east of the ICW discharge point.

The dense vegetation in the ICW ponds will result in in a substantial volume of water being lost to the atmosphere through evapotranspiration. In addition, certain key emergent plant species used within the wetland will result in evapotranspiration of approximately 1000 mm/ha of water annually (Barco, et al., 2018).

The parameters of the projected remining ICW effluent which will be discharged are outlined in Table 6-15. Of note are the projected levels of Total Ammonium (NH_4), which comply with the Water Framework Directive and are below required standards of the EC (Quality of Salmonid Waters) Regulations 1988. Considering the above, there is no potential for water quality impacts during the operational phase of the proposed development.

Table 6-15: Discharge Consent and Projected Treatment Performance

Parameter	Discharge consent limits (current)	Projected ICW Effluent
Suspended solids	35mg/l	<20mg/l
BOD	25mg/l	5mg/l
NH_4	0.5mg/l	<0.14mg/l

6.7.4.1.2 Habitat Degradation - Air Quality Impacts

Air Emissions

As outlined in Chapter 12 Air Quality and Climate, AWN Consulting Ltd. were commissioned to carry out an air dispersion modelling study of air emissions from the existing facility and the licensed waste management activities at WMF and considered the proposed extension.

The purpose of the air dispersion modelling study was to determine whether the air and odour emissions from the facility will lead to ambient concentrations which are in compliance with the relevant ambient air quality standards and guidelines for odour, NO_2 & PM_{10}/$PM_{2.5}$. The assessment was conducted using the methodology outlined in "Air Dispersion Modelling from Industrial Installations Guidance Note (AG4)" (EPA, 2020).

The NO_2 modelling results are detailed in Table 11.16 in Chapter 11 – Air Quality & Climate. The results indicate that the ambient ground level concentrations at the worst-case ground level location are significantly below the relevant air quality standards for NO_2. Cumulative emissions from the gas utilisation plant and flares lead to an ambient NO_2 concentration (including background) which is 79% of the maximum ambient 1-hour limit value (measured as a 99.8th%ile) and 31% of the annual limit value at the worst-case off-site location (refer to Table 12-21 in Chapter 12 – Air Quality & Climate). At the worst-case receptor this ambient NO_2 concentration (including background) which is 20% of the maximum ambient 1-hour limit value (measured as a 99.8th%ile) and 23% of the annual limit value.

With respect to protected habitats within designated sites, the closest designated site is Hodgestown Bog NHA which is located approximately 3.5-km from the proposed development site boundary. NOx concentrations due to the gas utilisation plant and flares at this designated site, and all other designated sites located beyond this distance, is considered negligible. Process contributions within the closest European site are less than 0.1 µg/Nm^3 or 0.3% of the 30 µg/m^3 limit value for NOx with respect to the projection of sensitive habitats. There is, therefore, no potential for air emission from the proposed development to result in impacts to any designated site.

6.7.4.2 Fauna

6.7.4.2.1 Disturbance/displacement

Noise and Vibration

As outlined in Chapter 10 – Noise & Vibration, noise levels associated with the proposed development, during operation, will remain largely unchanged compared to the operational phase of the existing MWF and was considered to neutral in terms of impacts. The impacts of the existing noise levels and the additional traffic volume has been assessed to be negative and not significant to slight.

Mammal and bird species are likely to be acclimatised to local disturbance from the existing waste facility, located directly adjacent to the proposed development site. Noise and disturbance from the operational phase of the proposed development was assessed as likely resulting in **short-term, imperceptible negative effects** on the local populations of mammal and bird species at a **local geographical scale**.

Lighting

New lighting will be installed as part of the proposed development site (refer to the Lighting Design ecological considerations in Appendix 6-2 of this Chapter). The new lighting will result in an increase in artificial lighting within the proposed development site and immediate surrounding area, which can negatively impact nocturnal species (Rich & Longcore, 2005). Lighting can impact bats' roosting sites, commuting routes and foraging areas (Bat Conservation Ireland, 2010). Although no confirmed bat roosts were identified within the proposed development site, or within the immediate surrounding area, bats were recorded foraging and commuting within the proposed development site during the dusk activity survey. Direct illumination of bat commuting or foraging routes would constitute a significant negative effect as it could alter feeding patterns, and/or deter bats from commuting along affected corridors, ultimately impacting bat populations.

Excess illumination of bat features could result in **short-term, moderate negative effects** on the local bat population at a **local geographical scale**.

6.7.5 Decommissioning Phase Impacts

The proposed development is expected to be operational for at least 25 years. Decommissioning will include the dismantling of infrastructure, minor excavation activities and the removal of waste offsite. Impacts during decommissioning are expected to be of similar type and magnitude to those anticipated during the construction phase, but generally of a shorter duration.

6.8 MITIGATION MEASURES

Mitigation measures which will be employed to ensure no significant effects on biodiversity occur as a result of the proposed development are described hereunder.

Mitigation is prescribed with regard to the 'Mitigation Hierarchy' set out in the EPA '*Guidelines on the Information to be Contained in Environmental Impact Assessment Reports'* (EPA 2022), which requires mitigation by avoidance as a first approach. Where this is not achievable, measures to prevent impacts from giving rise to adverse effects will be adopted. Where impacts cannot be avoided (e.g. generation of noise), mitigation by reduction of impact is prescribed to limit the exposure of the ecological receptor to an acceptable level (often achieved by interrupting the pathway between the source and receptor). When significant effects cannot be prevented, mitigation to counteract the effects is required (i.e. offsetting measures).

6.8.1 Construction Phase Mitigation Measures

Mitigation measures which will be implemented during the construction phase are detailed hereunder.

6.8.1.1 Construction Environmental Management Plan

A Construction Environmental Management Plan (CEMP) has been prepared and is included within this Planning Application. All mitigation measures outlined within this Chapter will be included within the CEMP. The CEMP is included in Appendix 2-5 of this EIAR.

6.8.1.2 Appointment of Environmental / Ecological Clerk of Works

A suitably qualified Ecological Clerk of works (ECoW) will be appointed by the Contractor. The ECoW will be experienced in the management of peatland habitats and will oversee all construction works and monitor any possible sources for impacts for the duration of the construction programme. The ECoW will guarantee the construction phase of the proposed development will be undertaken in strict agreement with the methods prescribed within the CEMP and will have the power to stop the works in case any activities/works are not compliant.

6.8.1.3 Management of European Sites

Mitigation measure which will ensure the protection of the River Barrow SAC, River Boyne and River Blackwater SAC, River Boyne and River Blackwater SPA during the construction phase are outlined in Section 7 of the NIS which is contained in Appendix 6-1 of this Chapter.

6.8.1.4 Management of Habitats and Flora

Where required, vegetation clearance will be kept to a minimum. The proposed construction work areas will be demarcated prior to the construction works commencing. No clearance of vegetation will be undertaken outside of the demarcated areas within the proposed development site. Construction vehicles will be restricted to designated areas access tracks to avoid impacting adjacent habitats and to ensure that soil compaction is restricted to these tracks. All disturbed ground will be fully reinstated following the completion of the works.

Bog mats will be used mitigating rutting and reducing soil erosion and impact to bog habitat. Bog mats replacement will be enforced when they become heavily used and worn. In addition, machinery used will have wide tracks suitable to be used over areas of soft bog.

6.8.1.5 Replanting of New Vegetation

The development of the ICW within the proposed development site will provide a new wetland feature which will be beneficial to invertebrate, amphibians and a range of breeding and wintering waterfowl species. The ICW will be approximately 5.61 ha in size and include a range of locally sourced and native wetland emergent species such as greater pond sedge (*Carex riparia*), reed sweet-grass (*Glycyeria maxima*), bulrush (*Typha latifolia*), common clubrush (*Schoenoplectus lacustris*) and yellow flag iris (*Iris pseudacorus*). In addition, native trees and shrubs such as alder buckthorn (*Frangula alnus*), willow, alder and birch will also be planted around the ICW where suitable ground conditions can be achieved, covering and area of approximately 2.15 ha.

In addition, the capping layer of the landfill will be planted with grass and shrub species, as each section is completed providing a total of 35.75 ha of new habitat. The use of "Green hay", which will be locally sourced, will be used to support reseeding the landfill capping. This will be done in addition to the use of an initial "nurse crop" that will initially revegetate the new soil. Primarily, native Irish species red fescue (*Festuca rubra*) and Common bent-grass (*Agrostis stolonifera*) will be used. This enhancement measure will aid in the recolonisation of suitable habitat for lepidoptera species.

Furthermore, 4-6 m high berms enclosing the development from the north, east and west will be planted with bands of locally sourced native peatland tolerant grass and shrub species. The remaining areas of the berm will be left to naturally revegetate over time. The vegetating of these areas will not only provide new habitats (ca, 12.6 ha), but will also compact the peat, reducing runoff of suspended solids.

The land located to the east of the eastern berms will be vegetated with peat tolerant grass and shrub species and will cover an area of 16.46 ha. This area of vegetation will also create a natural vegetative buffer between the berms and the drainage ditch, again reducing runoff.

Finally, the lands located to the south of the proposed landfill site will benefit from the blocking of drains on the eastern boundary of the site and will likely re-wet overtime. Blocking drains will raise water levels locally which will maintain groundwater levels higher and help to re-wet previously drained peat. As such, drain blocking will have a localised positive effect. Re-wetting is expected to reduce the leaching of ammonia and other chemical constituents (e.g. organic matter, dissolved organic carbon).

The regeneration of new habitats within this area (lands located to the south of the landfill and east of the eastern berm) will be encouraged firstly by reducing all disturbance within the area and allowing natural colonization, and through the creation of new habitats such as fens, reed swamps, heath embryonic sphagnum-rich peat forming communities and wet and birch woodland communities, where conditions are suitable.

The total area of new planting will be approximately 72.57 ha. All area of replanting are shown in the Landscape Plan in Appendix 2-1 of this EIAR. Further details on the replanting and creation of new habitats is detailed in the Habitat Management and Enhancement (HME) Plan included in Appendix 6-3 of this Chapter.

6.8.1.6 Management of Invasive Species and Pathogens

In order to comply with Regulations 49 and 50 of the European Communities (Birds and Natural Habitat) Regulations (2011), the appointed Contractor will ensure biosecurity measures are implemented throughout the construction phase to ensure the introduction and translocation of invasive species is prevented.

The following mitigation measures are prescribed to control the translocation or spread of invasive species and / or pathogens:

- No invasive plant species were recorded within the proposed development. However in the event that proposed construction works are delayed more than 18 months, a pre-construction invasive species survey will be undertaken as recommended within the CIEEM Advice Note (CIEEM, 2019). In the event that an invasive plant species, listed in Part 1 of the Third Schedule of S.I No. 477/2011 – European Communities (Birds and Natural Habitats) Regulations 2011 is recorded a site-specific Invasive Species Management Plan (ISMP) will be prepared.
- Prior to arrival all machinery and equipment used during the construction works will be thoroughly cleaned and then dried using a high-pressured steam cleaning, with water >65 °C, in addition to the removal of all vegetation material. Disinfectant, such as a Virkon® Aquatic solution, will be used. The appointed Contractor will establish and clearly delineate a bunded cleaning/washing area.
- No removed material or run-off will be allowed to enter any water bodies (e.g. drainage ditches).
- Evidence that all machinery and equipment has been cleaned will be required to be on file for review by the statutory authorities and the appointed ECoW.

6.8.1.7 Protection of Aquatic Habitats

All mitigation measures associated with sediment and pollution control outlined in Chapter 8 - Water will be implemented, which will ensure the protection of aquatic species present within the Cushaling River and further downstream.

A summary of mitigation measure proposed are outlined hereunder:

- All drains within the proposed development site will be blocked prior to the construction works commencing. The drains will be blocked off using locally sourced subsoil materials which will cause water levels in the subsoils and peat along the drain trajectories to rise. The rising water levels in the drains and surrounding lands within the proposed development boundary will be controlled by installing overflow pipes at the opposite end of drains which will allow water to overflow from the blocked drains to the new drains being established as part of the TSB Decommissioning and Rehabilitation Plan. Drain blocks and overflows will be constructed at the outset of peat stripping works to ensure that drainage water is kept out of excavation areas.
- These blocked drains to the east of the proposed landfill phases will serve as check dams/silt dams, helping to settle out any suspended matter that may derive from the peat berms.
- No instream works or water abstraction will be undertaken within/from the Cushaling River.
- Silt fences will be erected along the southern boundary of the proposed development site and around stock piles of material.
- Prior to the commencement of excavations, an area for stockpiling the excavated material will be identified within the proposed development site, at minimum of 50 m from the Cushaling River, or any drainage ditch.
- Excavation works will not be carried out during or following heavy rainfall (i.e. if there is a yellow weather warning in place or 5-mm in a 1-hour period).
- An emergency plan for the construction phase of the proposed development to deal with accidental spillages will be drawn up, which all site personnel must adhere to and receive training.

Further details on the mitigation measures which will be used to control water quality impacts are detailed in Chapter 8 – Water and Chapter 7 – Soils, Geology and Hydrogeology.

6.8.1.8 Management of Fauna

6.8.1.8.1 Pre-construction Badger Survey

In the event that construction works are delayed more than 12 months after the initial survey (undertaken in May 2022), a pre-construction badger survey will be undertaken within the proposed development site by an appropriately experienced ecologist, to identify any changes to badger activity, such as the establishment of new setts within the ZoI of the proposed development. The pre-construction survey should be conducted no more than 10-12 months in advance of the construction works, as per the NRA (2005) guidelines. In the event that a sett is identified, a derogation license will be sought from NPWS.

6.8.1.8.2 Protection of Nesting Birds

Breeding bird habitats will not be removed, cleared or trimmed between the 1st March and 31st August, inclusive, to avoid impacts on nesting birds protected under the Irish Wildlife Acts. In the unforeseen circumstances where the construction programme does not allow this time restriction to be observed, then these areas will be inspected by a qualified ecologist for the

presence of breeding birds prior to commencement of construction works. Where any nests are found, the appointed ECoW will provide recommendations as to whether a licence is required for vegetation removal and will detail the process for obtaining such derogation licence from the NPWS.

6.8.1.8.3 Translocation of Frogs Spawn

Due to local frogs occurrence (Section 6.5.2.2.7), along with the presence of suitable habitat within the proposed works area, it is recommended that a pre-construction frog spawn survey is undertaken within wet grassland and drainage ditch habitats, which may be disturbed during the common frog's spawning season (1st March – 31st June, inclusive). In the event that frog spawn is identified within the footprint of the proposed works, a derogation license under Sections 9, 23 and 43 of the Wildlife Acts will be sought from NPWS. The derogation license, if required, will detail specific measures to translocate the frogs and spawn to suitable nearby habitat which will not be impacted by the proposed development.

6.8.1.8.4 Protection of Aquatic Species

Refer to measures outlined in Section 6.8.1.7. In addition, no non-native fish species will be brought to, or released, within any water feature within the proposed development site, during the construction, operation and decommissioning phases.

6.8.1.8.5 Disturbance / Displacement Measures

Construction noise will be kept to a minimum in accordance with British Standard BS 5228 1:2009 'Code of Practice for Noise and Vibration Control on Construction and Open Sites –Part 1: Noise'. The appointed Contractor will be obliged to take specific noise abatement measures and will comply with the best practice outlined in BS 5228 and the NRA guidelines *Good practice Guideline for the Treatment of Noise during the Planning of National Road Schemes* (NRA, 2014). Noise levels will be monitored using standard noise meters.

To reduce disturbance, all temporary lighting associated with the construction works will be placed strategically by the appointed Contractor following consultation with the appointed ECoW. This will ensure that illumination beyond the works area is controlled. Lighting will be cowled and directional to reduce significant light splay.

6.8.1.8.6 Protection of Lepidoptera Species

A HME Plan is included within Appendix 6-3 of this Chapter. This management plan outlines measures that will be implemented to protect and enhance suitable lepidoptera habitats present within the proposed development site. Construction phase mitigation measures are summarised below:

- The works area will be clearly defined and fenced off in advance of construction activities;
- Vegetation clearance will be carried out in phases;
- Natural recolonisation will be used for spoil stabilization; and
- Sub-peat material/mineral soils will be stored separately from the peat materials that will be used for capping.

Further details are included within the Plan.

6.8.2 Operational Phase Mitigation Measures

Mitigation measures which will be implemented during the operational phase are detailed hereunder.

6.8.2.1 Management of European Sites

Mitigation measures which will ensure the protection of the River Barrow SAC, River Boyne and River Blackwater SAC and River Boyne and River Blackwater SPA during the operational phase are outlined in Section 8.2 of the NIS which is contained in Appendix 6-1 of this Chapter.

6.8.2.2 Protection Measure for Bats

The location of the proposed new lighting (as shown in the Lighting Plan in Appendix 6-2 of this Chapter) was designed in consultation with a qualified ecologist with regard made to the NPWS guidelines (Marnell *et al.*, 2022). No lighting will be installed along bat commuting/foraging routes (i.e. along existing drains or along edges of woodland).

The luminaires used will use LED 3000K with a warm colour temperature as recommended within the guidelines. In addition, the luminaires will be full cut off/ flat glass type with no tilt (0% uplight) which will minimise glare and light spill. Lighting at the landfill will be controlled and kept at a minimum.

Lighting will only be switched on when manned. Light shields and directional lighting will be used to minimise light spill.

6.8.2.3 Protection of Lepidoptera Species

A HME Plan is included within Appendix 6-3 of this Chapter. This management plan outlines measures that will be implemented to protect and enhance suitable lepidoptera habitats. Operational phase mitigation and monitoring measures are summarised below:

- Capping of the waste management facility will use subsoil as this will create a species rich grassy habitat;
- Wildflower seed mixes will not be used;
- The use of "green hay" will be used to support reseeding of the landfill capping;
- A mowing regime will be implemented and agreed with a suitably qualified ECoW;
- No mowing will be carried out during the breeding bird season (1st March – 31st August);
- Mowing will not be uniform i.e. mowing certain areas will be rotated to every second year;
- Cutting will favour the retention of south facing slopes, south facing banks provide a warm microclimate for butterflies; and
- Alder buckthorn (*Frangula alnus*) will be included in landscaping plans, this species is the food plant of the brimstone butterfly (*Gonepteryx rhamni*) and several moth species; and
- Vegetation establishment and species composition will be monitored by a suitably qualified ecologist.

6.8.2.4 Stormwater Monitoring

The proposed new, designed attenuation lagoons and ICW system form part of the proposed development and will treat all stormwater before discharging into the Cushaling River. As described in Appendix 2-4 of the EIAR, it is specifically designed to remove ammonia and

suspended solids in the discharge. It will serve to reduce loads that would otherwise be higher, which will benefit the receiving water environment. Numerous studies have found that ICWs are adequately able to treat wastewaters by significantly reducing nutrient levels and improve water quality Hickey *et al.,* (2017), Stack *et al* (2014) & Scholz *et al* (2010). The ICW concept, focuses on the explicit integration of total water management, ecological reanimation, and biodiversity support.

Surface water quality will be monitored downstream of the ICW outlet (SW9) during the operational phase of the facility under the new IE License. All surface water sampling will be carried out by trained personnel from Bord na Móna or by suitably qualified consultants. All analyses, except for on-site readings, will be carried out off-site, by an accredited laboratory. A visual inspection of all surface water streams on and adjacent to the proposed development will be carried out by site personnel on a weekly basis.

The key aspects of the surface water monitoring programme will be as follows:

- Surface water sampling locations will be identified with a permanent identification marker;
- Surface water will be sampled in accordance with industry standard protocols and guidelines prepared by the EPA. Samples will be handled and transported in accordance with accepted protocols; and
- The analytical programme will be carried out such that an ion balance can be computed.

In the unlikely event that deterioration in the surface water quality being discharged is detected, an automated isolating valve will close. This isolating valve will allow for the retention of all surface water on-site until the contamination event is investigated and remediated.

Annual biological monitoring will also be undertaken at SW4 during the monitoring period from June to September. Kick samples will be taken and analysed, in accordance with EPA guidelines, to determine the invertebrate colony of the surface water environment. A relationship between water quality and macroinvertebrate community structure will be determined in the form of a 'Q' value, where Q1 represents poor quality water and Q5 represents good quality water. The locations at which samples will be obtained will be agreed with the EPA and other relevant stakeholders such as Inland Fisheries Ireland (IFI).

Further details on the surface water monitoring which will be undertaken is provided in Chapter 8 – Water.

In relation to the ICW, a suitably qualified person with experience in ICWs will carry out monitoring and maintenance of the ICW. This will include:

- Monitoring water level;
- Influent and discharge monitoring – flow and quality;
- Vegetation monitoring and maintenance within cells and around the site;
- Maintenance of the inlet and outlet pipes; and
- Sediment/sludge management.

Additional details on the monitoring and maintenance of the ICW are included in the Preliminary Operations & Maintenance Plan (Appendix B of the ICW Report) in Appendix 2-4 of the EIAR.

6.8.3 Decommissioning Phase Mitigation Measures

Impacts during decommissioning are expected to be of similar type and magnitude to those anticipated during the construction phase, but generally of a shorter duration. Therefore, the

same mitigation measures implemented during the construction phase, will be applied during the decommissioning works.

6.8.3.1 Management of European Sites

Mitigation measure which will ensure the protection of the River Barrow SAC, River Boyne and River Blackwater SAC and River Boyne and River Blackwater SPA during the decommissioning phase are outlined in Section 8.3 of the NIS which is contained in Appendix 6-1 of this Chapter.

6.8.3.2 Management of Habitats

Refer to measures described in Section 6.8.1.

6.8.3.3 Management of Fauna

Refer to measures described in Section 6.8.1.

6.9 ENHANCEMENT MEASURES

6.9.1 Bat Boxes

It is recommended that four bat boxes (Schwegler Woodcrete 1FF bat box or equivalent) are erected on suitable mature trees or on existing buildings within the Bord na Móna landholding. The bat boxes will be erected prior to the construction works commencing and the exact siting of the bat boxes will be undertaken in consultations with a bat specialist/ecologist. The bat specialist will erect the bat boxes with assistance from the appointed Contractor. The bat boxes will be installed following the below points:

- The bat boxes will be located in areas where bats are known to forage or adjacent to suitable foraging areas. Locations should be sheltered from prevailing winds but in unshaded areas.
- The bat boxes should be erected at a height of 4-5 m above ground to reduce the potential of vandalism and predation of resident bats.
- Locations for bat boxes should be selected to ensure that the lighting plan for the proposed site does not impact on the bat boxes.
- The diameter of tree should be wide and strong enough to hold the required number of boxes. Telephones poles can also be used, if located within suitable areas.
- It is recommended that several bat boxes should be grouped together at different aspects to provide a range of warm conditions.
- Monitoring of the bat box should be undertaken one year after erection to ensure they are still weather tight and to clear away any debris.

6.9.2 Bird Boxes

It is recommended that four bird boxes are installed within the Bord na Móna landholding. The exact siting of the bird boxes will be undertaken in consultation with an ornithologist/ecologist. The bird boxes will be installed by the ornithologist following the below points:

- The bird boxes should be placed at 2-4 m above ground level and should face between north and east to avoid strong sunlight and the wettest winds.
- The bird boxes should have a clear flight path to the nest without any clutter directly in front of the entrance.
- The bird boxes should be tilted forward slightly to avoid any driving rain, which will instead hit the roof and bounce clear.

The above proposed enhancement measures will positively effect the local biota, and increase biodiversity within the receiving environment. Further details are provided within the HME Plan included in Appendix 6-3 of this Chapter.

6.10 CUMULATIVE EFFECTS

Cumulative effects is defined in the EPA (2022) guidance as "*The addition of many minor or insignificant effects, including the effects of other projects, to create larger, more significant effects*".

Information on the relevant projects within the vicinity of the proposed development is described in Chapter 4 of this EIAR (Policy, Planning & Development Context). The information was sourced from a search of the local authorities planning registers, EPA website, planning applications, EIAR documents and planning drawings which facilitated the identification of past and future projects, their activities and their potential environmental impacts. All projects listed in Chapter 4 of this EIAR were reviewed as part of the cumulative effects assessment. Key projects with the potential for cumulative effects are described further below.

6.10.1 Projects

Existing Drehid Waste Facility

The existing Drehid WMF and other consented and proposed activities (as set out in Chapter 2 – Description of the Proposed Development) are located directly adjacent to, and will share much of the same infrastructure, as the proposed development. The existing Drehid WMF is regulated by the EPA in accordance with IE Licence Reg. No. W0201-03. In addition, settlement lagoons are currently located at the existing WMF, and manage all of the requirements for primary surface water treatment, preventing the deterioration of the water quality of the receiving watercourses. Considering the existing license and mitigation measures currently in place, there is no potential for cumulative effects with the proposed development under appraisal in this report.

Timahoe North Project – Solar Farm (Planning Ref.: 18303249)

Bord na Móna Powergen Ltd & ESB are developing a solar farm and a 110kV substation and grid connection in Timahoe North Bog, located approximately 560 m north of the proposed development site. An EIA of the proposed solar farm was prepared an assessment of potential significant effects on the key ecological receptor within the receiving environment (McCarthy Keville O'Sullivan, 2018). The EIA concluded that the proposed solar farm and associated infrastructure will be constructed and operated in strict accordance with the design, best practise and mitigation as described within the application, and as such significant effects on ecology are not anticipated. Considering the above and the lack of connectivity, there is therefore no potential cumulative effects within the proposed development under appraisal in this report.

North Kildare Wind Farm (Planning Ref.: 181534)

The consented development by North Kildare Wind Farm Limited consists of a wind farm with 12 no. wind turbines and associated infrastructure in County Kildare, at a site located approximately 1km north of the proposed development. An EIA of the proposed windfarm was produced and an ecological appraisal undertaken (Fehily Timoney, 2018), The EIA identified potential impacts which included but are not limited to; habitat loss, disturbance, water quality impacts and habitat degradation. Additionally, the EIA prescribed mitigation measures which

will be implemented during all phases of the development, resulting in no significant effects. Considering the proposed wind farm will not result in significant effects on biodiversity and occurs within a separate water catchment, there is no potential for a cumulation of effects with the proposed development under appraisal in this report.

Other Smaller Developments:

There have been a number of projects and applications in the area surrounding the proposed development, that involve the construction or extension of small residential properties. Due to the small and temporary nature of these developments and lack of connectivity to the proposed landfill extension, there is limited potential for cumulative effects to arise.

6.10.2 Plans

Timahoe South Rehabilitation Plan

A rehabilitation and decommissioning plan is currently underway at Timahoe South Bog, and consists of the rehabilitation of part of the Timahoe South Bog as part of Bord na Móna's Peatlands Climate Action Scheme (PCAS), by raising water levels to the surface through internal drain blocking, and other techniques. The proposed rehabilitation area includes all Timahoe South Bog, which surrounds the proposed landfill site.

The Plan included an ecological impact assessment of the proposed rehabilitation works. A Natura Impact Statement (NIS) of the Plan has also been prepared (INIS, 2022). The environmental assessments identified potential impacts from the proposed rehabilitation works, which included, water quality impacts from the runoff of contaminates and / or sediment / silt / suspended solids, the spread of invasive alien species via hydrological pathways, ex-situ habitat loss and ex-situ disturbance. The Plan and NIS included a range of monitoring measures, protection measures and aftercare methods which will be implemented to ensure the protection of the receiving biodiversity. As a result, it is excepted there will be no cumulative effects within the proposed development under appraisal in this report. Further details on the potential cumulative effects on water quality impacts are addressed in Chapter 8 – Water of this report.

Kildare County Development Plan

The proposed development site is located in Kildare County administrative area. The Kildare County Development Plan 2023-2029[18] includes objectives and policies which are associated with the protection of the natural environment, (BI P2, BI O5, BI O6, BI O7, BI P3, BI O8, BI O9). All new plans and projects proposed within the county must adhere to the above-mentioned policies and objectives. Adherence to the Council's policies and objectives will ensure that all new plans and projects proposed within the area will not result in significant effects on biodiversity and international and national sites. Considering the above, there is no potential for significant cumulative effects on biodiversity.

6.11 RESIDUAL EFFECTS

The design of the proposed development has considered the existing ecological conditions within the receiving environment. Following the implementation of the proposed mitigation and enhancement measures associated with the construction, operational and decommissioning phases it is anticipated that the proposed development, will not result in significant residual effects on biodiversity, at any geographical scale. This assumption is further described

[18] Accessed [October 2022] via: https://draftkildarecdp2023-2029.ie/

hereunder in relation to Habitats and Flora and Fauna, and a summary of same is provided in Table 6-16 overleaf.

6.11.1 Habitats and Flora

The construction of the landfill extension will result in the permanent loss of habitat consisting of cutover bog, bog woodland and scrub. All habitats proposed to be permanently lost were assessed as being of Local Importance. Enhancement measures (Section 6.9) will include the planting of grass and shrub over the capped landfill. In addition, the ICW will provide a new wetland habitat within the site.

With the implementation of the mitigation measures outline in Section 6.8.1.4 which include measures to protect the existing habitats and flora within the site, the planting of new grass, shrub and tree species as well as the establishment of the ICW, it is considered, that impacts of the proposed development on habitats and flora will be minimised, resulting in no residual effects.

6.11.2 Fauna

The proposed development will result in the disturbance and lost of foraging habitat for protected fauna species which utilise the site. However, with the implementation of the mitigation measures outline in Section 6.8.1.8 and the proposed enhancement measures it is anticipated that no residual effects on protected mammals, birds, insects, reptiles or aquatic species are expected during the construction, operational and decommissioning phases of the proposed development, at any geographical scale.

Table 6-16: Summary of Residual Effects of KER following the Implementation of Mitigation Measures

Key Ecological Receptors	Potential Effects	Significance of Effects	Mitigation Measures	Residual Effects
Designated Sites				
River Barrow and River Nore SAC (001387)	Degradation of water quality (during all phases of the proposed development)	Short-term, moderate, negative effects	Refer to Section 7 in Appendix 6-1.	No significant residual effects
River Boyne and River Blackwater SAC (002299)	Degradation of water quality (during all phases of the proposed development)	To be updated when NIS is updated	To be updated when NIS is updated	To be updated when NIS is updated
River Boyne and River Blackwater SPA (004232)	Degradation of water quality (during all phases of the proposed development)	To be updated when NIS is updated	To be updated when NIS is updated	To be updated when NIS is updated
Habitats and Flora				
Cutover bog	Habitat loss	Permanent, slight, negative effect		Likely significant residual effect at

Key Ecological Receptors	Potential Effects	Significance of Effects	Mitigation Measures	Residual Effects
	(during construction phase)		Measures to reduce habitat loss are detailed in Section 6.8.1.3 and measures around habitat enhancement are detailed in Section 6.9.	a local geographic scale.
Bog woodland	Habitat loss (during construction phase)	Permanent, slight, negative effect		
Drainage ditches	Habitat loss (during construction phase)	Permanent, slight, negative effect		
Dry Meadow and Grassy Verges	Habitat loss (during construction phase)	Permanent, slight, negative effect		
Depositing/lowland River	Degradation of water quality (during all phases of the proposed development)	Short-term, moderate, negative effect	Measures to avoid water quality impacts are detailed in Section 6.8.1.7.	No significant residual effects
Fauna				
Badger	Habitat loss (during construction phase)	Permanent, slight, negative effect	Refer to measures outlined in 6.8.1.8.1, noise control measures in Section 6.8.1.8.5 and enhancement measures outlined in Section 6.9.	No significant residual effects
	Disturbance (during all phases of the proposed development)	Short-term, imperceptible negative effects		
Red deer	Habitat loss (during construction phase)	Permanent, slight, negative effect	Refer to noise control measures outlined in Section 6.8.1.8.5 and enhancement measures prescribed in Section 6.9.	No significant residual effects
	Disturbance (during all phases of the proposed development)	Short-term, imperceptible negative effects		
Bat	Habitat loss (during construction phase)	Permanent, slight, negative effect	Refer to proposed lighting measures proposed in Section 6.8.2.1 and enhancement measures prescribed in Section 6.9.	No significant residual effects
	Disturbance (during all phases of the proposed development)	Permanent slight, negative effect		

Key Ecological Receptors	Potential Effects	Significance of Effects	Mitigation Measures	Residual Effects
Otter	Disturbance (during all phases of the proposed development) & habitat loss	Permanent, imperceptible, neutral effects.	Refer to water quality measures outlined in Section 6.8.1.7, Section 6.8.1.8.4 and Section 6.8.2.4.	No significant residual effects
	Indirect effect through degradation of water quality (during all phases of the proposed development) & habitat loss	Short-term, slight negative effect		
Other Mammal Species	Habitat loss (during construction phase)	Permanent, imperceptible, negative effect.	Refer to noise control measures outlined in Section 6.8.1.8.5 and enhancement measures prescribed in Section 6.9.	No significant residual effects
	Disturbance (during all phases of the proposed development)	Short-term imperceptible, negative effects,		
Breeding and wintering bird species (non SCI[19] species)	Habitat loss (during construction phase)	Long-term/permanent, slight, negative effects	Refer to nest protection measures outlined in Section 6.8.1.8.2, noise control measures outlined in Section 6.8.1.8.5 and enhancement measures prescribed in Section 6.9.	No significant residual effects
	Disturbance (during all phases of the proposed development)	Short-term slight, negative effects		
Frog	Habitat loss and loss of frog spawn (during construction phase)	Permanent, slight, negative effect	Refer to measures outlined in Section 6.8.1.8.3 and the enhancement measures prescribed in Section 6.9.	No significant residual effects
Aquatic Species	Habitat loss (during construction phase)	Permanent, slight, negative effect	Refer to water quality measures outlined in Section 6.8.1.7, Section 6.8.1.8.4 and Section 6.8.2.4.	No significant residual effects
	Indirect effect through	Short-term, moderate, negative effects		

[19] Special Conservation Interests

Key Ecological Receptors	Potential Effects	Significance of Effects	Mitigation Measures	Residual Effects
	degradation of water quality (during all phases of the proposed development)			
Lepidoptera Species	Habitat loss (during construction phase)	Permanent, slight, negative effect	Refer to HME Plan in Appendix 6-3 and Section 6.8.1.8.6 and Section 6.8.2.3.	No significant residual effects

6.12 REFERENCES

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