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ENVIRONMENTAL SCIENCE &
PLANNING

ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR THE DEMOLITION OF AGRICULTURAL STRUCTURES AND THE DEVELOPMENT OF A MATERIALS RECOVERY FACILITY AT DERRYARKIN, RHODE, CO. OFFALY

VOLUME 2 – MAIN BODY OF THE EIAR CHAPTER 8 - BIODIVERSITY

Prepared for: Oxygen Environmental Unlimited Company



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8. BIODIVERSITY

8.1 Introduction

This chapter comprises the biodiversity assessment for the proposed development as described in Chapters 1 and 4.

A series of ecological surveys were undertaken at the proposed development site, including habitat, botanical, bird and mammal surveys (including bats). Based on the results of these studies, this assessment considered potential direct, indirect, cumulative and residual impacts of the proposed development during construction operation and decommissioning phases on the existing ecological receptors within the proposed project site and the wider study area and proposes appropriate mitigation measures to reduce and/or avoid potential impacts.

8.1.1 Project Overview

The proposed development is defined in Chapter 1 and a detailed description of the proposed development is set out in Chapter 4: Description of the Existing and Proposed Development, Volume 2 of this EIAR.

8.1.2 Statement of Competency

The surveys and this assessment were undertaken by Jason Guile and Jon Kearney of Fehily Timoney

Jason is a Senior Ecologist with Fehily Timoney and has over 10 years' experience in ecological assessment and holds a BSc in Marine Biology/Oceanography from the University of Wales, Bangor and a HND in Coastal Conservation with Marine Biology from Blackpool and Fylde College. Jason has a wide range of experience in the preparation of Environmental Impact Assessment Reports, Appropriate Assessment Screening reports and Natura Impact Statements. Jason was the lead ecologist on a range of projects in the UK, including large scale infrastructural schemes. Since moving to Ireland he has been lead ecologist / author (EIAR, AA Screening reports and NIS's) for a number of projects including historic landfill remediation works, urban planning applications and commercial regeneration sites. With FT, Jason is lead ecologist for a number of renewable energy projects.

Jon is a Principal Ecologist with Fehily Timoney and has 16 years' experience in the field of ecological assessment. He holds a BSc (Hons) in Applied Ecology from University College Cork and MSc in Ecological Management and Biological Conservation from Queens University Belfast. In his time as an ecological consultant in both the UK and Ireland, he has worked on a broad diversity of projects including NIS's for several offshore renewable energy projects, circa. 50 wind farms projects, solar farms, road schemes and commercial developments. Jon as the lead ecologist has been the lead expert witness for biodiversity and Appropriate Assessment at several An Bord Pleanála Oral Hearings.



8.2 Assessment Methodology

The assessment methodology section details the relevant guidance, consultation, desktop study and field assessment methodologies adhered to in conducting this assessment.

8.2.1 Relevant Guidance and Legislation

In addition to the EIA guidelines listed in Chapter 1 in Volume 2 of this EIAR, other reference documents used in the preparation of this section included the following:

- ‘Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (Version 1.1)’ (CIEEM, 2018 and revisions);
- ‘Best Practice Guidance for Habitat Survey & Mapping’ (Smith et al., 2011);
- ‘Interpretation Manual of European Union Habitats’ (European Commission, 2013);
- ‘Guidelines for the Treatment of Badgers Prior To the Construction of National Road’ (TII (previously NRA), 2006b);
- Flora species were assessed in accordance with their occurrence on the following
 - “Flora (Protection) Order 2015 (S.I. No. 356/2015)”
 - “Ireland Red List No. 10: Vascular Plants” (Wyse *et al.* 2016)
- Faunal species were assessed in accordance with their occurrence in the following:
 - Wildlife Act 1976, (as amended)
 - EU Habitats Directive (92/43/EEC) and the EU Birds Directive 2009/147/EC as transposed by the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011) as amended;
 - Article 17 Species Conservation Assessments [Volume 3];
 - Irish Red Data Lists ((King *et al.*, 2011), (Regan *et al.*, 2010) and (Marnell *et al.*, 2019));
 - Birds of Conservation Concern in Ireland List (Gilbert *et al.*, 2021);
 - Guidance Document on the strict protection of animal species of Community interest under the Habitats Directive. Commission Notice (2021) Brussels, 12.10.2021 C(2021) 7301 final.

8.2.2 Consultation

A consultation letter was sent out to various no. recipients on the 20th of May 2021. The recipients included relevant statutory consultees (as defined in Article 28 of the Planning and Development Regulations, as amended), non-governmental organisations (NGOs) and key stakeholders. No responses regarding biodiversity have been received. Refer to Chapter 6: Scoping and Consultation in Volume 2 of this EIAR for responses.

At the outset of this project, the Applicant held a pre-application consultation meeting with Offaly County Council. At this meeting, the Council required the Applicant to conduct a Whooper Swan survey for the purpose of informing this assessment.



8.2.3 Zone of Influence

CIEEM (2018) defines the Zone of Influence (Zoi) as “... the area over which ecological features may be affected by biophysical changes as a result of the proposed project and associated activities.” Each ecological feature will have a different Zones of Influence, depending on its ecological characteristics (CIEEM, 2018); best practice guidance and professional judgement were used to define the Zone of Influence for each ecological feature.

Given the scale and nature of the proposed development, the Zone of Influence defined for most ecological features was the footprint and immediate surroundings. To determine the zone of influence for designated sites, an initial buffer of 15km was first examined using Geographic Information System (GIS) Mapping (refer to Figure 8-2 and Figure 8-3) and the conservation interests of these designated sites were examined in order to ascertain whether there could be potential physical or ecological connectivity to the project and the associated likely project impacts. Additionally, any European sites beyond the initial 15km radius with hydrological connectivity were also identified for further examination.

The ‘Source-Pathway-Receptor’ model was used to determine impacts on European designated sites, aided by the EPA’s Appropriate Assessment tool to determine hydrological pathways (<https://gis.epa.ie/EPAMaps/AAGeoTool>).

8.2.4 Desk Study

Desk studies were used to collate and review available information, datasets and documentation sources pertaining to the ecology of the proposed development and the surrounding area. These desk studies aid in the assessment of the potential effects of the proposed development and aid in determining the requirement for field surveys.

Information for the desktop study was also accessed from the following sources:

- Offaly County Development Plan 2021-2027 <https://www.offaly.ie/eng/Services/Planning/County-Development-Plan-2021-2027/Stage-4-Final-Plan/Final-Plan.html>
- National Biodiversity Action Plan 2017-2021 <https://www.npws.ie/sites/default/files/publications/pdf/National%20Biodiversity%20Action%20Plan%20English.pdf>;
- Offaly Heritage Plan 2012-2016 https://www.offaly.ie/eng/Services/Heritage/Documents/Offaly_Heritage_Plan_2012_-_2016.pdf
- Offaly County Council Planning Enquiry System <https://www.offaly.ie/eng/Services/Planning/Planning-Search/>;
- National Parks and Wildlife Service (NPWS) website, maps and metadata available (www.npws.ie and <http://webgis.npws.ie/npwsviewer/>);
- A data request was sent to the NPWS for rare and protected species records within 10km of the proposed development on the 28th April 2021. These records were received from the NPWS on 5th May 2021. Updated request sent 31st January 2022 and records received 4th February 2022;
- National Parks and Wildlife Service (NPWS) website Flora Protection Order Map Viewer – Bryophytes <https://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=71f8df33693f48edbb70369d7fb26b7e> accessed May 2022.



- National Biodiversity Data Centre (NBDC) website and 10 km grid square records for N43 (www.biodiversityireland.ie) (<https://maps.biodiversityireland.ie/Map>) accessed November 2021 and updated May 2022;
- Bat Conservation Ireland (BCI) records obtained by request on 30th April 2021;
- Environmental Protection Agency's (EPA) Mapping Information System <https://gis.epa.ie/EPAMaps/> for EPA website datasets (soil, surface water quality, ground water quality, designated sites)
- Teagasc Soil area maps (<http://gis.teagasc.ie/soils/map.php>);
- Inland Fisheries Ireland (IFI) (<https://www.fisheriesireland.ie/>);
- Geological Survey Ireland (GSI) area maps <https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aac3c228>;
- River Basin Management Plan for Ireland 2018 – 2021 <https://www.gov.ie/en/publication/429a79-river-basin-management-plan-2018-2021/?referrer=http://www.housing.gov.ie/water/water-quality/river-basin-management-plans/river-basin-management-plan-2018-2021>
- River Basin Management Plan for Ireland 2022 – 2027 (Draft) <https://www.gov.ie/en/consultation/2bda0-public-consultation-on-the-draft-river-basin-management-plan-for-ireland-2022-2027/>
- EIAR Biodiversity chapters for nearby development via the EIA Portal <https://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=d7d5a3d48f104ecbb206e7e5f84b71f1> and;
- BirdWatch Ireland website.

8.2.5 Field Assessment Methodology

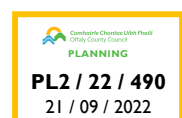
The methodologies and survey period details used to assess the various aspects of biodiversity within the study areas are described in the following sections.

8.2.5.1 *Habitats and Flora*

An Habitat Survey to identify habitats and the suitability of the various habitats and other features present to support fauna (protected and/or notable species) was carried out by Jason Guile on 17th June 2021. The study area comprised the redline boundary for the proposed development and habitats immediately adjacent, along with the drainage ditch to the south of the site (c. 20m)

Habitats were surveyed and classified according to Fossitt (2000) and following best practice as in Smith *et al.* 2011. The following keys and guidelines were utilised during habitat and flora assessment surveys.

- 'The Wild Flower Key', Revised edition, (Rose, 2006)., and
- 'The Wildflowers of Ireland. A Field Guide, (Devlin 2014).



Ortho-photographs of the study areas were annotated in the field to delineate each habitat type identified. Target notes were recorded for each habitat polygon and for features of interest observed during the survey.



The minimum size of habitats mapped was 400m² for polygons, or 20m for linear habitats, in line with recommended guidance (Smith *et al.*, 2011).

The position of notable small habitats and features of interest (including non-native invasive species) were marked using a GPS and recorded as points of interest and the main plant species in each habitat type were recorded. In addition to habitat identification, each habitat was assessed for its ecological significance, based on guidance provided in CIEEM (2018 and revisions). Refer to section 8.2.6 *Evaluation Criteria Methodology for Ecological Assessment*

8.2.5.2 Terrestrial Mammal Survey (exc. Bats)

Mammal surveys were carried out as part of the Habitat Survey on the 17th June 2021. The study area comprised the redline boundary for the proposed development and habitats immediately adjacent, along with the drainage ditch to the south of the site (150m up and down stream). Any signs of mammal activity, (including the presence of setts/holts/dens/dreys, foraging evidence, access runs, hairs caught on wires and bushes, tracks and prints) occurring within the study areas were recorded using field notes and/or handheld GPS units subsequently digitised using ArcGIS.

Surveys were undertaken in accordance with the following best practice guidance:

- NRA (2009) 'Ecological Surveying Techniques for Protected Flora and Fauna During the Planning of National Road Schemes'
- NRA, (2006). Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes.
- NRA, (2008). Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes.
- JNCC (2004) 'Common Standards Monitoring Guidance for Mammals'
- Scottish Badgers (2018). Surveying for Badgers: Good Practice Guidelines. Version 1.
- NPWS (2013) National Otter Survey of Ireland 2010/12. Irish Wildlife Manuals No. 76.
- Mammal identification and their field signs were undertaken with reference to a number of sources
 - Mammals of Britain: Their tracks, trails and signs (Lawrence & Brown, 1973);
 - Badgers (Clark, 1988);
 - The Badger and Habitat Survey of Ireland (Smal, 1995); and,
 - How to find and identify mammals (Sargent & Morris, 2003).



8.2.5.3 Bat Survey

8.2.5.3.1 Preliminary Roost Assessment

A preliminary roost assessment (ground level) for bats was carried out for the site as part of the Habitat Survey on the 17th June 2021. During this survey, habitats and structures (trees, buildings etc.) within the redline boundary of the proposed development and a 50m radius (where accessible ¹) were assessed for their potential suitability for bats, for foraging, commuting or roosting. Any evidence of activity or potential roost features observed within the study area were recorded using field notes and/or handheld GPS units subsequently digitised using ArcGIS.

Surveys were undertaken in accordance with the following best practice guidance:

- *Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd edition* (Collins, 2016);
- *Bat Roosts in Trees. A Guide to Identification and Assessment for Tree-Care and Ecology Professionals'* (Bat Tree Habitat Key, 2018);
- *Landscape Conservation for Irish Bats and Species-Specific Roosting Characteristics* (Lundy et. al, 2011).

Although undertaken prior to release, the surveys were also in accordance with *Bat mitigation guidelines for Ireland v2. Irish Wildlife Manuals, No. 134.* (Marnell et. al, 2022).

An overview of definitions of potential suitability of habitats for bats is provided in Table 8-1:

Table 8-1: Potential Suitability of Habitats for Bats (Collins, 2016)

Suitability	Description of Roosting Habitats	Commuting and Foraging Habitats
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	<p>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 to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).</p> <p>A tree of sufficient size and age to contain potential roosting features (PRFs) but with none seen from the ground or features seen with only very limited roosting potential.</p>	<p>Habitat that could be used by small numbers of commuting bats such as gappy hedgerow or un-vegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat.</p> <p>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.</p>



¹ It is not considered that this survey specific constraint represent a significant limitation barrier or data gap to adequately assessing the value of ecological features for the purposes of undertaking a proportionate and robust ecological impact assessment.



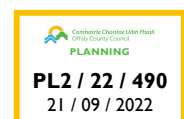
Suitability	Description of Roosting Habitats	Commuting and Foraging Habitats
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only- the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	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.
High	A structure or tree with one or more potential roost sites 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 edge. 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.

8.2.5.3.2 Trees

Inspections of the exterior of trees to look for features that bats could use for roosting (Potential Roost Features (PRFs)) from ground level. The aim of the survey was to look for features that bats could use for roosting (Potential Roost Features (PRFs)) from ground level, to determine the actual or potential presence of bats and the need for further survey and/or mitigation.

Inspections of each potential tree roost within the study area were undertaken. The inspections were carried out in daylight hours from ground level, and information was compiled on each tree, PRFs and evidence of bats. All trees surveyed were numbered and marked on a map and a description of each PRF observed was recorded. PRFs that may be used by bats include:

- Rot holes;
- Hazard beams;
- Other horizontal or vertical cracks or splits (e.g. frost cracks) in stems or branches;
- Lifting bark;
- Knotholes arising from naturally shed branches or branches previously pruned back to the branch collar;
- Man-made holes (e.g. flush cuts) or cavities created by branches tearing out from parent stems;
- Cankers in which cavities have developed;

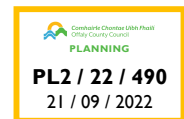




- Other hollows or cavities;
- Double leaders forming compression forks with included bark and potential cavities;
- Gaps between overlapping stems or branches;
- Partially detached ivy with stem diameters in excess of 50mm; and
- Bat or bird boxes.

Signs of a bat roost (excluding the actual presence of bats), include:

- Smoothing of internal crevices;
- Bat droppings in, around or below a PRF;
- Odour emanating from a PRF;
- Audible squeaking at dusk or in warm weather; and
- Staining below the PRF.



It should be noted that bats or bat droppings are the only conclusive evidence of a roost, and many roosts have no external signs. Therefore, this survey and evaluation was relatively basic as only those PRFs at ground level could be inspected closely to ascertain their true potential to support roosting bats. Trees were categorised according to the highest suitability PRF present in line with Collins (2016).

8.2.5.3.3 Structures

Structures within the proposed development site were subject to a visual inspection for evidence of, and potential for bats. The exterior of the structures was visually assessed for potential bat access points and evidence of bat activity using binoculars, a high-powered torch and an endoscope (Explorer Premium 8803 with 9mm camera) (endoscope surveys carried out under NPWS license). Features such as crevices and small gaps in the structure, such as between the brick or stonework, beneath roofing material, at eaves and around window frames which had potential as bat access points into the buildings were inspected. Evidence that these features/ access points were actively being used by bats include staining within the gaps, urine staining and bat droppings. Indicators that potential access points are not actively used by bats include general detritus within the access point. A note of potential features used by bats was made where present.

Internal inspections involved looking for features that may be suitable for roosting bats, such as joists and crevices in wood, holes or crevices between stonework in the walls and searching for bat droppings, urine stains and feeding signs on the floor.

8.2.5.4 Avifauna Survey

Due to the presence of significant numbers of Whooper Swans (*Cygnus cygnus*) in the area of the proposed development identified during the preparation of the planning application for Yellow River Wind Farm (application reference: 19.PA0032), County Offaly as a recognised favoured wintering location for Whooper Swans (International Swan census data 2020, Birdwatch Ireland), a species-specific survey was undertaken as part of this assessment. .



8.2.5.4.1 Whooper Swan

A species-specific survey to identify the presence of Whooper Swans within the proposed development and surrounding environs was undertaken between November 2020 and April 2021. Surveys were carried out by a combination of vantage point watches at both the known roost site and known feeding site identified by Biosphere Environmental Services in March 2014 (Refer to Appendix 8.1 *Yellow River Wind Farm Whooper Swan Survey, Winter 2013-2014* in Volume 3 of this EIAR). Frequency of survey was monthly with a total of 6 visits, with emphasis placed on early morning visits (minimum 1-hour surveys) to determine movement of birds from the known roost site (bog pools c. 500m east of the proposed development) to the known day time feeding areas (agricultural fields c. 650m south east of the proposed development) and unknown feeding areas. The objective of the survey was to determine the locations of feeding and roost sites and the numbers of swans present.

See Table 8-2 and Figure 8-1 for vantage points and viewsheds:

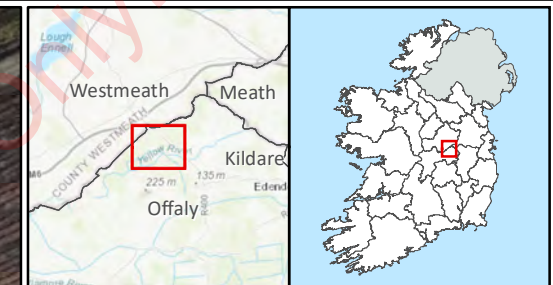
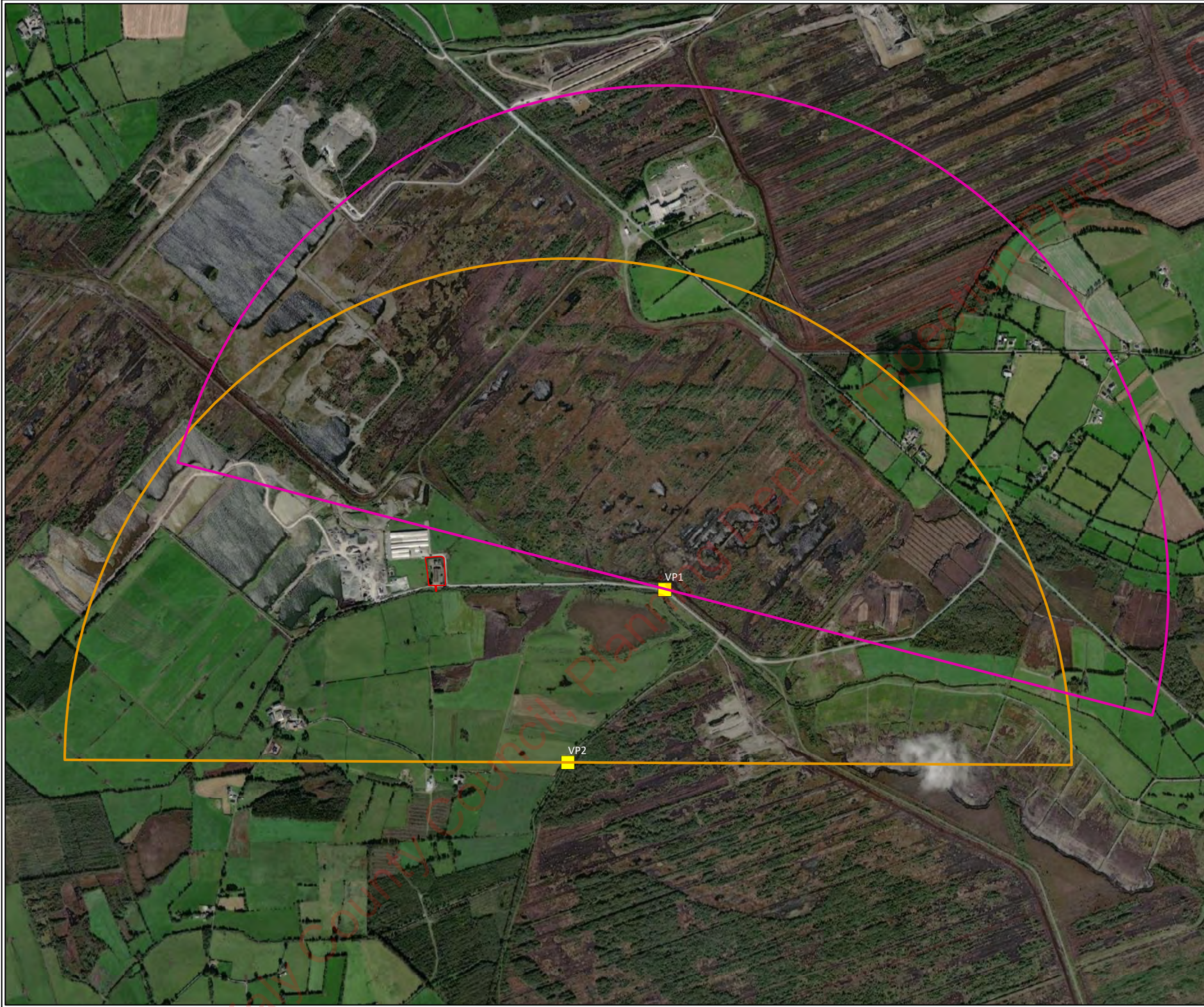
Table 8-2: Vantage Point Locations

Vantage Point No.	X (ITM)	Y(ITM)
1	649429	736727
2	649045	736040

8.2.5.4.2 Bird Assemblage

All avifauna species observed nesting/ feeding within the redline boundary for the proposed development were noted as part of the Habitat Survey on the 17th June 2021. Further species were also identified / noted if present within the feeding and/or roosting sites during the Whooper swan surveys.

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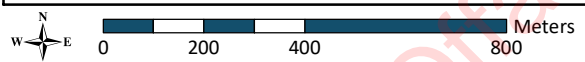
Legend

- Site Boundary
- Viewshed 1
- Viewshed 2
- Vantage Point (VP)

VP ID	X (ITM)	Y (ITM)
VP1	649429	736727
VP2	649045	736040

PL2 / 22 / 490
 21 / 09 / 2022

TITLE:	Vantage Point Locations
PROJECT:	Oxygen Derrynarkin Materials Recovery Facility
FIGURE NO:	8.1
CLIENT:	Oxygen Environmental Unlimited Company
SCALE:	1:15000
REVISION:	0
DATE:	27/06/2022
PAGE SIZE:	A3





8.2.5.5 Surveys for Other Terrestrial Fauna

The term 'Other fauna' includes faunal species not classified as avifauna, terrestrial mammals or bats. Species within this group range from amphibians, such as frogs and newts, to insects and molluscs (such as snails and slugs).

Observations of Lepidoptera (butterflies and moths), Odonata (dragonflies and damselflies) and any other taxa observed within the redline boundary area were noted, whilst conducting the other surveys. Observations of note were recorded as target notes and locations recorded using a hand-held GPS. The conservation status of other taxa was assessed by checking if any are listed in one or more of the following: Wildlife Acts 1976, (as amended), the Irish Red Data Lists, the EU Habitats Directive.

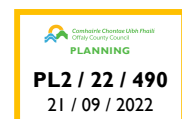
8.2.6 Evaluation Criteria Methodology for Ecological Assessment

This ecological assessment was carried out in accordance with EU 2017 EIAR Guidance and EPA 2022 Guidance, as described in Chapter 1 in Volume 2 of this EIAR and in the guidelines for ecological impact assessment produced by the Chartered Institute of Ecology and Environmental Management: *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine* (CIEEM, 2018 and revisions).

Ecological 'features' such as sites, habitats, features, assemblages, species or individuals, which occur in the vicinity of a project require assessment. The term 'ecological receptor' is used to describe an ecological resource once it has been determined that the proposed development may result in a significant impact.

The importance of the ecological resources/receptors at the proposed development site was evaluated using the ecological evaluation guidance given in *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine* (CIEEM, 2018 and revisions) which was developed in consultation with NRA guidance. In accordance with this guidance, the importance of ecological features is considered within a defined geographical context, with the following frame of reference:

- International and European;
- National;
- Regional;
- County (or other local authority-wide area);
- River Basin District;
- Estuarine system/Coastal cell;
- Local;
- Site.



Once the value of the identified ecological receptors has been determined, the next step is to assess the potential impact of the proposed development on the identified key ecological receptors.

Only features deemed 'important ecological features' by CIEEM (2018 and revisions) at 'Local value' and above are carried forward into the assessment of potential impacts of the proposed development. Refer to Appendix 8.2 *Ecological Feature Valuation and Typical Descriptions* in Volume 3 of this EIAR.



Ecological features valued below “Local” level are not considered features that could be affected significantly and therefore, these are scoped out of this impact assessment.

8.3 Baseline Environment

This section describes the site conditions and identifies the ecological features which may be affected by the proposed development and has been informed by the findings of the desktop study and site surveys as outlined above.

8.3.1 Designated Nature Conservation Sites

This section identifies and describes the internationally and nationally important sites which may be affected by the proposed development.

8.3.1.1 *Sites of European Importance*

There are four European sites within a 15km radius of the proposed development:

- Raheenmore Bog SAC (000582);
- Split Hills And Long Hill Esker SAC (001831);
- Lough Ennell SAC (000685);
- Lough Ennell SPA (004044).

There are a further nine European sites beyond a 15km radius of the proposed development with potential connectivity (hydrological or mobile species) to the proposed development:

- River Boyne And River Blackwater SAC (002299);
- River Boyne And River Blackwater SPA (004232);
- Lough Derravaragh SPA (004043);
- Lough Iron SPA (004046);
- Glen Lough SPA (004045);
- Lough Ree SPA (004064);
- Middle Shannon Callows SPA (004096);
- Boyne Coast and Estuary SAC (001957);
- Boyne Estuary SPA (004080).

The full NPWS site synopses for designated areas are available on www.NPWS.ie.



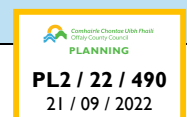


An Appropriate Assessment (AA) Screening Report has been prepared to appraise the likely significant effects of the proposed development either alone or in combination with other plans or projects on European Sites (screening); these accompany this planning application. A Natura Impact Statement (NIS) was subsequently prepared to allow the Competent Authority to ascertain if the project will not adversely affect the integrity of a European site.

Table 8-3 details designated sites within a 15km radius and with potential connectivity to the proposed development, along with their qualifying interests/ Special Conservation Interests. Figure 8.2 shows the location of the designated sites in relation to the proposed development site.

Table 8-3: Summary of European Sites within initial 15km search radius and with potential connectivity to the proposed development

Designated Site	Site code	Qualifying Interests	Distance to Proposed Development (km)
Raheenmore Bog SAC	000582	<ul style="list-style-type: none"> Active raised bogs [7110] Degraded raised bogs still capable of natural regeneration [7120] Depressions on peat substrates of the Rhynchosporion [7150] 	5.5
Split Hills And Long Hill Esker SAC	001831	<ul style="list-style-type: none"> Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210] 	10.1
Lough Ennell SAC	000685	<ul style="list-style-type: none"> Alkaline fens [7230] 	10.6
Lough Ennell SPA	004044	<ul style="list-style-type: none"> Pochard (<i>Aythya ferina</i>) [A059] Tufted Duck (<i>Aythya fuligula</i>) [A061] Coot (<i>Fulica atra</i>) [A125] Wetland and Waterbirds [A999] 	11.3
River Boyne And River Blackwater SAC	002299	<ul style="list-style-type: none"> Alkaline fens [7230] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355] 	18.6
River Boyne and River Blackwater SPA	(004232)	<ul style="list-style-type: none"> Kingfisher (<i>Alcedo atthis</i>) [A229] 	18.6
Lough Derravaragh SPA	(004043)	<ul style="list-style-type: none"> Whooper Swan (<i>Cygnus cygnus</i>) [A038] Pochard (<i>Aythya ferina</i>) [A059] Tufted Duck (<i>Aythya fuligula</i>) [A061] Coot (<i>Fulica atra</i>) [A125] 	25.6



CLIENT:

Oxigen Environmental Unlimited Company

PROJECT NAME:


EIAR for the Demolition of Agricultural Structures and the Development of a Materials Recovery Facility at Derryarkin, Rhode, Co. Offaly.

SECTION:

Chapter 8 - Biodiversity



Designated Site	Site code	Qualifying Interests	Distance to Proposed Development (km)
		<ul style="list-style-type: none"> Wetland and Waterbirds [A999] 	
Lough Iron SPA	(004046)	<ul style="list-style-type: none"> Whooper Swan (<i>Cygnus cygnus</i>) [A038] Wigeon (<i>Anas penelope</i>) [A050] Teal (<i>Anas crecca</i>) [A052] Shoveler (<i>Anas clypeata</i>) [A056] Coot (<i>Fulica atra</i>) [A125] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395] Wetland and Waterbirds [A999] 	25.8
Glen Lough SPA	(004045)	<ul style="list-style-type: none"> Whooper Swan (<i>Cygnus cygnus</i>) [A038] 	35.1
Lough Ree SPA	(004064)	<ul style="list-style-type: none"> Little Grebe (<i>Tachybaptus ruficollis</i>) [A004] Whooper Swan (<i>Cygnus cygnus</i>) [A038] Wigeon (<i>Anas penelope</i>) [A050] Teal (<i>Anas crecca</i>) [A052] Mallard (<i>Anas platyrhynchos</i>) [A053] Shoveler (<i>Anas clypeata</i>) [A056] Tufted Duck (<i>Aythya fuligula</i>) [A061] Common Scoter (<i>Melanitta nigra</i>) [A065] Goldeneye (<i>Bucephala clangula</i>) [A067] Coot (<i>Fulica atra</i>) [A125] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Lapwing (<i>Vanellus vanellus</i>) [A142] Common Tern (<i>Sterna hirundo</i>) [A193] Wetland and Waterbirds [A999] 	41.3
Middle Shannon Callows SPA	(004096)	<ul style="list-style-type: none"> Whooper Swan (<i>Cygnus cygnus</i>) [A038] Wigeon (<i>Anas penelope</i>) [A050] Corncrake (<i>Crex crex</i>) [A122] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Lapwing (<i>Vanellus vanellus</i>) [A142] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Wetland and Waterbirds [A999] 	41.5
Boyne Coast and Estuary SAC	(001957)	<ul style="list-style-type: none"> 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 (<i>Glauco-Puccinellietalia maritimae</i>) [1330] Embryonic shifting dunes [2110] 	>75



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Designated Site	Site code	Qualifying Interests	Distance to Proposed Development (km)
		<ul style="list-style-type: none"> Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] 	
Boyne Estuary SPA	(004080)	<ul style="list-style-type: none"> Shelduck (<i>Tadorna tadorna</i>) [A048] Oystercatcher (<i>Haematopus ostralegus</i>) [A130] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Lapwing (<i>Vanellus vanellus</i>) [A142] Knot (<i>Calidris canutus</i>) [A143] Sanderling (<i>Calidris alba</i>) [A144] Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Redshank (<i>Tringa totanus</i>) [A162] Turnstone (<i>Arenaria interpres</i>) [A169] Little Tern (<i>Sterna albifrons</i>) [A195] Wetland and Waterbirds [A999] 	>75

8.3.1.2 Sites of National Importance

Sites of National Importance in Ireland are termed Natural Heritage Areas (NHA) and proposed Natural Heritage Areas (pNHA).

In 1995, Proposed Natural Heritage Areas were published on a non-statutory basis but have not since been statutorily proposed or designated but are recognised for their ecological value by planning and licencing authorities and are subject to limited protection². For the purposes of this assessment pNHA's have been considered as fully designated sites. There are five NHA's and eight pNHA's within a 15km radius of the proposed development.

Table 8-4 details National Designated sites within a 15km radius and with potential connectivity to the proposed development, along with their features of interest. Figure 8-3 shows the location of the designated sites in relation to the proposed development. NPWS sites synopses and available information on proposed and designated Natural Heritage Areas can be viewed on www.npws.ie (NPWS, 2019).

See Appendix 8.3 *National Designated Site Description*, in Volume 3 of this EIAR for each NHA and pNHA site synopsis.



² Agri-environmental farm planning schemes such as Rural Environment Protection Scheme (REPS 3 and 4) and Agri Environmental Options Scheme (AEOS) continue to support the objective of maintaining and enhancing the conservation status of pNHAs. Forest Service requirement for NPWS approval before they will pay afforestation grants on pNHA lands.



Table 8-4: Summary of Nationally Designated Sites within initial 15km search radius of the proposed development

Designated Site	Site code	Features of Interest	Distance to Proposed Development (km)
Raheenmore Bog	000582	Raheenmore Bog is a classic example of a midland raised bog and the deepest remaining in Ireland. It is of high conservation importance as it contains good examples of the priority Annex I habitat active raised bog, and the non-priority habitats degraded raised bog and depressions on peat substrates (Rhynchosporion). Most of the site is owned by the NPWS and there has been considerable research and restoration work carried out on the site over the past 15 years. Of particular notes is that this is one of the few raised bogs where restoration of the lagg zone remains feasible.	5.5
Grand Canal	002104	The ecological value of the canal lies more in the diversity of species it supports along its linear habitats than in the presence of rare species. It crosses through agricultural land and therefore provides a refuge for species threatened by modern farming methods.	5.9
Cloncrow Bog (New Forest) NHA	000677	The site comprises a raised bog that includes both areas of high bog and cutover bog. The northern half of the bog is firm but wet and with a hummock/hollow microtopography, while in the southern and eastern sections the bog is wetter and spongy with good hummock/hollow microtopography, pools, inter-connecting pools, quaking areas and a flush. The site supports a good diversity of raised bog microhabitats, including pools, quaking areas, hummock/hollow complexes, a swallow hole and a small flush, as well as a number of scarce plant species	7.5
Milltownpass Bog NHA	002323	The site comprises a raised bog that includes both areas of high bog and cutover bog. This bog has pools present and is wet and quaking in places. The wet areas are formed by re-wetting of depressions on the high bog surface caused by subsidence. There is very little drainage on the high bog and no forestry. Cutover is found all around the high bog margins with encroaching scrub and a forestry plantation. Broad-leaved woodland occurs to the west of the site. This site supports a good diversity of raised bog microhabitats, including hummocks and pools and due to its easterly location, is of biogeographical importance	7.6
Rahugh Ridge (Kiltober Esker)	000918	It is a particularly fine esker ridge covered for almost its entire length in woodland. There has been some quarrying of gravel in the past.	8.6

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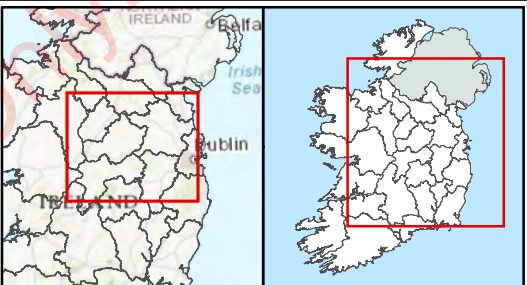
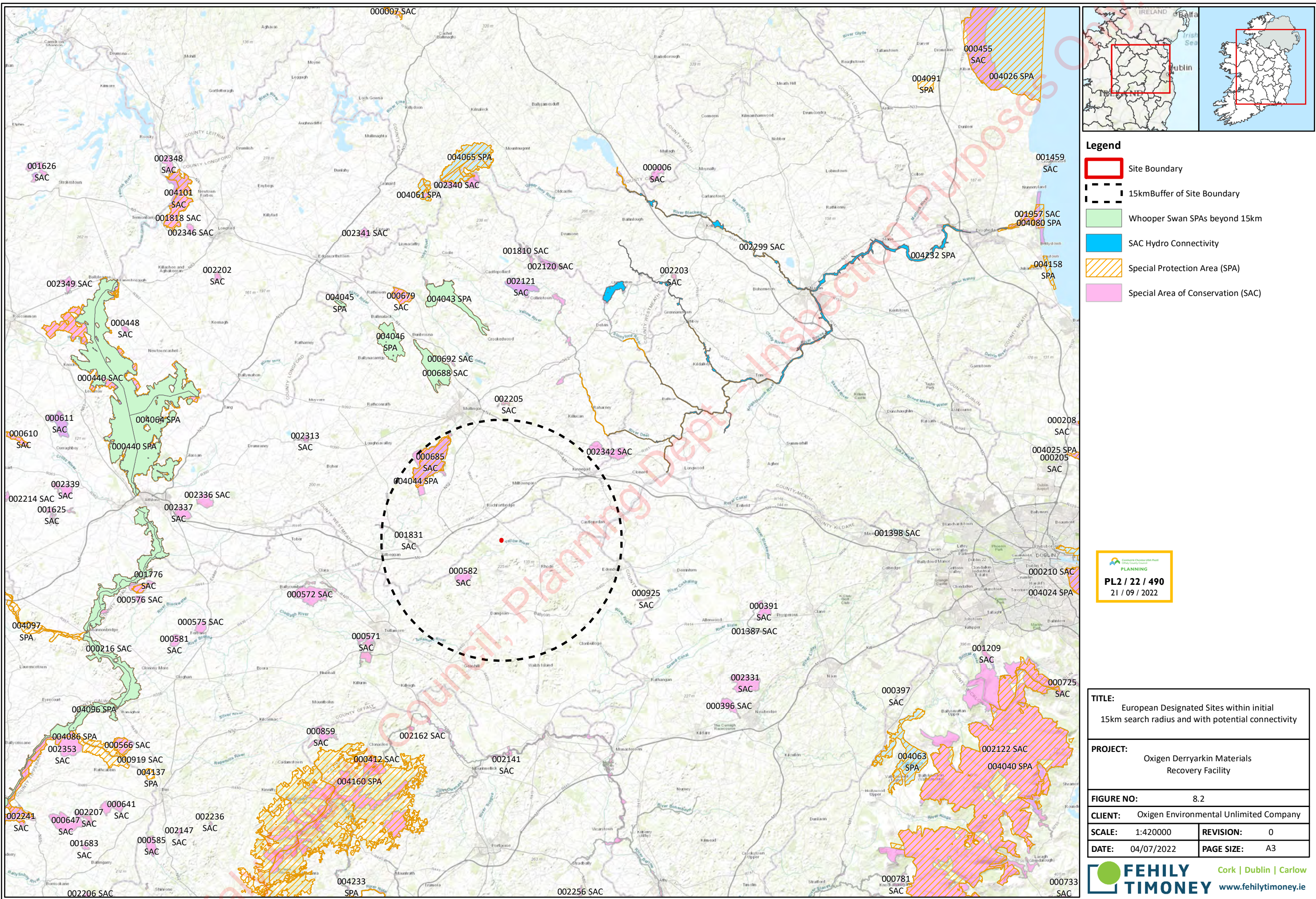
Designated Site	Site code	Features of Interest	Distance to Proposed Development (km)
Black Castle Bog NHA	000570	<p>The site comprises a raised bog that includes both areas of high bog and cutover bog. There is an absence of permanent pools on the high bog. The raised bog is of particular interest as it is one of the most easterly remaining raised bogs in the country. The peripheral area of abandoned cutover bog has developed into a range of different habitats.</p> <p>It is especially important because of its eastern location. This site also supports a wide range of habitats, especially associated with the cutover areas.</p>	9.1
Daingean Bog NHA	002033	<p>The site comprises a raised bog that includes both areas of high bog and cutover bog. The site consists of two main lobes. The northern lobe is much larger than the southern one and forms the majority of the high bog in the site. The lobes are separated by a drain running through a narrow, low-lying section between them. The cutover areas surrounding the site have, for the most part, been reclaimed for agriculture. The bog is of particular interest as it is one of the most easterly remaining raised bogs in the country. It is especially important because of its eastern location, at the extreme of the range of raised bogs in Ireland.</p>	9.9
Split Hills And Long Hill Esker	001831	<p>Split Hill and Long Hill Esker is one of the finest and longest wooded eskers in the country. It is also one of the few woodlands in the area and a fine geomorphological feature of great scenic value. The trees are particularly well-grown and impressive, and much of the woodland has developed naturally on its steep slopes. The presence of a species-rich ground flora, which includes a rare and legally protected plant species at its only known Irish location, makes this site of great botanical and ecological importance.</p> <p>The site also supports some excellent examples of calcareous grassland which is rich in orchids. The increasing rarity of this habitat (due to agricultural intensification) is recognised in that it is awarded priority status on Annex I of the E.U. Habitats Directive.</p>	10.1
Lough Ennell	000685	<p>Lough Ennell is of significance as a highly productive lake which supports a rich variety of lower plant and invertebrate species. Its lakeshore habitats, which include alkaline fen, a habitat listed on Annex I of the E.U. Habitats Directive, support a diverse flora. These habitats also provide important refuges for wildfowl.</p>	10.6



Designated Site	Site code	Features of Interest	Distance to Proposed Development (km)
Ardan Wood	001711	Ardan Wood is a crescent shaped woodland on a steep slope, about 5km west of Kilbeggan, forming the edge to a broader deposit of glacial drift than the normal eskers. It is a valuable demonstration of the natural climax forest type that the other esker vegetation is approaching and forms an important part of the series of woodlands in the east of the country.	11.0
Murphy's Bridge Esker	001775	This elongated gravel ridge is a feature of glaciation. The ridge runs in a north-east/south-west direction and is bisected by the Grand Canal approximately 7km north-east of Tullamore. The site is contiguous with Rahugh Esker. This site remains a good example of its type and has a range of habitats present. Of particular interest is its rich calcicole flora on exposed gravel slopes, which includes two rare species, one of which is protected by law.	11.2
Nure Bog NHA	001725	The site comprises a raised bog that includes both areas of high bog and cutover bog and adjoins Lough Ennell to the east. his raised bog was originally part of a larger area that has now been mostly cutover and reclaimed for agriculture. Although this bog has no pools there are hummocks throughout the high bog. Cutover is found all around the high bog and there is an area of coniferous forestry on the cutover in the south of the site. This site supports a good diversity of raised bog microhabitats, including hummocks and directly adjoins Lough Ennell SAC.	12.6
Royal Canal	002103	The ecological value of the canal lies more in the diversity of species it supports along its linear habitats than in the presence of rare species. It crosses through agricultural land and therefore provides a refuge for species threatened by modern farming methods.	13.1

8.3.1.3 Other Designated Sites

There is one nature reserve within a 15km radius of the site: Raheenmore Bog SAC 000582. There are no other nature reserves or other designated sites within 15km of the proposed development.



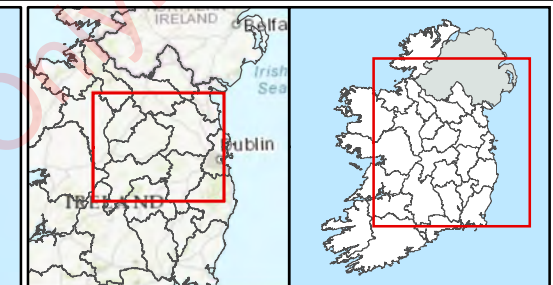
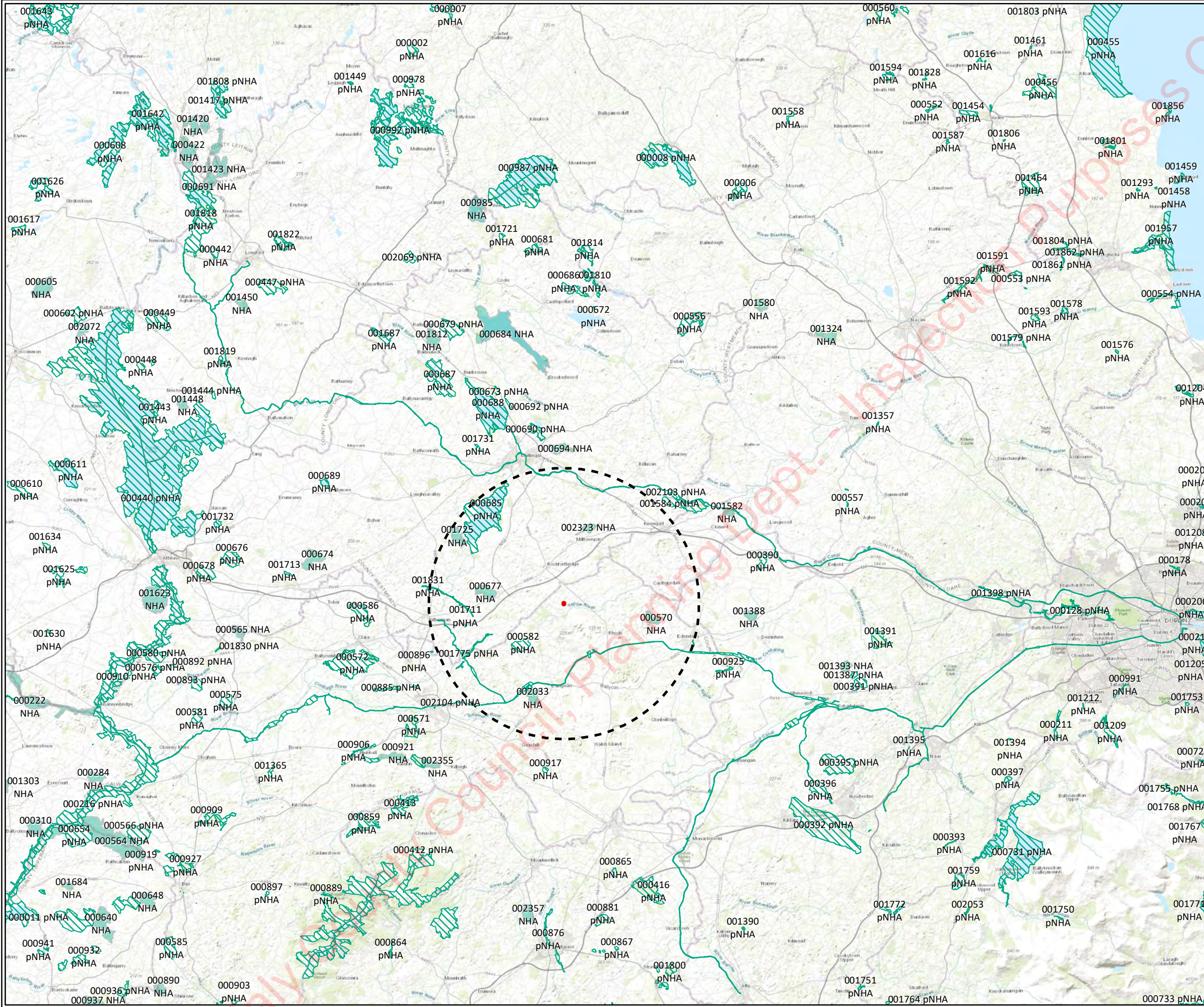
- Legend**
- Site Boundary
 - 15km Buffer of Site Boundary
 - Whooper Swan SPAs beyond 15km
 - SAC Hydro Connectivity
 - Special Protection Area (SPA)
 - Special Area of Conservation (SAC)

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TITLE: European Designated Sites within initial 15km search radius and with potential connectivity	
PROJECT: Oxigen Derryarkin Materials Recovery Facility	
FIGURE NO:	8.2
CLIENT:	Oxigen Environmental Unlimited Company
SCALE: 1:420000	REVISION: 0
DATE: 04/07/2022	PAGE SIZE: A3



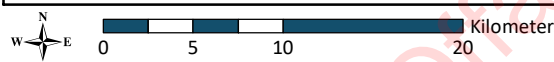
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- Legend**
- Site Boundary
 - 15km Buffer of Site Boundary
 - Proposed Natural Heritage Area (pNHA)
 - Natural Heritage Area (NHA)


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TITLE:	
NHAs and pNHAs within initial 15km search radius	
PROJECT:	
Orogen Derrarkin Materials Recovery Facility	
FIGURE NO: 8.3	
CLIENT: Orogen Environmental Unlimited Company	
SCALE: 1:420000	REVISION: 0
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8.3.2 Habitats

In this section habitats found within the proposed development site are summarised and considered with regards to their potential ecological quality and value.

Habitat mapping was carried out following the methodology and habitat guidelines previously outlined (section 8.2.5.1). Habitat types identified within the study area are illustrated in Figure 8-4 and are described below.

A total of six habitats and habitat mosaics have been identified within the proposed development planning boundary:

- agricultural grassland / neutral grassland (GA1 / GS1);
- recolonised bare ground (ED3);
- earth bank (BL2);
- buildings and artificial surfaces (BL3);
- treeline (WL2), and;
- dry meadow and grassy verges / drainage ditch (GS2 / FW4).

8.3.2.1 *Buildings and Artificial Surfaces BL3*

The proposed development site is dominated by large agricultural buildings and hard standing with a large pile of tractor tyres present (refer to Plate 8-1). A road is present within the southern section of the site boundary that is in constant use by large plant machinery of the quarry to the west (refer to Plate 8-2).

Habitat Evaluation: Due to the minimal vegetation on the hard standing, the limited potential for recolonisation, along with the constant movement of traffic along the road, this habitat is deemed to be of **Site Ecological Value** only.



Plate 8-1: Buildings and Artificial Surfaces (BL3). Looking south west from the north east corner of the site



Plate 8-2: Artificial Surfaces (BL3). Road to the south of the development site looking east.



8.3.2.2 Agricultural Grassland / Neutral Grassland (GA1 / GS1)

The western section of the site (including an old stone soakaway) is dominated by grassland that has colonised from the adjacent land parcel (refer to Plate 8-3). The adjacent land parcel appears to have previously been agricultural grazed land that has remained unmanaged for a number of years. The grass species that have within the habitat include Yorkshire fog (*Holcus lanatus*), perennial ryegrass (*Lolium perenne*), timothy (*Phleum pratense*), common bent (*Agrostis capillaris*), red fescue (*Festuca rubra*), Italian ryegrass (*Lolium multiflorum*) and cocks foot (*Dactylis glomerata*). The broadleaved herbs are dominated by nettle (*Urtica dioica*), buttercup species (*Ranunculus* spp.) and willowherb species (*Epilobium* spp.). Less common species present include docks (*Rumex* spp.), thistles (*Cirsium* spp.), white clover (*Trifolium repens*) and herb-robert (*Geranium robertianum*).

Habitat Evaluation: Due to the low diversity of mainly common species and the prevalence of the habitat type within the greater surroundings, it is deemed to be of **Local Ecological Importance**.



Plate 8-3: Agricultural Grassland / Neutral Grassland (GA1 / GS1). Western boundary looking west into adjacent land parcel

8.3.2.3 Earth Bank BL2

The northern boundary of the site is marked out by an earth bank with grasses and broadleaved herbs (refer to Plate 8-4). The grass species comprise of the same species identified within the agricultural / neutral grassland (see above). The broadleaved herbs are dominated by nettle, willowherb species and hedge mustard (*Sisymbrium officinale*).



Other species include common nipplewort (*Lapsana communis*), common groundsel (*Senecio vulgaris*), hedge parsley (*Torilis arvensis*), shepherds purse (*Capsella bursa-pastoris*) and common mouse-ear (*Cerastium fontanum*).

Habitat Evaluation: Due to the presence of mainly common and widespread species, this habitat is deemed to be of **Site Ecological Value** only.



Plate 8-4: Earth Bank (BL2). Northern earth bank.

8.3.2.4 Recolonised Bare Ground ED3

The eastern boundary of the site comprises recolonised bare ground dominated by nettle and thistle species. Growth of the dominant species at the time of the survey was approximately 50-100 cm (refer to Plate 8-5).

Habitat Evaluation: Due to the low species diversity and the presence of mainly common and widespread species, this habitat is deemed to be of **Site Ecological Value** only.



Plate 8-5: Recolonised Bare Ground (ED3) along the eastern boundary.

8.3.2.5 Treeline WL2

A small treeline of Cypress (*Cupressus × leylandii* and *sempervirens*) and elder (*Sambucus nigra*) trees is located within the western section of the site (refer to Plate 8-6). The Cypress species present are both mature (>10m in height) and immature. The elder is approximately 5m in height. The treeline is split into two sections with a 3-5m gap between, is unmanaged, and approximately 30m in length.

Habitat Evaluation: Due to the low species diversity and prevalence of non-native conifer trees, this habitat is deemed to be of **Site Ecological Value** only.



Plate 8-6: Treeline (WL2) on the south western boundary

8.3.2.6 Dry Meadow and Grassy Verges / Drainage Ditch GS2 / FW4

The ditch to the south of the proposed development site ranges between 3-5m wide at the top of the bank and is approximately 4m deep (refer to Plate 8-7 and Plate 8-8). The water level at the time of survey was 30-50cm. Broadleaved herb species present along the banks and along the northern verge include abundant docks, nettle and thistle species with occasional hogweed (*Heracleum sphondylium*), cow parsley (*Anthriscus sylvestris*), scentless mayweed (*Tripleurospermum inodorum*), hedge mustard and silverweed (*Argentina anserina*). Rarer species present include field vetch (*Vicia sativa*), ribwort plantain (*Plantago lanceolata*), long-headed poppy (*Papaver dubium*), black medic (*Medicago lupulina*) and bittercress (*Barbarea vulgaris*).

Habitat Evaluation: This habitat is frequent in the surrounding area and comprises common flora species. However, this habitat is part of the network of habitats and corridors for wildlife to flourish in the locality and connects to watercourses downstream of higher value. This habitat is therefore, deemed to be of **Local Ecological Importance**.

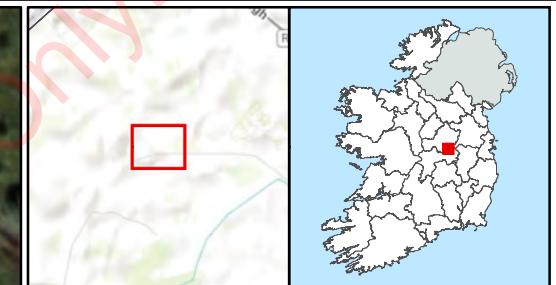
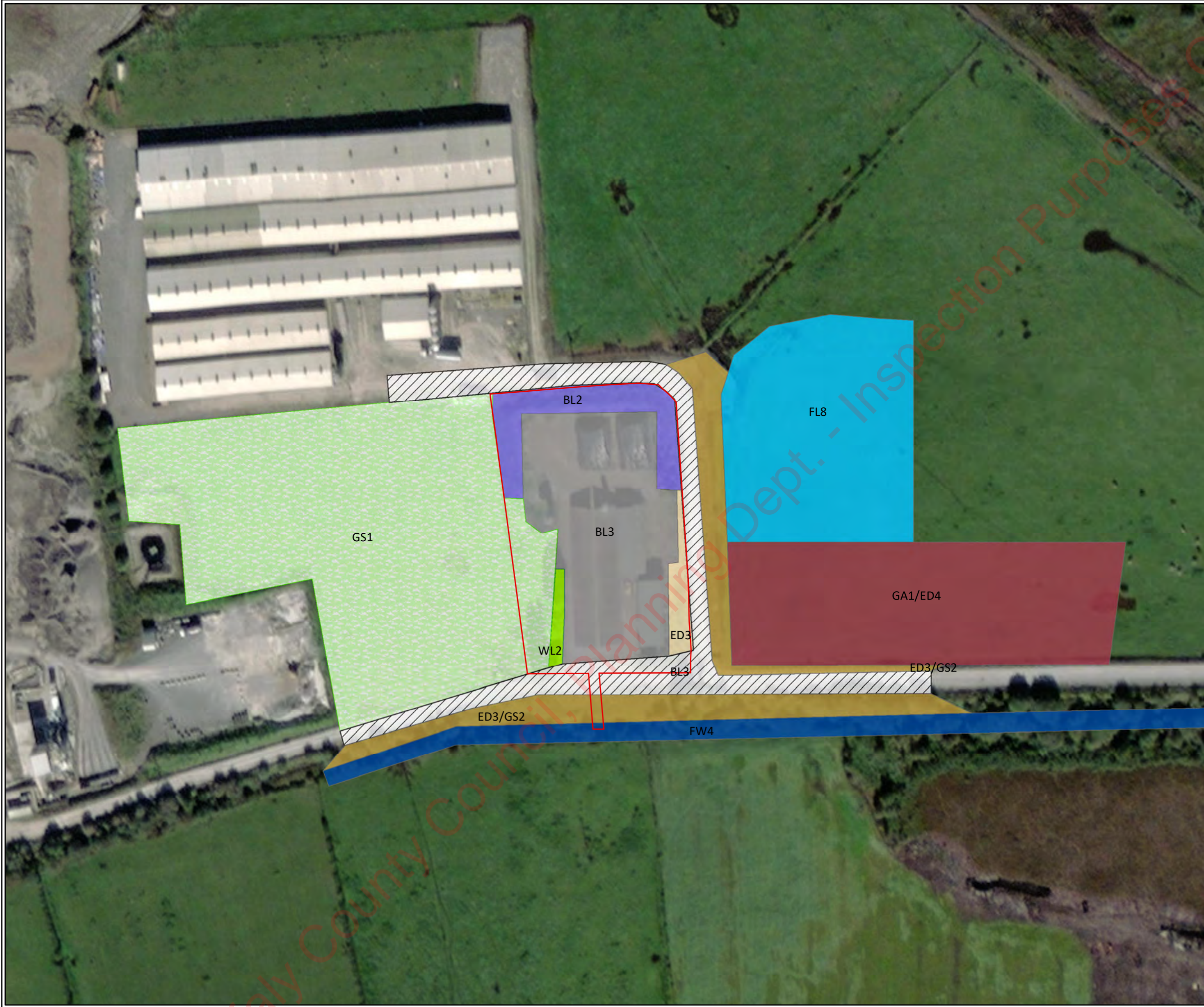


Plate 8-7: Dry Meadow and Grassy Verges / Drainage Ditch GS2 / FW4 (looking east from site)



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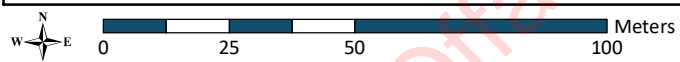
Plate 8-8: Dry Meadow and Grassy Verges / Drainage Ditch GS2 / FW4 (looking west from site)



- Legend**
- Site Boundary
- Habitats**
- Site Code and Description:
- BL2: Recolonised mound
 - BL3: Buildings and hard standing
 - BL3: Road
 - ED3/GS2: Recolonised bare ground/grass verge
 - ED3: Recol bare ground
 - FL8: Artificial pond
 - FW4: Drainage ditch
 - GA1/ED4: Quarry/Grassland
 - GS1: Grassland
 - WL2: Treeline

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TITLE:	Habitats
PROJECT:	Oxigen Derrparkin Materials Recovery Facility
FIGURE NO:	8.4
CLIENT:	Oxigen Environmental Unlimited Company
SCALE:	1:1500
REVISION:	0
DATE:	14/06/2022
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8.3.3 Flora Species

This section presents the results of a flora-based desktop review and field surveys. Invasive flora species are also considered within this section.

8.3.3.1 Desktop Study - Flora

Table 8-5 presents the findings of the desktop study for grid squares N43 (NBDC ³ and NPWS ⁴, 2022).

The conservation categories in Table 8-5 are based on the checklist of Protected and Threatened Species in Ireland (Wildlife Manuals, No. 116.). No flora identified during the desk study is listed on the Flora (Protection) Order, 2022. The remaining 75 species identified within the historic records are of least concern (IUCN Red List categories).

Table 8-5: Protected flora species recorded within 10 km grid square N43 (NBDC and NPWS, 2022)

Name	EU HD*	Red List Status**
Blue Fleabane (<i>Erigeron acer</i>)		EN
Scissors Pincerwort (<i>Cephalozia loitlesbergeri</i>)		VU
Large White-moss (<i>Leucobryum glaucum</i>)	IV	LC
Reindeer Moss (<i>Cladonia portentosa</i>)	V	
Cladonia tenuis (<i>Cladonia ciliata</i> var. <i>ciliata</i>)	V	

* European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011), as amended

** The latest Red List assessment of the Irish flowering plants by Wyse Jackson *et al.* (2016) and Bryophytes by Lockhart *et al.* (2012).

IUCN Red List categories and their abbreviations

EN – Endangered: those species that possess a very high risk of extinction as a result of rapid population declines of 50 to more than 70 percent over the previous 10 years (or three generations), a current population size of fewer than 250 individuals, or other factors.

VU – Vulnerable: those species that possess a very high risk of extinction as a result of rapid population declines of 30 to more than 50 percent over the previous 10 years (or three generations), a current population size of fewer than 1,000 individuals, or other factors.

LC - Least Concern: where it is evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

³ Accessed May 2022

⁴ Received February 2022



8.3.3.2 Results of Flora Survey

No Flora (Protection) Order (2022) species or red listed species were identified during surveys of the study area. Species identified present are common and widespread. Appendix 8.4 *Species List*, in Volume 3 of this EIAR lists flora species identified during the survey.

Overall, the proposed development site is assessed as being of *Site Ecological Value* only for flora species.

8.3.3.3 Desktop Study – Non-native Invasive Flora

Four non-native invasive flora species have been recorded within the 10 km grid square N43 (Biodiversity Ireland online database). These species are listed as both high and moderate impact non-native invasive species as identified by Biodiversity Ireland and Kelly et al (2013), refer to Table 8-6 below for the species and their level of impact.

Table 8-6: Invasive flora species recorded within 10 km grid square N43 (NBDC and NPWS, 2021)

Name	Impact Level	Invasive Species under Regulation S.I. 477 (Ireland)
Cherry Laurel (<i>Prunus laurocerasus</i>)	high	No
Japanese Knotweed (<i>Fallopia japonica</i>)	high	Invasive Species under Regulation S.I. 477 (Ireland); 'Third Schedule' species under Regulations 49 & 50 in the European Communities (Birds and Natural Habitats) Regulations 2011 - 2021
Rhododendron (<i>Rhododendron ponticum</i>)	high	Invasive Species under Regulation S.I. 477 (Ireland); 'Third Schedule' species under Regulations 49 & 50 in the European Communities (Birds and Natural Habitats) Regulations 2011 - 2021
Sycamore (<i>Acer pseudoplatanus</i>)	medium	No

Japanese Knotweed is a schedule III species, non-native species subject to restrictions under Regulations 49 and 50, Part 1 plants, the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011), as amended. Which makes it an offence to cause the spread of plant species listed on the Schedule.

Schedule III invasive flora species pose a risk to economic, agricultural and/ or natural environments.



8.3.3.4 Results of Invasive Flora Surveys

None of the species identified in the desk study, and no other invasive flora species were identified within the study area during the surveys undertaken on 17th June 2021.

8.3.4 Terrestrial Mammals

This section details the findings of the desktop study and field surveys, for terrestrial mammals.

8.3.4.1 Desktop Study Rare and Protected Mammals

Table 8-7 presents the findings of the desktop study for grid square N43 (NBDC, 2022)⁵ and NPWS 10km search radius of the proposed development (NPWS, 2022)⁶.

The conservation categories in Table 8-7 are based on the checklist of protected and threatened species in Ireland (Wildlife Manuals, No. 116.):

Table 8-7: Mammal Desktop Study Results

Mammal Name	EU HD*	WA**	Conservation Status (Marnell <i>et al.</i> 2019)
Badger (<i>Meles meles</i>)		✓	LC
Hedgehog (<i>Erinaceus europaeus</i>)		✓	LC
Otter (<i>Lutra lutra</i>)	II IV	✓	LC
Pine marten (<i>Martes martes</i>)	V	✓	LC
Pygmy shrew (<i>Sorex minutus</i>)		✓	LC
Red squirrel (<i>Sciurus vulgaris</i>)		✓	LC

* European Council, Habitats Directive 92/43/EEC

** Wildlife Act 1976, as amended

Only badger have been recorded within a 1km grid square overlapping the study area at c. 200m south. The closest otter record is c. 1.1km west of the proposed development which is hydrologically connected to the development site.

⁵ Accessed May 2022

⁶ Received February 2022



8.3.4.2 Results of Mammal Field Surveys

The riparian habitat along the drainage ditch is suitable for otter and the earth banks along the northern boundary have limited suitability for badger. The treeline has limited suitability for red squirrel and pine marten and the overgrown scrub ground flora has limited suitability for hedgehog. The treeline undergrowth and grassland have suitable foraging grounds for pygmy shrew.

No mammal evidence or sightings were recorded during the survey undertaken on 17th June 2021.

Overall, the proposed development site is assessed as being of **Site Ecological Value** only for mammals.

8.3.4.3 Desktop Study Invasive Mammal Species

Table 8-8 presents the findings of the desktop study for grid square N43 (NBDC, 2022)⁷ and NPWS 10km search radius of the proposed development (NPWS, 2022)⁸.

The conservation categories are based on the checklist of Protected and Threatened Species in Ireland (Wildlife Manuals, No. 116.), the 'Impact Level' (as defined in Kelly et al. 2013) and status with regard to European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011), as amended:

Table 8-8: Invasive Mammals Species Desktop Study Results

Name	Impact Level	Status	Date of last Record	Conservation Status in Ireland (Marnell <i>et al.</i> 2019)
American Mink (<i>Mustela vison</i>)	High	Invasive Species under Regulation S.I. 477/2011, (as amended) (Ireland);	2017	Not Assessed
Brown Rat (<i>Rattus norvegicus</i>)	High	Invasive Species under Regulation S.I. 477/2011, (as amended)(Ireland); 'Third Schedule' species under Regulations 49 & 50 in the European Communities (Birds and Natural Habitats) Regulations 2011 – 2021.	2017	Not Assessed
Eastern Grey Squirrel (<i>Sciurus carolinensis</i>)	High	Invasive Species under Regulation S.I. 477/2011, (as amended)(Ireland); EU Regulation No. 1143/2014 'Third Schedule' species under Regulations 49 & 50 in the European Communities (Birds and Natural Habitats) Regulations 2011 – 2021.	2012	Not Assessed

⁷ Accessed May 2022

⁸ Received February 2022



Name	Impact Level	Status	Date of last Record	Conservation Status in Ireland (Marnell <i>et al.</i> 2019)
European Rabbit (<i>Oryctolagus cuniculus</i>)	Medium	None	2013	Least Concern
Fallow Deer (<i>Dama dama</i>)	High	Invasive Species under Regulation S.I. 477/2011, (as amended) (Ireland);	2015	Least Concern
Greater White-toothed Shrew (<i>Crocidura russula</i>)	High	None	2017	Not Assessed

8.3.4.4 Results of Invasive Mammal Field Surveys

During site surveys invasive species identified within the desk study were not observed within or nearby the study area, however, they are likely to be in the general area. These species are all invasive mammal species and as such they negatively impact biodiversity.

8.3.5 Bats

This section details the findings of the desktop study and preliminary roost assessment of the site for bats.

8.3.5.1 Desktop Study - Bats

A desktop review of information available from the NBDC and NPWS indicated that the following species have been recorded within the grid square N43 (NBDC, 2022)⁹, NPWS 10km search radius of the proposed development (NPWS, 2022)¹⁰ and within the 10km search radius of N48561, 36794 (BCI, 2021)¹¹. Table 8-9 details the species records for NBDC and NPWS.

⁹ Accessed May 2022

¹⁰ Received February 2022

¹¹ Received April 2021



Table 8-9: Bat Species Desktop Study Results

Bat Name	Legal Protection	Year of Last Record	Conservation Status (Marnell <i>et al.</i> 2019)
Lesser Noctule (<i>Nyctalus leisleri</i>)	EU Habitats Directive (92/43/EEC) Annex IV, Wildlife Act 1976, as amended	2009	Least Concern
Daubenton's Bat (<i>Myotis daubentonii</i>)	EU Habitats Directive (92/43/EEC) Annex IV, Wildlife Act 1976, as amended	2009	Least Concern
Common Pipistrelle (<i>Pipistrellus sensu lato</i>)	EU Habitats Directive (92/43/EEC) Annex IV, Wildlife Acts 1976, as amended	2009	Least Concern
Soprano Pipistrelle (<i>Pipistrellus pygmaeus</i>)	EU Habitats Directive (92/43/EEC) Annex IV, Wildlife Acts 1976, as amended	2009	Least Concern

The closest roost identified by BCI records is 7.8km south east of the proposed, with the closest ad-hoc observations having been recorded c. 2km north of the proposed development. There are nine roosts that are identified within the 10km search radius from BCI records for common pipistrelle, soprano pipistrelle and brown long-eared bat. There are no records of bat species within 2km of the proposed development.

The bat landscape suitability index is a scoring system (Lundy, M.G., *et al.*, 2011) and was assessed through on-line mapping on the National Biodiversity Data Centre webpage (<https://maps.biodiversityireland.ie/>). The degree of favourability ranges from 0 – 100, with 0 being least favourable and 100 most favourable for bats. The values of the grid squares represent the range of habitat suitability values the bat species can tolerate within each individual square.

When the proposed development was assessed for 'all bat species' a result of 19.11 was produced (NBDC, 2022)¹². This figure conveys that the area encompassing the proposed development is not suitable for bat species, refer to Plate 8-9.

¹² Accessed May 2022

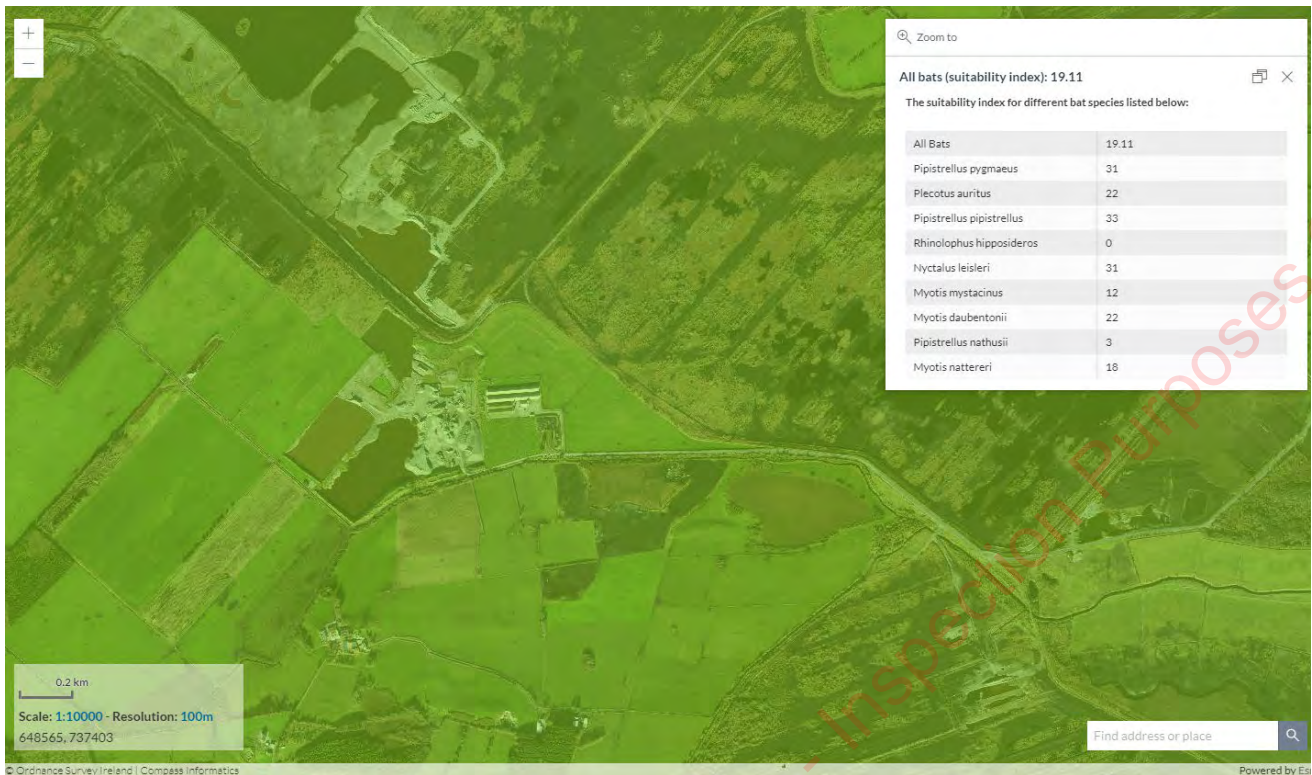
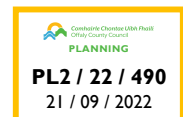


Plate 8-9: Bat landscape suitability index

8.3.5.2 Results of Bat Survey

The following site structures are currently present on-site:

- 1 no. portal frame shed with concrete slatted floor, underground slurry storage tanks;
- 1 no. 4 bay shed unit;
- 1 no. steel frame hay shed;
- 1 no. pump house;
- 1 no. above ground fuel oil storage tank;
- 1 no. feed silo;
- 1 no. above ground, raised water storage tank;
- 2 no. covered pits.



The structures within the proposed development did not comprise suitable roosting features for bats. No evidence of bat presence was found / observed during the survey. Therefore, all structures within the proposed development were assessed as being of negligible suitability for roosting bats.

No further structures within the study area, beyond the proposed development boundary, were assessed for bats. However, the buildings to the north within the piggery are comprised of a block wall base with a steel frame and cladded roof. No suitable external roosting features were observed during the survey. For a full description and photographs of the structures within the proposed development site refer to Chapter 4: Description of the Development in Volume 2 of this EIAR.



As described in section 8.3.2.5 *Treeline (WL2)*, there is a small treeline of Cypress and elder trees located within the western section of the site. The trees are of sufficient size and age to contain PRFs, but no such features were seen from the ground during the survey. Further trees within 50m of the proposed development are immature and categorised as being of negligible suitability for roosting bats as they contained no potential roosting features.

No bat evidence or sightings were recorded during the survey undertaken on 17th June 2021.

Overall, the proposed development site is assessed as being of *Site Ecological Value* only for bats.

8.3.6 Avifauna Survey

This section details the findings of the desktop study and field surveys, in relation to bird species.

8.3.6.1 Desktop Study – Avifauna

A total of 38 Red or Amber-listed species as per Gilbert *et al.* (2021) bird species have been recorded within grid square N43 (NBDC, 2022)¹³ these species are detailed in Table 8-10.

Of these 38 species, 16 are on the current 'Birds of Conservation Concern in Ireland' (BoCCI) Red list; these include barn owl, kestrel, common pochard, common snipe, common swift, corncrake, Eurasian curlew, woodcock, goldeneye, European nightjar, grey partridge, lapwing, red grouse, stock dove, whinchat, and yellowhammer (Gilbert *et al.*, 2021). Twenty-two of these species recorded are on the Amber list (BoCCI) (Gilbert *et al.*, 2021). Six Annex I species of the EU Birds Directive have been recorded historically, these species are corncrake, golden plover, European nightjar, merlin, peregrine falcon and whooper swan.

A review of the Irish Wetland Bird Survey (I-WeBS) sites within 10km of the proposed development site was undertaken, there are no I-WeBS sites within this search radius. The closest site is Lough Ennell SPA 11.3km north west (Lough Ennell; Site Code OW007).

Table 8-10: Avifauna Desk Study Records

Scientific name	Common name	Year of last record	*BoCCI status	**Annex I status
<i>Tyto alba</i>	Barn Owl	2016	Red	No
<i>Hirundo rustica</i>	Barn Swallow	2012	Amber	No
<i>Larus ridibundus</i>	Black-headed Gull	2011	Amber	No
<i>Fulica atra</i>	Common Coot	2011	Amber	No
<i>Locustella naevia</i>	Common Grasshopper Warbler	2011	Green	No
<i>Falco tinnunculus</i>	Common Kestrel	2016	Red	No

¹³ Accessed May 2022

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Scientific name	Common name	Year of last record	*BoCCI status	**Annex I status
<i>Carduelis cannabina</i>	Common Linnet	2011	Amber	No
<i>Phasianus colchicus</i>	Common Pheasant	2011	Green	No
<i>Aythya ferina</i>	Common Pochard	2011	Red	No
<i>Gallinago gallinago</i>	Common Snipe	2016	Red	No
<i>Sturnus vulgaris</i>	Starling	2011	Amber	No
<i>Apus apus</i>	Common Swift	2011	Red	No
<i>Columba palumbus</i>	Common Woodpigeon	2011	Green	No
<i>Crex crex</i>	Corncrake	1972	Red	Yes
<i>Numenius arquata</i>	Eurasian Curlew	2019	Red	No
<i>Anas crecca</i>	Eurasian Teal	2011	Amber	No
<i>Passer montanus</i>	Eurasian Tree Sparrow	2011	Amber	No
<i>Anas pepelophe</i>	Eurasian Wigeon	2011	Amber	No
<i>Scolopax rusticola</i>	Woodcock	1984	Red	No
<i>Pluvialis apricari</i>	European Golden Plover	2011	Red	Yes
<i>Caprimulgus europaeus</i>	European Nightjar	1972	Red	Yes
<i>Podiceps cristatus</i>	Great Crested Grebe	2011	Amber	No
<i>Perdix perdix</i>	Grey Partridge	1972	Red	No
<i>Delichon urbicum</i>	House Martin	2012	Amber	No
<i>Passer domesticus</i>	House Sparrow	2011	Amber	No
<i>Larus fuscus</i>	Lesser Black-backed Gull	2009	Amber	No
<i>Tachybaptus ruficollis</i>	Little Grebe	2011	Green	No
<i>Anas platyrhynchos</i>	Mallard	2011	Amber	No
<i>Falco columbarius</i>	Merlin	1984	Amber	Yes
<i>Cygnus olor</i>	Mute Swan	2011	Amber	No
<i>Vanellus vanellus</i>	Northern Lapwing	2011	Red	No
<i>Oenanthe oenanthe</i>	Northern Wheatear	1991	Amber	No
<i>Falco peregrinus</i>	Peregrine Falcon	1984	Green	Yes



Scientific name	Common name	Year of last record	*BoCCI status	**Annex I status
<i>Lagopus lagopus</i>	Red Grouse	1991	Red	No
<i>Charadrius hiaticula</i>	Ringed Plover	2011	Amber	No
<i>Columba livia</i>	Rock Pigeon	2011	Green	No
<i>Riparia riparia</i>	Sand Martin	2011	Amber	No
<i>Alauda arvensis</i>	Skylark	2011	Amber	No
<i>Muscicapa striata</i>	Spotted Flycatcher	2011	Amber	No
<i>Columba oenas</i>	Stock Dove	2011	Red	No
<i>Aythya fuligula</i>	Tufted Duck	2011	Amber	No
<i>Saxicola rubetra</i>	Whinchat	1991	Red	No
<i>Cygnus cygnus</i>	Whooper Swan	2016	Amber	Yes
<i>Emberiza citrinella</i>	Yellowhammer	2011	Red	No

8.3.6.2 Whooper Swan Vantage Point Survey Results

Results of bird surveys are summarised below; full results are included as Appendix 8.5 *Avifauna Survey Results* in Volume 3 of this EIAR.

During the winter VP surveys, a total of 11 species were observed. These species include four BoCCI red-listed lapwing, kestrel, golden plover and curlew; four amber-listed whooper swan, teal, mute swan and black-headed gull (*Chroicocephalus ridibundus*); two green listed little grebe and little egret (*Egretta garzetta*) (Gilbert *et al.*, 2021); great white egret (*Ardea alba*) are not listed in Ireland. Of these, four species (whooper swan, golden plover, little egret and great white egret) are also Annex I species.

When present at the roosting site, all whooper swans would fly to the feeding field. Refer to Appendix 8.5 *Avifauna Survey Results* in Volume 3 of this EIAR for figure identifying roosting and feeding locations.

There were no observations of whooper swans using the proposed development site to roost or feed during the vantage point surveys and no other species were observed within the boundary of the proposed development site during the survey undertaken on 17th June 2021.

8.3.6.3 Bird Assemblage

Common species such as robin (*Erithacus rubecula*), wren (*Troglodytes troglodytes*), blackbird (*Turdus merula*), blue tit (*Parus caeruleus*), great tit (*Parus major*), song thrush (*Turdus philomelos*), house martin (*Delichon urbicum*), hooded crow (*Corvus corone cornix*), rook (*Corvus frugilegus*), jackdaw (*Corvus monedula*), magpie (*Pica pica*) and wood pigeon (*Columba palumbus*) were observed feeding over adjacent land parcels and/or using the hedgerow on the bank of the drainage ditch.



There is evidence that the buildings are used by house martin, empty nests were observed on the rafters of the adjacent four bay agricultural shed unit (refer to Chapter 4: Description of the Development in Volume 2 of this EIAR).

The conifer trees within the treeline have limited suitability for bird species.

Overall, the proposed development site is assessed as being of **Local Ecological Importance** for bird species.

Refer to Table 8-11 for a summary of the avifauna species identified during surveys:

Table 8-11: Summary of Avifauna Field Survey Results

Species Name	BoCCI Status	Annex I status
Blackbird (<i>Turdus merula</i>)	Green	No
Black-headed Gull (<i>Chroicocephalus ridibundus</i>)	Amber	No
Blue tit (<i>Parus caeruleus</i>)	Green	No
Curlew (<i>Numenius arquata</i>)	Red	No
European Golden Plover (<i>Pluvialis apricari</i>)	Red	Yes
Great tit (<i>Parus major</i>)	Green	No
Great White Egret (<i>Ardea alba</i>)	Not listed	Yes
Hooded crow (<i>Corvus corone cornix</i>)	Green	No
House martin (<i>Delichon urbica</i>)	Amber	No
Jackdaw (<i>Corvus monedula</i>)	Green	No
Kestrel (<i>Falco tinnunculus</i>)	Red	No
Lapwing (<i>Vanellus vanellus</i>)	Red	No
Little Egret (<i>Egretta garzetta</i>)	Green	Yes
Little Grebe (<i>Tachybaptus ruficollis</i>)	Green	No
Magpie (<i>Pica pica</i>)	Green	No
Mute Swan (<i>Cygnus olor</i>)	Amber	No
Robin (<i>Erithacus rubecula</i>)	Green	No
Rook (<i>Corvus frugilegus</i>)	Green	No
Song thrush (<i>Turdus philomelos</i>)	Green	No
Teal (<i>Anas crecca</i>)	Amber	No
Whooper Swan (<i>Cygnus cygnus</i>)	Amber	Yes
Wood pigeon (<i>Columba palumbus</i>)	Green	No
Wren (<i>Troglodytes troglodytes</i>)	Green	No



8.3.7 Other Fauna

As discussed above (8.2.5.5), the term 'Other fauna' includes additional faunal species not covered under the above categories of Avifauna, Terrestrial Mammals or Bats. The assessment of all fauna types and groups is important to determine the diversity of species within the study area of the proposed development.

8.3.7.1 Desktop Study – Other Fauna

A desktop study for grid square N43 (NBDC, 2022)¹⁴ and NPWS 10km search radius of the proposed development (NPWS, 2022)¹⁵ records revealed 20 protected 'other fauna' species. The conservation status was also obtained from NBDC and NPWS records. These are presented in Table 8-12:

Table 8-12: Other Faunal Species Desktop Study Results

Species	Conservation Status and Legal Protection	Date of last record	Species	Conservation Status and Legal Protection	Date of last record
Common Frog (<i>Rana temporaria</i>)	Protected Species: EU Habitats Directive (92/43/EEC) >> Annex V: Wildlife Act 1976, as amended	2020	Marsh Fritillary (<i>Euphydryas aurinia</i>)	Protected Species: EU Habitats Directive Protected Species: EU Habitats Directive >> Annex II Threatened Species: Vulnerable	2020
Freshwater White-clawed Crayfish (<i>Austropotamobius pallipes</i>)	Protected Species: EU Habitats Directive (92/43/EEC) >> Annex II >> Annex V: Wildlife Act 1976, as amended	2012	Wall Brown (<i>Lasiommata megera</i>)	Endangered	2015
Dark Green Fritillary (<i>Argynnis aglaja</i>)	Vulnerable	2017	Great Yellow Bumble Bee (<i>Bombus (Subterraneobombus) distinguendus</i>)	Endangered	1974
Dingy Skipper (<i>Erynnis tages</i>)	Near threatened	2019	Large Red Tailed Bumble Bee (<i>Bombus (Melanobombus) lapidarius</i>)	Near threatened	2016
Large Heath (<i>Coenonympha tullia</i>)	Vulnerable	2019	Heath Snail (<i>Helicella itala</i>)	Vulnerable	1977
			Tree Snail (<i>Balea (Balea) perversa</i>)	Vulnerable	1977

¹⁴ Accessed May 2022

¹⁵ Received February 2022



8.3.7.2 Results of Field Survey Concerning Other Fauna

No signs or sightings of any of the fauna listed in Table 8-12 were recorded during the survey undertaken on 17th June 2021.

The proposed development site does not have suitable habitat and/or foodplants for dark green fritillary, dingy skipper, large heath, marsh fritillary, great yellow bumble bee, heath snail and tree snail.

There are potential suitable habitat and/or food plants available for common frog, wall brown and large red tailed bumble bee within the proposed development site, however, these habitats are widespread in the surrounding area.

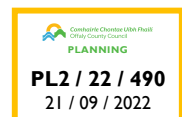
The closest record for freshwater white-clawed crayfish is c. 1km (c. 1.2km in-stream) east of the proposed development near the confluence point between the drainage ditch and the Yellow River. However, due to the slow flowing depositing nature of the drainage ditch and the extremely murky water observed during the survey, it is unlikely the species will be present within the drainage ditch network.

Overall, the proposed development site is assessed as being of **Site Ecological Value** only for other faunal species.

8.3.8 Biodiversity Evaluation

The basis of evaluation assessment should be a determination of which ecological resources within the zone of influence of the proposed development are of sufficient value to be material in decision making and therefore, included in the assessment (CIEEM 2018 and revisions).

Table 8-13: Summary of Habitat Evaluations



Habitat Type and Fossitt Code	Evaluation	Rationale	Selected as Key Ecological Receptor
Buildings and Artificial Surfaces (BL3)	Site	Artificial habitat of limited biodiversity value.	No
Agricultural Grassland / Neutral Grassland (GA1 / GS1)	Local	Common and widespread flora species. Habitat ubiquitous in the wider surroundings.	Yes
Earth Bank (BL2)	Site	Common and widespread flora species.	No
Recolonising Bare Ground (ED3)	Site	Low floral species diversity	No
Treeline	Site	Low species diversity	No



Habitat Type and Fossitt Code	Evaluation	Rationale	Selected as Key Ecological Receptor
(WL2)			
Dry Meadow and Grassy Verges / Drainage Ditch (GS2 / FW4)	Local	<p>Although not within the redline boundary, potential impacts may occur as part of the proposed development.</p> <p>Part of the network of habitats and corridors for wildlife to flourish in the locality and connects to watercourses downstream of higher value.</p>	Yes

8.3.8.1 Habitat Evaluation

Table 8-13 outlines the ecological resources in the form of habitat types found within the study area, their evaluation and the key ecological receptors are identified:

8.3.8.2 Fauna (Excluding Avifauna) Evaluation

Table 8-14 outlines the key receptors selected for fauna selected for assessment and their rationale:

Table 8-14: Summary of Fauna Evaluations and Selection as Key Ecological Receptors

Species Name	Conservation Status	Evaluation	Rationale	Key Ecological Receptor
Terrestrial Mammals				
Badger	Wildlife Act 1976 (as amended), Least Concern	Site Value	Likely present in habitats surrounding the proposed development site.	No
Hedgehog	Wildlife Act 1976 (as amended), Least Concern	Site Value	Likely present in habitats surrounding the proposed development site.	No
Otter	Wildlife Act 1976 (as amended), Annex II & IV EU Habitats Directive, Near Threatened	National Importance	Species likely to occur in surrounding landscape. Potential indirect effects via hydrological pathways.	Yes
Pine Marten	Wildlife Act 1976 (as amended),	National Importance	Likely present in habitats surrounding the proposed development site.	No

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Species Name	Conservation Status	Evaluation	Rationale	Key Ecological Receptor
	Annex V EU Habitats Directive, Least Concern			
Pygmy Shrew	Wildlife Act 1976 (as amended), Least Concern	National Importance	Likely present in habitats surrounding but not likely to be affected by proposed development.	No
Red Squirrel	Wildlife Act 1976 (as amended), Near Threatened	National Importance	Likely present in habitats surrounding the proposed development site.	No
Invasive Mammals				
American Mink	None	None	Invasive species of High Impact. Not found within site.	No
Brown Rat	None	None	Invasive Species of High Impact. Not found within site.	No
Grey Squirrel	None	None	Invasive Species of High Impact. Not found within site.	No
Rabbit	Least Concern	Local Importance	Invasive Species of Medium Impact. Not found within site.	No
Fallow deer	Least Concern Wildlife Act 1976, (as amended);	Local Importance	Invasive species of High Impact. Not found within site.	No
Greater White-toothed Shrew	None	None	Invasive species of no ecological value.	No
Bats				
Lesser Noctule	Wildlife Act 1976 (as amended), Annex IV EU Habitats Directive, Least Concern	National Importance	Not recorded within the site and no suitable roosting habitat present	No
Daubenton's Bat	Wildlife Act 1976 (as amended), Annex IV EU Habitats Directive, Least Concern	National Importance	Not recorded within the site and no suitable roosting habitat present	No
Common Pipistrelle	Wildlife Act 1976 (as amended), Annex IV EU Habitats Directive, Least Concern	National Importance	Not recorded within the site and no suitable roosting habitat present	No
Soprano Pipistrelle	Wildlife Act 1976 (as amended),	National Importance	Not recorded within the site and no suitable roosting habitat present	No

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Species Name	Conservation Status	Evaluation	Rationale	Key Ecological Receptor
	Annex IV EU Habitats Directive, Least Concern			
Other Fauna				
Common Frog	Annex V EU - Habitats Directive (92/43/EEC) & Wildlife Act 1976, (as amended);	National Importance	Species recorded in historical records. Potentially present in surrounding habitats including the drainage ditch	Yes
Dark Green Fritillary	Threatened Species: Vulnerable	National Importance	Species recorded in historical records. However no suitable habitat / foodplant within the proposed development.	No
Dingy Skipper	Threatened Species: Near threatened	Local Importance	Species recorded in historical records. However no suitable habitat / foodplant within the proposed development.	No
Large Heath	Threatened Species: Vulnerable	Local Importance	Species recorded in historical records. However no suitable habitat / foodplant within the proposed development.	No
Marsh Fritillary	Annex II EU Habitats Directive (92/43/EEC) & Threatened Species: Vulnerable	National Importance	Species recorded in historical records. However no suitable habitat / foodplant within the proposed development.	No
Wall Brown	Threatened Species: Endangered	Local Importance	Species recorded in historical records. Potentially present in surrounding habitats (grasslands) but not likely to be affected by proposed development.	No
Great Yellow Bumble Bee	Threatened Species: Endangered	Local Importance	Species recorded in historical records, however last record c. 45 years ago. No suitable habitat within the proposed development. It is now found only on the west coast (All Ireland Pollinator Plan ¹⁶)	No
Large Red Tailed Bumble Bee	Threatened Species: Near threatened	Local Importance	Species recorded in historical records. Potential habitat loss within the works footprint (grassland) but not likely to be affected by proposed development.	No



Species Name	Conservation Status	Evaluation	Rationale	Key Ecological Receptor
Heath Snail	Threatened Vulnerable	Species: Local Importance	Species recorded in historical records, however last record c. 45 years ago. No suitable habitat within the proposed development.	No
Tree Snail	Threatened Vulnerable	Species: Local Importance	Species recorded in historical records, however last record c. 45 years ago. No suitable habitat within the proposed development.	No

8.3.8.3 Avifauna Evaluation

Table 8-15 outlines the key avifauna receptors selected for assessment and their rationale:

Table 8-15: Avifauna Evaluation

Common Name	Conservation Status	Evaluation	Rationale	Key Ecological Receptor
Barn Owl	Red Listed	National	Historical records within the 10km grid encompassing the site, potential feeding habitat surrounding the proposed development. However, there exists large areas of similar habitat within the local area for the species to feed. No roosting or nesting sites recorded within the proposed development site.	No
Barn Swallow	Amber Listed	Local	Historical records within the 10km grid encompassing the site. The species is not likely to depend on the habitats within the proposed development for feeding or roosting.	No
Blackbird	Green Listed	Site	Observed using the adjacent lands for feeding, and potentially nesting within/ adjacent to the site.	Yes
Black-headed Gull	Red Listed	County	Historical records within the 10km grid encompassing the site. Species observed using habitats surrounding the site,	Yes

¹⁶ <https://pollinators.ie/helping-endangered-pollinators/great-yellow-bumblebee/> Accessed May 2022



Common Name	Conservation Status	Evaluation	Rationale	Key Ecological Receptor
			however, not observed within the proposed development site for feeding or roosting.	
Blue tit	Green Listed	Site	Observed using the adjacent lands for feeding, and potentially nesting within/ adjacent to the site.	Yes
Coot	Amber Listed	Local	Historical records within the 10km grid encompassing the site.	No
Common Grasshopper Warbler	Amber Listed	Local	Historical records within the 10km grid encompassing the site. Not observed within the proposed development site.	No
Common Kestrel	Red Listed	Local	Species observed using surrounding habitats. Although habitats observed within the proposed development site are conducive to that of its prey species, the species is not likely to solely depend on the habitats due to the abundance of similar habitat in the adjacent lands.	No
Common Linnet	Amber Listed	Local	Historical records within the 10km grid encompassing the site. Not observed within the proposed development site.	No
Common Pheasant	Green Listed	Local	Historical records within the 10km grid encompassing the site. Not observed within the proposed development site.	No
Common Pochard	Red Listed	National	Historical records within the 10km grid encompassing the site. Not observed within the proposed development site.	No
Common Snipe	Red Listed	National	Historical records within the 10km grid encompassing the site. Not observed within the proposed development site.	No
Common Swift	Red Listed	National	Historical records within the 10km grid encompassing the site. Not observed within the proposed development site.	No
Common Woodpigeon	Green Listed	Local	Observed using the adjacent lands for feeding, and potentially nesting within/ adjacent to the site.	Yes
Corncrake	Annex I, Red Listed	National	Historical records within the 10km grid encompassing the site, but this species is now confined to Donegal and West Connaught.	No

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EIAR for the Demolition of Agricultural Structures and the Development of a Materials Recovery Facility at Derryarkin, Rhode, Co. Offaly.

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Common Name	Conservation Status	Evaluation	Rationale	Key Ecological Receptor
Eurasian Curlew	Red Listed	National	Historical records within the 10km grid encompassing the site. Species observed using habitats surrounding the site, however, is not likely to depend on the habitats within the proposed development for feeding or roosting.	Yes
Eurasian Tree Sparrow	Amber Listed	Local	Historical records within the 10km grid encompassing the site. Not observed within the proposed development site.	No
Eurasian Wigeon	Amber Listed	Local	Historical records within the 10km grid encompassing the site. Not observed within the proposed development site.	No
European Nightjar	Annex I, Red Listed	National	Historical records within the 10km grid encompassing the site. The habitats on site are not suitable for this species.	No
Golden Plover	Annex I, Red Listed	National	Historical records within the 10km grid encompassing the site. Species observed using habitats surrounding the site.	Yes
Great White Egret	Not Listed	Local	Species observed using habitats surrounding the site, however, is not likely to depend on the habitats within the proposed development for feeding or roosting.	No
Great Crested Grebe	Amber Listed	Local Importance	Historical records within the 10km grid encompassing the site. Not observed within the proposed development site.	No
Grey Partridge	Red Listed	National	Historical records within the 10km grid encompassing the site. Not observed within the proposed development site.	No
Hooded crow	Green Listed	Site	Observed using the adjacent lands for feeding, and potentially nesting within/ adjacent to the site.	Yes
House Martin	Amber Listed	Local	Historical records within the 10km grid encompassing the site. Historic nests found within the buildings of the proposed development. Observed foraging in adjacent lands.	Yes
House Sparrow	Amber Listed	Local	Historical records within the 10km grid encompassing the site. Observed using the adjacent lands for feeding, and potentially nesting within/ adjacent to the site.	Yes

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Common Name	Conservation Status	Evaluation	Rationale	Key Ecological Receptor
Jackdaw	Green Listed	Site	Observed using the adjacent lands for feeding, and potentially nesting within/ adjacent to the site.	Yes
Little Egret	Green Listed	Local	Historical records within the 10km grid encompassing the site. Species observed using habitats surrounding the site, however, is not likely to depend on the habitats within the proposed development for feeding or roosting.	No
Little Grebe	Amber Listed	Local	Historical records within the 10km grid encompassing the site. Species observed using habitats surrounding the site, however, is not likely to depend on the habitats within the proposed development for feeding or roosting.	No
Magpie	Green Listed	Site	Observed using the adjacent lands for feeding, and potentially nesting within/ adjacent to the site.	Yes
Mallard	Amber Listed	Local	Historical records within the 10km grid encompassing the site. Not observed within the proposed development site.	No
Merlin	Annex I, Amber Listed	National Importance	Historical records within the 10km grid encompassing the site. Not observed within the proposed development site.	No
Mute Swan	Amber Listed	Local	Historical records within the 10km grid encompassing the site. Species observed using habitats surrounding the site, however, is not likely to depend on the habitats within the proposed development for feeding or roosting.	Yes
Northern Lapwing	Red Listed	National	Historical records within the 10km grid encompassing the site. Species observed using habitats surrounding the site, however, is not likely to depend on the habitats within the proposed development for feeding or roosting.	No
Northern Wheatear	Amber Listed	Local	Historical records within the 10km grid encompassing the site. Not observed within the proposed development site.	No
Peregrine	Annex I, Green Listed	National	Historical records within the 10km grid encompassing the site. Not observed within the proposed development site.	No

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Common Name	Conservation Status	Evaluation	Rationale	Key Ecological Receptor
Red Grouse	Red Listed	National	Historical records within the 10km grid encompassing the site. Not observed within the proposed development site.	No
Ringed Plover	Amber Listed	Local	Historical records within the 10km grid encompassing the site. Not observed within the proposed development site.	No
Robin	Green Listed	Site	Observed using the adjacent lands for feeding, and potentially nesting within/ adjacent to the site.	Yes
Rock Pigeon	Green Listed	Local	Historical records within the 10km grid encompassing the site. Not observed within the proposed development site.	No
Rook	Green Listed	Site	Observed using the adjacent lands for feeding, and potentially nesting within/ adjacent to the site.	Yes
Sand Martin	Amber Listed	Local	Historical records within the 10km grid encompassing the site. Not observed within the proposed development site.	No
Skylark	Amber Listed	Local	Historical records within the 10km grid encompassing the site. Not observed within the proposed development site.	No
Song Thrush	Green Listed	Site	Observed using the adjacent lands for feeding, and potentially nesting within/ adjacent to the site.	Yes
Spotted Flycatcher	Amber Listed	Local	Historical records within the 10km grid encompassing the site. Not observed within the proposed development site.	No
Starling	Amber Listed	Local	Historical records within the 10km grid encompassing the site. Not observed within the proposed development site.	No
Stock Dove	Red Listed	Local	Historical records within the 10km grid encompassing the site. Not observed within the proposed development site.	No
Teal	Green Listed	Site	Observed using the adjacent lands for feeding, and potentially nesting within/ adjacent to the site.	Yes
Tufted Duck	Amber Listed	Local	Historical records within the 10km grid encompassing the site. Not observed within the proposed development site.	No

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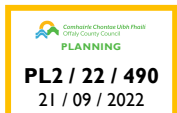
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Common Name	Conservation Status	Evaluation	Rationale	Key Ecological Receptor
Whinchat	Red Listed	National	Historical records within the 10km grid encompassing the site. Not observed within the proposed development site.	No
Whooper Swan	Annex I, Amber Listed	National	Historical records within the 10km grid encompassing the site. Species observed roosting at bog pools c. 500m east of the proposed development and feeding in agricultural fields c. 650m south east of the proposed development.	Yes
Woodcock	Red Listed	National Importance	Historical records within the 10km grid encompassing the site. The habitats on site are not suitable for this species.	No
Wren	Green Listed	Site	Observed using the adjacent lands for feeding, and potentially nesting within/ adjacent to the site.	Yes
Yellowhammer	Red Listed	National	Historical records within the 10km grid encompassing the site. This species is a farmland bird and prefers areas with large proportions of arable crops.	No

Offaly County Council, Planning Department, Planning Section, Planning Purposes Only





8.3.8.4 Aquatic Ecology Evaluation

Table 8-16 outlines the key aquatic ecology receptors selected for assessment and their rationale:

Table 8-16: Aquatic Ecology Evaluation

Species Name	Conservations Status	Geographic Importance	Rationale	Key Ecological Receptor
Atlantic Salmon	Annex II and V EU Habitats Directive (92/43/EEC) & Threatened Species: Venerable	International	Species likely to occur in connecting watercourses. Potential indirect effects via hydrological pathways.	Yes
River Lamprey	Annex II and V Eu Habitats Directive (92/43/EEC) & Threatened Species: Near Threatened	International	Species likely to occur in connecting watercourses. Potential indirect effects via hydrological pathways.	Yes
Freshwater White-clawed Crayfish	Wildlife Act 1976 (as amended), Annex II & V EU Habitats Directive ;	National Importance	Species likely to occur in connecting watercourses. Potential indirect effects via hydrological pathways.	Yes

Offaly County Council, Planning Dept. Inspection Purposes Only!



8.4 Potential Impacts

8.4.1 'Do Nothing' Impacts

If the proposed development does not proceed, the 'do nothing' scenario is that the existing environment and key receptors identified in Section 8.3.8 are likely to remain as previously described. Existing buildings present on-site will continue to deteriorate and become unstable to the point of collapse.

8.4.2 Construction Phase Impacts

8.4.2.1 *European Sites*

An Appropriate Assessment Screening Report (AASR) and Natura Impact Statement (NIS) has been prepared to provide the Competent Authority with the information necessary to complete an Appropriate Assessment for the proposed development in compliance with Article 6(3) of the Habitats Directive.

Of the 13 European sites identified within the initial 15km search radius or having connectivity to the proposed development site, two have been identified as being within the potential ZoI. The AASR identified that there is the possibility of negative effects on the River Boyne and River Blackwater SAC (002299) and SPA (004232) because of potential impacts from the proposed development either alone or in-combination with other plans and projects. The AASR further determined that there are no pathways for likely significant effects on the remaining nine European sites.

The NIS identified that potential for adverse effects due to the proposed development could occur to the following QI's of the River Boyne and River Blackwater SAC/ SPA in the absence of mitigation:

- Salmon;
- River Lamprey;
- Otter;
- Kingfisher.

However, taking cognisance of the project design and mitigation measures proposed within the NIS, the report concluded that the proposed development will not have any adverse effect on the integrity of the River Boyne and River Blackwater SAC and SPA in light of the site's conservation objectives and status.

8.4.2.2 *Natural Heritage Areas or Proposed Natural Heritage Areas*

A total of three pNHAs lie within the boundary of the study area and therefore are considered as part of the accompanying AASR and NIS. These are as follows:

- Raheenmore Bog pNHA (000582) is located within the boundary of Raheenmore Bog SAC (000582)
- Lough Ennell pNHA (000685) is located within the boundaries of Lough Ennell SAC (000685) and Lough Ennell SPA (004044)

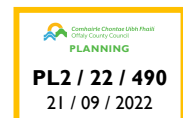




- Split Hills And Long Hill Esker pNHA (001831) is located within the boundary of Split Hills And Long Hill Esker SAC (001831).

There are a further five NHA's and five pNHA's within a 15km radius of the proposed development that are not overlapped by a European site:

- Cloncrow Bog (New Forest) NHA (000677);
- Milltownpass Bog NHA (002323);
- Black Castle Bog NHA (000570);
- Daingean Bog NHA (002033);
- Nure Bog NHA (001725);
- Grand Canal pNHA (002104);
- Rahugh Ridge pNHA (Kiltober Esker) (000918);
- Ardan Wood pNHA (001711);
- Murphy's Bridge Esker pNHA (001775);
- Royal Canal pNHA (002103).



Potential Direct Impacts

The proposed development site is not within the boundaries of any designated nature conservation site. All NHAs / pNHAs are outside the footprint, therefore, no direct impacts will occur.

Potential Indirect Impacts

In considering the potential for indirect impacts via the hydrological network, the following key information on water regions is of relevance; the proposed development is situated within the Yellow[Castlejordan]_SC_010 waterbody sub-catchment which includes the following two waterbody sub-basins that bisect the proposed development site:

- Eastern half of the proposed development site – Yellow (Castlejordan)_020
- Western half of the proposed development site – Castlejordan_020

Raheenmore Bog pNHA and Rahugh Ridge (Kiltober Esker) are hydrologically connected to the proposed development site. Raheenmore Bog pNHA, however, is c. 8km (in-stream) upstream of the confluent point between the drainage ditch and the Yellow River. Rahugh Ridge (Kiltober Esker) is a further c. 8km (in-stream) upstream on from the Raheenmore Bog pNHA in a different sub-catchment. As such, the proposed development will not have an indirect impact on these sites.

Milltownpass Bog NHA is within the same sub-basin and is hydrologically connected to the proposed development site. However, the NHA is c. 13km (in-stream) upstream of the confluent point between the Yellow [Castlejordan] River and the Castlejordan_07 which is c. 12km downstream of the confluent point between the drainage ditch and the Yellow River.



As such, the proposed development will not have an indirect impact on this site.

Cloncrow Bog (New Forest) NHA, Black Castle Bog NHA, Daingean Bog NHA and Nure Bog NHA are all designated for terrestrial / wetland habitats. They are all located in different sub-basins to the proposed development and are not hydrologically connected to the development site. As such, the proposed development will not have an indirect impact on these sites.

The proposed development is not hydrologically connected to the remaining pNHAs. As such, the proposed development will not have an indirect impact on these sites.

8.4.2.3 Overview of Key Ecological Receptors and how they may be affected by Construction Phase Impacts.

This section provides an overview of Key Ecological Receptors (as identified in Section 8.3.8), and the work activities of the proposed development that may impact them. The resultant characterisation of impacts is then provided for each.

8.4.2.3.1 Habitats and Flora

Potential Direct Impacts

The footprint of the proposed development is 0.8 ha. The most abundant habitat type within the development area is Buildings and Artificial Surfaces (BL3). Other manmade habitats include the Earth Bank (BL2) and Recolonising Bare Ground (ED3). All these habitats are modified, are of low ecological value and are not classed as key ecological receptors. Consequently, these are not considered further.

The encroaching grasslands (GA1/GS1) within the western boundary of the proposed development will be lost as part of the proposed development site clearance works. This habitat is of some local value due to the suitability for foraging mammal and bird species, however, the amount of habitat lost is minimal compared to the remaining adjacent land parcel. The resultant loss of grassland is characterised as a **Negative, Irreversible, Permanent, Not significant impact** in the absence of mitigation.

To the south of the proposed development site will be the installation of the surface water discharge outfall point. Refer to Drawing Ref: P2344-0500-0001 depicting the stormwater drainage/collection and attenuation system contained in Volume 4 of this EIAR. The installation of this outfall will result in the temporary loss of approximately 1m² of dry meadow and grassy verges on the northern bank of the drainage ditch. The resultant temporary loss of habitat is characterised as a **Negative, Reversible, Brief, Not significant impact** in the absence of mitigation.

Approximately 30m length of treeline will be lost as part of the proposed development. Although it offers potential foraging habitat and shelter for birds, small mammals and invertebrates, the treeline is of low ecological value and not classed as a key ecological receptor. Consequently, it is not considered further.

The upgrade of the junction between the private road and the R400 will result in the permanent loss of Earth Bank (BL2) and Recolonising Bare Ground (ED3). These habitats are modified, are of low ecological value and are not classed as key ecological receptors. Consequently, these are not considered further.



Potential Indirect Impacts

As the existing hard standing is to be broken out and removed, deposition of dust could affect adjacent terrestrial habitats by inhibiting plant growth and contributing to the sediment load in watercourses. However, the Air Quality and Climate Chapter (Chapter 11, Volume 2 of this EIAR) identified that 'There are no sensitive human or ecology receptors with respect to construction phase dust impacts, within 350 m of the site boundary or 500 m from the exit of the site along the road. The construction stage dust assessment does not therefore, have any receptors to assess the sensitivity of, and the dust assessment has been scoped out as there is no potential for significant impacts.' The resultant impacts from dust are considered **Negligible in a local context**.

8.4.2.3.2 Terrestrial Mammals

Potential Direct Impacts

Due to there being no signs of evidence that mammals are utilising the site and the relatively small-scale loss of suitable habitat within the site, the project will not result in a significant negative impact on the distribution of mammal fauna. Any impacts to these species are characterised as a **Negative, Reversible, Short-term, Imperceptible Impact in a local context** in the absence of mitigation.

Potential Indirect Impacts

Though no holts or evidence of otter was found at or within 150m up or down-stream of the proposed development during the surveys undertaken in June 2021, the drainage ditch and connecting Yellow River offer suitable areas for foraging. There are also historic records of the species being present along the Yellow River to the South of the proposed development. This species may therefore be indirectly impacted if water quality were to deteriorate due to the proposed development impacting prey species (refer to Section 8.4.2.3.5 for potential impacts to aquatic ecology). Further indirect impacts may occur through disturbance (noise, human presence and/or lighting). The resultant impacts are characterised as a **Negative, Reversible, Temporary, Slight impact in a local context**, in the absence of mitigation.

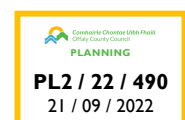
8.4.2.3.3 Avifauna

Potential Direct Impacts

As there were no observations of avifauna within the proposed development site at the time of surveys, nor suitable nesting or foraging habitats for Black-headed Gull, Common Kestrel, Eurasian Curlew, Golden Plover, Mute Swan, Northern Lapwing and Whooper Swan, therefore, there will be no direct impacts to these Key Ecological Receptors.

Abandoned / historic House Martin nests were observed within the buildings of the proposed development. The removal of the buildings would represent a loss of suitable habitat for the species. However, there are suitable habitats within the surrounding landscape and the habitat type (buildings) will be replaced as part of the proposed development. The resultant impact is characterised as a **Negative, Reversible, Temporary, Slight impact in a local context** in the absence of mitigation.

The demolition and clearance works (demolition of buildings), if carried out in the bird nesting season (preferred option – refer to Chapter 4: Description of the Existing and Proposed Development, Volume 2 of this EIAR), may result in the direct loss of House Martin nests and eggs/chicks. This impact is characterised as a **Negative, Irreversible, Permanent, Significant impact in a local context** in the absence of mitigation.

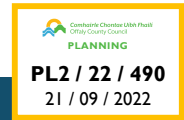




Potential Indirect Impacts

The avifauna Key Ecological Receptors Black-headed Gull, Common Kestrel, Eurasian Curlew, Golden Plover, Mute Swan, Northern Lapwing and Whooper Swan have been recorded roosting and/or feeding within 500m and 600m respectively of the proposed development site within the winter months. Table 8-17 shows the Zone of Sensitivity (McGuinness et al., 2015¹⁷) for the species.

Table 8-17: Zone of Sensitivity for Avifauna Key Ecological Receptors



Species	Zone of Sensitivity (m)
Black-headed Gull	1000
Common Kestrel	N/A
Eurasian Curlew	800
Golden Plover	800
Mute Swan	N/A (assumed to be similar to Whooper Swan)
Northern Lapwing	800
Whooper Swan	600

Common species robin, wren, blackbird, blue tit, great tit, song thrush, house martin, hooded crow, rook, jackdaw, magpie and wood pigeon were observed within adjacent land parcels and/or using the hedgerow on the bank of the drainage ditch. High levels of activity and disturbance during construction may cause birds to vacate territories close to the works, especially for species vulnerable to disturbance. The displacement of birds from areas within and surrounding developments can effectively amount to habitat loss (Drewitt, A. L. and Langston, R. H., 2006). If a habitat is therefore avoided as a result of the disturbance, then effective habitat loss can occur. However, due to the baseline noise levels of the adjacent quarry and movement of plant machinery, it is unlikely the proposed development will produce a significant increase in noise levels (refer to Chapter 12: Noise and Vibration, Volume 2 of this EIAR) to displace the wintering bird species. This impact is characterised as a **Negative, Reversible, Temporary, Not Significant impact** in the absence of mitigation.

8.4.2.3.4 Other Species - Freshwater White-clawed Crayfish

Potential Direct Impacts

Direct impacts to potential populations of the species within the drainage ditch will not occur. The closest record for freshwater white-clawed crayfish is c. 1km (c. 1.2km in-stream) east of the proposed development near the confluence point between the drainage ditch and the Yellow River. However, due to the slow flowing depositing nature of the drainage ditch and the extremely murky water observed during the survey, it is unlikely the species will be present within the drainage ditch network.

Potential Indirect Impacts

Indirect effects via potential deterioration in water quality are considered in detail in Section 8.4.2.3.5.

¹⁷ Note: This report is in relation to wind energy developments, therefore, the numbers are very conservative for a development of this nature.



8.4.2.3.5 Aquatic Ecology

The impacts from the proposed development on the aquatic environment are expected to occur during the construction phase. Primarily, these risks relate to water pollution and or contamination via siltation (suspended solids), hydrocarbons, concrete etc. The Construction Environmental Management Plan (CEMP; Appendix 4.3, Volume 3 of this EIAR), which details the construction methodology, to reduce the risk of potential contamination and water pollution. Potential impacts relating specifically to hydrology are dealt with in Chapter 10: Hydrology and Water Quality and potential impacts relating specifically to hydrogeology are dealt with in Chapter 9: Soils, Geology and Hydrogeology, Volume 2 of this EIAR. The potential impacts relating to specific construction-phase activities on the aquatic environment are discussed in detail below.

Potential impacts during Advance Works, the Re-routing of Existing ESB Lines traversing the site, and Demolition and Site Clearance

Demolition, site clearance and minor earthworks activities will be carried out during the advance works stage of the construction phase.

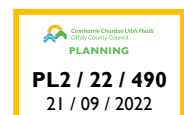
The re-routing of ESB lines traversing the site will involve the carrying out of minor excavation and backfilling works to facilitate the laying of ducting and electricity cables. These activities may result in sediment becoming entrained in surface water generated on-site and being discharged to the drainage channel to the south of the site. Given the proximity of the proposed development and the drainage channel to the south, potential impacts to aquatic ecology resulting from these activities do exist. The potential impact from surface water runoff on aquatic ecology specifically associated with re-routing of ESB lines is characterised as a **Negative, Reversible, Temporary, Moderate impact in the local context** in the absence of mitigation.

The proposed development will include the demolition and removal of all existing above ground structures and infrastructure as described in Chapter 4: Existing and Proposed Development, Volume 2 of this EIAR. This includes excavation and stripping of all existing concrete yard surfaces where required, and removal of foundations and sub-surface structures. Site levelling and removal of vegetation (including treeline) will also occur during these works. Soil erosion as a result of earthworks and traffic heavy machinery movements during these works represents a potential source of increased sediment in surface water runoff.

The greatest threat to aquatic ecology from the site clearance works is surface water run-off and the quality (e.g. suspended solids, hydrocarbons, concrete, nutrients) of the escaping water into the adjacent drainage ditch and ultimately downstream watercourses.

The earthworks required for the stripping of all existing concrete yard surfaces and removal of foundations and sub-surface structures may also liberate concrete particles into surface water run-off. The release of cement / concrete to an aquatic environment can have the effect of altering the levels of pH, nitrate, phosphate, total solids, total suspended solids, total dissolved solids, turbidity and biological oxygen demand in the water. Cement products are particularly harmful to aquatic life due to the associated change in alkalinity in the water, which can cause burns to fish skin.

Standing water in excavations could contain an increased concentration of suspended solids as a result of the disturbance of the underlying soils. If the standing water were to become part of the surface water run-off it would release the increased sediment load potentially impacting water quality and aquatic sensitivities (e.g. fish, macro-invertebrates, otter, white-clawed crayfish) in the adjacent drainage ditch and downstream watercourses.





This may impact sensitive aquatic ecological receptors through mobilisation of sediment and or nutrients (especially phosphorus), resulting in impacts to both water quality and aquatic habitat. The release of nutrients to the drainage ditch and watercourses downstream can also come from brush if material is left within proximity to the drainage ditch. However, it is noted that the site has not undergone the use of fertilisers, therefore, nutrient leaching would be less severe than, for example, an upland conifer plantation which was heavily fertilised. Considering these factors, the potential for impacts associated with nutrient run-off or leaching is relatively low.

Site clearance will require trafficking of heavy machinery which can lead to pollution due to spillage of fuels and hydrocarbons. Hydrocarbons are toxic to flora and fauna, including fish, and these chemicals tend to be persistent in the environment. It is also a nutrient supply for adapted micro-organisms, which can rapidly deplete dissolved oxygen in waters, resulting in death of aquatic organisms.

Given the proximity of the proposed development and the drainage ditch to the south, potential impacts to aquatic ecology resulting from demolition of the existing structures on-site and site clearance do exist. The potential impact from surface water runoff on aquatic ecology specifically is characterised as a **Negative, Reversible, Temporary, Significant impact in the local context** in the absence of mitigation.

Potential impacts during the construction of the materials recovery facility, the development of an on-site wastewater treatment system and associated percolation area, and the development of an on-site ESB sub-station.

Refer to Chapter 4: Description of the Existing and Proposed Development, Volume 2 of this EIAR, for full list of components involved in the construction of the materials recovery facility.

Excavations work will be undertaken to facilitate the development of proposed foundations of the facility, on-site sub-station, tanks, the drainage network along with the on-site wastewater treatment system (WWTS) and adjoining percolation area.

It is proposed excess soil and stone material generated on-site during construction will be removed from the site however, most of the soil and stone material generated will be reutilised through infilling on-site. Inappropriate site management of excavations and stockpiled material could lead to loss of silt laden run-off and/or suspended solids through run-off and as dust particles, as such having potential to alter the physicochemical conditions of adjacent and downstream watercourses. However, it is noted that construction phase mitigation measures are defined in Chapter – Hydrology and Surface Water, which will prevent the entrainment of sediment in surface water and the discharge of this surface water to the drainage ditch to the south of the site. Considering these factors, the potential for impacts associated with run-off / dust from stockpiled materials is relatively low.

Wet concrete poured for the different stages of the materials recovery facility construction or rinsing of truck chutes on-site could lead to contamination of receiving waters via surface water run-off. Concrete and other cement-based products are highly alkaline and corrosive and can have significant negative impacts on water quality and aquatic biota.

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons can cause significant pollution risk to surface waters and aquatic ecology. It is also a nutrient supply for adapted micro-organisms, which can rapidly deplete dissolved oxygen in surface waters, resulting in death of aquatic organisms. However, it is noted that suitable spill kits and absorbent material for dealing with oil spills will be maintained on site as part of the CEMP, the potential for impacts associated with spillage of fuels and hydrocarbons is relatively low.



Given the proximity of the proposed development and the drainage ditch to the south, potential impacts to aquatic ecology resulting from the construction of the materials recovery facility, the development of an on-site ESB sub-station and the development of an on-site wastewater treatment system and associated percolation area, is characterised as a **Negative, Reversible, Temporary, Significant impact in the local context** in the absence of mitigation.

Potential impacts associated with surface water discharge outfall construction

The construction phase will result in changes to the existing drainage network within the proposed development site, which may increase sediment and nutrient loads to receiving watercourses, adjoining or draining the site. The main change will be the installation of a surface water discharge outfall point into the drainage ditch. This will consist of a pre-cast concrete headwall on 100mm thick bed of lean mix concrete and will involve excavations to formation level.

Excavations to formation level will involve the use of construction plant which can lead to pollution of watercourses due to spillage of fuels and hydrocarbons. Hydrocarbons are toxic to flora and fauna, including fish, and these chemicals tend to be persistent in the environment. It is also a nutrient supply for adapted micro-organisms, which can rapidly deplete dissolved oxygen in waters, resulting in death of aquatic organisms. However, it is noted that suitable spill kits and absorbent material for dealing with oil spills will be maintained on site as part of the CEMP, the potential for impacts associated with spillage of fuels and hydrocarbons is relatively low.

The concrete will be poured in situ (including the section of outfall to the existing watercourse). Wet concrete escaping the excavations could lead to contamination of the receiving drainage ditch and downstream watercourses. Concrete and other cement-based products are highly alkaline and corrosive and can have significant negative impacts on water quality and aquatic biota.

It is noted that the works involved in the installation of the surface water discharge outfall point are estimated to last for approximately one day.

Given that the works involve the drainage ditch to the south, potential impacts to aquatic ecology resulting from site drainage do exist. The impact is characterised as a **Negative, Reversible, Brief, Significant impact in the local context** in the absence of mitigation.

Potential impacts associated with R400 junction upgrade works

The junction between the private access road leading to the development site and the R400 will be upgraded as part of the proposed development. Vegetation removal associated with junction/road widening will be minor, limited and localized in nature. The closest watercourse to the junction is c. 150m north east (Yellow(Castlejordan)_20) and the Yellow River is c. 600m south. There is no hydrological connection between the junction and either of these water bodies. As such, there is no potential for junction upgrade construction activities causing the discharge of emissions to water bodies. Junction upgrade construction activities will be minor and time limited in nature. As such, there is no potential for junction upgrade construction activities causing elevated noise or dust levels that may significantly effect ecological receptors.



8.4.3 Operational Phase Impacts

The main potential impacts to biodiversity from the operation of the project will be via noise and surface water pathways.

Refer to Chapter 12 Noise and Vibration in Volume 2 of this EIAR for the list of noise sources associated with operation of the facility.

As identified in Chapter 12, the noise levels are expected to rise during the day, evening and night due to the operation of the proposed development. The predicted operational phase daytime, evening and night-time noise levels will all fall significantly below noise limits for licensed activities prescribed by the EPA in their Noise Guidance document NG4. The level of increase is therefore unlikely to displace the wintering bird populations of the surrounding area. Potential operational phase impacts on Avifauna due to operational noise **Negative, Reversible, Temporary, Slight impact in the local context.**

The sources for potential surface water impacts could be:

- Normal operational traffic and other traffic necessary for the maintenance of the proposed development may result in minor accidental leaks or spills of fuel/oil.
- Storage of fuel and oils on-site.
- On-site refuelling activities
- Pooling and insufficient percolation from the installed wastewater treatment system (which will consist of a secondary treatment / soil polishing system) due to inadequate maintenance procedures. This may result in increased ammonia and phosphorus migration to groundwater and eventually to surface water
- External storage of green waste giving rise to foul water.
- Risk of accidents which could include the following:
 - Uncontrolled spillages arising from the accidental release from the underground tanks or the wastewater treatment system.
 - Outbreak of fire at the facility which could result in the discharge of contaminated firefighting water to surface waters.

Potential operational phase impacts on aquatic ecology are considered **Negative, Reversible, Short-term, Significant impact in the local context**, in the absence of mitigation.

However, during the operation phase the potential operational stage impacts at the proposed development will be controlled and monitored under the requirements of the of the WFP and IE licence.

8.4.4 Decommissioning Phase Impacts

In the event a cessation of waste processing activities occurs at this facility, the site will be decommissioned in accordance with a Closure, Restoration, Aftercare Management Plan (CRAMP) for the facility (which will be prepared as a condition of the prospective IE Licence).

Impacts associated with decommissioning are likely to be of a much smaller magnitude than impacts associated with the construction of the proposed development.



It is intended to wind the operation down gradually until such time all residual wastes and materials are removed from the site. Residual materials will be classified before being dispatched to an appropriately authorized waste management facility for treatment. All residual waste will be managed in accordance with the CRAMP for the facility.

All built infrastructural elements of the site will remain as they are in-situ. As such, there will be no disturbance of soils, earthworks or demolition activities during the decommissioning phase of the proposed development.

The proposed stormwater drainage and attenuation will remain as constructed and will continue functioning and controlling stormwater run-off from the site.

All hard-standing areas and drainage systems including interceptors and underground tanks will be cleaned and washed down. Any foul water and wash-water present in underground storage tanks on-site will be taken up and removed for disposal at an appropriately authorised wastewater treatment facility.

Potential operational phase impacts on aquatic ecology are considered **Negative, Reversible, Temporary, Slight in the local context**, in the absence of mitigation.

8.4.5 Cumulative Impacts

Refer to Appendix 1.1 in Volume 3 of this EIAR for projects and plans considered during Cumulative Impact Assessment. Those that have the capacity to effect ecological receptors in-combination with the proposed development are considered below.

8.4.5.1 Projects

There are six planning applications (refer to Table 8-18) that have the capacity to effect ecological receptors in-combination with the proposed development:

Table 8-18: Projects with capacity to effect ecological receptors in-combination with the proposed development.

Planning App No.	Address	Description
21247	Derryarkin and Bunsallagh townlands, Rhode, Co. Offaly	A 23-year permission for a 44.0 hectare extension to an existing authorised sand and gravel pit
19.PA0032	In the townlands of Derryarkin, Derryiron, Coolcor, Coolville, Ballyburly, Greenhills, Bunsallagh, Derrygreenagh, Knockdrin, Wood, Killowen, Corbetstown, Carrick, Garr and Dunville, just north of Rhode, County Offaly,	15-year planning permission for development of a 32-turbine wind farm.
1849	Derryarkin and Bunsallagh townlands, Rhode, Co. Offaly	Development consisting of a total area of 30.2 hectares comprising of the following: (a) extraction of sand and gravel from a greenfield area (area 1 = 26.0 hectares) by



Planning App No.	Address	Description
		mechanical means and transportation to the manufacturing area (area 2) for processing and all associated facilities/works. (b) continuation of use of the existing authorised manufacturing area (area 2 = 4.2 hectares) and existing infrastructure.
18324	Derryarkin, Rhode Co. Offaly	The filling of lands with inert waste consisting of concrete, bricks, tiles and ceramics, soil and stones for the purpose of land reclamation and all associated ancillary facilities.
178	Derryarkin & Bunsallagh townlands Rhode Co. Offaly	Sand and gravel extraction from two areas of land consisting of 30.9 hectares (area a1 consisting of 19.3 hectares and area a2 consisting of 11.6 hectares).
Ex190010 (1476)	Derryarkin Rhode Co. Offaly	PI2/14/76 for construction of 2 no. Pig houses and 1 no. Stormwater attenuation tank together with all ancillary structures and associated site works arising from the above proposed development.

In terms of the proposed development under consideration in this EIAR, the construction phase has the greatest potential to contribute suspended solids/pollutants to nearby watercourses due to excavation works and general construction works.

The EIAR for each of the planning applications 178, 21247, 18324 and 1849, concluded that *'the proposed development would not have significant impacts on the local flora and fauna or on any ecological site of interest (including designated sites) in a wider area.'* Quarrying and infilling operations associated the planning applications 1849, 18324 and 178 have already commenced, and proposed mitigation measures for these operational activities are currently being implemented. If the proposed development was to occur in-combination with these permitted operational activities, as well as committed development activities associated with the 21247 planning application, the impact on the drainage channel to the south of the site and/or the Yellow River is predicted to be **Negative, Reversible, Temporary, Significant impact in the local context.**

Application 19.PA0032 pertains to the Yellow River Wind Farm project. Construction of the wind farm is expected to begin in late 2022, with an expected completion date of late 2023. The EIAR for the application concluded that *'the proposed development would not have significant impacts on the local flora and fauna or on any ecological site of interest (including designated sites) in a wider area.'* If the proposed development was to occur in-combination with the construction phase of the wind farm development, the impact on the drainage channel to the south of the site and/or the Yellow River is predicted to be **Negative, Reversible, Temporary, and Significant in the local context.**

Potential in-combination impacts with the Yellow River Wind Farm (19.PA0032) may also occur due to 'disturbance' of birds utilising winter roosting/ foraging grounds within the zone of disturbance of the proposed development. However, the application for the wind farm included an EIAR and NIS with appropriate mitigation measures to avoid / prevent significant impacts on the receiving environment including the avifauna population. Therefore the cumulative impacts on the avifauna population is predicted to be **Negative, Reversible, Temporary, and Not Significant in the local context** due to the implementation of the mitigation measures at the wind farm and the low likelihood of impact from the proposed development.



There is potential for the subject proposed development and the piggery located immediately north/north-west of the development site to have a combined or cumulative impact on ecological receptors:

Providing all mitigation measures associated with the piggery facility have been appropriately implemented as proposed, the cumulative impact on the drainage channel to the south of the site and/or the Yellow River from the construction stage of the proposed development is predicted to **Negative, Reversible, Temporary, and Significant in the local context**

There are no likely significant effects on hydrology, air quality and noise from the operation and decommissioning of the proposed development (refer to conclusions contained in Chapters 10, 11 and 12 respectively), therefore, cumulative impacts during operations and decommissioning are predicted to be **Negative, Reversible, Temporary and Not significant in the local context.**

8.4.5.2 Plans

The National Biodiversity Action Plan 2017-2021

Ireland's National Biodiversity Action Plan sets out actions through which a range of government, civil and private sectors will undertake to achieve Ireland's 'Vision for Biodiversity' and follows on from the work of the first and second National Biodiversity Action Plans.

119 targeted actions are contained in the Plan, underpinned by seven strategic objectives. The objectives lay out a clear framework for Ireland's national approach to biodiversity, ensuring that efforts and achievements of the past are built upon, while looking ahead to what can be achieved over the next five years and beyond. They include:

1. mainstreaming biodiversity across the decision-making process in the State;
2. strengthening the knowledge base underpinning work on biodiversity issues;
3. increasing public awareness and participation;
4. ensuring conservation of biodiversity in the wider countryside;
5. ensuring conservation of biodiversity in the marine environment;
6. expanding and improving on the management of protected areas and protected species;
7. enhancing the contribution to international biodiversity issues.

Offaly County Development Plan 2021-2027

The Offaly County Development Plan 2021-2027 is the existing plan for the county. The policies and objectives in Chapter 4: Biodiversity and Landscape of the Offaly County Development Plan 2021-2027 are relevant to this EIAR (refer to Appendix 8.6 *Offaly County Development Plan 2021-2027, Chapter 4 Policies and Objectives* for the full list).

Without mitigation the proposed development could adversely affect the integrity of a European site therefore, it would be contrary to the policies and objectives of the aforementioned plans in the absence of mitigation.



8.5 Mitigation Measures

8.5.1 Construction Phase Mitigation

8.5.1.1 *Habitats and Flora*

The area of the proposed works will be kept to the minimum necessary, including all site clearance works. No disturbance to habitats or flora outside the proposed development area will occur (other than the footprint of the proposed drainage outfall). Works will be restricted to the immediate footprint of the development site. Machinery, and equipment will be stored within the site. Access to the site will be primarily via the existing local road R400. HGVs shall approach the site via this road.

In the presence of mitigation measures, potential impacts to external habitats resulting from the proposed development are considered **Imperceptible in the local context**.

The area of Dry Meadow and Grassy Verges temporarily removed during the construction of the surface water outfall point will be reinstated upon completion. The plant machinery use will not encroach on the bank or verge (unless necessary for safety). Refer also to mitigation measures within Chapter 10: Hydrology and Water Quality, Volume 2 of this EIAR and section 8.5.1.4.

In the presence of mitigation measures, potential impacts to the Dry Meadow and Grassy Verges habitat along the bank of the drainage ditch are considered **Imperceptible in the local context**.

8.5.1.2 *Otter*

No evidence of otter holts or evidence was observed within the study area.

The construction site will not be lit at night (with the exception of low-level switchable safety lighting). Construction works will take place predominantly during the hours of daylight to minimise disturbances to faunal species at night.

All lighting systems will be designed to minimise nuisance through light spillage. Shielded, downward directed lighting will be used, and all non-essential lighting will be switched off during the hours of darkness.

Lighting will be directed away from the drainage ditch and surrounding landscape.

In the presence of mitigation measures, potential impacts to otter resulting from the proposed development are considered **Not significant in the local context**.

8.5.1.3 *Avifauna*

The clearance of the site, including the buildings, treeline and vegetation, should only be undertaken outside of the bird breeding season (March 1st to August 31st inclusive). This will help protect nesting birds. Where this is not possible due to construction program constraints, the buildings, treeline and vegetation will be inspected for nesting birds by a suitably qualified Ecologist no more than 48hrs in advance of the felling / clearance works and advise if bird species are present.



In the event of birds nesting within buildings/ vegetation to be cleared, a species-specific buffer zones (exclusion zone for all works) will be put in place and clearance of the structure / vegetation will only proceed once the birds have fledged.

Construction operations will take place during the hours of daylight for the most part to minimise disturbances to roosting birds or any active crepuscular/nocturnal bird species.

Toolbox talks will be undertaken with construction staff on disturbance to key species during construction. This will help minimise disturbance.

In the presence of mitigation measures, potential impacts to avifauna within the site resulting from the proposed development are considered **Temporary, Imperceptible in the local context**.

Although the impacts to the Key Ecological Receptors, Black-headed Gull, Kestrel, Curlew, Golden Plover, Mute Swan, Lapwing and Whooper Swan have been determined as not significant in the absence of mitigation, additional measures as detailed in Chapter 12 in Volume 2 of this EIAR, have been proposed to reduce impacts related to construction noise and vibration. This will further reduce the potential for impacts on the Key Ecological Receptors bird species. Therefore, potential impacts to avifauna outside the site resulting from the proposed development are considered **Imperceptible in the local context** in the presence of mitigation measures.

8.5.1.4 Aquatic Ecology

Construction phase mitigation measures to protect the receiving surface water environment and therefore aquatic ecology present in receiving surface water bodies are comprehensively defined in Chapter 10 – Hydrology and Surface Water, of Volume 2 of this EIAR and the CEMP for the proposed development. These measures will serve to prevent the discharge of silt, hydrocarbons, nutrients and cement based substances to receiving waters, thereby ensuring the protection of aquatic ecology. These measures will ensure effective protection of aquatic ecological interests downstream of the proposed development, particularly the habitats supporting sensitive aquatic species present in the River Boyne and River Blackwater SAC (002299).

In the presence of these mitigation measures, potential impacts to aquatic ecology resulting from the proposed development are considered **Not Significant in the local context**.

8.5.2 Operational Phase Mitigation

8.5.2.1 Avifauna

The main potential for disturbance to the Key Ecological Receptors, Black-headed Gull, Kestrel, Curlew, Golden Plover, Mute Swan, Lapwing and Whooper Swan during the operation of the proposed development is that of noise. However, potential impacts on ecology due to noise from the development were determined as not significant in the absence of mitigation (section 8.4.2.3.3). Nonetheless, with the implementation of design measures, including mitigation measures detailed in Chapter 12- Noise and Vibration, potential impacts to the Key Ecological Receptor bird species during the operation of the proposed project are considered **Imperceptible in the local context**.



8.5.2.2 Aquatic Ecology

Due to the surface water drainage design, including the stormwater drainage and attenuation system, foul water and washwater drainage and collection system and on-site wastewater treatment system (refer to Chapter 4 in Volume 2 of this EIA), along with the proposed additional operational phase mitigation measures detailed in Chapter 10 Hydrology and Surface Water, Volume 2 of this EIA, to prevent surface water leaving the site, the potential impacts to aquatic ecology resulting from the operation of the proposed development are considered **imperceptible in the local context**.

8.5.2.3 Lighting

All lighting systems will be designed to minimise nuisance through light spillage. Shielded, downward directed lighting will be used and all non-essential lighting will be switched off during the hours of darkness. Lighting will be directed away from the drainage ditch and surrounding landscape.

8.5.3 Decommissioning Phase Mitigation

Decommissioning will take place in accordance with a defined Closure / Decommissioning Management Plan. This will ensure that all residual plant, equipment, waste and materials which pose an environmental risk will be safely removed from the site. Implementation of this plan will ensure that all known environmental liabilities associated with the site at the time of closure are fully addressed.

In the presence of mitigation, potential decommissioning phase impacts on aquatic ecology are considered **Temporary, Not significant in the local context**.

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8.6 Residual Impacts

Residual effects are outlined in Table 8-19 below:

Table 8-19: Impacts, Mitigation and Residual Impacts

Activity	Ecological Receptor	Description of unmitigated impact on the Ecological Receptor	Characterisation of impact without mitigation	Mitigation	Residual impact
Construction	Agricultural Grassland / Neutral Grassland GA1 / GS1	Permanent loss of habitat	In the absence of mitigation, this impact is characterised as a Negative, Irreversible, Permanent, Not significant impact in the local context	Works will be restricted to the immediate footprint of the development.	With the implementation of mitigation, this impact is characterised as Imperceptible.
	Dry Meadow and Grassy Verges / Drainage Ditch GS2 / FW4	Temporary loss of habitat	In the absence of mitigation, this impact is characterised as a Negative, Reversible, Brief, Not significant impact in the local context	Habitat to be reinstated.	With the implementation of mitigation, this impact is characterised as Imperceptible.
		Construction of new surface water discharge outfall from the site	In the absence of mitigation, this impact is characterised as a Negative, Reversible, Brief, Significant impact in the local context	Cast-in-place concrete must be done in dry conditions and isolated from any flowing water.	With the implementation of mitigation, this impact is characterised as Not Significant in the local context
	Otter	Indirectly impacted, disturbance (noise, human presence, water quality and/or lighting)	In the absence of mitigation, this impact is characterised as a Negative, Reversible, Temporary, Significant impact in the local context	Appropriate lighting required. No night-time works.	With the implementation of mitigation, this impact is characterised as



Activity	Ecological Receptor	Description of unmitigated impact on the Ecological Receptor	Characterisation of impact without mitigation	Mitigation	Residual impact
	Avifauna (including Black-headed Gull, Curlew, Golden Plover, Mute Swan, Lapwing, Whooper Swan and Bird assemblage of common species)	Disturbance during construction may cause birds to vacate territories close to works	In the absence of mitigation, this impact is characterised as a Negative, Reversible, Temporary, Not Significant impact in the local context	Mitigation measures as detailed in Chapter 12 – Noise and Vibration, of Volume 2 of this EIA, including, construction activities shall be carried out during normal working hours and avoid unnecessary revving of engines and switch off equipment when not required	With the implementation of mitigation, this impact is characterised as Imperceptible.
	House Martin	Loss of suitable habitat	In the absence of mitigation, this impact is characterised as a Negative, Reversible, Temporary, Slight impact in the local context	Clearance of the site to be undertaken outside of the bird breeding season.	With the implementation of mitigation, this impact is characterised as Temporary, Imperceptible in the local context
	Aquatic Ecology (including Freshwater White-clawed Crayfish and Otter)	Direct loss of nests and eggs/chicks Potential Impacts during Advance Works, the Installation of Temporary Construction Site Compound and the re-routing of Existing ESB Lines traversing the site	In the absence of mitigation, this impact is characterised as a Negative, Irreversible, Permanent, Significant impact in the local context	Construction phase mitigation measures for the protection of receiving surface waters defined in Chapter 10 – Hydrology and Surface Water, of Volume 2 of this EIA.	In the absence of mitigation, this impact is characterised as a Negative, Reversible, Temporary, Moderate impact in the local context





Activity	Ecological Receptor	Description of unmitigated impact on the Ecological Receptor	Characterisation of impact without mitigation	Mitigation	Residual impact
<p>Operation</p>	<p>Avifauna</p>	<p>Surface water run-off associated with demolition of existing structures on-site and site clearance</p>	<p>In the absence of mitigation, this impact is characterised as a Negative, Reversible, Temporary, Significant impact in the local context</p>		
		<p>Construction of the materials recovery facility, the development of an on-site ESB sub-station and the development of an on-site wastewater treatment system and associated percolation area</p>	<p>In the absence of mitigation, this impact is characterised as a Negative, Reversible, Temporary, Significant impact in the local context</p>		
		<p>Construction of new surface water discharge outfall from the site</p>	<p>In the absence of mitigation, this impact is characterised as a Negative, Reversible, Brief, Significant impact in the local context</p>		
		<p>Disturbance during operations may cause birds to vacate territories close to works</p>	<p>In the absence of mitigation, this impact is characterised as a Negative, Reversible, Temporary, Slight impact in the local context</p>	<p>Operational phase noise mitigation measures as detailed in Chapter 12 – Noise and Vibration, of Volume 2 of this EIA</p>	<p>With the implementation of mitigation, this impact is characterised as Imperceptible in the local context</p>





Activity	Ecological Receptor	Description of unmitigated impact on the Ecological Receptor	Characterisation of impact without mitigation	Mitigation	Residual impact
	Aquatic Ecology (including Freshwater White-clawed Crayfish and Otter)	Risk of accidental discharge of polluting material to SW.	In the absence of mitigation, this impact is characterised as a Negative, Reversible, Short-term, Significant impact in the local context	Surface water drainage design along with the proposed additional operational phase surface water related mitigation measures detailed in Chapter 10 – Hydrology and Surface Water, of Volume 2 of this EIA	With the implementation of mitigation, this impact is characterised as Imperceptible in the local context
Decommissioning	Aquatic Ecology (including Freshwater White-clawed Crayfish and Otter)	Decommissioning	In the absence of mitigation, this impact is characterised as a Negative, Reversible, Temporary, Slight impact in the local context	Implementation of the Closure/Decommissioning Management plan will ensure that all known environmental liabilities associated with the site at the time of closure are fully addressed.	With the implementation of mitigation, this impact is characterised as Temporary, Not significant in the local context





8.7 Conclusion and Summary of Effects

The baseline biodiversity of the proposed development site has been identified, assessed and evaluated, and an evaluation made of potential significant impacts conducted for the construction, operational and decommissioning phases of the proposed development. Mitigation measures have been developed which avoid and minimise impacts on biodiversity. Following the full implementation of these measures, the residual

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