5 Biodiversity

5.1 Introduction

This chapter provides an Ecological Impact Assessment (EcIA) which addresses the potential ecological impacts that may occur in the future on the terrestrial, avian and aquatic ecology of a Proposed Development at Curraghnagarraha, Reatagh, and Curraghballintlea, Co. Waterford and its surrounding environs.

This report has been undertaken in accordance with the guidelines issued by the Environmental Protection Agency (EPA) and the Chartered Institute of Ecology and Environmental Management (CIEEM).

It follows a standard approach based upon the description of the existing baseline conditions within the Proposed Development site. An evaluation of the likely habitats and species currently present within the Proposed Development site is also given, along with the identification of the potential ecological impacts arising from the construction and operation of the Proposed Development. An assessment of the likely significance of the identified impacts on Valued Ecological Receptors (VERs), both within and close to the Proposed Development site is also made. Where a significant negative impact has been identified, suitable remedial mitigation measures are provided in order to prevent, reduce, or offset the impact.

The main objectives of this ecological assessment were:

- Undertake a desktop review of existing baseline ecological data for the Proposed Development site and the wider area, including European and National sites of biodiversity importance within the Zone of Influence of the Proposed Development site.
- Undertake a field survey of the receiving environment.
- Evaluate the features of biodiversity value within the Proposed Development site and within the Zone of Influence of the Proposed Development site.
- Evaluate the potential negative impacts of the Proposed Development site on features of biodiversity value within the Proposed Development site and its Zone of Influence.
- Evaluate potential significant effects upon European or National sites.
- Consider measures to mitigate the potential negative impact(s) of the project on the ecology of the receiving environment.

5.1.1 Legislative and Policy Context

The Irish Wildlife Act 1976 (and its amendment of 2000) provides protection to most wild birds and animals. Interference with such species can only occur under licence. Under the act it is an offence to "wilfully interfere with or destroy the breeding place or resting place of any protected wild animal". The basic designation for wildlife is the Natural Heritage Area (NHA). This is an area considered important for the habitats present or which holds species of plants and animals whose habitat needs protection. Under the Wildlife Amendment Act (2000) NHAs are legally protected from damage. NHAs are not part of the Natura 2000 network and so the Appropriate Assessment process does not apply to them.

The Flora Protection Order 1999 provides statutory protection in Ireland to a number of rare plant species from being wilfully cut, picked, uprooted or damaged. It is also illegal under this order to alter, damage or interfere with their habitats.

The Birds Directive (Council Directive2009/147/EC) recognises that certain species of birds should be subject to special conservation measures concerning their habitats. The Directive requires that Member States take measures to classify the most suitable areas as Special Protection Areas (SPAs) for the conversation of bird species listed in Annex 1 of the Directive. SPAs are selected for bird species (listed in Annex I of the Birds Directive), that are regularly occurring populations of migratory bird species and the SPA areas are of international importance for these migratory birds.

The EU Habitats Directive (92/43/EEC) requires that Member States designate and ensure that particular protection is given to sites (Special Areas of Conservation) which are made up of or support particular habitats and species listed in annexes to this Directive.

The Water Framework Directive (WFD) (2000/60/EC), which came into force in December 2000, establishes a framework for community action in the field of water policy. The overall aim of the WFD is the eventual achievement of good status in all waterbodies. The WFD was transposed into Irish law by the European Communities (Water Policy) Regulations 2003 (S.I. 722 of 2003). The WFD rationalises and updates existing legislation and provides for water management on the basis of River Basin Districts (RBDs). RBDs are essentially administrative areas for coordinated water management and are comprised of multiple river basins (or catchments), with cross-border basins (i.e. those covering the territory of more than one Member State) assigned to an international RBD. Ireland is now within the 3rd cycle of the WFD (2022 – 2027).

5.1.2 Planning Policies

National

Nationally, the Government's commitment to sustainable development is set out in a number of documents including the National Planning Framework and the National Development Plan 2018 – 2027.

Regional

Planning at the regional level is now guided by the Regional Spatial and Economic Strategy (RSES). The RSES is a strategic plan which identifies regional assets, opportunities and pressures and provides appropriate policy responses in the form of Regional Policy Objectives.

Local

Planning policy at the local level is currently provided by the Waterford City and County Development Plan 2022–2028. This plan contains a number of objectives and Development Management Requirements relevant to ecology, biodiversity, green infrastructure and nature conservation. These are summarised in **Table 5.1**.

Policy No:	Biodiversity Policy Objectives
BD01	We will protect and conserve all sites designated or proposed for designation as sites of nature conservation value (Natura 2000 Network, Ramsar Sites, NHAs, pNHAs, Sites of Local Biodiversity Interest, Geological Heritage Sites, TPOs) and protect ecological corridors and networks that connect areas of high conservation value such as woodlands, hedgerows, earth banks and wetlands. We will contribute towards the protection and enhancement of biodiversity and ecological connectivity, including woodlands, trees, hedgerows, semi-natural grasslands, rivers, streams, natural springs, wetlands, the coastline, geological and geo-morphological systems, other landscape features, natural lighting conditions, and associated wildlife where these form part of the ecological network and/or may be considered as ecological corridors or stepping stones in the context of Article 10 of the Habitats Directive.
BD 02	In support of the All-Ireland Pollinator Plan we will seek to maintain and enhance Waterford's biodiversity in favourable conservation condition so that environmental resilience and net gain in biodiversity enhancement and creation are achieved during implementation of this plan.
BD 03	All proposed development will be considered in terms of compliance with the standards and legal requirements of the following where they apply; • Appropriate Assessment of Plans and Projects in Ireland-Guidance for Planning Authorities Department of Housing, Local Government and Heritage (2021). • NRA Guidelines on Ecological Impact Assessment (2009) • All-Ireland Pollinator Plan (2021) • Planning for Watercourses in the Urban Environment (2020) Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites.
BD 04	Appropriate Assessment All projects and plans arising from this Plan will be screened for the need to undertake Appropriate Assessment under Article 6 of the Habitats Directive. A plan or project will only be authorised after the competent authority has ascertained, based on scientific evidence, Screening for Appropriate Assessment, and subsequent Appropriate Assessment where necessary,
BD 05	Protection of European Sites Projects giving rise to adverse effects on the integrity of European sites (cumulatively, directly or indirectly) arising from their size or scale, land take, proximity, resource requirements, emissions (disposal to land, water or air), transportation requirements, duration of construction, operation, decommissioning or from any other effects shall not be permitted except as provided for in Article 6(4) of the Habitats Directive, viz. There must be a) no alternative solution available, b) imperative reasons of overriding public interest for the project to proceed; and c) Adequate compensatory measures in place.
BD 06	Management Plans Article 6(1) of the Habitats Directive requires that Member States establish the necessary conservation measures for European sites involving, if need be, appropriate management plans specifically designed for the sites or integrated into other Development Plans. The Local Authority support the preparation and implementation of management plans for the conservation of Natura 2000 sites, pNHAs and Sites of Local Biodiversity as per appropriate.
BD 07	We will protect plant and animal species and habitats which have been identified by the EU Habitats Directive (1997), EU Bird Directive (1979), Wildlife Act (1976) and Wildlife (Amendment) Act 2000 and the Flora Protection Order (2015) and ensure development does not impact adversely on wildlife species or the integrity and habitat value of the site.
BD 08	We will assess all proposed developments at each level of the Development Planning process from City & County Development Plan, Local Area Plan to project level to determine potential for significant effects on the conservation objectives and /or adverse impact on the integrity of the Natura 2000 network and ensure that the requirements of Articles 6(3) and 6(4) of the Habitats Directive are fully satisfied.
BD 09	We will ensure a sufficient level of information is provided in development applications to enable a fully informed assessment of impacts on biodiversity to be made. Ecological Impact Assessments submitted in support of development proposals shall be carried out by appropriately qualified professionals and ecological survey work carried out at optimal survey time to ensure accurate collation of ecological data.
BD 10	We will prevent unnecessary fragmentation and promote integration of existing green infrastructure such as trees, woodlands, hedgerows, earth banks and wetlands in the design of

	new development. Proposed development will be encouraged to retain and create green corridors within and between built up urban areas along with areas that are not subject to public access so as to promote wildlife habitat value.
BD 11	We will mitigate potential adverse impacts on existing biodiversity and green infrastructure in development proposals through requirement for biodiversity enhancement measures such as habitat creation, pollinator friendly landscaping schemes and or nesting boxes for pollinators, birds and mammals.
BD 12	We will continue to develop the broader network of habitats through habitat mapping and management planning in collaboration with other agencies to record the range of habitats and network of ecological corridors and integrate this information in the Development Planning process.
BD 13	We will prevent unnecessary noise and light disturbance to wildlife habitats and species by requesting Noise Impact Assessments and Lighting Plans to support development proposals so that wildlife friendly lighting specifications and avoidance of unnecessary noise are incorporated in early design stage of development schemes.
BD 14	To promote sustainable and creative proposals in lighting and display technologies. All external lighting should be down lighting and should be time limited where possible. Lighting should be avoided in sensitive wildlife areas and light pollution avoided. All external light proposals should be accompanied by a light pollution study and deviations to the objective will only be considered where the applicant can clearly show that the proposed light solution would result in a more sustainable solution.
BD 15	We will ensure that Waterford's floodplains, wetlands and watercourses are retained for their biodiversity and flood protection values and maintain good ecological status of wetlands and watercourses in support of the provisions of the Water Framework Directive and Ramsar Convention.
BD 16	We will protect wetland sites listed in Appendix 11 and other wetlands that may be identified of biodiversity value from infilling and other developments that may affect the biodiversity value of these sites.
BD 17	The preservation of riparian corridors is a requirement for the protection of aquatic habitats and facilitation of public access to waterways. Development proposals will be required to avoid culverting of river channels while maintaining a buffer zone of at least 15m between the development works and the top of the riverbank. We will consult with Inland Fisheries Ireland and LAWPRO on the establishment and protection of riparian habitats where appropriate.
BD 18	Drainage or Reclamation of Wetlands We will implement the relevant parts of the Planning and Development (Amendment) (No. 2) Regulations 2011 and the European Communities (Amendment to Planning and Development) Regulations 2011, which require planning permission to be applied for where the area impacted by works relating to the drainage or reclamation of a wetland exceeds 0.1 hectares or where such works may have a significant effect on the environment. Such applications for permission would need to be supported by an Appropriate Assessment where necessary.
BD 19	Peatlands We will support the implementation of any relevant recommendations contained in the National Peatlands Strategy 2015. Developments sited on peatlands have the potential to increase overall carbon losses, potentially undermining expected carbon savings (in the case of renewable energy developments) and damaging rare habitats of European importance. It is recommended that when developing project proposals for developments on peatlands assessments are undertaken that consider: • Peatland stability • Carbon emissions balance; and • Hydrology and Ecology
BD 20	To protect hedgerows in all new developments, particularly species rich roadside and townland boundary hedgerows, such features should be incorporated into the open space provisions at the concept design stage. There will be a presumption against the removal of hedgerows however where their removal is unavoidable replacement planting shall involve establishment of new hedgerows with native species of local provenance and that support pollinating species.
BD 21	We will preserve and enhance the amenity and biodiversity value of the County and City by preserving as far as possible trees, woodlands and hedgerows and will consider Tree Preservation Orders in order to protect trees of significance throughout the City and County. Existing TPOs are listed in Appendix 11. Trees of Special Amenity Value are also listed in Appendix 11.

BD 22	To implement the Waterford City and County Tree Management Strategy 2021 and review as appropriate.
BD 23	Where development proposals require felling of mature trees a comprehensive tree survey carried out by a suitably qualified arborist shall be submitted assessing the condition, ecological and amenity value of the tree stock proposed for removal and mitigation planting and management scheme. We will seek in all cases to ensure when undertaking development or when permitting development that the loss of or damage to existing trees is minimised.
BD 24	To ensure when planning to undertake development or when considering the approval or authorisation of development that adequate information to assess the impact of the proposed development on existing trees, including tree surveys and planting and management schemes, is provided and that the protection, preservation and management of existing trees of amenity value, and the implementation of a planned planting and management scheme, are provided for.
BD 25	We will continue to enhance our public realm and general amenity of the City and County through the continued maintenance and provision of trees in the urban environment with a view to providing continuity of tree cover where possible throughout our urban centres and promoting the use of native species where possible, with varied species and age distribution.
BD 26	We will carry out an audit of all trees of special amenity value and TPOs, as listed in Appendix 11, with a view to updating same.

Table 5.1: Development Management Requirements Relevant to Ecology and Nature Conservation

5.1.2.1 Heritage Plans

Ireland's National Biodiversity Plan identifies actions that need to be taken in order to understand and protect biodiversity in Ireland. It states that biodiversity and ecosystems in Ireland should be conserved and restored, to deliver benefits that are essential to all sectors of society and that Ireland should contribute to the efforts to halt the loss of biodiversity and the degradation of ecosystems in the EU and globally.

Previous Waterford County Heritage and Biodiversity Plans identified a number of objectives and policies in order to protect the natural heritage and biodiversity of County Waterford.

5.2 Methodology

5.2.1 Statement of Competence

The site survey and report were carried out by Noreen McLoughlin. Noreen is the owner and main ecologist at Whitehill Environmental. Noreen holds a BA (Hons) in Natural Science (Mod) Zoology and an MSc in Freshwater Ecology (TCD, Dublin). She has been a full member of the CIEEM (Chartered Institute of Ecology and Environmental Management) for over 18 years. Noreen has over 20 years' experience as a professional ecologist in Ireland and in that time has carried out a large number of Ecological Impact Assessments and Appropriate Assessments for a wide range of projects.

5.2.2 Study Area

The study area encompasses all the land within the area defined in the plan submitted for planning consent, i.e., the Proposed Development site. In addition, important ecological habitats and receptors within the Zone of Influence of the Proposed Development site were also studied.

5.2.3 Desk Based Studies

The desk study involved the examination of aerial photographs, current and historical maps and plans and drawings of the Proposed Development site. In addition, information was collated on designated nature sites within the Zone of Influence of the Proposed Development site and on protected and rare species within the 1km square of the site.

The following websites were used to access information and data:

- National Parks and Wildlife Service – www.npws.ie. Information held by NPWS on protected species within the Zone of Influence of the Proposed Development site was queried.
- National Biodiversity Data Centre – www.biodiversitycentre.ie. Data was gathered on rare, protected or threatened species located within the Zone of Influence of the Proposed Development site.
- Ordinance Survey Ireland – www.osi.ie. Current and historical maps, along with aerial photographs to ascertain current and past land-use and potential habitats within the Proposed Development site and surrounding lands.
- My Plan – www.myplan.ie – Additional mapping information.
- Google Maps & Street View – maps.google.ie – Aerial photographs.
- Environmental Protection Ireland – www.epa.ie.The EPA Appropriate Assessment tool was used to gather information on Natura 2000 sites within the Zone of Influence of the Proposed Development site. Information on Water Quality was also obtained from this site.
- Waterford City and County Council – Information pertaining to planning history in the area and other plans and projects to allow an assessment of the potential cumulative impacts.

5.2.4 Field Based Studies

A visit to the Proposed Development site at Curraghnagarraha and Reatagh was conducted on February 16th, 2024, when relevant field notes, species lists and photographs were taken. The habitats within the Proposed Development site were identified and classified according to 'A Guide to Habitats in Ireland' (Fossitt, 2000). Plant species present in each habitat type were recorded. Habitats were assessed for their potential to be protected habitats under Annex I of the EU Habitats Directive (92/43/EEC) and for their capacity to support rare, threatened, and

endangered species. The methodology used in this report to assess the impact on habitats is based on NRA guidelines (2009).

The habitat mapping exercise had regard to the 'Best Practice Guidance for Habitat Survey and Mapping' (*Smith et al., 2011*) published by the Heritage Council. Scientific and common names for plants follow *Parnell et al. (2012)* and *Blamey et al. (1996)*, respectively. In addition to habitat identification, each habitat was assessed for its ecological significance, based on the National Roads Authority (NRA) Site Evaluation Scheme (NRA, 2009).

5.2.4.1 Terrestrial Mammals, Birds and Bats

Any signs and sightings of terrestrial mammals were noted in the site walkover in March 2024. All bird activity seen or heard was noted. Potential bat habitats and roosts were also noted.

5.2.4.2 Aquatic Surveys

Aquatic ecology surveys, including biological assessment (Q-values) of the stream on site, were also carried out in March 2024 by ORS.

5.2.4.3 Seasonal Constraints

Having regards to the limited and largely improved habitats within the main area of the Proposed Development site, it was considered that there were no seasonal constraints associated with the habitat assessment element of the field work for this EcIA. The timing of the survey was ideal for the identification of mammal tracks and signs.

5.2.5 Assessment Methodology

5.2.5.1 Evaluation of Ecological Features

The methodologies used to determine the value of ecological resources, to characterise the impacts of the Proposed Development, and to assess the significance of impacts and any residual effects are described below. This approach is in accordance with the following guidelines and methodologies:

- Guidelines for Ecological Impact Assessment in the UK and Ireland by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018)
- Guidelines On the Information to be contained in Environmental Impact Assessment Reports (EPA, 2022)
- Guidelines for Assessment of Ecological Impacts of National Road Schemes. (NRA, 2009).
- Guidelines on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission, 2013).

CIEEM suggest that to ensure a consistency of approach, ecological features are valued in accordance with their geographical frame of reference, as defined below:

- International
- National (Ireland)
- Regional (South East)
- County (Waterford)
- District (Carrick-on-Suir)
- Local/Townland (Curraghnagarraha, Reatagh, and Curraghballintlea)

The above categories are then applied to the ecological features identified. Ecological features can be defined as:

- Designated sites (i.e., SACs, SPAs, NHAs, pNHAs, National Nature Reserves) or non-statutory locally designated sites and features.
- Non-designated sites and habitats and features of recognised biodiversity value, such as rivers and streams. The features being evaluated can be considered in the context of the site and locality and thus a more accurate assessment of the impacts in the locality can be made.

5.2.5.2 Assessment of Impacts

The assessment of potential ecological impacts has been carried out using guidelines published by the EPA and the CIEEM. They can be summarised as:

- The identification of the range of potential impacts which can reasonably be expected to occur should the Proposed Development receive planning consent.
- The consideration of the systems and processes in place to avoid, reduce and mitigate the possible effects of these impacts.
- The identification of opportunities for ecological enhancement within the Proposed Development site.

Impacts are defined as being positive, negative, or neutral. A significant impact is defined as an impact upon the integrity of a defined ecosystem and/or the conservation status of a habitat or species within a given area. Where a potential negative impact has been identified, mitigation measures have been formulated using best practices techniques and guidance to prevent, reduce or offset the impact.

5.3 Characteristics of the Proposed Development

5.3.1 Description of the Proposed Project

The applicant, Mr. James Foran and Nephin Renewable Gas - Reatagh Limited , proposes to develop an Anaerobic Digestion Facility on a site located in the townlands of Curraghnagarraha, Reatagh, and Curraghballintlea, Co. Waterford.

Occupying an area of circa 7.7 hectares, the development will accept and treat 90,000 tonnes per annum of locally sourced agricultural manures, slurries, food processing residues and crop-based feedstocks to produce grid quality biomethane, also known as renewable natural gas (RNG) suitable for direct injection into Gas Network Ireland's (GNI) transmission and distribution network. The RNG produced at the Anaerobic Digestion Facility will be used as a direct replacement for conventional natural gas and in doing so contribute towards the Government's aspiration to develop 5.7TWh of indigenous biomethane production. In addition to RNG, the facility will produce a nutrient rich bio fertiliser which can be used as a direct replacement for fossil fuel derived fertiliser. The Anaerobic Digestion Facility will also include the recovery of biogenic carbon dioxide (CO_2) from the biogas upgrading process.

The development will consist of the following:

- Construction of 3 no. digesters (c. 15.5m in height), 2 no. digestate storage structures (c. 15.5m and 12m in height), 4 no. pump houses (c. 2.59m in height), a liquid feed tank (c. 4m in height), located in the northeastern section of the site.
- Construction of 4 no. pasteurisation tanks (each c. 6m in height), a post pasteurisation cooling tank (c. 4m in height) and pre fertiliser manufacturing tank (c. 4m in height) located in the centre of the site.
- Construction of a part single-storey and part two-storey reception hall (with a gross floor area (GFA) of c. 2,113 sq.m and an overall height of c. 16.5m) to accommodate reception and storage areas, a laboratory, panel room, tool store, workshop, located in the northwestern section of the site.
- Construction of a single-storey solid digestate storage and a nutrient recovery building (with a GFA of c. 880 sq.m and an overall height of c. 12.4m) located to the south of the reception hall, in the central section of the site.
- Odour abatement plant and equipment and a fuel tank will be provided to the south of the solid digestate storage and nutrient recovery building.
- 2 no. CO_2 tanks (c. 10.7m in height), a CO_2 loading pump (c. 2.5m in height), CO_2 auxiliaries (c. 2.6m in height), CO_2 liqueufactor (c. 8.2m in height), a CO_2 compressor (c. 5.9m in height), a CO_2 pre-treatment skid (c. 3.5m in height), and associated plant including a backup boiler / biomethane boiler and a Compressed Natural Gas compression unit / biogas compression system located in the southern portion of the site.
- A H_2S washing tower (c. 7.8m in height), a biogas treatment skid (c. 4.1m in height), a combined heat and power (CHP) unit and panel room (c. 10m in height), a biogas compression system, a biogas upgrading module, and an emergency biogas flare (c. 11.3m in height), also located within the southern section of the site.
- Construction of a two-storey office and administration building with an overall height of c. 8.5m and a GFA of c. 272sq.m, located within the western area of the site, adjacent to the main site access.
- Construction of a grid injection unit (c. 2.75m in height) within a fenced compound, an ESB substation (c. 3.4m in height and a GFA of c. 23.5 sq.m), and 2 no. propane tanks located in the south-western portion of the site.

- Alterations to the existing public road (c. 475m to the south of the main site area) including provision of boundary setbacks and replacement planting, providing a new site entrance and access road to serve the development.
- Associated and ancillary works including parking (6 no. standard, 3 no. EV and 1 no. disabled parking spaces and bike storage for 10 no. bikes), a weighbridge, solar PV arrays at roof level, wastewater treatment equipment, bunding and surface treatments, attenuation pond, boundary treatments, lighting, services, lightning protection masts, drainage, landscaping, and all associated and ancillary works.

Extracts from the planning drawings as submitted can be seen in **Figures 5.1a** and **5.1b**. A detailed description of the processes involved at this Proposed Development are included in **Chapter 2: Project Description** of this EIAR.

Figure 5.1: Extract from Planning Drawings (as prepared by ORS)

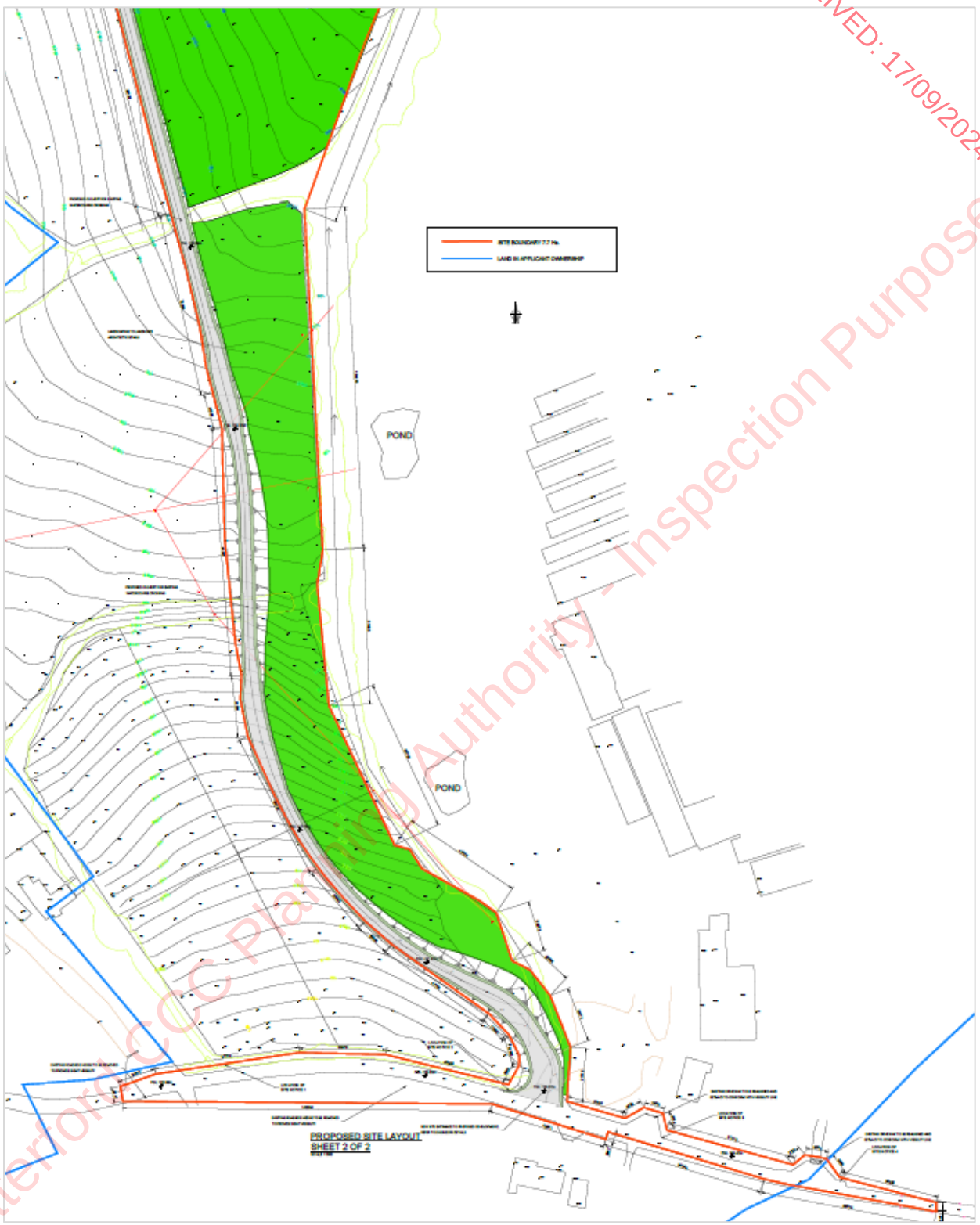

Figure 5.1: Extract from Planning Drawings (as prepared by ORS)

5.4 Receiving Environment

This section provides an overview of the existing ecological conditions within the site and the surrounding environment.

5.4.1 Site Location & General Description

The site in question is approximately 7.7 hectares in area, including the proposed access road. It is located in a rural area in the townlands of Curraghnagarraha, Reatagh, and Curraghballintlea, approximately 2.9km south-east of Carrick-on-Suir and 3.6km south-west of Piltown. The site will be accessed via the creation of a new entrance that is just off a local, third-class road. The site is to the immediate west of an existing operational piggery. Site location maps can be seen in **Figures 5.2** and **5.3.**

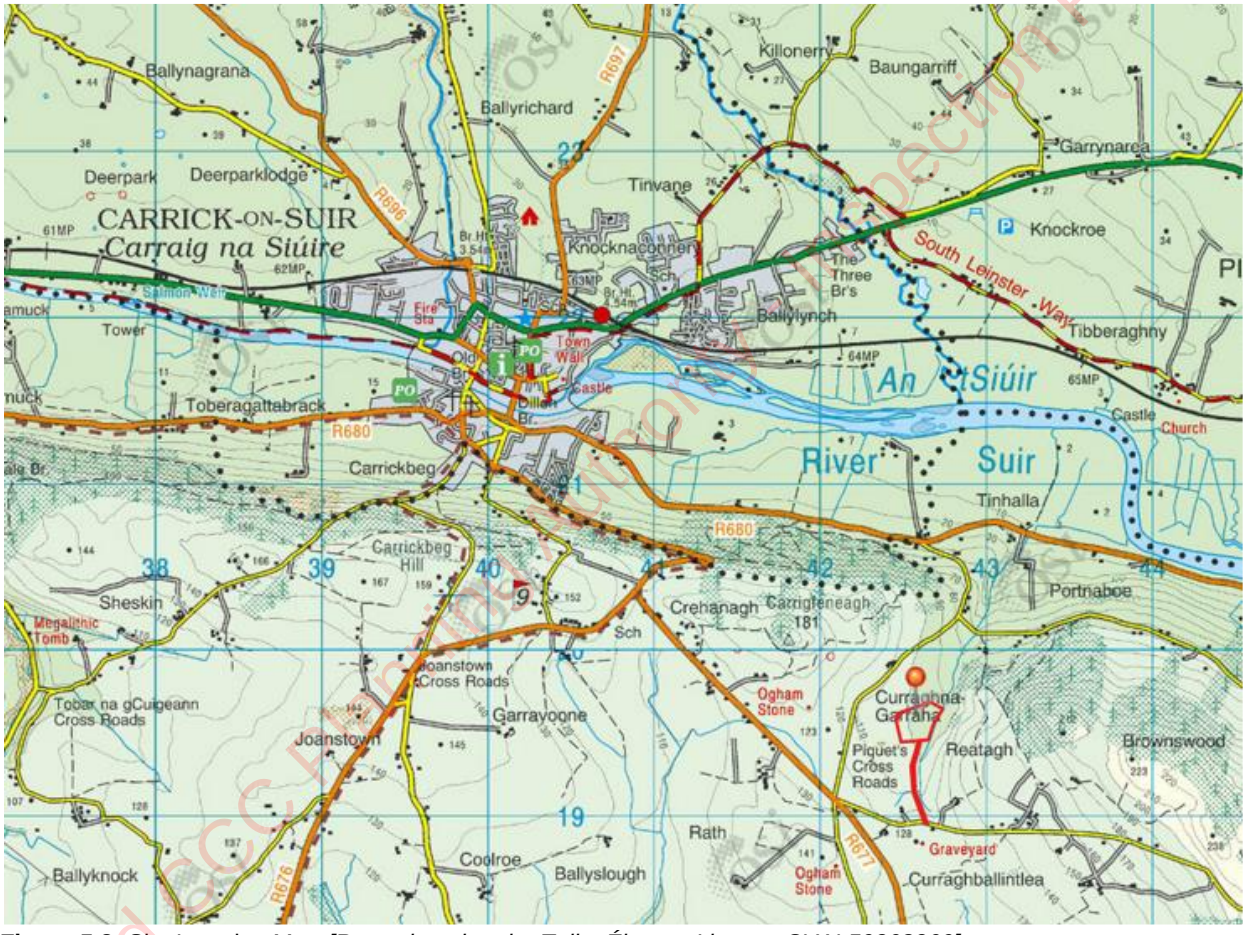

Figure 5.2: Site Location Map *[Reproduced under Tailte Éireann License CYAL50368269]*

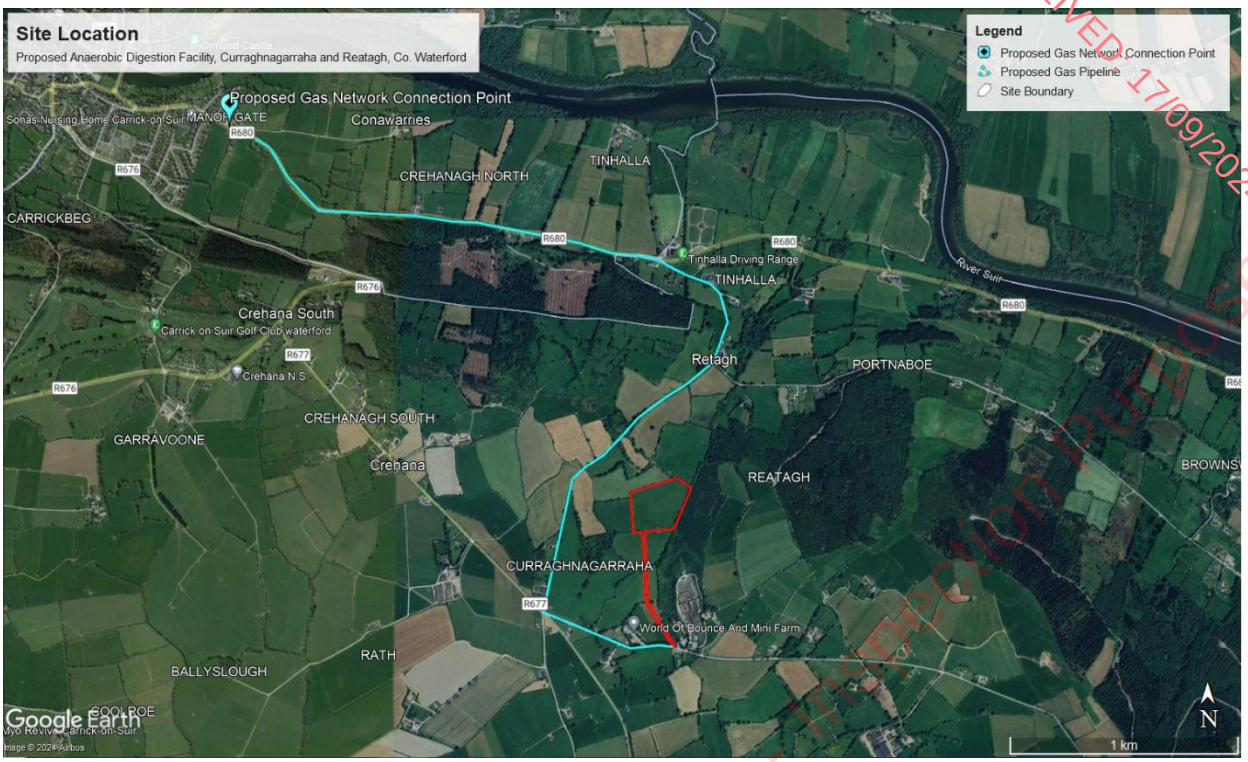

Figure 5.3: Site Location Map.

5.4.1.1 Land Use and Habitats Surrounding the Proposed Development

Using up to date aerial photographs, an overview of the land-use and habitats surrounding the site was assessed and noted. The site is in a rural area where the predominant land use is intensive agriculture and the dominant habitat associated with this use is improved agricultural grassland (Fossit Code: GA1). Other habitats represented in the wider area include semi-improved grasslands, hedgerows (WL1), treelines (WL2), and areas of coniferous and broadleaved woodlands (WD4, WD2, WD1). There are also a number of watercourses close to the site, including the River Suir which is 1.7km north of the site.

The site is located in a slight valley characterised by the Tinhalla Stream, which rises in elevated lands to the south of the site.

An overview of the local habitats surrounding the Proposed Development site can be seen in the aerial photograph in **Figure 5.4**.

Figure 5.4 – Aerial photograph showing habitats surrounding the study area. Proposed Development site is outlined in red and proposed gas pipeline in blue.

5.5 Designated Sites

5.5.1 Natura 2000 Sites

The proposed site is not within or immediately adjacent to any site that has been designated as a Special Area of Conservation (SAC) or a Special Protection Area (SPA) under the EU Habitats or EU Birds Directive.

There are three Natura 2000 sites within the Zone of Influence of this Proposed Development site. These sites are summarised in **Table 5.2**. The location of the site in relation to these designated areas are shown in **Figures 5.5** and **5.6** and a full synopsis of these sites can be read online on the website of the National Parks and Wildlife Service (www.npws.ie).

Table 5.2 – Natura 2000 Sites within 15km of the Proposed Development

Site Name & Code	Distance from Site	Qualifying Interests
Lower River Suir SAC 002137	1.3km north-east / 1.9km downstream	• Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] • Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation [3260] • Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] • Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0] • *Taxus baccata* woods of the British Isles [91J0] • *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] • *Austropotamobius pallipes* (White-clawed Crayfish) [1092] • *Petromyzon marinus* (Sea Lamprey) [1095] • *Lampetra planeri* (Brook Lamprey) [1096] • *Lampetra fluviatilis* (River Lamprey) [1099] • *Alosa fallax fallax* (Twaite Shad) [1103] • *Salmo salar* (Salmon) [1106] • *Lutra lutra (Otter)* [1355]
Hugginstown Fen SAC 000404	14.2km north-east	• Alkaline fen
Comeragh Mountains SAC 001952	10.7km south-west	• Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110] • Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation [3260] • Northern Atlantic wet heaths with *Erica tetralix* [4010] • European dry heaths [4030] • Alpine and Boreal heaths [4060] • Blanket bogs • Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani) [8110]

		• Calcareous rocky slopes with chasmophytic vegetation [8210] • Siliceous rocky slopes with chasmophytic vegetation [8220] • *Drepanocladus vernicosus* (Slender Green Feather-moss) [1393]

The generic conservation objectives of the SACs are:

To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.

The generic conservation objectives of the SPAs are:

To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.

The favourable conservation status of a habitat is achieved when:

- Its natural range and area it covers within that range is stable or increasing and the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future;
- The conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

The population dynamics data on the species concerned indicate that it is maintaining itself on a long -term basis as a viable component of its natural habitats.

- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future.
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

As potential significant effects upon the sites identified could not be ruled out due to potential emissions arising from the operation of the Proposed Development, a separate NIS as required under Article 6 of the EU Habitats Directive has been submitted as part of this application. This NIS will allow the competent authority to undertake its statutory obligations with regards to Appropriate Assessment.

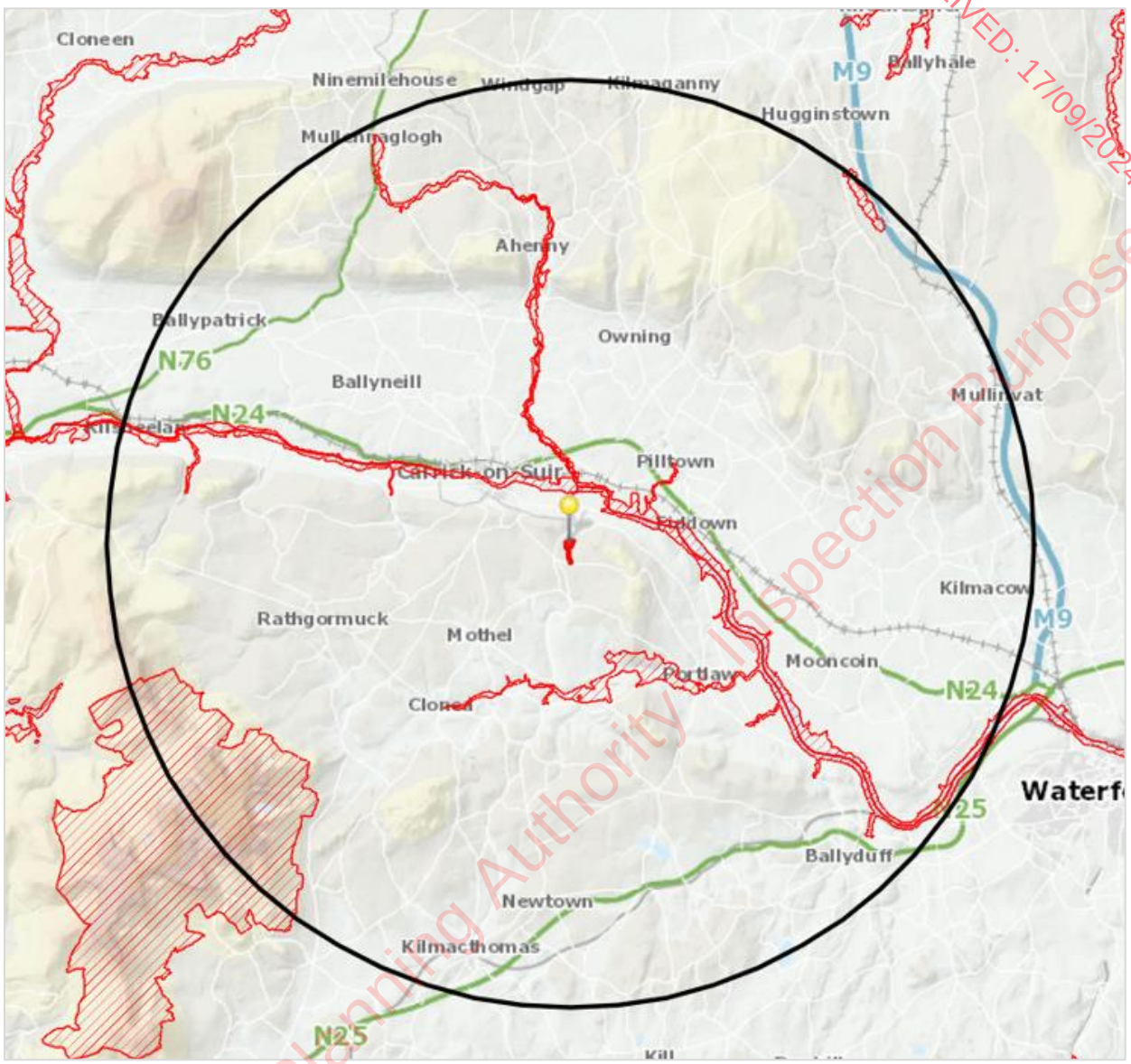

Figure 5.5 – Designated Sites within the Zone of Influence of the Proposed Development (Pinned). SACs – Red Hatching, SPAs – Pink Hatching.

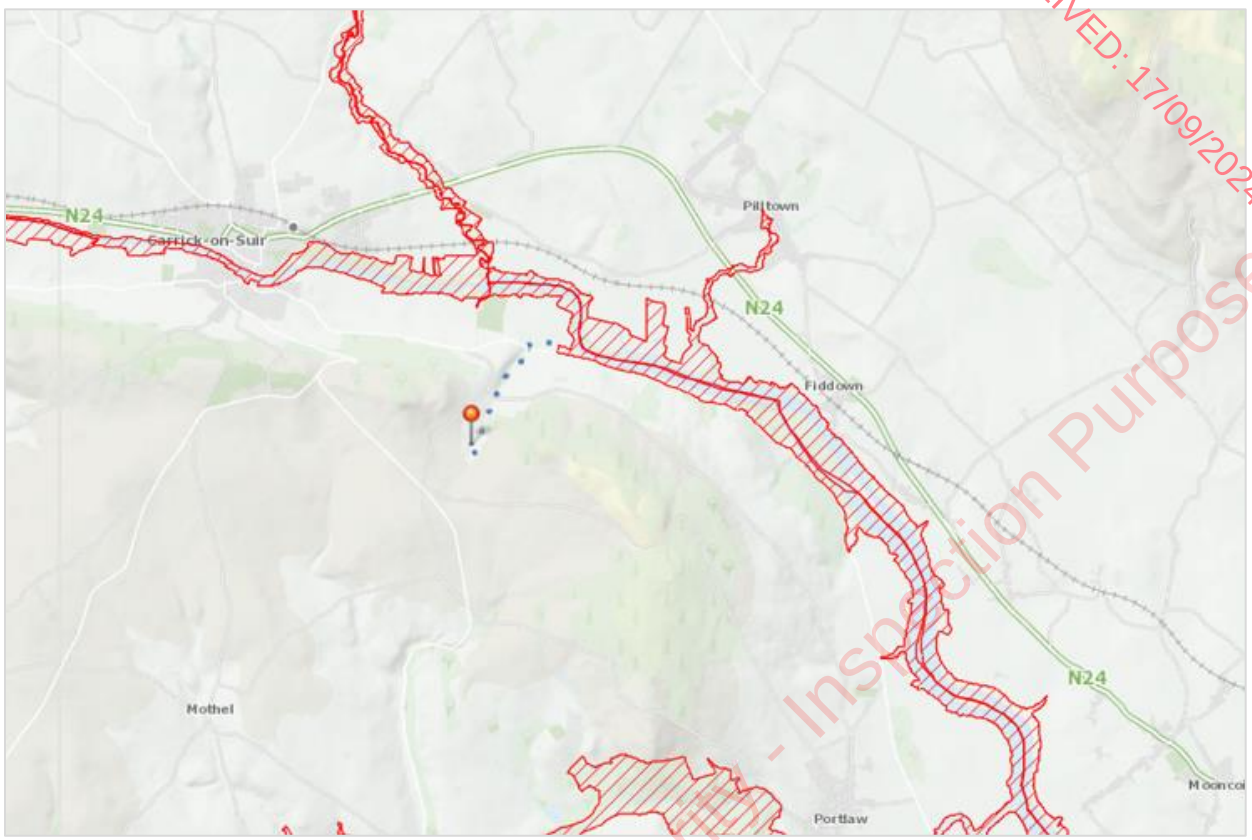

Figure 5.6 – The Proposed Development in Relation to the Lower River Suir SAC (Red Hatching). Connectivity is Included.

5.5.2 Nationally Important Sites

The Proposed Development is not within or immediately adjacent to any nationally designated site, such as a Natural Heritage Area or a proposed Natural Heritage Area. It is within the Zone of Influence of nine sites that have been designated as proposed Natural Heritage Areas. These sites are summarised in **Table 5.3** and a map showing their locations relative to the Proposed Development is shown in **Figure 5.7**.

Table 5.3 – Nationally Important Sites within 15km of the Proposed Development

Site Name & Code	Distance from Site
Tibberaghny Marshes pNHA 000411	1.6km north-east
River Suir Below Carrick-on-Suir pNHA 000655	1.6km north
Fiddown Island pNHA 000402	3km east
Portlaw Woods pNHA 000669	3.1km south
Lower River Suir (Coolfin, Portlaw) pNHA 000399	6km south-east
Higginstown Fen pNHA 000404	14.2km north-east
Comeragh Mountains pNHA 001952	10.7km south-west
Slievenamon Bog NHA 002388	14.3km north-west
Toor Wood pNHA 001708	13.1km west

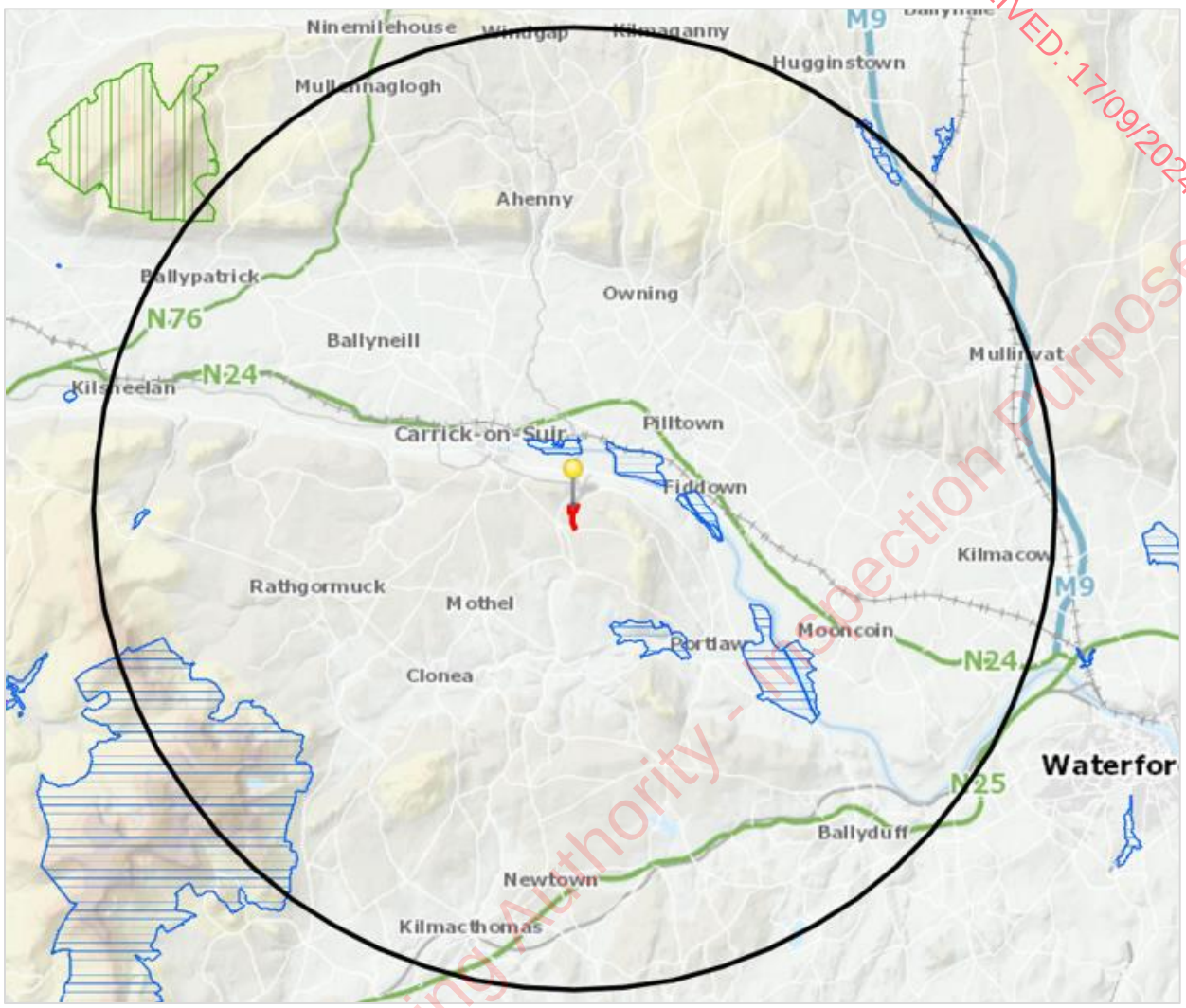

Figure 5.7 – Proposed Development in relation to proposed Natural Heritage Areas within 15km (Blue Cross Hatching).

5.6 Flora

5.6.1 Habitats within the Study Area

No part of the Proposed Development site lies within, nor is it immediately adjacent to any area that has been designated for nature conservation purposes. All Proposed Development works within the Proposed Development site will take place on areas of low – high biodiversity value on a local level. These habitats are described in greater detail below, whilst a habitat map depicting the main habitats in the Proposed Development site is presented in **Figure 5.8**.

The Proposed Development site consists of one large field (proposed location of Anaerobic Digestion Facility) and this field will be accessed via the creation of an access road that traverses a strip of land through three other fields.

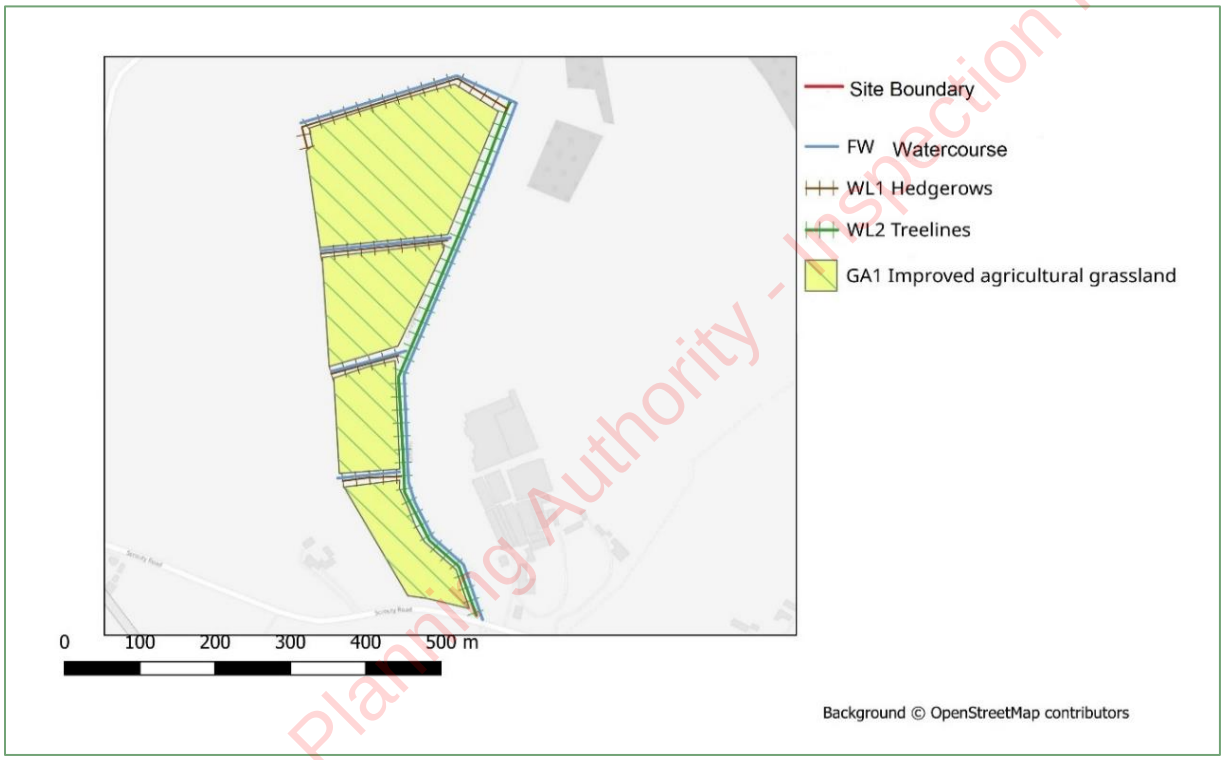

Figure 5.8 – Habitat Map of the Proposed Study Area

The dominant habitat within the site is highly modified Improved Agricultural Grassland (GA1). The sward is dominated by rye grasses (*Lolium* sp) and meadow grasses (*Poa* sp.), and there is a low proportion of broadleaved species in the grass sward. There are no wetland indicators within the grassland habitat, e.g., no rushes (*Juncus sp*), meadowsweet (*Filipendula ulmaria)* or Flag iris (*Iris pseudocorus*), however on the day of the survey the ground was waterlogged. This is likely due to the high level of rainfall that had occurred in the season previous to the survey. It is likely that the grassland drains well in drier months. The grassland here is currently being grazed by a small herd of sheep. The improved grassland habitat extends throughout the four fields that will form part of the development site, i.e., the portion of the fields that will be used for the access road, and the final field where the anaerobic digestion facility will be located. The overall ecological value of the grassland habitat within all fields is low.

The perimeters of the site consist of high value Hedgerows (WL1), Treelines (WL2), Streams

(FW1) and Drainage Ditches (FW4). These features are of high ecological value on a local level. The proposed access road will be constructed in the eastern section of the first three fields. There is a mature treeline along this eastern perimeter. There is a good mixture of native species in this treeline, including gorse (*Ulex europaeus)*, holly (*Ilex aquifolium)*, elder (*Sambucus nigra)*, bramble (*Rubus fruticosus agg)*, hawthorn (*Crataegus monogyna),* alder (*Alnus glutinosa)* and willow (*Salix sp*). There are also some mature beech (*Fagus sylvatica)* and ash (*Fraxinus excelsior)* along this treeline.

The main part of the site (location of anaerobic digestion facility) consists of a large field that is bordered to the north, east and south by Hedgerows (WL1) or Treelines (WL2). The western perimeter consists of a fence. The northern perimeter of this field consists of a hedgerow that is dominated by gorse and holly, with an occasional mature ash. There is a wet drainage ditch (FW4) along this hedgerow. The southern perimeter of this field consists of a low, sparse gorse hedgerow, with an occasional mature ash. There is also a wet drain present along this boundary. The eastern perimeter of the main field is a continuation of the treeline described above that will be close to the proposed access road.

There is a small stream (Tinhalla Stream) flowing along the eastern perimeter of the site. This stream flows over small cobbles, it is clear, with little instream vegetation, although watercress Apium was noted occasionally. The stream flows north towards the River Suir.

5.6.1.1 Overall Evaluation of Habitats within the Proposed Development Site

Overall, the biodiversity and ecology of this Proposed Development site varies from low-high local value. The dominant habitat within the site is highly modified improved grassland. This habitat is of no biodiversity value. The hedgerows / treelines within the site are of higher biodiversity value and they would provide suitable nesting sites for birds and these ecological features also form part of the ecological networks that connect to the River Suir SAC. The stream that flows along the eastern perimeter of the site is also of high ecological value.

5.6.1.2 Rare and Protected Plant Species

An examination of the website of the National Parks and Wildlife, the National Biodiversity Data Centre and the Online Atlas of Vascular Plants for Ireland revealed that there are no records for any plant species protected under the Flora Protection Order from within the 10km square (S55) of the Proposed Development site. The majority of the habitats within the site are all highly modified and no protected plant species were noted within the Proposed Development site.

5.6.1.3 Invasive Species

No non-native invasive species that are regulated for control under the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477) were recorded from within the study area.

5.7 Fauna

5.7.1 Protected Mammals

Records from the National Biodiversity Data Centre reveal the presence of the following protected mammals from within the 10km square (M26) of this Proposed Development site:

- Brown Long-eared Bat (*Plecotus auritus*)
- Daubenton's Bat (*Myotis daubentonii*)
- Eurasian Badger (*Meles meles*)*
- Eurasian Pygmy Shrew (*Sorex minutus)*
- Eurasian Red Squirrel (*Sciurus vulgaris*)
- European Otter (*Lutra lutra)*
- Lesser Noctule (*Nyctalus leisleri*)
- Nathusius's Pipistrelle (*Pipistrellus nathusii*)
- Natterer's Bat (Myotis nattereri)
- Pine Marten (*Martes martes*)
- Pipistrelle (*Pipistrellus pipistrellus sensu lato*)
- Soprano Pipistrelle (*Pipistrellus pygmaeus*)
- West European Hedgehog (*Erinaceus europaeus*)
- Whiskered Bat (*Myotis mystacinus*)

A custom polygon generated for the Proposed Development site revealed that none of these records were obtained from within the planning site itself.

All these species are protected under the Irish Wildlife Acts. In addition, the otter (*Lutra lutra)* is protected under Annex II of the European Habitats Directive. The field survey of the site found no badger setts present within the site, and no obvious worn tracks or trails that could be attributed to badgers were noted. However, having regards to the natural habitats that are present in the lands surrounding the site, the site may be of local importance to mammal species.

The riparian zone of the stream that flows along the eastern perimeter of the site was walked to determine the presence of any otter signs such as slips, couches or spraints. None of the above signs were noted, however this does not exclude the possibility that otters use this stream. The National Biodiversity Data Centre has records for otters for separate streams that lie to the south of the site, whilst otters are also present along the River Suir.

5.7.2 Bats

5.7.2.1 Bat Suitability Index

The National Biodiversity Data Centre (NBDC) has produced a landscape suitability index for bat species in Ireland, and this is based on work by *Lundy et al (2011).* The results are provided as maps, where the area of concern is coloured to indicate the overall suitability of the landscape for bats. The index ranges from 0 to 100 with 0 being least favourable and 100 most favourable for bats. The overall assessment of bat habitats for the current study area is given as 39.11, which is moderately high. **Table 5.4** gives the suitability of the study area for the bat species found in the study area (based on NBDC).

Table 5.4 – Bat Suitability Index for the Proposed Development (NBDC)	
Bat Species	**Suitability Index**
All Species	39.11
Brown Long-Eared Bat *Plecotus Auritus*	56
Soprano Pipistrelle *Pipistrellus Pygmaeus*	47
Natterer's *Bat Myotis Nattereri*	54
Nathusius' Pipistrelle *Pipistrellus Nathusii*	1
Daubenton's Bat *Myotis Daubentoniid*	39
Whiskered Bat *Myotis Mystacinus*	53
Leisler's Bat *Nyctalus Leisleri*	45
Lesser Horseshoe Bat *Rhinolophus Hipposideros**	2
Common Pipistrelle *Pipistrellus Pipistrellus*	55

** Annex II Species*

5.7.2.2 Bat Features within the Proposed Development Site

There are no buildings within the site, however there are mature trees present along the site boundaries that are potentially of bat roost potential. Overall, the landscape is considered to be of high local importance for bats due to a good network of hedgerows and treelines around the fields in the wider area. These ecological features are important for commuting and foraging bats.

5.7.3 Birds

No birds of conservation concern were noted within the Proposed Development site during the site survey. The following bird species were heard singing within the Proposed Development site or flying overhead. Overall bird activity in the main field of the Proposed Development site was limited. The current conservation status of the birds is also given, where green status is of low conservation concern, amber is of medium concern and red is of high concern (*Gilbert et al., 2021*).

- Blackbird (*Turdus merula) – Green Status*
- Great tit (*Parus major) – Green Status*
- Wren (*Troglodytes troglodytes) – Green Status*
- Robin (*Erithacus rubecula*) *– Green Status*
- Chaffinch (*Fringilla coelebs) – Green Status*
- Starling (*Sturnus vulgaris) – Amber Status*
- Pied wagtail (*Motacilla alba yarrellii)* – Green Status
- Buzzard (*Buteo buteo)* – Green Status
- Jackdaw (*Corvus monedula*) – Green Status
- Pigeon (*Columba livia f. domestica)* – Green Status

Having regards to the network of treelines and hedgerows that surround the site, the site and its surrounding habitats are likely to be of medium-high local importance for birds.

5.7.4 Amphibians, Reptiles and Invertebrates

February is frog spawn season; however, no frog spawn was noted in any of the watercourses surrounding the site. The flow in these watercourses is likely to be too fast for the deposition of spawn. There are no ponds within the site that would provide suitable breeding habitat for the smooth newt. In summer months, the viviparous lizard (*Zootoca vivipara*) may bask on rocks within the site.

The improved agricultural grassland habitats within the site provide limited value to pollinating insects, however any unmanaged verges along the site perimeters and the hedgerows would provide suitable foraging habitats for pollinating insects in the late spring and summer.

5.8 Aquatic Environment

5.8.1 Water Features and Quality

5.8.1.1 Surface Waters – Water Framework Directive Status

The site is within the Suir Hydrometric Area (16) and Catchment (16), the Suir Sub-Catchment (140) and the Tinhalla (010) Sub-Basin. There are drains along the perimeter of the fields within the site, whilst the Tinhalla Stream flows along the eastern perimeter of the site. This stream rises just to the south of the site. It flows north, along field boundaries until its confluence with the River Suir (upper Suir Estuary) at a point 1.9km downstream of the site.

The EPA have classed the ecological status of the Tinhalla Stream as moderate. The ecological status of the Suir Estuary at this point is noted as poor. Under the requirements of the Water Framework Directive, this is unsatisfactory and good status must be achieved in these watercourses by the end of the 3rd WFD cycle (2027). An overview of the ecological status of the watercourse in the area and surrounding catchments is presented in **Figure 5.8**.

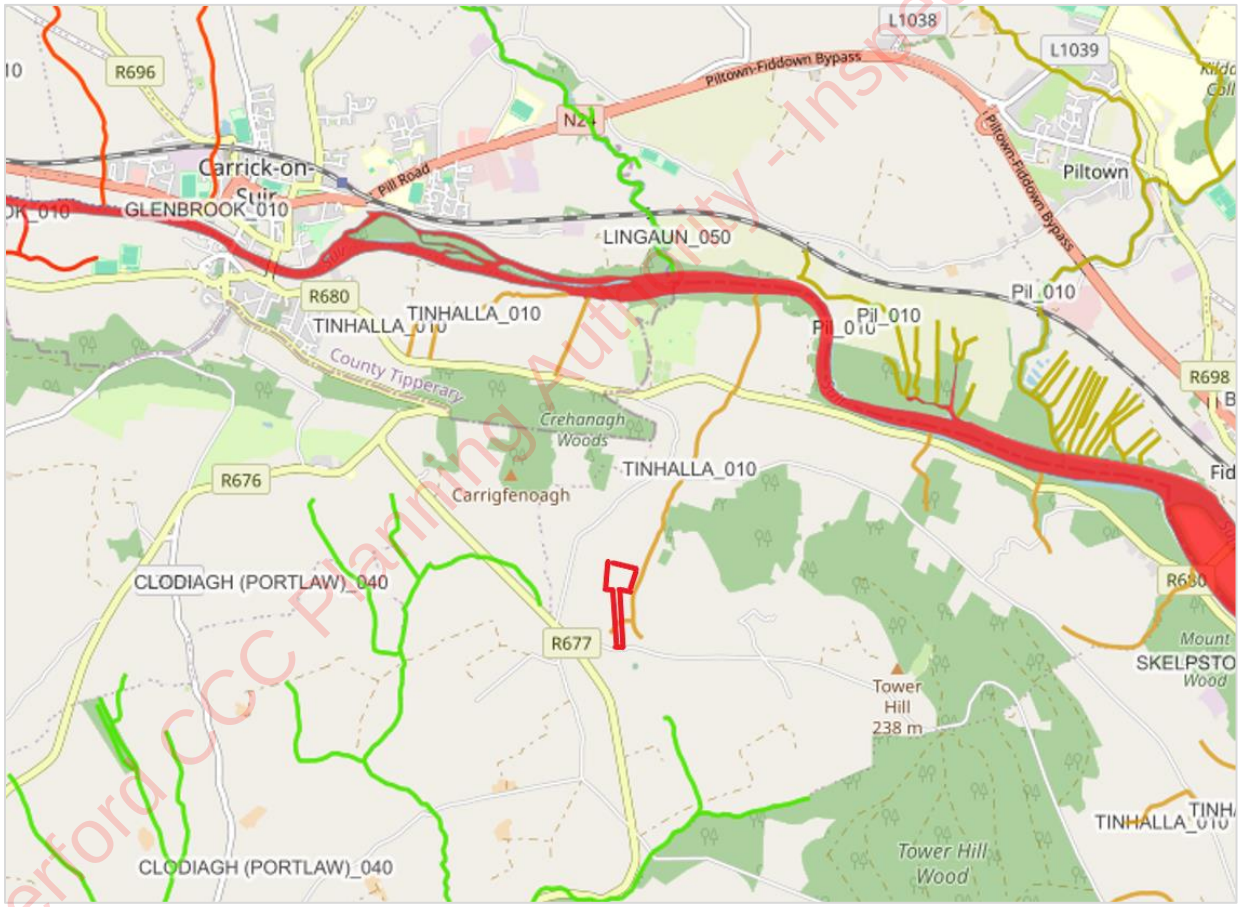

Figure 5.8 – The site (Outlined in red) and local WFD Status [Green – Good Status; Yellow – Moderate Status; Red – Poor Status].

5.8.1.2 Surface Waters – Biological Quality Assessment

The results of the biological water quality assessment from the Tinhalla Stream at points upstream and downstream of the site are presented below in **Table 5.5**.

Table 5.5 –Q Values Results of the Tinhalla Stream		
Station ID	**Q-Value**	**Ecological Status**
Station 1 – Downstream	Q3-4	Moderate
Station 2 – Upstream	Q4	Good

5.8.1.3 Ground Water

The Proposed Development site is within the Comeragh Groundwater Body and the current status of this waterbody is noted as good. This groundwater body is currently considered as Not At Risk. Within the Proposed Development site itself, groundwater vulnerability ranges from high to extreme.

5.9 Ecological Evaluation

5.9.1 Summary of the Value of the Site

The Proposed Development site is within the Zone of Influence of three sites designated under

the Natura 2000 network (SACs / SPAs). The cclosest of these is the Lower River Suir SAC, which is 1.3km north-east of the site. The hydrological connectivity between these areas is 1.9km, via the Tinhalla Stream.

The Proposed Development site is also within 15km of nine sites designated as Natural Heritage Areas (NHAs and pNHAs). The closest of these is Tibberaghny Marshes pNHA and this is 1.6km north-west of the site, on the northern shores of the River Suir.

Within the Proposed Development site itself the dominant habitats are improved agricultural grasslands, watercourses (the Tinhalla Stream and its tributaries), hedgerows and treelines. The watercourses, treelines and hedgerows that occur along the perimeters of the site are important ecological features - these areas provide important nesting areas and safe commuting corridors for local populations of birds and small mammals, including potentially bats. They also provide ecological connectivity to the SAC. The Lower River Suir SAC is of International Importance.

The NRA guidelines on the Assessment of Ecological Impacts on National Road schemes (NRA, 2009) provides a rationale for the evaluation of ecological receptors within a site. **Table 5.6** lists the habitats that have been described within the Proposed Development site and their associated ecological value, based on the NRA guidelines.

Table 5.6 – Ecological Features and their Evaluation

Habitat	Rating	Criteria
Improved Agricultural Grasslands – GA1	No Value - Local Importance (Lower Value)	Limited biodiversity value although may provide some habitat opportunities for invertebrates and birds
Well Structured Hedgerow – WL1 Well Structured Treelines – WL2 Watercourses (Tinhalla Stream) – FW2	Local Importance (Higher Value)	Semi-Natural Habitat that is higher in biodiversity value in a local context. Provides value for local populations of bats and birds. The Tinhalla Stream provides connectivity to the Lower River Suir SAC.
Lower River Suir SAC (Downstream of Discharge)	International Importance	'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation.

5.10 Impact Assessment

5.10.1 Introduction

The information gathered as part of the desk study and field survey for the Proposed Development has been used to complete an Ecological Impact Assessment (EcIA). This EcIA has been undertaken following the latest guidelines set out by CIEEM (2018) and the EPA.

The identification of potential impacts and the assessment of their significance typically requires the identification of the type and magnitude of the impacts. For example, will the impacts be short term or long term, direct, indirect or cumulative and will they occur during construction or operation. This section will establish whether ecological impacts of the Proposed Development are likely to occur and whether or not they are significant. These potential impacts will be examined with respect to the ecological receptors identified in the previous section.

The emphasis in EcIA is on “significant” effects, rather than all ecological effects (CIEEM, 2018). For the purpose of EcIA, a “significant effect” is an effect that either supports or undermines biodiversity conservation objectives for important ecological features for biodiversity in general. Conservation objectives may be specific (e.g., for a designated site) or broad (e.g., national / local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local.

A significant effect is an effect that if sufficiently important to require assessment and reporting so that the decision maker (i.e., Local Authority) is adequately informed of the environmental consequences of permitting the project. In broad terms, significant effects encompass impacts on structures and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance, and distribution). (CIEEM, 2018).

5.11 Impacts upon Designated Sites

5.11.1 Natura 2000 Sites

The site at Curraghnagarraha, Reatagh, and Curraghballintlea, Co. Waterford is 1.9km upstream of the Lower River Suir SAC and connectivity is provided by the Tinhalla Stream In the absence of mitigation, it cannot be ruled out with certainty that significant effects upon these Natura 2000 sites will not arise. Any negative effects on the Lower River Suir SAC could be significantly negative at an international scale. An NIS as required under Article 6 of the EU Habitats Directive has been submitted as part of this application. This NIS will allow the competent authority to undertake its statutory obligations with regards to Appropriate Assessment.

The following impacts upon the Lower River Suir SAC were considered in the NIS:

Deterioration of Water Quality in Designated Areas Arising from Pollution to Surface Water or Ground Water During Site Preparation and Construction – The construction of the new structures and associated works will involve the excavation of soil and the pouring of concrete for foundations and other surfaces. These works will take place on a site that is adjacent to the Tinhalla Stream and hydrologically upstream of the Lower River Suir SAC. If appropriate mitigation measures are not taken during construction and operation of the Proposed Development, then there is the possibility that run-off into the Tinhalla Stream could occur, leading to deteriorations further downstream in the River Suir SAC.

Therefore, as there is a potential risk of direct and indirect impacts arising from the site preparation and construction of the Proposed Development, appropriate mitigation will be required to maintain the conservation status of the Lower River Suir SAC and its protected habitats and species.

Deterioration of Water Quality in Designated Areas Arising from Pollution to Surface Water or Ground Water During the Operation of the Site - Negative impacts upon water quality in the Lower River Suir SAC have also been considered. There will be no process discharges from the operation into the Tinhalla Stream, as following Waste Assimilate Capacity (WAC) calculations, it was determined that this stream does not have the appropriate capacity or ecological status to assimilate this discharge without causing potential further deteriorations.

However, other sources of pollution during the operation of this Proposed Development were also considered. The site is within an area of high groundwater vulnerability which extends into areas of extreme groundwater vulnerability – bedrock at surface. Pollution of groundwater could occur during loading or unloading of the material. In addition, any structural weaknesses in the effluent or soiled water holding tanks on site could lead to impacts upon groundwater. Groundwater quality can impact upon surface water quality as these two resources mix at the hyporheic zone, which is the region just under a river or stream bed where there is a mixing of shallow ground water and surface water. Any pollution of groundwater locally could lead to significant effects upon designated water dependant ecosystems that are in the same catchment.

Land-Spreading - The biobased fertiliser (biobased fertiliser) produced will be a rich source of nutrients that will be used by customer farmers for the fertilisation of their land. In the worst case scenario and in absence of mitigation, any inappropriate land-spreading of the biobased fertiliser could lead to impacts upon the receiving waters in local catchments and it can result in

eutrophication, algal blooms, fish kills and loss of biodiversity. Designated habitats and species can be impacted upon. There is a greater risk when groundwater vulnerability at the lands for spreading is high, or when land-spreading is undertaken close to drains or streams. In these situations, the Pollution Impact Potential for both phosphates and / or nitrates is high.

The farms of the customer farmers have been identified; however, these will be subject to local change on an annual basis. All farmers will use the biobased fertiliser on lands that have an agronomic requirement for fertiliser. Spreading will be done in accordance with the specific Nutrient Management Plan for the farm and in accordance with S.I. 113 of 2022. Records for the movement of all biobased fertiliser will be kept.

The positive benefits of using the biobased fertiliser produced must also be considered, as this provides an alternative to the land-spreading of liquid slurry. Using biobased fertiliser presents several scientific advantages over the continued use of untreated manures, slurries, or chemical fertilisers, particularly concerning plant nutrient availability and the mitigation of nutrient leaching into watercourses. The benefits are outlined below.

Balanced Nutrient Availability

Biobased fertiliser typically contains a balanced mix of essential nutrients, including nitrogen (N), phosphorus (P), potassium (K), and micronutrients crucial for plant growth. This balanced nutrient profile contrasts with chemical fertilisers, which often supply only specific nutrients. Studies have shown that the diverse nutrient composition of biobased fertiliser supports comprehensive plant nutrition, contributing to improved crop yields and overall plant health (Möller and Müller, 2012)[1].

Slow-Release Nutrients

Biobased fertiliser releases nutrients gradually over time as it decomposes in the soil. This gradual release mechanism ensures a sustained supply of nutrients to plants, contrasting with untreated manures, slurries and chemical fertilisers, which can be prone to leaching or volatilisation. The slow-release nature of biobased fertiliser reduces the risk of nutrient loss and enhances nutrient uptake efficiency by plants (Yao et al., 2011)[2]. Analysis has shown that approximately 80% of the total nitrogen in biobased fertiliser is present as readily available nitrogen. Digestion of livestock slurry has also been shown to increase the plant availability of nitrogen in slurry by *ca*. 10%.
Compared to untreated manures and slurries, biobased fertiliser poses a lower risk of nutrient leaching into watercourses. The balanced nutrient composition and slow-release nature of biobased fertiliser minimise the likelihood of excess nutrients washing away into streams or groundwater. This reduction in nutrient leaching coupled with land spreading best practice helps mitigate water pollution and eutrophication, safeguarding aquatic ecosystems and maintaining water quality (Möller and Müller, 2012).

Enhanced Soil Health

[1] Möller, K., & Müller, T. (2012). Effects of anaerobic digestion on biobased fertiliser nutrient availability and crop growth: a review. Engineering in Life Sciences, 12(3), 242-257.

[2] Yao, R., Li, G., Xie, H., Zhao, B., & Liu, H. (2011). *Release characteristics of nutrients from aerobic composted swine manure in soil. Journal of Soils and Sediments*, 11(1), 103-111.

Rich in organic matter, biobased fertiliser improves soil structure, promotes water retention, and stimulates microbial activity. These soil health benefits contribute to improved nutrient cycling, root development, and overall soil fertility (De Vries et al., 2015).[3]

Pathogen and Weed Reduction

Manure and slurry may contain a range of bacterial, viral, and parasitic pathogens and land application of these organic fertilisers typically occurs without prior treatment. In contrast, Anaerobic Digestion, and subsequent pasteurisation of biobased fertiliser significantly reduces the presence of pathogens and weed seeds, making it safer for agricultural use compared to untreated manures and slurries (Vinnerås et al., 2006).[4]

Biobased Fertiliser Usage

At full capacity the total tonnages for transportation off-site as biobased fertiliser to local agricultural operators are summarised below:

- Biobased fertiliser Fibre - 8,600 tonnes
- Biobased fertiliser Liquid Concentrate - 17,000 tonnes

Of the maximum 90,000 tonnes of annual feedstock intake, circa 42,000 tonnes of untreated manures and slurries would normally be land spread locally. Following the AD, pasteurisation and biobased fertiliser treatment there will be 8,600 tonnes of solid and 17,000 tonnes of liquid biobased fertiliser. This represents a significant reduction in the hydraulic loading of land spreading locally of circa 16,000 tonnes per annum.

Post-pasteurisation the biobased fertiliser will meet the standard of an EU fertilising product under Regulation (EC) No 2019/1009 under the criteria outlined for Product Function Category (PFC) 3 B: Inorganic Soil Improver. The operator will apply for End of Waste status upon grant of permission.

All biobased fertilisers will be used in accordance with S.I. 113 of 2022 European Communities (Good Agricultural Practice for Protection of Waters) Regulations, 2022). The spreading of the biobased fertiliser on the customer farms will be done on accordance with the specific Nutrient Management Plan for that farm.

In summary, utilising biobased fertiliser as a biobased fertiliser offers several scientific benefits, including balanced nutrient availability, slow-release nutrients, improved soil health, reduction of pathogens and weeds, and reduced risk of nutrient leaching into watercourses. These advantages support sustainable agricultural practices, enhance crop productivity, and contribute to environmental conservation efforts.

Cumulative Impacts with other Proposed/Existing Developments - To make an overview assessment of cumulative impacts on the Natura 2000 sites, an examination was made of other planning applications granted within the Curraghnagarraha and Reatagh, Co. Waterford areas for the past five years. In this time, two other planning applications in the townlands were

[3] De Vries, J. W., Groenestein, C. M., & Kool, P. L. (2015). *Effects of anaerobic digestion and composting on reducing the environmental impact of pig manure*. Journal of Environmental Management, 162, 230-237.

[4] Vinnerås, B., Nordin, A., & Niwagaba, C. (2006). *Anaerobic treatment of faecal matter at low temperatures and intermittent loading*. Water Research, 40(18), 3389-3395.

applied for or permitted.

- 19655 - The Erection of PV solar panels on the western aspect of the roofs of the following buildings in the farmyard complex: Fattening Houses A, B, C, D, P, Q, R, A-B, A-C, Farrowing House Gi, Weaner Houses Gii, Drwsow Houses L & M. The development comprises of an activity in relation to which an Industrial Emissions Directive Licence (formerly IPPC Licence) is operated. This application is adjacent to the Proposed Development site. This application was screened for AA by Waterford County Council and significant effects upon Natura 2000 sites were ruled out.

- 23190 - A 450 kwp ground mounted Solar PV system on 0.94 ha site and all associated ground works to the rear of the premises. This application is adjacent to the proposed development site. This application was screened for AA by Waterford County Council and significant effects upon Natura 2000 sites were ruled out.

For future applications, the Local Authority must ensure that any development that has the potential to impact upon the Natura 2000 sites be screened competently for Appropriate Assessment. With the implementation of the mitigation measures contained in this EcIA and the NIS, the current application will have no cumulative impacts upon the Lower River Suir SAC site when considered in combination with other developments that are adequately screened for AA or where mitigation measures have been included as part of a Natura Impact Assessment.

5.11.2 Natural Heritage Areas

The Proposed Development will not lead to the loss or fragmentation of protected habitats within any pNHA or NHA. However, three pNHAs occur along the River Suir downstream of its confluence with the Tinalla Stream, i.e., the Tibberaghny Marshes pNHA, Fiddown Island pNHA and Lower River Suir (Coolfin, Portlaw) pNHA. In the absence of mitigation measures, significant effects upon these pNHAs cannot be ruled out due to pollution of the Tinhalla Stream. The impacts are the same as those which were previously described in the preceding section on the Natura 2000 sites.

5.12 Impacts within the Site

5.12.1 Construction Phase

In the absence of suitable design and mitigation measures, the following impacts could occur during the site preparation and construction of the Proposed Development.

Habitat Loss and Fragmentation

The dominant habitat within the Proposed Development site is Improved Agricultural Grassland. This habitat will be converted to Buildings and Artificial Surfaces. This habitat has limited ecological value and therefore its loss constitutes a negligible ecological impact.

In order to achieve safe site lines at the entrance, XXXXm of hedgerow boundary will be removed along the roadside. This is low quality hedgerow, consisting primarily of immature poplar trees. Its removal does not constitute a significant ecological impact. Landscape plans for the site have included for the replacement of this section of hedgerow with native species.

Plans indicate that the remaining mature vegetation along the boundaries will be retained and this will mitigate against any impacts due to the direct loss of these ecological features. However, damage to these existing hedgerows and mature trees and a subsequent reduction in their lifespan may arise if any root compaction occurs due to works or storage of heavy vehicles or spoil in the root protection zone (RPA) of these features. Any loss or damage to these features would have a negative impact upon the local biodiversity value

The biomethane produced will be delivered to the grid via a new pipeline (which will be designed in detail, consented, and delivered by GNI) along Scrouty Road and the R680. This may result in the loss of hedgerows and grassy verges along the roadside.

Impacts on Local Wildlife

<u>Birds</u>
In the absence of mitigation, any removal of vegetation within the field or along the route of the gas pipeline during the bird nesting season could result in direct mortality of birds. In addition, during site preparation and construction, local populations of birds may be disturbed by the increase in noise, traffic and human activity.

<u>Mammals</u>
During site preparation and construction, local populations of mammals may be disturbed by the increase in noise, traffic and human activity.

Negative effects upon the otter could arise due to any reductions in water quality in the River Suir that might occur due to run-off into the Tinhalla Stream during construction.

There will be no loss or fragmentation of any habitats used by roosting or hibernating bats during construction.

<u>Amphibians, Reptiles, Insects</u>
No significant effects anticipated.

Pollution to Surface and Ground Water – Site preparation and construction will occur on lands that are in close proximity to the Tinhalla Stream. Potential impacts upon this stream arising from the construction of the Proposed Development were described in the Natura 2000 impact section.

The site is in an area of high - extreme groundwater vulnerability. Any deep excavations that are required for the construction could lead to pollution of the groundwater with hydrocarbons or other pollutants.

5.12.2 Operational Phase

In the absence of suitable design and mitigation measures, the following impacts may arise during the operation of the Proposed Development that could affect the ecology / biodiversity of the Proposed Development site and its surrounding environs.

Impacts on Local Wildlife

Birds
Significant effects not anticipated during the operation of the site.

Mammals
Negative effects upon the otter could arise due to any reductions in water quality in the River Suir that might occur due to general run-off from the site during operation.
Any increase in the baseline level of nighttime lighting in the area could give rise to negative effects upon local bats that might forage in the area.

Amphibians, Reptiles, Insects
No significant effects anticipated.

Pollution to Surface and Ground Water

Run-off from impermeable areas within the Proposed Development site such as roads and car parking areas may contain potentially polluting substances such as hydrocarbons etc. This run-off could be mobilised to the Tinhalla Stream and further downstream to the River Suir. In addition, structural weaknesses in any of the tanks could lead to pollution of the groundwater. These impacts are also discussed in the Natura 2000 impact section.

Flood Events - A flood event occurring on the developed site would cause the Sustainable Urban Drainage Infrastructure (SuDS) to become overwhelmed, creating additional pathways for potential contaminants to migrate off-site into downstream receptors along with elevated flow rates. The Proposed Development is located within Flood Zone C and the overall flood risk of the site is considered to be low.

Cumulative Impacts - Cumulative impacts or effects are changes in the environment that result from numerous human-induced, small-scale alterations. Cumulative impacts can be thought of as occurring through two main pathways: first; through persistent additions or losses of the same materials or resource, and second, - through the compounding effects as a result of the coming together of two or more effects (*Bowers-Marriott, 1997*).

In the larger context of the Carrick-on-Suir area, there are a number of other ongoing and Proposed Developments, some of which are proposed for previously undeveloped, green field sites.

These developments combined will reduce the open spaces and habitat availability of the Carrick-on-Suir area as a whole, thereby cumulatively impacting on local bird and mammal populations.

However, the creation of new areas of biodiversity within the Proposed Development site and the retention and protection of the existing hedgerows and stonewalls, will provide local ecological corridors and networks that will reduce the overall cumulative impact of this development in the Carrick-on-Suir area.

5.13 Mitigation Measures

5.13.1 Introduction

In order to avoid any reductions in water quality in the area surrounding the Proposed Development, a number of mitigation measures must be implemented and followed. These measures will protect the surface and ground water quality locally and will subsequently prevent significant effects upon the Lower River Suir SAC. Measures have also been suggested that will help to protect or enhance the local biodiversity of the surrounding area and to ensure the protection of local wildlife. The implementation of these site-specific mitigation measures will ensure the protection of Natura 2000 habitats and species, and the local non-designated ecological receptors. These mitigation measures are also included in the accompanying NIS report.

It is recommended that the measures contained herein, along with all other measures outlined in this EIAR and the NIS are contained in a Construction and Environmental Management Plan and that all works are overseen by an onsite Environmental or Ecological Clerk of Works.

5.13.2 Pre-Construction and General Requirements

- Site preparation and construction must be confined to the Proposed Development site only and it must adhere to all the mitigation measures outlined in this Chapter and in the separate NIS. Work areas should be kept to the minimum area required to carry out the proposed works and this area should be clearly marked out in advance of the proposed works.

- Prior to the commencement of developments on site, the site engineer and the contractors must be made aware of the ecological sensitivity of the Proposed Development site and its connection to the Lower River Suir SAC. They must be made familiar with the mitigation measures outlined in this Chapter and the NIS report and a signed statement saying that they have taken on board the mitigation measures contained herein should be presented to the local authority along with the Notice of Commencement. The applicant will be responsible for alerting the engineers and contractors to the sensitivity of the habitats and water receptors surrounding the Proposed Development site. This will be done prior to the commencement of any site works.

5.13.3 Protection of Terrestrial Habitats and Features

- In accordance with the policies and objectives of the Regional and County Development Plans, the existing green infrastructure (GI) of the Proposed Development site, i.e., the treelines and hedgerows, must be incorporated into the development. In order to prevent damage to treelines / hedgerows in the Proposed Development site that are to be retained, then protective barrier fencing should be erected at a minimum 2m out from these boundaries to protect these features prior to the commencement of site clearance works. There must be no dumping or storage of construction waste or machinery in this zone during construction.

- Any small tree or shrubs that require removal should be removed outside of the bird nesting season (March – August).

5.13.4 Mitigation Measures during Construction

5.13.4.1 Protection of Water Quality and Management of Pollutants

- Efficient construction practices and sequences should be employed on site, and this will minimise soil erosion and potential pollution of local watercourses with soil and sediment. Unnecessary clearance of vegetation should be avoided and only areas necessary for building works should be cleared. All existing grassland habitats within 10m of the Tinhalla Stream should be retained. The retention of these areas will also help retain storm water run-off from the site during construction and operation.

- It is vital that there is no deterioration in water quality in the Tinhalla Stream, which is upstream of the Lower River Suir SAC. Therefore, strict controls of erosion, sediment generation and other pollutants associated with the construction process should be implemented, including the provision of attenuation measures, silt traps or geotextile curtains to reduce and intercept sediment release into any local watercourses. Guidelines in the following best practice documents should be adhered to:

    - Construction Industry Research and Information Association (CIRIA) (2005) Environmental Good Practice on Site (C692).

    - Construction Industry Research and Information Association (2001) Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (C532).

    - Construction Industry Research and Information Association (2000) Environmental Handbook for Building and Civil Engineering Projects (C512).

    - Environmental Protection Agency (2015) List of Waste and Determining if Waste is Hazardous or Non-Hazardous.

    - Environment Agency et al. (2015) Guidance on the Classification and Assessment of Waste, Technical Guidance WM3.

- Works in proximity to the stream should be avoided during periods of heavy rainfall.

- There must be no uncontrolled discharges of contaminated waters to ground or surface waters from this development, either during the construction or operation of the development. The control and management of hydrocarbons on site will be vital to prevent deteriorations in surface and groundwater quality locally. The following measures should be employed on site:

    - During construction re-fuelling of equipment and machinery must be done off site. If this is not possible, then a dedicated re-fuelling location must be established on site in the compound area away from ground clearance or rock-breaking activities.

    - Spill kits stations must be provided at the fuelling location for the duration of the works.

    - Staff must be provided with training on spill control and the use of spill kits.

    - All fuel storage containers must be appropriately bunded, roofed and protected from vehicle movements. These bunds will provide added protection in the event of a flood event on site.

- All chemicals must be stored as per manufacturer's instructions. A dedicated chemical store within a building must be provided on site if chemicals are to be stored on site.
- Procedures and contingency plans must be established on site to address cleaning up small spillages as well as dealing with an emergency incident. A stock of absorbent materials such as sand, spill granules, absorbent pads and booms should be kept on site, on plant working near the water and at the refuelling area.
- Daily plant inspections will be completed by all plant operators on site to ensure that all plant is maintained in good working order. Where leaks are noted on these inspection sheets, the applicant must remove the plant from operations for repairs.
- All personnel shall observe standard precautions for handling of materials as outlined in the Safety Data Sheets (SDS) for each material, including the use of PPE. Where conditions warrant, emergency spill containment supplies should be available for immediate use.

- Best practice concrete / aggregate management measures must also be employed on site during construction.
  - It is important that run-off from the construction works does not enter the Tinhalla Stream or any drains that lead to this stream. Therefore, it is recommended that silt fences are installed along the buffer zones of all watercourses within the site. The silt fences should be sturdy and constructed of a suitable geotextile membrane (Hy-Tex Terrastop Premium silt fence, or similar) to ensure that water can pass through, but that silt will be retained. The silt fences must be capable of preventing particles of 425mm from passing though. The footing of the fencing to be buried into the ground and the visible fencing to be *ca.* 0.5m high.
  - An interceptor trench will be required in front of this silt fence.
  - The silt fences should be monitored daily to ensure that they remain functional throughout the construction of the Proposed Development. Maintenance of the fences should be carried out regularly. Fences should be inspected thoroughly after periods of heavy rainfall.
  - Concrete Washout Skip: Chutes of concrete trucks are only to be washed out into an impermeable lined (polythene) skip. The washout water is to be removed off-site for treatment.
  - The concrete washout skip is to be located to the east of the site, where the underlying overburden is greater.
  - Excavations lined with an impermeable liner are not permitted as concrete washout bays on the site.
  - Large excess loads of concrete are to be returned to the supplier or poured into concrete block modules (Betonblock or similar design), in order to minimise waste and reduce the risk of concrete being dumped throughout site.
  - Best practice in bulk-liquid concrete management should be employed on site, addressing pouring and handling, secure shuttering, adequate curing times etc.

- Stockpile areas for sands and gravel must be kept to a minimum size, well away from drains on site.
- Where concrete shuttering is used, measures should be put in place to prevent against shutter failure and control storage, handling and disposal of shutter oils.
- Activities which result in the creation of cement dust should be controlled by dampening down the areas.
- Raw and uncured waste concrete should be disposed of by removal from the site.

- The proposed access road will necessitate the crossing of one small drain in the site. It is recommended that pre-cast open box culverts are used to minimise disruption to the ecology of the bed of the watercourse on site. The minimal amount of vegetation should be removed to facilitate the insertion of these culverts. The installation of these crossings should be overseen by the Clerk of Works.

5.13.4.2 Management of Construction Waste and Soil

- All construction waste must be removed from site by a registered contractor to a registered site. Evidence of the movement and safe disposal of the construction waste must be retained and presented to the Local Authority upon request. Removal of the construction waste should occur as soon as possible after construction works. There must be no disposal of construction waste or topsoil in any designated site or site of biodiversity value.

- All topsoil generated from site works should be stored within the Proposed Development site until it is required for landscaping. It must not be stored outside the Proposed Development site boundaries and it must not be used for the infilling of any area outside of the Proposed Development site. If there is more topsoil than is needed for landscaping, it must be removed from site by a registered contractor for appropriate use elsewhere. The end location of the topsoil must be identified and records presented to the local authority if requested.

5.13.5 Mitigation Measures during Operation

5.13.5.1 Environmental Management System (EMS)

An Environmental Management System (EMS) accredited to ISO14001:2015 ill be prepared and implemented by the operating company during the operational phase. This is a practical document which will include detailed procedures to address the main potential effects on surface water and groundwater.

The Proposed Development will operate under an Industrial Emissions Licence (IEL) issued by the Environmental Protection Agency (EPA). The licence will contain several conditions which the operator must remain in compliance with for the entire duration of the Anaerobic Digestion Facility's lifespan. Typical conditions relating to the protection of water receptors include:

- Emissions Limit Values for all emissions including surface water
- Monitoring requirements for surface waters
- Resource use and energy efficiency
- Waste management control and documentation
- Storage and transfer of substances

- Facility management
- Accident prevention and emergency response including fire water retention
- Operational Controls

Other conditions of relevance to uncontrolled releases will include:

- Dedicated hard standing for off-loading areas, with a minimum separation distance from adjacent water courses.
- Use of spill kits, bunded pallets and secondary containment units, as appropriate.
- All bunds sized to contain 110% of the volume of the primary storage vessel.
- Environmental Management System to include site specific standard operating procedures pertaining to waste management and emergency response.
- There will be no process water discharges to surface or groundwater bodies during the operational phase.
- The entire digestion tank area of the Proposed Development site will be underlain by an impermeable bund structure, acting as secondary containment in the event of a catastrophic failure.
- Tanks and bunds will be subject to integrity assessments by a suitably qualified engineer.

5.13.5.2 Landscaping and Lighting

The landscaping of the Proposed Development site offers the potential for biodiversity enhancements within the Proposed Development site. Future landscaping of the Proposed Development site should adhere to the following recommendations:

- The treelines and hedgerows around the site are important ecological corridors. These features should be enhanced and maintained for the benefit of wildlife.

- The existing gappy hedges should be enhanced with some more native shrubs if possible.. Planting should focus on providing year-long interest for pollinators. Planting should be delivered in accordance with the Landscape Plan (Document Ref: **24/NRG/ORS/Rt/M/001/ Rev B**) which accompanies the application.

- The natural verges along the hedgerows could also provide excellent opportunity for the benefit of wildlife. These should be managed as old hay meadows, cutting only in late summer. This will be of significant benefit to local pollinators.

- It is recommended that further actions that are outlined as part of the National Pollinator Plan should be implemented. There is a specific guide for farms (Farmland: Actions to help pollinators - //pollinators.ie/farmland).

- Nesting areas for solitary bees will be included by providing south or east-facing banks or areas of bare earth. Bee boxes for cavity-nesting bees could be created by drilling holes in untreated wooden blocks and attaching them to an outdoor structure. The holes should be 10cm in depth and 4-8mm in diameter at a height of at least 1.5-2m. It is important to have holes of different sizes for the different species.

- Bat boxes will be installed around the Proposed Development site, on walls, tree trunks and posts. They should be located as high as possible (at least 4m off the ground) in a sunny but sheltered location. If erecting on a mature tree, choose one that has clean bark (no ivy)

with no branches for 1m radius around the location of the box. If erecting on a building, erect as close as possible to the eaves.

- When erecting bat boxes externally (i.e. on a tree or external wall of a building), put up a minimum of three boxes facing in different directions to provide a range of temperature conditions. For example, boxes facing from south-east to south-west allow the sun to fall on each box for part of the day. During very hot days a south-facing box may overheat, but the other boxes should have some shade. Three boxes can be arranged around the trunk of large, mature and clean trunk trees. When erecting bat boxes, erecting three different types of bat boxes will increase the chance of catering for the different species likely to be found foraging on the Proposed Development site. Guidelines for the construction of bat boxes can be obtained on the website of Bat Conservation Ireland.

- The use of herbicides within the Proposed Development site will be minimised. The clearance of vegetation around fences should be done by hand if possible. Where spraying is necessary, it should be done with a knapsack sprayed to minimise spray and target required areas only.

- All rodenticides use on the Proposed Development site should be in accordance with the Campaign for Responsible Rodenticide use.

- Lighting should be kept to a minimum around the remaining trees on the Proposed Development site. Guidelines from Bat Conservation Ireland will be provided for considering how to avoid light pollution of the hedgerows to allow for feeding, commuting, and roosting.

- There should be no lighting directed from the Proposed Development site towards mature vegetation or the Tinhalla Stream.

- Lighting shall be controlled to avoid light pollution of green areas and shall be targeted to areas of human activity and for priority security areas. Motion-activated sensor lighting is preferable to reduce light pollution. None of the remaining mature trees or trees proposed for planting shall be illuminated.

    - Dark corridor for movement of bats along the grounds of the Proposed Development site. Lighting shall be directed downwards away from the treetops and shall not illuminate the hedgerows and treelines around the site, or the Tinhalla Stream or vegetation along its banks.
    - All luminaires shall lack UV elements when manufactured and shall be LED.
    - A warm white spectrum (ideally <2700 Kelvin) to reduce blue light component.
    - Luminaires shall feature peak wavelengths higher than 550nm.
    - Tree crowns shall remain unilluminated.
    - Planting shall provide areas of darkness suitable for bats to feed and commute.

5.13.6 Use of the Biobased Fertilisers by Customer Farmers

- In order to avoid any reductions in water quality within the catchment as a whole, all biobased fertilisers must be used in accordance with S.I. 113 of 2022 European Communities (Good Agricultural Practice for Protection of Waters) Regulations, 2022).

- The spreading of the biobased fertiliser on the customer farms must be done in accordance with the specific Nutrient Management Plan for that farm. Records will kept by the farmer and routinely provided to the Applicant for verification.

5.14 Residual Impacts

According to Environmental Protection Agency guidelines, Residual Impact is described as '*the degree of environmental change that will occur after the proposed mitigation measures have taken place*.' The mitigation strategy above recommends actions to be taken to reduce or offset the scale, significance, and duration of the effects on the surrounding ecological receptors.

5.14.1 Construction Phase

A summary of the predicted effects associated with the construction phase in terms of quality, significance, and duration, along with the proposed mitigation measures and resulting residual effects are summarised in **Table 5.7**.

The overall impact anticipated for the construction phase of the project following the implementation of suitable mitigation measures is considered to be ***neutral***, ***slight***, and ***temporary.***

5.14.2 Operational Phase

A summary of the predicted effects associated with the operational phase in terms of quality, significance, and duration, along with the proposed mitigation measures and resulting residual effects are summarised in **Table 5.8.**

The overall impact anticipated for the operational phase of the project following the implementation of suitable mitigation measures is considered to be ***neutral***, ***slight***, and ***short-term*** to ***long-term***.

5.14.3 Conclusion

With the recommended mitigation measures, it can be concluded that the Proposed Development site at Curraghnagarraha, Reatagh, and Curraghballintlea, Co. Waterford will have a neutral impact upon local ecological receptors. The proposed landscaping plan and the creation of new habitats on the Proposed Development site will be a positive benefit to local ecology and with proper management of the Proposed Development site and its green areas, local areas of biodiversity will be allowed to develop.

Potential Source	Environmental Receptor	Impact Description	Quality	Significance	Duration	Mitigation	Residual Impact
Habitat Loss and Fragmentation	**Improved Agricultural Grasslands**	The dominant habitat within the site is Improved Agricultural Grasslands. This habitat will be converted to Buildings and Artificial Surfaces. This habitat has limited ecological value and therefore its loss constitutes a negligible ecological impact.	Negative	Negligible	Temporary	• The landscaping of the site offers the potential for biodiversity enhancements within the site. • Any existing gappy hedges should be enhanced with native shrubs if possible, such as hawthorn, gorse, and blackthorn. • Planting should focus on providing year-long interest for pollinators. • Selected areas around the site to be seeded with species rich grassland to promote biodiversity.	**Positive, Slight, Long Term**
	Vegetation (ca. 1m) along the banks of the Tinhalla Stream	Any removal of vegetation along the Tinhalla Stream.	Negative	Slight	Temporary	• Unnecessary clearance of vegetation should be avoided and only areas necessary for the laying of the pipe should be cleared. • These works should be overseen by an ecological Clerk of Works.	**Neutral, Slight, Temporary**
	Hedgerows and grassy verges	The biomethane produced will be piped along the local access road. The installation of the pipeline may result in the loss of hedgerows and grassy verges along the roadside.	Negative	Slight	Temporary	• Roadside hedgerows must be left intact, and the root systems of these hedgerows must not be damaged. • Upon completion of the work, the soil should be reinstated, and grassy verge vegetation should be allowed to recolonise naturally.	**Neutral, Slight, Temporary**

Disturbance to Local Wildlife		Any removal of vegetation during the bird nesting season could result in disturbance of birds. In addition, during site preparation and construction, local populations of birds and mammals may be disturbed by the increase in noise, traffic, and human activity.	Negative	Moderate	Long-term	• In accordance with the policies and objectives of the Regional and County Development Plans, the existing green infrastructure (GI) of the site, i.e., the stonewalls and hedgerows, must be incorporated into the development. • In order to prevent damage to treelines / hedgerows in the site that are to be retained, then protective barrier fencing should be erected at a minimum 2m out from these boundaries to protect these features prior to the commencement of site clearance works. There must be no dumping or storage of construction waste or machinery in this zone during construction. • Any small tree or shrubs that require removal should be removed outside of the bird nesting season (March – August).	**Neutral, Slight, Temporary**
Pollution to Surface and Ground Water	**Surface Water** Tinhalla Stream and downstream receptors of the Lower River Suir SAC and the Tibberaghny Marshes pNHA, Fiddown Island pNHA and Lower River Suir (Coolfin, Portlaw) pNHA	The clearing of the site and the construction of an anaerobic digestor and associated works will generate sediment and without due care this sediment could be mobilised into the Tinhalla Stream. These works could also result in the pollution of the water with cement or other hydrocarbons.	Negative	Moderate	Temporary		**Neutral, Slight, Temporary**

	Groundwater Comeragh Groundwater Body	The site is in an area of high-extreme groundwater vulnerability / bedrock at surface. In the absence of mitigation, any deep excavations that are required for the construction could lead to pollution of the groundwater with hydrocarbons or other pollutants.	Negative	Moderate	Long Term	• Excavations to be backfilled as soon as possible to prevent any infiltration of contaminants to the subsurface and the aquifer. • Works should be avoided during periods of heavy rainfall. • The control and management of hydrocarbons on site will be vital to prevent deteriorations in surface and groundwater quality locally. The following measures should be employed on site: • During construction re-fuelling of equipment and machinery must be done off site. If this is not possible, then a dedicated re-fuelling location must be established on site in the compound area away from ground clearance or rock-breaking activities. • Spill kits stations must be provided at the fuelling location for the duration of the works. • Staff must be provided with training on spill control and the use of spill kits. • All fuel storage containers must be appropriately bunded, roofed and protected from vehicle movements. These bunds will provide added protection in the event of a flood event on site. • All chemicals must be stored as per manufacturer's instructions. A dedicated chemical store within a building must be provided on site if chemicals are to be stored on site. • Procedures and contingency plans must be established on site to address cleaning up small spillages as well as dealing with an emergency incident. A stock of absorbent materials such as	**Neutral, Slight, Temporary**

						sand, spill granules, absorbent pads and booms should be kept on site, on plant working near the water and at the refuelling area. • Daily plant inspections will be completed by all plant operators on site to ensure that all plant is maintained in good working order. Where leaks are noted on these inspection sheets, the applicant must remove the plant from operations for repairs. • All personnel shall observe standard precautions for handling of materials as outlined in the Safety Data Sheets (SDS) for each material, including the use of PPE. Where conditions warrant, emergency spill containment supplies should be available for immediate use. • Best practice concrete / aggregate management measures must also be employed on site during construction.	

Table 5.7: Summary of predicted construction phase effects, mitigation measures and residual impact

Potential Source	Environmental Receptor	Impact Description	Quality	Significance	Duration	Mitigation	Residual Impact
Disturbance to Local Wildlife		The operation of the site will be associated with an overall increase in human activity, noise and lighting on the site. However, having regards to the overall low value of the site to mammals, this impact is not considered significant. However, mitigation measures will be included to ensure that all lighting used within the site is of a low level to ensure minimum disruption to bats and other nocturnal mammals.	**Negative**	**Slight**	**Long term**	• The natural verges along the stonewalls hedgerows could also provide excellent opportunity for the benefit of wildlife. These should be managed as old hay meadows, cutting only in late summer. This will be of significant benefit to local pollinators. Herbicides must not be used along these natural verges, and they should be 1.5m – 2m wide at the base. • It is recommended that further actions that are outlined as part of the National Pollinator Plan should be implemented. There is a specific guide for farms (Farmland: Actions to help pollinators - //pollinators.ie/farmland). • Nesting areas for solitary bees will be included by providing south or east-facing banks or areas of bare earth. Bee boxes for cavity-nesting bees could be created by drilling holes in untreated wooden blocks and attaching them to an outdoor structure. The holes should be 10cm in depth and 4-8mm in diameter at a height of at least 1.5-2m. It is important to have holes of different sizes for the different species. • Bat boxes will be installed around the site, on walls, tree trunks and posts. They should be located as high as possible (at least 4m off the ground) in a sunny but sheltered location. If erecting on a mature tree, choose one that has clean bark (no ivy) with no branches for 1m radius around the location of the box. If erecting on a building, erect as close as possible to the eaves. • When erecting bat boxes externally (i.e. on a tree	**Neutral, Slight, Long term**

						or external wall of a building), put up a minimum of three boxes facing in different directions to provide a range of temperature conditions. For example, boxes facing from south-east to south-west allow the sun to fall on each box for part of the day. During very hot days a south-facing box may overheat, but the other boxes should have some shade. Three boxes can be arranged around the trunk of large, mature and clean trunk trees. When erecting bat boxes, erecting three different types of bat boxes will increase the chance of catering the different species likely to be found foraging on the site. Guidelines for the construction of bat boxes can be obtained on the website of Bat Conservation Ireland. • The use of herbicides within the site will be minimised. The clearance of vegetation around fences should be done by hand if possible. Where spraying is necessary, it should be done with a knapsack sprayed to minimise spray and target required areas only. • All rodenticides use on the site should be in accordance with the Campaign for Responsible Rodenticide use. • Lighting should be kept to a minimum around the remaining trees on the site. Guidelines from Bat Conservation Ireland will be provided for considering how to avoid light pollution of the hedgerows to allow for feeding, commuting, and roosting. • There should be no lighting directed from the site towards mature vegetation along the site boundaries or along the Tinhalla Stream. • Lighting shall be controlled to avoid light pollution of green areas and shall be targeted to areas of	

						human activity and for priority security areas. Motion-activated sensor lighting is preferable to reduce light pollution. None of the remaining mature trees or trees proposed for planting shall be illuminated. • Dark corridor for movement of bats along the grounds of the site. Lighting shall be directed downwards away from the treetops and shall not illuminate the Tinhalla Stream or the mature vegetation surrounding the site. • All luminaires shall lack UV elements when manufactured and shall be LED. • A warm white spectrum (ideally <2700 Kelvin) to reduce blue light component. • Luminaires shall feature peak wavelengths higher than 550nm. • Tree crowns shall remain unilluminated. • Planting shall provide areas of darkness suitable for bats to feed and commute.	
Pollution to Surface and Ground Water		In the absence of mitigation, run-off from impermeable areas within the Proposed Development site such as roads and car parking areas may contain potentially polluting substances such as hydrocarbons etc. This run-off could be mobilised to the Tinhalla Stream. Structural weaknesses in any of the tanks could lead to pollution of the groundwater.	Negative	Moderate	Long Term	• An Environmental Management System (EMS) will be prepared and implemented by the operating company during the operational phase. This is a practical document which will include detailed procedures to address the main potential effects on surface water and groundwater. • The Proposed Development will operate under an Industrial Emissions Licence (IEL) issued by the Environmental Protection Agency (EPA). The licence will contain several conditions which the operator must remain in compliance with for the entire duration of the AD facility's lifespan. Including:	**Neutral, Slight, Long term**

						○ Emissions Limit Values for all emissions including surface water ○ Monitoring requirements for surface waters ○ Storage and transfer of substances ○ Facility management ○ Accident prevention and emergency response including fire water retention ○ Operational Controls Other conditions of relevance to uncontrolled releases will include: • Dedicated hard standing for off-loading areas, with a minimum separation distance from adjacent water courses. • Use of spill kits, bunded pallets and secondary containment units, as appropriate. • All bunds sized to contain 110% of the volume of the primary storage vessel. • Environmental operating plan to include site specific standard operating procedures pertaining to waste management and emergency response. • There will be no uncontrolled discharges to surface or groundwater bodies during the operational phase. • The entire digestion tank area of the site will be underlain by an impermeable bund structure, acting as secondary containment in the event of a catastrophic failure. • Tanks and bunds will be subject to integrity assessments by a suitably qualified engineer. ○	

Table 5.8: Summary of predicted operational phase effects, mitigation measures and residual impact

Appendix 13.1: References

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