MWP

CHAPTER 6: ECOLOGICAL IMPACT ASSESSMENT

Brittas Wind Farm Project

Brittas Wind Farm Ltd

November 2024

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6. Biodiversity

6.1 Introduction

6.1.1 Background and Objectives

Woodrow Sustainable Solutions Ltd, part of the APEM Group ("APEM Group Woodrow"), was commissioned by Ørsted to prepare a Biodiversity Chapter to inform the Environmental Impact Assessment Report (EIAR) for a proposed wind farm in Brittas, Thurles, Co. Tipperary.

This Biodiversity Chapter presents an assessment of likely significant effects from the Brittas Wind Farm (hereafter referred to as the 'proposed project' in relation to habitats, invertebrates, freshwater ecology, amphibians, reptiles, birds, non-volant mammals and bats during the construction, operational and decommissioning phases.

Throughout the report, certain words have been abbreviated. "T" refers to turbines. When T is accompanied by a number from one to ten (e.g. T.1), it refers to that specific turbine location These locations are outlines in Figure 6. 1. "D" refers to the bat static detectors deployed throughout the seasons. When D is accompanied by a number from one to ten (e.g. D.01), this refers to that specific detector location deployed in 2022. A layout of these detector locations can be seen in Figure 6. 14. "H.01" refers to the detector at height deployed in 2023 and can also be seen in Figure 6. 14. "F" refers to potential roosting feature for bats. A full list of features identified along with pictures can be found in Appendix 6B. The location of these features can also be seen in Figure 6. 12 and Figure 6. 13.

The existing baseline conditions and results of surveys undertaken to inform the assessment are detailed in the following sections, in addition to the impact assessment and proposed mitigation measures and monitoring required to reduce or eliminate any residual effects.

The objectives of the assessment are to:

- Produce a baseline study of the existing ecological environment in the vicinity of the proposed project;
- Identify all potential significant ecological effects (positive and negative) associated with the proposed project during the construction, operational and decommissioning phases;
- Ensure compliance of the proposed project with nature conservation legislation;
- Identify mitigation measures to avoid, remediate or reduce likely or significant negative effects;
- Assess likely or significant cumulative effects of the proposed project as a result of other developments;
- Provide an assessment of the significance of any residual impacts; and
- Detail monitoring measures required to verify performance of mitigation measures.

6.1.2 Description of the Proposed Project

A full description of the proposed project is presented in Chapter 2: Project Description.

Brittas Wind Farm Ltd. (the Applicant) propose to develop a wind farm (named Brittas Wind Farm) referred to hereafter as the "proposed project", located c. 3km north of Thurles town as shown Chapter 2 Project Description, Figure 2-1 . The proposed project site is located within the following townlands: Brittas, Rossestown, Clobanna,

Brownstown, Killeenleigh and Kilkillahara in County Tipperary. This report has been prepared as part of the planning application.

A ten-year consent is being requested for this development. The applicant requests the grant of permission is on the basis of a 35-year operational period. With permission for the onsite substation sought in permanency, given that the substation will form part of the national electricity network. Therefore, the substation will be retained as a permanent structure and will not be removed.

The main components of the proposed project are ten wind turbine generators (WTGS) with a blade tip height of 180 m, a hub height range from 102.5 to 105.5 m and a rotor diameter range from 149 m to 155 m, an on-site 110kV electrical substation, a Battery Energy Storage System (BESS) and an underground electrical connection to an existing 110kV substation at Thurles which is connected to the National Grid. Due to the range in WTGS three models have been assessed in the EIAR. These are

- Turbine Type A- blade length = 73.7 m, Hub height = 105 m, Lowest rotor swept = 31.3 m
- Turbine Type B- blade length = 76 m, Hub height = 102.5 m, Lowest rotor swept = 26.5 m
- Turbine Type C- blade length = 73 m, Hub height = 105 m, Lowest rotor swept = 32 m

Should it become operational, it is anticipated that this wind farm will be capable of providing between 57 and 66 megawatts (MW) of renewable electricity to the National Grid.

The Site comprises largely agricultural fields bounded by hedgerows and treelines. An area of broadleaf forestry is located at the southwest of the Site. The River Suir transects the Site from north to south. The N62 is located west of the Site, running north to south, connecting Templemore to Thurles. The N62 provides a link to the M6, M7 and M8 motorways. The L8017 local road traverses the centre of the Site from east to west, crossing the River Suir at a bridge point.

The development for which planning permission is sought in the planning application (the proposed project) consists of the following:

- 10 No. Wind Turbines with a blade tip height of 180 m, hub height range from 102.5 m to 105.5 m and a rotor diameter range from 149 m to 155 m;
- 10 No. Wind Turbine foundations and Hardstand areas and associated drainage infrastructure;
- 1 No. Permanent Lidar unit and associated foundation, hardstand area and compound for Meteorological Monitoring;
- 1 No. 110kV Electrical Substation including 2 No. control buildings, electrical plant and equipment, welfare facilities, carparking, water and wastewater holding tanks, security fencing, lightening protection and telecommunications masts, security cameras, external lighting and all associated infrastructure;
- Installation of medium voltage underground electrical and communication cabling connecting the wind turbines to the proposed onsite substation and associated ancillary works;
- Installation of 7 km of underground electricity and communication cabling between the proposed onsite substation and the nearby existing Thurles 110kV substation in the townland of Ballygammane, Co. Tipperary. The cabling will be laid primarily within the public road and will connect the proposed wind farm to the national grid;
- 4 No. Site Entrances from the public road and associated fencing and signage;
- Construction of new permanent site access tracks, turning heads and associated drainage infrastructure;
- The upgrading of existing access tracks and associated drainage infrastructure;

- 2 No. Temporary construction site compounds and mobile welfare facilities;
- 1 No. Borrow pit and associated drainage infrastructure to be used as a source of stone material during construction;
- Spoil deposition areas;
- Associated surface water management systems;
- Tree felling and hedgerow removal to accommodate wind farm infrastructure;
- Replanting of trees on site;
- Temporary accommodation works at 2 no. locations adjacent to the public road to facilitate delivery of turbine components to site within the townlands of Brittas and Brittasroad, Co. Tipperary. The works primarily relate to trimming and clearing of vegetation, temporary removal of street furniture and fencing, and installation of temporary stone hard standing; and
- All related site works and ancillary development.

Other elements of the project which are assessed throughout the EIAR but are not the subject of this SID planning application are as follows:

- Battery Energy Storage Facility (BESS) located adjacent the proposed substation;
- Rerouting of on-site ESB 38kV overhead powerline (OHL); and
- Additional accommodation works along the turbine delivery route which includes temporary removal of traffic signs and lights, electricity poles, bollards and lamp posts, fences, hedge and tree removal / trimming, land take and road widening.

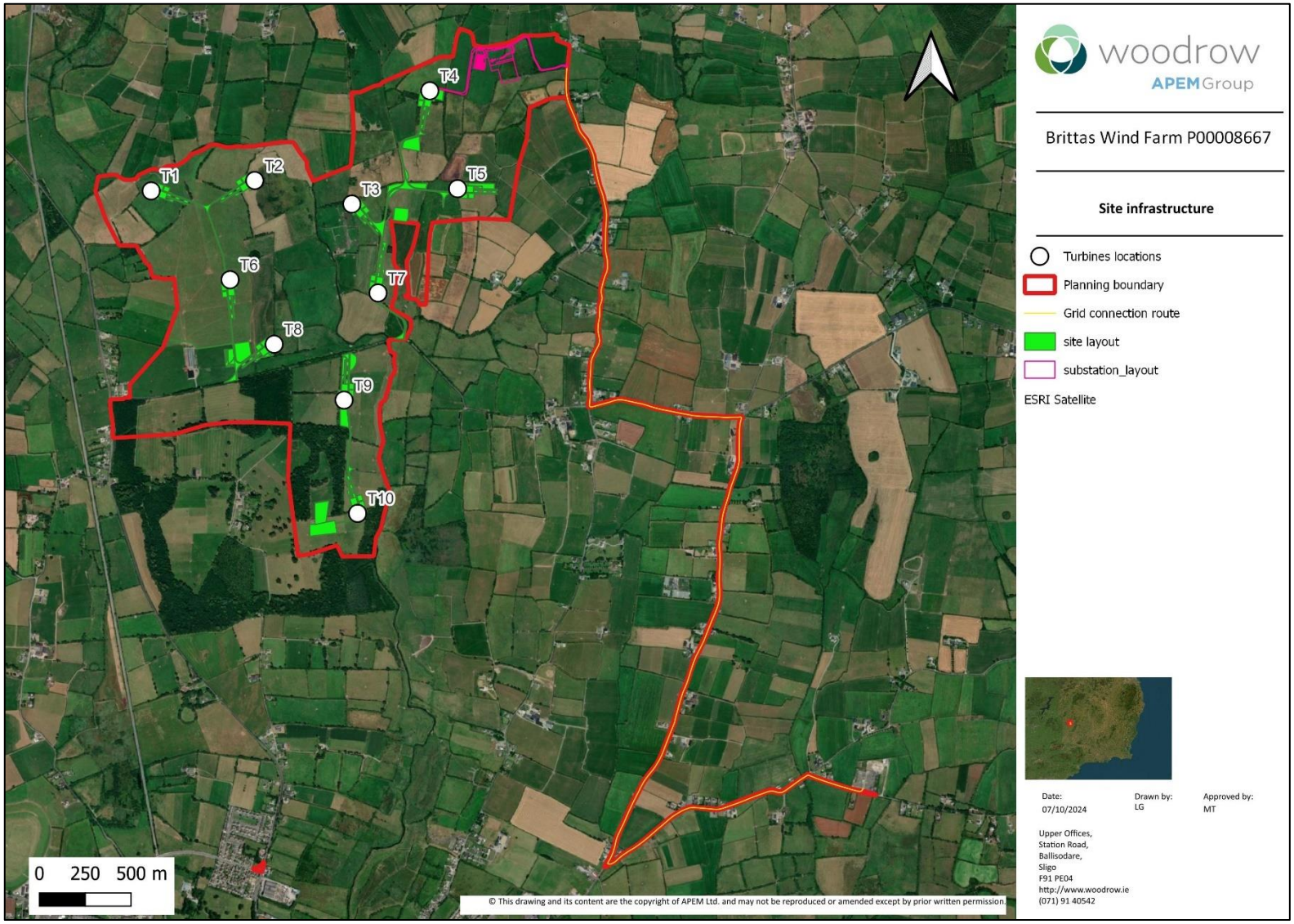

Figure 6. 1: Site infrastructure

6.1.3 Statement of Authority

APEM Group Woodrow is an established and accomplished environmental consultancy committed to delivering robust ecological assessment services for clients in the private and public sectors. APEM Group Woodrow provides an in-house team of ecologists and environmental professionals whose primary specialisms include botany, habitats, birds, bats, mammals, invertebrates and aquatic ecology. APEM Group Woodrow staff are fully conversant with wildlife legislation in both Ireland and the UK, and work to exacting standards, according to established guidelines issued by the Chartered Institute of Ecology and Environmental Management (CIEEM). All the ecological surveys to inform this Chapter were undertaken by appropriately experienced and licensed surveyors. This report was prepared by Louise Gannon (LG) and Amy Adwan (AA). The following table includes a list of personnel involved:

Surveyors					
Habitat and botanical Surveys		Aquatics and Fisheries Assessment		Bat surveys, data analysis and reporting	
Name	Initials	Name	Initials	Name	Initials
Aoife Hughes	AH	Adon McFarlane	AMcF	Adrian Walsh	AW
Brittany Arendse	BA	James O'Connor	JOC	Amy Adwan	AA
Bridget Keehan	BK	Patrick Quinn	PQ	Frederico Hintze	FH
Bruno Mels	BM			Jason Guile	JG
Emmeline Cosnett	EC			Louise Gannon	LG
Emma Horgan	EH			Mike Trewby	MT
Giulia Mazzotti	GM			Oisín O'Sullivan	OOS
Julie Kohlstruck	JK			Patrick Power	PP
Meadhbh Costigan	MC			Róisín O'Connell	ROC
Mike Trewby	MT				
Patrick Power	PP				
Róisín O'Connell	ROC				

A list of the surveyors and their bios including their relevant qualifications and expertise can be found in **Appendix 6A**.

6.1.4 Legislation, Policy and Guidance

National and international legislation guidelines and policies relevant to the assessment of biodiversity are outlined in this Section aiming to contextualise legislation with respect to the proposed project.

6.1.4.1 Legislation

The following legislation is relevant to this report:

- The Habitats Directive 92/43/EEC
- The Birds Directive 2009/147/EC
- European Communities (Birds and Natural Habitats) Regulations 2011 as amended

- European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. 272 of 2009) as amended
- European Union Environmental Objectives (Freshwater Pearl Mussel) (Amendment) Regulations 2009 to 2018
- Planning and Development Acts 2000, as amended – PART XAB
- EU Water Framework Directive
- The EIA Directive Council Directive 2011/92/EU as amended by Directive 2014/52/EU
- Wildlife Acts 1976 , as amended
- Flora (Protection) Order 2022 (S.I. No. 235/2022); and
- EC Regulation on the prevention and management of the introduction and spread of invasive alien species (1143/2014).

6.1.4.2 Policy

With regards to Policy, the National Heritage Plan 2030[1] was published in 2020. Along with the Heritage Plan, The National Biodiversity Action Plan 2017-2021[2] set out strategies for the conservation and management of Ireland's heritage. A key element of both plans is an enhanced role for local authorities in heritage awareness and management, to be given effect through the preparation and implementation of County Heritage Plans and Biodiversity Action Plans. The National Biodiversity Action Plan 2023-2030 (NBAP) emphasises the requirement for National, Regional and Local Governments to ensure that the conservation and sustainable use of biodiversity for human well-being is at the forefront of their work. This stemmed from the United Nations 'Convention on Biological Diversity's Cancun Declaration' (CBD, 2016) which defines biological diversity, or biodiversity. Ireland's Vision for Biodiversity is set out in the NBAP and states: *"That biodiversity and ecosystems in Ireland are conserved and restored, delivering benefits essential for all sectors of society and that Ireland contributes to efforts to halt the loss of biodiversity and the degradation of ecosystems in the EU and globally."*

The footprint of the proposed project falls within County Tipperary. The Thurles Biodiversity Action Plan (BAP) 2023 – 2027 and the County Tipperary Local Economics & Community Plan 2024 - 2029, include policies in relation to biodiversity and proposed developments.

Thurles Biodiversity Action Plan 2023 – 2027

The Thurles BAP sets out a synopsis of biodiversity in Thurles at present, along with objectives and actions for the enhancement of biodiversity. While the BAP is high level and focuses on areas within the town centre, Objective 1 is most relevant to the proposed project, as this involves measures to enhance and protect biodiversity within Thurles. The main actions the proposed project aligns with include:

- Encourage the use of biodiversity friendly hedgerow management practices
- Monitor for invasive plant species

1 Heritage Ireland 2030 - available online at: https://www.gov.ie/pdf/?file=https://assets.gov.ie/216633/d5e7370d-ee0e-41a8-81b5-9bc46bc75e17.pdf#page=null (Accessed 04/09/2024).
2 The National Biodiversity Action Plan – Available online at: https://www.npws.ie/sites/default/files/files/4th_National_Biodiversity_Action_Plan.pdfhttps://www.npws.ie/legislation/national-biodiversity-plan (Accessed 04/09/2024).

County Tipperary Local Economic & Community Plan 2024- 2029

This plan sets out objectives and actions for Co. Tipperary to work on to promote and support the economic and community development. This plan has a focused point (HLG 3) in relation to climate action and biodiversity enhancement. It sets out that Co. Tipperary should "*…contribute its fair share to national targets for reductions in greenhouse gas emissions, that its households, communities, and businesses would be active in adapting to climate change, and that environmental impact considerations would inform all decisions in the county*". It also states that it will protect biodiversity and try to reverse any habitat and species loss where possible. Natural habitats and water quality will also be protected and maintained.

Tipperary County Development Plan 2022- 2028

The Tipperary County Development Plan 2022 to 2028 outlines the zoning of the area with regards to development There are goals set out within this development plan which the proposed project will align include:

SO7: To maintain the integrity of the Natura 2000 sites (lower River Suir SAC) and the proposed NHA (Marlfield Lake) and to support proposals to enhance the ecological and environmental value of these areas.

SO15: ensuring the ecological protection of Lough Derg (Shannon) SPA and Lower River Shannon SAC and to require the preparation of Nature Impact Statements, as necessary, in assessment of any impacts on this Natura 2000 sites. Refer to accompanying NIS (Apem, 2024)

SO16: To seek the protection of trees and natural hedgerows in the town and to seek their retention, subject to traffic safety, as part of new development proposals.

SO17: To seek to support the development of ecological corridors and wildlife as part of new development proposals and public realm projects and trails.

6.1.4.3 Guidance

The following guidance documents were compiled with during the preparation of this biodiversity chapter:

- Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report (European Commission 2017);
- Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022a);
- CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute Ecology and Environmental Management. Version 1.2.
- Guidance Document on the strict protection of animal species of Community interest under the Habitats Directive. Commission Notice (2021) Brussels, 12.10.2021 C (2021) 7301 final
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DoEHLG, 2018)
- European Commission Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (EU, 2013).

6.1.5 Limitations

No significant limitations were identified in terms of scale, scope or context in the preparation of the Biodiversity Chapter of the EIAR.

The following survey and data analysis limitations were encountered and have been fully accounted for in the impact assessment:

- Bat surveys:
    - Limitations relating to bat surveying and data analysis are covered in the technical bat report contained in Appendix 6B. Many of these limitations stem from modifications made to the project's layout after the bat static acoustic surveys. Turbines T.2, T.3, T.4 and T.10 were relocated subject to design modification after the 2022 survey season, therefore further data collection has been carried out during the 2024 survey season. While the absence of data at T.2, T.3, T.4 and T.10 locations introduces complexities to the interpretation of survey results, the locations surveyed in 2022 provide appropriate data for assessment of all habitat types within the Site in accordance with NatureScot (2021) and account for potential movement of turbines subject to design change including the finalised layout for the proposed project.
    - Due to the removal of the weather station and therefore a gap in on-site data for the autumn season 2022 (August to October), publicly available meteorological data was used to interpret the weather over this period. While this reduces the analysis of bat activity within certain weather conditions during the autumn survey season, the data collected and previously and publicly available data used is adequate for assessment, therefore, it is not considered to have affected the bat assessment.

It is acknowledged that accurately monitoring brown long-eared activity can prove quite difficult as this species is known to make low amplitude calls and frequently forage using their eyes or ears rather than echolocation (Collins, 2016 and Russ, 2012). As a result, brown long-eared bats are frequently underrepresented in surveys which rely on the use of bat detectors.

- Aquatic surveys
    - The kick sampling location WQ2 could not be completed as the substrate was too soft, and there was no suitable kick sampling habitat. While this reduces the species survey at this location, the other location provided full results, therefore, it not considered to have affected the aquatic assessment.

6.2 Methodology

Due to the range in WTGS three models have been assessed in the **EIAR**. These are

- Turbine Type A- blade length = 73.7 m, Hub height = 105 m, Lowest rotor swept = 31.3 m
- Turbine Type B- blade length = 76 m, Hub height = 102.5 m, Lowest rotor swept = 26.5 m
- Turbine Type C- blade length = 73 m, Hub height = 105 m, Lowest rotor swept = 32 m

6.2.1 Desktop Study

As per NatureScot 2021, a desktop study was carried out for data up to 10km to collate information available on the receiving environment for the proposed project.

Primary sources of information for the desktop study included:

- Ortho-imagery and 6-inch mapping was viewed using Bing Maps[3], Google Earth[4], Google Maps[5], Ordnance Survey Ireland- GeoHive6
- NPWS Designations Viewer was used to view sites designated for nature conservation. Shapefiles and metadata for designated sites have been downloaded and are updated annually for use by APEM Group Woodrow ecologists on GIS
- EPA Maps, a mapviewer which was used to investigate hydrological connectivity and water quality status
- Office of Public Works (OPW) floodinfo.ie mapviewer which was used to investigate flood risk in the area and the influence of arterial drainage
- Sharrock (1976) was used to investigate historic records and changes in the breeding ranges of species;
- Important and protected species including those identified in the Wildlife Act (as amended), listed under the FPO, EU Habitats and Species Directive
- NPWS site synopsises for Natura 2000 Sites as well as Article 17 and Article 12 reports and datasets.
- National Biodiversity Data Centre (NBDC) online maps for species records. 10km grid square S16.
- Tipperary County Council planning portal7; and
- Inland Fisheries Ireland (IFI) website and previous reporting for relevant catchments.

A data request was submitted to Bat Conservation Ireland (BCI) for the 10km grid square encompassing the site for up-to-date information. Woodrow received bat records from 2009 to July 2022.

3 Bing maps. Available at https://www.bing.com/maps//?cp=53.291489%7E-6.240234&lvl=7.0 (Accessed 04/09/2024)

4 Google Earth. Available at https://earth.google.com/web/search/thurles/@52.70993978,-7.80851749,102.51555096a,4398.89549541d,35y,0h,0t,0r/data=CigiJgokCd-QfPvSR0tAESHOl6gx9EpAGWB1i7i4Yh7AIR5uiSqz2CPA (Accessed 04/09/2024)

5 Google Maps. Available at https://www.google.com/maps. (Accessed 04/09/2024)

6 Geo-hive. Available at https://webapps.geohive.ie/mapviewer/index.html (Accessed 04/09/2024)

7 https://eplanning.ie/TipperaryCC/searchexact (accessed 04/09/2024).

6.2.2 Field surveys methodologies

The following ecological surveys were undertaken to inform this chapter, an overview of which is provided in Table 6. 1:

- Site scoping survey
- Habitat mapping (Fossitt, 2000), with Annex I habitat assessments where required*;
- Invasive species surveys;
- Invertebrate habitat suitability assessment (marsh fritillary);
- Aquatic and fisheries assessments (salmon/lamprey suitability, freshwater pearl mussel and Q-values);
- Terrestrial (non-volant) mammal surveys; and
- Bat surveys (compliant with NatureScot *et al*., 2021**).

*Habitat surveys were updated in September 2023, and February and June 2024 due to the finalisation of infrastructure locations and routes.

**NatureScot, *et al*., 2021 guidance is followed for bat surveys. Collins, 2016, updated by Collins, 2023 state that it does include guidance for proposed wind farms as this is provided in the NatureScot *et al*., 2021 Bats and Onshore Wind Turbines – Survey, Assessment and Mitigation. NatureScot is the most recently published wind farm guidance with the last wind farm guidance for bats specific to Ireland being published in 2010. It is applicable to Ireland as we have the similar species assemblages and climates meaning the risk posed by wind farms to bats is contextually similar.

While specific surveys were not conducted for the turbine delivery route, the presence and suitability of habitats and species specific features were noted while ecologists were operating in the wider area for other surveys and during the desk-study.

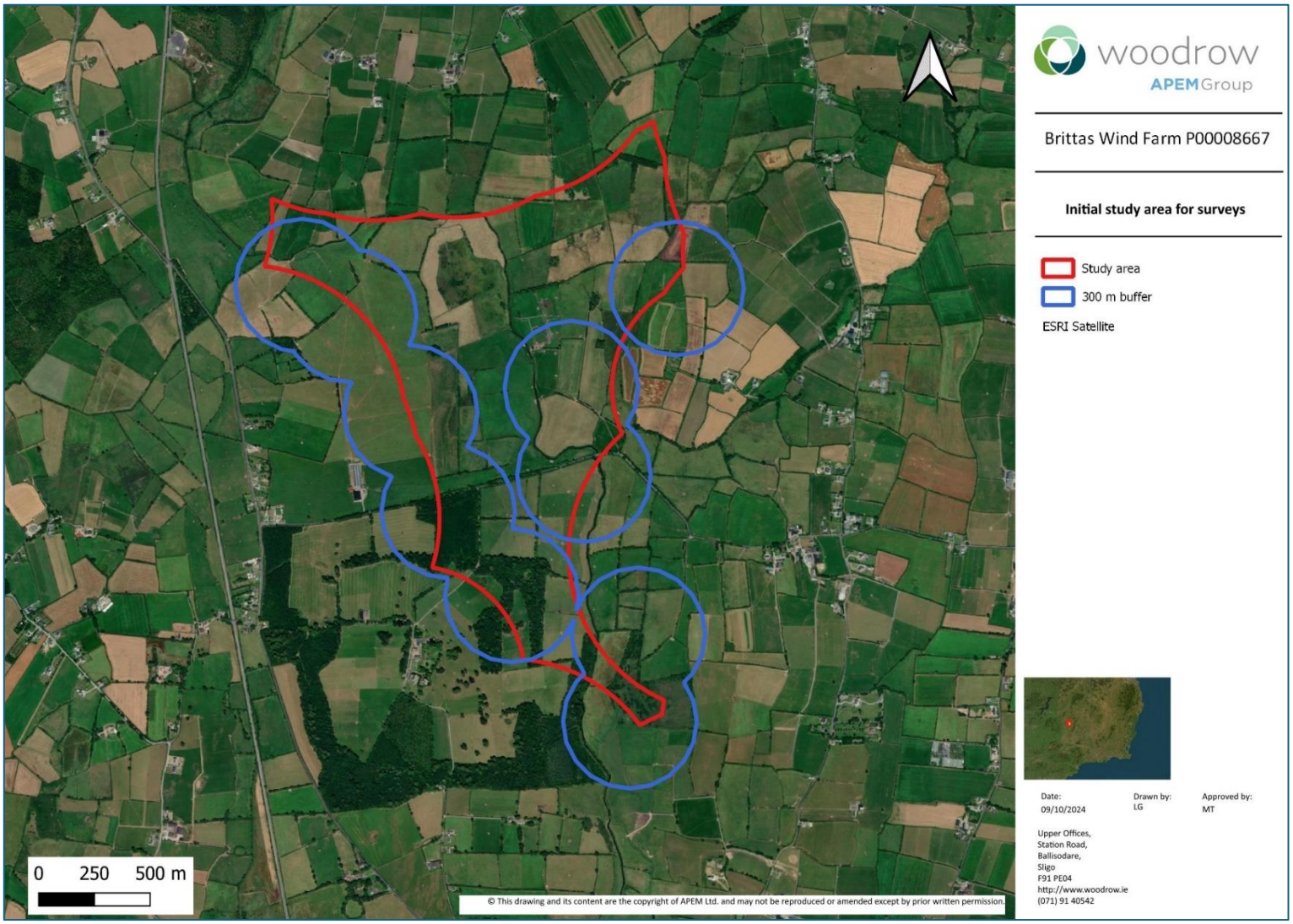

Figure 6. 2: Initial study area for surveys

Table 6. 1 Overview of ecological surveys

Ecological surveys	Description	Study area (refer to Figure 6.2)	Dates & personnel (initials)
Site scoping	Initial site scoping of the proposed project site, walkover to identify ecological constraints and inform site layout, undertaking multidisciplinary surveys including habitat mapping, invasive species surveys, amphibian/reptile habitat suitability assessments, mammal surveys and bat habitat assessments (Preliminary Roost Assessment (PRA) and Potential Roost Features (PRF) surveys)	Redline	11 and 12 May 2022 AH, MT and ROC 16 and 22 June 2022 MT, BK, EC, JK, AMcF and GM 19, 20 and 21 July 2022 GM and AH 16 August 2022 AH and GM 13, 14 and 15 September 2022 AH, and GM 20 September 2023 BM 08 and 21 February 2024 PP, BM, BA and MC 31 May 2024 PP and BM 05 June 2024 MC
Habitat surveys	Habitat descriptions and classification to Fossitt (2000) level 3, concentrating on highlighting areas of conservation importance – semi-natural woodland areas. Invasive species surveys were also undertaken.	Redline	11 and 12 May 2022 AH, ROC, MT, ATC 16 June 2022 MT, BK, EC, GM, JK 22 June 2022 AMcF, JK, MT 19, 20 and 21 July 2022 GM, AH 16 August 2022 AH, GM 13, 14 and 15 September 2022 AH, GM 08 February 2024 PP, BM 21 February 2024 MC 05 June 2024 MC
Aquatic & Fisheries Assessment	River Hydro-morphology Assessment Techniques (RHAT) and baseline water quality assessment (Q-values). Also conducted otter *Lutra lutra* survey and kingfisher *Alcedo atthis* habitat suitability.	500m up and down stream of entry point	01, 07 and 08 October 2022 AMcF
Invertebrate, amphibian & reptile	As part of a multidisciplinary approach to surveying, habitat suitability assessment for marsh fritillary *Euphydryas aurinia*, Odonata species, smooth newt *Lissotriton vulgaris* and common lizard *Zootoca vivipara* were undertaken and species recorded if found to be present	Redline	11 and 12 May 2022 AH 16 June 2022 MT, EC, JK 16 August 2022 AH, GM 13 and 14 September 2022 AH, GM
Bat surveys Appendix 6B provides full details	Habitat suitability assessment and potential roost availability/suitability surveys	Blueline	11 May 2022 MT, EH, AMcF, GM
	Potential roost feature- PRF surveys; and	Blueline	15 February 2022 PP BM 22 March 2022 OOS, PP

Ecological surveys	Description	Study area (refer to Figure 6.2)	Dates & personnel (initials)
	Building inspection and tree roost inspection surveys under license Assessment of proposed tree felling areas for bat roost suitability		08 April 2022 PP, OOS 11 May 2022 PP 26 May 2022 PP, OOS 22 June 2022 OOS 31 August 2022 PP, 12 June 2024 KOR, BM
	Deployment of static bat detectors Three deployments of minimum 10-nights covering spring, summer & autumn 2022	Blueline	Spring 10 units: 11 May-2022 Summer 10 units: 22 June 2022 Autumn 10 units: 29 September 2022
	Continuously recording static at height		15 June to 12 October-2023
	Weather station (3G remote data)		11 May to August 2022
	Bat transect and roost emergence/re-entry surveys	Blueline	11 and 12 May 2022 Transect and re-entry survey ROC, OOS and MT
		Blueline	26 and 27 May 2022 Emergence, transect and re-entry survey AW and PP
		Blueline	12 and 13 July 2022 Emergence, transect and re-entry survey ROC and PP
		Blueline	31 August 2022 Emergence and transect survey ROC and PP
		Blueline	24 October 2022 Emergence and transect survey OOS and AC
Protected terrestrial mammals survey	Habitat suitability and field signs surveys for badger *Meles meles*, otter, Irish hare *Lepus timidus hibernicus*, red squirrel *Scuirus vulgaris*, pine marten *Martes martes* and other mammals. Recording of field signs for terrestrial mammal signs was undertaken during multi-dispensary site walkovers, including when undertaking habitat surveys, bat habitat suitability surveys and bird surveys.	Redline	11 and 12 May 2022 AH, ROC, MT, EH 16 and 22 June 2022 MT, EC, GM, BK, JK 19, 20 and 21 July 2022 AH GM 16 August 2022 AH 13, 14 and 15 September 2022 AH and GM

Ecological surveys	Description	Study area (refer to Figure 6.2)	Dates & personnel (initials)
			20 September 2023 BM 21 February 2024 MC and BA 31 May 2024 PP and BM
Turbine delivery route	Multidisciplinary surveys, including mammal surveys, bat habitat suitability surveys (PRF surveys). Anecdotal surveys for habitats & invasive species (out of season),	TDR route and adjacent roadside banks/pathways	21 February 2024 PP, BA
Grid connection route (GCR)	Multidisciplinary surveys, including habitat mapping & invasive species (out of season), mammal surveys, bat habitat suitability surveys (PRF surveys)	GCR route plus 50m buffer	21 February 2024 PP, BA
Substation	Multidisciplinary surveys, including habitat mapping & invasive species, mammal surveys, bat habitat suitability surveys (PRF surveys)		08 February 2024 PP, BM 31 May 2024 BM, PP 05 June 2024 MC

6.2.2.1 Habitat surveys, including identification of protected & non-native flora

Habitat surveys and mapping were undertaken following standard guidance (Smith *et al*. (2011), with all habitats classified into recognised communities defined by Fossitt (2000) and cross-referenced to Annex I habitats of the EU habitats directive. Given the higher level of classification required to Annex I habitats, careful consideration was given to species composition, location, and physical characteristics of the surveyed habitats, as described in European Commission (2013)[8]. In cross checking habitat classifications for semi-natural woodland, reference was made to Rodwell (1991)[9], Hall *et al*. (2004)[10], Perrin *et al*. (2008)[11] and Perrin *et al*. (2010)[12]. The use of the Irish Vegetation Classification (IVC) guidelines were also used in determining habitat classifications[13]. During these surveys target areas, such as the proposed turbine locations and access tracks, were walked and ecological features of interest were recorded using handheld GIS and recording software (ArcGIS Survey123), enabling ecological information and photographs to be georeferenced in the field and subsequently incorporated into GIS. During the survey, consideration was given to identifying important or protected habitats, such as Annex I habitats listed under the E.U. Habitats directive, invasive alien species, and habitats with the potential to support protected species. Particular attention was paid to searching suitable habitat for rare or protected flora species, to determine presence within, or close to the proposed project.

Preliminary ecological surveys and habitat surveys were undertaken between May and September 2022 and were used to identify habitat related constraints and inform project design, as detailed in **Chapter 4: Alternatives**.

8 European Commission (2013) *The Interpretation Manual of European Union Habitats* - EUR28 (Accessed 04/09/2024)

9 Rodwell, J S (ed.) (1991) *British Plant Communities. Volume 1. Woodlands and scrub*. Cambridge University Press, Cambridge (Accessed 04/09/2024)

10 Hall, J.E.; Kirby, K.J. & Whitbread, A.M. (2004). *National Vegetation Classification: Field guide to woodland*. Joint Nature Conservation Committee (JNCC) (Accessed 04/09/2024)

11 Perrin P., Martin J., Barron S. O'Neil F., McNutt K. & Delaney A. (2008) *National Survey of Native Woodlands 2003-2008*. Volume I: Main report. Botanical, Environmental & Conservation Consultants Ltd. report submitted to the NPWS. (Accessed 04/09/2024)

12 Cross, J.; Perrin; P. & Little, D. (2010). *The Classification of Native Woodlands in Ireland and its Application to Native Woodland Management*. Native Woodland Information Note No. 6. NPWS, BEC Consultants Ltd & Woodlands of Ireland. (Accessed 04/09/2024)

13 National Biodiversity Data Centre (2024) Classification explorer. Accessible at https://biodiversityireland.ie/ivc-classification-explorer/. (Accessed 04/09/2024).

Updated habitat surveys focused on areas around the finalised turbine locations and access tracks, as revised, and the location of the proposed substation and grid connection route.

Habitats along the grid connection route and focal areas of the turbine delivery route were mapped in February 2024, while the finalised substation location was assessed and mapped in June 2024. This substation survey focused on defining potential areas of Annex I habitat.

6.2.2.2 Aquatic and fisheries habitat assessment surveys

Aquatic surveys were conducted at seven locations on, and adjacent to, the proposed project site on 01, 07 and 08 October 2022 and included the following elements:

- An ecological assessment of the streams within and draining the proposed project site (notably with respect to white-clawed crayfish *Austropotamobius pallipes*, salmon *Salmo salar*, river lamprey Lampetra fluviatilis, brook lamprey Lampetra planeri and sea lamprey *Petromyzon marinus* suitability) was conducted at key locations. Sections of waterbodies potentially directly impacted by the works were walked and assessed for salmonid/lamprey suitability using the Life Cycle Unit (LCU) Approach, where aquatic habitats are classified according to type: nursery, holding, spawning; and quality: excellent (1) to marginal (4), as detailed in Kennedy,1984 and O'Connor & Kennedy, 2002;
- While conducting stream assessments, banks and drains were searched for signs of otter activity and were assessed for kingfisher suitability;
- Q-value assessments were conducted at nine sample locations (n = 9) on the existing river network. Seven of these were located on the main river channel (i.e. the River Suir), while two were located on the Rossestown River, a tributary of the River Suir in the north eastern section of the site (see Appendix 6C). Biological scoring was undertaken by adopting a sampling method currently employed by the EPA. A handheld pond net (1 mm mesh size) was used to collect a two-minute multi-habitat kick sample that was followed by a one-minute stonewash where possible. Where kick sampling was not a viable option (e.g. due to a soft substrate), bankside sweeps were undertaken. This involved sweeping along the marginal areas until such time as a representative sample was obtained. Live macroinvertebrate samples were assessed in the field, where they were assigned to the lowest taxonomic resolution required for scoring, and their categorical relative abundance determined using approximate counts. Basic water quality parameters were also measured at a total of 10 locations using an Aquaread® Multiparameter Water Quality Probe to provide a baseline profile of water chemistry in the water bodies assessed. Parameters measured included temperature (°C), pH, DO (% and mg/L) as well as conductivity (µs/cm);
- White-clawed crayfish assessments (i.e. presence/absence) were carried out at 10 sample locations using a string of four trappy funnel crayfish traps that were baited with approx. 40 g of mackerel *Scomber scombrus* under licence (Licence No. C58/2022). These were laid out and left to soak overnight in areas of suitable habitat. Traps were spaced approximately 4 m apart and laid parallel to the riverbank. Each end of the string was secured to the riverbank in order to prevent the traps from being moved. Traps were left overnight and checked for crayfish the following morning; and

All survey work was carried out in line with the IFI (2010) *Biosecurity Protocol for Field Survey Work*, which involved dipping and rinsing sampling equipment (e.g. pond nets) in a 1% solution of Virkon™ Aquatic, inspecting footwear and PPE for debris or vegetation prior to leaving a site, and cleaning footwear and PPE with Virkon.

6.2.2.3 Other taxa surveys

This section covers field survey methodologies for all other relevant taxa which have potential to be present within the proposed project site.

Invertebrates

As outlined in Table 6. 1, multi-disciplinary walkover surveys of the proposed project site were covered on various dates. During the habitat surveys, an assessment was carried out for the suitability to support rare and / or threatened invertebrates including marsh fritillary. The initial survey and desk-based study showed that there was a lack of suitable habitats for terrestrial invertebrates and no specific terrestrial invertebrate surveys were required, including surveys for *Vertigo* (snail) species and the Kerry slug *Geomalacus maculosus*. However, surveys were completed for the Annex II marsh fritillary butterfly due to suitable habitat identified.

Amphibians and reptiles

During initial scoping surveys any habitat potentially suitable for smooth newt, common frog *Rana temporaria* and common lizard within the proposed project site was identified. Where suitable habitat was identified the habitats were subjected to targeted species surveys to determine presence or absence.

Scoping surveys noted some ponds/drains considered capable of supporting breeding smooth newts and therefore frog, based on criteria outlined in JNCC (2003)[14]., Further habitat suitability surveys for smooth newt were carried out. Further frog surveys were not considered necessary as frogs were recorded present when observed on an *ad hoc* basis during other site surveys. There were no suitable habitat to support common lizards therefore no specific lizard surveys were carried out.

6.2.2.4 Protected mammal surveys – terrestrial, arboreal & aquatic

provides a list of survey dates and personnel that carried out protected mammal surveys. The surveys were undertaken by experienced surveyors in line with guidelines referenced by CIEEM and in accordance with Irish survey guidelines, such as those produced by Smal (1995) and Transport Infrastructure Ireland (NRA, 2009). Evidence of mammals were searched for, including tracks, markings such as scratches on posts or latrines, feeding signs, droppings and scent-points as well as by direct observation of animals themselves. All observations were recorded. Survey areas included a 50m buffer for terrestrial mammals and for semi-aquatic mammals such as otter, survey areas included 150m upstream and downstream of the proposed project. The proposed grid connection route was also checked for mammals in May and June 2024.

The main focus of mammal surveys was to identify the presence of otter or their resting places such as layups or holts (Reid *et al.*, 2013), and badger, or their resting places/setts (Smal, 1995). During these targeted surveys, surveyors also searched for evidence of other mammals such as pine marten, red squirrel and Irish mountain hare given the suitable habitats present to support these species. Signs and/or sightings of invasive mammals, such as American mink *Neovison vison* and grey squirrel *Sciurus carolinensis* were also recorded where encountered.

6.2.2.5 Bat surveys

Appendix 6B provides a detailed bat report including methodologies for bat surveys conducted at the proposed project site. A summary of survey methodology is provided below. It is noted that due to the age of the surveys assessment criteria described in Collins (2016) was used to provide guidelines for assessing potential suitability of habitat features as bat roosts and for foraging bats. At the end of the core study period these criteria were updated

14 Joint Nature Conservation Committee - JNCC (2003). Herpetofauna Workers Manual. Available at: http://jncc.defra.gov.uk/page-3325http://jncc.defra.gov.uk/page-3325 (accessed 09/09/2024)

in Collins (2023).The habitat assessment surveys for bats were completed in 2022, before the release of the updated Collins (2023) guidance in September 2023. However, the update in the guidance means the surveys and data are compliant with the 2023 guidance.

An initial desk study and site scoping survey (preliminary roost assessment (PRA) and potential roost features (PRF) assessment) in the field were undertaken to gather baseline data on the proposed project site and its potential suitability for bat species. These surveys outlined potential for further surveys and the survey effort required. The initial scoping involved assessing trees and buildings/structures and applying a classification following standard guidance (Collins, 2016 and BTHK, 2018) of suitability for bat roost potential.

The following surveys were undertaken:

- Site Scoping
- Habitat suitability assessments for bats
- Roost emergence/re-entry surveys
- Winter roost inspections
- Bat activity transects
- Seasonal static bat detector surveys, including monitoring at height
- Monitoring of climatic conditions.

Habitat Suitability Assessment for Bats

As there were no guidelines available for Ireland at the time of the surveys, the habitat suitability assessment for bats followed NatureScot *et al.,* 2021 guidance on features that could support bats within a 200m plus rotor radius of the boundary of the proposed project site. Due to the likelihood of changing turbine locations over the course of the design iterations of a project to achieve a final optimised design, APEM Group Woodrow conduct these surveys within 300m of potential build areas.

Roost Emergence / re-entry Surveys

Dusk emergence/dawn re-entry surveys were completed in 2022 to ascertain if PRFs identified during scoping surveys were in use by roosting bats. A large number of trees were determined to have suitable PRF's, including woodlands and discrete stands of trees providing possible roost resources; in line with BTHK (2018) the survey effort was amended to reflect the proportionality (*Assessments should be proportionate to the nature and scale of the development proposed and the likely impact on biodiversity*, BTHK (2018)). Therefore, trees/woodlands with high potential for impacts were the areas targeted for surveying, along with an abandoned pump house and Rossestown Bridge.

Surveys commenced 15 minutes before sunset and up to 1.5 hours before sunrise and were typically undertaken prior to or after undertaking transect surveys of the wind farm site. Dusk emergence/dawn re-entry surveys were undertaken using Elekon Batlogger M bat detectors to collect geo-referenced records of bat activity, which were then analysed using BatExplorer to identify species. Detailed survey dates and roost locations are provided in Appendix 6B.

Winter Roost Inspections

NatureScot *et al.*, (2021) recommend that winter roost surveys should also be carried out for any potential hibernation roost within 200 m plus rotor radius of developable area. The survey was conducted on the 15 February 2022, within the timeframe in which bats would still be utilising the hibernation roosts. Surveys involved searching for and collecting bat faecal samples to be sent for DNA analysis, closer examination of roost potential, the primary use of an endoscope and a thermal imaging camera, as an indirect device, to detect the heat

signatures of hibernating bats due to bats being in a state of torpor. Structures assessed as PRFs of low to moderate roost potential and which were judged to have potential for occupation as a winter roost were examined.

Bat Activity Transects

As there were no guidelines available for Ireland at the time of the surveys, NatureScot *et al.* (2021) was used. The NatureScot *et al.* (2021) guidance considers the application of transect surveys to be discretionary, with survey requirements designed on a site-by-site basis. Transects are complementary to data collected from static bat detectors; and are important for identifying flight lines and for gaining understanding of bat abundance within the survey area. Point counts (of a fixed duration) can be incorporated into transects to survey specific features to provide information on comparative density of use.

Five transects were completed in 2022, which mainly covered the southern section, including the forestry. Survey dates and details are provided in **Appendix 6B**. Field records were made of bat species encountered, number of bat passes, activity (when observed: e.g., foraging, commuting, advertising), travelling direction and approximate height (when observed). Temperature and wind speed were measured at intervals throughout the survey, with Batloggers recording temperature throughout the surveys.

Seasonal Static Bat Detector Surveys

Static detector surveys were undertaken using two models of Wildlife Acoustics Song Meters detectors, Song Meter 4 Bat Full Spectrum (SM4BAT-FS) and Song Meter Minis (SM Mini), on three occasions covering spring (May), summer (June – July) and autumn (September- October) in 2022. A 384 kHz sampling rate was set for all detectors, and recording was scheduled to be continuous from 30 minutes before sunset until 30 minutes after sunrise, for at least 10 weather-compliant nights. The seasonal deployment periods, along with deployment locations, dates and recording duration of each static deployed provided are shown in **Appendix 6B**.

A static detector at height survey was undertaken using Wildlife Acoustics Song Meters Song Meter 2 Bat Plus (SM2BAT+) with one microphone recording at height (50 m), consistently from June to October during 2023. A stereo 192 kHz sampling rate was set for the detector, and recording was scheduled to be continuous from 30 minutes before sunset until 30 minutes after sunrise. Static bat detectors were deployed to determine presence of high-risk species, particularly Nathusius' pipistrelles and Leisler's bats who are known for their distinctive higher flight levels. Survey effort is outlined in **Appendix 6B.**

Activity levels were assessed using an adaptation of the criteria applied by Matthews *et al*. 2016 in a study that examined the risk of European bats to wind energy developments in the UK. Activity levels as classified in the study are summarised in Table 6. 2. The bat activity level scale used for the assessment of the proposed project (Table 6. 3) has been adapted to average bat passes per hour. This adaption uses an average value of 10 hours per night across the active bat season to determine the cut-off of 'high' activity**. Table 6. 3** shows the adapted activity categories.

Table 6. 2: Activity levels as per Matthews *et al.* (2016)

Classification	Bat passes per night
Low	<3.00
Medium	3.00 – 49.99
High	≥50.00

Table 6. 3: Activity level classification as per Matthews *et al*. (2016) adapted to hourly activity levels

Classification	Bat passes per hour
Low	< 2
Moderate	2.00 ≤ 4.99
High	≥5.00

Monitoring of Climatic Conditions

Monitoring climatic of conditions was undertaken through the deployment of an on-site fully automated weather station with 3G connectivity. The weather station was deployed on the 11 May 2022 at 52.712773,-7.803407.

6.2.3 Impact assessment methodology

The general approach for the EIAR methodology is set out in Chapter 1 of this EIAR. As there are many unknowns with regards to sensitivity and magnitude of effects on flora and fauna within the onshore environment, it is determined that the CIEEM approach to impact assessment be used to establish significance of effects. Therefore, biodiversity and ecological impacts of the proposed project have been assessed in accordance with Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal, and Marine published by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018, updated 2022), however, the following guidelines have all been considered during the assessment process:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA 2022)
- Environmental Impact Assessment of Projects- Guidance on the preparation of the Environmental Impact Assessment Report (European Commission 2017)
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA 2009)

Ecological 'features' such as sites, habitats, assemblages, species, or individuals, which occur in the vicinity of a project, all require assessment. The term 'ecological receptor' is used to describe an ecological resource once it has been determined that the proposed project may result in a significant impact. In accordance with CIEEM (2018), impact assessment is only undertaken of Key Ecological Receptors (KERs). These are features within the zone of influence of the proposed scheme which are '*both of sufficient value to be material in decision making and likely to be affected significantly*'.

The zone of influence is determined on a case-by-case basis and is identified using the following:

- Size and scale of the proposed project;
- Nature of the works;
- Sensitive ecological features recorded or have potential to be found on site; and,
- Pathways (direct, indirect) from the proposed project and sensitive ecological receptors in the immediate and wider area.

Those ecological features which occur within the zone of influence, such as sites designated for nature conservation, habitat or species are then evaluated in geographic hierarchy of importance. The categories used for this evaluation are listed in Table 6. 4.

The status of a species requiring protection at an international level does not necessarily impose an 'International' conservation value on any single example of that species found at a site. Approaches to attributing nature conservation value to species have been previously developed for groups such as birds and bats. Specific assessment criteria employed for assessing avian and bat populations are detailed towards the end of this section.

Key ecological features ('KERs') are defined as those features which are within the zone of influence and are evaluated as being of Local Importance or greater as described in Table 6. 4.

Table 6. 4: Geographic frame of reference used to determine ecological value

Source: NRA (2009) which has been adapted to fit into CIEEM (2018, updated 2022)

Importance Criteria
International Importance
• Sites, habitats and species populations of importance in a European context. • 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA), proposed Special Area of Conservation (pSAC) or Proposed Special Protection Area (pSPA) • Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended). • Features essential to maintaining the coherence of the Natura 2000 Network.[15] • Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive. • Resident or regularly occurring populations (assessed to be important at the national level) of species of animal and plants listed in Annex II and/or IV of the Habitats Directive and/or Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive. • Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979). • Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979). • World Heritage Sites (implications for biodiversity value only)
National Importance
• Sites, habitats and species populations of importance in a national context, including any site designated or proposed as a Natural Heritage Area (NHA), Statutory Nature Reserve, Refuge for Fauna and Flora protected under the Wildlife Acts and/or National Park. • Undesignated site fulfilling the criteria for designation as a NHA (pNHA), Statutory Nature Reserve, Refuge for Fauna and Flora protected under the Wildlife Act and/or a National Park. • Resident or regularly occurring populations (assessed to be important at the national level) of the following: - Species protected under the Wildlife Acts; and/or - Species listed on the relevant Red Data list

15 See Articles 3 and 10 of the Habitats Directive

Importance Criteria
• Site containing 'viable areas'[16] of habitat types listed in Annex I of the Habitats Directive
County (Regional) Importance- Tipperary
• Resident or regularly occurring populations (assessed to be important at the County level)[17] of the following: - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; - Species protected under the Wildlife Acts; and/or - Species listed on the relevant Red Data list. • Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance. • County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or Local Biodiversity Action Plans (BAP), if this has been prepared. • Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county. • Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.
Local Importance - Brittas, Rossestown, Clobanna, Brownstown, Killeenleigh and Kilkillahara
• Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared. • Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality. • Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value. • Resident or regularly occurring populations (assessed to be important at the Local level) of the following: - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; - Species protected under the Wildlife Acts; and/or - Species listed on the relevant Red Data list.
Site
• Habitats and species populations of less than local importance but of some value. • Sites or features containing non-native species with some importance in maintaining habitat links.

16 A 'viable area' is defined as an area of a habitat that, given the particular characteristics of that habitat, was of a sufficient size and shape, such that its integrity (in terms of species composition, and ecological processes and function) would be maintained in the face of stochastic change

17 It is suggested that, in general, 1% of the County population of such species qualifies as a County important population. However, a smaller population may qualify as County important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle

6.2.3.1 Identification and characterisation of impacts

The impact assessment was carried out with regard to the criteria outlined in CIEEM (2018). The process involves the following steps:

- Identifying and characterising potential impacts;
- Incorporating measures to avoid and mitigate (reduce) these impacts;
- Assessing the significance of any residual effects after mitigation;
- Identifying appropriate compensation measures to offset significant residual effects (if required); and
- Identifying opportunities for ecological enhancement.

When describing impacts, reference is made to the following characteristics, as appropriate:

- Positive or negative (type of effect on ecological receptor);
- Extent (size of affected ecological receptor or proportion of population affected by the impact);
- Magnitude (degree of effect on ecological receptor);
- Duration (period of time over which the effect will occur);
- Timing and frequency (how often the effect will occur); and
- Reversibility (can the effect be reversed; will it be permanent or temporary).

The impact assessment process considers both direct and indirect impacts: direct ecological impacts are changes that are directly attributable to a defined action, e.g., the physical loss of habitat occupied by a species during the construction process. Indirect ecological impacts are attributable to an action, but which affect ecological resources through effects on an intermediary ecosystem, process, or feature, e.g., the creation of roads which cause hydrological changes, which, in the absence of mitigation, could lead to the drying out of wet grassland.

Consideration of conservation status is important for evaluating the effects of impacts on individual habitats and species and assessing their significance:

- Habitats – conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure, and functions as well as its distribution and its typical species within a given geographical area.
- Species – conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.

6.2.3.2 Significant Effects on Key Ecological Features

For the purpose of assessment a 'significant effect', in ecological terms (whether negative or positive), is an outcome to a KER resulting from an impact, that either supports or undermines biodiversity conservation objectives for that ecological feature. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. National / local nature conservation policy). As such, effects can be considered significant in a wide range of geographic scales, from 'International' to 'Local'. Consequently, 'significant effects' should be qualified with reference to the appropriate geographic scale (CIEEM, 2018, updated 2022).

6.2.3.3 Assessment of Residual Impacts and Effects

After characterising the potential impacts of the proposed project and assessing the potential effects of these impacts on the KERs, mitigation measures are proposed to avoid and/or mitigate the identified ecological effects. Once measures to avoid and mitigate ecological effects have been finalised, assessment of the residual impacts and effects should be undertaken, to determine the overall significance of effects on the KERs.

6.2.3.4 Assessment of Cumulative Impacts and Effects

Cumulative effects can result from individually insignificant, but collectively significant, actions occurring over a period of time or concentrated in a location (CIEEM, 2018). Different types of actions can cause cumulative impacts and effects. As such, these types of impacts may be characterised as:

- Additive/incremental – in which multiple activities/projects (each with potentially insignificant effects) add together to contribute to a significant effect due to their proximity in time and space (CIEEM, 2018, updated 2019); or
- Associated/connected – where a development activity 'enables' another development activity e.g. phased development as part of separate planning applications. Associated developments may include different aspects of the project which may be authorised under different consent processes. It is important to assess the potential impacts of the 'project' as a whole and not ignore impacts that fall under a separate consent process (CIEEM, 2018, updated 2019).

6.2.3.5 Sites Designated for Nature Conservation

A Natura Impact Statement (NIS) has been prepared (APEM, 2024) and accompanies this EIAR. Refer to the report for likely significant effects on qualifying interests from the proposed project.

6.2.3.6 Impact assessment criteria for bats

To effectively evaluate the potential impact of the proposed project on bats, it is crucial to consider not only the species composition and bat activity at the proposed project but also their vulnerability to wind turbine impacts, particularly concerning Irish bat populations.

While NatureScot *et al*. (2021) primarily focuses on British bat species found in England, Scotland and Wales, the species found in Ireland are also found in the UK. Therefore, while not directed at Irish populations, NatureScot *et al*. (2021) offers guidance on assessing the risk to bat species on wind farms. Furthermore, there are no current guidelines that offer guidance on assessing the risk to bat species on wind farms in Ireland. NatureScot is the most recently published wind farm guidance with the last wind farm guidance for bats specific to Ireland being published in 2010. It is applicable to Ireland as we have the similar species assemblages and climates meaning the risk posed by wind farms to bats is contextually similar, therefore making this the most acceptable guidance to use for this assessment. To assist in the assessment of impacts to Irish bat populations further sources are also considered, including Marnell, Looney & Lawton (2019) and Reason & Wray (2023), refer to (Table 6. 5).

Table 6. 5: Red list status, rarity category and turbine collision risk of bat species

Species	Red list status (Marnell, Looney & Lawton, 2019)	Rarity category (adapted from Reason & Wray, 2023)	Turbine collision risk (NatureScot *et al.*, 2021)
Daubenton's bat *Myotis daubentonii*	Least concern	Rarer	Low risk

Species	Red list status (Marnell, Looney & Lawton, 2019)	Rarity category (adapted from Reason & Wray, 2023)	Turbine collision risk (NatureScot *et al.*, 2021)
Whiskered bat *Myotis mystacinus*	Least concern	Rarest species	Low risk
Natterer's bat *Myotis nattereri*	Least concern	Rarer species	Low risk
Leisler's bat *Nyctalus leisleri*	Least concern	Rarer species	High risk
Common pipistrelle *Pipistrellus pipistrellus*	Least concern	Common species	High risk
Soprano pipistrelle *Pipistrellus pygmaeus*	Least concern	Common species	High risk
Nathusius' pipistrelle *Pipistrellus nathusii*	Least concern	Rarest species	High risk
Brown long-eared bat *Plecotus auritus*	Least concern	Rarer species	Low risk

Considering the population status in Ireland and the assessed risk level concerning adverse interactions with turbines, it is crucial to determine which bat populations may face threats due to wind turbine impacts, as illustrated in Table 6. 6

Table 6. 6: Level of potential vulnerability of bat populations in Ireland

Sources: Adapted from NatureScot (2021) and Reason and Wray (2023)
Population Vulnerability: Green = *low* Yellow = *medium* Red = *high*

Irish Bat Species		Collision risk		
		Low risk	Medium risk	High risk
Relative abundance	Common species			Common pipistrelle Soprano pipistrelle
	Rarer species	Daubenton's bat Natterer's bat Brown long-eared bat		Leisler's bat
	Rarest species	Whiskered bat		Nathusius' pipistrelle

6.3 Description of Existing Environment – Ecological Baseline

The following section provides a description of the baseline ecological condition associated with the proposed project.

6.3.1 Zone of Influence (ZoI)

The 'zone of influence' for a project is "the area over which ecological features may be affected by biophysical changes as a result of the proposed project and associated activities. This is likely to extend beyond the project site, for example where there are ecological or hydrological links beyond the site boundaries. The zone of influence will vary for different ecological features depending on their sensitivity to an environmental change" (CIEEM 2018).

The ZoI of air quality effects is generally local to the proposed project and not greater than a distance of 50m from the red-line boundary and Grid Connection Route (GCR), and up to 300m from the red-line during the construction phase, and up to 200m for the operational phase (refer to Chapter 14 (Air Quality) of this EIAR for more detail).

The hydrogeological ZoI for the proposed project is variable depending on the nature of the proposed works at specific locations and the receiving environment ground conditions, this is deemed to extend beyond the red-line boundary, Grid Connection Route (GCR) and Turbine Delivery Route (TDR) and is discussed with reference to specific construction activities in Chapter 8 (Land, soils, Geology & Hydrogeology) of this EIAR.

With regards to hydrological impacts, the distances over which water-borne pollutants are likely to remain in sufficient concentrations to have a likely significant effect on receiving waters and associated wetland / terrestrial habitat is highly site-specific and related to the predicted magnitude of any potential pollution event. Evidently, it will depend on volumes of discharged waters, concentrations and types of pollutants (in this case sediment and/or hydrocarbons), volumes of receiving waters, and the ecological sensitivity of the receiving waters. In the case of the proposed project, this includes: all freshwater habitats downstream of the proposed project site red-line, GCR and TDR.

For designated sites, the ZoI is defined in the accompanying NIS (APEM, 2024). For clarity, the ZoI for designated sites was examined to initially include a precautionary initial search radius of 15km of the planning application boundary and TDR for Natura 2000 sites to understand the potential physical and ecological connectivity to the Site and associated likely project impacts. Additionally, any Natura 2000 sites beyond the initial 15km buffer with direct hydrological or physical connectivity were also identified for further examination. After undertaking the preliminary assessment, it was established due to ecological and hydrologically connectivity, the ZoI for Natura 2000 sites is 6.5km from the planning application boundary. Due to the TDR using the existing road network and infrastructure, therefore, avoiding unnecessary impacts on habitats and watercourses a ZoI of 500m has been applied from the TDR.

From the preliminary assessment, it was found that there is no Natura 2000 site recorded within the boundary of the site. The closest Natura 2000 site is the Lower River Suir SAC (Site Code: 002137) located c. 5.5km terrestrially and c. 7.8km hydrologically via the main channel of the River Suir. Kilduff, Devilsbit Mountains SAC (Site Code: 000934) lies c. 11.5km northwest of the site, with no hydrological or ecological connectivity. The Kilduff, Devilsbit Mountain SAC is located c. 11.5km northwest of the Site, and c. 9 km north-east of the TDR. There is no downstream hydrological connectivity between the Site (or TDR) and the Kilduff, Devilsbit Mountains SAC. This SAC is therefore not considered to be within the ZoI for impact relating to the Site or TDR (APEM, 2024).

There is no Special Protection Area (SPA) recorded within the initial 15km search radius. The closest SPA is the Slievefelim to Silvermines Mountains SPA (Site Code 004165), c. 18km west of the Site. This SPA is designated for Hen Harrier *Circus cyaneus*. Ornithology surveys completed for the Site found habitat suitability for hen harrier

within the Site to be low, and no hen harriers were recorded as breeding or roosting within the 2 km turbine buffer (for roost surveys). Only one observation of hen harrier was recorded within the proposed project Site during the vantage point (VP) watches, suggesting that the Site is not associated with breeding or wintering roosting hen harrier (Woodrow APEM Group, 2023). However, as some relatively minor felling of forestry and associated replanting will be included in the proposed project, this may inadvertently create Hen Harrier habitat within the Site boundary and increase its suitability for the species which often utilise pre-thicket forests. Despite this, due to known foraging ranges this is considered to be too far for connectivity with the species associated with this SPA. There is also no downstream hydrological connectivity between this SPA and the Site or TDR and thus no potential for impacts to occur via watercourses on bog or heath habitats that this species may utilise as per the conservation objectives document.

The ZoI for small mammal species is expected to be limited to no more than approximately 100m from the proposed project site boundary including GCR and TDR due to their small territory sizes and sedentary lifestyle. The ZoI for otters, badgers, stout and hedgehogs may extend over greater distances than small mammal species due to their ability to disperse many kilometres from their natal / resting spaces. The ZoI for significant disturbance impacts to badger and otter breeding / resting places may extend as far as 150m from the proposed project site boundary and TDR. This ZoI has been defined in accordance with the following guidance: Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (NRA 2005a), the Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes (NRA 2005b) and the Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (NRA 2006) and is considered to be of a precautionary distance. During construction-related disturbance, the screening effect provided by surrounding vegetation and buildings would likely reduce the actual distance of the ZoI for badgers and otters.

As effects on bat species are dependent on many factors (such as species, roost type, surrounding habitat, commuting routes *etc.*), this is assessed on a case-by-case basis and the ZoI may increase / decrease from the turbine locations accordingly. Given the large foraging ranges for some species, the ZoI of potential landscape scale impacts, such as habitat loss and severance, could extend for several kilometres from the proposed project site but the most significant effects are likely to occur within 1km of important roost sites (e.g., maternity roosts).

The ZoI in relation to amphibian species is likely to be limited to direct habitat loss and severance within the proposed project and / or indirect impacts to water quality in wetland habitats hydrologically connected to the proposed project.

In terms of construction noise, levels below 50dB (decibels) would not be expected to result in any response from wildlife. Noise levels above 70dB would likely result in some wildlife moving out of the affected zone or leaving the area altogether. At approximately 300m from the noise source, typical noise levels associated with construction activity (British Standard Institute (BSI) British Standard (BS) 5228-1:2009 +A1:2014 Code of Practice for noise and vibration control of construction and open sites- Part 1: Noise (hereafter referred to as BS 5228–1) (BSI 2008)) are generally below 60dB or, in most cases, are approaching the 50dB threshold.

The ZoI in relation to amphibians and reptiles is likely to be limited to direct habitat loss and severance within and across the proposed project site and disturbance / displacement effects in the immediate vicinity during construction. This could also include water quality impacts in any freshwater areas downstream of the proposed project.

The ZoI in relation to protected invertebrates is likely to be limited to direct habitat loss and severance within the proposed project boundary and disturbance / displacement effects in the immediate vicinity during construction.

Table 6. 7: Potential Zone of Influence for the Proposed Wind Farm.

Potential Receptor / Impact	ZoI
Air Quality	300m from emissions source
Hydrological Receptors (Watercourses: Freshwater, Coastal, Marine)	in this case refer to Designated Sites
Designated Sites	6.5km (Lower River Suir SAC)
Small mammal species	100m from proposed project site boundary
Large mammal species	150m from proposed project site boundary
Bat Roosts	200m from turbine locations
Foraging / Commuting Bats	1km from important maternity sites
Disturbance from Noise	300m from the noise source
Amphibians and Reptiles	500m of water body or watercourse
Protected Invertebrates	Immediate vicinity

6.3.2 Existing ecological records

Details of all protected and endangered species recorded within 10 km of the proposed project site are summarised in Table 6. 8. Both NatureScot (2021) and Collins (2023) recommend a background study of a 10 km search area around the proposed project. Only data from the previous 10 years are shown in the summary. Refer to Appendix 6D for full species table. Likewise, existing invasive species records from within 10 km of the proposed project have been provided in Table 6. 9. It is noted that bird species are omitted from this table as a separate Ornithology Assessment is presented in Chapter 7 of this EIAR.

There are no plant species listed in the Flora (Protection) Order 2022.

Table 6. 8: Existing ecological records for protected and/or notable species (10 km)

The second column indicates species list on Annex II & IV of Habitats Directive, and the fourth column shows species protected under the Wildlife Act, as amended

- Key to Red List Status: EX = Extinct; RE = Regional Extinct; CR = Critically Endangered; EN = Endangered; NT = Near Threatened; VU = Vulnerable; LC = Least Concern; DD = Data Deficient; blank = not listed
- Data sources: 1. NBDC = National Biodiversity Recorded Centre, 2. NPWS = National Parks & Wildlife Service, 3. BCI = Bat Conservation Ireland

Species name	Hab. Dir. (An. II/ IV)	Wildlife Acts	Red List Status	Most recent record	Data source
Ash (*Fraxinus excelsior*)			LC	2009	1
Beech *(Fagus sylvatica*)				2018	1
Branched bur-reed (*Sparganium erectum*)			LC	2008	1
Charlock (*Sinapis arvensis*)			LC	2018	1
Common dog-violet (*Viola riviniana*)			LC	2020	1

Species name	Hab. Dir. (An. II/ IV)	Wildlife Acts	Red List Status	Most recent record	Data source
Common fumitory (*Fumaria officinalis*)			LC	2019	1
Common ivy (*Hedera helix subsp. Helix*)			LC	2018	1
Common nettle (*Urtica dioica*)			LC	2018	1
Common ragwort (*Senecio jacobaea*)			LC	2017	1
Cow parsley (*Anthriscus sylvestris*)			LC	2017	1
Cowslip (*Primula veris*)			LC	2014	1
Groundsel (*Senecio vulgaris*)			LC	2018	1
Herb-Robert (*Geranium robertianum*)			LC	2018	1
Ivy (*Hedera helix*)			LC	2018	1
Ivy-leaved toadflax (*Cymbalaria muralis*)				2018	1
Lesser celandine (*Ranunculus ficaria*)			LC	2018	1
Red clover (*Trifolium pratense*)			LC	2019	1
Red valerian (*Centranthus* ruber)				2018	1
Maidenhari spleenwork (*Asplenium trichomanes*)			LC	2018	1
Rustyback (*Ceterach officinarum*)			LC	2018	1
Ancylus fluviatilis			LC	2017	1
Dusk mussel (*Anodonta (Anodonta) anatine*)			VU	2017	1
Lake limpet (*Acroloxus lacustris*)	Y	Y	LC	2014	1
Pisidium				2017	1
Sphaerium				2017	1
Freshwater white-clawed crayfish (*Austropotamobius pallipes)*	Y	Y	CR	2015	1
Asellus				2017	1
Gammarus				2017	1
Acari				2014	1
Aceria cephalonea				2015	1
Lumbricidae				2017	1
Lumbriculidae				2014	1
Amaurobius spider				2019	1

Species name	Hab. Dir. (An. II/ IV)	Wildlife Acts	Red List Status	Most recent record	Data source
Beetle - *Elmis aenea*				2017	1
Beetle - *Limnius volckmaria*				2017	1
Brimstone butterfly *(Gonepteryx rhamni)*				2019	1
Grenn-veined white butterfly *(Pieris napi)*				2019	1
Orange-tip butterfly *(Anthocharis cardamines)*				2019	1
Peacock butterfly *(Inachis io)*				2019	1
Small tortoiseshell butterfly *(Aglais urticae)*				2020	1
Speckled wood butterfly *(Pararge aegeria)*				2021	1
Caddisfly *(Allotrichia pallicornis)*				2015	1
Caddisfly *(Athripsodes cinereus)*				2015	1
Caddisfly *(Glossosomatidae)*				2014	1
Caddisfly *(Hydropsyche)*				2017	1
Caddisfly *(Hydropsyche angustipennis)*				2015	1
Caddisfly *(Hydropsyche pellucidula)*				2015	1
Caddisfly *(Hydropsyche siltalai)*				2015	1
Caddisfly *(Hydroptilidae)*				2017	1
Caddisfly *(Lepidostomatidae)*				2014	1
Caddisfly *(Leptoceridae)*				2017	1
Caddisfly *(Polycentropus)*				2014	1
Caddisfly *(Polycentropus flavomaculatus)*				2015	1
Caddisfly *(Rhyacophila)*				2017	1
Caddisfly *(Rhyacophila dorsalis)*				2015	1
Caddisfly *(Sericostoma)*				2017	1
Caddisfly *(Silo nigricornis*				2015	1
Caddisfly *(Tinodes waeneri)*				2015	1
Common hawker dragonfly (*Aeshna juncea*)				2020	1
Andrena (*Andrena)* clarkella				2017	1
Bombus lucorum agg.				2019	1

Species name	Hab. Dir. (An. II/ IV)	Wildlife Acts	Red List Status	Most recent record	Data source
Early bumble bee (*Bombus (Pyrobombus)* pratorum)				2016	1
Gooden's nomad bee (*Nomada goodeniana*)				2017	1
Halictus (Halictus) rubicundus				2017	1
Large red tailed bumble bee *(Bombus (melanobombus) lapidaries)*				2019	1
Alainites muticus				2017	1
Baetis				2017	1
Caenis rivulorum				2017	1
Mayfly - Ecdyonurus				2017	1
Mayfly- Green drake (*Ephemera Danica*)				2017	1
Mayfly – *Heptagenia*				2014	1
Mayfly – *Serratella ignita*				2017	1
Cinnabar moth (*Tyria jacobaeae)*				2017	1
Stonefly- *Leuctra*				2017	1
True fly – *Chironomidae*				2017	1
True fly- *Dicranota*				2017	1
True fly – *Simuliidae*				2017	1
Common Frog (*Rana temporaria*)	V			2018	1
Lesser Noctule (*Nyctalus leisleri*)	Y	Y		2018	1, 3
Daubenton's Bat (*Myotis daubentonii*)	Y	Y		2018	1, 3
Natterer's Bat (*Myotis nattereri*)	Y	Y		N/A	1, 3
Pipistrelle (*Pipistrellus pipistrellus sensu lato*)	Y	Y		2018	1, 3
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	Y	Y		2018	1, 3
West European Hedgehog (*Erinaceus europaeus*)		Y		2021	1
Red fox (*vulpes vulpes*)				2018	1
Pine Marten (*Martes martes*)		Y		2018	1, 2
European Otter (*Lutra lutra*)	Y	Y		2015	1, 2

Table 6. 9: Existing ecological records of invasive species (10 km)

Species name	Invasive status	Most recent record	Record Source
Common Broomrape *(Orobanche minor)*	Medium impact	2019	1
Jenkin's spire snail (Potamopyrgus antipodarum)	Medium impact	2017	1
Stone loach (*Barbatula barbatula*)	Not assessed	2018	1

6.3.2.1 International Designated Sites

An NIS has been prepared which assesses potential impacts on European Designated Sites (APEM, 2024).

The closest Natura 2000 site is the Lower River Suir Special Area of Conservation (SAC) (Site Code 002137) located c. 5.5km terrestrially and c. 7.8km hydrologically via the main channel of the River Suir (APEM, 2024). No Special Protection Areas (SPA) were identified within the initial 15km search radius. Refer to Figure 6. 3showing the initial 15km search radius.

There is no ecological, hydrological or hydrogeological connectivity between the Site and any other Natura 2000 site. Therefore, the ZoI for designated sites is defined as 6.5km, including the Lower River Suir SAC (Site Code 002137). The NIS therefore assessed potential impacts on the Lower River Suir SAC (APEM, 2024).

Potential significant impacts were identified in relation to emissions to water, disturbance and invasive species. Potentially affected Qualifying Interests (QIs) of the Lower River Suir SAC include:

- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260]
- *Austropotamobius pallipes* (White-clawed Crayfish) [1092]
- *Petromyzon marinus* (Sea Lamprey) [1095]
- *Lampetra planeri* (Brook Lamprey) [1096]
- *Lampetra fluviatilis* (River Lamprey) [1099]
- *Salmo salar* (Salmon) [1106]
- *Alosa fallax fallax* (Twaite Shad) [1103]
- *Lutra lutra* (Otter) [1355]

Mitigation measures outlined in the NIS relevant to flora and fauna identified for significant effects within assessment have been brought forward to this Chapter.

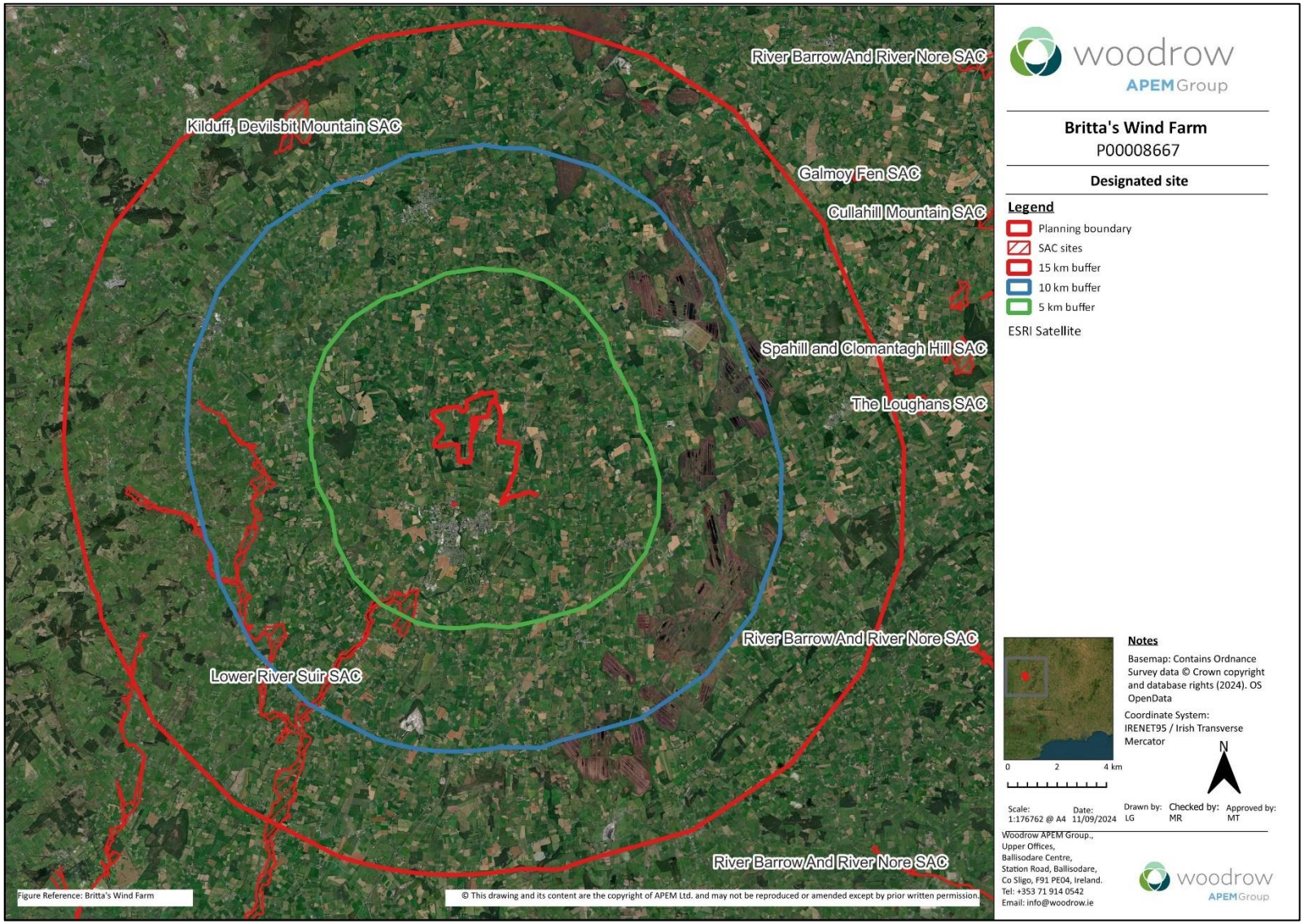

Figure 6. 3: SAC sites

6.3.2.2 National Designated Sites

There are no NHAs and seven pNHA's within an initial 15 km search radius of the proposed project site. Refer to Table 6. 10 which identifies the site name, features for which the site is designated and the potential pathway for impacts from the proposed project site. Refer to Figure 6. 4 for locations with regards to the proposed project site.

Table 6. 10: pNHAs within 15 km

Site	Distance (km) and direction	Qualifying features	Pathway for effects
Cabragh wetlands [001934]	1.3 SW and 6.3 SW	Part of the Lower River Suir SAC. Refer to Accompanying NIS	Hydrological connectivity
Ormond's mill, Loughmoe, Templemore [002066]	3.5 N	Brown long-eared bat roost and natterer's bat roost	Potential links through habitat and hydrological connections between source and receptor for this pNHA
Templemore Wood [000942]	8.3 NW	Woodland flora	No hydrological or ecological connectivity
Kilough Hill [000959]	9.9 S	Pavement and limestone grassland	No hydrological or ecological connectivity
Kilduff, Devilsbit Mountain [000934]	12.5 NW	Part of the Kilduff, Devilsbit Mountain SAC. Refer to Accompanying NIS (Apem, 2024)	No hydrological or ecological connectivity
Laffansbridge [000965]	13.8 SE	Green-winged orchid	No hydrological or ecological connectivity
Kilcooly Abbey Lake [000958]	13.64 E	Lesser bulrush, otters, breeding waterfowl	No hydrological or ecological connectivity

Proposed Natural Heritage Areas (pNHAs) are sites published on a non-statutory basis since 1995, however, they have not been statutorily proposed or designated. These sites are of significance for wildlife and habitats, which often have been superseded by the designation of the site as an SAC or SPA. Where the designation has been superseded by the SAC/SPA, they will be assessed in the accompanying NIS (APEM, 2024). There is one pNHA (not overlapping an SAC) that has potential for connectivity to the proposed project site, Ormond's mill, Loughmore, Templemore. Refer to Section 0 for assessment of potential effects. There are no other pNHA's with potential for connectivity between the proposed project and the designated site.

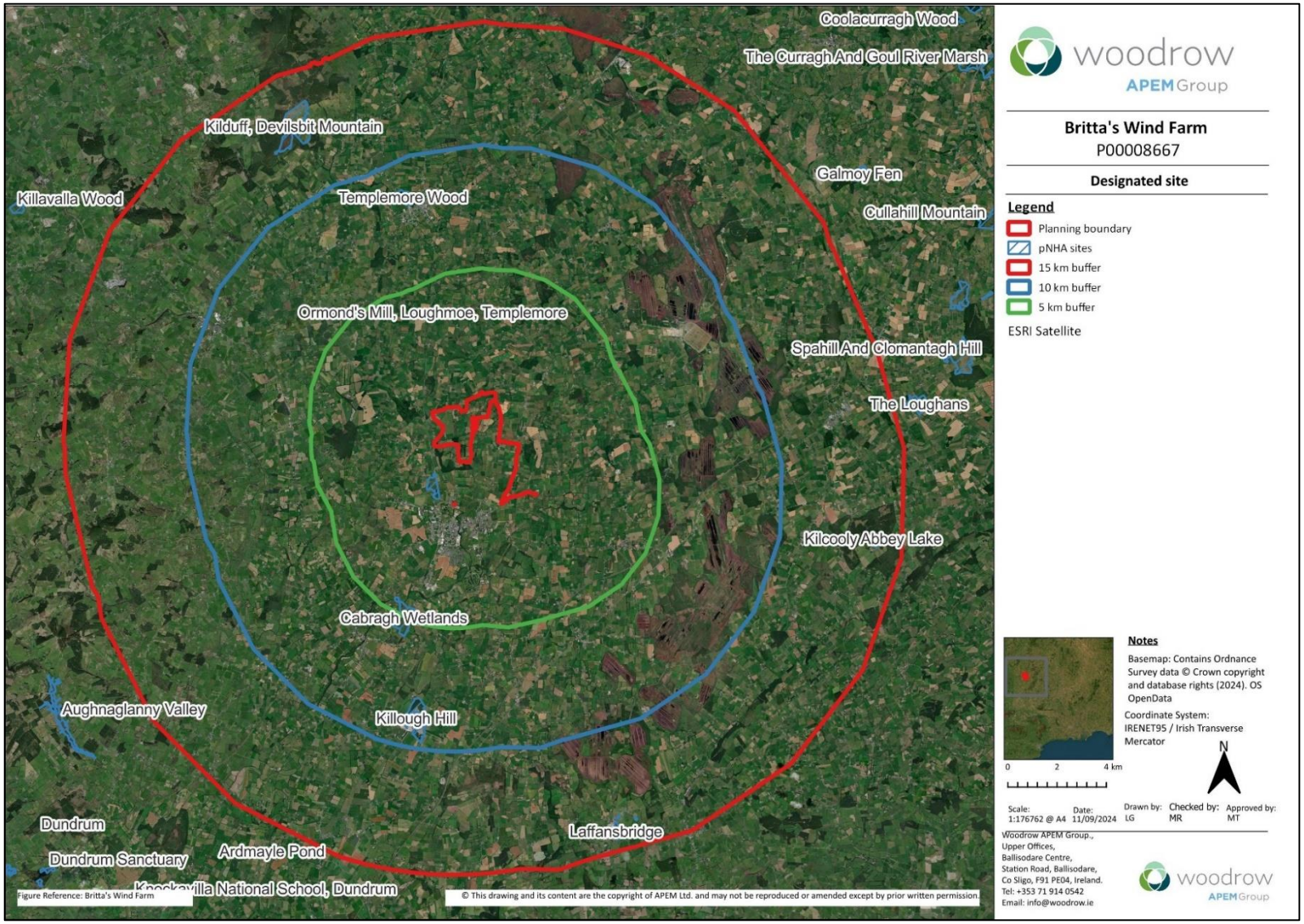

Figure 6. 4: pNHA sites

6.3.3 Field survey results

6.3.3.1 Habitats

The existing habitats within the proposed project site, including the grid connection route are listed in Table 6. 11, which provides Fossitt (2000) habitat types and potential links to Annex I habitat types, along with areas in hectares (ha) or lengths for linear features in meters (m). While no habitat surveys were undertaken along the TDR, habitats were noted for their potential to support protected flora and fauna.

Habitat maps showing habitat types in relation to the proposed turbine layout and proposed project are provided in Figure 6. 5 and Figure 6. 6, which show polygon and linear habitat features separately for clarity. The habitat map for the proposed grid connection route, which runs along the public road, are also provided in Figure 6. 5 and Figure 6. 6, along with a map showing the locations of the non-native plant species recorded. These surveys identified potentially sensitive and rare habitats within the proposed project site; habitats with the potential to qualify as priority habitats listed under Annex I of the EU Habitats Directive (92/43/EEC).

Improved Grassland GA1

Improved grassland (Fossitt Code GA1) is the most dominant habitat recorded on Site. This habitat is dominated by perennial ryegrass *lolium perenne*, field thistle *cirsium discolor*, *Agrostis* sp., creeping buttercup *Ranunculus repens*, meadow buttercup *Ranunculus acris, broad-leaf plantain Plantago major, cuckoo flower Cardamine pratensis* and cow parsnip *Heracleum.* It is considered predominantly used to graze livestock based on short swards, visuals of animals and evidence of such during field surveys.

The proposed substation field has an improved grassland habitat with dominant species present here including perennial ryegrass, annual bluegrass *Poa annua,* sorrel *Rumex acetosa,* creeping buttercup *Rannunculus repens* and white clover *Trifolium repens*.

Evaluation: This habitat type is evaluated as being of Site Importance.

Wet Grassland GS4

Wet grassland (GS4) comprises 1.64 ha of the substation site.

Some areas within the Site are semi-improved. Dominant species recorded in these areas include *Molinia* sp., crested dog-tail *Cynosurus cristatus,* false oat-grass *Arrhenatherum elatius,* devil's bit scabious *Succisa pratensis, Cirsium* sp., Carnation sedge *Carex panicea, Crepis* sp., *Centaurea* sp., red-stemmed feather moss *Pleurozium schreberi*, round-fruited rush *Juncus compressus* and black bog-rush *Schoenus nigricans.*

In parts this habitat is recorded as having potential affinity to EU Annex I habitat – *Molina* meadow (EU habitats directive code 6410) based on being dominated by graminoids and relatively species rich. Variable sward heights were noted across the habitat as the site had been recently grazed by horses. Some bare ground and disturbance were noted. Soils were peaty. Bare limestone rock was obvious in places. Sedges *Carex* spp., rushes *Juncus* spp., and grasses *Molinia caerulea* are all co-dominant throughout the habitat. However, there was much variation in species composition within the sward. Water mint *Mentha aquatica*, meadowsweet *Filipendula ulmaria* and devils bit scabious *Succisa pratensis* were prominent components of the herb layer. Several orchids were identified across the site including heath spotted orchid *Dactylorhiza maculata*. The bryophyte layer was somewhat under-developed and dominated by pointed spear-moss *Caliergonalla cuspidate*. There is 0.52 ha of *Molinia* meadow habitat within the substation footprint.

Link to Annex habitats I: Possible *Molina* meadow on fen. Fens are a sign of a rich diversity of flora and fauna. Three quadrats were surveyed within this habitat to further investigate it's potential affinity to Annex I *Molinia* meadow.

At quadrat 1 of the substation fields (52.72690,-7.792538), 1.8 ha of wet grassland (GS4), which corresponds to high quality Annex 1 6410 *Molinia* meadows is recorded. Variable sward heights are noted across this habitat where it is considered to have been grazed by livestock, likely horses and bare ground and disturbance were noted. Soils are recorded as were peaty and outcrops of bare limestone rock is also present. This habitat is dominated by graminoids and relatively species rich. Sedges *Carex* spp., rushes *Juncus* spp., and purple moor-grass *Molinia caerulea* are all co-dominant throughout the habitat. However, there was much variation in species composition within the sward. Water mint *Mentha aquatica* , meadowsweet *Filipendula ulmaria* and devils bit scabious *Succisa pratensis* were prominent components of the herb layer. Heath spotted orchid *Dactylorhiza maculata* was also recorded across the habitat. The bryophyte layer was somewhat under-developed and dominated by pointed spear-moss *Caliergonalla cuspidata*.

At quadrat 2 of the substation fields (52.726725,-7.793146), long stalked yellow sedge *Carex lepidocarpa* is co-dominant with hard rush *Juncus inflexus* and purple moor grass *Molinia caerulea*. The bryophyte layer is dominated by pointed spear-moss *Calliergonella cuspidate.* This vegetation community aligns with the IVC GL1D *Molinia-Potentilla* grassland. It is typically a more species-poor assemblage when compared with GL1C *Molinia-Succisa* grassland. It occurs on infertile acidic peats and marginal grazing land. Typical species include purple moor-grass *Molinia caerulea*, jointed rush *Juncus articulates*, creeping bent (*Agrostis stolonifera*, sweet vernal grass *Anthoxanthum odoratum* and Yorkshire fog *Holcus lanatus*, carnation sedge *Carex panicea*, glaucous sedge *Carex flacca*, and common sedge *Carex nigra*. The habitat quality is poorer than that assessed at quadrat 1 based on vegetation structure (forb-to graminoid-ratio) and vegetation composition (0 high quality indicator species). However, this habitat is still considered to have affinity with Annex I 6410 Molinia meadows, due to the number of positive indicator species present, the non-tussock forming habit of the purple moor-grass *Molinia caerulea,* and its proximity to more forb rich vegetative communities.

Quadrat 3 (52.727058,-7.792869) was located within a discrete area (10m x 5m) which aligns with the Fossitt classification of poor fen and flush (PF2). The graminoid layer was dominated by bottle sedge (*Carex rostrata*) with abundant soft rush (*Juncus effusus*), and hard rush (*Juncus inflexus*). Several other species present also align with the description provided in Fossitt (2000) including, common cottongrass (*Eriophorum angustifolium*), common sedge (*Carex nigra*), lesser spearwort (*Ranunculus flammula*). No sphagnum was present and the bryophyte layer was dominated by Calliergonella cuspidata. The water table was high with water pooling in areas trampled by livestock and more bare peat noted than other quadrats. According to the IVC classification this habitat aligns with FE2D *Carex rostrata- Menyanthes trifoliata* mire, which falls under the Fens and Mire division. Bottle sedge (Carex rostrata) is listed as the dominant species in this vegetation community. Other constant species which align with the quadrat data include, water horsetail (*Equisetum fluviatile*), creeping bent (*Agrostis stolonifera*) and water mint (*Mentha aquatica*), cuckoo flower (*Cardamine pratensis*), and lesser spearwort (*Ranunculus flammula*). As in quadrat 3 the bryophyte cover is only occasional and chiefly composed of *Calliergonella cuspidata*. Examples of this community may correspond with EU HD Annex I habitat 7140 Transition mires. However, the size of the habitat is too small to be considered distinct from the wet grassland and as such is considered to form a component of the dominant habitat type in the area being protected under Annex I 6040 Molinia meadows.

There is high quality Annex 1 *Molinia* meadow within the proposed substation field. An assessment of the quality of the habitat was carried out following methods outlined in the Irish semi-natural grassland survey government guidance (O'Neill, *et al.,* 2013). The results show this is a high-quality habitat achieving success in all assessment criteria.

Evaluation: This habitat type is evaluated as being of National Importance.

Marsh GM1

The fields close to T.6 and T.8 were considered to be of marsh habitat. It was noted that habitats on the eastern side of the River Suir were also similar, however, the land on the eastern side appeared to be more poached. Dominant species here include sharp-flowered rush *Juncus acute,* soft rush *Juncus effusus,* black bog-rush *Schoenus nigricans,* marsh thistle *Cirsium palustre*, Yorkshire fog *Holcus lanatus,* white clover *Trifolium repens, Epilobium sp*., *Ulex* sp., common daisy *Bellis perennis, tormentil Potentilla erecta, Hypericum* sp., common reed *Phragmites australis*, self-heal *Prunella vulgaris, Equisitum* sp., field thistle *Cirsium discolor,* lesser spearwort *Ranunculus flammula,* creeping buttercup *Ranunculus repens, Orchidaceae* sp., quaking grass *Briza media*, fairy flax *Linum* catharticum, *Samolus* sp., water mint *Mentha aquatica,* heath milkwort Polygala serpyllifolia, Ambrosia sp., bog pimpernel *Anagallis tenella,* common sedge *Carex nigra*, bird vetch Vicia cracca, common mouse-ear chickweed *Cerastium fontanum*, bird's-foot trefoil *Lotus corniculatus,* meadowsweet *Filipendula ulmaria*, devil's bit scabious *Succisa pratensis,* butterworts *Pinguicula,* marsh lousewor*t Pedicularis palustris*, common sedge *Carex nigra*, long-stalked yellow-sedge *Carex viridula,* oval sedge *Carex ovalis* and fragrant orchid *Gymnadenia conopsea*.

In the southeast corner of the proposed substation field, there is devil's bit scabious *Succisa pratensis* present here, where the grid connection route enters the field.

Link to EU Annex I Habitats: None noted.

Evaluation: This habitat type is evaluated as being of Local Importance.

Drainage ditches FW4

There are drainage ditches throughout the Site which divide up the fields. These areas had the following dominating species present: bulrush *Typha latifolia*, *Angelica* sp., meadowsweet *Filipendula ulmaria*, sweet grass *Anthoxanthum* sp., *Rumex* sp., willow *Salix* sp., blackberry *Rubus fructicosus, Carex* sp*., hairy willowherb Epilobium hirsutumn,* common hazel *Corylus avellana,* water mint *Mentha aquatica,* field horsetail *Equisetum arvense,* yellow iris *Iris pseudacorus, Juncus sp., Linium sp.,* and *Centaurea sp.*

To the east of T.6, a drain with stagnant water and some vegetation is recorded. Dominant species within the drain present here include prickly wild rose *Rosa acicularis*, blackberry *Rubus fructicosus*, *Tyoha* sp., purple loosestrife *Lythrum salicaria*, hawthorn *Crataegus* sp., ivy *Hedera* sp., willow *Salix* sp., guelder-rose *Verbernum opulus*, European crab apple *Malus sylvestris*, blackthorn *Prunus spinosa*, buckthorn *Rhamnus* sp., gorse *Ulex* sp., spear thistle *Circium vulgare* and field thistle *Circium discolor*.

There is a ditch to the east of T.2 (*c.* 415 m) which holds vegetation including willowherb *Epilobium* sp., *Ambrosia* sp., *Angelica* sp., fool's water cress *Apium nodiiflorum, hawthorn Crataegu*s sp., and ivy *Hedura* sp. along the bank. There is a dry ditch with a hedgerow present also to the east of T.2. Species dominant on the ditch include willow *Salix* sp., bird vetch *Vicia cracca, willowherb Epilobium* sp., silverweed *Potentilla anserina*, *Myosotis* sp., common nettle *Urtica dioica*, St. John's wort *Hypericum perforatum, Rumex* sp., field thistle *Cirsium discolor,* purple loosestrife *Lythrum salicaria,* water mint *Mentha aquatica,* and meadowsweet *Filipendula ulmaria*. The hedgerow is made up of *Crataegus* sp., prickly wild rose *Rosa acicularia,* blackberry *Rubus fructicosus, Hedura* sp., blackthorn *Prunus spinosa* and *Fraxinus* sp.

Link to Annex habitats: None noted.

Evaluation: This habitat type is evaluated as being of Local Importance.

Hedgerows WL1

Hedgerows comprise ca. 14804.66 m within the proposed project site. East of T.6 the hedgerow is 542.51 m long and 3.5 m wide with a drain and 646.9 m of field margin. Dominant species include blackthorn *Prunus spinosa*, *Ulex* sp., prickly wild rose *Rosa acicularis, perennial ryegrass, Crataegus* sp., common nettle *Urtica dioica, blackberry Rubus fructicosus, creeping buttercup Ranunculus repens, soft rush Juncus effusus, Yorkshire fog Holcus*

lanatus, Rumex sp., white clover *Trifolium repens* and *Salix* sp. At 52.716469,-7.811249 is a hedgerow of 121.98 m long, 6.68 m wide and is set on a dry drain. Dominant species here include *Salix* sp., *Crataegus* sp., *prickly wild rose Rosa acicularis*, purple loosestrife *Lythrum salicaria, meadowsweet Filipendula ulmaria, common nettle Urtica dioica, bird vetch Vicia cracca,* gorse *Ulex sp., blackberry Rubus fructicosus and blackthorn Prunus spinosa.*

To the northeast of the proposed project site, an intact hedgerow of 239.34 m long is recorded. Dominant species include gorse *Ulex* sp., willow *Salix* sp., prickly wild rose *Rosa acicularis*, *Fraxinus* sp., guelder-rose *Viburnum opulus,* hawthorn *Crataegus* sp., *Sorbus* sp., ivy *Hedura* sp., blackberry *Rubus fructicosus*, blackthorn *Prunus spinosa* and *Alnus* sp.

At the closest point to the River Suir, adjacent to T.3, an intact hedgerow of 219.4 m is recorded. Dominant species include willow *Salix* sp., and hawthorn *Crataegus* sp. and a wet ditch is present at the base.

A hedgerow with standard trees is to the north of T.3. This hedgerow is c. 360 m in length with two tree species 169.5 m long and is dominated by hawthorn *Cragaetus* sp., willow *Salix* sp., ivy *Hedura* sp. and prickly wild rose *Rosa acicularis*. A drain is recorded at the base of this hedgerow which is considered to be seasonally dry based on limited vegetation growth within. *Water mint Mentha aquatica* and jointed rush *Juncus articulatus* is recorded within the drain.

The hedgerow surrounding the proposed substation field has blackthorn *Prunus spinosa, ivy Hedura* sp., blackberry *Rubus fructicosus* and willow *Salix* sp. present.

Link to Annex habitats: None noted.

Evaluation: This habitat type is evaluated as being of Local Importance.

Depositing / lowland rivers FW2

A map of rivers and streams are in Figure 6. 8. The River Suir flows within the proposed project site giving this habitat classification. The species present at the River Suir to the east of T.9 include *Nymphaeaceae* and *Typha latifolia.*

Athnid more stream (742.51 m) is found northeast of the Site. This stream flows downstream and joins the Rossestown bridge river. The Rossestown bridge river (1642.57 m within the red-line boundary) flows downstream from the north to south of the Site and into the River Suir. The Rossestown river flows downstream into the River Suir. This river does not occur within the red-line boundary, however, is less than one meter away from the Site.

Link to Annex habitats: Watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] or Rivers with muddy banks with *Chenopodiun rubri* p.p. and *Bidention* p.p. vegetation [3270]. No potential for these Annex I habitats identified on site.

Evaluation: This habitat type is evaluated as being of Local Importance.

Poor fen and flush PF2

Poor fen and flush (PF2) comprises c. 0.47 ha at the substation location. The graminoid layer was dominated by bottle sedge (*Carex rostrata*) with abundant soft rush (*Juncus effuses*), and hard rush (*Juncus inflexus*). Several other species present also align with the description provided in Fossitt (2000) including, common cottongrass (*Eriophorum angustifolium*), common sedge (*Carex nigra),* lesser spearwort *(Ranunculus flammula*). No sphagnum was present, and the bryophyte layer was dominated by *Calliergonella cuspidata.* The water table was high with water pooling in areas trampled by livestock and bare peat noted.

According to the IVC classification this habitat aligns with FE2D *Carex rostrata - Menyanthes trifoliata* mire, which falls under the Fens and Mire division. Bottle sedge (*Carex rostrata)* is listed as the dominant species in this vegetation community. Other constant species which align with the quadrat data include, water horsetail (*Equisetum fluviatile*), creeping bent (*Agrostis stolonifera*) and water mint (*Mentha aquatica*), cuckoo flower

(*Cardamine pratensis*), and lesser spearwort (*Ranunculus flammula*). The bryophyte cover is only occasional and chiefly composed of *Calliergonella cuspidata.* Examples of this community may correspond with EU HD Annex I habitat 7140 Transition mires. However, the size of the habitat is too small to be considered distinct from the wet grassland and as such is considered to form a component of the dominant habitat type in the area being protected under Annex I 6040 Molinia meadows.

There is potential for Annex 1 Fen and Flush habitat to occur in the field to the east of T.10 based on the dominant species being sedges as per Fossitt 2000 .

Link to Annex habitats: Potential for Annex I Fen and Flush habitats

Evaluation: This habitat type is evaluated as being of National Importance.

(Mixed) broadleaved woodland WD1

This habitat type includes broadleaved plantations and smaller areas holding more species rich broadleaved woodland.

According to Fossitt (2000), plantations of broadleaved trees are included in this category. Oak (*Quercus* sp.), beech (*Fraxinus excelsior*) and horse chestnut (*Aesculus hippocastanum*) make up the majority of this mature woodland in the southwest of the proposed project site. The woodland has been managed as a plantation woodland and more recent underplanting (identified by immature growth) of species such as ash *Fraxinus* , beech *Fagus sylvatica* and sycamore *Acer pseudoplatanus* is evident. Some natural regeneration was also observed.

The ground layer is dominated by bramble *Rubus fruticosus* and nettle *Urtica* dioica in places, however, for the most part the ground layer is sparse with a cover of leaf litter only. A number of typical woodland species and some ancient woodland indicators are noted such as primrose *Primula vulgaris and* Enchanter's nightshade *Circaea lutetiana,* indicating that the present woodland potentially was established on an area of historic woodland.

Adjacent to T.4, there is a "T"-shaped treeline dominated by *Crataegus* sp., *Ulex* sp., blackberry *Rubus fructicosus, Fraxinus* sp., *Sorbus* sp., *Salix* sp. guelder-rose *Virburnum opulus,* prickly wild rose *Rosa acicularis*, with devil's bit scabious *Succisa pratensis* in parts. This treeline is 160 m in length from the most westerly point to the most easterly point, 30 m in width and 160 m from north to south.

Semi-natural broadleaf woodland is also recorded east of T.10 in the south-east of the red-line boundary. Species dominating the canopy layer here include willow *Salix* sp., *Fraxinus* sp., *Crataegus* sp. and *Vibernum opulus* (<1%). The understorey layer was made up of *Filipendula ulmaria* (70%), *Phragmites* (70%), *Galium* sp. (10%), *Iris pseudacorus* (10%), *Angelica* Sp., and *Galium palustre.*

The woodland habitat associated with the ring fort *c.* 150 m northeast of T.6 is dominated by *Fraxinus* sp., *Crataegus* sp., *Urtica dioica, Rubus fruticosus, Cirsium discolor, Corylus* sp., *Rosa acicularis* and *Malus* sp.

Link to Annex habitats: None noted.

Evaluation: This habitat type is evaluated as being of Local Importance.

Buildings and Artificial Surfaces BL3

This habitat type is present within the proposed project site in the form of roads and agricultural buildings. Buildings and artificial surfaces makes up a very small proportion of the site, which is primarily agricultural type habitats. This habitat is of limited value to wildlife but can provide shelter for some bird and mammal species if disturbance is low.

Link to Annex habitats: None noted

Evaluation: This habitat type is evaluated as being of Local Importance.

Eutrophic Lakes FL5

A eutrophic lake habitat was recorded within the southern woodland *c*. 210 m from T.9.

Link to Annex habitats: None noted

Evaluation: This habitat type is evaluated as being of Local Importance.

Reed and Large Sedge Swamp FS1

Reed and Large Sedge swamp is present in one area of the proposed project site and comprises primarily common reed *Phragmites australi,* common club rush Schoenoplectus lacustris *,* and yellow iris *Iris pseudocorus.* This habitat provides shelter and food for a variety of species including birds, insects and bats.

Link to Annex habitats: None noted

Evaluation: This habitat type is evaluated as being of Local Importance.

Mixed Broadleaf / Conifer Woodland WD2

There is .01 ha mixed broadleaf / confier woodland *c.* 382 m from T.4. Species here include Scot's pine *Pinus sylvestris*, hawthorn *Crataegus monogyna*, one mature oak *Quercus*, holly *Ilex aquifolium*, bramble *Rubus fructicosus agg*., and willow *Salix spp*.

Link to Annex habitats: None noted

Evaluation: This habitat type is evaluated as being of Local Importance.

(Mixed) Conifer Woodland WD3

(Mixed) conifer woodland is present in one area within the proposed project site, to the south-west. This comprises a monoculture of commercial forestry and is of limited value to wildlife due to its low biodiversity. However, it does provide some shelter and potential dwelling habitat for mammals. This plantation is comprised of Japanese larch, sitka spruce and Scot's pine.

Link to Annex habitats: None noted

Evaluation: This habitat type is evaluated as being of Local Importance.

Scattered Trees and Parkland WD5

According to Fossitt, 2000 , "... This category can be used in situations where scattered trees, standing alone or in small clusters, cover less than 30% of the total area under consideration but are a prominent structural or visual feature of the habitat. This usually occurs in areas of cultivated grassland, particularly amenity areas. In the case of parkland or parks which originate from former planting and landscaping, the proportion of non-native trees is typically high..." This area consists of oak trees and the non-native horse chestnut. This area is an archery amenity.

Link to Annex habitats: None noted

Evaluation: This habitat type is evaluated as being of Local Importance.

Scrub WS1

There are four patches of scrub habitat recorded within the proposed project site. Scrub was noted as mainly being less than 5 m high and 4 m wide. The main species record here is gorse *Ulex sp.,* hawthorn *Crataegus monogyna,* bramble *Rubus fructicosus agg.,* elder *Sambucus nigra, and* willow *Salix sp.*

Link to Annex habitats: None noted

Evaluation: This habitat type is evaluated as being of Local Importance.

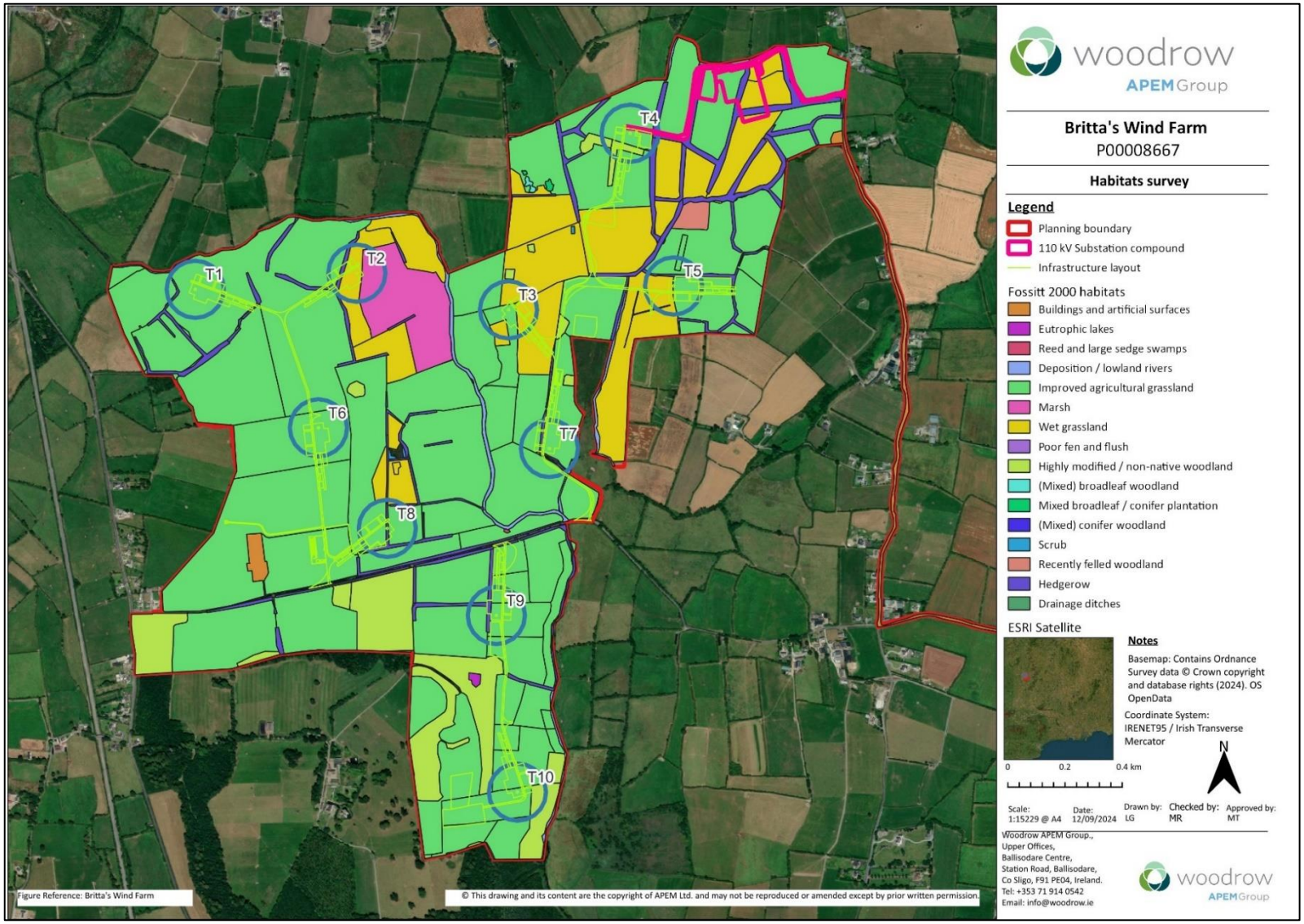

Figure 6. 5: Fossitt 2000 habitat classification with 100 m turbine buffer

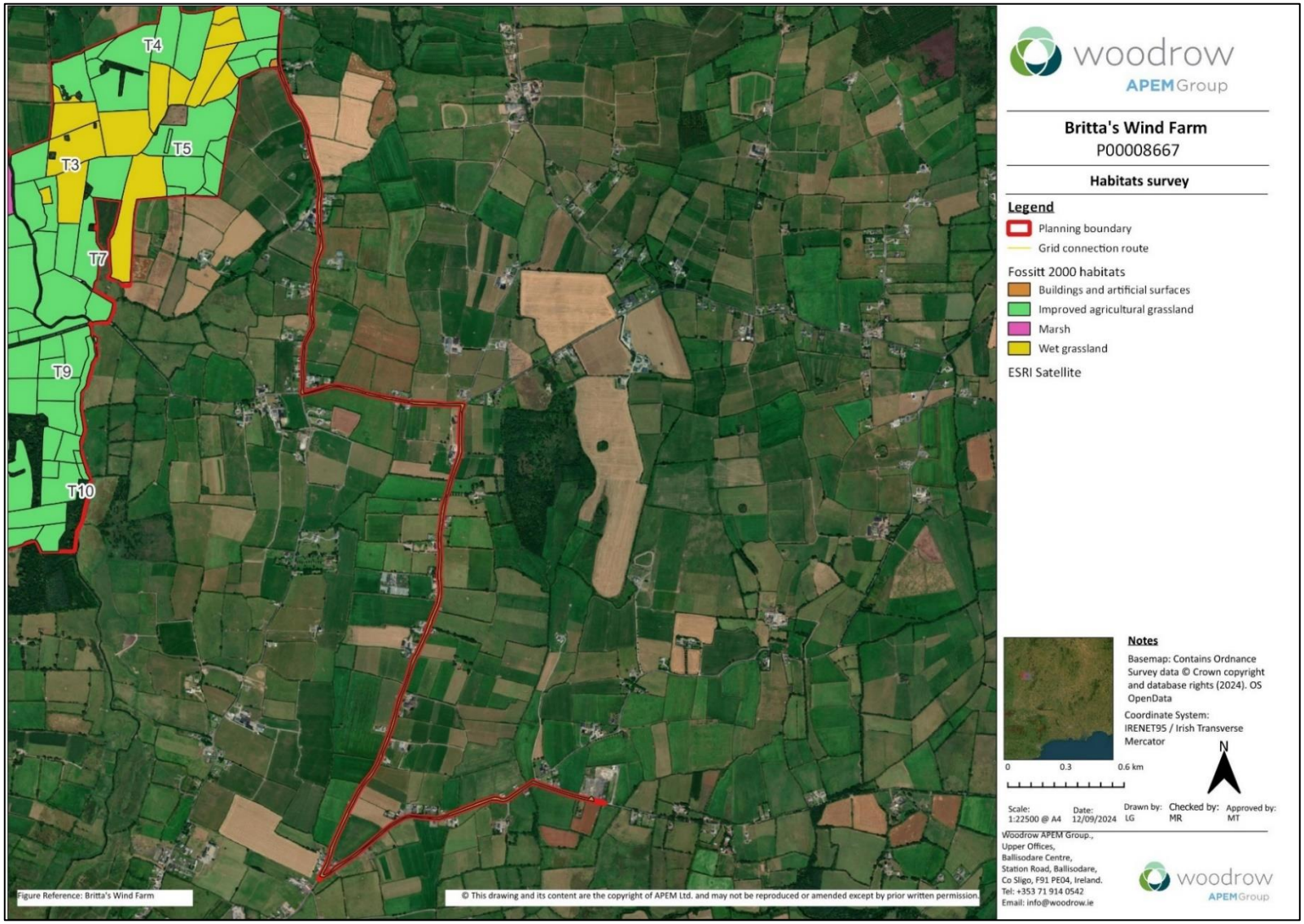

Figure 6. 6: Fossitt 2000 Habitats within proposed project

Table 6. 11: Habitat types within proposed project (Fossitt, 2000 classifications)

Fossitt (2000) Habitat Type	Potential EU Annex I Affiliations	Area (ha) or length (m)	Occurrence within proposed project
Improved Agricultural Grassland (GA1)	No	233.15 ha	Areas of improved grassland are present within the proposed project site. There are also areas of improved grassland present in the proposed substation fields. There is possible Molinia meadows on fen habitat present next to the substation field.
Wet Grassland (GS4)	Yes	52.32 ha	The proposed substation fields were identified as wet grassland habitats. They were identified as having high quality Molinia meadows. There is also wet grassland habitat near T.2, T.3, T.4 and T.5.
Marsh (GM1)	Yes	9.1 ha	Fields close to T.6 and T.8. There is high quality Annex 1 Molinia meadows within the proposed substation field.
Drainage Ditches (FW4)	No		Drainage ditches were present throughout the proposed project site. Some were recorded at T.6, T.2
Hedgerows (WL1)	No	14804.66 m	There are hedgerows present throughout the proposed project site. Some were recorded at T.3, T.4 and the proposed substation fields.
Depositing / Lowland Rivers (FW2)	Yes	8070.71 m	The River Suir flows within the proposed project site, it is in close proximity to T.1, T.2, T.3, T.7, T.8, T.9 and T.10. No potential for Annex I on site.
Poor Fen and Flush (PF2)	Yes	0.52 ha	Areas of the proposed substation field were also identified as being of poor fen and flush habitat. This could have potential to be classed as Annex 1 Transition mires, however given the small size of the habitat, it was identified as Annex 1 Molina meadows.
(Mixed) Broadleaved Woodland (WD1)	No	22.31 ha	There is semi-natural broadleaf woodland identified in the field to the east of T.10 and to the south of T.4. The main woodland in the south of the proposed project site makes up this habitat.
Buildings and Artificial Surfaces (BL3)	No	1.11 ha	There is one building to the west of T.8 along an access track into the met mast. There is also buildings *c.* 126 m south of the entrance point into the substation field.
Eutrophic Lakes (FL5)	No	0.15 ha	A eutrophic lake occurs within the southern woodland *c.* 193 m south of T.9.
Reed and Large Sedge Swamp (FS1)	No	0.02 ha	Reed and large sedge swamp occurs south of the River Suir, *c.* 307 m north of T.9.
Mixed Broadleaf / Conifer Woodland (WD2)	No	0.1 ha	A .01 ha woodland made up of Scot's pine and hawthorn *c.* 382 m from T.4.

Fossitt (2000) Habitat Type	Potential EU Annex I Affiliations	Area (ha) or length (m)	Occurrence within proposed project
(Mixed) Conifer Woodland (WD3)	No	0.1 ha	Conifer woodland is present to the south-west. Made up of Japanese larch, sitka spruce and Scot's pine.
Scattered Trees and Parkland (WD5)	No	0.002 ha	This habitat type was recorded on the western side of the southern woodland, c. 126 m from the borrow pit and *c.* 378 m from T.10.
Scrub (WS1)	No	0.25 ha	Scrub was recorded *c*. 260 m and *c*. 311 m from T.6. It was also recorded *c*. 353 m from T.3 and *c*. 165 m from T.5

Non-native plant species

Figure 6. 7provides maps showing the distribution of non-native plant species recorded during surveys.

Table 6. 12provides a list of non-native species recorded, along with the legal status of these species as invasive alien species (IAS), risk ratings, notes on propagation pathways and occurrence within the proposed project.

Snowberry *Symphoricarpos albus* is recorded *c*. 220 m and *c*. 770 m from the proposed substation field entrance along the grid connection route. Cherry laurel *Prunus laurocerаus* is recorded *c*. 560 m from the proposed substation field entrance along the grid connection route. Beech *Fagus sylvatica* and Sycamore *Acer pseudoplatanus* were also recorded in the southern woodland.

As indicated in

Table 6. 12 of the non-native species recorded, cherry laurel and snowberry were the species considered to be most at risk of being spread during the construction phase of the project. These species have the potential for negative impacts on native plants and habitats. No plant species listed under the Third Schedule of the European Communities (Birds and Habitats) Regulations 2011 as 'non-native species subject to restrictions under Regulations 49' were recorded.

Table 6. 12: List of non-native species

Species	Legal status of as Invasive Alien Species - IAS[1]	Risk of impact assessment NBDC[2] & Invasive Species Ireland[3]	Covered in NRA guidance[4]	Propagation pathway Sources of information [2], [5]	Occurrence within the site † Indicates widespread species where distribution was not mapped fully, as the project was not considered as posing a risk of spreading the species during construction works
Sycamore *Acer pseudoplatanus*	None	2. Risk of medium impact 3. Amber listed	No	Winged seeds	† Throughout the proposed project site in southern woodland.
Beech *Fagus sylvatica*	None	2. Not accessed 3. Amber listed	No	Seed	† Throughout the proposed project site in southern woodland.
Cherry laurel *Prunus laurocerаus*	None	2. Risk of high impact 3. Not assessed	Yes	Seed – spread by birds through h droppings.	Noted at one location along the grid connection route.
Snowberry *Symphoricarpos albus*	None	2. Risk of medium impact 3. Amber listed- uncertain risk	No	Vegetative – suckering.	Identified along grid connection route.

2. Impact status based on risk assessments for invasive species in Ireland (Kelly et al. 2013 & O'Flynn et al. 2014).

Kelly, J., O'Flynn, C., and Maguire, C. (2013). Risk analysis and prioritisation for invasive and non-native species in Ireland and Northern Ireland. A report prepared for the Northern Ireland Environment Agency and National Parks and Wildlife Service as part of Invasive Species Ireland. Available online at: https://invasivespeciesireland.com/wp-content/uploads/2013/03/Risk-analysis-and-prioritization-29032012-FINAL.pdf

O'Flynn, C., Kelly, J. & Lysaght, L. (2014). Ireland's invasive species and non-native species – trends in introduction. National Biodiversity Data Centre Series No.2, Ireland. Available online at: http://www.biodiversityireland.ie/wordpress/wp-content/uploads/Trends-Report-2013.pdf

3. Information from Invasive Species Ireland website: https://invasivespeciesireland.com/wp-content/uploads/wp-post-to-pdf-enhanced-cache/1/amber-list-recorded-species.pdf

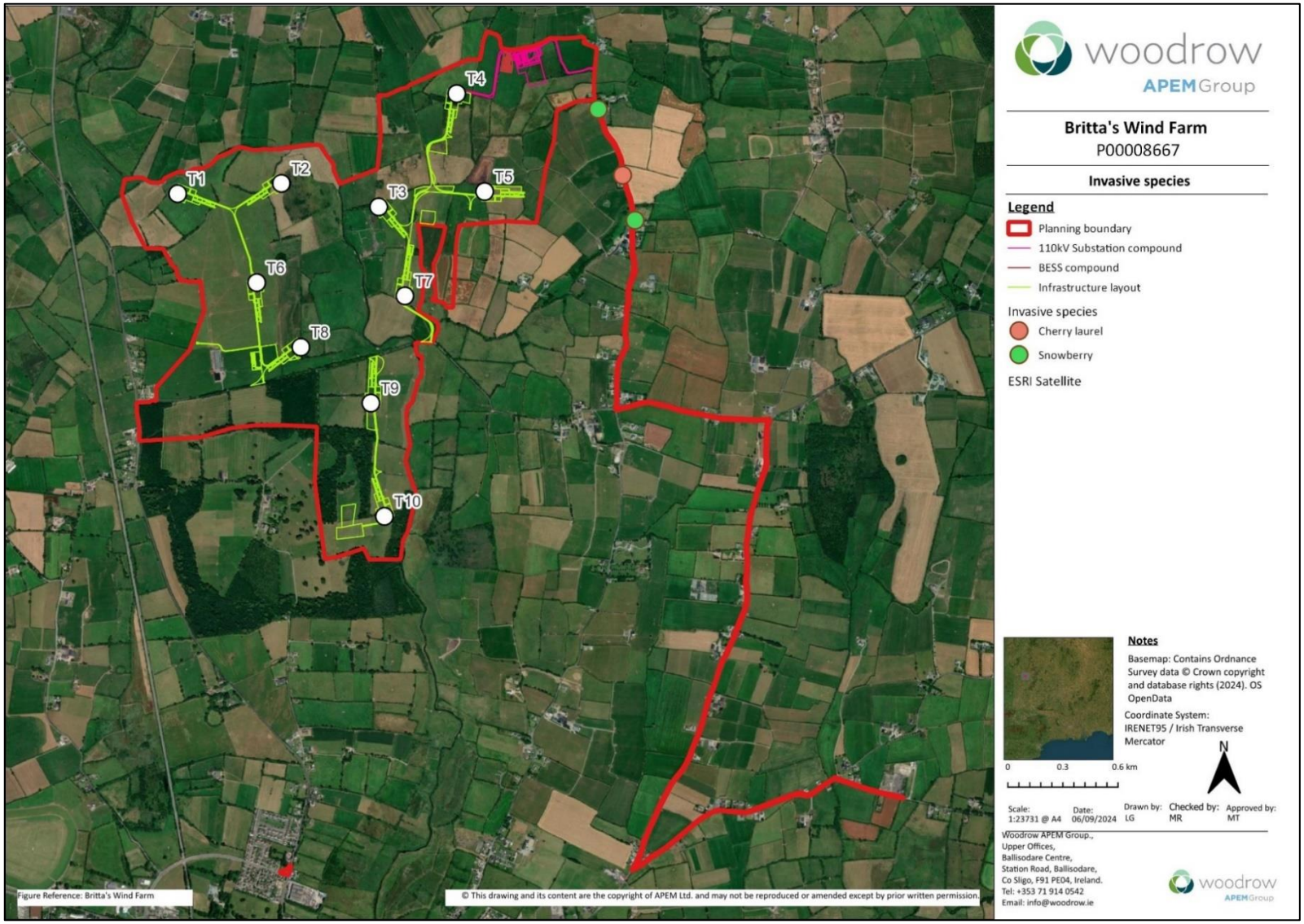

Figure 6. 7: Invasive species

6.3.3.2 Aquatic

The baseline aquatic results for the proposed project are listed in Table 6. 13 and Table 6. 14. Survey locations are shown in Figure 6. 8 Photographs of the survey locations are located in Appendix 6C.

Q-Values

A total of 29 taxa were recorded at the survey locations, ranging from 9-16 taxa per location Refer to Appendix 6C for the full list. Most locations were dominated by Group C taxa, which are tolerant to pollution. The survey sample locations can be seen in Figure 6. 8 identified as "WQ". The Q-value results provided, together with the water quality parameters obtained (e.g. Dissolved Oxygen % saturation), suggest that much of the river network assessed has been impacted to varying degrees by pollution, as well as channel modification and dredging. This was most evident on the main river channel (i.e. the River Suir), particularly at locations WQ1, WQ4 and WQ10, which were characterised by steep banks, depositing habitat, soft substrates and emergent riparian vegetation indicative of nutrient enrichment (e.g. *Sparganium erectum*, *Phragmit*es sp.).

Fish

One of the sample locations on the Rossestown River (WQ7), along with WQ5 on the main river channel, scored higher in the Q-value assessments (Q3-4), and were among the few locations assessed that contained eroding habitat (e.g., riffle, run), cobble/gravel substrates and areas considered suitable for juvenile salmonids. Incidentally, at WQ7, three lamprey ammocoetes were recovered in the kick sample, while a brown trout (*Salmo trutta*) was also recovered in one of the crayfish traps. An adult salmonid (likely trout) was also observed feeding near the surface at WQ5, downstream of the Rossestown Bridge. While Salmon and lamprey species are considered KER's, they are not brought forward for assessment in this report. Refer to the accompanying NIS (Apem, 2024) for assessment on Qualifying Interests which includes these species. Other *Salmo* and fish species are considered a KER and brought forward for assessment of potential significant effects.
Evaluation: Other *Salmo* and fish species are evaluated as being of Local Importance.

White-clawed crayfish

Records of white-clawed crayfish are identified from the desk study, for the 10-km covering the proposed project site [S16], with some records being recorded at the Rossestown bridge which is within the proposed project site between T.7 and T.9. However, no crayfish were recovered during the baited trap surveys, nor were there any signs of crayfish predation along the riverbanks (e.g., in otter spraint). Crayfish plague, caused by the water mould *Aphanomyces astaci*, is present within the River Suir catchment (Marine Institute, 2023) and may partially explain the absence of crayfish in the section of river assessed. The locations of these surveys ("WCC" in the map) can be seen in Figure 6. 8. Additionally, much of the main channel appears unsuitable for crayfish due to siltation and historical drainage works. Therefore, white-clawed crayfish can be objectively ruled out as a KE and not brought forward for assessment. Refer to the accompanying NIS (Apem, 2024) for assessment on Qualifying Interests which includes this species.
Evaluation: White-clawed crayfish are evaluated as being of National Importance.

Freshwater pearl mussel

As the proposed project is within the River Suir catchment, and there is a known population of freshwater pearl mussel (FPM) in the River Suir catchment, the species has assessed during desk study for potential to be present. However, FPM are present within the Clodiagh [Portlaw] river and the Clodiagh subcatchment, upstream of the main channel of the lower reaches of the Suir. There is no downstream hydrological connection between the location of the population and the proposed project. Therefore, FPM can be objectively ruled out as a KER requiring no further assessment.

Evaluation: Freshwater pearl mussel are evaluated as being of National Importance.

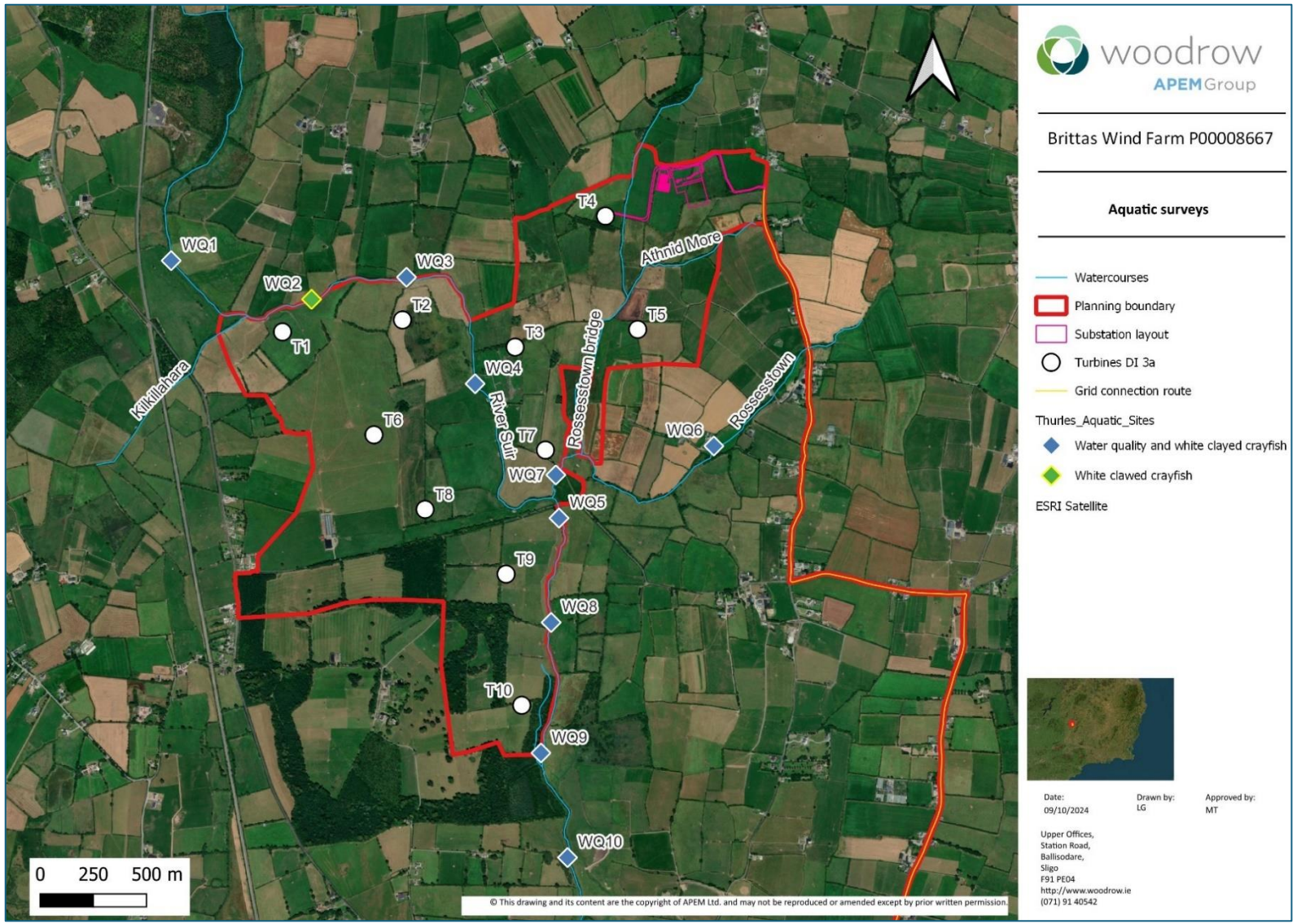

Figure 6. 8: Aquatics survey locations

Table 6. 13 Water quality results: Q-values, WFD status & physio-chemical readings

Water Quality Site	WQ1	WQ2	WQ3	WQ4	WQ5	WQ6	WQ7	WQ8	WQ9	WQ10
Date surveyed	01/09/2022	01/09/2022	01/09/2022	01/09/2022	01/09/2022	08/09/2022	08/09/2022	07/09/2022	07/09/2022	08/09/2022
River	Suir	Suir	Suir	Suir	Suir	Rossestown	Rossestown	Suir	Suir	Suir
Stream order	4th Order	4th Order	4th Order	4th Order	4th Order	3rd Order	3rd Order	4th Order	4th Order	4th Order
EPA code	16S02	16S02	16S02	16S02	16S02	16R01	16R01	16S02	16S02	16S02
Q-Value	Q3	-	Q3-4	Q3	Q3-4	Q3	Q3-4	Q3-4	Q3	Q3
WFD Class	C	-	B	C	B	C	B	B	C	C
WFD Status	Poor	-	Moderate	Poor	Moderate	Poor	Moderate	Moderate	Poor	Poor
Dissolved O_2 %	57.8	60.3	70.3	60.1	98.2	85.4	73.6	103.8	62.5	49.4
Dissolved O_2 mg/l	5.75	5.87	6.79	5.82	9.60	8.42	7.20	9.95	5.99	4.83
pH.	7.99	7.79	7.93	7.87	8.28	8.33	8.15	7.90	7.90	7.60
Conductivity µs/cm	753	821	823	810	790	791	825	656	708	677
Turbidity NTU	0.0	0.0	6.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Temp °C	15.7	16.6	17.0	16.9	16.4	15.1	15.6	16.3	16.3	15.6

Table 6. 14 Salmon/lamprey habitat suitability results

Salmon suitability sites	A	B	C
Date surveyed	Oct-2022	Oct-2022	Oct-2022
River/stream name	River Suir	River Suir	Rossestown
River sub-basin	Suir_050	Suir_050	Suir_050
River/Stream order	4th Order	4th Order	3rd Order
EPA code	16S02	16S02	16R01
Salmon suitability	**Yes**	**Yes**	**Yes**
Substrate	Gravel	Gravel	Gravel
Description	Potential for salmon and lamprey spawning.	Potential holding for adult and juvenile salmon and lamprey.	Potential for salmon and lamprey spawning.
Anthropogenic impacts	Agriculture	Agriculture	Agriculture
Flow	Slow	Slow	Slow

6.3.3.3 Other taxa

This section covers all other relevant taxa surveys which have potential to be present within the proposed project. Refer to Figure 6. 9for locations of species identified.

Invertebrates

Habitat suitability assessments in the field, combined with information on species distribution compiled during the desk-based study, showed that the site was considered likely to support protected invertebrate species.

Initial scoping surveys for the proposed project revealed that suitable habitat types were present for *Odonata* (dragonfly and damselfly), as well as marsh fritillary.

Marsh fritillary is the only invertebrate species occurring in Ireland listed on Annex II of the Habitats Directive that requires EU member states to designate SACs to protect this species and monitor the status of the national population. There are no designated sites for marsh fritillary close to the proposed project. During targeted marsh fritillary surveys conducted in September 2022, there were both devil's bit scabious plants *Succisa pratensis* recorded and marsh fritillary webs to the southeastern corner outside the red-line boundary. In Ireland the occurrence of this species is largely restricted to locations where the larval foodplant devil's-bit scabious occurs (Harding, 2008[18] and Hickin, 1992[19]). Devil's bit scabious was found within the proposed project near T.2, T.4 and beside the substation. While there are limited suitable habitat for marsh fritillary, it cannot be objectively ruled out as a KER and will be brought forward for assessment.

Evaluation: Marsh fritillary are evaluated as being of National Importance.

Due to the size of the study area and the extent of suitable habitat within and outside the proposed project, no species-specific surveys were conducted for *Odonata*. Therefore, *Odonata* could be objectively ruled out as a KER requiring further assessment.

18 Harding, J.M. (2008). Discovering Irish Butterflies and their Habitats (accessed 16/08/2024).
19 Hickin, N. (1992). *The Butterflies of Ireland: A Field Guide*. Robert Rinehart, Cork (accessed 16/08/2024)

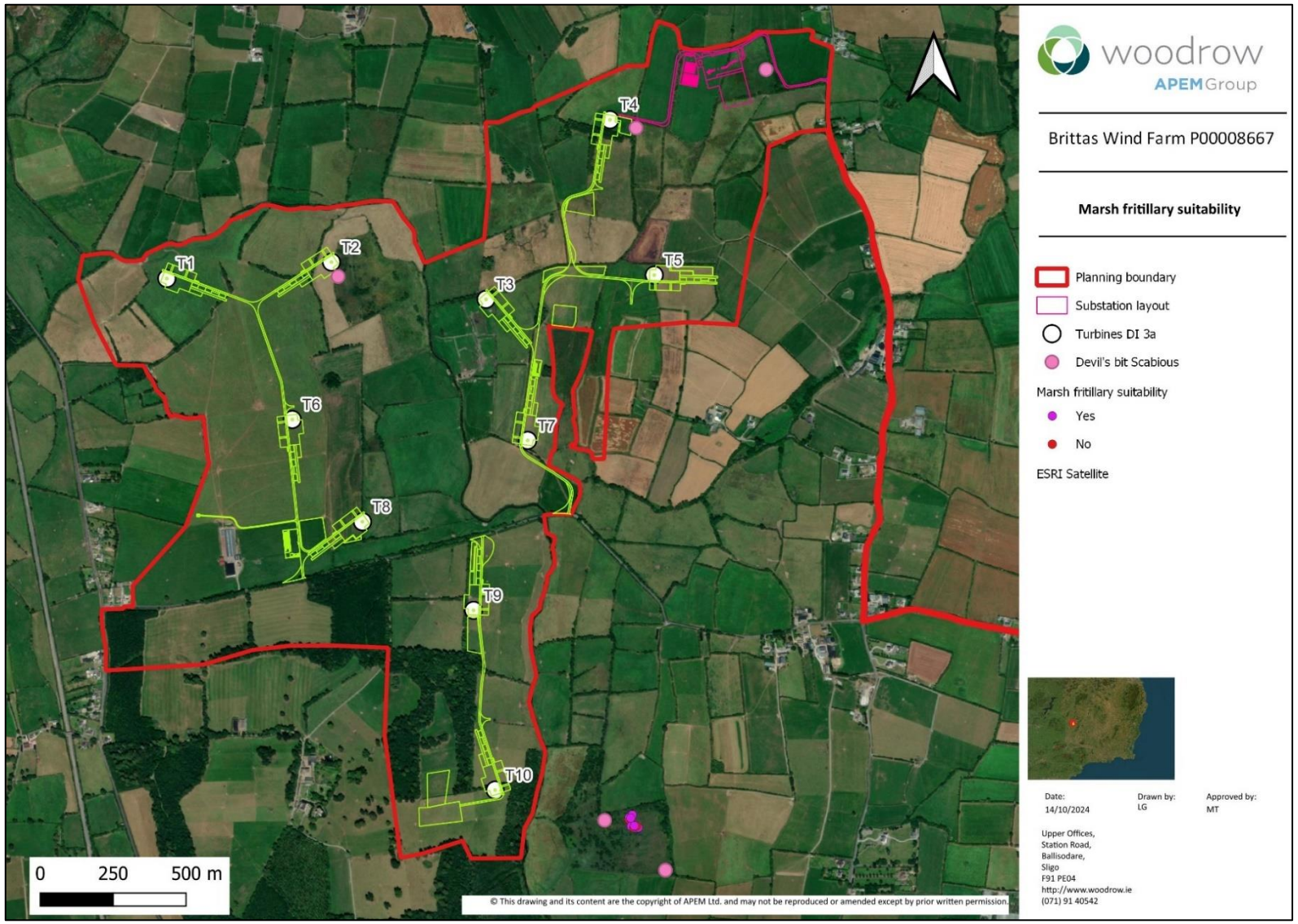

Figure 6. 9: Marsh fritillary

Amphibians & reptiles

There are no NBDC/NPWS records of smooth newt in the proposed project site (see Meehan, 2013). However, this species is notably under recorded and often occurs where suitable ponds or other standing water occurs. There were some areas identified as suitable newt habitat within the proposed project, with multiple drains with standing water. One such area was identified to the east of T.9 (*c.* 450 m). Another area with suitable habitat is to the south of T.4 (*c.* 360 m) and to the northwest of T.5 (c. 240 m). In addition, the proposed project largely avoids direct impacts to water features. There were no newts observed during the site scoping, or newt habitat assessment surveys.

Only one species of amphibian, common frog, has the potential to occur within the proposed project site due to suitable damp habitats. Two frogs were recorded to the southeast of T.10 which is now outside of the planning boundary in a marshy grassland habitat. Frogs are often associated with less shaded vegetation along drains and occasionally within wetter patches of fields of improved grassland. However, based on the walkover surveys, frogs were not identified as being common or widespread throughout the proposed project. Suitable spawning sites for frogs and especially newts within the proposed project site were considered very limited and through avoidance of potential habitat, the proposed project was considered highly unlikely to have a significant impact on any amphibian populations. Therefore, these amphibian species can be objectively ruled out as KERs requiring no further assessment.

No common lizards were encountered during any site visits. The closest record for this species is c. 17 km southeast, with records being relatively sparse for the region and typically associated with areas of raised bog. The proposed project site was assessed as unsuitable for common lizard, due to the intensive nature of agricultural activities which are adjacent to forestry plantations and woodlands.

Overall, the proposed project was considered unlikely to significantly impact on any common lizard populations or potentially suitable habitats for this species, due to lack of habitat suitability. Therefore, common lizard can be objectively ruled out as a KER requiring no further assessment.

Invasive species

There was a rabbit burrow identified to the east of T.2 (*c*. 415 m). The European rabbit *Oryctolagus cuniculus* are classed as being of medium impact on the invasive species list. Their conservation status is now near threatened, and NBDC maps shows a decline in numbers between maps pre-2017 and 2017-2020.

6.3.3.4 Protected mammals – terrestrial, arboreal and aquatic

A map showing the proposed infrastructure in relation to the location of resting places for protected mammal species (considered as KERs) is provided is Figure 6. 10 and Figure 6. 11. Several native species of mammals afforded protection under Section 23 of the Wildlife Act (1976) as amended 2000 and listed on the Fifth Schedule were recorded within the proposed development, including otter, badger, pine marten and Irish hare. Otter is also listed in Annex II of the Habitats Directive and there is a downstream SAC (Lower River Suir SAC), where otter is listed as a Qualifying Interest (QI). No evidence of red squirrel was recorded within the proposed project, although the older growth woodlands in the south were noted as suitable habitat.

No evidence of the non-native greater white-toothed shrew *Crocidura russula* was observed (often found dead in spring), although NBDC records for S16 show it has been recorded in the wider area (refer to Appendix 6D). Other protected mammal species not recorded that have the potential to occur include Irish stoat *Mustela erminea hibernica* and hedgehog *Erinaceus europaeus*. Other mammal species recorded included foxes, whose presence in the proposed project were common. These species are not listed as protected mammals on the Fifth Schedule.

Otter

Otters are a Qualifying Interest (QI) of the downstream of the Lower River Suir SAC which is hydrologically connected to the River Suir channel running through the proposed project site. Otters are reported as occurring throughout the SAC (NPWS, 2014)[20]. As shown in Figure 6. 10, otter signs (paw prints, a slide and lay-up couches) were recorded in several locations along drainage channels within the proposed project. It is considered that otter utilise the network of drains and River Suir channel to commute through the area. There were two slides recorded beside each other in the field in the most southeastern section close to T.10. There was also otter spraint recorded in the proposed substation field. Surveys along the grid connection route also confirmed the presence of otters, with slides, prints, mammal tracks and possible otter spraint recorded. There was a potential holt with two connected entrances and slides also recorded along the grid connection route. Otters are considered KER's, and they are brought forward for assessment in this report. Refer to the accompanying NIS (Apem, 2024) for assessment on Qualifying Interests otter.

Badger

Setts, trails and feeding signs of badgers were recorded during site scoping surveys confirming their presence within the proposed project site. One such sett was identified to the northeast of T.6 (*c*. 100 m). This sett had up to five entrances identified, however, it was recorded as being inactive. There was another sett identified to the east of the T.9 (c. 650 m east, outside of the red-line boundary). This sett was identified as being a possible outlier sett, with cobwebs present suggesting it may be no longer actively used. A latrine and snuffle holes were observed to the north of T.2 (*c*. 70 m), an active sett is identified in the hedgerow immediately west of T.9. There were multiple trails observed in the fields surrounding T.6 and T.8, which also had suitable habitat suggesting the presence of another sett, however this was not fully confirmed. There is another possible sett within dense gorse vegetation at the "T"-shaped treeline at T.4 in the northeast section of the proposed project site. There were trails recorded around this area too leading down to the drain. There was a fresh sett dug out within the woodland south of the proposed borrow pit area. There was another entrance accompanying this freshly dug entrance, however these two entrances are outside of the red-line boundary. Trails were observed in the south woodland, along the River Suir, and through the fields surrounding T.8. There were trails recorded throughout the proposed project site.

There was evidence of badgers feeding within the proposed project site. There was one fresh feeding sign identified along the same hedgerow as the outlier sett identified to the east of T.9 (outside of the red-line boundary). There was also evidence of badgers using the southern woodland to forage, with snuffle holes observed. Given that the presence of badgers is evident within the proposed project, and some presence is within close proximity to the proposed turbine locations, without mitigation measures, it is likely to have significant effects on this species. Therefore, badgers are considered a KER and brought forward for assessment of potential significant effects. The locations of the features described above are mapped in Figure 6. 11

Evaluation: Badger are evaluated as being of County Importance.

20 NPWS (2023). Site synopsis: Lower River Suir SAC [0002137]. National Park & Wildlife Service (accessed 16/08/2024).

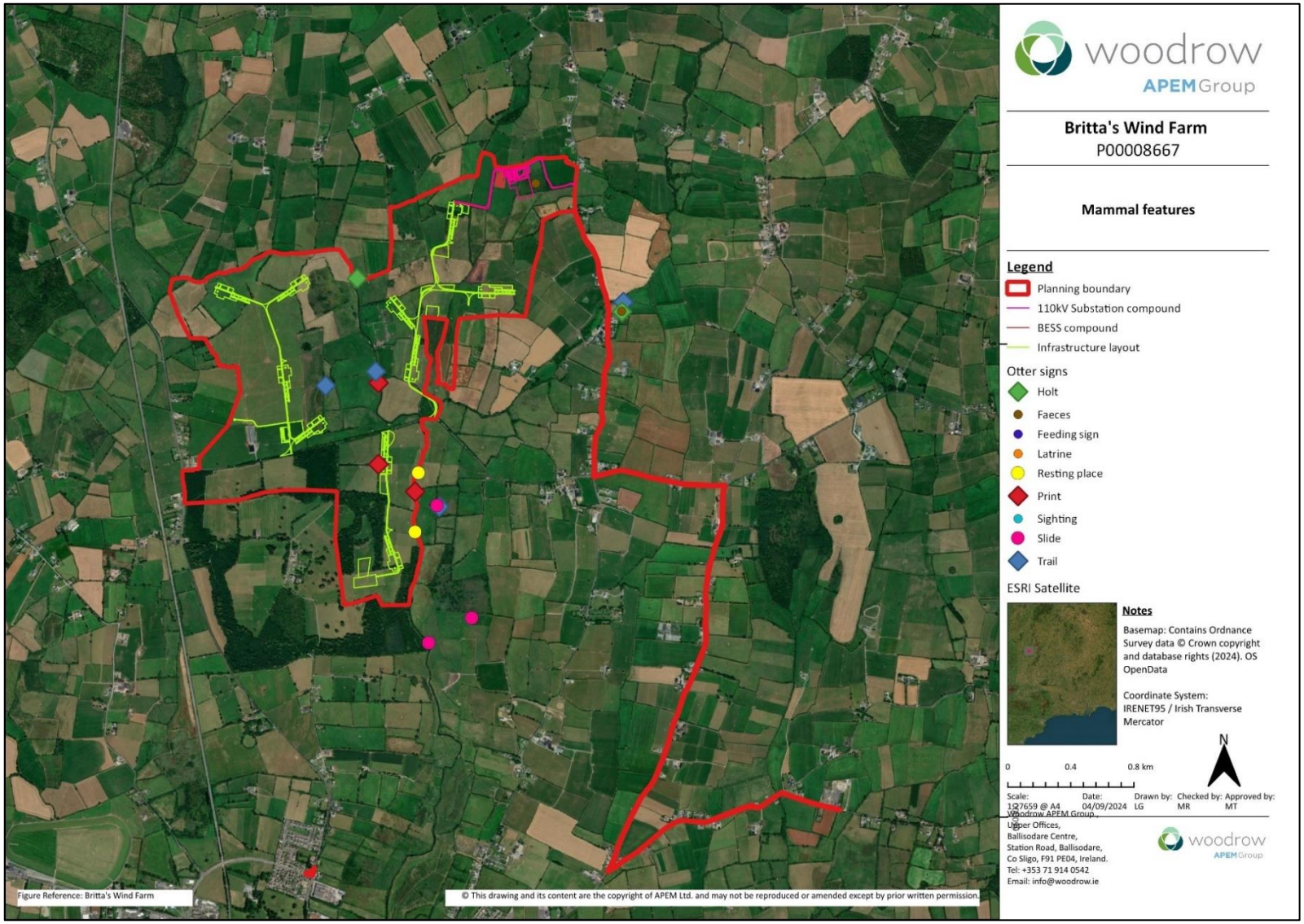

Figure 6. 10: Otter signs

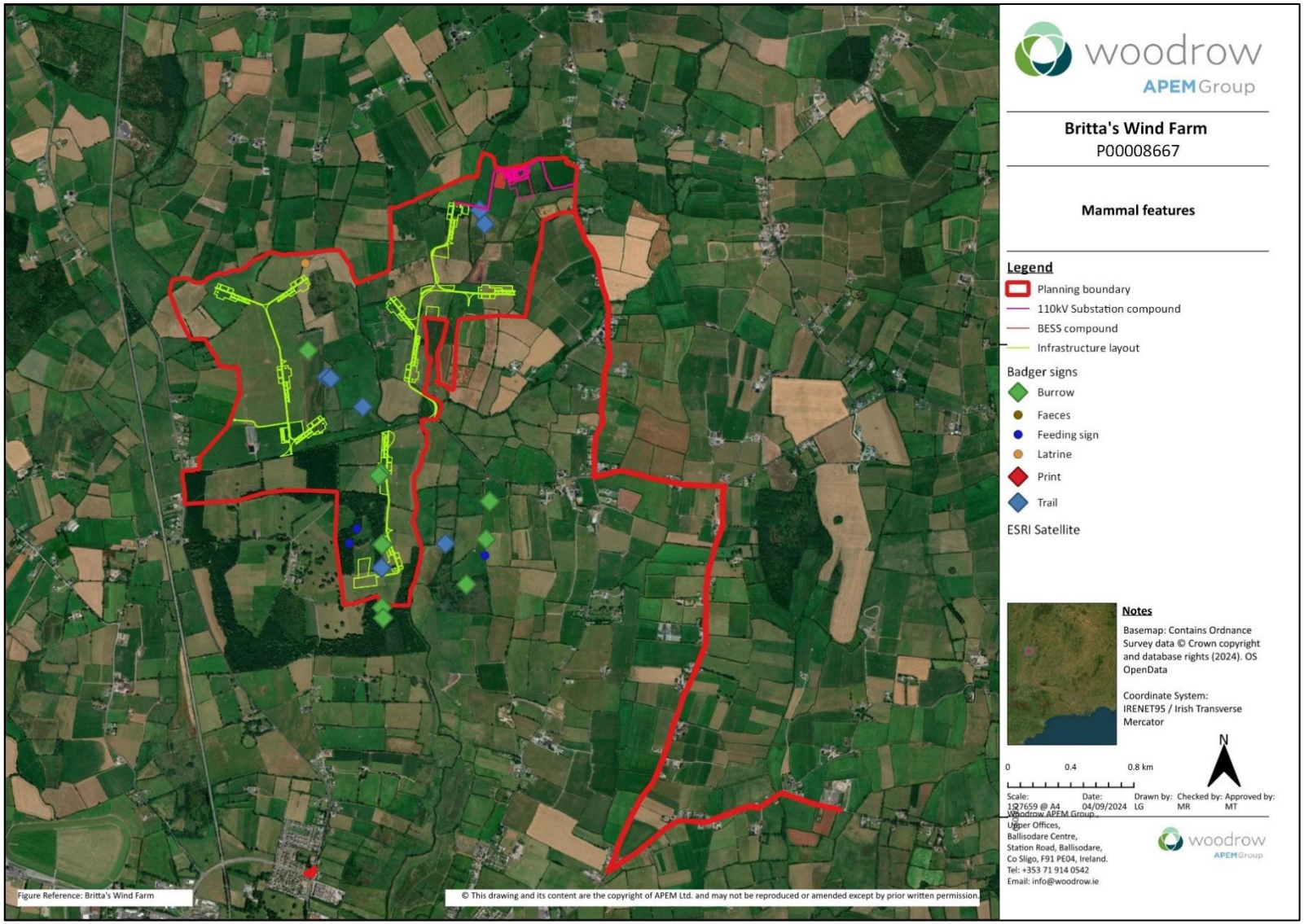

Figure 6. 11: Badger signs

Pine marten

There was evidence of pine marten activity (fresh scats) within the southern woodlands of the proposed project site. The first scat was recorded as very fresh, while the second scat found was recorded to be a possible territory marker. The old growth woodland in the south of the proposed project has the potential to provide natural tree cavities for dens; however, none were located in the areas surveyed. No suitable den sites were identified within the proposed works corridor for the proposed infrastructure, which largely avoids the old growth woodland with veteran trees capable of supporting pine marten dens. Pine marten are considered a KER and brought forward for assessment of potential significant effects.

Evaluation: Pine martin are evaluated as being of Local Importance.

Irish hare

There was one sighting of an Irish hare recorded within the proposed project site during a bird vantage point (VP) survey, the hare was observed and considered likely to be breeding in the area. While hares are protected under the Wildlife Act (1976) as amended (2000), it is also cited in the Act as a quarry species that may be hunted in season. Irish hare are considered a KER and brought forward for assessment of potential significant effects.

Evaluation: Irish Hare are evaluated as being of Local Importance.

Red squirrel

Red squirrels are an arboreal species reliant on woodland habitats. Although existing records for red squirrel include the 10km grid square S16 (last recorded sighting 1969), there were no sightings, or any evidence of this species recorded during site scoping surveys. During multi-disciplinary surveys woodlands within the proposed project site were searched for signs/evidence of red squirrel, e.g. gnawed pinecones and dreys, however no evidence of this species was detected. Therefore, red squirrel could be objectively ruled out as a KER requiring no further assessment.

6.3.3.5 Bats

The desk-based study included reviewing distances from closest Natura 2000 sites designated for bats (only bat SACs in Ireland are for lesser horseshoe bat *Rhinolophus hipposideros*)- the area of interest (in Co. Tipperary) is outside the range for lesser horseshoe bat in Ireland.

The bat field surveys at the proposed project site included the identification of c (PRFs), emergence/re-entry surveys at potential roosts, walked transects and the use of static bat detectors between May and October 2022, and a continuously detector recording at height in 2023. Data collected provides robust information to facilitate an understanding of how the local bat population utilise the proposed project site. This section summarises the main findings of bat surveys conducted in 2022 and 2023. The following reproduces the baseline conditions detailed in the bat report- see Appendix 6B.

Habitat availability and roost suitability for bats

The proposed project encompasses a diverse habitat, including improved grassland, fen, old mature deciduous woodland and commercial woodland (refer to Section 0). Bat use of the proposed project site is primarily linked to specific habitat features such as linear elements including tree lines, hedgerows, and water courses such as streams and lakes.

Some of the most important features within the proposed project site for bats include mature tree lines, woodlands and hedgerows. An essential mature woodland for the bat populations is situated south of turbine T.8, west of T.9 and within the T.10 300 m buffer to the northwest and southeast areas. This tree line comprises multiple trees with low, moderate and high suitability for potential roost features. The importance of preserving

these features is shown by the significant richness and activity of bats detected, during all seasons. Turbine T.4 is situated at the "T"-shaped treeline in the northeast of the site. This "T" treeline is made up of Scot's pine with an understorey of hawthorn and ash. There is both dead and live ash trees present here, both of which are valuable for foraging, commuting and roosting bats. Hedgerows throughout the site play a role in habitat connectivity for rarer slow-flight bat species, such as brown long-eared bats and some *Myotis* species.

Rivers and streams are also important features within the proposed project site for bats. The River Suir flows north to south through the proposed project site. The flood plain is low lying at approximately 100 m above mean sea level and is subject to flooding in several locations, which are associated with a range of wet grassland, hedgerows, swamp areas, marsh, and fens. The river flows within the 300 m buffers of T.1, T.2, T.3, T.7, T.9 and T.10. Water bodies like these are commonly utilized by bats for drinking water and foraging on emerging arthropods. The high activity and bat richness noted during the static surveys, particularly D.07 emphasise their important role in supporting the local bat populations. Although no data has been collected in these specific areas at T.2 and T.3, it is conceivable that local bats may utilise it in a manner like the observed behaviour in D.01 (see Figure 6. 14).

The Bat Conservation Ireland (BCI) data identified a confirmed whiskered bat roost along with a *Myotis* species within 10 km of this proposed project site. There were ad hoc and transect records of common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, brown long-eared bat, Daubenton's bat, and *Myotis* species within 10 km of the proposed project site. Maps provided in Figure 6. 12 and Figure 6. 13, show the distribution of potential roost features (PRFs) classified low to high throughout the 300 m turbine search buffer.

The semi-natural woodland in the southern section of the proposed project site contains many suitable roosts and due to its size and complexity, has been treated as a "roost resource" as a result. This area is of importance to the local bat population (Table 6. 15) provides a summary of foraging and roosting features for each proposed turbine location, the substation and along grid connection routes. and show where the features are within the proposed project site. A full description of each feature identified can be found in Appendix 6B.

As detailed in Appendix 6B (Section 3.3.1), emergence/re-entry surveys at potential roosts sites:

- Confirmed a common pipistrelle and soprano pipistrelle roost in the stone bridge on the River Suir, which is on the 300 m buffer of T.7

No potentially suitable hibernation roosts were identified within the 300 m turbine search buffer during the hibernation survey on the 15th February 2022.

Table 6. 15: Summary of bat habitat and roost suitability

Turbine Location	Foraging features and habitat assessment within c.300m turbine buffer	Roost potential c. 300m turbine buffer (low-moderate or higher suitability)
T.1	This turbine is to be located in open grassland, with hedgerows (hawthorn and scrub) within the 300 m buffer. The River Suir is also within this buffer. These hedgerows and the river create high foraging and commuting potential within this buffer.	There are potential roost features within the 300 m buffer (F.3 is a stress fracture of moderate potential and F.8 is young hawthorn of low potential, see Figure 6. 12 for locations). There are also some potential roost features just outside the 300 m buffer. F.1 is mature and veteran trees of moderate roosting potential to the north of the buffer. F.2 is hawthorn with stranding hollow dead wood of moderate potential, F.4 is an ash tree with welds and rot branch of low potential and F.5 has a tear out of moderate roosting potential to the west of the buffer. F.6 is a low potential roosting hedgerow and F.7 is low roosting potential treeline to the south

Turbine Location	Foraging features and habitat assessment within c.300m turbine buffer	Roost potential c. 300m turbine buffer (low-moderate or higher suitability)
T.2	Turbine T.2 is to be located in improved grassland. The River Suir passing along the east and north of the site within this turbine's 300 m buffer. There are also hedgerows providing foraging and commuting routes.	There is one potential roosting feature noted within the vicinity of this detector location F.13). There are also two potential roost features just outside but still within close proximity to the 300 m buffer (F.11 and F.12)
T.3	This turbine is to be located in an area of improved grassland. There are hedgerows within the 300 m buffer and the River Suir passing through the west of the buffer	There are four potential roosting features noted as within the vicinity of this turbine location (F.33, F.34, F.35 and F.36).
T.4	The turbine is to be located north of the "T"-shaped treeline. It is an area of improved grassland with hedgerows bordering the field boundaries.	There are ten potential roosting features noted as within the vicinity of this turbine location (F.19, F.20, F.21, F.22, F.23, F.24, F.25, F.26, F.27, F.28). There are also 6 potential roosting features just outside but still within close proximity to the 300 m buffer (F.14, F.15, F.16, F.17, F.18 and F.29)
T.5	This turbine is to be located on improved grassland in the northeast section of the proposed project.	There are no potential roosting features noted as within the vicinity of this turbine location
T.6	This turbine is to be located in the western section of the proposed project site in improved grassland. The temporary met mast was also erected here where a detector was placed to gather data at height (50 m), which showed Leisler's bat activity.	There are four potential roosting features identified within this 300 m buffer (F.9, F.10, F.11 and F.12)
T.7	This turbine is to be located in improved grassland. The River Suir passes through the southern section and western section of the 300 m buffer providing foraging and commuting potential. There was high Leisler's bat activity recorded here in autumn 2022 on two nights.	There are three potential roosting features identified within this 300 m buffer (F.37, F.148 and F.149). There is also one potential roosting feature just outside but still within close proximity to the 300 m buffer (F.38)
T.8	This turbine is to be located in an area of improved grassland, with some of the broadleaf plantation within the southern area of the 300 m buffer	There are two potential roosting features identified within this 300 m buffer (F.31 and F.142)
T.9	This turbine is to be located in improved grassland. There are hedgerows connecting this area to the woodlands to the west and south, creating high foraging and commuting potential.	There are 24 potential roosting features identified within this 300 m buffer (F.39, F.40, F.115, F.116, F.117, F.118, F.119, F.120, F.121, F.122, F.123, F.124, F.125, F.126, F.127, F.128, F.129, F.130, F.131, F.132, F.133, F.134, F.141 and F.142). There is also one potential roosting just outside but still within close proximity to the 300 m buffer (F.41)
T.10	This turbine is to be located in the most southerly location placed between the two fragmented woodlands connected by a hedgerow..	There are 45 potential roosting features identified within this 300 m buffer (F.46, F.50, F.51, F.52, F.53, F.54, F.55, F.56, F.57, F.58, F.59, F.60, F.61, F.62, F.63, F.64, F.65, F.66, F.67, F.68, F.69, F.70, F.71, F.72. F.73, F.74, F.75, F.76, F.77, F.78, F.79, F.80, F.81, F.89, F.90, F.91, F.92, F.93, F.94, F.95, F.96, F.97, F.98, F.99 and F.100). There are many more potential roosting features just outside this 300 m buffer within the woodland.

Turbine Location	Foraging features and habitat assessment within c.300m turbine buffer	Roost potential c. 300m turbine buffer (low-moderate or higher suitability)
Substation	The footprint is situated within an improved grassland field, encompassed by a treeline predominantly comprised of ash and birch with some small pockets of alder. The ash trees were noted to have ash dieback.	The field has negligible roosting potential, however, within 300 meters to the east of the footprint, there are hedgerows and treelines bordering the fields with potential bat roosting features..
Grid connection	The proposed grid connection route will connect to the nearby Thurles 110kV substation located c. 6.1 km southeast of the northeastern section of the proposed project site. The entire grid connection route is proposed along existing public roads.	There is one tree of moderate roosting potential on the Cassestown road (L4120) along the grid connection route. There were two high roosting potential trees identified on the Furze road (L8014). There was also one derelict house of high roosting potential identified on the Loughtagella Road just before the Furze Road turn off (L4120/L8014). There is a bridge just before the existing Thurles 110kV substation turn-off which was classed as moderate roosting potential. There was also one field to the west of the Thurles 110kV substation, which was flooded, creating ideal foraging habitat for bats.
Turbine delivery route	The Turbine Delivery Route (TDR) runs from the Port of Foynes in County Limerick to the Wind Farm Site via the national, regional and local road network. Proposed works associated with the Turbine Delivery Route are located in the Townlands of Brittas and Brittas Road, County Tipperary. The Turbine Delivery Route is identified in Chapter 2 Figure 2-15. The small section of land in Thurles town needed for the accommodation works for the Turbine Delivery is located in the townland of Brittasroad.	There were three beech trees classed as PRF-Ms on the Rossestown Road. There is also a hazel of PRF-M classification on the Rossesstown Road.

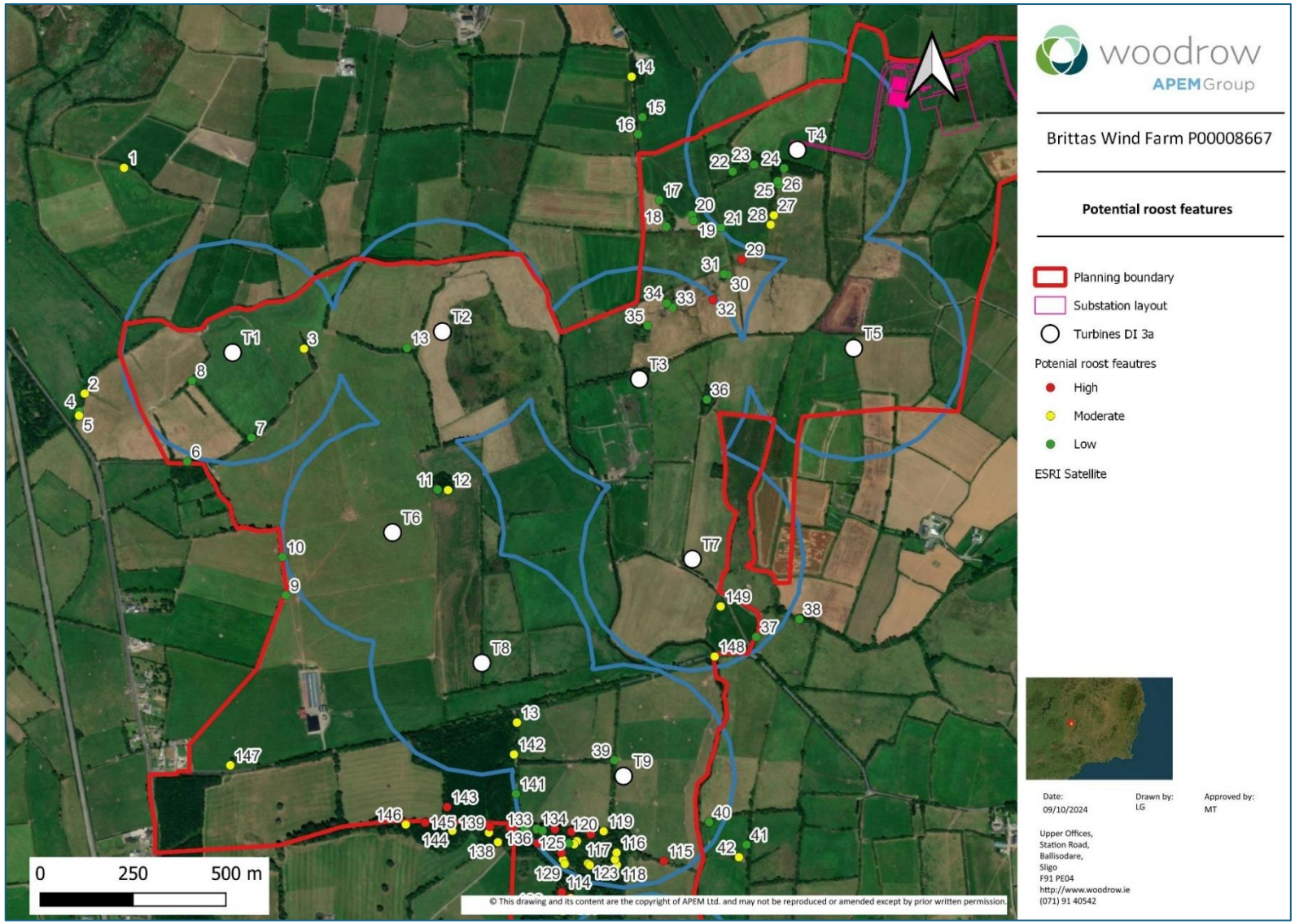

Figure 6. 12: Potential roost features in the northern section of the proposed project

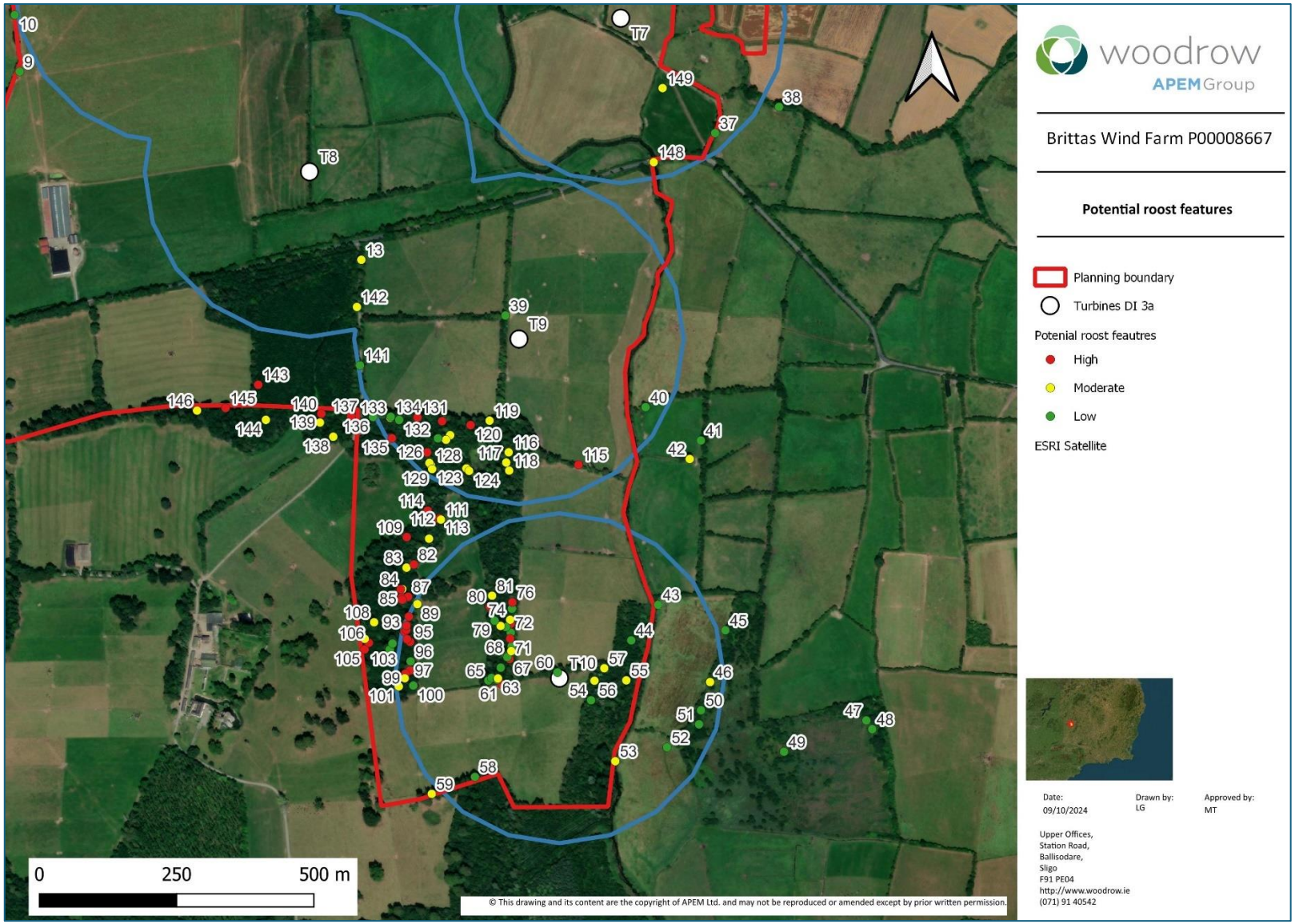

Figure 6. 13: Potential roost features in the southern section of the proposed project

Species activity within the proposed project site

During the 2022 seasons, bat activity was recorded within the survey area for a minimum of five species, including common pipistrelle, soprano pipistrelle, Leisler's bat, Myotis species, brown long-eared bat, and Nathusius' pipistrelle.

Most of the bat activity was attributed to soprano pipistrelle (35.4%), common pipistrelle (34.8%), and Leisler's bat (26.7%). These three species were recorded during all acoustic surveys performed within the site. All the remaining species accounted together for 2.9% of the bat activity on the site. Leisler's bats, common pipistrelles and soprano pipistrelles showed high activity in 2022 spring and summer survey seasons while only common pipistrelles showed high activity during the autumn survey season.

The following subsections provide accounts for the species recorded, giving details of any seasonal or distributional patterns that emerged. Note that "D" prefix refers to deployment location and do not necessarily translate to turbine location, which are referred to with the prefix "T" (see Figure 6. 14 for a map showing deployment locations in relation to the proposed turbine locations). Refer to Appendix 6B (Section 3.5) for a full summary of survey data collected from static deployments.

Pipistrelle species

Common and soprano pipistrelles exhibited consistent presence and activity across the entire survey area, during all deployments at every location in 2022. They were also recorded during the 2023 detector at height, each having accounted for 5% of the overall activity. In contrast, the presence and activity of Nathusius' pipistrelle were deemed residual, as evidenced by minimal activity, with only four bat passes recorded.

Soprano pipistrelle

Soprano pipistrelle were overall the most active species across the site, with a total 15,956 bat passes recorded, and were more active during spring (Table 6. 16). This species showed high activity at D.05, D.06 and D.07 in spring, and D.05 and D.07 in summer. There were no high activity levels in autumn, however, D.07 recorded moderate activity during the autumn season, with the rest of the season being of low activity (Table 6. 16). This species was also the most active during the transect surveys in 2022, which covered areas of commercial broadleaf woodlands, with high foraging and commuting potential. D.07 was a common place that showed high activity throughout the surveys for soprano pipistrelles. This detector was located on the edge of an improved grassland that is adjacent to the fen, with good connectivity to the adjoining areas and River Suir by the extensive network of treelines/hedgerows. The riparian habitat and good connectivity, being of moderate foraging and commuting potential can explain the high levels of activity for this area. D.05 was another common place which showed high activity in both spring and summer. This detector was placed on a feature along a broadleaf plantation and improved grassland just outside the 300 m buffer search area of the current T.9 location. Soprano pipistrelles accounted for 5% of passes, out of a total of 139 passes, during the 2023 permanent detector at height deployment. Soprano pipistrelle are considered a KER and brought forward for assessment of potential significant effects.

Evaluation: Soprano pipistrelles are evaluated as being of Local Importance.

Common pipistrelle

Overall, common pipistrelles were the second most active species across the site, with a total 15,680 bat passes recorded, and were more active during spring (Table 6. 16). This species showed high activity at D.05, D.06, D.070 and D.08 in spring, and D.07 in summer and autumn. This species exhibited high activity at D.07 during summer and again at D.07 during autumn (Table 6. 16). Just like the soprano pipistrelle, D.07 is a place of high activity for this species. This species is a "flexible species" in terms of favourable habitat suitability and foraging/commuting areas as they can be found foraging in a various habitats (EUROBATS, 2019). This adaptability can explain the high

activity levels at D.07 for each season. The high activity levels at D.05, D.06 and D.08 can also be explained, as they are located within broadleaf woodland in the south of the site and also, adjacent to the River Suir, providing high foraging and commuting potential for this species. Similarly, to the soprano pipistrelle, they also accounted for 5% of bat passes recorded during the 2023 deployment at height. Common pipistrelle are considered a KER and brought forward for assessment of potential significant effects.

Evaluation: Common pipistrelles are evaluated as being of Local Importance.

Nathusius' pipistrelle

Nathusius' pipistrelle activity was very low, having recorded only four passes during the surveys conducted (once in summer at D.10, twice at D.03 in autumn and once at D.07 in autumn, with each of the passes recorded on separate nights) (Table 6. 16). According to Lundy *et al.* (2010), Nathusius' pipistrelles may be experiencing an expansion in their range due to increased availability of suitable habitats throughout Europe. The species' distribution is influenced by a positive association with high average minimum temperatures, urbanization, waterbodies, and the absence of peat/heathland and woodland, in descending order of importance. This can be seen during the BCI Car-Based Monitoring survey results throughout Northern Ireland. Nathusius' pipistrelles were absent from this survey in 2008. There were three records in 2009, and it has been recorded each year since then (Clarke, *et al.* (2004)).

Despite its potential range expansion, the presence and activity of species at the proposed project site are considered residual. While there are only low accounts of this species being present within the proposed project site, the species are classed as a high risk with regards to potential collisions (NatureScot, 2021 and NIEA, 2024), therefore, Nathusius' pipistrelle are considered a KER and brought forward for assessment of potential significant effects.

Evaluation: Nathusius' pipistrelles are evaluated as being of National Importance.

Leisler's bat

Leisler's bat were overall the third most active species across the site, with a total 12,006 bat passes recorded (Table 6. 16). This species showed high activity at D.04 in spring and D.07 in summer during the 2022 static surveys. They also showed moderate activity at D.01, D.02, D.05, D.07, D.08 and D.09 in spring and at D.09 in autumn. They were also recorded at H.1 during the 2023 permanent static at height deployment. In autumn, D.09 showed moderate activity, specifically on two nights. Just like the soprano pipistrelle and common pipistrelles, Leisler's bats also showed high activity at D.07 in summer. Leisler's bats will frequently fly at heights greater than other species (Carlin and Mitchell-Jones, 2009) and are also found to frequently fly in open areas (NatureScot, 2023) generally increasing their risk of turbine collision. Leisler's bats were the most active species during the permanent detector at height 2023 deployment, having accounted for 89% of the total passes (125 passes). Comparing this data to the closest detector, D.02, in the 2022 deployment, there was moderate activity during spring. It can be assumed that there is potential risk of collision for this species if commuting between T.1 and T.6. Leisler's bat are considered a KER and brought forward for assessment of potential significant effects.

Evaluation: Leisler's bats are evaluated as being of Local Importance.

Myotis species

The *Myotis* species group was the fourth most active across the site, with a total 1,193 bat passes recorded (Table 6. 16). Overall activity of this species group was low at all locations during the three 2022 deployment seasons. There were no recordings of species of this group during the permanent detector at height 2023 deployment. Given the low numbers recorded, it could be assumed that the Natterer's bats population roosting at the Ormond mill pNHA are not utilising the proposed project site. While the species group are not considered high risk with

regards to potential for collision, they are susceptible to other construction impacts, therefore, the *Myotis* species group are considered a KER and brought forward for assessment of potential significant effects.

Evaluation: *Myotis* species are evaluated as being of County Importance.

Brown long-eared bat

Brown long-eared bat was the fifth most active species across the proposed project, with a total 115 bat passes recorded (Table 6. 16). Overall activity of this species was low at all locations during the 2022 deployments. The majority of passes from this species occurred during spring (82 passes) while summer had 27 passes recorded and autumn had only six passes recorded at D.01 The most active location for this species was D.1 with 24 passes recorded across all 2022 deployments. This was followed by D.09 and D.10, both of which had 20 passes recorded. It is assumed (professional judgement) that the passes could be that of the same bat commuting and foraging through the proposed project site. This species relies on the use of linear features (hedgerows, treelines and riparian habitats) to commute between roosting locations and foraging areas, being able to commute up to 2.8km from roosts (Entwistle *et al.* 1996). There were no recordings of species of this group during the permanent detector at height 2023 deployment. Given the low numbers recorded, it could be assumed that the brown long-eared population roosting at the Ormond mill pNHA are not utilising the proposed project site. While brown long-eared bat are not considered high risk with regards to potential for collision, they are susceptible to other construction impacts, therefore, the brown long-eared bat are considered a KER and brought forward for assessment of potential significant effects.

Evaluation: Brown long-eared bats are evaluated as being of County Importance.

Deployment		*Myotis* spp.			Leisler's bat			Nathusius' pipistrelle			Common pipistrelle			Soprano pipistrelle			Brown long-eared bat		
		Average	Std Dev	IQR	Average	Std Dev	IQR	Average	Std Dev	IQR	Average	Std Dev	IQR	Average	Std Dev	IQR	Average	Std Dev	IQR
Spring	D.01	0.13	0.43	0	2.47	4.39	3	0	0	0	0.78	1.43	1	0.56	1.25	0.25	0.13	0.55	0
	D.02	0.23	1.75	0	2.05	4.04	2	0	0	0	0.44	1.40	0	0.33	0.88	0	0.03	0.16	0
	D.03																		
	D.04	0.57	1.16	1	26.69	52.68	16.25	0	0	0	2.17	5.85	2	1.65	2.13	2	0.12	0.51	0
	D.05	0.04	0.23	0	4.55	8.07	5	0	0	0	6.17	14.27	4	7.28	12.70	7.25	0.05	0.28	0
	D.06	0.13	0.34	0	0.97	1.94	1	0	0	0	19.26	28.06	24.25	6.26	8.70	9	0.03	0.16	0
	D.07	0.55	0.98	1	2.86	6.14	3	0	0	0	18.39	20.01	25.25	41.16	52.10	53.75	0.03	0.16	0
	D.08	0.39	0.71	1	2.09	3.41	3	0	0	0	7.73	22.04	5	3.68	8.89	4	0.03	0.16	0
	D.09	0.30	0.57	0	2.88	5.47	4	0	0	0	2.23	3.38	3	1.47	2.02	2.25	0.11	0.41	0
	D.10	1.66	3.54	1	1.88	3.35	2	0	0	0	1.36	2.32	1.25	0.73	1.73	1	0.16	0.74	0
Summer	D.01	0.17	0.53	0	0.27	0.83	0	0	0	0	0.27	0.83	0	0.13	0.44	0	0.02	0.15	0
	D.02	0.07	0.29	0	0.39	0.87	0	0	0	0	0.39	0.87	0	0.65	1.81	1	0.02	0.12	0
	D.03	0.06	0.24	0	0.26	0.70	0	0	0	0	0.26	0.70	0	0.62	1.15	1	0.02	0.15	0
	D.04	0.05	0.25	0	0.94	4.14	0	0	0	0	0.94	4.14	0	4.59	5.26	5	0.02	0.18	0
	D.05	0.35	0.72	0	1.76	2.93	2	0	0	0	1.76	2.93	2	11.42	13.35	14.5	0.00	0.00	0
	D.06	0.01	0.09	0	0.27	0.93	0	0	0	0	0.27	0.93	0	0.24	0.82	0	0.00	0.00	0
	D.07	0.21	0.73	0	10.94	14.26	15	0	0	0	10.94	14.26	15	18.63	22.40	20	0.02	0.15	0
	D.08	0.31	0.58	0.5	1.17	3.22	1	0	0	0	1.17	3.22	1	1.52	1.97	2	0.02	0.12	0
	D.09	0.17	0.42	0	0.79	1.22	1	0	0	0	0.79	1.22	1	1.16	1.67	2	0.04	0.20	0
	D.10	0.16	0.48	0	0.31	0.79	0	0.01	0.09	0	0.31	0.79	0	0.54	1.13	1	0.01	0.09	0
Autumn	D.01	0.06	0.40	0	0.06	0.45	0	0.00	0.00	0	0.19	1.36	0	0.06	0.40	0	0.01	0.11	0
	D.02	0.01	0.08	0	0.12	1.24	0	0.00	0.00	0	0.69	5.99	0	0.25	1.53	0	0.00	0.00	0
	D.03	0.04	0.28	0	0.29	1.95	0	0.00	0.07	0	0.28	1.94	0	0.10	0.74	0	0.00	0.00	0
	D.04	0.02	0.15	0	0.02	0.13	0	0.00	0.00	0	0.99	4.40	0	1.58	6.51	0	0.00	0.00	0
	D.05																		

Deployment		*Myotis* spp.			Leisler's bat			Nathusius' pipistrelle			Common pipistrelle			Soprano pipistrelle			Brown long-eared bat		
		Average	Std Dev	IQR	Average	Std Dev	IQR	Average	Std Dev	IQR	Average	Std Dev	IQR	Average	Std Dev	IQR	Average	Std Dev	IQR
	D.06																		
	D.07	0.32	2.24	0	0.02	0.22	0	0.00	0.06	0	8.63	37.65	0	4.40	13.98	0	0.00	0.06	0
	D.08	0.09	0.48	0	0.09	0.55	0	0.00	0.00	0	1.10	8.17	0	0.36	1.54	0	0.00	0.06	0
	D.09	0.07	0.54	0	4.06	33.75	0	0.00	0.00	0	0.64	3.95	0	0.23	1.62	0	0.00	0.00	0
	D.10	0.01	0.16	0	0.09	0.66	0	0.00	0.00	0	2.20	9.17	0	0.74	3.58	0	0.00	0.00	0

Table 6. 16: Average bat passes (bp/h) values (colours represent the activity level) by season/deployment.

Notation: Std Dev = standard deviation and IQR = interquartile range

Activity level classification based on average bat passes per hour: < 2 bp/h = Low, 2 to < 5 bp/h = Moderate, ≥ 5 bp/h High

Bat activity associated with proposed turbine locations

It is noted that during the design of the proposed project there have been several amendments to turbine locations between the 2022 surveys season and the completion of this report. Due to the changes in turbine locations (due to design constraints and the iterative design process, as detailed in **Chapter 4** of this **EIAR**) static detector coverage has deviated. This is because there are five turbine (T.2, T.3, T.4, T.9 and T.10) locations which were moved during design stages. NatureScot, *et al*. (2021) states "... *Survey effort should be focused in those parts of the development site where turbines are most likely to be located, although proposed turbine locations are often subject to change. At sites where the proposed turbine locations are known, static detectors should be placed to provide a representative sample of bat activity at or close to these points*.." Therefore, as per the NatureScot *et al.* (2021) guidelines, professional judgement was used when first siting the static detectors (as it was assumed turbines may move) and a system of stratified sampling based on the availability of different habitats and topographical features on the site was used.

While it is acknowledged that no data was collected within 300m buffer of the current turbine locations for T.2, T.3, T.4, T.9 and T.10 locations, the data collected provides adequate representation of habitats with potential activity at these turbine locations for this assessment (e.g. T.1 and T.2 have similar habitat types of improved grassland and the River Suir flowing through, so data from T.1 should be the same as activity around T.2)

Table 6. 17 summarises the bat activity by location during the 2022 static detector deployments, 2023 detector at height and the overall bat activity on site.

Bat activity at T.1

The proposed turbine location is within an open area of improved grassland. There are hedgerows of young and mature hawthorn present within this area. The River Suir is also in close proximity, *c.* 90 m north of T.1.

The monitoring unit (D.01) is positioned *c.* 55 m southwest from the current T.1 location. Further away from T.1 (*c.* 278 m south), D.02 was located also in an improved grassland habitat, offering insights into how bats utilise linear features in this area of the site. The habitat between the detector and finalised turbine location is similar and allows for a sufficient assessment of bat activity at the finalised turbine location.

Both D.01 and D.02 had moderate activity levels for Leisler's bats in spring 2022. All other species recorded here showed low activity levels during all deployments. Leisler's bats are not as reliant on linear features as other species, and like to forage over improved grassland and rivers, which could explain the moderate activity levels in this area.

Bat activity at T.2

The proposed turbine location is within an open area of improved grassland, with fragmented hedgerows and treelines. The River Suir is also passing through the northern area, at 155 m. No detectors were deployed at this specific location, with the closest detectors, D.02, being positioned *c*. 480 m southwest of T.2 and D.01, positioned *c*. 620 m southwest of T.2, It is likely that bat activity and species richness at T.2 will align with the observations made at D.01 and D.02. Both these locations have similar habitats including improved grassland, and the River Suir flowing through the northern sections of the 300 m buffers. While the absence of data at T.2 introduces complexities to the interpretation of survey results, the locations surveyed in 2022 provide appropriate data for assessment of all habitat types within the Site in accordance with NatureScot (2021) and account for potential movement of turbines subject to design change including the finalised layout for the proposed project.

Bat activity at T.3

The proposed turbine location is within an open area of improved grassland with fragmented hedgerows (pine and hawthorn), gorse and some trees. There is one cluster of trees made up of pine, larch and spruce species to

the southeast of T.3. Another cluster of trees to the north include mixed birch and pine species, along with standing deadwood and some small patches of hawthorn. The River Suir passes from north to south in the western section of this area, with the closest point of the river to the turbine location being *c.* 175 m.

No detectors were deployed at this specific location, with the closest detector, D.09, positioned *c*. 430 m away. Given the high activity event at D.09 and the habitat characteristics and features present at T.3, fair representation of potential activity would be better compared to observations made at D.01 and D.10, due to the similar habitats in both areas. While the absence of data at T.3 introduces complexities to the interpretation of survey results, the locations surveyed in 2022 provide appropriate data for assessment of all habitat types within the Site in accordance with NatureScot (2021) and account for potential movement of turbines subject to design change including the finalised layout for the proposed project.

Bat activity at T.4

The proposed turbine location is just north of the "T"-shaped treeline and is the most northeasterly turbine within the site. The treeline is made up of both live and dead ash trees, some of which have heavy ivy coverage. There are also Scot's pine trees with an understorey of both dead and live hawthorn also. There are also hedgerows within this area made up of hawthorn and gorse.

No detectors were deployed at this specific location, with the closest detector, D.10, positioned more than 600 m away. While the absence of data at T.4 introduces complexities to the interpretation of survey results, the locations surveyed in 2022 provide appropriate data for assessment of all habitat types within the Site in accordance with NatureScot (2021) and account for potential movement of turbines subject to design change including the finalised layout for the proposed project.

Although there was no static detector deployed at this turbine location during the 2022 static detector surveys, there was one roost and one transect activity survey conducted in May 2022 within the area of T.4's location. The survey results provide insight into the activity at this turbine location. During the dusk roost survey at F.24 (Figure 6. 12), which was a low classed standing dead ash feature, multiple species were recorded foraging. During the transect, Leisler's bats, common pipistrelles and soprano pipistrelles were recorded foraging and commuting within the location of T.4 at the "T"-shaped treeline.

Bat activity at T.5

The proposed turbine location is within an open area of improved grassland, that is artificially drained and had the removal of hedgerows and scrub. There are fragmented hedgerows in this area. There is also a treeline bordering the Rossestown bridge river to the west of T.5, which is of moderate foraging potential. The monitoring unit D.10, designed for T.5, was located *c*. 98 m south of its current (2024) proposed position. The data gathered within this area is still robust to the finalised turbine location due to the similar habitats in both areas. The locations surveyed in 2022 provide appropriate data for assessment of all habitat types within the Site in accordance with NatureScot (2021) and account for potential movement of turbines subject to design change including the finalised layout for the proposed project.

There were low levels of activity from all species present at D.10 during all 2022 survey seasons, with the exception of common pipistrelles in summer, which showed moderate activity levels. The previous removal of linear features (hedgerows and scrub) that were present here, and the fragmented hedgerows could attain to the lower levels of activity. This would interfere with foraging and commuting routes because most species are reliant on the use of linear features to commute to/from forage areas. The River Suir isn't close-by compared to the previous turbine locations, and so, this area is not as favourable as others, attributing to the lower activity levels throughout the survey deployment.

Bat activity at T.6

The proposed turbine location is within an improved grassland field, with very few linear features present within the 300 m buffer zone. There is a small treeline just outside the 300 m buffer to the west of this turbine location. These trees have heavy ivy coverage, which have the potential for hidden roost features (BCT, 2023). One tree also has buttrot, however, it was deemed to be very low and unlikely to be a potential roost feature. There is also a ring of ash and alder trees of low roosting potential and an ash tree with a split compression fork, stress shear feature of moderate roosting potential. This cluster of trees is *c.* 160 m from T.6.

D.03 is *c*. 130 m from the current T.6 location. There was no spring data available at D.03 in 2022, as this detector failed. NatureScot (2021) recommends multiple detectors deployed throughout the proposed project site covering the different types of habitats to allow for the collection of robust data, even if one piece of equipment fails. Summer and autumn deployments for D.03 were fully compliant. showing low activity from all species recorded. This can be explained due to the lack of linear features within this area, which many species, except Leisler's bats, are reliant on to commute to/from foraging locations (BCT, 2023).

Bat activity at T.7

The proposed turbine location is an open area of improved grassland, with hedgerows and treelines bordering fields. The River Suir flowing through on the south, southwest and northwest sections of the 300 m buffer. D.09 is c. 80 m from the current T.7 location. High-risk collision species Leisler's bats and common pipistrelles both recorded moderate levels of activity at this location in spring. During summer, all species recorded here had low levels of activity. In autumn, Leisler's bats were recorded at moderate levels of activity, while all other species had low levels of activity. Although Leisler's bats were recorded having moderate activity levels, accompanying data identifies this area is of significant importance to the local Leisler's bat population. Analysis shows activity levels spiked on two specific nights in autumn (26th October 2022 and 27th October 2022), On the 26th October, there were 440 Leisler bat passes and 215 Leisler bat passes between 19:00 and 20:00, with sunset being 18:12 on this day. At 21:00 on this same night, pass numbers again dropped back down to 32 Leisler bat passes and activity remained low for the remainder of the night. On the 27th October, there were 397 Leisler bat passes and 261 Leisler bat passes between 19:00 and 20:00, with sunset on this night at 18:10. Again, the activity then dropped significantly for the remainder of the night. This could be due to bad weather and localised flooding in the days beforehand.

There were two roost surveys conducted within this 300 m buffer. The stone bridge on the River Suir (F.148) was surveyed on the 27th May 2022 at dawn. During this survey, both a common and soprano pipistrelle were recorded re-entering the bridge, confirming it as a roost. There was one roost survey conducted on the pump house (F.149) on the 24th October 2024 at dusk, which is of low roosting potential.

Further analysis shows that the busy activity is primarily one to two hours after sunset on both these nights at D.09. It can be seen that this trend has occurred across all detectors on site at these times, although not to the extremity of D.09. Sunset was at 6.12pm and 6.10pm respectively, therefore, no expectation of a roost for Leisler's bats given that this species is known for earlier emergences.

Bat activity at T.8

The proposed turbine location is an open area of improved grassland. There are hedgerows present within the area, and some of the broadleaf forestry is also within this area to the south of T.8. There is no detector data available for this turbine location, however, two detectors are on the edges of the 300 m buffer (D.03 being *c*. 285 m northwest of T.8 and D.04 being *c*. 300 m south). The data gathered within this area is still robust to the finalised turbine location due to the similar habitats in both areas. The locations surveyed in 2022 provide appropriate data

for assessment of all habitat types within the Site in accordance with NatureScot (2021) and account for potential movement of turbines subject to design change including the finalised layout for the proposed project.

The activity at D.03 was low for all species during summer and autumn, with no data available for spring. During spring at D.04, there were high levels of activity from Leisler's bats and moderate activity from common pipistrelles. The plantation part of the woodland to the south has been clear-felled, let regenerate, clear-felled again and then maintained between the years *c*. 1995 and 2010. There are signs of regeneration between 2011 and 2013 which is still growing presently. The presence of the mature broadleaved trees creates good potential for roosting Leisler's bats known to be tree roosting species (BCI, 2024). Furthermore, Leisler's bats tend to avoid cluttered areas when foraging, being more commonly found above or just below tree canopies and above open grassland. The mature trees present in this woodland would also likely influence a higher insect population in the spring months (Knuff *et al.* 2020), contributing to high activity levels in this area.

Soprano pipistrelles showed moderate levels of activity at D.04 in summer, while autumn was low activity from all species recorded at this detector.

Bat activity at T.9

No detectors were deployed at this specific location, with the closest detectors, D.04 to the west at c. 320 m and D.05 to the southwest at c. 350 m. The locations surveyed in 2022 provide appropriate data for assessment of all habitat types within the Site in accordance with NatureScot (2021) and account for potential movement of turbines subject to design change including the finalised layout for the proposed project. While there were no detectors at this turbine location, considering the habitat characteristics and features present, it is likely that bat activity and species richness may align with the observations made at D.01, D.02, D.03 and D.08. Therefore higher levels of activity are expected for Leisler's bat, common and soprano pipistrelle.

Bat activity at T.10

No detectors were deployed at this specific location, with the closest detectors, D.05 positioned c. 370 m northwest D.06 positioned *c*. 420 m southeast and D.07, positioned *c*. 340 m northeast. While the absence of data at T.10 introduces complexities to the interpretation of survey results, the locations surveyed in 2022 provide appropriate data for assessment of all habitat types within the Site in accordance with NatureScot (2021) and account for potential movement of turbines subject to design change including the finalised layout for the proposed project. Considering the habitat characteristics and features present at this location, it is likely that bat activity and species richness may align with the observations made at D.05, D.06 and D.07. The River Suir is beside this woodland to the east of T.10 (*c*. 160 m), which the bats would be expected to use for foraging and drinking. It can be assumed that species commuting from the woodland to the west of T.10 would use this treeline as a commuting pathway to reach the River Suir

Detector at height 2023

The static at height detector was placed at the meteorological mast *c.* 160 m west of T.6. This detector had a microphone placed at a height of 50 m above ground level. There were 139 passes recorded, with 89% (125 passes) being Leisler's bats. Activity peaked during September, with 60 passes. Average wind speed was between 2 m/s and 4 m/s, while temperature ranged from 17°C to 21°C. There was also one pass recorded on the 26th and 30th September, with average wind speeds of 12 m/s and 11 m/s respectively. Leisler's bats are less reliant on linear features for commuting and foraging paths. This would increase this species collision risk if they were commuting from the south of the site towards T.1 or T.2 to forage at the River Suir. There were also common pipistrelles and soprano pipistrelles recorded at height, much lower numbers account for 10% (14 passes) of the passes.

Common and soprano pipistrelles both had seven passes each during this survey period, with a peak in activity in September (six and 4 passes respectively). Of these six common pipistrelle passes, three passes were recorded on the 8th September, with average windspeed between 1 m/s and 3 m/s and temperatures of 20°C and 21°C. Three of the soprano pipistrelle passes were recorded on the 9th September, with average windspeed of 4 m/s and temperatures of 17°C and 20°C.

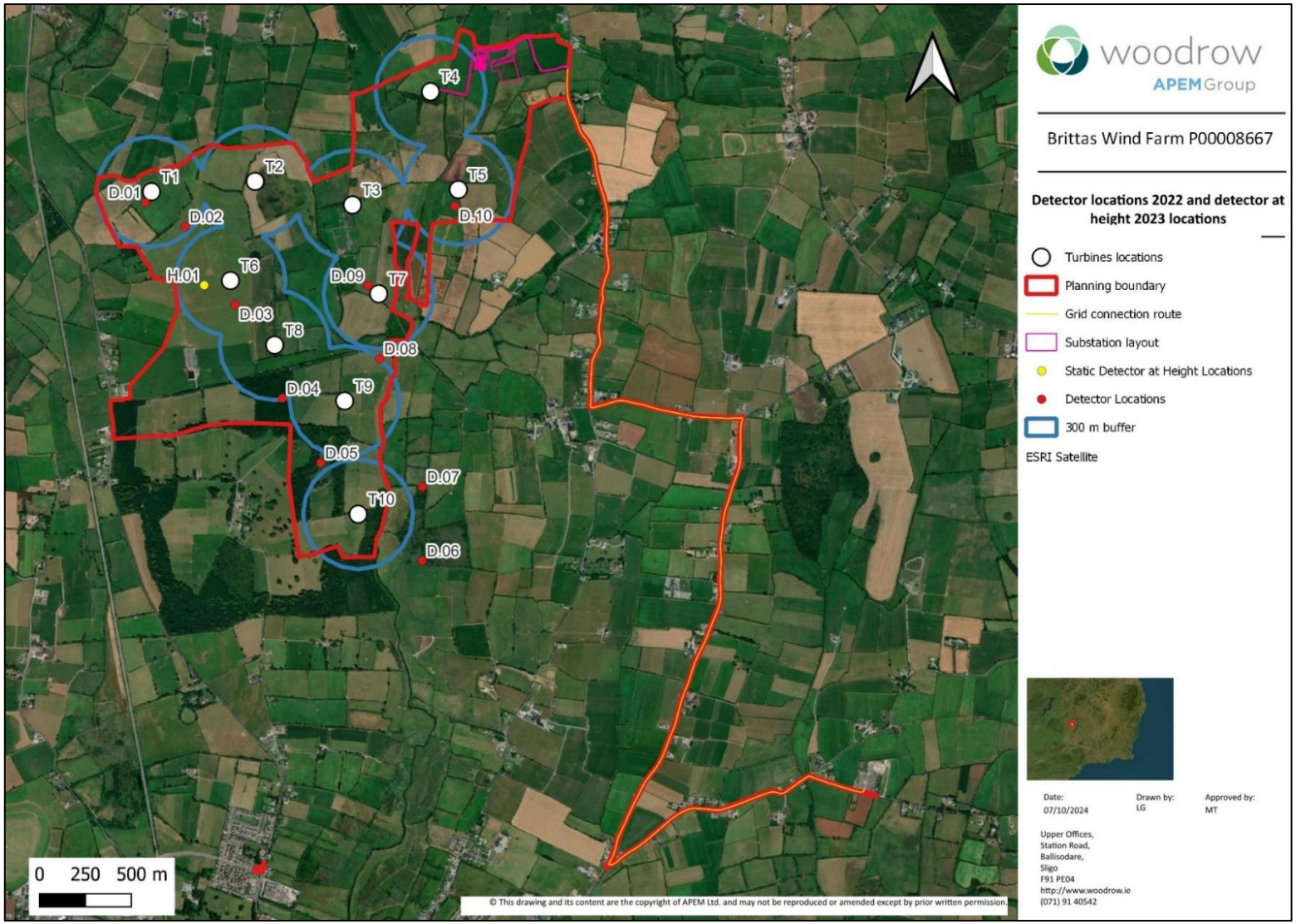

Figure 6. 14: Static detector locations in light of proposed turbine locations (refer to Chapter 2: Project Description)

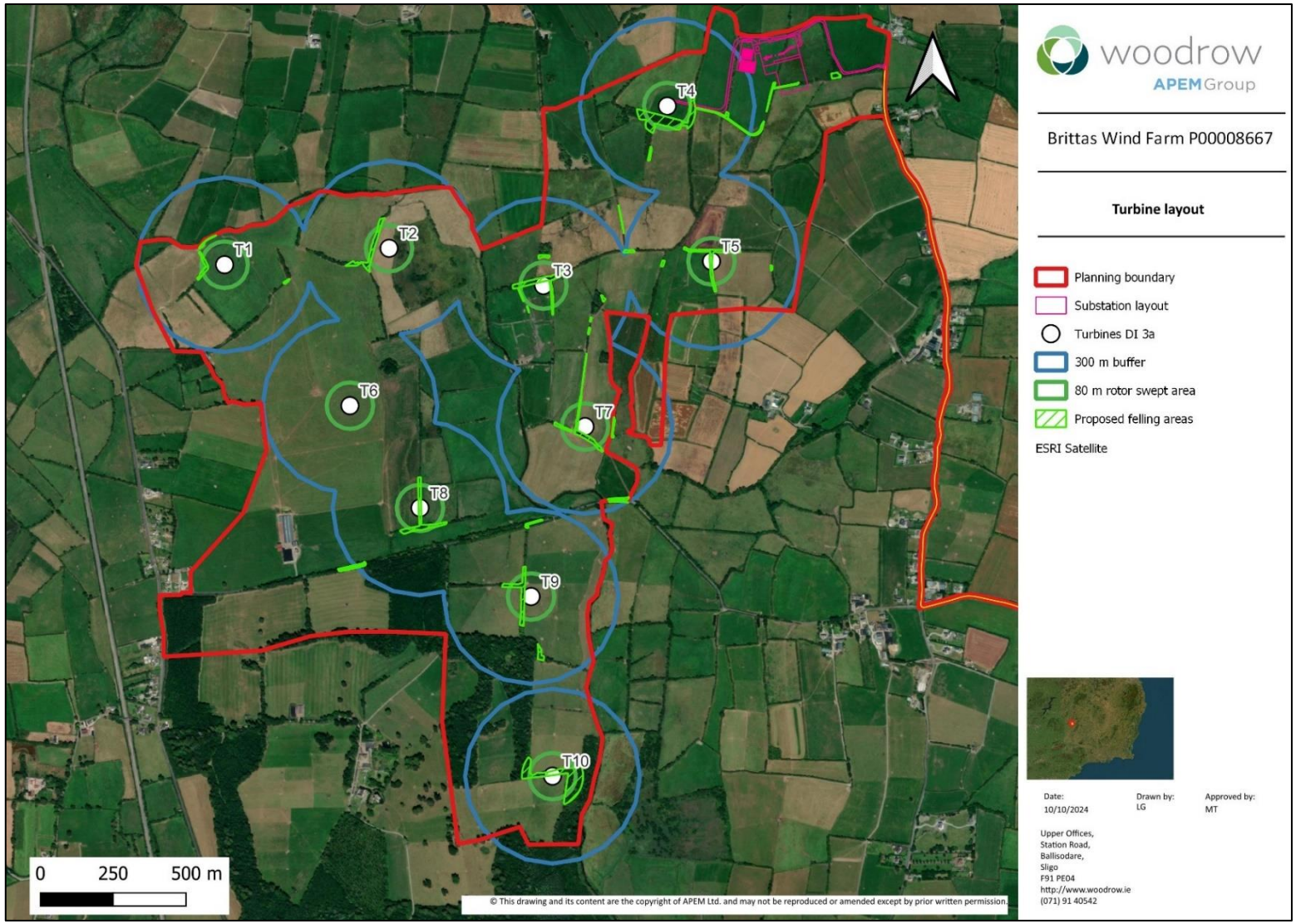

Figure 6. 15: Turbine layout with 80 m rotor swept area

Table 6. 17: Summary of bat activity during the static surveys in 2022 and 2023

The colours correspond to the activity levels specified in Table 6. 3

Deployment	Common pipistrelle	Soprano pipistrelle	*Pipistrellus* spp.	Nathusius' pipistrelle	Leisler's bat	*Myotis* spp.	Brown long-eared bat	All bats (total)
Spring April – May 2022 (8512 hours)	6.41 bp/h (n= 7,378 bp)	6.76 bp/h (n= 7,435 bp)	0.01 bp/h (n= 3 bp)	0.00 bp/h (n= 0 bp)	5.17 bp/h (n= 5,804 bp)	0.44 bp/h (n= 502 bp)	0.07 bp/h (n= 82 bp)	18.86 bp/h (n= 21204 bp)
Summer June- July 2022 (10144 hours)	1.71 bp/h (n= 2,524 bp)	3.95 bp/h (n= 5,616 bp)	0.00 bp/h (n= 0 bp)	0.00 bp/h (n= 1 bp)	2.60 bp/h (n= 3,781 bp)	0.15 bp/h (n= 291 bp)	0.02 bp/h (n= 27 bp)	8.44 bp/h (n= 12240 bp)
Autumn September- November 2022 (21983 hours)	1.77 bp/h (n= 5,778 bp)	0.91 bp/h (n= 2905 bp)	0.01 bp/h (n= 97 bp)	0.00 bp/h (n= 3 bp)	0.66 bp/h (n= 2,421 bp)	0.07 bp/h (n= 400 bp)	0.01 bp/h (n= 6 bp)	3.43 bp/h (n= 11610 bp)
2023 Detector at height June- September 2023 (65080 hours)	0.02 bp/h (n= 7 bp)	0.02 bp/h (n= 7 bp)	0.00 bp/h (n= 0 bp)	0.00 bp/h (n= 0 bp)	0.28 bp/h (n= 125 bp)	0.00 bp/h (n= 0 bp)	0.00 bp/h (n= 0 bp)	0.32 bp/h (n= 139 bp)
All surveys (mean) (105,719 hours)	9.91 bp/h (n= 15,687 bp)	11.64 bp/h (n= 15,963 bp)	0.02 bp/h (n= 100 bp)	0.00 bp/h (n= 4 bp)	8.71 bp/h (n= 12,131 bp)	0.66 bp/h (n= 1,193 bp)	0.10 bp/h (n= 115 bp)	31.05 bp/h (n= 45,193 bp)

6.3.4 Summary of identified KER's

Table 6. 18: Summary of key ecological receptors identified

	Key ecological receptor identified	Highest geographic evaluation* *NRA (2009) which has been adapted to fit into CIEEM (2018, undated 2022)
Designated sites	Lower River Suir SAC Qualifying Interest • Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-batrachion* vegetation [3260] • *Austropotamobius pallipes* White-clawed Crayfish [1092] • *Petromyzon marinus* (Sea Lamprey) [1095] • *Lampetra planeri* (Brook Lamprey) [1096] • *Lampetra fluviatilis* (River Lamprey) [1099] • *Salmo salar* (Salmon) [1106] • *Alosa fallax fallax* (Twaite Shad) [1103] • *Lutra lutra* (Otter) [1355] NIS determined that there were no source-receptor pathways with these QI habitats and species resulting in no mitigation needed for the following: Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330], Alluvial forests [91E0], Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430], *Taxus baccata* woods of the British Isles [91J0], Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0], and *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029]	International Importance
	Ormond's mill, Loughmoe, Templemore pNHA	National Importance
Habitats	Improved Grassland (GS1) Wet Grassland (GS4)	Site Importance National importance
	Marsh (GM1) Drainage Ditches (FW4)	Local importance Local importance
	Hedgerows (WL1)	Local importance

	Depositing / Lowland Rivers (FW2)	National importance
	Poor Fen and Flush (PF2)	National Importance
	(Mixed) Broadleaved Woodland (WD1)	Local importance
	Buildings and Artifical Surfaces (BL3)	Local Importance
	Eutrophic Lakes (FL5)	Local importance
	Reed and Large Sedge Swamp (FS1)	Local importance
	Mixed Broadleaf / Conifer Woodland (WD2)	Local importance
	(Mixed) Conifer Woodland (WD3)	Local importance
	Scattered Trees and Parklands (WD5)	Local importance
	Scrub (WS1)	Local importance
Aquatic	*Salmo* species	Local Importance
Other Taxa	Marsh fritillary	National Importance
Terrestrial mammals		
	Badger	County Importance
	Pine marten	Local Importance
	Irish hare	Local Importance
Bats	Common pipistrelle	Local (Wray *et al*. 2010)
	Soprano pipistrelle	Local (Wray *et al*. 2010)
	Nathusius' pipistrelle	County (Wray *et al*. 2010)
	Leisler's bat	Regional (Wray *et al*. 2010)
	Myotis species	County (Wray *et al*. 2010)
	Brown long-eared bat	County (Wray *et al*. 2010)

6.4 Potential Impacts

This section describes the potential impacts which may occur if the proposed project did not commence. It also assesses potential impacts on the existing environment which may occur as a result of the construction, operational and decommissioning phases of the proposed project.

6.4.1 'Likely Evolution of the Baseline

The proposed project encompasses agricultural farmland and commercial forestry plantation that are currently managed through a combination of intensively managed pasture, tillage regimes and agroforestry practices. If the proposed project does not proceed, the current state of the environment is considered likely to remain in use for agriculture/forestry purposes.

6.4.2 Construction phase impacts

The construction phase will result in a certain amount of inevitable impact, largely in the form of habitat loss/alteration and disturbance to facilitate construction of site access tracks, turbine bases, hardstand areas, substation and excavation for the cabling trenches to facilitate grid connection.

The potential for impacts upon ecological features along the haul route where modifications to areas may be required to facilitate the passage of large vehicles and components was considered. The existing road network will be used for the transportation of materials to and from the site, however, some tree removal and vegetation clearance will be required in targeted areas where the existing infrastructure will not facilitate the large size of some materials required. These areas are identified in Appendix 2a of Volume 3 of this EIAR.

The construction phase for the proposed project is proposed to be less than two years (expected 18-month programme), resulting in disturbance effects that are considered temporary or short-term (EPA 2022). However, the timing of construction activities can have specific impacts on fauna. For instance, concerning bats, if construction works are scheduled during the night, the presence of lighting and noise near foraging and commuting habitats could have detrimental effects for those populations by displacement. This may create barriers for more sensitive species such as brown long-eared bats and *Myotis* species, potentially impeding their passage or making them more vulnerable to predators. Alternatively, it could attract other more common species such as pipistrelles. Other species known to be seasonally sensitive or seasonally located within and adjacent to the proposed construction corridor, are breeding badgers or otters (refer to accompanying NIS (Apem, 2024)).

6.4.2.1 Potential sources of direct and indirect impacts during the Construction Phase

Potential impacts during the construction phase encompass both direct and indirect impacts, which are summarised as follows:

Sources of direct impacts during the construction phase

- Clearance of vegetation, soil and rock for access roads, hardstands and turbine bases leading to the loss of habitats;
- Clearance of hedgerows / treelines to facilitate infrastructure such as access roads;
- The loss of a (potential) roost or swarming site due to demolition or disturbance during construction;
- Light disturbance;
- Noise disturbance;

- Clearance of woodland around turbines to reduce turbulence;
- Clearance of woodland around turbines to implement 105 m bat feature buffers at T.4 and T.10;
- Creation of temporary infrastructure such as site compound, blade set-down areas and crane pads;
- Excavation of trenches for cable ducting;
- Excavation of borrow pit; and
- Placement of material arising from infrastructure works;

Note: A tree felling licence will be applied for from the Department of Agriculture, Food and Marine if planning permission is granted. The removal of vegetation around turbines to create 50 m separation distance between rotor swept areas and potential bat features is a mitigation measure and should technically be considered under the section on potential operational phase impacts of the project. However, to avoid duplication in assessment of likely significant effects and because there is considerable overlap between felling required for both bat feature buffers and turbulence buffers, the areas to be targeted for felling have been combined and are assessed together.

Sources of indirect impacts during the construction phase

- Noise disturbance;
- Displacement;
- Introduction and spread of invasive alien species;
- Changes in insect productivity in foraging sites due to lighting or changes in the vegetation composition;
- Deterioration in water quality due to potential emissions to surface water including hydrocarbons, sediment; and
- Disturbance to qualifying interests of the Lower River Suir SAC.

6.4.2.1.1 International Designated Sites

As detailed in the NIS (APEM, 2024), in the absence of mitigation, the proposed project has the potential to have indirect impacts upon designated features of one Natura 2000 site, specifically the Lower River Suir SAC *c.* 6.5 km downstream. This is through the potential for deterioration in water quality caused by entry of pollutants or suspended solids into drains flowing adjacent to the proposed works corridor. Disturbance impacts to QI species that may be present on the site were also identified, as well as potential invasive species impacts.

The potential impact on Natura 2000 sites has been assessed within the NIS (APEM, 2024). Potential for significant effects were identified for the following QIs:

- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-batrachion* vegetation [3260]
- *Austropotamobius pallipes* White-clawed Crayfish [1092];
- Petromyzon marinus (Sea Lamprey) [1095];
- *Lampetra planeri* (Brook Lamprey) [1096];
- *Lampetra fluviatilis* (River Lamprey) [1099];
- *Salmo salar* (Salmon) [1106];
- *Alosa fallax fallax* (Twaite Shad) [1103]; and

- *Lutra lutra* (Otter) [1355].

The Water courses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] located c. 7.8 km downstream could be negatively impacted by emissions to water. For White-clawed crayfish, while there is crayfish plague known in the Suir this species could occur at the Site and downstream in the SAC. Sea lamprey are unlikely to be present at the Site due to barriers to migration but are likely to be present further downstream. Brook / River lamprey are likely to be present at the Site, and ammocoetes were recorded in kick samples at the Site. For Salmon and Twaite Shad, both of which could be unlikely to occur in the vicinity of the Site due to barriers to migration, but due to uncertainty must be considered as having potential to be present downstream of the Site, could be negatively impacted by emissions to water. For otters, these species are likely to be present on the Site and downstream, with evidence of their usage, as well as a potential holt, recorded during the surveys at the Site.

Potential impacts

Emissions to Water

Emissions to water involving sediments is likely to alter particle size ranges and thus the substratum required for habitats and species in this SAC. This could affect habitat requirements for the water courses of plain to montane levels, as well as spawning habitat that could be covered by sediment and thus this habitat extent could be lost or its quality or distribution reduced. The same can be said for the availability of juvenile lamprey habitat, as juveniles require silt deposits along the channel as this is the habitat they utilise at this life stage. Contaminated surface water reaching the SAC downstream could alter the water quality, noted in the conservation objectives as being important for almost all QIs in the SAC.

In the absence of mitigation, the above impacts relating to emissions to water will have a ***likely significant effect*** at the ***International Scale*** due to distance upstream and likely dilution factors**.** The effects are concluded the same for all turbine options.

Disturbance

Disturbance impacts could also affect fish species in watercourses at the Site, through lighting on the surface of the water, or human activities and noise. Activities at the Site could result in disturbance and displacement of otters, through increased noise and human disturbance, and thus reduce the percentage of positive survey sites for distribution of otter in the SAC. Disturbance arising from activities at the proposed project site is very unlikely to affect c. 7.8km downstream in the Lower River Suir SAC, however, as the Suir main channel is present within the Site, otters recorded here are potentially the same population as the SAC. Thus, otters at the Site are considered within the same conservation objectives outlined for the SAC.

Disturbance impacts for otters will have a ***likely significant effect*** at the ***International Scale*** due to distance to the main population of otters in the SAC downstream**.** The effects are concluded the same for all turbine options.

Invasive Alien Species

While no third schedule invasive species were recorded on Site during the surveys, there is potential for invasive species to be introduced to the Site via machinery, humans or tools. Seeds or vegetated material can be brought onto Site from elsewhere and colonise the Site itself or result in this plant material flowing downstream via the watercourses on the Site. Seeds and roots can be transported via watercourses and colonise riparian banks, which can in turn affect river habitats, resulting in increased sedimentation once invasive species have died back during winter, or affecting levels of shade and thus affecting aquatic flora. This could affect all the identified QIs in the Lower River Suir SAC downstream (APEM, 2024). Invasive Species impacts will have a ***likely significant effect*** at the ***International Scale***. The effects are concluded the same for all turbine options.

6.4.2.1.2 National Designated Sites

There are no source-receptor pathways between the proposed project and nationally designed sites NHAs.

Ormond's mill, Loughmoe, Templemore, Co. Tipperary pNHA [Site Code: 002066] site c. 3.5 km north of the proposed project. This mill has a colony of Natterer's bat and brown long-eared bats roosting here. This mill is an important nursery roost for the natterer's bat. Both of these species are dependent on the surrounding woodlands for foraging. Brown long-eared bats are known to come out later once it is completely dark. Aughney *et al*. (2011) shows that brown long-eared bats demonstrate *"…a significant positive correlation between bat numbers and a 'woodland edge' component; higher numbers were associated with increased commuting distances, but higher woodland cover within 2.5km of the roosts"*. This species are known to forage in more "woody" areas with good tree coverage, which aids in darker surroundings. Although studies say their known foraging range is *c.* 2.5 km, given the connection between the River Suir and Ormond's mill, there is potential for this species to commute down the River Suir into the proposed project Site and forage within the mature woodlands. Another study by Smith, P. G and Racey, P. A (2008) has shown that natterer's bats prefer to forage in broadleaf woodlands and river corridors, which also increases the likelihood of this species commuting down the River Suir into the mature woodland on the proposed project for foraging.

While the proposed project has potential to indirectly effect the populations of the pNHA due to loss of foraging habitat, data collected during the 2022 static deployments shows low activity from both these species at the proposed project Site, therefore, ***No Effects*** are anticipated on the pNHA from the proposed project for all turbine options.

6.4.2.1.3 Habitats

Construction of infrastructure and the construction corridors will result in direct habitat loss. Habitat loss/alteration is required to implement turbulence reduction buffers around some of the turbines and these are examined here. Additional habitat loss/alteration required to implement mitigation measures for the protection of ecological features are considered under operational impacts, specifically additional felling of predominately commercial forestry to create 50 m standoffs between the rotor swept area and habitat features potentially utilised by foraging/community bats.

As given in Table 6. 19, the infrastructural footprint of the project was designed to avoid the most sensitive habitats within the proposed project, including the southern woodland of mixed broadleaved woodland (WD1). Direct habitat loss due to the footprint of the proposed project will result in the loss of 1.4 ha of plantation and 4086 m of hedgerow (WL1) removal, which is considered to have a ***likely significant effect*** at the ***Local*** scale. The effects are concluded the same for all turbine options.

Within the proposed substation fields, high quality Annex I *Molinia* meadow habitat is present on fen habitat and the location of the substation has been altered to avoid these more sensitive areas. The fen habitat in this area is representative of poor fen and flush habitat. The field directly next to the proposed substation contains a semi-improved grassland habitat which has the potential to develop into Annex I *Molinia* meadow habitat.

Marsh habitat recorded in the field approx. 480m to the east of T.10 within the initial study area. This habitat is now *c*. 320 m outside the proposed project planning boundary. This area has Devil's bit scabious scattered throughout. It was noted that habitats on the opposite side of the River Suir were also similar, however, the land on the eastern side appeared to be more poached.

The River Suir also flows through the proposed project site and supports some of the more mobile QIs of the Lower River Suir SAC. This is classified as a depositing / lowland river.

Habitat loss will be minor in scale for proposed access roads, hard standing, turbine footprints and other infrastructure. However, where tree felling, and removal of vegetation is required this will require greater areas of habitat loss. Linear features such as treelines and hedgerows will be removed in some areas, and this could result in fragmentation impacts related to habitat loss. Where woodland is required to be removed, this could also result in fragmentation in conjunction with habitat loss impacts. The majority of habitats on the site comprise improved agricultural grassland, of limited value, and thus impacts are not considered to be significant in these areas. Habitats of higher value, for example the *Molinia* meadows habitat and poor fen and flush habitat, have been avoided insofar as possible. The total area of habitat loss (improved grassland, marsh, wet grassland and mixed broadleaf woodland) within the 100 m buffer around the ten turbines and including access roads and other infrastructure is 46.93 ha. This is considered to have a ***likely significant effect*** at the ***Local*** scale in the absence of mitigation measures.

The proposed GCR will consist of approximately 7km of a 110kV underground cable buried in the public road. The Grid Connection Route will connect the proposed on-site 110kV substation at the proposed project Site to the nearby existing Thurles 110kV substation located in the townland of Ballygammane. The grid route passes through agricultural fields within proposed new access tracks. The route then enters the public road at the proposed project Site boundary at the townland of Killeenleigh and heads southeast towards its destination at Thurles 110kV substation in the townland of Ballygammane. The entire route from the Proposed Project Site boundary to the Thurles 110kV substation is located along public local roads. Therefore, no habitat loss impacts are expected to be associated with the grid connection route. There will be no change in habitat type, as the existing buildings and artificial surfaces habitat type along these roads will remain the same following the construction of the underground cable. Habitat loss in relation to the GCR will have ***no likely significant effect.***

The proposed TDR is also located along existing roads but will require temporary accommodation works required to allow the movement of oversized loads, including the temporary removal of traffic signs and lights, electricity poles, bollards and lamp posts, hedges and tree removal or trimming, temporary land take, lowering of some roadside banks, temporary fence removal and road widening. In the case of hedges and tree removal / trimming and roadside banks, temporary and permanent habitat loss (improved grassland, hedgerows, treelines, earth banks) impacts are considered likely to occur. It must be noted that as this is located along an existing road, hedgerow / tree maintenance will be ongoing for road safety to a certain extent. However, any trees to be felled will result in habitat loss but is unlikely to result in habitat fragmentation along the existing road here. Habitat loss impacts in relation to the TDR will have ***no likely significant effect***.

Potential indirect impacts on habitats during the construction phase relate to emissions to water and invasive species. Emissions to water could arise through sediment wash-out from cleared areas, deposition areas or dewatering of excavations. The nature of such impacts is usually localised and some habitats are more sensitive than others, in particular aquatic habitats or more specifically aquatic ecosystems. Section 0 assesses potential impacts on watercourses and downstream ecology further. In relation to habitats, this is likely to affect depositing / lowland rivers for the watercourses on the site and could also potentially affect other habitats that have specific water requirements such as marsh or fen. Without control measures the impact of sedimentation on habitats within local drainage channels has the potential for ***likely significant effects*** at the ***Local*** scale. Without control measures, the impact of sedimentation on non-QI habitats within the River Suir has the potential for ***likely significant effect*** at the ***Local*** scale.

In terms of impacts on terrestrial habitats, extended periods of heavy rain in association with extensive areas of cleared ground, for example, could result in significant washout of sediment onto surrounding areas, if uncontrolled. The majority of the habitats within the proposed project are not considered sensitive to this impact, including areas of southern woodland and agricultural improved habitats, Therefore, without control measures, the impact of sedimentation on terrestrial habitats will have ***no likely significant effects***.

Compaction and excavation of soil adjacent to hedgerow/treelines has the potential to cause damage and disease of plants. Ash die-back is present on the proposed project site. Dust due to construction activities has the potential to suppress plant growth by smothering photosynthetic activity. However, it is considered unlikely that dust will consistently reach levels that will have a measurable impact on the growth of the woodland/hedgerow vegetation. Therefore, without control measures, the impact of dust on terrestrial habitats will have ***no likely significant effects***.

In the absence of appropriate biosecurity measures there is risk of spreading non-native species within the proposed project, which if invasive can impact negatively on sensitive habitats. As indicated in Table 6. 9, of the non-native species recorded within or adjacent to the proposed project cherry laurel and snowberry were the species considered to be most at risk of being spread during the construction phase of the project. No plant species listed under the Third Schedule of the European Communities (Birds and Habitats) Regulations 2011 as 'non-native species subject to restrictions under Regulations 49'[21] were recorded. No invasive aquatic plant species were recorded during surveys. The species recorded, cherry laurel in particular, have the potential for negative impacts on native plants and habitats. These species were recorded along the grid connection route. Snowberry is assessed as a low-risk invasive species in Ireland. Although considered low risk in terms of invasiveness, in woodland and hedgerow habitats snowberry can form dense thickets of cover, which exclude native species. Snowberry formed hedgerow sections along the proposed grid connection route. Without mitigation spoil infected with viable roots has the potential to result in the spread this species. The impact of accidentally spreading invasive species into areas of native/semi-native woodlands occurring within and adjacent to the proposed project has the potential for ***likely significant effects*** at the ***Local*** scale.

21 Regulation 49(2) of the European Communities (Birds and Habitats) Regulations 2011 states that any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow in any place specified in relation to such plant in the third column of Part 1 of the Third Schedule, any plant which is included in Part 1 of the Third Schedule, shall be guilty of an offence. Regulation 49(3) states that it shall be a defence to a charge of committing an offence under paragraph (2) to prove that the accused took all reasonable steps and exercised all due diligence to avoid committing the offence.

Table 6. 19: Habitats associated with the proposed infrastructure and felling around turbines to limit turbulence

Habitats that are identified as being linked to Annex habitats are marked with a *

Habitat types Fossitt (2000) code	Linear features (m)		Areas of habitats (ha)													Footprint area (ha)
	WL1	FW2	BL3	FL5	FS1	GA1	GM1	GS4*	PF2*	WD1	WD2	WD3	WD5	WS1	WS5	
Total lengths/areas within redline boundary	14804.66	6057.77	1.11	0.15	0.02	233.15	9.10	52.32	0.17	22.31	0.10	0.10	0.00	0.25	1.21	319.99
Infrastructural elements																
Spoil storage areas (x8)	0.00	0.00	0.00	0.00	0.00	2.77	0.00	0.51	0.00	0.03	0.00	0.00	0.00	0.00	0.00	3.31
Substation	222.54	0.00	0.00	0.00	0.00	0.84	0.00	1.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	224.64
BESS	0.00	0.00	0.00	0.00	0.00	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.55
Substation access track	769.42	0.00	0.00	0.00	0.00	0.92	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	770.53
Access tracks	0.00	0.00	0.00	0.00	0.00	2.09	0.00	0.55	0.00	0.63	0.00	0.00	0.00	0.00	0.00	3.27
Grid Route	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
T.1 - Hardstand	0.00	0.00	0.00	0.00	0.00	1.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.22
T.2 - Hardstand	131.71	0.00	0.00	0.00	0.00	0.55	0.00	0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	132.91
T.3 - Hardstand	0.00	0.00	0.00	0.00	0.00	0.31	0.00	0.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.22
T.4 - Hardstand	19.52	0.00	0.00	0.00	0.00	0.89	0.00	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	20.74
T.5 - Hardstand	98.09	0.00	0.00	0.00	0.00	1.11	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.31
T.6 - Hardstand	0.00	0.00	0.00	0.00	0.00	1.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.22
T.7 - Hardstand	110.04	0.00	0.00	0.00	0.00	1.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	111.26
T.8 - Hardstand	104.01	0.00	0.00	0.00	0.00	1.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	105.23
T.9 - Hardstand	94.91	0.00	0.00	0.00	0.00	1.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	96.13
T.10 - Hardstand	90.29	0.00	0.00	0.00	0.00	1.21	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	91.51
LiDAR unit	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Borrow pit	0.00	0.00	0.00	0.00	0.00	1.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.74
Temporary compounds (x2)	0.00	0.00	0.00	0.00	0.00	0.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62
Total habitat loss for infrastructural elements	1640.53	0.00	0.00	0.00	0.00	19.71	0.00	4.18	0.00	1.00	0.00	0.00	0.00	0.00	0.00	1665.42

Habitat types Fossitt (2000) code	Linear features (m)		Areas of habitats (ha)													Footprint area (ha)
	WL1	FW2	BL3	FL5	FS1	GA1	GM1	GS4*	PF2*	WD1	WD2	WD3	WD5	WS1	WS5	
% habitat affected	22.16	0.00	0.00	0.00	0.00	16.91	0.00	15.98	0.00	8.96	0.00	0.00	0.00	0.00	0.00	64.01
Areas for felling operations for substation, turbulence buffers and 105 m bat feature buffers																
Substation felling	211.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	211.45
Substation access track	36.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	36.25
T.1	104.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	104.28
T.2	172.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	172.09
T.3	236.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	236.35
T.4	104.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.74	0.00	0.00	0.00	0.00	0.00	105.61
T.5	193.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	193.07
T.7	117.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	117.55
T.8	321.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	321.92
T.9	232.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	232.43
T.10	137.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.00	0.00	0.00	0.00	0.00	138.55
Access tracks	484.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	484.66
Total habitat alteration for felling	2352.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.34	0.00	0.00	0.00	0.00	0.00	2354.21
% habitat affect by alteration	15.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.01	0.00	0.00	0.00	0.00	0.00	21.90

6.4.2.1.4 Aquatic ecology

There is potential for direct impact on watercourses within the proposed project due to potential emissions to water, which could affect any watercourse within the proposed project or downstream, including the River Suir which flows directly through the site. It is noted that impacts on the Lower River Suir SAC and it's QIs are covered in the accompanying NIS (APEM, 2024). Potential emissions to water concerns direct effects such as sedimentation, hydrocarbon run-off or run-off of other chemicals, debris or litter. Indirect impacts are considered as the same emissions to water sources but travelling downstream, affecting areas elsewhere in the catchment.

Salmonid species require very high levels of water quality in order to complete their life cycles. High levels of suspended solid concentrations in waterbodies can affect the feeding and health of individual species through increased turbidity (inhibiting respiration through gills) and increased siltation affecting composition of riverbed substrate (reducing fry survival) and affecting spawning beds. Suspended solids often hold nutrients such as phosphorus or hydrocarbons that can result in eutrophication and reduced oxygen levels (with high oxygen levels being important for all life stages of salmonids, for example). Habitat availability and quality are intrinsically linked with survival rates of juvenile salmonids. Therefore, small amounts of debris entering a section of river important for vulnerable life stages of salmonids can have deleterious effects, even in the short-term, on survival of juveniles.

Release of hydrocarbons as a result of such events as fuel spills have the potential to impact on water quality as a result of reduced oxygen, thereby affecting the salmonid populations that require good oxygen supplies. Hydrocarbons are known to bioaccumulate in salmonids (e.g. McCain *et al.*, 1990). The release of even small amounts of hydrocarbons into the River Suir within the proposed project site has the potential to result in significant impacts on salmonids and other fish species present in the watercourses that drain the site. Hydrocarbons released due to inappropriate storage or dispensing of fuel could have detrimental effects on the habitats and species present. Horizontal directional drilling is required at two locations on site and at two location for the GCR, which will avoid in-stream works. However, there is also a risk of spillage of chemicals and works beside the watercourse during this activity which could negatively affect water quality.

There is potential hydrological connectivity from surface waters exiting the proposed turbine locations and downstream watercourses. The creation of temporary drainage during the construction phase may create connectivity from surface water drainage. Groundwater pathways are another vector for the transportation of contaminants downstream. The surrounding area of the site "Templemore", under the Ground Waterbody WFD status 2016-2021 is classified as overall 'Good' status.

Impacts on aquatic ecology during the construction phase will have a ***likely significant effect*** at the ***Local*** scale. The effects are concluded the same for all turbine options.

6.4.2.1.5 Other taxa

Marsh fritillary habitat suitability were found to occur in the vicinity of the proposed project, c. 470m from T.10, which are now outside of the planning boundary. No records of Marsh fritillary were found on the site; however, devil's bit scabious has been recorded within the proposed project. There is no potential for direct impacts on this species as it was not found to be present on the infrastructure corridor. Indirect impacts on Marsh fritillary concern potential disturbance and foraging habitat loss. While no larval webs were found on the site and thus no breeding evidence recorded, there is potential for adults to forage on the proposed project site on suitable flowering species within the habitats recorded. Construction activities and noise could result in disturbance and displacement impacts if undertaken during the time of year when adults are on the wing. Similarly, as this species may forage on the site, habitat loss impacts affecting marsh, fen or wet grassland would result in reduced foraging habitat for

the species. Adult marsh fritillary will feed on a variety of flowering plants such as thistles, knapweeds, buttercups and cuckooflowers (Phelan *et al.,* 2021)

Given the distance from the nearest suitable breeding habitat (although not recorded), c. 470m from T.10, it is considered unlikely that habitats on the site are within a core foraging range for the species. Therefore, while this is an Annex II species, and indirect impacts may occur, there will be ***no likely significant effects*** from construction. The effects are concluded the same for all turbine options.

6.4.2.1.6 Terrestrial (non-volant) mammals

Based on habitat availability and/or occurrence within the proposed project, four species of protected mammal were considered as KERs; including: otter, badger, pine marten and the Irish hare. Impacts on Otter are covered in the accompanying NIS as this is an Annex II species (APEM, 2024).

Direct impacts on mammals during construction relate to impacts on resting sites, where young or resting animals can be killed or injured, although in some instance construction activities may only result in the destruction of the resting site itself. Tree/vegetation removal impacts arboreal species, and ground works such as excavation or pile driving can impact on burrowing species (badgers). Badger were found to utilize the site, with an active sett near T.9 and possibly also at T.4. There is therefore the potential that these setts are destroyed over the course of construction, or vacated due to disturbance, in the absence of mitigation measures. In the absence of mitigation, potential direct impacts on badgers are considered likely, therefore, there are ***likely significant direct effects*** at the ***County*** scale on this species. The effects are concluded the same for all turbine options.

Foraging badgers to a lesser extent are nocturnal; and therefore, are unlikely to be affected by construction activities which occur during the day. In terms of indirect impacts to mammals during construction the main cause for concern at this site is disturbance to breeding badgers, which were found to have a main sett northeast of T.6 (*c*. 100 m). NatureScot advises employing a minimum exclusion zone of 30 m from sett entrances to construction works, and this increases to 100 m for pile driving or blasting. Indirect impacts resulting from potential disturbance to badger setts during construction will have a ***likely significant effect*** at the ***County*** level in the absence of mitigation.

No pine marten dens were identified within the proposed project site and habitats were considered to be sub-optimal for dens. Pine marten do utilize the site, as fresh scat was recorded. This species is also likely to utilize woodland habitats on the site. No direct impacts on pine marten are envisaged to arise, therefore, there will be ***no likely significant effect*** from construction. The effects are concluded the same for all turbine options.

Disturbance from construction activities is considered unlikely to impact on foraging pine marten; as this species hunts over a large area and the surrounding area contains a large amount of similar foraging habitat that may be used, if construction noise causes certain areas to be avoided. Indirect impacts on pine marten are unlikely to occur, therefore, there will be ***no likely significant effect*** from construction. The effects are concluded the same for all turbine options.

Hares do not occupy a single den but instead rest in ‘forms’, a flattened area in long grass. This, coupled, with the characteristics of young hare and the habits of nursing females, means that potential direct impacts resulting from construction phase of the proposed project are likely to be very limited. Young hares are born fully furred and are able to run soon after birth. During daylight, they hide in long grass and are fed only once a day, at dusk. As construction will be undertaken during daylight hours, the risk of disturbance is limited to physical disturbance of young rather than disturbance and displacement of the mother. As young hares are able to move freely, mortality is unlikely to result from construction activities. Overall, direct impacts upon hare resulting from the construction phase will have ***no likely significant effect***. For Irish hare in the context of the surrounding landscape, which

provides abundant suitable habitat, the potential indirect impacts resulting from construction will have ***no likely significant effect***. The effects are concluded the same for all turbine options.

6.4.2.1.7 Bats

The construction phase is anticipated to induce inevitable impacts, primarily manifesting as habitat loss/alteration and disturbances necessary for various construction activities, including the establishment of site access routes, turbine bases, hardstand areas, substation and Battery Energy Storage System, and the proposed borrow pit in the south of the site.

Throughout the construction phase, tree felling operations (under license) will be conducted to reduce turbulence around turbines and, in accordance with recommendations outlined by NatureScot *et al.* (2021), to ensure a minimum standoff distance of at least 50 meters between turbine swept areas and habitat features used by bats (50 m bat feature buffer).

The construction phase for the proposed project is expected to be 18-months, resulting in disturbance effects that are considered temporary or short-term. However, the timing of construction activities can have specific impacts on fauna. For instance, concerning bats, if construction works are scheduled during the night, the presence of lighting and noise near foraging and commuting habitats could prove detrimental for those populations. This may create barriers for more sensitive species such as brown long-eared bats and *Myotis* species, potentially impeding their passage or making them more vulnerable to predators. Alternatively, it could attract other more common species such as pipistrelles.

The loss of a (potential) roost or swarming site due to demolition or disturbance during construction would constitute a very significant adverse impact of a proposed project on bats. Direct impacts on bats resulting from wind farm construction may include vegetation removal, leading to the loss of potential roost sites and foraging habitats. Other significant (indirect) impacts might include noise disturbance near roost sites, changes in insect productivity in foraging sites due to lighting or changes in the vegetation composition. Although usually considered as source of indirect impacts, lighting and noise can also be a cause of direct impacts, such as the barriers created by lighting or noise in more sensitive/rare species cited above

Habitat loss

Site access routes

Vegetation clearance will be necessary during the construction of some sections of the site's access route to enable access and construction activities, including 'punching' holes through hedgerows. There are some low, moderate and high potential roost features proposed to be felled particularly around T.4 and T.10. Hedgerows serve as crucial commuting and foraging grounds for the local bat populations and are essential components for habitat connectivity within the site. Therefore, without mitigation measures, even partial removal of these hedgerows constitutes a ***likely significant effect*** on local bat populations. The access track towards T.4 requires some vegetation removal to the east of the turbine location. There was no detector present at this location to assess the bat activity in this area, and so, there is only comparable data from detectors D.01 and D.10 which were placed within similar habitat. While the absence of data introduces complexities to the interpretation of survey results, the locations surveyed in 2022 provide appropriate data for assessment of all habitat types within the Site in accordance with NatureScot (2021) and account for potential movement of turbines subject to design change including the finalised layout for the proposed project. A roost survey and transect activity survey were conducted in this area. During the roost survey, there was multiple species foraging and commuting around this treeline. Utilising professional judgement and the data available from detectors of similar habitat and taking a pre-cautionary approach in light of the lack of a detector within this specific area around T.4, it is anticipated that the vegetation removal here will have direct and indirect impacts on the local bat population in the absence of

mitigation measures. Therefore, construction of T4 access track will have a ***likely significant effect*** at a ***Local scale.*** The effects are concluded the same for all turbine options.

There is also some proposed vegetation removal south of T.7 at the stone bridge along the Rossesstown Road (identified as F.148 Figure 6. 13) (There was a confirmed common and soprano pipistrelle roost in this bridge. Although no works will be associated with the bridge and therefore no direct impacts to the roosting population. The proposed felling nearby and machinery crossing over the bridge will have potential for noise and lighting impacts. Therefore, indirect impacts on the roosting population at the bridge will have a ***likely significant effect*** at a ***Local scale.*** The effects are concluded the same for all turbine options.

There is proposed tree removal on the eastern edge of the southern woodland near T.9 between F.115 and F.116. The indirect impacts due to fragmentation of linear features will have a ***likely significant effect*** at a ***Local scale.*** The effects are concluded the same for all turbine options.

Turbine bases and hardstand areas

Vegetation clearance, including the removal of hedgerows, will be necessary during the construction of the turbine bases and hardstand areas. Due to the size of the Site the habitat being removed has low to moderate roosting and foraging potential. The removal of hedgerow may cause some fragmented pathways for commuting and may impact the species which rely heavily on linear features for commuting and foraging (refer to Figure 6. 15). The removal of vegetation will, therefore, have a ***significant direct and indirect effect*** at the ***Local scale*** on the local bat populations. The effects are concluded the same for all turbine options.

The woodland to the south of the Site is considered as a "high" classed roost resource due to the multiple mature trees with moderate and high classed roosting features. While there are no proposed works within the woodland, indirect impacts from construction are anticipated. The impacts, if not mitigated, will have a ***significant effect*** at the ***Local scale*** on the bat population utilising the woodland and connecting features. The effects are concluded the same for all turbine options.

Substation & Battery Energy Storage System (BESS)

The substation and BESS are proposed to be installed within an improved grassland field. A potential roost feature survey carried out on the 8th February 2024 has shown that this area is of negligible roosting potential. Given the "high" classed woodland roost resource, the Brittas castle and the river Suir all within close proximity, the area in which the substation is proposed should not attract much activity from bats and as a result Therefore, there will be ***no likely significant effect*** from construction of the substation and BESS.

Borrow pit

To source material for site works it is proposed to excavate a borrow pit on site to cut down on the traffic that would be required to transport aggregate to the site. The borrow pit is located within the southern section of the Site, near the woodland with "high" classed roost resource. While there are no trees proposed to be removed, therefore, ***no direct likely significant effects***, linking hedgerow and surrounding habitat will be removed as part of the works. There will, therefore, be a ***likely significant indirect effect*** at a ***Local Scale*** due to the potential fragmentation of commuting corridors.

Artificial Lighting

Lights infrastructure and machinery during construction may directly or indirectly contribute to increased/decreased bat activity. For example, bats may orient towards or away from light of certain wavelengths during migration (Guidance Note GN08/23). For several years, studies have recorded that faster-flying species can congregate around white light sources (Guidance Note GN08/23), species such as: Leisler's and pipistrelle. This is particularly true for light sources with ultra-violet spectrum light. Other species, such as *Myotis* and brown long-eared avoid light sources and have shown to decrease in activity. While it is proposed that works will be

undertaken in day light hours, lighting will be required throughout the construction phase as part of the security measures and activities taking place outside the aforementioned day light hours.

Due to the level of activity within the Site, potential impacts from artificial light, if not mitigated, will have a ***likely significant effect*** at the ***Local scale*** on the bat population.

Noise

Indirect displacement from potential roosting locations and foraging areas could occur in response to noise from construction activities which could cause avoidance behaviour in individuals. Behavioural avoidance is more likely to occur in areas of higher construction activity (e.g. the borrow pit) and plant machinery movement. Therefore, impacts from noise will have a ***likely significant effect*** at the ***Local scale*** on the bat population.

6.4.3 Operation phase impacts

Operational impacts of the proposed project are considered as those emanating from the footprint of the development, including turbines, hardstands, access tracks and substation and BESS, along with mitigation measures such as the maintenance of the bat buffer. As the grid connection is underground and avoids any notable sensitive habitats, once installed it is considered that there will be no operational impacts due to underground cabling/ducting. Additionally, the TDR is not predicted to have any impacts during the operational phase as the materials and turbines for construction would have been already delivered using the route.

The proposed operational lifespan for the wind farm is 35 years, therefore, effects can be considered *long-term effects* if lasting 15 to 60 years (EPA, 2017). As the footprint of the proposed project is within a landscape that has been highly modified by agriculture and agroforestry, it is considered that effects, specifically in relation to habitat loss are fully *reversible* (EPA, 2017).

6.4.3.1 Potential sources of direct and indirect impacts during the Operational Phase

Sources for impacts during the operational phase have the potential to result in both direct and indirect impacts; and sources for potential impacts are summarised as follows:

Potential sources of direct operational phase impacts of wind farms, include:

- Collisions or barotrauma risk with turbines for bats; and
- Disturbance to other existing mammals.

Potential sources of indirect operational phase impacts of wind farms, include:

- Collection/drainage of surface water runoff;
- Operational activities and servicing- though this will be limited to relatively few visits per year and will not be considered to add significantly to existing/background levels of human activity in the area;
- Displacement effect of operating turbines; and
- Displacement effects of lighting for substation.

6.4.3.1.1 International Designated sites

As detailed in the NIS (APEM, 2024) and summarised in Section 6.3.2.1 of this Chapter, only one internationally-designated site was identified as falling within the potential zone of influence of the proposed project. The Lower River Suir SAC, has a hydrological connection to the proposed project.

The main source of potential downstream impacts on water quality during the operational phase is likely to come from ground exposed by felling operations to create bat feature buffers. The risk of run-off acting on bare ground will occur over a short-term, as the felled area will revegetate over one or two years. There is also potential for poorly designed, engineered and/or constructed wind farm infrastructure, to result in increased runoff and sedimentation, specifically drainage associated with turbine hardstands and access tracks. Potential for any accidental hydrocarbon pollution during the operational phase of the project would be limited to rare accidental spillages from small volumes of service vehicles periodically accessing the proposed project Site. There is also no risk of cement/concrete entering watercourses. Due to the short-term nature of the potential impacts during operation and the small likelihood of the impacts reaching a watercourse, there are ***no likely significant effects*** due to emissions to water during the operational phase of the proposed project. The effects are concluded the same for all turbine options.

There is also a risk of introduction of invasive alien species during the operational phase, through regular vegetation maintenance and machinery / tools / personnel entering the site from elsewhere. However, due to the amount of personnel needed to undertake the maintenance, this is extremely unlikely. There are ***no likely significant effects*** due to invasive alien species during the operational phase of the proposed project. The effects are concluded the same for all turbine options.

Disturbance impacts on otters could also arise with human activity during maintenance operations and use of artificial lighting, however, due to the low level of workers required during normal maintenance (APEM, 2024) this is extremely unlikely. There are ***no likely significant effects*** on otters during the operational phase of the proposed project. The effects are concluded the same for all turbine options.

6.4.3.1.2 National Designated sites

There are no source-receptor pathways between the proposed project and nationally designed sites NHAs.

Ormond's mill, Loughmoe, Templemore, Co. Tipperary pNHA [Site Code: 002066] site c. 3.5 km north of the proposed project. This mill is designated for its colony of Natterer's bat and brown long-eared bats. While the proposed project has potential to indirectly effect the populations of the pNHA due to loss of foraging habitat, data collected during the 2022 static deployments shows low activity from both these species at the proposed project Site. While it is assumed the two species may commute to the proposed project Site using the River Suir, the proposed project Site is beyond the foraging range (*c.* 2.5 km) of the two species. Furthermore, the 2022 static deployments show low activity from both these species. Therefore, ***no likely significant effects*** are anticipated on the pNHA from the proposed project for all turbine options.

Refer also to operational impacts on bats below.

6.4.3.1.3 Habitats

Potential direct impacts on habitats during the operational phase are considered to largely relate to maintenance of the bat buffers already cleared during the construction phase. Habitats such as the wet grassland, marsh or fen could be negatively affected by accumulations of dust from track out of vehicles accessing the site for maintenance. However, due to the low level of workers/ machinery required during normal maintenance (APEM,

2024) this is extremely unlikely. There are ***no likely significant effects*** on habitats during the operational phase of the proposed project. The effects are concluded the same for all turbine options.

There is also a risk of introduction of invasive alien species during the operational phase, through regular vegetation maintenance and machinery / tools / personnel entering the site from elsewhere. However, due to the amount of personnel needed to undertake the maintenance, this is extremely unlikely. There are ***no likely significant effects*** due to invasive alien species during the operational phase of the proposed project. The effects are concluded the same for all turbine options.

6.4.3.1.4 Aquatic ecology

The main sources of potential downstream impacts on water quality during the operations phase is likely to come from maintenance of the ground exposed by the habitat clearance operations to create the bat feature buffers during the construction phase, if not managed appropriately. However, Due to the short-term nature of the potential impacts (1-2 years to revegetate) during operation and the small likelihood of the impacts reaching a watercourse, there are ***no likely significant effects*** due to emissions to water during the operational phase of the proposed project. The effects are concluded the same for all turbine options.

This could enter watercourses. Invasive species could also negatively affect aquatic ecology during the operational phase. Invasive alien species can affect soil stability, which could also run-off into watercourses on the site, as well as colonise riverbanks and affect light levels which in turn can affect habitat suitability for salmonids. However, due to the amount of personnel needed to undertake the maintenance, this is extremely unlikely. There are ***no likely significant effects*** due to invasive alien species during the operational phase of the proposed project. The effects are concluded the same for all turbine options.

6.4.3.1.5 Other taxa

No evidence of breeding was recorded during the current surveys of the site, with the closest recorded larval web being c. 470m from the proposed infrastructure. Habitat degradation, whether through vegetation clearance for maintenance or bat buffers, or through dust emissions or surface water run-off, could reduce habitat suitability for foraging adults. Due to the distance from the nearest recorded breeding evidence, this is unlikely to be significant. There are ***no likely significant effects*** on marsh fritillary during the operational phase of the proposed project

6.4.3.1.6 Terrestrial (non-volant) mammals

Based on habitat availability and/or occurrence within the proposed project Site four species of protected mammal were considered as KERs; including: otter, badger, pine marten and hare. Impacts on Otter are covered in the accompanying NIS as this is an Annex II species (APEM, 2024).

As there is no habitat removal required during the operational phase, only the maintenance of habitats already removed during the construction phase, there will be ***no direct likely significant effects*** on mammals during the operation of the proposed project.

Maintenance of the bat buffers has potential to displace or disturb mammal species utilising the Site. However, due to the amount of personnel/ machinery needed to undertake the maintenance, this is extremely unlikely. Furthermore, in general, woodland areas have been avoided during the design of the proposed project, this habitat provides shelter in an otherwise agricultural type of landscape and will continue to be used by mammals during the operational phase. There are ***no indirect likely significant effects*** on mammals during the operation of the proposed project.

6.4.3.1.7 Bats

6.4.3.1.7.1 Bat collision risk assessment

Site risk level Assessment (Stage 1)

Analysis of the baseline data collected during the 2022 and 2023 surveys reveals a notable heterogeneity in bat habitat suitability across the site. The overall site exhibits moderate to- high quality features for bat foraging and roosting, and certain specific habitats within the site are heavily utilised by commuting and foraging bats. Although only one confirmed roost was identified during the surveys, multiple moderate to high potential roosting features were observed, suggesting a likelihood of bats utilising these on a transitional basis. Key features supporting bat populations within the site include mature tree lines and woodlands, hedgerows, and water courses. The overall habitat risk of the site is assessed as **Moderate** (**Error! Reference source not found.**)

However, given the highly heterogeneous nature of the site, habitat risk levels vary from Low to High depending on specific locations within the area. **Error! Reference source not found.**summarises the habitat risk for each t urbine (T), detector and detector at height (D. or H.) locations.

Table 6-20: Habitat risk assessment for overall site and specific locations within the proposed project site.

Location	Habitat risk assessment	Rationale
Overall site	**Moderate**	The overall area has features presenting risk levels from low to high, along with the River Suir and linear features providing good connectivity within the site.
D.01	**Moderate**	There is a mature beech treeline within 300m of this detector location which contains “moderate” roosting potential trees. There is also good connectivity due to the presence of the River Suir and hedgerows bordering fields.
D.02	**Moderate**	Similar to D.01.
D.03	**Low**	There is one potential low roost feature within 300 m of this detector location. The remaining treelines contain low potential trees. There are very few linear features presence also.
D.04	**High**	In the woodland, there are multiple moderate and high roosting potential trees within 300 m of this detector location. High activity from Leisler’s bats during spring, suggesting a swarming or migration event.
D.05	**High**	There are multiple moderate and high roosting potential trees within 300 m of the turbine locations. The River Suir is also just outside to the east of the 300 m buffer, creating high foraging potential for bats.
D.06	**Moderate**	No potential moderate/high roost features, however some low roost features. This detector is near to the River Suir that offers high quality foraging habitat for bats.
D.07	**Moderate**	Similarly to D.06, there are multiple features of low to moderate roosting potential. There is also the River Suir to the west of this location, offering high quality foraging habitats for bats.
D.08	**Moderate**	There is one feature (stone bridge F.148) of high potential, which was confirmed as a roost. There is also the River Suir beside this location offering high quality foraging habitat. There is one moderate roosting feature and two features of low roosting potential in this area.
D.09	**Moderate**	One roosting feature of moderate potential is in this area, along with the River Suir creating high quality foraging habitat. This location had high activity from Leisler’s bats during autumn.
D.10	**Low**	No potential moderate/high roost features and low foraging quality habitat due to few linear features present.
H.1	**Low**	No potential moderate/high roost features nearby. Open area with few linear features present for foraging and commuting.
T.1	**Moderate**	Similar to D.01.

Location	Habitat risk assessment	Rationale
T.2	Moderate	Similar to D.01, however, no potential roost features identified in this area.
T.3	Moderate	Similar as D.01, with low roosting features present, and linear features and the River Suir passing through area creating high quality foraging habitat.
T.4	Moderate	Roosting features of low to moderate present, and foraging potential within the "T"-shaped treeline, which is proposed to be felled, creating a loss of foraging and roosting habitat.
T.5	Low	Similar to D.10.
T.6	Low	Similar to D.03.
T.7	Moderate	Similar to D.09.
T.8	Moderate	Two moderate roosting features identified. Woodland to the south of this location within the 300 m buffer is of low- high roosting potential and of high foraging potential. High Leisler's activity at this woodland in spring.
T.9	High	Multiple roosting features of low to high present within this woodland, and the River Suir to the east of this location creating high quality foraging habitat.
T.10	High	Similar to T.09.

According to the criteria outlined in NatureScot, 2021 for classifying project size, the proposed 10 turbines could be categorised as a small project, regarding only to the number of turbines (≥ 10 turbines). However, turbine models to be employed exceed 100 meters in height, categorising a large project. Therefore, considering both aspects, the project size is assessed as **Medium**.

Following both habitat risk and project size assessments, the overall site risk was categorized as **medium risk (3)**. Considering the heterogeneity within the site mentioned above, different locations have different risk associated. Table 6. 20 presents the site risk assessment of turbine (T), detector and detector at height (D. or H.) locations.

Table 6. 20: Site risk assessment (green (1-2) = lowest/low risk, yellow (3) = moderate risk, red (4-5) = high/highest risk) for overall site and specific locations within the Brittas proposed project site.

Location	Habitat risk assessment	Project size	Site risk level (1-5)
Overall site	Moderate	Medium	Moderate (3)
D.01	Moderate	Medium	Moderate (3)
D.02	Moderate	Medium	Low (2)
D.03	Low	Medium	Low (2)
D.04	High	Medium	High (4)
D.05	High	Medium	High (4)
D.06	Moderate	Medium	Moderate (3)
D.07	Moderate	Medium	Moderate (3)

Location	Habitat risk assessment	Project size	Site risk level (1-5)
D.08	Moderate	Medium	Moderate (3)
D.09	Moderate	Medium	Moderate (3)
D.10	Low	Medium	Low (2)
H.01	Low	Medium	Low (2)
T.1	Moderate	Medium	Moderate (3)
T.2	Moderate	Medium	Moderate (3)
T.3	Moderate	Medium	Moderate (3)
T.4	Moderate	Medium	Moderate (3)
T.5	Low	Medium	Low (2)
T.6	Low	Medium	Low (2)
T.7	Moderate	Medium	Moderate (3)
T.8	Moderate	Medium	Moderate (3)
T.9	High	Medium	High (4)
T.10	High	Medium	High (4)

6.4.3.1.7.2 Overall site bat risk level assessment (stage 2)

The overall bat collision risk level for the site was determined to be **3 (low risk)**. Specifically, Leisler's bat, common pipistrelles, and soprano pipistrelles were assessed as having a medium risk level of 9, while Nathusius' pipistrelle was rated as a low risk level of 3 (Table 6. 20). Individually, Leisler's bat showed an overall high-risk level at D.04, being high at D.04 in spring and D.07 in summer. They showed an overall high-risk in spring. Common pipistrelle showed overall high-risk levels at D.06 and D.07, being high at D.05, D.06, D.07 and D.08 in spring, D.07 in summer and D.07 in autumn. They showed an overall high-risk in spring. Soprano pipistrelles showed overall high-risk levels at D.05, D.06 and D.07 in spring and D.05 and D.07 in summer. They showed an overall high-risk in the autumn season. Table 6. 21 presents the bat risk assessment for the static detector locations (designated as D.XX or H.01) by season, highlighting the individual risk assessment for each high collision risk species identified on the site.

Table 6. 21: Bat risk assessment (n (0-4) = low risk, (5-12) = medium risk, (15-25) = high risk) for the overall site and specific static detector locations

		Bat risk level						
		Overall Bat risk level	*Myotis* spp. risk levels	Leisler's bat risk level	Nathusius' pipistrelle risk level	Common pipistrelle risk level	Soprano pipistrelle risk level	Brown long-eared risk level
All seasons	Site overall	3	3	9	0	9	9	3
	D.01	3	3	3	0	3	3	3
	D.02	3	3	3	0	3	3	3
	D.03	2	2	2	0	2	2	2
	D.04	4	4	20	0	4	12	4
	D.05	12	4	12	0	12	20	4
	D.06	3	3	3	0	15	9	3
	D.07	9	3	9	0	15	15	3
	D.08	3	3	3	0	9	3	3
	D.09	3	3	9	0	3	3	3
	D.10	2	2	2	0	2	2	2
Spring	Site overall	9	3	15	0	15	15	3
	D.01	3	3	9	0	3	3	3
	D.02	3	3	9	0	3	3	3
	D.03	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	D.04	12	4	20	0	12	4	4
	D.05	12	4	12	0	20	20	4
	D.06	15	3	3	0	15	15	3
	D.07	3	3	9	0	15	15	3
	D.08	3	3	9	0	15	9	3
	D.09	3	3	9	0	9	3	3
	D.10	2	2	2	0	2	2	2
Summer	Site overall	3	3	3	0	3	9	3
	D.01	3	3	3	0	3	3	3

		Bat risk level						
		Overall Bat risk level	*Myotis* spp. risk levels	Leisler's bat risk level	Nathusius' pipistrelle risk level	Common pipistrelle risk level	Soprano pipistrelle risk level	Brown long-eared risk level
	D.02	3	3	3	0	3	3	3
	D.03	2	2	2	0	2	2	2
	D.04	4	4	4	0	4	12	4
	D.05	12	4	4	0	4	20	4
	D.06	3	3	3	0	3	3	3
	D.07	9	3	15	0	15	15	3
	D.08	3	3	3	0	3	3	3
	D.09	3	3	3	0	3	3	3
	D.10	2	2	2	2	2	2	2
Autumn	Site overall	3	3	9	0	3	15	3
	D.01	3	3	3	0	3	3	3
	D.02	3	3	3	0	3	3	3
	D.03	2	2	2	0	2	2	2
	D.04	4	4	4	0	4	4	4
	D.05	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	D.06	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	D.07	3	3	3	0	15	9	0
	D.08	3	3	3	0	3	3	0
	D.09	3	3	9	0	3	3	0
	D.10	0	2	2	0	6	2	0
2023	H.01	0	2	2	0	2	0	0

Collision risk evaluation at turbine T.1

Turbine T.1 is proposed for installation nearby the area monitored by detector D.01, indicating a comparable bat collision risk level to that assessed for D.01. Consequently, in accordance with the findings outlined in Table 6. 21 turbine T.1 when operational is anticipated to pose **low collision risk level** to overall bat species, with a risk score of 3 across all seasons including Leisler's bat, common pipistrelles, and soprano pipistrelles (high collision risk species). However, during the spring season Leisler's bats individually scored a risk value of 9 (medium risk potential for collision).

Due to the absence of bat activity recorded at this site, the risk assessment for Nathusius' pipistrelle was determined to be 0, signifying **low collision risk**.

The sampled location D.01 holds significance in gauging potential bat activity and species dynamics following landscape alterations resulting from the removal of linear features for turbine installation and during operation . Thus, and as indicated by D.01 collision risk assessment, this landscape change may marginally elevate the overall bat risk associated with the turbine to a score of 3 during the operational phase.

In conclusion, **the overall collision risk may be considered low** (including for high collision risk bat species such as Leisler's bat, common pipistrelles soprano pipistrelles and Nathusius' pipistrelle).

Collision risk evaluation at turbine T.2

Turbine T.2 is proposed to be located in an area of improved grassland, with the River Suir to the north of this location. There are some hedgerows within this 300 m buffer with one part of the hedgerow to the west of the turbine location proposed for removal. While there was no detector deployed in this area in 2022, given the habitat characteristics and features observed at the proposed T.2 location, using a precautionary approach, it is assessed that the collision risk will be similar to that of D.01 (refer above).

Therefore, when operational T.2 is anticipated to pose **low collision risk level** to overall bat species, with a risk score of 3 across all seasons including Leisler's bat, common pipistrelles, and soprano pipistrelles (high collision risk species). However, during the spring season Leisler's bats individually scored a risk value of 9 (medium risk potential for collision).

In conclusion, **the overall collision risk may be considered low** (including for high collision risk bat species such as Leisler's bat, common pipistrelles soprano pipistrelles and Nathusius' pipistrelle).

Collision risk evaluation at turbine T.3

Turbine T.3 is proposed to be located in an area of improved grassland, with the River Suir to the west of this location. There are some hedgerows within this 300 m buffer with one part of the hedgerow going from west to east directly north of the turbine location and one part going from north to south of the turbine location proposed for removal. While there was no detector deployed in this area in 2022, given the habitat characteristics and features observed at the proposed T.3 location, using a precautionary approach, it is assessed that the collision risk will be similar to that of D.01 (refer above).

Therefore, when operational T.3 is anticipated to pose **low collision risk level** to overall bat species, with a collision risk score of 3 across all seasons including Leisler's bat, common pipistrelles, and soprano pipistrelles (high collision risk species). However, during the spring season Leisler's bats individually scored a risk value of 9 (medium risk potential for collision).

In conclusion, the **overall collision risk may be considered low** (including for high collision risk bat species such as Leisler's bat, common pipistrelles soprano pipistrelles and Nathusius' pipistrelle).

Collision risk evaluation at turbine T.4

Turbine T.4 is the most northeasterly turbine within the Site. It is proposed to be located in an area of improved grassland, with the "T"-shaped treeline. While there was no detector deployed in this area in 2022, given the habitat characteristics and features observed at the proposed T.4 location, using a precautionary approach, it is assessed that the collision risk will be similar to that of T.5 and D.10 (refer below).

Therefore, when operational T.4 is anticipated to pose **low collision risk level** to overall bat species, with a risk score of 3 across all seasons including Leisler's bat, common pipistrelles, and soprano pipistrelles (high collision risk species). However, during the spring season Leisler's bats individually scored a risk value of 9 (medium risk potential for collision).

In conclusion, the **overall collision risk may be considered low** (including for high collision risk bat species such as Leisler's bat, soprano pipistrelles and Nathusius' pipistrelle). However, for common pipistrelles during the autumn months, the collision risk may be considered medium.

Collision risk evaluation at turbine T.5

Turbine T.5 is proposed for installation near the area monitored by detector D.10, indicating a similar bat collision risk level to that assessed for D.10. Additionally, the sampled location D.10 plays a crucial role in assessing potential bat activity and species dynamics in response to landscape alterations resulting from the removal of plantation habitat for turbine installation and operation.

Accordingly, in line with the findings presented in Table 6. 21, the operation of turbine T.5 is expected to present a **low collision risk level** to overall bat species, with a **collision risk score of 2** across all seasons, for Leisler's bat and soprano pipistrelle. Common pipistrelle showed a **medium collision risk level** in autumn, with **a score of 9**.

Given the absence of recorded bat activity at this site, the risk score for Nathusius' pipistrelle was determined to be **0**, signifying **low risk**.

In conclusion, the **overall collision risk may be considered low** (including for high collision risk bat species such as Leisler's bat, soprano pipistrelles and Nathusius' pipistrelle).However, for common pipistrelles during the autumn months, the collision risk may be considered medium.

Collision risk evaluation at turbine T.6

Turbine T.6 is proposed for installation near the area monitored by detector D.03, indicating a similar bat collision risk level to that assessed for D.03. There is no proposed removal of hedgerows and treelines within the 300 m buffer of T.6.

Accordingly, in line with the findings presented in Table 6. 21, the operation of turbine T.6 is expected to present a **low collision risk level** to overall bat species, with a **collision risk score of 2** across all seasons, including for Leisler's bat, common pipistrelle, and soprano pipistrelle. The detector at height was also in close proximity (*c.* 100 m) to T.6, which identified Leisler's bats, common pipistrelle and soprano pipistrelle activity. These three species all scored **a collision risk of 2** (**low risk**).

Given the absence of recorded bat activity at this site, the risk score for Nathusius' pipistrelle was determined to be **0**, signifying **low risk.**

In conclusion, **the overall collision risk may be considered low** (including for high collision risk bat species such as Leisler's bat, common pipistrelle, soprano pipistrelles and Nathusius' pipistrelle).

Collision risk evaluation at turbine T.7

Turbine T.7 is proposed for installation near the area monitored by detector D.09, indicating a similar bat collision risk level to that assessed for D.09. Additionally, the sampled location D.09 plays a crucial role in assessing potential bat activity and species dynamics in response to landscape alterations resulting from the removal of hedgerows and treelines for turbine operation.

Accordingly, in line with the findings presented in Table 6. 21, the operation of turbine T.7 is expected to present a **low collision risk level** to overall bat species, with a **collision risk score of 3** across all seasons, for common pipistrelle, and soprano pipistrelle. However, common pipistrelles showed a **collision risk score of 9 (medium risk**) in spring.

Leisler's bats scored an overall **collision risk score of 9 (medium collision risk)**, particularly in spring and autumn.

Given the absence of recorded bat activity at this site, the risk score for Nathusius' pipistrelle was determined to be **0**, signifying **low risk**.

In conclusion, while the **overall collision risk may be considered low** (including for high collision risk bat species common pipistrelle, soprano pipistrelles and Nathusius' pipistrelle), there are seasons of higher activity that are considered medium for common pipistrelle (spring). The collision risk for Leisler's bat may be considered medium.

Collision risk evaluation at turbine T.8

Turbine T.8 is proposed for installation near the area monitored between detectors D.03 and D.04, allowing these two detectors' collision risk assessments to offer insights into the potential risks' turbine T.8 might pose to bats. Additionally, the sampled location D.03 and D.04 play crucial roles in assessing potential bat activity and species dynamics in response to landscape alterations resulting from the removal of hedgerows and treelines for turbine operation.

Accordingly, in line with the findings presented in Table 6. 21 noyothe operation of turbine T.8 is expected to present a **low collision risk level** to overall bat species with a **collision risk score ranging between 2 and 4** across all seasons. However, the overall bat collision risk for D.04 in spring was **12 (medium).**

However, the collision risk score for D.04 shows Leisler's bats scored a collision risk level of **20 (high**) across all seasons, while they scored a **collision risk score of 2 (low**) at D.03 across all seasons.

Soprano pipistrelles also scored a **collision risk level of 12 (medium**) at D.04 across all seasons.

Common pipistrelles scored a **collision risk level of 12 (medium)** in spring.

Given the absence of recorded bat activity at both these locations, the risk score for Nathusius' pipistrelle was determined to be 0, signifying low risk.

In conclusion, while the **overall collision risk may be considered low** (including for high collision risk bat species common pipistrelle, soprano pipistrelles and Nathusius' pipistrelle), there are seasons of higher activity that are considered medium for common pipistrelle (spring) and soprano pipistrelle (summer). Leisler's bat are considered a **high collision risk** in spring and summer.

Collision risk evaluation at turbine T.9

Turbine T.9 is proposed for installation in the south of the site. While there was no detector deployed in this area in 2022, given the habitat characteristics and features observed at the proposed T.9 location, using a precautionary approach, it is assessed that the collision risk will be similar to that of D.04, D05 and D.08. D.04 is to the west of

T.9, D.05 to the southwest and D.08 to the northeast. Additionally, the sampled locations, D.04, D.05 and D.08, play crucial roles in assessing potential bat activity and species dynamics in response to landscape alterations resulting from the removal of trees withing this southern woodland and removal of hedgerows for turbine operation.

Accordingly, in line with the findings presented in Table 6. 21 the operation of turbine T.9 is expected to present a **medium collision risk level** to overall bat species, with a **collision risk score of 12** across all seasons, including for Leisler's bat and common pipistrelle. Soprano pipistrelle, however, presented a **collision risk level of 20 (high)**.

Across all seasons, the collision risk score was **4 (low)** for D.04, **12 (medium)** for D.05 and **3 (low)** for D.08. however, D.04 shows Leisler's bats scored a **collision risk level of 20 (high)** and common pipistrelles scored a **collision risk level of 9 (medium)** at D.08 across all seasons.

Leisler's bat, common pipistrelle and soprano pipistrelle all present both **medium** and **high collision risk levels** in spring. With a **medium** (D.05 and D.08) and **high** (D.04) for Leisler's bat, **medium** (D.04) and **high** (D.05 and D.08) for common pipistrelle and **medium** (D.08) and **high** (D.05) for soprano pipistrelle. Soprano pipistrelles also showed **medium** (D.04) and **high** (D.05) **collision risk levels** during the summer season.

Given the absence of recorded bat activity at this site, the risk score for Nathusius' pipistrelle was determined to be 0, signifying low risk.

In conclusion, T.9 is considered to pose a **medium to high collision risk** for Leisler's bat, common pipistrelle and soprano pipistrelles (high collision risk bat species) and a low **collision risk for** Nathusius' pipistrelle.

Collision risk evaluation at turbine T.10

Turbine T.10 is proposed for installation in the south of the site. It is the most southern turbine in the site. While there was no detector deployed in this area in 2022, given the habitat characteristics and features observed at the proposed T.10 location, using a precautionary approach, it is assessed that the collision risk will be similar to that of D.05, D.06 and D.07. D.05 is to the northwest of T.10, D.06 to the southeast and D.07 to the northeast. Additionally, the sampled location D.05, D.06 and D.07 play crucial roles in assessing potential bat activity and species dynamics in response to landscape alterations resulting from the removal of trees within this woodland for turbine operation.

Accordingly, in line with the findings presented in Table 6. 21the operation of turbine T.10 is expected to present a **medium collision risk level** to overall bat species, with a **risk score ranging between 9** (D.07) and **12** (D.05) across all seasons, including for Leisler's bat, common pipistrelle, and soprano pipistrelle.

Given the absence of recorded bat activity at this site, the risk score for Nathusius' pipistrelle was determined to be 0, signifying low risk.

Common pipistrelles scored a **collision risk level of 12 (medium**), **15 (high**), and **15 (high)** respectively across all seasons and soprano pipistrelles scored a **collision risk level of 20 (high), 9 (medium)** and **15 (high)** respectively across all seasons.

In spring, Leisler's bats scored a **collision risk level of 12 (medium)** at D.05 and **9 (medium) at** D.07. Both common pipistrelles and soprano pipistrelles scored **high collision risk levels 20 (high), 15 (high)** and **15 (high)** at D.05, D.06 and D.07 respectively.

In summer, Leisler's bats and common pipistrelles scored a **collision risk level of 15 (high risk**) at D.07. Soprano pipistrelles scored a **collision risk level of 20 (high risk)** at D.05 and **15 (high risk)** at D.07.

In autumn common and soprano pipistrelles scored a **collision risk level of 15 (high)** and **9 (medium) respectively**.

In conclusion, T.10 is considered to pose a **medium to high collision risk** for Leisler's bat, common pipistrelle and soprano pipistrelles (high collision risk bat species) and a low **collision risk for** Nathusius' pipistrelle.

Collision risk evaluation of the detector at height location

The detector at height was deployed on the existing temporary meteorological mast located near T.6. It showed an **overall collision risk score of 0** (**low risk)** across the deployment. Individually, Leisler's bats, common and soprano pipistrelle all presented a **collision risk score of 2 (low)**.

In conclusion, the **overall collision risk** for species at height may be considered **low** (including for high collision risk bat species Leisler's bat, common pipistrelle, soprano pipistrelles and Nathusius' pipistrelle).

Potential operational phase impacts to bats

Potential impacts for bats during the operational phase can be direct or indirect, including risk of collision or barotrauma (injuries to internal air cavities and blood vessels caused by sudden change in air pressure behind a moving blade), displacement and attraction (from operational turbines and substation lighting).

Among these potential impacts, direct collision and barotrauma are considered Significant direct impacts on bats, extensively documented to cause major injuries and fatalities if no adequate mitigation measures are put in place (e.g., Cryan & Barclay, 2009; Rydell *et al.,* 2010; Cryan *et al*., 2014; Arnett *et al.,* 2016; Matthews *et al.*, 2016). The Irish bat species at risk are listed in Table 6. 5.

Turbines installed in open habitat without any linear feature nearby, such as turbine T.5 or T.6, have a lower risk of collision and barotrauma. However, if turbines are located within proximity to linear features such as hedgerows, treelines, and rivers/streams, as with T.1, T.2, T.3, T.4, T.7, T.8, T.9 and T.10, there is potential for a greater occurrence of bats within the rotor-swept area, resulting in increased potential for risk of collision and barotrauma. Consequently, without appropriate mitigation measures, the collision risk may in locations where the bat risk assessment was assumed as low.

Due to the potential for collision and barotrauma being different for individual species, the potential for collision and barotrauma impacting each bat species recorded at the wind farm site are considered in the following section.

Potential for collision and barotrauma on common and soprano pipistrelles

As listed in Table 6.5, both common pipistrelle and soprano pipistrelle are classified as being at high risk of injury or mortality from turbines, attributed to either barotrauma (injuries to internal air cavities and blood vessels caused by sudden change in air pressure behind a moving blade) or collision, based on their flight and ecological behaviour. These species are often observed to be attracted to turbines, with various hypotheses proposed to explain this phenomenon (Guest *et al* 2022). Common and soprano pipistrelles typically exhibit a preference for linear habitat features such as woodland/plantation edges, scrub, treelines, hedgerows, and rivers/streams, although pipistrelles are also known to occasionally forage in open habitat (Marnel *et al.* 2022).

Recorded activity levels of these species at the Site were observed to be medium to high in similar habitats at D.05, D.06, D.07 and D.08, which are near turbines T.9 and T.10, particularly during the spring and summer seasons. Therefore, without adequate mitigation measures, potential direct collision and barotrauma on common pipistrelle and soprano pipistrelle are considered to have a ***likely Significant effect*** at the ***Local context*** during the operational phase of the proposed project. The effects are concluded the same for all turbine options.

Potential for collision and barotrauma on Nathusius pipistrelle

As indicated in Table 6.5, Nathusius' pipistrelle is classified as being at high risk of injury or fatality from turbines, attributed to either barotrauma or collision. A review of turbine-related bat fatalities in Europe (Rydell *et al.,* 2010) found that 13% of the casualties were Nathusius' pipistrelles. This species regularly flies in open habitats and at height, furthermore Nathusius' pipistrelles are strong flyers and known to be migratory, potentially flying at height during migration.

Nathusius' pipistrelle was recorded only twice during the static detector survey in 2022 (D.10 in summer and D.03 in autumn), leading to the collision risk assessment of this species for the proposed project being classed as low and, therefore there will be ***no likely Significant effect*** due to collision and barotrauma. However, based on the precautionary principle, given that the range and frequency of recordings of this species in Ireland are increasing (Roche and Langton, 2024), potential direct impact of the turbines operational phase may occur also increase.

Potential for collision and barotrauma on Leisler's bats

As indicated in Table 6.5, Leisler's bat is classified as being at high risk of injury or fatality from turbines, attributed to either barotrauma or collision. Along with their sibling species common noctule (*Nyctalus noctula*), they are amongst the most commonly recorded casualties during bat fatalities monitoring in Europe (Rydell *et al.,* 2010). Leisler's bats are usually tree-dwellers and feature strong and fast in flight, regularly foraging over the tree canopy or taking direct flights across open habitats and strong linear features like rivers at heights (Marnel *et al.* 2022) within the collision risk zone for turbines.

Recorded activity levels of Leisler's bat at the site were observed to be medium to high in similar habitats or at D.04 and D.07 which are near turbines T.8, T.9 and T.10, particularly during the spring and summer seasons. There was also moderate activity in autumn at D.09,with two nights specifically showing an increase in activity. Therefore, without adequate mitigation measures, potential direct collision and barotrauma on Leisler's bat are considered to have a ***likely Significant effect*** at the ***Local context*** during the operational phase of the proposed project. The effects are concluded the same for all turbine options.

Potential for collision and barotrauma impacts on Myotis species

As indicated in Table 6.5, bats of the genus *Myotis* are considered as being at low risk of injury or fatality from turbines, attributed to either barotrauma or collision. This is attributed to their ecological behaviour of flying at low heights and slow speeds within cluttered habitats or over water. A study (Mathews *et al*., 2016) monitoring bat fatalities at wind farms around the UK found a single carcass of a *Myotis* bat during the searches (a Natterer's bat- *Myotis nattereri*). *Myotis* species in the UK are rarely recorded flying at heights within the rotor-swept area (above 30 m) and tend to prefer a more cluttered habitat due to their short range, high frequency echolocation characteristics. Furthermore, their relatively slow flight speed allows them to manoeuvre well and therefore have the agility to avoid potential collision events (Mathews *et al*., 2016 & Rydell *et al.,* 2010).

Recorded activity levels of *Myotis* species at the site were observed to be low during all seasons. Therefore, no ***likely Significant effect*** are expected on these species from direct collision and barotrauma during the operational phase of the proposed project. The effects are concluded the same for all turbine options.

Potential for collision and barotrauma impacts on brown long-eared bat

As indicated in Table 6.5, brown long-eared bats are considered as being at low risk of injury or fatality from turbines, attributed to either barotrauma or collision. Similar to *Myotis* species, this is attributed to their ecological behaviour of flying at low heights and slow speeds within cluttered habitats or forest edges. A study (Mathews *et al.,* 2016) monitoring bat fatalities at wind farms around the UK found a single brown long-eared bat carcass during the searches. The study also showed brown long-eared bats in the UK are rarely recorded flying at heights within

the rotor-swept area (above 30 m) and tend to prefer a more cluttered habitat due to their short range, high frequency echolocation characteristics.

Recorded activity levels of brown long-eared bats at the site were observed to be low during all seasons. Therefore, no ***likely Significant effect*** are expected on these species from direct collision and barotrauma during the operational phase of the proposed project. The effects are concluded the same for all turbine options.

Potential for indirect impacts due to habitat maintenance during the Operational Phase.

As there is no habitat removal required during the operational phase, only the maintenance of habitats already removed during the construction phase, there will be ***no direct likely significant effects*** on bat species using the Site during the operation of the proposed project.

Maintenance of the bat buffers has potential to displace or disturb bat species utilising the Site. However, due to the amount of personnel/ machinery needed to undertake the maintenance, this is extremely unlikely. Furthermore, in general, woodland areas have been avoided during the design of the proposed project, this habitat provides foraging and commuting opportunity and will continue to be used by bat species during the operational phase. There are ***no indirect likely significant effects*** due to the bat buffers maintenance during the operation of the proposed project.

Potential for indirect impacts due to artificial lighting during the Operational Phase

There will be additional lighting on the substation, which in the absence of mitigation has the potential to result in the displacement of light sensitive species.

For several years, studies have recorded that faster-flying species can congregate around white light sources (Guidance Note GN08/23), species such as, Leisler's; and pipistrelle. This is particularly true for light sources with ultra-violet spectrum light. As the artificial lighting within the Site will not create barriers to movement for these species, there will be ***no indirect likely significant effects*** due to artificial lighting during the operation of the proposed project.

All resident *Myotis* and long-eared bats are light-sensitive (light-averse) species that have shown to significantly reduce in activity levels and avoid areas that are illuminated with white and amber lighting (Guidance Note GN08/23). While *Myotis* and long-eared bats have been recorded (albeit in low numbers), the areas of activity are outside that of the potential light spill area of the Substation and BESS. Using the precautionary principle, in the absence of mitigation, there will be ***likely indirect significant effects*** in the ***Local context*** due to artificial lighting during the operation of the proposed project.

6.4.4 Decommissioning phase impacts

Decommissioning phase impacts are likely to be broadly similar to construction phase impacts, in terms of disturbance through increased noise levels, ground clearance works, and reinstatement. There will also be the potential for surface water quality impacts from ground disturbance, refuelling and the storage of potentially hazardous materials onsite.

Certain aspects of activities occurring during the construction phase are anticipated to occur at reduced levels during decommissioning, such as excavation of turbine foundations that will be left in situ and covered with soil for reinstatement. Access tracks will also remain for ongoing usage as farm and forestry tracks. In addition, the use of building materials, including concrete and aggregates will not be required.

The implementation of all mitigation measures detailed in the construction phase will ensure that all such impacts are minimised or avoided. A Decommissioning Plan will be put in place prior to removal infrastructure. This will

detail specific actions aimed at protecting KERs, including all the mitigation measures specified for the construction phase. These include limitations on the working corridor, minimised impact on vegetation, protection of water quality and protection of roosting bats. A pre-decommissioning bat survey will be undertaken with the specific objective of identifying any species that may be affected by the decommissioning phase and works timed accordingly to avoid sensitive periods, i.e. not during maternity season.

6.5 Mitigation & Monitoring Measures

6.5.1 Mitigation

All potential impacts of a project must undergo thorough consideration to facilitate a three-element process – avoid, mitigate, compensate (often referred to collectively as mitigation) – ensuring that development plans are adjusted or enhanced to address these impacts as effectively as possible (Rodrigues *et al.*, 2015, Marnell *et al.*, 2022; Reason & Wray, 2023).

If significant impacts are expected, and avoidance is not possible, mitigation and compensation are both strategies used to address the negative impacts of development (Rodrigues *et al.*, 2015). Mitigation measures involve actions taken to reduce the negative effects of a development activity, while compensation measures come into play when mitigation alone is insufficient to fully address the adverse impacts. Compensation efforts aim to provide some form of reparation or offset to compensate for the potential outcomes of those impacts.

These measures should be proportionate to the size and type of impacts and the vulnerability of species to those impacts, based on thorough site surveys and impact assessments (Marnell *et al.*, 2022; Reason & Wray, 2023). When uncertainties arise that cannot be resolved, the precautionary principle should be applied if these uncertainties are significant to decision-making (Reason & Wray, 2023). However, precautionary mitigation (i.e., going ahead with mitigation before a proper survey has been undertaken), is not normally acceptable (Marnell *et al.*, 2022). Only in certain limited cases, notably where there is good evidence to indicate that the site is of very low importance and there will be negligible impacts, will it be acceptable to submit mitigation plans based on little or no survey (Marnell *et al.*, 2022). All of these measures should aim to achieve a positive outcome for biodiversity and should be clearly defined to implement the proposed mitigation, compensation, and associated monitoring required (Reason & Wray, 2023).

6.5.1.1 Mitigation–construction phase

Protection of watercourses and designated sites

Proposed mitigation measures required to prevent adverse effects on the downstream Lower River Suir SAC during construction are outlined in the Natura Impact Statement (NIS) for the proposed project- see APEM (2024). The mitigation measures included in the NIS relate to protection of water quality flowing into the Lower River Suir SAC. These mitigation measures are considered sufficient to also avoid impacts on other aquatic ecology KERs including salmonids. No further measures are deemed to be required to avoid impacts on watercourses. The NIS mitigation measures are also included in this section for clarity:

- Both the GCR and TDR have been designed to use the existing road network therefore using existing infrastructure and avoiding sensitive habitat types and avoiding unnecessary impacts on watercourses.
- Turbine locations and associated infrastructure will be placed at a minimum set-back distance of 50m from the EPA mapped watercourses. Any works taking place in the vicinity of unmapped watercourses or land drains will be undertaken in accordance with the mitigation measures set out in Chapter 9: Water and in the CEMP (Appendix 2B). The buffer zone will avoid physical damage to watercourses and associated release of sediment; and avoid the entry of suspended sediment from earthworks into watercourses.
- Seven water crossing will be required (see Chapter 9 Figure 923), including five crossings at the Wind Farm site for the internal underground cables and access tracks. The cable river crossings will involve Horizontal Directional Drilling (HDD) under the River Suir (see Chapter 2 Figure 225- 227). The cable river crossings will occur at:

1. 52.715389,-7.8064687 (underground cable crossing)
2. 52.713628,-7.8051775 (underground cable crossing))
3. 52.715096,-7.8025279 (access track crossing)
4. 52.721177,-7.7993980 (underground cable and access track crossing)
5. 52.726091,-7.7981416 (underground cable and access track crossing)

- Two additional stream crossings will be needed for the grid connection route. This will involve Horizontal Directional Drilling (HDD) under the river/stream courses. The watercourse crossing on L4120-18 (Rossestown Road) is a single span masonry arch span bridge. The 110kV cable will cross the bridge in a flatbed formation or alternatively a horizontal directional drill (HDD) methodology will be used. Descriptions of the methodologies proposed for crossing this bridge are given in subsequent sections of this report. No instream works will be required. The watercourse crossing on L8015-0 (Furze Road) is a single span masonry arch span bridge. The 110kV cable will cross the bridge in a flatbed formation or alternatively a horizontal directional drill (HDD) methodology will be used. Descriptions of the methodologies proposed crossing this bridge are given in subsequent sections of this report. No instream works will be required. Overall, in-stream works are not required along the proposed grid connection route.
- Flood attenuation will be provided to limit the flowrate into the settlement ponds during high intensity storm events so that the settlement ponds do not become overloaded. This will also attenuate the flow to the downstream watercourses. The volume of water requiring attenuation relates to direct precipitation on the tracks and other infrastructure footprint only. Temporary storage will be provided within the drainage channels by creating stone dams within them at regular intervals. The spacing of the dams is typically 100 metres but depends on the channel slope, with steeper channels requiring shorter intervals. The dams, which are constructed with small sized aggregate held in place by large aggregate, also reduce the flow rate through the drainage system and are an effective means of providing flow control. Silt fences will also provide storage and flow control.
- Working near watercourses during or after intense or prolonged rainfall events will be avoided and work will cease entirely near watercourses when it is evident that there is a risk that pollution could occur. All construction method statements will be developed in consultation with Inland Fisheries Ireland and in accordance with the details in the CEMP accompanying this application. The selection criteria and other details of the proposed crossings can be found in Chapter 03 Civil Engineering. These crossings will be subject to a Section 50 application to ensure flood risk upstream and downstream of the crossing is not increased.
- Where possible the layout of the wind farm has utilised already existing infrastructure such as access tracks, minimising the number of crossings required across the water course.
- To avoid in-stream works, HDD will be used at two locations on the Site and two locations along the GCR, for electrical cable crossings.
- The main contractor appointed for the project will be required to designate a member of staff, or engage a specific person, with experience of environmental management and monitoring of construction at wind farm sites, referred to hereafter as the “Environmental Manager” (EM). The EM will have demonstrated professional experience in managing large-scale construction works affecting ecological receptors identified within the EIAR. The EM will assume responsibility for overseeing the implementation of all environmental protective measures and mitigation measures set out in this document and in the Construction Environmental Management Plan (CEMP) (see Chapter 8 Land-Soils and Appendix 2B). The EM will be responsible for employing good working practice during all phases of the project and for

providing a briefing on environmental protection measures and ecological sensitivities of the Site to all site personnel in advance of commencement of works.

- An Ecological Clerk of Works (ECoW) will be appointed to oversee all aspects of work. The ECoW will be a suitably experienced ecologist. The ECoW will have demonstrated professional experience in managing large-scale construction works affecting ecological receptors identified within the EIAR. The ECoW will deliver weekly Toolbox Talks to contractors at the beginning of the workday before work commences and will undertake audits of the site offering guidance and due diligence and ensure that ecological mitigation measures set out in all documents are implemented, working and reviewed.
- The names and contact details of the individuals with responsibility for implementation and supervision of mitigation measures during all phases of the works will be clearly identified and displayed on notice boards at the site compounds as well as set out in documents such as the CEMP and site- specific method statements.
- A Construction and Environmental Management Plan (CEMP) has been prepared (see Chapter 8 Land-Soils and Appendix 2B) and will be updated in accordance with the parameters in the CEMP and to incorporate any planning conditions during the preconstruction and construction phases and implemented on site. The CEMP will be a key construction contract document, which will ensure that measures, considered necessary to protect the environment, prior to construction, during construction and during operation and decommissioning of the proposed project, are implemented.
- Good work practices such as those set out in *Guidelines on Protection of Fisheries During Construction Works In and Adjacent to Waters* (IFI, 2016), *Environmental Good Practice on Site Guide* (CIRIA, 2015) will be employed at all times on site during the construction of the proposed project. The CEMP submitted as part of the documentation supporting the planning application will be finalised by the appointed contractor and will be treated as a live document to be updated as required throughout the lifetime of the proposed project.
- All personnel involved with the proposed project will receive an on-site induction, prior to commencing work on the site, relating to operations and the environmentally sensitive nature of the Lower River Suir SAC and to re-emphasize the precautions that are required as well as the measures to be implemented.
- All staff and subcontractors will be required to:
    - Work to agreed plans, methods and procedures to eliminate and minimise environmental impacts;
- Attend Toolbox talks (with written confirmation of attendance) which explain the importance of avoiding emissions on-site, including pollutants, sediments and noise, and how to respond in the event of an incident to avoid or limit environmental impact;
    - Respond in the event of an incident to avoid or limit environmental impact;
    - Report all incidents immediately to their site environmental manager;
    - Monitor the workplace for potential environmental risks and alert the immediate line manager if any are observed; and
    - Co-operate as required, with site inspections.
- A felling licence will be applied for, which will set out how to deal with sensitive areas, buffer zone guidelines for aquatic zones, ground preparation and drainage, chemicals, fuel and machine oils. All associated conditions must be complied with within this licence.
- Only qualified persons shall operate machinery or equipment, with machinery and equipment checked on a regular basis to ensure they are working properly (no oil/fuel leaks etc.).

- No refuelling shall take place within 50m of any watercourse. Fuel will be stored in doubly-bunded bowsers or in bunded areas at the site compound;
- Plant nappies and spill kits will be readily available on plant equipment or when working with fuel operated heavy tools;
- To mitigate against sources of contamination, refuelling of plant and vehicles will only take place within designated areas of the site compound or in other areas specifically designated for this purpose;
- Only emergency breakdown maintenance will be carried out on site;
- Appropriate containment facilities will be provided to ensure that any spills from breakdown maintenance vehicles are contained and removed off site;
- There will be no discharge of any priority or hazardous substances to groundwater and surface waters; and
- A suitable permanent fuel and oil interceptor will be installed to deal with all substation surface water drainage. Temporary petrol and oil interceptors will be installed at the site compound for plant repairs/storage of fuel/temporary generator installation.
- For deliveries and dispensing activities, it will be ensured that:
    - Site specific procedures are in place for bulk deliveries;
    - Delivery points and vehicle routes are clearly marked;
    - Emergency procedures are displayed and a suitably sized spill kit is available at all delivery points, and staff are trained in these procedures and the use of spill kits.
- Potential leaks from delivery vehicles will be reduced by visually inspecting all delivery vehicles for major leaks. Contractors supplying concrete and crushed stone to the site will be contractually required to supply their products using roadworthy vehicles.
- Vehicles and plant will not park near or over drains and will be washed in accordance with the commitments set out above.
- Should there be an oil leak or spill, the leak or spill will be contained immediately using oil spill kits; the nearby dirty water drain outlet will be blocked with an oil absorbent boom until the fuel/oil spill has been cleaned up and all oil and any contaminated material removed from the area. This contaminated material will be properly disposed of in a licensed facility.
- The Environmental Manager will be immediately informed of the oil leak/spill and will assess the cause and the management of the clean-up of the leak or spill. They will inspect nearby drains for the presence of oil and initiate the clean-up if necessary.
- Immediate action will be facilitated by easy access to oil spill kits. An oil spill kit that includes absorbing pads and socks will be kept at the site compound and also in site vehicles and machinery.
- Correct action in the event of a leak or spill will be facilitated by training all vehicle/machinery operators in the use of the spill kits and the correct containment and cleaning up of oil spills or leaks. This training will be provided by the Environmental Manager at site induction.
- In the event of a major oil spill, a company who provide a rapid response emergency service for major fuel spills will be immediately called for assistance, their contact details will be kept in the site office and in the spill kits kept in site vehicles and machinery.

- In the case of an environmental incident or spillage, the following procedure is to be followed:
- Prepare and be in readiness to implement at all times an Emergency Response Plan (see **Appendix 2B CEMP: EMP 11**).
    - Notifying the relevant statutory authority of environmental incidents, and
    - Carrying out an investigation and producing a report regarding environmental incidents. The report of the incident and details of remedial actions taken should be made available to the relevant authority, the Design Engineer and the Construction Manager.
    - The Site Environmental Manager shall notify the Client of any complaints or environmental incidents within 24 hours of occurrence. Where significant incidents occur requiring the involvement of statutory authorities or emergency services or where any pollution events occur, the Client shall be notified within 1 hour.
- No in-stream crossing of rivers or streams by machinery will be permitted, all machinery must stay within the designated routes.
- The proposed surface water management system, including existing and proposed infrastructure, will be inspected prior to commencement of works and confirmed to be of sufficient capacity to prevent any potential emissions to water entering the watercourses on Site. Drainage measures will be implemented to attenuate runoff and guard against soil erosion / soil compaction, safeguarding local water quality.
- No in-stream works will be undertaken, and no works shall take place during periods of high rainfall in order to reduce risk of runoff into watercourses. Suitable weather windows (dry, no weather warnings or heavy rainfall expected) will be chosen when undertaking the HDD at watercourse crossings.
- There will be no concrete batching on the Site and a dedicated, bunded area will be created to cater for concrete wash-out. Any excess construction material shall be disposed of off-site in a fully licensed landfill.
- A wheel wash facility will be set up on Site for biosecurity measure to reduce the likelihood of spreading IAS. All vehicles entering / exiting the Site will be required to use the wheel wash facility. Once machinery arrives on Site, it will be checked for any vegetative material such as roots or seeds that could contain IAS. If found, this will be removed and appropriately disposed of before using the machinery on Site.
- Triple layer silt fencing will be used in the areas of highest risk of surface water run-off, and single- or double-layer silt fencing at frequent intervals along pathways towards aquatic zones. It will be the responsibility of the EM and / or the ECoW to determine which locations require triple, double- or single-layer silt fences. Silt fencing will be removed only when bare soil is revegetated, and sediment movement is no longer a risk. This will act to prevent entry to the existing drainage network of sand and gravel-sized sediment in surface water runoff. Inspection and maintenance of these structures during construction phase is critical to ensure they are fit for purpose and as such inspection will be carried out on a regular basis. They will remain in place throughout the entire construction phase. All surface water run-off within the Site will be directed into a planned drainage system. A silt fence will be erected around any spoil heaps as part of surface water management for the Site.
- The silt curtain will be installed before any works commence and will be checked daily by the EM or ECoW.
- Depending on the timing of the proposed works, different life stages of migratory fish species may be impacted by factors such as noise and disturbance associated with the installation of hardstands, or by increased sediment ingress into the watercourse during works involving excavation. Spawning and egg incubation for salmon occurs from October to February and for lamprey species from March to May,

therefore, works required for the watercourse crossing (and any other works required within 50m of watercourse), , will be carried out over summer and under supervision of the EM or EcOW, bearing in mind that juveniles of these species may be present at any time of year.

- Artificial lighting will be kept to a minimum as required for security. Light spill will be minimised near any watercourses by employing lighting restrictions. Restrictions will be in place during dark hours from 9pm to 5am such as reducing light levels, turning off lights, or using motion sensor lighting only near access roads beside watercourses. White LED lighting has been shown to have greater impacts on wildlife and so alternative warmer colour wavelengths will be used, between 2700 and 3000 Kelvin (Institute of Lighting Professionals 2018). Lighting installed near watercourses will also be directional, i.e. pointing towards the access road, with no lighting directed along the surface of the watercourse.
- While no plant species listed under the Third Schedule of the European Communities (Birds and Habitats) Regulations 2011 as 'non-native species subject to restrictions under Regulations 49' were recorded on the Site, there is potential for IAS to be introduced to the Site. The EM and ECoW will be responsible for monitoring potential introduction of IAS to the Site. If IAS are identified, the areas of IAS will be screened (fenced) off, including an appropriate buffer and no personnel or machinery will enter this area. Should the IAS be within or adjacent to the proposed construction areas or corridors, they will be managed and removed by a contractor with appropriate experience in dealing with IAS and disposed of appropriately. This will prevent machinery hitting and spreading the IAS. All personnel and machinery will follow biosecurity measures to prevent the spread of IAS.
- The 'check, clean dry' method from the Northern Ireland Environment Agency[22] and the 'Inspect, Remove, Dispose, Clean and Disinfect' method from the IFI[23] will be employed as general biosecurity measures on site for any works required within the 50m watercourse buffer, including any watercourse crossings and HDD. Any machinery, tools or equipment required within this buffer will also use the above methods post-works to avoid any contamination to other locations. This will also provide appropriate protection with regards to the spread of crayfish plague which is known to be present within the catchment.

Protection of habitats

Within the proposed project, there are several areas supporting important habitats. Annex I habitat *Molinia* meadows, poor fen and flush habitat and marsh habitats were identified.

These sensitive habitats were identified in site scope surveys and the original site layout was re-designed to avoid these areas. This involved altering the layout of the substation in the proposed substation fields. One proposed turbine was also re-located away from the southern mature woodland in which it was first placed. These areas of the southern woodlands will be retained and additional post-construction monitoring for bats will be undertaken at these locations to determine if the residual habitat feature draws bats towards the rotor swept area – see post-construction monitoring for bats (Section

).

The proposed project layout was designed to utilise existing tracks, and the infrastructural footprint is largely located within lower value habitats, including improved grassland. Likewise, areas where felling is required to

[22] https://invasivespeciesni.co.uk/what-can-i-do/check-clean-dry/check-clean-dry-resources/ (last accessed 10/09/2024)

[23] https://www.fisheriesireland.ie/what-we-do/education-and-outreach/safeguarding-and-governance/biosecurity#:~:text=Biosecurity%20is%20the%20prevention%20of,boats%2C%20protective%20gear%20and%20clothing. (last accessed 10/09/2024)

implement bat feature buffers and the lengths of treelines and hedgerows that will be removed has been kept to a minimum. Likewise, the number of locations where access tracks are required to punch through hedgerows/treelines has been limited and the areas removed will be kept to a minimum.

To avoid widespread disturbance to habitats, access within the construction site will be restricted to the footprint of the proposed works corridor. Access routes will be agreed on site and no access between different parts of the infrastructure will be permitted, except via the proposed works corridor. An Ecological Clerk of Works (ECoW) will be employed from the commencement to completion of construction works and will be tasked with monitoring work practices, which will ensure that construction activities are tightly restricted to within the works corridor.

To avoid construction damage from excavation or compaction to the roots of plants in hedgerows, treelines and woodlands adjacent to the proposed infrastructure that will be retained post-construction, appropriate root protection area (RPAs) will be implemented, in accordance with BS 5837:2012 *Trees in relation to design, demolition and construction -Recommendations*, as outlined in National Roads Authority- NRA (2006)[24]. To this effect an appropriately qualified arboriculturist will undertake a pre-construction assessment to ensure impacts to vegetation are avoided. It should be noted that tree felling will only take place under licence. A tree felling licence will be applied for if planning is granted.

Protection of other taxa

It is considered that mitigation measures to protect water quality and habitats listed in the sections above will be sufficient to avoid potential impacts on protected Marsh fritillary that may forage on the site.

Protection of terrestrial mammals

Potential impacts on aquatic mammals, specifically for otter which are a QI of the Lower River Suir SAC, is covered in the NIS (APEM, 2024) and outlined above in mitigation for watercourses. The following mitigation measures, as set out in the NIS, will be implemented in order to avoid disturbance to otters:

Before works commence, the Site and up to 150 m from the work site will be checked for evidence of otter by a suitably experienced ecologist. The ecologist will have demonstrated professional experience in managing large-scale construction works affecting ecological receptors identified within the EIAR. Should an otter holt be recorded, no works will be undertaken within 150 m of the identified holt until a suitably experienced and qualified ecologist has advised on Site specific measures.

The following measures will be implemented to minimise as far as possible the disturbance to aquatic species:

- Methods to reduce noise and vibration;
    - Soft-start techniques will be employed during working hours; and
    - Machinery will not be used early in the day or late in the day, in proximity to watercourses (i.e., they will not start until at least one hour after sunrise and will cease not later than one hour prior to sunset). Lamprey species typically migrate in darkness, so this restriction will benefit them particularly and further minimise the potential for disturbance to be caused
- To reduce noise and vibration impacts, the following measures will be employed:
    - Road vehicles will not wait or queue up with engines running on the site
    - Noise from reversing alarms will be controlled and limited

    - Site layout has been designed to limit and where reasonably practicable, avoid the need for reversing vehicles by installing one-way systems or turning circles.
    - The contractor shall ensure that drivers are familiar with the site layout.
    - Reversing alarms will be set to the minimum output noise level required for health and safety compliance.
- Equipment, including vehicles, will be shut down when not in use.
- Engine compartments will be closed when equipment is not in use.
- Plant and equipment will be examined for defects daily prior to the start of works and under no circumstances is defective plant to be used.
- Generators, compressors and pumps etc. required for 24-hour operation will be super silenced and screened/enclosed as appropriate.
- Modern, silenced and well-maintained plant fitted with efficient attenuators, mufflers or acoustic covers, where appropriate, will be used.
    - The appointed EM will perform weekly checks on Site to ensure that noise and vibration is monitored on a regular basis and if noise or vibration is found to be above acceptable levels, this will be remedied immediately.

The proposed layout for site infrastructure has been designed to minimise impact on features which are important for mammals such as hedgerows and drains. Old growth woodland and treelines have been avoided where possible. While some felling (under licence) is necessary, care has been taken to ensure that overall connectivity between the existing woodland and linear features will be retained throughout the construction and operational phased of the project.

It is acknowledged that the distribution of mammal resting places can change over time. Therefore, in order to avoid accidental disturbance during the construction phase of the project, prior to works commencing these will be preceded by a due diligence ecological walkover survey of the proposed works corridor, including the grid connection route. If any mammal resting places are identified then appropriate exclusion zone will be implemented and felling operations will be timed to avoid sensitive periods for the species affected, i.e. the breeding season.

Likewise, inappropriately timed vegetation removal required to implement bat feature buffers has the potential to directly impact on the resting sites of borrowing and arboreal mammals. Although during baseline surveys, no mammal resting places were identified within the proposed felling areas, a due diligence ecological walkover survey will be undertaken prior to commencement of felling operations.

Pre-construction/felling surveys will cover all suitable habitat for protected mammals including within 50 m of the works corridor for badgers and 100 m for pine martin. The aim of the surveys is to identify the resting sites of protect mammals and implement appropriate exclusion zone buffers, if required.

Setts, trails and feeding signs of badgers were recorded during site scoping surveys. Setts identified included one inactive sett with five entrances and an active outlier sett and active main sett. The following mitigation measures will be applied to avoid disturbance to badgers:

- No works will be undertaken within 20 m of active badger sett(s), as measured from all the entrances to burrows.
- All heavy machinery will be excluded from areas within 30 m of active badger sett(s), as measured from all the entrances to burrows.

- Exclusion zone buffers of 30 m around all sett entrances will be marked off prior to commencement of construction works to ensure protection of these locations. Buffer zones will be appropriately signposted and will be marked out using fencing posts and rope.
- To avoid the period of time when badgers are particularly sensitive to disturbance (birthing and raising young cubs); no heavy construction works, including tree felling will be undertaken during the badger breeding season (December to June inclusive) within 50 m of a sett(s) as measured from all the entrances to burrows. Therefore, all felling and heavy construction works for the substation will be undertaken in July to November inclusive.

Disturbance to foraging mammals will be avoided by:

- Construction works being largely limited to daylight hours allowing nocturnal animals like badgers and otters to forage through the night.
- Minimising the risk of mammals becoming trapped if falling into excavated holes and trenches through the provision of egress points, e.g. placing escape planks or spoil runs. In addition, the length of time excavations will be exposed will be limited.

Protection of bats

Mitigation to avoid potential direct impacts on roosting bats

Throughout the proposed project site vegetation removal will be required to facilitate construction of wind farm infrastructure, mainly for access tracks and hardstands. Trees within the southern semi-natural woodland have potential roost features ranging from low to high. Given that the species present here are capable of fission and fusion, this woodland could be seen as a roost resource of high potential. It would be fair to assume that the majority of these trees could be used throughout the different seasons, from hibernation roosts (the high classes trees) to day-roosts, transitional roosts or even night roosts in poor weather. Therefore, due to the transient nature of tree dwelling bat species, there is a risk that any trees identified as supporting potential roost features (PRF), which are earmarked for removal during construction, could become occupied prior to works commencing. This is especially relevant for the southern woodland deemed a “roost resource”. Each tree proposed for felling will be inspected by a bat specialist under a roost disturbance licence using an endoscope before any felling occurs, to ensure no bat is occupying the tree roost at that time. To ensure the tree inspection can be fully carried out by the bat specialist, the use of tree climbing equipment, or the use of a mobile elevated work platform (MEWP) will be required for any high potential features which are not accessible from the ground level. Any tree found to have a bat roost will not be fell and will be re-checked again after a few days to establish if the roost remains occupied. The fission and fusion behaviour means that bats will usually only spend a few days, sometimes only a single night in a tree roost (Kaňuch *et al.* 2022).

The woodland planted at Brittas estate contains multiple mature broadleaved trees some are veteran or even ancient. The design and layout of the proposed project, as described in sections above, ensures that this woodland is avoided as much as possible, to further protect these trees during the construction phase of the project, primarily the excavation of the borrow pits and access tracks, a root protection area (RPA) has been established to preserve and protect them. The method of calculating RPA is compliant with the BS:5387:2012. This root protection area (RPA) is 30 m. Works will not commence within this 30 m RPA before an updated PRF survey has been completed by a suitably licensed ecologist has inspected the tree.

The proposed felling at the “T”-shaped treeline is made up of live and dead ash trees. There are mainly ivy clad trees, with mainly trees of low roost potential. There is the occasional moderate classed tree here and so, it is anticipated that much occupancy of any PRFs will be limited to transitional roosts, e.g. autumn mating roosts. It is also considered that the surrounding area holds a number of structures offering higher suitability for the formation of significant maternity and hibernation roosts, e.g. Britta’s castle.

Noting that areas within the site, including within potential felling areas, hold PRFs that could potentially support bats in the future, pre-construction roost surveys will be an important component of the species protection plan. For any trees found to be occupied by roosting bats prior to construction, an exclusion zone will be implemented to prevent disturbance during times of occupancy. Table 6. 22provides restrictive periods for different types of roosts, and therefore by extension restrictive periods for construction works, during which the exclusion zone for construction work will be applicable. As there are no guidelines available to establish a suitable exclusion zone, it is established for the proposed project that all exclusion zones will be in line with the 30m RPA identified above.

Under both the Wildlife Acts and European Communities (Birds and Natural Habitats) Regulations 2011, it is an offence to intentionally disturb, injure or kill a bat or disturb its resting place. Under this legislation it is unlawful to destroy, alter or disturb known bat roosts without an appropriate derogation licence, as issued by the NPWS. While no roosts have been confirmed within the proposed project, due to the transient nature of tree dwelling bat species, using a precautionary approach, there is a risk that any trees identified as supporting bats (having PRFs), which are earmarked for removal during construction, could become occupied prior to works commencing. Therefore, a pre-construction survey is required for all trees to be removed. Pre-construction surveys will determine whether a derogation licence is required. If a derogation licence is required, it will be sought from NPWS prior to any construction works being undertaken.

While acknowledging the limited likelihood of the treelines where vegetation removal/cutting is proposed to facilitate wind farm infrastructure; the mature trees identified as supporting PRFs will require further pre-construction roost surveys and assessment in acknowledgement that they have the potential to be utilised by bats in the future. The following locations have been highlighted as requiring this:

- Trees requiring felling at turbine T.10 location (at the south of the site)
- “T”-shaped treeline at T.4 (north east of the site)

Areas listed above which are earmarked for vegetation removal will be thoroughly re-assessed for PRFs during pre-construction surveys. Surveys will be conducted by an appropriately experienced ecologist. Any trees, outside of the “high” classed woodland roost resource, supporting PRFs will be targeted with further surveys, including emergence/re-entry surveys and/or roost inspections (using endoscopes and thermal imaging cameras) to determine occupancy of any moderate to high PRFs identified.

1. If any bat roosts are identified, further assessment will be required to determine the type of roost (e.g. maternity, hibernation, mating, transitional), species using the roost and the level of occupancy.
2. For any roost sites occupied, these surveys will inform the application of a derogation license from NPWS to undertake appropriate mitigation actions as required to ensure the conservation of bats. Subject to agreement with NPWS, it is proposed that these will include measures to exclude bats from potential roost holes prior to vegetation removal and provision of alternative roost sites.
3. Reporting of pre-construction bat surveys will be required to demonstrate due diligence regarding avoidance of disturbance to potential bat roosts.

Table 6. 22: Optimal season for works at different roost types

Source: Kelleher & Marnell (2006)

Bat usage of site	Optimum period for carrying out works (some variation between species)
Maternity	01-Oct to 01-May
Summer (not a proven maternity site)	01-Sep to 01-May
Hibernation	01-May to 01-Oct
Mating/swarming	01-Nov to 01-Aug

The presence of high-risk collision species such as Leisler's bats, common pipistrelles and soprano pipistrelles, showing medium to high activity levels on site, will result in likely significant effects on these species during the operational phase.

As recommended by NatureScot *et al*. (2021), a basic calculation formula is used to estimate bat feature buffers for this project. These buffers are provided as the distance from turbine towers to the feature, with the separation distance being dependent on feature heights in relation to turbine dimensions. Refer to Figure 6. 16.

As recommended by NatureScot *et al*. (2021), a minimum 50 m separation distance from habitat features used by bats and the tips of operational turbine blades must be maintained as bat feature buffer. Larger buffers may be appropriate when turbines are near important bat features such as swarming, maternity or hibernation sites (NatureScot *et al*., 2021). EUROBATS (Rodrigues *et al*., 2015) recommend buffers up to 200 m, therefore providing a compromise between NatureScot and EUROBATS buffers, a 100 m buffer was also calculated (named here as NatureScot "extended"). Table 6. 24 provides the bat feature buffer for the three turbine models assessed for the proposed project. The alternative turbine types are described in Section 2.4.1 of this EIAR.

Table 6. 23: Bat buffers calculations using three turbine models in relation to feature height and the buffers recommended by NatureScot *et al.* (2021) and EUROBATS (Rodrigues *et al.,* 2015).

Turbine model	Feature height (m)	Turbine buffer distance (m)		
		NatureScot (50 m)	NatureScot "extended" (100 m)	EUROBATS (200 m)
Turbine Type A blade length = 73.7 m Hub height = 105 m, Lowest rotor swept = 31.3 m	0	65.4	138.4	252.8
	2	68.5	139.9	253.6
	5	72.8	142.0	254.8
	15	84.9	148.6	258.5
	25	94.4	154.2	261.7
Turbine Type B blade length = 76 m Hub height = 102.5 m, Lowest rotor swept = 26.5 m	0	73.3	143.1	256.3
	2	76.0	144.5	257.1
	5	79.8	146.5	258.2
	15	90.6	152.7	261.8
	25	99.3	158.0	264.9
Turbine Type C blade length = 73 m Hub height = 105 m, Lowest rotor swept = 32 m	0	64.1	137.5	252
	2	67.2	139.0	252.8
	5	71.6	141.2	254.0
	15	83.8	147.7	257.7
	25	93.4	153.4	261.0

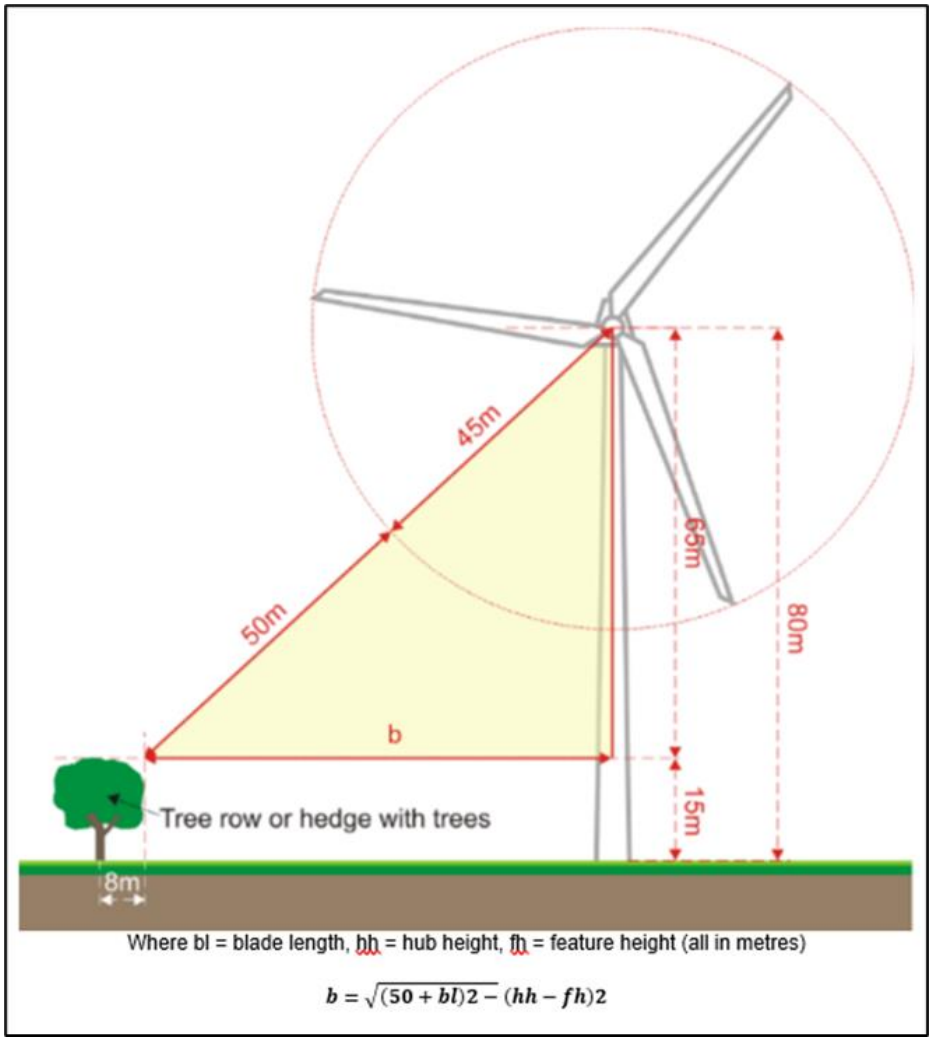

Figure 6. 16: Schematic representation and calculation formula to estimate bat buffers around turbines using turbine specification and habitat feature height

The area where trees/scrub are cleared to create the bat feature buffers must be rendered as unsuitable for roosting and foraging bats as much as possible and maintained as such throughout the lifetime of the wind farm. To achieve this, felled timber and branches must be removed, and stumps should be brushed to ground level. Any excess spoil from excavation works during construction can be broadcast to cover over any ground stumps, creating a more homogeneous surface. Additionally, to prevent the area from scrubbing up again, a mowing or grazing regime will be implemented and closely monitored as part of the Habitat Management Plan.

6.5.1.2 Mitigation– Operational phase

Protection of watercourse & downstream designated sites

Proposed mitigation measures required to prevent adverse effects on the downstream Lower River Suir SAC during operation are outlined in the Natura Impact Statement (NIS) for the proposed project- see APEM (2024). The mitigation measures included in the NIS relate to protection of water quality flowing into the Lower River Suir SAC. These mitigation measures are considered sufficient to also avoid impacts on other aquatic ecology KERs including

salmonids. No further measures are deemed to be required to avoid impacts on watercourses. The NIS mitigation measures are also included in this section for clarity:

- Any herbicide / weed killer will be an ecologically safe product, including safe for the aquatic environment to ensure that any run-off from the site will not contain harmful herbicide / weed killer that could affect surface water.
- Any maintenance required will avoid hydrological features as in the construction phase mitigation, by the implementation of buffer zones (i.e. 50 m to main watercourses, and 10 m to main drains, except for watercourse crossings). Any maintenance vehicles will also be checked for leaks and other potential sources of contaminants before arriving on Site and on a daily basis for the maintenance time required. No fuels, oils or construction fluids will be stored on the Site, unless within a designated area with bunds of 110% storage capacity and away from any drains and / or watercourses. Spill kits will be available in areas where these chemicals are stored. No plant maintenance will be completed on-site, with any broken-down plant removed from site to be fixed.
- No crossing of rivers or streams by machinery will be permitted, all machinery must stay within the constructed access routes.
- Any maintenance works required during the operational phase will follow mitigation measures outlined above for the construction phase. Site personnel will also be made aware to check for signs of IAS colonising the Site. Where this is identified, the IAS will be dealt with appropriately and immediately to prevent further spread.

Protection of important habitats

Certain habitats were identified within the redline boundary as Annex I or having the potential to become Annex I habitats. The proposed substation layout was altered slightly to avoid these important areas. The grid connection route will follow existing roads for the majority of the route. Existing roads and farm roads within the proposed site will also be utilized where possible, reducing the need to create new tracks and disturb habitats. For the duration of the project, the proposed tracks will be the only tracks designated for use for operations and maintenance of the wind farm, limiting works to a confined working corridor to minimise the extent of land take. This will help reduce habitat impact.

No additional measures for avoidance to protect habitats during the operational phase are required.

Protection of other taxa

No additional measures for avoidance to protect other taxa during the operational phase are required.

Protection of terrestrial mammals

No significant impacts on the overall connectivity between existing woodland and linear features are expected to arise during the construction or operational phases of the project. Hedgerows required to be felled during the construction phase will be replanted for the operational phase, resulting in no net loss of hedgerow length. The movement/siting of turbines away from the woodland “roost resource” will also reduce potential impacts on the existing mammal populations using this woodland for roosts and foraging.

Protection of bats

The bat survey report in Appendix 6B provides details discussion on mitigation measures for bats to avoid operational impacts, including collision and barotrauma; as well as indirect impacts on foraging and commuting bats due to vegetation removal.

Once proposed bat feature buffer are implemented during the construction phase, no further operational phase impacts were identified for mammals; therefore, no specific mitigation measures are required.

Mitigation to avoid potential direct operational impacts on bats

Curtailment

Bat feature buffers are effective in reducing turbine collisions for high-risk collision bat species, such as common and soprano pipistrelles, which commute and forage along forest edges. However, they may be less effective for species like Leisler's bat and Nathusius' pipistrelle that regularly commute and forage at turbine height in open areas. For these species, a turbine curtailment plan is highly recommended as a mitigation measure by NatureScot *et al.* (2021), EUROBATS (Rodrigues *et al.,* 2015) and CIEEM (Reason & Wray, 2023). A curtailment plan involves reducing specific turbines to run at less than 2 rpm, when predetermined climatic conditions suggest increased Leisler's bat activity during the active bat season.

New automated smart curtailment technologies such as the Turbine Integrated Mortality Reduction (TIMR) system (Hayes *et al.*, 2019) are more effective than weather data-only curtailment schemes (blanket curtailment). Smart curtailment systems comprise three primary components aimed at facilitating smart curtailment:

- Bat acoustic detectors installed on the turbine nacelle for detecting bats within the turbine rotor swept zone;
- A TIMR server responsible for analysing bat acoustic data in real-time alongside wind speed data obtained from the facility; and
- A SCADA (Supervisory Control And Data Acquisition) interface designed to initiate turbine shut down when bats are detected, and wind conditions are within the curtailment zone.

Using this smart curtailment approach, turbines are feathered only when bats are detected and wind conditions are within the curtailment zones, thereby minimising power generation losses (Hayes *et al.*, 2019, Rabie *et al.*, 2022). Applying this smart curtailment approach not only reduces the likelihood of high fatality rates of open space bat species such as Leisler's bat but also addresses species that may be attracted to turbines, such as common, soprano, and Nathusius' pipistrelles (Voigt *et al.*, 2018a).

Due to the level of bat activity at the proposed project Site (refer to Section 6.4.3.1.7), SMART curtailment (including all three measured outlined above) will be implemented at turbines with the highest collision risk. The strategy will be to curtail during times of high activity and when weather conditions are optimal. Therefore the turbines and seasons for curtailment are shown in Table 6. 25.

Table 6. 24: Curtailment strategy, showing season, optimal temperature and cut in wind speed

Turbine	Curtailment	Season	Temperature (oC)	Wind speed (m/s)
T.1	No			
T.2	No			
T.3	No			
T.4	Yes	Autumn	above 10	5
T.5	Yes	Autumn	above 10	5
T.6	No			
T.7	Yes	Spring Summer Autumn	above 5 above 9 above 10	5
T.8	Yes	Spring Summer	above 5 above 10	5

Turbine	Curtailment	Season	Temperature (oC)	Wind speed (m/s)
T.9	Yes	Spring Summer Autumn	above 5 above 8 above 12	5
T.10	Yes	Spring Summer Autumn	above 5 above 8 above 12	5

This mitigation measure technique has been documented to reduce bat fatalities rates substantially and effectively at wind farms (Voigt *et al.* 2022) with minimal impact on power generation. For instance, a recent study in Canada estimated that feathering wind turbines when windspeed was lower than 5.5 m/s between 6 pm of one day and 6 am the following day would result in only a 0.43% loss of total energy production (Thurber *et al.,* 2023). Multiple curtailment strategies have shown that curtailment reduced total bat fatalities by 33% with every 1.0ms−1 increase in curtailment wind speed. A 5.0ms−1 cut-in speed has been estimated to reduce total bat fatalities by an average of 62% (Whitby et al., 2024)

Mitigation to avoid potential indirect impacts on bat foraging/commuting habitat

Several locations have been identified where vegetation removal has the potential to impact on foraging and commuting bats, with the follow areas highlighted as locations where the impact will be negative., including:

- The loss of some of the woodland at T.4, and T.10; and
- The loss of hedgerows at T.1, T.2, T.3, T.5, T.7, T.8 and T.9.

Project design has attempted to avoid the removal of treelines, hedgerows and woodland habitats utilised by bats. To compensate for any unavoidable loss of bat commuting/ foraging habitat there will be an equivalent area identified as compensatory habitat.

Compensation aims to maximise future woodland, hedgerow and treeline ecological function by specifying an appropriate species mix and replacement locations to maximise connectivity. In the latter case, full consideration must be taken of bat usage of the site. It is proposed that compensatory planting of hedgerow/treeline habitat will be undertaken in order to maintain connectivity between the woodland surrounding T.10. From the roost survey at F.24, it shows that the "T"-shaped treeline at T.4 is important for foraging for multiple species on site, and so replanting of hedgerow/treeline habitat just outside the 300 m buffer will be undertaken. Replanting will also be implemented at T.7, as this area had high Leisler activity..

This replanting, given adequate buffer distance from the turbine, would complement the mitigation for collision and barotrauma by acting as linear features along which bats commute, reducing their likelihood of commuting through the turbine buffer zones. The removal of vegetation to implement turbine buffers is not anticipated to significantly reduce the edge effects that create habitat features utilised by bats and may actually increase this, in combination with compensatory planting leading to an enhancement of the foraging features within the project site.

6.5.1.3 Offsetting – Mitigation by remedy

Following implementation of the construction-phase habitat protection measures described monitoring of the success of habitat restoration will be undertaken. A monitoring programme, and requirements for remedial measures, will be incorporated for the site.

As stated in IWEA (2012), any tree felling, with a certain few exceptions, requires a tree felling licence from the Forest Service. The licensing requirements are set out in the Forest Service Policy on Felling Licences for Wind

Farm Development. These include information on replanting requirements as well as compensatory afforestation (compensatory afforestation describes new planting on lands not previously forested. The current policy is to require compensatory afforestation of an area equal to the area of deforestation and/or of an area equal to 10% of the area of turbulence felling. S.I. 558 of 2010 requires that afforestation requires prior approval from the Forest Service. The Forestry Act, 1946 requires that any land proposed for compensatory afforestation must, at the time of the granting of the licence, be in the ownership of the applicant for the relevant Felling Licence).

While the environmental impact of felling is considered at the planning application stage, felling can only occur after the grant of a felling licence by the Department of Agriculture, Food and the Marine (DAFM). However, the extent of felling required is determined by the grant of planning permission. Therefore, the scope of the licence required can only be determined after the grant of planning permission. It follows that details of the area size and location of the replant lands will not be capable of being determined until after planning permission is granted. It is environmentally prudent to process felling and afforestation licences closest to the time when those activities are to occur. For example, if a licence is obtained at the planning application stage, it is probable that the licence would expire before the planning process and post planning delivery preparations could not be completed. Moreover, the identification and licensing of replant lands after the grant of planning permission has the benefit of ensuring that the licence is compliant with up to date legislation and environmental information, and that the cumulative environmental assessment considers the wider environmental impacts at that point in time. This reflects the fact that key environmental issues relating afforestation (i.e. water, soils, biodiversity, archaeology, landscape, and climate) are subject to regular updates in terms of best practice, guidelines, standards, and national policies. Therefore, delaying the identification of replant lands until such time as they are required enables identification of optimum lands available from an environmental perspective.

If Planning Permission has been granted for the development by the consenting authority, a copy of the full Planning Permission, EIAR and NIS will be submitted to support the felling licence application.

6.5.1.4 Decommissioning phase mitigation

The implementation of similar mitigation measures, as detailed for the construction phase will ensure that all decommissioning phase impacts are minimised or avoided. A Decommissioning Plan will be drafted prior to removal of the proposed infrastructure. This will detail the specific actions aimed at protecting KERs. As for the construction phase, these include limitations on the working corridor, minimised impact on vegetation, protection of water quality and protection of roosting bats. The NIS outlines decommissioning mitigation measures for the protection of affected QIs in the Lower River Suir SAC (APEM, 2024) as *the decommissioning phase will follow mitigation measures outlined for the construction phase*.

A pre-decommissioning walkover survey will be undertaken with the specific objective of identifying any species of nature conservation importance that may be affected by the decommissioning phase and works timed accordingly to avoid sensitive periods.

6.5.2 Monitoring Measures

6.5.2.2 Pre-construction due diligence ecological monitoring

In order to avoid accidental disturbance to the resting places of protected mammals, during the construction phase of the proposed project, including badgers, hares and pine martens; prior to works commencing, a due diligence ecological walkover survey will be completed of the proposed works corridor, including the grid connection route, TDR areas that include tree felling and hedgerow removal, and bat feature buffers.

In order to limit accidental disturbance to bat roosts during the construction phase of the proposed project; prior to works commencing, trees within the works corridor previously assessed as supporting moderate to high PRFs will be re-assessed. Initially this will involve a ground level visual assessment, which will be followed up by inspections under licence and re-entry/emergence surveys, as required.

6.5.2.3 Ecological monitoring during construction

Construction works in areas of maternity bat roost potential will be avoided to prevent disturbance during the maternity season and until mothers and pups have moved on in search of hibernation roosts.

6.5.2.4 Monitoring of water quality during construction

In order to verify the efficacy of pollution prevention and mitigation works during construction, water quality monitoring is required. Monitoring will be undertaken by a suitable qualified independent Ecological Clerk of Works (ECoW). Monitoring will be conducted prior to, during and post completion of construction works. Survey locations will target watercourses within the catchment of the construction area and monitoring will comprise visual, hydrochemistry and grab sampling. A water monitoring programme will be prepared and agreed with Inland Fisheries Ireland before construction works.

A surface water monitoring schedule will be prepared and followed during the construction phase. This will involve weekly field monitoring of surface water quality chemistry. The following parameters will be tested:

- pH (field measured);
- Electrical Conductivity (field measured);
- Temperature (field measured);
- Dissolved Oxygen (field measured);
- Total Dissolved Solids (TDS) (field measured); and
- Turbidity (field measured).

There will also be continuous, in-situ, monitoring equipment will be installed at selected locations upstream and downstream of the proposed project. The monitoring equipment will provide continuous readings for turbidity levels, flow rate and water depth in the watercourses.

6.5.2.5 Habitat monitoring of Annex I Molinia meadows habitats – pre-construction, construction and post-construction

At pre-construction, eight permanent quadrats (10x10 m squares) will be set up within the area of Annex I habitat in the proposed substation field for long-term vegetation monitoring. To ensure quadrats can be relocated on subsequent visits, accurate grid references of the square will be taken and these will be marked using permanent metal pins. Quadrats will be distributed through the habitat to sample central areas and areas around the edge of the Molinia meadows habitat.

Baseline conditions will be established pre-construction and for each quadrat:

- Photographs will be taken to visually document any changes in site conditions over time;
- Vegetation type will be recorded;

- All species present will be listed, together with an indication species abundance, both in terms of % cover and rating on the DOMIN scale;
- The presence of both positive and negative indicator species for the habitat type will be noted;
- Other factors including vegetation height, ground conditions and management will be recorded;

During construction, quadrat and walkover surveys will be repeated to ensure that the habitat is not impacted by constructions works, especially by any drainage in the vicinity of tracks leading to T4 from the substation field.

Post-construction surveys will be undertaken in Years 1, 2, 3, 5 and 10.

Surveys will be undertaken by a suitable qualified botanist and at the optimal time of year for surveying *Molinia* meadow habitat.

6.5.2.6 Post-construction bat monitoring

The aim for bat feature buffers around turbines is to ensure that habitats are as featureless as possible to avoid bats flying next to operating turbines. However, due to the extensive habitat changes often necessary at wind farm sites, particularly regarding vegetation removal and resulting edge effects and habitat connectivity disruptions, it is recognized that post-construction patterns of bat activity can be unpredictable (Rodrigues *et al.,* 2015, NatureScot *et al.*, 2021). Therefore, NatureScot *et al.* (2021) recommends a three-year post-construction monitoring program for bats, involving monitoring in each of the first three years to assess the effectiveness of the bat feature buffers and the SMART curtailment plan.

Initially, regular monitoring will be conducted in Year 1, 2 and 3 to ensure that vegetation clearance measures and ongoing management efforts result in the desired habitat conditions. Following the establishment of optimal conditions (after year 3), a habitat maintenance plan will be implemented. Annual compliance checks in spring (April) and late summer (August) will be carried out throughout the proposed project's lifespan to ensure that buffers are maintained in suitable conditions. Regular monitoring during Year 1, 2 and 3 will also include bat activity monitoring and carcass searches. Three-year post-construction monitoring also includes bat activity monitoring and carcass searching. The bat activity monitoring will include the deployment of 10 bat detectors in the same locations as pre-construction surveys. Carcass searches will also be conducted during the same time as activity monitoring. Areas around operational turbines will be searched by an ecologist with a high observer efficiency rate to look for bat casualties. These surveys will be carried out as early as possible to avoid possible predation.

Bat activity monitoring in years 1, 2 and 3 will involve three seasonal deployments of 10 static bat detectors operating for a minimum of 10 nights under compliant weather conditions. Ten detectors will be positioned, one at each turbine location to monitor bat activity post-construction. Deployment will cover the following periods:

- early May and mid-June
- mid-June and mid-August
- early September

Similar to pre-construction surveys, a fully automated weather station with 3G connectivity will be deployed to generate real-time rainfall, wind speed, and temperature data. This can be supplemented with wind speed data collected from wind turbines.

NIEA guidance recommends carcass searching which involves the detection of bat (and bird) casualties around the turbine blades (NIEA, 2024). These searches will be conducted by appropriately trained operational staff and will be carried out early in the morning during high-risk periods at the site (i.e., during summer and autumn). While not mandatory, the proposed project will employ the use of trained dogs with handlers as they are considerably

more efficient and quicker than humans (alone) in locating carcasses around turbines, therefore, providing better results. Observer efficiency will not fall below 50%, necessitating observer efficiency tests to minimize the risk of high false negative results. Alongside these observer efficiency tests, the carcass removal rate by predators will also be quantified to mitigate bias resulting from scavenging.

6.6 Residual Effects

Table 6. 25 outlines any residual impacts which may occur following the implementation of mitigation measures.

Residual effects refer to the effects from the project which may still arise after mitigation measures have been put in place. Residual effects can occur during the construction, operational and decommissioning phases as outlined in the following sections.

6.6.1 Residual effects during the construction phase

The NIS prepared for the proposed project provides mitigation measures to ensure there are no remaining integrity level effects on the QIs for the Lower River Suir SAC (APEM,2024). Residual effects on designated sites are assessed as being ***Not Significant.***

The hedgerow removal and replanting on-site will offset habitat loss impacts identified. Any hedgerows due to be intersected will be reinstated with a similar species or native species. Any hedgerow lost permanently will be replanted in a more appropriate area, which will aid in guiding bats to a safer areas away from the proposed works and minimise disturbance. While there will be residual effects for the duration of the planting maturing (usually the first 1-3 years), once the planting has established, the residual effects relating to habitats are assessed as being ***Not Significant.***

Mitigation measures outlined in the NIS and again in this chapter have ensured that no significant residual effects on aquatic ecology remain. Appropriate water quality protection, disturbance reduction and reducing the potential risk of invasive species affecting aquatic ecology will ensure that residual effects relating to aquatic ecology are ***Not Significant.***

Mitigation measures outlined for protection of habitats have ensured that no significant residual impacts on other taxa, namely the Marsh fritillary, remain. Residual effects on other taxa for the construction phase are considered to be ***Not Significant.***

Mitigation and monitoring measures outlined for the protection of habitats, avoidance and reinstatement of habitats; and reduction of disturbance all ensure that no significant residual impacts on terrestrial mammals remain. Residual effects on terrestrial mammals for the construction phase are considered to be ***Not Significant.***

Mitigation and monitoring measures outlined for the protection of bats and there potential roost(s), avoidance and reinstatement of habitats; and reduction of disturbance (e.g. RPA and lighting) all ensure that no significant residual impacts on bats remain. Residual effects on bats for the construction phase are considered to be ***Not Significant***.

6.6.2 Residual effects during the operational phase

The NIS prepared for the proposed project provides mitigation measures to ensure there are no remaining integrity level effects on the QIs for the Lower River Suir SAC (APEM,2024). Residual effects on designated sites are assessed as being ***Not Significant.***

Habitat monitoring and the HSMP will ensure no significant effects remain. This will ensure residual effects relating to habitats are ***Not Significant.***

Mitigation measures outlined in the NIS and again in this chapter have ensured that no significant residual effects on aquatic ecology remain. Appropriate water quality protection, disturbance reduction and reducing the potential risk of invasive species affecting aquatic ecology have ensured that residual effects relating to aquatic ecology are ***Not Significant.***

Mitigation measures outlined for protection of habitats have ensured that no significant residual impacts on other taxa, namely the Marsh fritillary, remain. Residual effects on other taxa for the operational phase are considered to be ***Not Significant.***

Mitigation and monitoring measures outlined for the protection of habitats, avoidance and reinstatement of habitats; reduction of disturbance all ensure that no significant residual impacts on terrestrial mammals remain. Residual effects on terrestrial mammals for the operational phase are considered to be ***Not Significant.***

Mitigation and monitoring measures outlined for the protection of bats and there potential roost(s), habitat maintenance; and curtailment all ensure that no significant residual impacts on bats remain. Residual effects on bats for the operational phase are considered to be ***Not Significant***.

6.6.3 Residual effects during the decommissioning phase

Mitigation and monitoring measures outlined for the protection of habitats and species during the construction phase, also being implemented for the decommissioning phase ,albeit in a reduced capacity for certain elements, all ensure that no significant residual impacts remain. Residual effects for the decommissioning phase are considered to be ***Not Significant.***

Table 6. 25: Summary of residual impacts following implementation of proposed mitigation measures

Key Ecological Receptors	Importance	Description of Impacts	Significance without mitigation	Proposed mitigation / monitoring / compensation	Significance of residual effects
Designated sites: **Lower River Suir SAC, Ormond's Mill, Loughmore, Templemore pNHA** Lower River Suir SAC affected QIs (APEM, 2024): **Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation;** **White clawed crayfish;** **Sea lamprey; Brook lamprey; River lamprey; Salmon; Twaite Shad; Otter**	International	Emissions to water;	Likely Significant Effects	Protection of water quality, avoidance measures, biosecurity measures, and monitoring of water quality.	No Likely Significant Effects
		Disturbance	Likely Significant Effects	Disturbance and lighting reduction	No Likely Significant Effects
		Invasive species	Likely Significant Effects	Avoidance measures and biosecurity measures	No Likely Significant Effects
Habitats: **Improved Grassland (GS1);**	Site	Habitat loss / degradation, Invasive species, Emissions to water	Likely Significant Effects	Protection of water quality, avoidance measures, biosecurity measures, monitoring of water quality, monitoring of Annex I, HSMP, reinstatement of habitats	No Likely Significant Effects
Wet Grassland (GS4);	National				
Marsh (GM1);	Local				
Hedgerows (WL1);	Local				
Depositing / lowland Rivers (FW2);	National				
Poor Fen and Flush (PF2);	National				
(Mixed) Broadleaved Woodland (WD1);	Local				
Buildings and Artificial Surfaces (BL3);	Local				
Eutrophic Lakes (FL5);	Local				
Reed and Large Sedge Swamp (FS1);					

Key Ecological Receptors	Importance	Description of Impacts	Significance without mitigation	Proposed mitigation / monitoring / compensation	Significance of residual effects
Mixed Broadleaf / Conifer Woodland (WD2); **(Mixed) Conifer Woodland (WD3);** **Scattered Trees and Parklands (WD5);** **Scrub (WS1)**	Local Local Local Local Local				
Aquatic ecology: ***Salmo* species** not covered in the QIs for the Lower River Suir SAC	Local	Emissions to water; Disturbance; and Invasive species	Likely Significant Effects	Protection of water quality; Avoidance measures; Biosecurity measures; Disturbance reduction; Monitoring of water quality; and Lighting	No Likely Significant Effects
Other taxa: **Marsh fritillary**	National	Disturbance; and Habitat loss of foraging habitat	No Likely Significant Effects	Habitat protection measures; Habitat reinstatement; and Monitoring	No Likely Significant Effects
Terrestrial mammals: **Badgers;** **Pine marten;** **Irish hare.**	County Local Local	Mortality; Habitat loss of breeding and foraging habitat; and Disturbance, displacement	Likely Significant Effects No Likely Significant Effects No Likely Significant Effects	Avoidance measures; Protection of water quality; HSMP; Disturbance reduction; and Reinstatement of habitats	No Likely Significant Effects
Bats Common pipistrelles; Soprano pipistrelles; Nathusius' pipistrelles; Leisler's bats; *Myotis* sp. and Brown long-eared bat	 Local Local National Local County County	Mortality; Habitat loss of breeding and foraging habitat; and Disturbance, displacement	Likely Significant Effects	Avoidance measures; Protection of water quality; HSMP; Disturbance reduction; Reinstatement of habitats; and Rotor swept buffers.	No Likely Significant Effects

6.7 Cumulative Effects

Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Cumulative effects can occur where a proposed project results in individually insignificant impacts that, when considered in-combination with impacts of other proposed or permitted plans and projects, can result in significant effects (CIEEM, 2018).

Other plans and projects to be considered include the following types of future development within the same zone of influence:

- Proposals for which consent has been applied which are awaiting determination in any regulatory process (not necessarily limited to planning permission);
- Projects which have been granted consent (not limited to planning permissions) but which have not yet been started or which have been started but are not yet completed (i.e., under construction); and,

Proposals for which consent has not been applied to the extent that the applicant is aware of such proposals. .

6.7.1 Significant planning applications

Chapter 1: Introduction outlines a total of 68 significant planning applications within 20 km of the proposed project over the last ten years. Table 1-4 reduces the number of significant planning applications to 33 within 5km. While there are no guidelines for cumulative assessments with other project/developments, the 5km search radius for significant planning applications is appropriate for the proposed project.

The closest of these planning applications to the proposed project include:

- Four multiple housing developments in Thurles;
- 1 incomplete powerline (Borrisoleigh to Thurles – note there are 2 planning applications for this line);
- A community health care centre and pharmacy (Thurles); and
- A multifunctional spectator stand for a sports facility with three pitches in Thurles (Table 14).

One multi-housing development (86 units) in Thurles was permitted in Feb 2024, another in Feb 2023 (26 units) and a third in Sept 2022 (63 dwellings). One multi-housing planning application in Thurles is still under consideration. These are all located at least 3km south and downstream of the proposed project and therefore cumulative ecological effects are unlikely.

The only potential development where direct cumulative effects that could reasonably be foreseen is the incomplete powerline which transects the proposed project site (see Figure 2-22 in Chapter 02 Project Description). This c.6.94 km of incomplete powerline requires either new poles to be erected or that existing poles be strung. The structures to be erected comprise either twin or predominately single timber pole structures strung or to be strung with a twin line. This development was permitted in mid-2023 and is likely to be constructed prior to the start of the construction phase of the proposed project. The wind farm developer will submit a separate planning application for the rerouting of this line through the wind farm site to Tipperary County Council, in consultation with ESB. The possible options for this re-routing are outlined in Chapter 04 Alternatives of the EIAR.

The construction of this powerline will be completed prior to construction of the proposed project and will therefore not have any additional cumulative effects in combination with the proposed project. This EIAR has assessed the potential effects of rerouting this powerline during the construction of the wind farm – as part of the project. Therefore, an assessment of cumulative effects is not relevant.

Therefore, there are ***no likely significant cumulative effects*** from the proposed project and significant planning applications during all phases of the proposed project.

6.7.2 Small planning applications

Small scale and other types of planning applications over the last ten years (2014 – 2024) for dwellings in proximity to the project have been considered in the cumulative assessment (refer to Appendix 1G). There is potential for some cumulative construction traffic and noise effects should these projects be constructed in parallel with the proposed wind farm. This is unlikely however, as potential construction works for the proposed project are not expected to be initiated until Q4 of 2028. Consequently, the potential for cumulative effects during construction will not occur.

While there are no guidelines for cumulative assessments for other project/developments, a 3km search radius for small planning applications is deemed appropriate for the proposed project. Other small planning applications within a 3km radius around the proposed project site (refer to Appendix 1G) relate to agricultural sheds and shed extensions, livestock facilities, dwelling houses, and extensions to dwelling houses, attic conversions, domestic wastewater treatment systems, property entrances and roads, sports facilities, garages, demolitions, and retention permission applications etc. Twenty-Eight of these are in areas around Thurles town or in villages north and further east of the project site that would not be affected by construction works for the proposed project, therefore cumulative ecological effects are unlikely.

Seven are in the Rossestown and Clobanna areas where there is some potential for cumulative construction related effects along the grid route. Seven of these were permitted in 2023, two in 2022, six in 2021, seven in 2020 and four in 2019. The construction of these small projects will likely be completed, and their planning permissions expired by the time construction of the proposed project will potentially begin (at the end of 2028). Consequently, such dispersed small scale domestic and agricultural developments are not expected to have significant cumulative effects with the proposed project. These minor projects are either under the threshold for EIA or excluded from the list of projects requiring EIA and due to the nature and scale of these applications will not introduce complex or significant issues and are therefore not considered in the cumulative assessment.

Therefore, there are ***no likely significant cumulative effects*** from the proposed project and small planning applications during all phases of the proposed project.

6.7.3 Other wind farm developments

Other existing wind energy development in proximity to the proposed Brittas wind farm have potential to cause cumulative noise and visual effects in combination with the proposed project. Any permitted and proposed wind farms in the area may also have cumulative effects should the construction phases overlap with the proposed project. While there are no guidelines for cumulative assessments with other wind farm developments, NatureScot et al., 2021, proposes a search radius of 10 km for other wind farm developments, therefore this methodology has been adopted for the assessment of the cumulative effects of the proposed development and other wind farms. Wind farms identified within 10km of the proposed project over the last ten years (2014 – 2024) are listed in Table 15 of Chapter 1: Introduction. The 10km radius identifies only two wind farms (Lisheen and Kiloran),both of which are operational. the remaining identified wind farms are beyond 10 km. Due to the wind farms already being in operation there will be ***no likely significant cumulative effects*** with the proposed project.

Due to the distance between the proposed project and the two wind farms (approximately 9.8 km and 9.28 km respectively), along with the implementation of mitigation measures outlined above and within the respective wind farm applications, there are ***no likely significant cumulative effects*** with the operational phase of the proposed project and the two wind farms.

As the decommissioning phase of the other wind farms will occur before the proposed project, there are ***no likely significant cumulative effects*** with the decommissioning phase of the proposed project and the two wind farms.

6.7.4 Other renewable energy developments

Other renewable energy projects that have been identified within 20km to the proposed project include solar farms and bioenergy processing facilities (see list in Table 16 in Chapter 1: Introduction). While there are no guidelines for cumulative assessments with other renewable project/developments, due to the low level of expected impacts from other renewables identified, a 3km search radius for is deemed appropriate for cumulative assessments with the proposed project.

There are no renewable developments within the 3 km assessment radius, the closest is ENGIE solar farms located 4 km south and 5 km south-west of the proposed development. These projects were granted planning permission in 2020 and 2021 and expected to be in operation prior to the construction phase of the proposed project. Therefore, there will be ***no likely significant cumulative effects*** with the proposed project.

While there are no other renewable projects within the 3 km, there are four existing or permitted bioenergy facilities within 10 km (all 9.4 – 10 km). These projects make use of renewable resources (organic waste) from agriculture, forestry and the marine sources to produce food, feed, materials and energy, while reducing waste, to support the achievement of a sustainable and climate neutral society. The projects are expected to be in operation before the commencement of the construction phase of the proposed development. Due to the distance, each project being in operation before the proposed project starts, along with the implementation of mitigation measures outlined above and within the respective planning applications, there are ***no likely significant cumulative effects*** with the proposed project.

In addition, the National BioEconomy campus at Lisheen (former mine), is located 9.4km north-east of the proposed project. This is proposed to be used to pilot and demonstrate various bioenergy technologies and facilities. As there is currently insufficient information to incorporate the project into a reliable cumulative assessment, it not been included in the assessment.

6.8 References

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