FEHILY TIMONEY

DESIGNING AND DELIVERING
A SUSTAINABLE FUTURE

DREHID WIND FARM AND SUBSTATION FURTHER INFORMATION RESPONSE

SID FURTHER INFORMATION RESPONSE AN COIMISIÚN PLEANÁLA (Ref. 322845-25)

Prepared for:

North Kildare Wind Farm Limited

FEHILY TIMONEY

DESIGNING AND DELIVERING
A SUSTAINABLE FUTURE

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1. INTRODUCTION

1.1 Background to Request for Further Information (FI) Response Report

Fehily Timoney and Company (FT), Core House, Pouladuff Road, Cork, has been engaged by North Kildare Wind Farm Limited, (the Applicant), Building 3400, Cork Airport Business Park, Cork, T12 AE76, to make a response to the Request for Further Information from An Coimisiún Pleanála (ACP) dated 2nd of April 2026 and subsequent correspondence which extended the submission deadline to 20th October 2026. Please see Appendix 1 for copy of ACP correspondence.

1.2 Further Information Response Report Structure

This Further Information Response Report is structured as follows:

- Section 1 - Introduction;
- Section 2 - RFI Item 1: Biodiversity;
- Section 3 - RFI Item 2: Water Framework Directive;
- Section 4 - RFI Item 3: Flood Risk;
- Section 5 - RFI Item 4: Noise;
- Section 6 - RFI Item 5: Sensitive Receptors;
- Section 7 - RFI Item 6: Landscape;
- Section 8 - RFI Item 7: Mitigation Measures;
- Section 9 - Conclusion.

2. BIODIVERSITY

2.1 RFI Item 1: Biodiversity

a) It is fundamental that biodiversity baseline data are fit for purpose, up-to-date and sufficient. Where the lifespan of ecological survey data exceeds the typical validity period as set out in recognised guidelines, the applicant is required to provide up to date information or justification on the sufficiency of the information provided with respect to site condition, species mobility, species population and distribution trends and clearly disclose any limitations in reporting.

Therefore, the following is requested:

2.2 Avifauna

2.2.1 RFI Item i:

As per NatureScot, 2025 guidelines Recommended bird survey methods to inform impact assessment of onshore windfarms, survey data is collected within five years of planned submission, and within three years where bird species populations are rapidly changing. You are requested to review the ornithological assessment particularly with respect to rapidly changing species recorded including Curlew, Lapwing and Golden Plover.

2.2.2 RFI Item i Response:

A total of 2.5 years of bird surveys were completed for the current application, which built further on surveys completed for the previous application. While the older survey data was not relied on for the current EIAR, it contributes to an extensive and robust dataset available for the site which covers a long timeframe. It is noted that the most recent year of preplanning surveys encompassing full winter and summer seasons were within the 3-year window for rapidly changing species at the time of submission, with the last winter season being completed 2 years and 3 months before submission.

A full suite of bird surveys was completed during the breeding season of 2026 in order to update the ornithological baseline. The habitat survey was also updated, providing current information which is also key to the updated ornithological assessment.

Please see the Summer 2026 Ornithological Baseline Report in Appendix 2 for a comprehensive account of these surveys.

Regarding the rapidly changing species specifically identified in Item A (i), surveys undertaken during the breeding season of 2026 including breeding wader surveys, breeding bird surveys and vantage point (VP) surveys provided updated information relating to the breeding season.

No observations of Curlew were recorded across all surveys covering the proposed development during summer 2026. This is consistent with previous surveys which recorded Curlew only during hinterland surveys, with no observations occurring within the proposed development or adjacent lands. Curlew observations recorded during pre-planning breeding season surveys comprised four records, all located over 9 km south or south-west of the site (Lodge Bog and Lullymore Wetlands). No successful breeding was confirmed in these observations; nest predation was noted in one instance at Lodge Bog.

During winter season pre-planning surveys three observations of Curlew were recorded, all occurring at Hortland (located at minimum 3.1 km east of the proposed development). No wintering Curlew were recorded within or near the proposed development during pre-planning surveys.

Surveys included dedicated wader transects in peatland habitats and other habitats encompassing the proposed development, and VP surveys. Cumulatively, these surveys provided robust spatial and temporal coverage of the proposed development and adjacent lands. The results confirm the baseline remains unchanged, i.e. breeding curlew are not present within or near the proposed development.

These results obtained repeatedly over multiple years and survey seasons are in alignment with the most recent data on the Irish breeding curlew population published by the NPWS (*Status and Distribution of Breeding Eurasian Curlew in Ireland 2021*) (Colhoun et al., 2022). The 2021 breeding curlew distribution map included in this publication (see Plate 1 below) notes two probable breeding pairs associated with the bogs in the vicinity of Lullymore over 6 km south-west of the proposed development, and possible pairs immediately east of Edenderry and at Mouds Bog/Allen Bog north of Newbridge (c. 8.5 km and 14.5 km respectively from proposed development). As such, there are no records of established curlew breeding territories at or near the proposed development.

IWM138 (2022) Irish Breeding Curlew Survey 2021

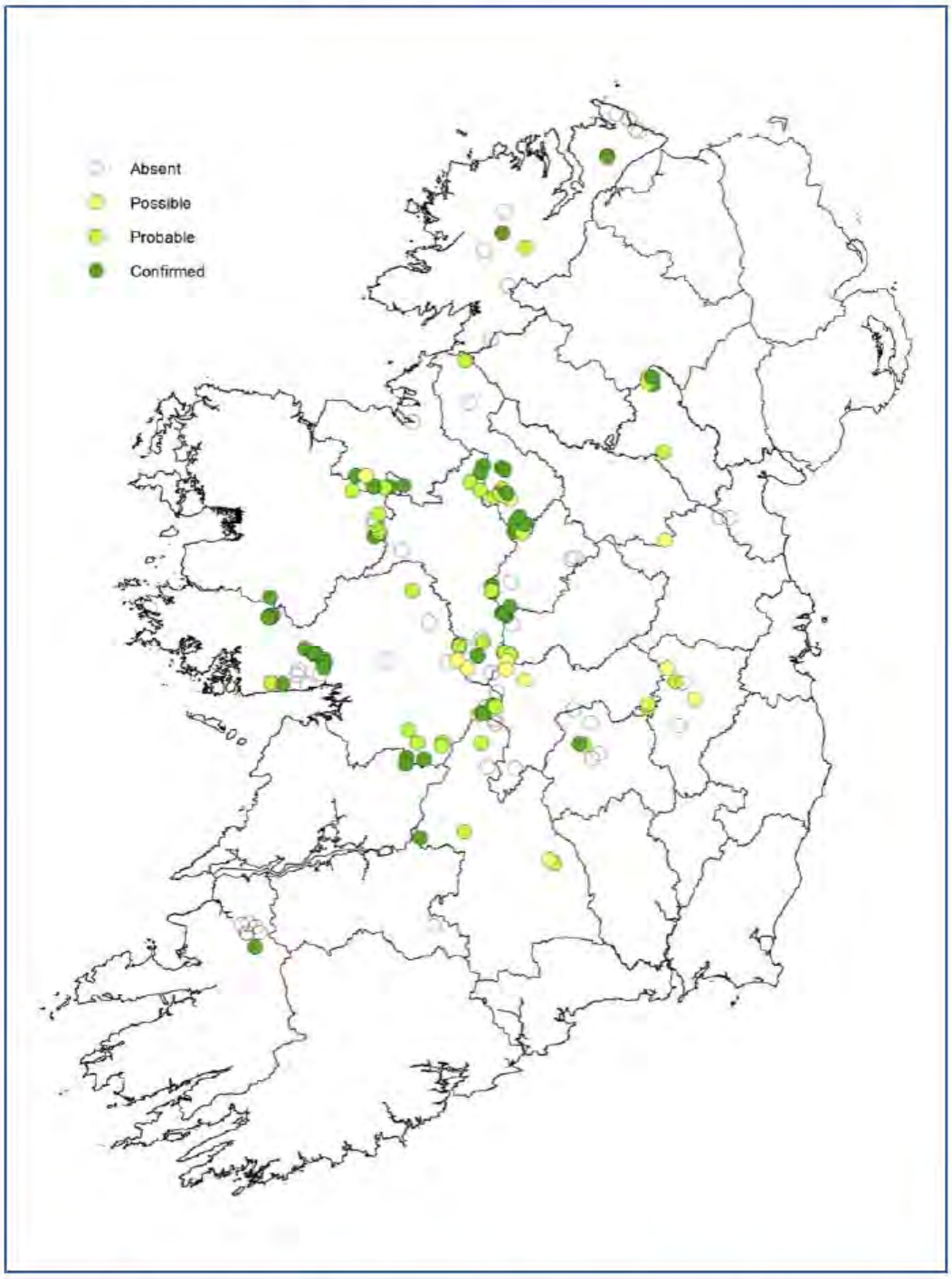


Figure 5 Distribution of breeding Curlew in 2021 in Ireland, classifying territories as no longer occupied (absent n=52) or breeding (n=115), with breeding status being categorised as possible (n=14), probable (n=48) or confirmed (n=58).

Figure 2-1: Map of breeding curlew distribution (Colhoun et al., 2022)

The EIAR assessment considered the potential for breeding Curlew to occupy potentially suitable breeding habitat in the vicinity of the proposed development could lead to a Short-term Significant effect prior to mitigation if breeding curlew established within 200-300m of proposed wind farm prior to construction. However, based on the continued absence of curlew records during current surveys and further examination of current trends and behaviour patterns for the Irish breeding curlew population, it is assessed to be highly unlikely that this could occur.

As detailed above, the Irish breeding Curlew population is limited in size and restricted to a number of established breeding sites in certain areas, none of which overlap the proposed development or adjacent areas. Curlew are philopatric, i.e. they return to their birthplace to breed, resulting in the pattern seen in the distribution and use patterns of Irish breeding sites.

As such, it is considered that the assessment should be limited to the existing baseline conditions proven over multiple survey years, and omit the hypothetical assessment based on potential future occupancy.

Therefore, anticipated effects are based on existing baseline conditions only, i.e. there are no breeding Curlew present within or near the proposed development. As such, the EIAR assessment (Table 8-25 in Section 8.16.1.2) has been updated (see Item A-iv response) and predicted effects are restricted to disturbance and/or displacement resulting in a **Short-term Imperceptible** effect.

Regarding Lapwing, no observations of Lapwing were recorded across all surveys covering the proposed development during summer 2026. This is consistent with previous surveys which did not record this species at the proposed development (Lapwing records from previous surveys were limited to the surrounding hinterland, with the closest records being from cutover bogs near the access track running to the south of Timahoe North Solar Farm located c. 1.1 km south-east of the proposed T2 location).

Surveys along wader transects 4 and 5 traversing agricultural fields overlapped by the proposed development did not record any wader activity, and the fields in this area were noted to be unsuitable for breeding lapwing due to the dominance of improved agricultural grassland and ongoing agricultural practices including silage cutting (potential nest destruction), high density-livestock grazing (potential trampling of eggs), fertilisation and drainage (depletes the abundance of prey items including earthworms and other invertebrates in the soil). Ground conditions were noted to be particularly dry in the agricultural lands within the proposed development during surveys in summer 2026.

No lapwing have been observed in the cutaway bog habitats immediately south of the proposed development (immediately south of T7 – T8) or on Mulgeeth Bog (immediately south of T9 – T10). These adjacent cutover bog habitats south of T7 – T8 have some limited suitability for Lapwing but are less suitable than areas in the centre of Timahoe North Bog which have more expanses of open water where Lapwing have previously been observed. The limited areas of open water, in addition to dense heather regrowth and areas of scrub/bog woodland reduce the suitability of the cutaway bog habitats immediately south of T7 – T8. Mulgeeth Bog (south of T9 – T10) is not suitable for Lapwing due to the dominance of dense tall vegetation.

As such, current survey results indicate the baseline remains unchanged, i.e. breeding lapwing are not present within the proposed development. Due to the separation of C. 1.1 km between the proposed development and the area where breeding lapwing were noted during previous surveys, potential for both construction stage and operational disturbance is low. This remains unchanged from the assessment presented EIAR Chapter 8-2.

Limited Lapwing activity was recorded during previous winter season surveys; one record of lapwing was made during the 2021-22 winter VP surveys involving a group of four individuals flying within the 500m buffer zone. There were no records of lapwing during the winter 2022-23 VP surveys which were completed within 3 years of the planning submission. As such, the assessment presented in EIAR Chapter 8-2 remains unchanged.

Golden plover were occasionally recorded flying over the flight activity study area or surrounding lands in winter and once each in spring and autumn during pre-planning surveys, but no observations of golden plover landing, roosting, feeding or engaging in any other ground-based activity was observed. It is noted that the proposed development or adjacent lands do not contain the characteristic expansive areas of bare peat on cutover bog habitats favoured by foraging and roosting golden plover, and this has remained consistent from pre-planning to current surveys.

Surveys have demonstrated that the proposed development is not a habitual wintering site for this species; wintering golden plover are known to use other sites distributed across the region including the Curragh, Lullybeg, HVP4 (Hortland) and HVP6 (Ballynafagh Lake and Bog). In the event of any migratory or wintering birds stopping over on a casual basis, any potential disturbance would be of low magnitude. As such, the assessment presented in EIAR Chapter 8-2 remains unchanged.

Current surveys did not return any new wader species not previously recorded, or notable changes in the activity patterns of individual species. No significant changes relating to use of the proposed development and surroundings lands have occurred since pre-planning surveys were completed.

As such, the impact assessment remains unchanged for these species discussed above and for all other species. Current surveys reconfirm the conclusions in the EIAR.

2.2.3 RFI Item ii

An Coimisiún Pleanala shares the concerns of the Department of Housing Local Government and Heritage, Development Applications Unit in their submission dated 14th August 2025, relating to the absence of rationale for the selection of transects for breeding waders. The Commission also has concerns relating to the variability in survey effort during the survey period. Please provide reasoning to support your rationale and to update the breeding bird survey transects to ensure survey effort is compliant with best practice and representative of the diversity of habitats across the site and bird species associated with same.

2.2.4 RFI Item ii Response:

The previous breeding bird and wader survey effort obtained representative samples of the homogenous forestry and agricultural habitats dominating the north and south of the proposed development where the proposed turbines are located and peatlands present outside the site. The surveys targeted the higher value habitats within the study area for birds. For waders this included the peatland habitat adjacent to the site and the woodlands in the northern section of the site. The habitats to the south of the site were deemed to be of negligible value for waders in particular due to the ongoing intensive agricultural actives (intensive grazing, fertilisation, drainage, regular silage cutting, etc) making these fields unsuitable for breeding. Additional wader transects (Wader 4 and Wader 5) surveyed during the updated 2026 survey confirmed the absence of waders in these lands (surrounding Turbines T1 to T5) and reconfirm the findings of the EIAR. The transects completed during previous surveys are considered robust due to the homogenous nature of the habitats in the areas where proposed turbines are located.

The coverage of current (2026) surveys has been increased to provide additional coverage of these lower value habitats within the proposed development. While the coverage of these surveys has been extended into the lower value habitats particularly the network of Improved Agricultural Grassland fields to the south of the site, the 2026 results were consistent with previous surveys in terms of providing a representative sample of the habitats at the proposed development and reconfirm the findings of the EIAR.

2.2.4.1 Current Survey Effort

Breeding bird and breeding wader surveys were undertaken during the breeding season of 2026 in accordance with suitable methodologies including those described in Bibby et al. (2000), Gilbert et al, (1998), O'Brien & Wilson (2011) and NatureScot (2025) as detailed in the ornithology baseline report in Appendix 2.

A total of five breeding wader transects were surveyed, including three transects (wader transects 1, 2 & 3) targeted on peatland habitats which represent the most (potentially) suitable habitats for waders in the area, in addition to two transects (wader transects 4 & 5) located in agricultural land which were surveyed on a precautionary basis in order to sample this habitat type and extend coverage as widely as possible across the proposed development.

Woodcock surveys in accordance with Hoodless et al. (2009) were also undertaken, covering the areas of woodland where proposed turbines are located.

A total of four breeding bird transects focused on proposed infrastructure and were designed to provide extensive coverage of the proposed development while also giving a representative sample of habitats were surveyed across two rounds during summer 2026.

2.2.4.2 Breeding Wader Surveys

As noted already in Item A (i), breeding wader surveys and VP surveys did not detect any breeding Curlew or Lapwing activity at the proposed development, reconfirming the existing baseline and impact assessment.

There was just one record of a wader across all current breeding wader transect surveys, namely an individual Snipe flushed form cutover bog outside the proposed development site and outside the 500m turbine buffer to the south of wader transect 3, observed on 28/04/26 (this snipe was flushed form the middle of Timahoe North Bog, c. 870m from the proposed development). No behaviour indicative of breeding was observed on this occasion.

As detailed above in Appendix 2, snipe activity was observed during VP surveys at VP2 during May and June 2026. One adult was flushed by the surveyor on 07/05/2026. Three records of flight activity were recorded on 22/05/2026. On 18/07/2026, two snipe adults were noted in song at separate locations in and around Mulgeeth bog. One of these birds also engaged in short bursts of display flight.

All snipe activity observed during VP surveys was focused on Mulgeeth bog. While vocalisations and display flights potentially indicative of territorial behaviour were recorded, the surveyor noted there were no reliable indications that breeding occurred in this area during summer 2026.

The pre-planning surveys noted drumming birds and up to three breeding territories on Mulgeeth Bog in 2022, but no observations of breeding snipe were made during 2023 wader surveys. As such, the absence of breeding snipe during current surveys and 2023 surveys in contrast to 2022 surveys indicates inter-annual variability in the use of Mulgeeth Bog by breeding snipe.

The existing impact assessment stands when the above is taken into consideration, and associated mitigation remains suitable and is designed to be triggered based on the activity of snipe or other breeding waders at pre-construction and construction changes. Residual impacts for snipe remain unchanged, i.e. Long-term Moderate Reversible Residual Disturbance/Displacement Effects.

2.2.4.3 *Woodcock Surveys*

Current surveys confirmed that woodcock continue to occupy wooded sections of the proposed development and surrounding areas (see Appendix 2). While similar levels of overall activity were observed during the 2026 breeding season, observations of Roding (breeding display flights) were limited to one observation in contrast to numerous observations of Roding during previous surveys. Due to the ongoing presence of woodcock during the breeding season, it is assessed that the impact assessment and mitigation for Woodcock in EIAR Chapter 8-2 remain valid.

2.2.4.4 *Breeding Bird Surveys*

A total of 33 species were observed during summer 2026 breeding bird surveys. Of these, one is Red-listed under BoCCI (Gilbert et al., 2021): meadow pipit. A further 8 are Amber-listed under the BoCCI: goldcrest, herring gull, house sparrow, skylark, spotted flycatcher, swallow, and willow warbler. The remaining 24 species are Green-listed under BoCCI. No annex I species were recorded during these surveys.

Compared with previous breeding bird surveys, just two additional species were recorded: herring gull and magpie. The individual herring gull record was of a gull flying over and as such is not a breeding record. Magpie was recorded in the 25-100m distance band on one occasion.

Previous breeding bird transect surveys recorded a total of 53 species, meaning that a total of 22 species recorded during pre-planning surveys were not recorded during current surveys. These species were Buzzard, Goldfinch, Greenfinch, Grey Heron, House Martin, Jackdaw, Lesser Black-backed Gull, Long-tailed Tit, Mallard, Northern Wheatear, Peregrine, Pheasant, Pied Wagtail, Redshank, Reed Bunting, Rook, Starling, Stock Dove, Stonechat, Swift, Treecreeper and Yellowhammer. It is noted that the Peregrine record was a fly-over and as such not indicative of breeding.

As such, while a lower number of species was recorded during current surveys, a similar suite of common species was recorded. Current surveys do not indicate any need to revise the existing impact assessment with regards to general breeding birds; no new species of significance were recorded, and it is considered prudent to retain all previously recorded species in the assessment on a precautionary basis.

2.2.4.5 *Conclusion*

Since current surveys which included more extensive coverage of the proposed development did not indicate any material changes to the existing baseline (less species were recorded vs. previous surveys; new/additional species were limited to magpie, a common and widespread species and a herring gull flying over), it has been confirmed that the previous survey effort was sufficiently robust and provided suitable baseline data for assessment of potential effects.

2.2.5 RFI Item iii

An Coimisiún Pleanala shares the concerns of the Department with respect to the adequacy of the barn owl survey. You are required to update the barn owl surveys with respect to best practice guidelines appropriate to wind farm development.

2.2.6 RFI Item iii Response:

A barn owl survey was carried out during the breeding season of 2026 in accordance with the guidance documents '*Survey and Mitigation Standards for Barn Owls to inform the Planning, Construction and Operation of National Road Projects*' (TII, 2021) and *'Recommended bird survey methods to inform impact assessment of onshore windfarms*' (NatureScot, 2025).

An initial desk-based assessment collated available information including aerial imagery, desktop records, previous survey results and information from local residents. A core study area of 2 km was defined in accordance with NatureScot (2025) raptor survey requirements and McGuiness et al., (2015) (BirdWatch Ireland Guidance Document *Bird Sensitivity Mapping for Wind Energy Developments and Associated Infrastructure in the Republic of Ireland*).

The study area of 5 km defined in TII (2021) is intended for the assessment of road projects, for which both disturbance to roosting/breeding birds during construction and also collision with traffic during operation are key concerns. The foraging range of barn owls extends to c. 4 km during breeding season, potentially putting them at risk from traffic collisions where new roads are proposed within their foraging territories. McGuiness et al., (2015) note that barn owl hunting flight is low (typically 2m), placing them at risk of road traffic collisions. Since this low-flying species is not prone to wind turbine collisions and since the limited and slow-moving traffic associated with wind farm construction and operational phases poses no collision risk to barn owl, potential effects are limited to localised/temporary disturbance. As such, the potential effect category of most relevance for wind farms is disturbance of a breeding site during construction. Since construction disturbance is extremely unlikely to occur beyond several hundred metres, the 2 km study area adopted in line with NatureScot (2025) raptor survey guidance is highly conservative and actually exceeds the 1km survey buffer recommended for owls in NatureScot (2025). As such, the 2km study area is robust and fit for the purpose of assessing a proposed wind farm.

Following the initial desktop assessment, a recce survey to identify potentially suitable barn owl nest locations and search for signs of barn owl such as pellets, white-wash and moulted feathers was undertaken during daylight on June 15th and 23rd, and July 2nd and 8th.

Watches at potentially suitable breeding locations including a barn (in use for agricultural activities), an abandoned thatched cottage and a disused house were undertaken on June 23rd, July 2nd and 8th as detailed in the ornithological baseline report (see Appendix 2) Watches were undertaken during suitable conditions (dry, clear weather with good visibility and absence of strong winds).

In addition to barn owl sign searches and vantage point watches, autonomous audio recording devices (audio moths) were deployed at five locations in the vicinity of potential breeding locations to increase the potential of detecting barn owl activity. The audio moths were deployed for a total of 18 nights from 23/06/2026 to 10/07/2026, recording between 23:00 - 03:00 each night. See Figure 2-5 in Appendix 2 for deployment locations.

A total of five days survey effort was carried out across these surveys, including over 18 hours of watch time at potentially suitable breeding sites. All survey effort was undertaken within the recommended survey window (mid-March to mid-July) (TII, 2021). NatureScot (2025) additionally notes that late evening surveys for calling juveniles during May-July can be used to detect successful breeding pairs.

No barn owl activity or signs of barn owl were recorded during surveys, reconfirming the results of previous surveys. Potentially suitable habitat and breeding locations were confirmed to be present in the locality. However, current surveys did not obtain any evidence of barn owl activity or use of potential roosting locations in the area surrounding the proposed development. The presence of a barn owl nest box in woodland north of T6 outside the proposed development is also noted. This was confirmed to have remained inactive by the landowner up to the present. This nest box is located c. 100m from the proposed T6 felling buffer.

The updated desktop study noted one confirmed record of breeding barn owl outside the 2km study area; this record comprised three recently fledged juveniles at Thomastown, Enfield on 16/07/2025. This record is associated with a building located 2.7 km north-west of the proposed development.

As such, it is confirmed that barn owl are present in the wider region. While current and previous surveys have confirmed the presence of potentially suitable breeding locations for this species in the locality of the proposed development, they do not provide any evidence of barn owl using these features. Considering that suitable breeding features are likely to outnumber barn owls, in addition to the confirmed breeding site at Thomastown and their tendency towards breeding site fidelity (Lusby et al. 2009; Lusby et al. 2010; Lusby et al. 2012), potential for barn owl to begin occupying previously unused features in the locality of the proposed development is low.

As such, the results of current surveys are consistent with the information on barn owl activity contained in the existing baseline detailed in EIAR Chapter 8-2.

Goodship and Furness (2022) note in their NatureScot literature review of disturbance distances for selected bird species that buffer zones to protect barn owls from forestry operations during the breeding season range from 75 to 250m. The closest potentially suitable nesting location identified is a barn (Site 4) located 175m from the proposed blade set-down area at the southern entrance of the proposed development. The nocturnal audio survey did not detect any barn owl activity at this location. Considering that the separation distance between this barn and the proposed development is towards the conservative end of the buffer range, and the limited potential for disturbance to arise due to the nature of proposed activities at the site entrance (floating access track/hard standing construction and turbine blade transfers), it is unlikely that the proposed development would cause disturbance in the event that breeding barn owl took up occupancy of this barn.

All remaining buildings identified as being potentially suitable for breeding barn owl are located over 250m from proposed infrastructure.

2.2.6.1 Conclusion

The updated surveys completed in 2026 encompassing the conservative 2 km buffer, including watches and acoustic monitoring did not detect any barn owl activity within or in the surrounding locality of the proposed development. As such, the results of EIAR baseline surveys have been reconfirmed.

The updated desktop survey confirmed the presence of breeding barn owl (new record published on 16/07/2025 after the planning submission) in the wider region (outside 2 km study area).

While the baseline for barn owl presented in EIAR Chapter 8-2 remains unchanged and potential for barn owl to begin using features in the locality of the proposed development for breeding is low, following a conservation-focused approach based on the precautionary principle it is considered prudent to update the assessment and provide mitigation to cover the eventuality that the baseline could potentially change in the future.

2.2.6.2 Update to EIAR

While no barn activity was recorded during current or previous surveys, due to the presence of potentially suitable features which could be used as breeding sites, it is considered prudent to add barn owl as a key ecological receptor.

As such, the following sections assessing barn owl is an addendum to the EIAR:

Potential Construction Effects

Table 2-1: [update to EIAR Table 8-24] Effect of habitat loss to target species – Barn Owl

Key Receptor (Sensitivity)	Construction Direct Effect Character	Significance without mitigation
Barn Owl (High)	No potentially suitable breeding habitat structures or trees for barn owl are present within the proposed development footprint or associated buffers. Potentially suitable hunting habitat for barn owl is limited in the area of the proposed development. Suitable areas of rough grassland and low-growing open scrub occur as temporary successional habitats in parallel with replanted conifer plantation and immature woodland prior to these replanted areas developing closed vegetation structures as scrub thickets expand and trees grow and begin to form canopies. These habitats follow the cycle of forestry management. A number of areas including immature woodland traversed by the northern access track, and replanted conifer plantation north-east of T9 and between the proposed substation and T11 which in 2023 previously supported more open grassy vegetation suitable for hunting barn owl have begun to develop more scrubby enclosed habitats, reducing suitability for hunting barn owl. As such, there are no optimal high-quality hunting habitats for barn owl within the proposed development.	**Sensitivity:** High **Magnitude:** Negligible **Overall significance:** Low (Criteria: Percival, 2003) Loss of habitat will be a **Long-term Imperceptible** effect due to absence of breeding and suitable hunting habitats from the proposed development (Criteria: EPA, 2022)

Table 2-2: [update to EIAR Table 8-25] Indirect Construction Effects on Avifauna – Barn Owl

Key Receptor (Sensitivity)	Construction Indirect Effect Character	Significance without mitigation
Barn Owl (High)	Barn owl have not been recorded during current or previous surveys for the proposed development. While potentially suitable breeding locations are present in the locality, this does not automatically mean these will be used by breeding barn owl. Recent desktop records confirm that barn owl breed c. 2.7 km north-west of the proposed development, and a tendency towards site fidelity (Lusby et al. 2009; 2010 & 2012) means this breeding site is likely to be favoured over potentially suitable features closer to the proposed development. As such, the following potential effects which could arise if breeding barn owl occupied a site closer to the proposed development represent a hypothetical scenario and are included on a purely precautionary basis.	**Sensitivity:** High **Magnitude:** Negligible **Overall significance:** Low (Criteria: Percival, 2003) Disturbance and/or displacement will be a Short-term **Imperceptible** effect (Criteria: EPA, 2022). Hypothetical disturbance and/or displacement affecting nesting barn owl would be a Short-term **Moderate** to **Significant** effect (Criteria: EPA, 2022).

Key Receptor (Sensitivity)	Construction Indirect Effect Character	Significance without mitigation
	The majority of buildings providing potentially suitable breeding habitat are located outside the higher end of the range of barn owl nest buffering distances (75 to 250m) detailed in Goodship and Furness (2022), making potential for disturbance to these sites negligible. The closest potentially suitable nesting locations are the nest box c. 100m north of the T6 felling buffer (no barn owl activity recorded) and the barn (Site 4; no barn owl activity recorded) located 175m from the proposed blade set-down area at the southern entrance of the proposed development. Since no barn owl activity has been recorded at either of these locations, it is extremely unlikely that disturbance to barn owl will occur. Considering the separation distances between the proposed development and these features, in addition to the construction activities proposed at each location, in a hypothetical scenario where barn owl was present, disturbance would be more likely to affect the nest box than the barn due to closer proximity and greater potential for disturbance from felling and turbine construction Based on the precautionary principle and separation distances being lower than the highest nest buffer distance quoted in Goodship and Furness (2022) (250m), it is considered that limited potential for some level of disturbance may exist, in the unlikely event that barn owl occupied wither of these locations. While it is considered unlikely that disturbance to nesting barn owl would occur, if it did, it could result in a hypothetical medium magnitude effect. The predicted effect magnitude based on baseline survey results is negligible. While no optimal foraging habitat is present, there is limited potential for barn owl to hunt occasionally in marginally suitable habitat such as forestry tracks and field boundaries. Construction will primarily occur during daylight; occasional night work may be required. Considering the limited duration and localised nature of any night work, in combination with low/sporadic potential for hunting barn owl to use the limited areas of sub-optimal habitat at the proposed development, potential disturbance to hunting barn owl is assessed as negligible.	

Potential Operational Effects

Due to absence of barn owl observations, the effective collision risk for this species is zero. It is further noted that this species is not susceptible to turbine collisions due to it's flight characteristics and hunting behaviour i.e. low flight searching for small mammals. McGuiness et al., (2015) note that barn owl hunting flight is typically low (in the region of 2m). This flight altitude is below the collision risk volume.

Table 2-3: [update to EIAR Table 8-27] Disturbance and Barrier effect on target species – Barn Owl

Key Receptor (Sensitivity)	Operational Indirect Effect Character	Significance without mitigation
Barn Owl (High)	**Disturbance/Displacement:** Potential disturbance could arise from noise or visual intrusion. However, due to the limited occurrence and sub-optimal nature of habitats at the proposed development, disturbance or displacement is unlikely. Barn owl breeding success has shown no declines in areas of high disturbance levels in the UK, such as near to military activity (Shawyer, 2011); it is unlikely that noise from turbines would significantly affect hunting birds (if present), resulting in negligible effect magnitude. **Barrier Effect:** Given the absence of observations during surveys and limited occurrence of desktop records, avoidance of the proposed wind farm is unlikely to induce significant energetic expenditure on either daily patterns of birds or birds undertaking larger movements such as post-fledging dispersal of juveniles. It is also noted the turbine layout features large gaps (minimum of c. 400m) between individual turbines, avoiding a 'wall' or barrier effect.	Disturbance/Displacement: **Magnitude**: Negligible **Sensitivity**: High **Overall Significance:** Low (Criteria: Percival 2003). Significance of effects is assessed as a **Long-term Imperceptible** (Criteria: EPA, 2022). Barrier Effect: **Magnitude:** Negligible **Sensitivity:**High **Overall Significance:** Low (Criteria: Percival 2003). Overall significance considered a **Long-term Imperceptible** effect (Criteria: EPA, 2022).

2.2.6.3 Mitigation

Based on the results of current and previous surveys, no mitigation specific to barn owl is required. However, as a precautionary measure, mitigation to cover the unlikely occurrence of breeding barn owl occupying a site near the proposed development prior to or during construction is included below.

A re-confirmatory pre-construction survey (March/April or extended further into breeding season as necessary) will be conducted to assess any evidence of barn owl activity or occupation of new territories. Should any nesting locations be recorded, works at these locations will be restricted to outside the breeding season (March 1st to August 31st inclusive) or until chicks are deemed to have fledged (following monitoring). In the event of breeding barn owl occupying any site in the close proximity to the proposed development, all construction works will be halted within 250m of the nest until breeding is complete.

The ECoW/Project Ornithologist will monitor any breeding sites to ensure disturbance is avoided and confirm when breeding is complete.

2.2.6.4 Residual Effects (Barn Owl)

With the implementation of mitigation (if required), the proposed development will have an **Imperceptible** Residual Effect in the local context on barn owl.

2.2.7 RFI Item iv:

With respect to the request items i-iii listed above, you are requested to update the planning application documentation including the ornithological impact assessment, collision risk assessment and cumulative effects, as required.

2.2.8 RFI Item iv Response:

A comprehensive suite of ornithological surveys were carried out for the EIAR, including vantage point (VP), breeding and winter bird transects, breeding wader surveys, woodcock surveys, merlin surveys and hinterland surveys (including dedicated searches for breeding raptors and barn owl). These surveys were undertaken between the survey seasons of summer 2021 to summer 2023 inclusive. Within this period, a total of four consecutive seasons of VP surveys were completed during winter 2021-22, summer 2022, winter 2022-23 and summer 2023. All pre-planning surveys were completed within 5 years of the planning submission date as per NatureScot (2025) guidance which states: "*Survey data to inform any proposal should have been collected within **five years of planned submission**, and within three years where species populations are rapidly changing*".

Regarding the longevity of survey data, a lifespan of five years from the planning submission date is specified for ornithological surveys in '*Recommended bird survey methods to inform impact assessment of onshore wind farms'* (NatureScot, 2025), provided habitats and conditions at the site remain unchanged. This notes that adequate and site-specific information up to five years old may be used. This would place the 2021-2023 ornithological surveys within the acceptable timeframe in terms of the planning submission date; the earliest of these surveys (Summer 2021 season) were four years old at the time of planning submission in June 2025. It is also noted that the final year of pre-planning surveys (including winter 2022-23) was completed within 3 years of the planning submission.

While all of the bird surveys data was within the accepted timeframe for the planning submission as required in NatureScot (2025) guidelines, an additional season of surveys was completed during the 2026 breeding season. This was carried out to reconfirm the existing baseline at the time of the current further information request and to provide up to date information for rapidly changing species (NatureScot 2025 guidance requires survey data for rapidly changing species to be obtained within three years of submission). It is noted that the final winter and summer seasons (winter 2022-23, summer 2023) seasons of pre-planning surveys were completed within 3 years of the planning submission. The completion of the final year of surveys within 3 years of the planning submission, in addition to the surveys completed in the breeding season of 2026 ensure there are no gaps in the surveys and the data available for assessment is compliant with NatureScot (2025) guidance.

The 2026 breeding season surveys included VPs, breeding bird, breeding wader, woodcock and barn owl surveys. General hinterland surveys are complimentary to the core surveys covering the proposed development and as such were not required to be repeated. Due to previous merlin surveys in summer 2023 indicating a lack of breeding merlin activity in the area, in addition to robust coverage of the proposed development by other surveys (including 2.5 years of pre-planning surveys and summer 2026 surveys), breeding merlin surveys were not required to be repeated.

The effects of current survey results on the ornithological impact assessment, collision risk assessment and cumulative effects are discussed below. Due to the similarity in activity patterns and habitats between previous and current surveys, requirements to update the impact assessment are minimal. No requirement to update the NIS has been identified.

2.2.8.1 Baseline Approach

This response deals with key Ecological Receptor (KER) species detected during both pre-planning and current surveys. Table 1-4 below provides a comparison identifying which key ecological receptor (KER) species were identified during both pre-planning and current surveys, and those identified only during pre-planning surveys.

Habitat surveys undertaken during summer 2026 confirmed that the habitats within and surrounding the proposed development remain largely unchanged since previous surveys (some minor changes occurred, but these do not represent material changes; see Appendix 3). As such, it can reasonably assumed that the KER bird species which were not observed during 2026 surveys would follow the same activity patterns recorded during previous / pre-planning surveys. Therefore a more conservative approach has been adopted and the impact assessment remains unchanged for these species rather than reducing the predicted impact levels despite these species not being observed during the summer 2026 survey.

Table 1-4 provides a comparison showing which KER species were recorded during 2021-23 surveys only, and those recorded during both 2021-23 surveys and summer 2026 surveys. Only those species observed during the 2026 surveys are included in the KER Species (2026) column in Table 2-4. For species not observed during the 2026 surveys the assessment in the EIAR remains unchanged / valid following the precautionary principal.

Table 2-4: ***Comparison of KER species identified during both pre-planning and current surveys***

KER Species (2021 – 2023)	2021-2023 Surveys	BoCCI	Annex I	2026 Surveys	KER Species (2026)
Buzzard	✓	Green	No	✓	Buzzard
Curlew	✓	Red	No	x	-

KER Species (2021 – 2023)	2021-2023 Surveys	BoCCI	Annex I	2026 Surveys	KER Species (2026)
Goldcrest	✓	Amber	No	✓	Goldcrest
Golden Plover	✓	Red	Yes	x	-
Goshawk	✓	Amber	No	x	-
Great Black-backed Gull	✓	Green	No	x	-
Greenfinch	✓	Amber	No	x	-
Grey Heron	✓	Green	No	x	-
Hen Harrier	✓	Amber	Yes	x	-
Herring Gull	✓	Amber	No	✓	Herring Gull
House Martin	✓	Amber	No	x	-
House Sparrow	✓	Amber	No	✓	House Sparrow
Kestrel	✓	Red	No	✓	Kestrel
Kingfisher	✓	Amber	No	x	-
Lapwing	✓	Red	No	x	-
Lesser Black-backed Gull	✓	Amber	No	✓	Lesser Black-backed Gull
Linnet	✓	Amber	No	✓	Linnet
Little Egret	✓	Green	Yes	x	-
Long-eared Owl	✓	Green	No	x	-
Meadow Pipit	✓	Red	No	✓	Meadow Pipit
Merlin	✓	Amber	Yes	x	-
Peregrine	✓	Green	Yes	✓	Peregrine
Red Kite	✓	Red	No	x	-
Redwing	✓	Red	No	x	-
Sand martin	✓	Amber	No	x	-

KER Species (2021 – 2023)	2021-2023 Surveys	BoCCI	Annex I	2026 Surveys	KER Species (2026)
Skylark	✓	Amber	No	✓	Skylark
Snipe	✓	Red	No	✓	Snipe
Sparrowhawk	✓	Green	No	✓	Sparrowhawk
Starling	✓	Amber	No	✓	Starling
Stock Dove	✓	Red	No	x	-
Swallow	✓	Amber	No	✓	Swallow
Swift	✓	Red	No	✓	Swift
Wheatear	✓	Amber	No	x	-
Whooper Swan	✓	Amber	Yes	x	-
Willow Warbler	✓	Amber	No	✓	Willow Warbler
Woodcock	✓	Red	No	✓	Woodcock
Yellowhammer	✓	Red	No	x	-

The following sections compare and (where required) update the construction, operational and decommissioning effects for KER species detected during both pre-planning and current surveys within the same framework used in EIAR Chapter 8-2, i.e. habitat loss and disturbance/displacement at construction stage, barrier effect and disturbance/displacement at construction stage, and a general overview of potential decommissioning effects.

With respect to Collision Risk, it is not appropriate to update the CRM submitted as part of the EIAR. However, the appropriateness of the CRM in the context of the latest survey results can be validated by virtue of the similarity or otherwise of previously recorded activity levels and patterns when discussing operational effects.

2.2.8.2 Construction Stage Effects

Passerines

Based on current surveys and absence of material habitat changes at the proposed development, there is no change to the impact assessment regarding Passerines and non-Target Species detected during both pre-planning and current surveys. As such the following effects remain valid for this group (species re-recorded in summer 2026 are included in Table 2-5; species recorded during previous surveys which were not re-recorded in summer 2026 are not included and the previous assessment is considered to remain valid on a conservative basis).

Table 2-5: Non-target species – construction stage effects

Species	Effect Significance (pre-mitigation)
Goldcrest and Linnet (Percival sensitivity: Medium)	Long-term Not significant Effect in a local context which is Reversible (Criteria: EPA, 2022).
House sparrow (Percival sensitivity: Medium)	Temporary Imperceptible Effect and Reversible in a local context is predicted for house sparrow.
Starling (Percival sensitivity: Medium)	Temporary Imperceptible Effect and Reversible in a local context is predicted for starling.
Swallow (Percival significance: Medium) Note: derelict shed along proposed northern access route still contains a disused swallow's nest. No signs of use since previous observations were noted during current surveys.	Long-term Not significant Effect in a local context which is Reversible is identified for this group (Criteria: EPA, 2022). In the event that the nest in the shed or a new nest at this location came into use prior to construction, population-level effects would remain Low/Not significant for swallow, but potential interference with a nest during breeding season would give rise to a Temporary Significant effect for the individuals directly affected (prior to mitigation).
Meadow Pipit (Percival sensitivity: High) Skylark (Percival sensitivity: Medium)	Long-term Imperceptible effect (Criteria: EPA, 2022). In the event that breeding birds were present within or close to the proposed footprint at the time of construction, this would result in a Temporary Significant effect for any individuals directly affected (prior to mitigation).
Willow warbler (Percival sensitivity: Medium)	Long-term and Slight in a local context which is Reversible (Criteria: EPA, 2022).

Habitat Loss & Disturbance/Displacement (Target Species)

The following section updates the construction phase habitat loss and disturbance/displacement assessment for target species presented in Section 8.16.1.1.2 and Tables 8-24 and 8-25 of the EIAR. Table 1-6 below includes only the target species recorded during both pre-planning and current surveys (and one additional species, Cormorant, which was not previously recorded). The assessments for species which were not re-recorded in summer 2026 (including two species – Lapwing and Golden Plover, which were named in the F.I request) remain unchanged and as such are not repeated here.

Additional Target Species: Cormorant

One target species which was not previously observed (Cormorant) was recorded on one occasion during current surveys. Due to absence of suitable habitat at the proposed development for this species, construction-stage effects in terms of habitat loss or displacement/disturbance are assessed as **Imperceptible** for this species.

Table 2-6: [update to EIAR Table 8-24] Effect of habitat loss on target species

Key Receptor (Sensitivity)	EIAR Impact Characterisation	Current Activity/Updates	Significance without mitigation
Buzzard (Low)	Typically high levels of flight activity were recorded for buzzards during VP surveys. This species was recorded 111 times across all breeding season VP surveys, and 54 times across all winter season VP surveys. The majority of which observed buzzards traversing the 500m buffer zone. Buzzards were observed circling, soaring and perching in trees. No hunting was observed. No breeding behaviour was observed, excluding display flights (display flights can be used for both territorial defence and courtship). Although no breeding activity was recorded, there is suitable potential habitat for breeding buzzards on-site. Effects on open agricultural habitats used for foraging and wooded habitats for breeding will be minimal (loss of 21.7 ha of wooded habitats/ 6 ha open agricultural habitats). This equates to 12.7 % of total wooded habitats and 3.7% of open agricultural habitats, resulting in low to medium magnitude effects.	Current surveys recorded similar buzzard activity continues at the proposed development with a total of 40 observations of buzzards seen during VP surveys. This is lower than the average number of breeding season observations (55.5 observations) across 2022 & 2023 when pre-planning VP surveys were conducted. Juvenile buzzards were noted on two occasions during current VP surveys. Juveniles had not previously been observed. No nest sites were observed within or near the proposed development. The EIAR impact assessment acknowledges the presence of suitable potential habitat for breeding buzzards on-site. This remains unchanged. Current habitat surveys recorded a small decrease in the area of (Mixed) broadleaved woodland in the study area (a total of three trees were felled, resulting in loss of 0.05 ha of woodland).	No update is required. Sensitivity: Low Magnitude: Low -Medium Overall significance: Very Low (Criteria: Percival, 2003) Loss of habitat will be a Long-term Imperceptible effect due to low magnitude/species sensitivity and abundance of suitable habitats in the local area (Criteria: EPA, 2022)

Key Receptor (Sensitivity)	EIAR Impact Characterisation	Current Activity/Updates	Significance without mitigation
		This is a materially insignificant proportion of the overall woodland habitat resource, representing only 0.02% of the combined woodland habitat resource within the study area. As such, the EIAR assessment remains valid.	
Curlew (High)	Curlew were exclusively recorded during hinterland surveys, and were not observed at the proposed wind farm site. Records observed curlew c. 9 km south-west of the Site during the breeding seasons, and c. 3.1 km east of the Site during the winter seasons. With no records of curlew within the Site, and a lack of suitable on-site breeding and foraging habitats, the resultant habitat loss will not be significant. Habitat loss is not envisaged to effect this species.	There were no observations of Curlew during current surveys. There is no suitable habitat for Curlew within the proposed development footprint. With no records of curlew within the Site, and a lack of suitable on-site breeding and foraging habitats, the resultant habitat loss will not be significant. Habitat loss is not envisaged to effect this species.	No update is required. Sensitivity: High Magnitude: Negligible Overall significance: Very Low No loss of habitat will occur, resulting in a be a Long-term Imperceptible effect (Criteria: EPA, 2022)
Cormorant (Low)	Not recorded during pre-planning surveys.	One observation of Cormorant flying over the flight activity survey area was recorded during current surveys. There is no suitable habitat for Cormorant within or near the proposed development site. As such, there are no potential for effects on Cormorant in terms of habitat loss.	Addition of effect significance for Cormorant is required. Sensitivity: Low Magnitude: Negligible Overall significance: Low (Criteria: Percival, 2003)

Key Receptor (Sensitivity)	EIAR Impact Characterisation	Current Activity/Updates	Significance without mitigation
			Loss of habitat will be a Long-term Imperceptible effect (Criteria: EPA, 2022)
Herring Gull (Medium)	Herring gulls were recorded on 128 occasions during VP surveys, with the majority of observations (118) occurring during the winter seasons. All ten records during the 2022 and 2023 breeding seasons noted lone individuals or flocks of up to 42 birds in flight. No breeding or foraging activities were observed. During the winter seasons, 118 observations were made. Only 32 of which occurred during the 2022/23 winter VP surveys. The majority of records observed individuals flying over and traversing the 500m buffer zone. Two records noted flocks of three and four birds landing in nearby agricultural fields. No foraging activities were recorded. Effects on open agricultural habitats potentially used for foraging (loss of 6 ha open agricultural habitats). This equates to loss of 3.7% of open agricultural habitats, resulting in a Low magnitude effect.	Current surveys recorded similar activity patterns to pre-planning VP surveys. A total of six observations of herring gull were made in summer 2026, with 15 individual gulls contributing to observed flight activity. The number of observations is similar to previous breeding seasons (approximately half of the ten observations recorded across 2022 and 2023). However, numbers observed were lower during current surveys, with the maximum flock size being five gulls, in contrast to a maximum of 42 during previous surveys. Similarly to previous surveys, all current observations involved herrings gulls flying over the site, with no foraging or breeding observed.	No update is required. Sensitivity: Medium Magnitude: Low Overall significance: Low (Criteria: Percival, 2003) Loss of habitat will be a Long-term Not significant effect based on the low magnitude of secondary foraging habitat loss, absence of breeding habitat and absence of records of herring gull foraging on-site (Criteria: EPA, 2022)

Key Receptor (Sensitivity)	EIAR Impact Characterisation	Current Activity/Updates	Significance without mitigation
		While one agricultural field was noted to have been converted from arable land back to grassland, this is not considered a material change.	
Kestrel (High)	Kestrel were observed 22 times during the breeding season VP surveys, and 17 times during the winter season VP surveys. The majority of records observed kestrel flights intersecting the 500m buffer zone. This species typically breeds and forages in woodland, dry heath, dry meadows, grassy verges, improved agricultural grassland, recently felled woodland and scrub - thus kestrel is rather flexible in its habitat needs and can utilise a broad mosaic of different habitat types. The site was observed to be used by commuting individuals. No foraging, hunting, breeding or nesting was observed, although the landscape-scale habitat mosaic in which the proposed wind farm is located is suitable for these activities. Considering the broad range of habitats potentially utilised by kestrel, loss of kestrel habitat is calculated as total loss across all habitat types excepting sub-optimal conifer plantation which equates to 3.7% loss, resulting in a Low magnitude effect.	Recorded kestrel activity during current surveys was restricted to a single observation of an unsexed adult hunting/hovering over the proposed development near T9. As such, kestrel activity was markedly reduced in comparison to previous breeding seasons. Previous surveys did not record any hunting activity, in contrast to current surveys. No breeding activity or nest sites were observed across both previous and current surveys. The landscape-scale habitat mosaic in which the proposed wind farm is located remains similar to EIAR baseline conditions, and as such provides suitable habitat for kestrels.	No update is required. Sensitivity: High Magnitude: Low Overall significance: Low (Criteria: Percival, 2003) Loss of habitat will be a Long-term Not significant effect (Criteria: EPA, 2022)

Key Receptor (Sensitivity)	EIAR Impact Characterisation	Current Activity/Updates	Significance without mitigation
		Despite the lower activity levels recorded during current surveys, the habitat loss assessment remains unchanged.	
Lesser Black-backed Gull (Medium)	Lesser black-backed gull were observed on 18 occasions during summer VP surveys, and 11 occasions during winter VP surveys. The majority of which observed birds traversing the 500m buffer zone. Breeding and roosting were not observed within the site over the survey period. Although this species nests primarily on the coast, it is also known to nest on buildings, in larger towns and cities. Birds nesting inland occurs near larger waterbodies, and therefore there is no potential for breeding on-site. Open agricultural habitats on site could be used occasionally as secondary foraging habitats. Effects on open agricultural habitats potentially used for foraging (loss of 6 ha open agricultural habitats). This equates to loss of 3.7% of open agricultural habitats, resulting in a Low magnitude effect.	A total of 44 lesser black-backed gulls were recorded across 18 separate flight activity observations during summer 2026. All observations involved gulls flying over the site. The total number of observations during Summer 2023 was also 18, comprised of six spring records in April and 12 further records across the remainder of the summer season. No Observations of lesser black-backed gull were recorded in summer 2022. While one agricultural field was noted to have been converted from arable land back to grassland, this is not considered a material change. The existing assessment that open agricultural habitats on site could be used occasionally as secondary foraging habitats remains unchanged.	No update is required. Sensitivity: Medium Magnitude: Negligible Overall significance: Very Low (Criteria: Percival, 2003) Loss of habitat will be a Long-term Not significant effect based on the low magnitude of secondary foraging habitat loss, absence of breeding habitat and absence of records of lesser black-backed gull foraging on-site (Criteria: EPA, 2022)

Key Receptor (Sensitivity)	EIAR Impact Characterisation	Current Activity/Updates	Significance without mitigation
Peregrine (Very High)	Peregrine were observed infrequently across the survey period. This species was recorded once during the winter 2022/23 VP surveys, three times during hinterland surveys, and once during breeding bird transect surveys. The observations consisted of adult individuals flying over the 500m buffer zone, and surrounding hinterland. No hunting or breeding activities were observed. Peregrine require tall cliff-faces or man-made structures which resemble these, for breeding. No such habitats or structures occur on site. Peregrines are aerial hunters which dive on prey from above and as such are not strictly limited to any particular habitat, instead they require sufficient numbers of avian prey. As such, there are no predicted habitat loss effects on this species.	Current surveys recorded two peregrine falcon observations: one juvenile female moving through the area, and one adult male successfully predating a starling from a tree line near VP1 outside the 500m turbine buffer. While previous surveys did not detect any hunting activity, it is noted that peregrine falcon are not adapted to any specific habitats, but rather require sufficient numbers of avian prey and as such can make use of diverse landscape mosaics for hunting. As such, the observation of a hunting peregrine during current surveys is consistent with the area in which the proposed development is located forming part of a larger landscape-scale hunting territory. Changes to habitats at the proposed development would not affect prey density or distribution which could materially affect the hunting resource used by peregrine falcon. There is no suitable breeding habitat for peregrine within or near the proposed development.	Minor update to rationale underlined. Effect significance remains unchanged. Sensitivity: Very High Magnitude: Negligible Overall significance: Low (Criteria: Percival, 2003) Loss of habitat will be a Long-term Not significant effect due to peregrine hunting requirements not being site or habitat-specific, and absence of suitable breeding habitats on-site (Criteria: EPA, 2022)

Key Receptor (Sensitivity)	EIAR Impact Characterisation	Current Activity/Updates	Significance without mitigation
Snipe (High)	Snipe were observed on six occasions during the spring migration VP surveys, seven times during summer VP surveys, and four times during the winter VP surveys. The majority of records observed snipe traversing the 500m buffer zone. Snipe were also observed during winter walkover, breeding wader, and hinterland surveys. During surveys, snipe were noted chipping and/or drumming in bog habitats adjacent to the proposed wind farm, south of T9 – T10. In both 2022 and 2023, breeding was confirmed in the local area as snipe near turbines T9-10 were observed drumming and occupying territory. Snipe are ground-nesting birds that breed in grassy tussocks in or adjacent to bog habitats. Snipe are commonly found in bog and wet grassland habitats during the breeding season, as well as wetland habitats and lowland lake shores during the non-breeding season. While suitable habitats for snipe are present in the vicinity of the proposed wind farm, there will be no loss of intact and semi-intact bog habitats suitable for breeding snipe.	Snipe activity observed during current surveys was mainly centred on Mulgeeth Bog south of T9 – T10, similar to previous surveys. In contrast to previous surveys, no breeding behaviour or established territories were recorded. In terms of habitat suitability, the existing impact assessment remains valid; suitable habitats for snipe are present in the vicinity of the proposed development, but there will be no land-take of these habitats. While breeding was not confirmed during current surveys, the habitat loss assessment remains unchanged.	No update is required. Sensitivity: High Magnitude: Negligible Overall significance: Very Low (Criteria: Percival, 2003) No loss of habitat will occur, resulting in a be a Long-term Imperceptible effect (Criteria: EPA, 2022)

Key Receptor (Sensitivity)	EIAR Impact Characterisation	Current Activity/Updates	Significance without mitigation
Sparrowhawk (Low)	Sparrowhawk were recorded a total of 17 times during breeding season VP surveys, and 26 times during winter season VP surveys. The majority of records observed lone individuals or pairs of sparrowhawks traversing the 500m buffer zone. All records were exclusively of birds in flight. No breeding or hunting activities were observed. This species was also observed twice along Transect 1 during winter walkover surveys, and twice during hinterland surveys (at HVP 7 – 9.5 km S; and at HVP 4 – 3.1 km E). This species requires mature trees for nesting and are commonly found in coniferous plantations. A second key requirement is an abundance of small birds, including meadow pipit and skylark. Although no breeding, nesting or hunting was observed, due to the presence of suitable habitats on-site and availability of suitable prey, there is potential for sparrowhawk to breed, nest and hunt in the area in which the proposed wind farm is located. Considering the broad range of habitats potentially suitable for sparrowhawk, loss of habitat is calculated as total loss across all habitat types which equates to 7.4% loss, resulting in a Medium magnitude effect.	Sparrowhawk activity recorded during current surveys was lower than previous surveys, with a total of five observations, all involving individual birds. Two of these involved hunting birds – one adult male and one juvenile. This sparrowhawk activity is similar to the previous survey season 2023 (four records), but slightly lower than Summer 2022 (three in spring, ten in summer). The overall activity pattern is similar to the EIAR baseline. No breeding activity or nest sites were observed across both previous and current surveys, although the presence of a juvenile during current surveys confirms breeding occurs in the local area. Considering the absence of material changes to habitats at the proposed development, habitats which are potentially suitable for sparrowhawk persist and the impact assessment remains valid.	No update is required. Sensitivity: High Magnitude: Low Overall significance: Low (Criteria: Percival, 2003) Loss of habitat will be a Long-term Not significant effect (Criteria: EPA, 2022)

Key Receptor (Sensitivity)	EIAR Impact Characterisation	Current Activity/Updates	Significance without mitigation
Swift (High)	Minimal observations of swift were made across all surveys. This species was observed on five occasions during breeding season VP surveys, three times during breeding walkover surveys, once during a merlin survey, and once during hinterland surveys. Three records in 2023 observed swift hawking within the 500m buffer zone. Swift feed exclusively on various invertebrates (midges, flies, spiders) caught in flight. Therefore, there is no scope for direct effects on foraging habitat. There is no swift breeding habitat present at the proposed wind farm site.	Swift were observed foraging on two occasions within the outer extent of the 500m turbine buffer on the south-western edge of Mulgeeth Bog to the south-west of proposed T9-T10. Groups sizes observed were two and five birds. The surveyor also noted a minimum of 58 birds flying through a point (commuting) outside the 500m buffer on the south-western edge of Mulgeeth Bog across the entire watch at VP2 on 22/05/2026. A similar observation noted a minimum of 11 birds passing through a point south of VP1 across the entire watch on 05/08/2026. While the observations of swift commuting outside the 500m buffer represent an observation of a new activity pattern, the observations of swift foraging within the 500m turbine buffer are similar to previous surveys, and the continued absence of breeding habitat and lack of material changes to habitats at the proposed development site result in the impact assessment remaining valid.	No update is required. Sensitivity: High Magnitude: Negligible Overall significance: Very Low (Criteria: Percival, 2003) Loss of habitat will be a Long-term Imperceptible effect based on the absence of swift nesting habitat and no potential for effects on foraging (Criteria: EPA, 2022)

Key Receptor (Sensitivity)	EIAR Impact Characterisation	Current Activity/Updates	Significance without mitigation
Woodcock (High)	Woodcock were recorded during targeted woodcock surveys across all survey years, as well as breeding wader surveys in summer 2022. 32 records of woodcock were made during the 2021, 2022 and 2023 targeted woodcock surveys, and records typically observed woodcock roding. This indicates a breeding population is present in wooded areas in which the proposed wind farm is located. The recorded observations of displaying males indicate breeding woodcock are distributed across the areas of woodland overlapped by the proposed wind farm. The majority of wooded habitats present are potentially suitable for breeding woodcock. Based on a combined loss of 27.5 ha (7.4%) across all wooded habitats, a Medium magnitude effect will occur.	Current surveys confirmed that woodcock continue to occupy wooded sections of the proposed development and surrounding areas. While similar levels of overall activity were observed during the 2026 breeding season, observations of Roding (breeding display flights) were limited to one observation in contrast to numerous observations of Roding during previous surveys. However, on a precautionary basis due to the ongoing presence of woodcock during the breeding season and due to observed activity levels, it is assessed that the impact assessment and mitigation for Woodcock in EIAR Chapter 8-2 remain valid.	No update is required. Sensitivity: High Magnitude: Medium Overall significance: High (Criteria: Percival, 2003) Loss of habitat will be a Long-term Moderate effect based on the proportion of wooded habitat loss, while considering the abundance of suitable displacement habitat within in the local area. (Criteria: EPA, 2022)

Table 2-7: [update to EIAR Table 8-25] Indirect Construction Effects on Avifauna

Key Receptor (Sensitivity)	EIAR Impact Characterisation	Current Activity/Updates	Significance without mitigation
Buzzard (Low)	Buzzards were recorded on 111 occasions during breeding season VP surveys, and 54 occasions during winter season VP surveys. The majority of records observed buzzards flying and soaring within the 500m buffer zone. No breeding behaviours were observed, outside of display flights which can be used for both courtship and territorial defence. Due to the high levels of activity within the proposed wind farm, there is potential for noise or visual disturbance to buzzard within the Site.	Current surveys observed similar buzzard activity levels at the proposed development with a total of 40 observations of buzzards seen during Summer 2026 VP surveys. As such, the EIAR assessment remains valid.	No update is required. Sensitivity: Low Magnitude: Medium Overall significance: Very Low (Percival, 2003) Disturbance and/or displacement will be a Short-term Imperceptible effect (Criteria: EPA, 2022).
Cormorant (Low)	N/A	One observation of Cormorant flying over the flight activity survey area was recorded during current surveys. There is no suitable habitat for Cormorant within or near the proposed development site. As such, there are no potential for effects on Cormorant in terms of construction stage disturbance/displacement.	Addition of effect significance for Cormorant is required. Sensitivity: Low Magnitude: Negligible Overall significance: Low (Criteria: Percival, 2003) Disturbance/displacement will be a Short-term Imperceptible effect (Criteria: EPA, 2022)

Key Receptor (Sensitivity)	EIAR Impact Characterisation	Current Activity/Updates	Significance without mitigation
Curlew (High)	Curlew were exclusively recorded during hinterland surveys, and were not observed within the proposed wind farm site. During the breeding season hinterland surveys, curlew were recorded on peatland habitats c. 9 km south-west of the Site. At this location, a pair failed to breed successfully due to nest predation in May 2021, and a group of three birds were sighted in May 2022. No successful breeding was observed. Due to the presence of recolonising cutover bog and intact raised bog immediately adjacent to the proposed wind farm, there is potential curlew breeding habitat adjacent to the proposed wind farm. However, the habitats within the wind farm site are not suitable for breeding curlew. During the winter season, curlew were observed four times in the wider environment, c. 3 km east of the proposed wind farm site. No records were made within the wind farm site. It is considered on a precautionary basis that due to the close proximity of suitable curlew breeding habitat, there is potential for disturbance to occur in the event that breeding curlew became established prior to construction. However, if the baseline remains unchanged no disturbance will occur due to absence of breeding curlew.	The EIAR assessment considered the potential for breeding Curlew to occupy potentially suitable breeding habitat in the vicinity of the proposed development could lead to a Short-term Significant effect prior to mitigation if breeding curlew established within 200-300m of proposed wind farm prior to construction. However, based on the continued absence of curlew records during current surveys and further examination of current trends and behaviour patterns for the Irish breeding curlew population, it is assessed to be highly unlikely that this could occur. The Irish breeding Curlew population is limited in size and restricted to a number of established breeding sites in certain areas, none of which overlap the proposed development or adjacent areas. See Item A (i) response above for details of the closest established breeding sites and Colhoun et al. (2021) for information on the Irish breeding population.	Update: hypothetical effect omitted; anticipated effects are Based on existing baseline conditions only. **Sensitivity**: High **Magnitude:** Negligible **Overall significance:** Very Low (Percival, 2003) Based on established baseline, disturbance and/or displacement will be a **Short-term Imperceptible** effect. (Criteria: EPA, 2022).

Key Receptor (Sensitivity)	EIAR Impact Characterisation	Current Activity/Updates	Significance without mitigation
		Curlew are philopatric, i.e. they return to their birthplace to breed, resulting in the pattern seen in the distribution and use patterns of Irish breeding sites. As such, it is considered that the assessment should be limited to the existing baseline conditions proven over multiple survey years, and omit the hypothetical assessment based on potential future occupancy.	
Herring Gull (Medium)	Herring gull were regularly recorded during VP surveys, with the majority of records occurring during the winter seasons. Herring gull were predominantly observed flying over and traversing the 500m buffer zone. On two occasions, flocks of three and four birds were observed landing in nearby agricultural fields, outside of the 500m buffer zone. No foraging activities were recorded within the buffer zone; however, there is potential for this species to forage occasionally in agricultural habitats at the proposed wind farm site. Therefore, there is limited potential for disturbance of foraging birds to occur.	Current surveys indicated similar activity patterns to pre-planning VP surveys, although numbers observed were lower during current surveys, with the maximum flock size being five gulls, in contrast to a maximum of 42 during previous surveys. Similarly to previous surveys, all current observations involved herrings gulls flying over the site, with no foraging or breeding observed.	No update is required. Sensitivity: Medium Magnitude: Low Overall significance: Low (Percival, 2003) Disturbance and/or displacement will be a Short-term Not Significant effect (Criteria: EPA, 2022).

Key Receptor (Sensitivity)	EIAR Impact Characterisation	Current Activity/Updates	Significance without mitigation
		The existing assessment remains valid in that potential for this species to forage occasionally in agricultural habitats at the proposed wind farm site exists.	
Kestrel (High)	Kestrel have a low to medium sensitivity to human disturbance and studies cite a buffer zone of between 100-200m during the breeding season and ≤ 50m during the non-breeding season (Goodship and Furness, 2022). Kestrel were observed 22 times during the breeding season VP surveys, and 17 times during the winter season VP surveys. The majority of records observed kestrel flights intersecting the 500m buffer zone. The 100-200m buffer zone is suggested to protect nesting Kestrels from forestry operations. However, the proposed wind farm site was observed to be used exclusively by commuting individuals. No foraging, hunting or breeding was observed. The presence of a kestrel nest box (currently unoccupied) c. 58m from the northern site entrance access track is noted. If the current baseline remains unchanged, potential disturbance/displacement affecting foraging kestrel will be a Low magnitude effect.	Recorded kestrel activity during current surveys was restricted to a single observation of an unsexed adult hunting/hovering over the proposed development near T9. As such, kestrel activity was markedly reduced in comparison to previous breeding seasons. No breeding activity or nest sites were observed across both previous and current surveys. The landscape-scale habitat mosaic in which the proposed wind farm is located remains similar to EIAR baseline conditions, and as such continues to provide suitable habitat for kestrels.	No update is required. Sensitivity: High Magnitude: Low (foraging kestrel)/ High (breeding kestrel within 100-200m) Overall significance: Low (foraging kestrel)/ Very High (breeding kestrel within 100-200m) (Percival, 2003) Disturbance and/or displacement affecting foraging kestrel will be a Short-term Not significant effect. In the event that breeding kestrel became established within 100-200m prior to construction, a Short-term Significant effect could occur prior to mitigation (Criteria: EPA, 2022).

Key Receptor (Sensitivity)	EIAR Impact Characterisation	Current Activity/Updates	Significance without mitigation
	In the event that a kestrel breeding site became established within 100-200m of the proposed wind farm site prior to construction, a High magnitude effect could occur prior to mitigation.	The kestrel nest box c. 58m from the northern site entrance access track noted during previous surveys is no longer present following the felling of trees in this area. Despite the lower activity levels and absence of nest sites recorded during current surveys, potential for kestrel to establish within 100-200m of the proposed wind farm site prior to construction Remains. As such, the construction stage disturbance/displacement assessment remains unchanged.	
Lesser Black-backed Gull (Medium)	Lesser black-backed gull were observed a total of 29 times across all flight activity VP surveys, with most records observing individuals traversing the 500m buffer zone. No nesting, breeding or foraging was observed; however, there is potential for this species to forage occasionally in agricultural habitats at the proposed wind farm site. Therefore, there is limited potential for disturbance of foraging birds to occur.	A total of 18 separate flight activity observations were recorded during summer 2026. All observations involved gulls flying over the site. While agricultural habitats potentially suitable for foraging gulls are present at the proposed development, no nesting, breeding or foraging was observed. As such, the existing assessment remains valid.	No update is required. Sensitivity: Medium Magnitude: Medium Overall significance: Low (Percival, 2003) Disturbance and/or displacement will be a Short-term Not Significant effect (Criteria: EPA, 2022).

Key Receptor (Sensitivity)	EIAR Impact Characterisation	Current Activity/Updates	Significance without mitigation
Peregrine (Very High)	A single record of peregrine was made within the 500m buffer zone during the winter 2022/23 VP surveys. Peregrine were also observed once flying over during the breeding bird transect surveys, and three times during the hinterland surveys. This species was not observed during any other surveys. Goodship and Furness (2022) cite buffer zones to protect breeding Peregrines from forestry operations in the UK range from 200 to 600m. A safe working distance for aircraft in Scotland is considered to be 500-750m (lateral). No hunting or breeding activities were observed, and there are no suitable nesting habitats at the proposed wind farm site. Therefore, it is unlikely for peregrine to be affected by noise and/or visual disturbance.	Current surveys recorded two peregrine falcon observations including one juvenile female moving through the area, and one adult male successfully predating a starling outside the 500m turbine buffer. There is no suitable breeding habitat for peregrine within or near the proposed development. Any potential disturbance/displacement of hunting birds would be temporary and localised and would not give rise to significant effects due to the small proportion of hunting habitat which the proposed development provides relative to the wider landscape-scale mosaic of suitable hunting habitat. As such, the existing assessment remains valid.	No update is required. Sensitivity: Very High Magnitude: Negligible Overall significance: Low Disturbance and/or displacement of hunting peregrine will be a Short-term Not significant effect (Criteria: EPA, 2022).

Key Receptor (Sensitivity)	EIAR Impact Characterisation	Current Activity/Updates	Significance without mitigation
Snipe (High)	Studies indicate construction works cause a significant decline in densities of snipe (Pearce-Higgins et al, 2012), which may lead to density declines post construction. Pearce-Higgins et al. (2009) states snipe use habitats within 400m of turbines less than expected, leading to an expected 48% decline in abundance within 500m of turbines. Surveys indicate there are breeding snipe present in the surrounding environment within, potentially including areas of raised bog within 500m of turbines T9-10. As such, there is potential for breeding snipe to be indirectly effected by noise and/or visual disturbance prior to mitigation.	Snipe activity observed during current surveys was mainly centered on Mulgeeth Bog south of T9 – T10, similarly to previous surveys. In contrast to previous surveys, no breeding behavior or established territories were recorded. While breeding was not confirmed during current surveys, the habitat on Mulgeeth Bog south of T9 – T10 remains suitable for breeding snipe and could be used by breeding snipe prior to or during construction. As such, the existing assessment remains valid.	No update is required. Sensitivity: High Magnitude: High Overall significance: Very High (Percival, 2003) Disturbance and/or displacement will be a Short-term Significant effect prior to mitigation (Criteria: EPA, 2022).
Sparrowhawk (Low)	Sparrowhawk were observed within the proposed wind farm on 43 occasions during VP surveys. Most observations recorded sparrowhawk traversing the 500m buffer zone. All records were of birds in-flight, and no breeding or foraging activities were recorded. Although no breeding behaviour was detected, there are suitable habitats to support breeding sparrowhawk on-site. Additionally, there are suitable prey items, including meadow pipit and skylark available in the local area.	The sparrowhawk activity recorded during current surveys is similar to the previous survey season in Summer 2023 (four records), but slightly lower than Summer 2022 (three in spring, ten in summer). The overall activity pattern is similar to the EIAR baseline.	No update is required. Sensitivity: Low Magnitude: Medium Overall significance: Very Low (Percival, 2003) Disturbance and/or displacement will be a Short-term Imperceptible effect (Criteria: EPA, 2022).

Key Receptor (Sensitivity)	EIAR Impact Characterisation	Current Activity/Updates	Significance without mitigation
	As such, there is potential for commuting, and potentially also foraging and breeding sparrowhawk to be indirectly effected by noise and/or visual disturbance.	No breeding activity or nest sites were observed across both previous and current surveys, although the presence of a juvenile during current surveys confirms breeding occurs in the local area. Considering the absence of material changes to habitats at the proposed development, potential for disturbance/displacement effects on sparrowhawk remains low and the impact assessment remains valid.	
Swift (High)	A total of nine observations of swift were made over the survey period. No breeding activity or suitable breeding habitat was recorded. Swift feed exclusively on various invertebrates (midges, flies, spiders) caught in flight. Three records of foraging (i.e. hawking) were recorded within the 500m buffer zone. Foraging swift are unlikely to be effected by disturbance/displacement.	Swift were observed foraging on two occasions within the outer extent of the 500m turbine buffer on the south-western edge of Mulgeeth Bog to the south-west of proposed T9-T10. The surveyor also noted swifts commuting outside the 500m turbine buffer during two VP watches. Due to absence of breeding habitat and lack of material changes to habitats at the proposed development site, the impact assessment remains valid.	No update is required. Sensitivity: High Magnitude: Negligible Overall significance: Very Low (Percival, 2003) Disturbance and/or displacement will be a Short-term Imperceptible effect (Criteria: EPA, 2022).

Key Receptor (Sensitivity)	EIAR Impact Characterisation	Current Activity/Updates	Significance without mitigation
Woodcock (High)	Woodcock were recorded during targeted woodcock surveys across all survey years, as well as breeding wader surveys in summer 2022. Surveys indicate a breeding population is present within and surrounding the proposed wind farm. Therefore, there is potential for breeding woodcock to be affected by noise and/or visual disturbance prior to mitigation.	Current surveys confirmed that woodcock continue to occupy wooded sections of the proposed development, although observations of Roding were limited to one observation in contrast to numerous observations of Roding during previous surveys. Due to the ongoing presence of woodcock during the breeding season and due to observed activity levels, it is assessed that the impact assessment and mitigation for Woodcock in EIAR Chapter 8-2 remain valid.	No update is required. Sensitivity: High Magnitude: High Overall significance: Very High (Percival, 2003) Disturbance and/or displacement will be a Short-term Significant effect prior to mitigation (Criteria: EPA, 2022).

2.2.8.3 Operational Effects

The following sections update the operational phase effects assessments (collision risk, barrier effect and disturbance/displacement) for target species presented in Sections 8.16.2.3 and 8.16.3, and Tables 8-26 and 8-27 of the EIAR. The sections below include only the target species recorded during both pre-planning and current surveys (and one additional species, Cormorant, which was not previously recorded). The assessments for species which were not re-recorded in summer 2026 remain unchanged and as such are not repeated here.

Collision Risk

Examination of the activity patterns and target species occupancy of the collision risk volume (CRV) observed during current surveys indicates that the CRM does not need to be repeated due to the persistence of similar activity patterns and levels relative to previous surveys.

In order to provide an indicative comparison of flight activity within the collision risk zone between previous and current surveys, the total numbers of flight seconds recorded for flight lines overlapping the 500m turbine buffer in the height bands overlapped by the proposed blade-sweep are compared below in Table 2-9. The number of flight seconds within the 500m buffer occurring in the height bands occupied by the proposed turbine blade-swept heights are utilised in the CRM, and the same parameters were used to calculate the number of flight seconds recorded in summer 2026 shown below. It is noted that this represents a conservative indication of flight times within the collision risk volume because the CRM accounts for the percentage of height bands occupied by the turbine blade (where a height band is only partially occupied by the turbine blade, the number of seconds in that height band is adjusted to reflect the proportion of the height band occupied by the turbine blade). However, it is not possible to factor this variable into the comparison outside of the CRM. As such, the analysis presented here is a more conservative assessment which utilises all flight time within the height bands intersected by the blade swept height to compare flight activity within the collision risk volume across the available summer seasons.

The comparison has been limited to the summer seasons to enable direct comparison with the data available from the summer 2026 survey season. For the same reason data from previous spring migration surveys has been omitted since current surveys did not include this additional survey effort. Direct comparison of flight seconds between summer seasons is possible; however, average values are also included. These enable comparison of the summer 2026 flight times to the average flight times across summer 2022/summer 2023 and also provide an average for summer season flight time calculated across all surveys seasons (2022, 2023 & 2026).

This analysis and comparison is sufficiently robust to indicate whether any material changes in predicted collision risk are likely to have occurred since previous surveys based on the additional data available.

Table 2-8: Comparison of flight times within collision risk volume

Species	Predicted Collision Risk assessed in EIAR	Total Flight Time Within Rotor-swept Height Bands (s) (Summer 2022)	Total Flight Time Within Rotor-swept Height Bands (s) (Summer 2023)	Average Flight Time Summer 2022 & 2023	Total Flight Time Within Rotor-swept Height Bands (s) (Summer 2026)	Average Flight Time Summer 2022, 2023 & 2026
Buzzard (Low)	Predicted number of collisions per year (assuming 98% avoidance rate) is 1.68 (0.620 % of the of county population/0.015% of national population/9.33% of local population).	6,135	1,605	3,870	1,937	3,226
Cormorant (Low)	N/A	N/A	N/A	N/A	72	N/A
Herring Gull (Medium)	Predicted number of collisions per year (assuming 99.56% avoidance rate) is 8.02. This equates to 5.53% of the local population/3.43% of county population/0.082% of national population.	320	220	270	201	247

Species	Predicted Collision Risk assessed in EIAR	Total Flight Time Within Rotor-swept Height Bands (s) (Summer 2022)	Total Flight Time Within Rotor-swept Height Bands (s) (Summer 2023)	Average Flight Time Summer 2022 & 2023	Total Flight Time Within Rotor-swept Height Bands (s) (Summer 2026)	Average Flight Time Summer 2022, 2023 & 2026
Kestrel (High)	Predicted number of collisions per year (assuming 95% avoidance) is 0.7 (3.04% of the local population, 0.18 % of the of the county population and 0.04 % of the national population).	1935	375	1,155	420	910
Lesser Black-backed Gull (Medium)	Predicted number of collisions per year is 0.49 (assuming 99.56% avoidance rate). This equates to 2.28% of the local population/0.279% of county population/0.007% of national population.	0	750	375	641	464

Species	Predicted Collision Risk assessed in EIAR	Total Flight Time Within Rotor-swept Height Bands (s) (Summer 2022)	Total Flight Time Within Rotor-swept Height Bands (s) (Summer 2023)	Average Flight Time Summer 2022 & 2023	Total Flight Time Within Rotor-swept Height Bands (s) (Summer 2026)	Average Flight Time Summer 2022, 2023 & 2026
Peregrine (Very High)	Less than 1 collision over proposed 35-year wind farm lifespan. Negligible at all population scales.	0	0	0	43	14
Snipe (High)	Less than 1 collision over proposed 35-year wind farm lifespan. Negligible at all population scales.	20	80	50	38	46
Sparrowhawk (Low)	Predicted number of collisions per year (assuming 98% avoidance rate) is 0.2 per year. This equates to 1.176% of the local population/0.070% of county population/0.002% of national population.	455	137	296	87	226

Species	Predicted Collision Risk assessed in EIAR	Total Flight Time Within Rotor-swept Height Bands (s) (Summer 2022)	Total Flight Time Within Rotor-swept Height Bands (s) (Summer 2023)	Average Flight Time Summer 2022 & 2023	Total Flight Time Within Rotor-swept Height Bands (s) (Summer 2026)	Average Flight Time Summer 2022, 2023 & 2026
Swift (High)	The predicted collision risk for swift (assuming 98% avoidance rate) is 0.1 per year. This equates to 0.091% of the local population/0.005% of county population and 0.0001% of national population.	245	510	378	45	267

The majority of the species recorded during both previous and current surveys (Buzzard, Herring Gull, Kestrel, Snipe, Sparrowhawk and Swift) demonstrate no increases in average amount of flight time within the collision risk volume (0 – 170m altitude within 500m turbine buffer). There is inter-annual variability for most species; however, the averages demonstrate relative stability in the levels of flight activity recorded. The addition of summer 2026 survey data did not increase the average summer season flight time within the collision risk volume for these species. As such, based on the comparison of flight times during the summer seasons, there is no indication of increased collision risk for these species.

An increase of c. 24% in the average flight time occurred for Lesser Black-backed Gull, although this was heavily influenced by the high level of inter-annual variation between summer 2022 and summer 2023 (0 seconds vs 750 seconds respectively). When summer 2023 and summer 2026 are compared, similar levels of flight activity were recorded, with slightly lower activity in 2026 (641 seconds in summer 2026 vs 750 seconds in summer 2023). If predicted collision risk increased by 24% in line with the conservative average comparison, predicted collision risk for Lesser Black-backed Gull could indicatively rise from 0.5 to 0.61 per year. This would result in population-level effects increasing to 2.84% of the local population/0.359% of county population/0.009% of national population. These slight increases do not alter the magnitude of effects as per Percival (2003) and as such the EIAR assessment remains unchanged.

Peregrine falcon is notable in not having had any flight activity recorded during previous summer seasons. A total of 43 flight seconds arising from one observation overlapping the collision risk volume were recorded in the summer 2026 season (average = 14 seconds when including summer 2022 and summer 2023 seasons where no activity was recorded). Due to absence of previous summer season flight activity in the CRV (collision risk volume), it is more useful to compare current activity with the overall level of flight activity and predicted collision risk associated with previous surveys (since the overall number of Peregrine records is so low, utilising only the data from previous summer surveys seasons would provide less reliable comparisons versus utilisation of data from all survey windows).

The predicted collision risk for Peregrine is 0.01 collisions per year (0.00716209056273162 before rounding) (arising from 95 seconds of flight time associated with a single observation in Winter 2022/23), which is considered negligible. A conservative indicative increase of 25% in the collision risk for this species based on comparison with 2026 survey results would indicatively increase the collision risk to 0.0107431358440974 collision per year. While this would represent a slight increase, when rounding is applied to the standard 2 decimal places used in the Band (2024) CRM, predicted collision risk would remain at 0.01 per year and would also remain below one collision over the proposed 35-year wind farm lifespan. As such, it is considered that the additional flight time observed in 2026 is unlikely to materially alter collision risk for this species and the EIAR assessment remains unchanged.

Regarding Cormorant, which was not previously recorded, the individual observation of a 72-second flight event overlapping the CRV recorded in summer 2026 would likely result in either negligible or very low collision risk. The observed low level of Cormorant activity indicates this species does not habitually overfly the site. On a conservative basis it is estimated that any potential effects on Cormorant arising from collision risk are likely to remain negligible at all population scales.

Barrier Effect

Considering that flight activity levels have remained relatively unchanged for the species recorded during both previous and current surveys, it is considered that the EIAR assessment remains unchanged with regards to barrier effect for these species and all other species assessed within the EIAR.

Regarding the additional species observed during current surveys (Cormorant), the low activity observed (singe observation) means any barrier effects are likely to be negligible. Barrier effects on either migration or regular flights of Cormorant has been shown for 2 out of 6 studies to date (2004) in a European context (Hötker et al., 2006), with the overall effect significance being non-significant.

For barrier effect relating to cormorant, magnitude of effects is assessed as Negligible, species sensitivity is Low, overall effect significance is Very Low (Criteria: Percival, 2003).

Magnitude relating to migrating/commuting cormorant in terms of energy expenditure assessed as Imperceptible. magnitude of daily barrier effect assessed as Imperceptible. Overall significance considered an **Imperceptible Long-term** effect (Criteria: EPA, 2022).

No additional mitigation is required for Cormorant.

Disturbance and Displacement

Due to the absence of material changes to habitats within and surrounding the proposed development, and similarity in activity patterns observed during previous and current surveys, it is considered that the EIAR assessment remains unchanged with regards to operational disturbance/displacement for all species recorded during both previous and current surveys, and all other species assessed within the EIAR.

For the additional species observed during current surveys (Cormorant), the low activity observed and absence of suitable habitats within and surrounding the proposed development means any effects are likely to be negligible.

For operational disturbance/displacement relating to cormorant, magnitude of effects is assessed as Negligible, species sensitivity is Low, overall effect significance is Very Low (Criteria: Percival, 2003).

Overall significance (operational disturbance/displacement relating to cormorant) is considered an **Imperceptible Long-term** effect (Criteria: EPA, 2022).

No additional mitigation is required for Cormorant.

2.2.8.4 Cumulative Effects

Based on the similarity in activity patterns and habitats between previous and current surveys, no requirements to update the cumulative effects were identified. No additional mitigation is required.

2.3 Fauna

2.3.1 RFI Item v:

An assessment of the status of existing or new features to support mobile species such as otter, badger and bat, is requested to update the planning application documentation and liaison with the NPWS if Regulation 54 derogations are required.

2.3.2 RFI Item v Response:

Ecological surveys including mammal, bat and habitat surveys were repeated to reconfirm the existing baseline during summer 2026 (see Appendix 3). The results of these surveys are discussed further under individual headings below in light of Item A (v).

Current surveys for these species have confirmed that no features within or adjacent (within 150m) of the proposed development are in use as otter holts. Current surveys indicate the Fear English River is utilised by otter as a commuting corridor, but no features are in use as holts and potential foraging opportunities for otter in this river are extremely limited.

Badger activity remains similar to previous surveys, although fewer setts were confirmed to be active during current surveys. No additional setts were recorded.

Regarding bats, no material changes to habitats which could influence bat usage have occurred at the site scale. No new potential roost features (PRFs) were observed within the proposed development site. The number of PRFs at the proposed development and along the TDR has reduced relative to previous surveys due to factors including tree felling, limb cutting, degradation of bat boxes and die-off of ivy.

It is noted that Regulation 54 derogation licences are not required for badgers since they are protected under national legislation and are not listed on Annex IV of the EU Habitats Directive.

Following the updates provided by current surveys, no requirement for Regulation 54 derogation licences for either otter or bats has been identified.

2.3.2.1 Otter

Surveys to re-confirm/update the otter baseline were undertaken on 09/07/2026, 22-23/07/2026 and 18/08/2026. This included inspections of the previously identified potential otter holts (H1 and H2), in addition to trail camera surveys at H2 (see Figure 2-1 in Appendix 3). The trail camera surveys were carried out under licence No. 032/2026. Surveys focused on identification of signs such as holts, spraints, couches, prints, and other signs.

All watercourses within 150m of proposed works were covered by the survey, including sections extending up and down stream within 150m. It is further noted that the general mammal survey extending to 150m from all proposed works locations also examined all suitable drains within the survey area to search for holts and otter signs.

Surveys included inspections of the features previously identified as potential otter holts (H1 and H2) (see Figure 2-1 in Appendix 3).

It is noted that H1 and H2 were mis-labelled in EIAR Chapter 8-1 Section 8.9.1.9.2/Table 8-31 (H1 and H2 were mixed up in Table 8-31) and as such this table requires updating. The amended version (Table 2-9 below) providing correct distances from proposed infrastructure for H1 and H2 is provided below. This replaces the existing Table 8-31 in EIAR Chapter 8-1. See Figure 2-1 in Appendix 3 as noted above for locations of H1 and H2.

Table 2-9: [update to EIAR Table 8 31] Otter Holts: potential effects

Holt	Distance from Construction Activities	Potential Effect?
1	Access track felling buffer (178m) Access track (161m) Turbine Hard Stand (128m) Turbine T4 (142m)	Yes
2	Access track felling buffer (167m) Access track (160m) Turbine Hard Stand (196m) Turbine T4 (221m)	No

The feature known as H1 was identified as a potential otter holt based on visual assessment during initial surveys (2018) due to it's location and general suitability for mammals (although noted to be sub-optimal due to obstructing root). As such it was brought forward for assessment in the EIAR on a precautionary basis. However, no previous surveys or current surveys have recorded any evidence that this feature is used by otter or any other mammal species. As such, based on repeated observations, it is no longer classified as a holt.

During current surveys, the H1 entrance showed no signs of use when observed on 09/07/2026. Sticks were lightly placed across the entrance[1] to detect any use by mammals. These remained in place during subsequent visits on 22/07/2026 and 19/08/2026. This pattern of inactivity aligns with previous surveys, which noted a lack of activity at H1 and also noted the same tree root obstructing the entrance, restricting access and severely reducing potential for use by otter.

As part of the otter survey, any new features (holes/burrows) along the bank were examined. None of the features examined showed any signs of use by otter, nor were any found to be suitable for otter.

Otter spraints were recorded beside the Fear English River c. 144m south-east of T4 near the interface between wooded habitats occupying the north of the proposed development and the agricultural habitats to the south. Dried spraints deposited on mud were observed at this location on 09/07/2026, and a new spraint was observed on a cobble in the same location on 19/08/2026.

The pattern of fresh spraint being deposited at this location during the monitoring period demonstrates that otters continue to commute along the river channel. As such, considering that repeated observations permit the conclusion that H1 is not an otter holt and absence of any new holts or couches being identified in this area, otter activity on this section of the Fear English River is limited to commuting.

It is noted that the Fear English potentially provides only limited foraging during winter, and either very poor or non-existent foraging in summer when water levels are low (previous aquatic and general ecology walkover surveys noted absence of suitable conditions for fish in summer, and when water levels are higher in winter, marginal habitat for salmonids, and no suitability for lampreys and crayfish). It's primary value to otter is as a commuting corridor.

H2 located further downstream was previously confirmed to be used by otters. This feature was also observed and monitored by trail camera between 09/07/2026 and 22/07/2026. There were no signs of recent use at H2, and no otter signs in the vicinity during current surveys. A badger was recorded on camera investigating this feature on one occasion. This feature which is located over 150m from the closest proposed infrastructure was noted as being active during previous surveys in 2022 due to the presence of a wetted trail running into the holt and multi-age spraints observed nearby. It was also noted to be active in 2023, but no signs confirming otter as the occupant were observed at this time. Due to its location over 150m from proposed infrastructure, there is no potential for disturbance to otters potentially occupying this holt.

As such, there is no requirement for a Regulation 54 derogation licence for otter.

2.3.2.2 Badger

As noted above, Regulation 54 derogation licences are not required for badgers since they are protected under national legislation (Wildlife Act, 1976; Wildlife Amendment Act, 2000) and are not listed on Annex IV of the EU Habitats Directive.

[1] These sticks were easily removable and as such did not present an obstacle to mammal access.

Badger setts identified during the previous round of surveys (2024 pre-planning surveys) were revisited in order to re-confirm their status, and a survey for badger signs and setts was conducted across the entire mammal survey study area (200m of turbine locations, 150m of bat felling buffers as applicable and within 150m of all other infrastructure).

Badger activity remains similar to previous surveys, although fewer setts were confirmed to be active during current surveys (see Table 2-10). No additional setts were recorded. Additional entrances were noted at Setts 2 and 6, but the distance to proposed infrastructure or activity status did not change for either of these setts.

Badger signs such as snuffle holes and latrines were noted throughout the study area, and badger activity was captured on trail camera as noted in Appendix 3.

A total of two subsidiary setts (Setts 1 & 2) are located within 30m of proposed infrastructure but are separated by a deep drainage channel, screened by vegetation and face away from works. As such, it is proposed to keep these setts open during construction (with monitoring) since they are unlikely to be damaged or disturbed and would not be used for breeding. A total of two setts (Setts 4 & 7) are overlapped by proposed works to the degree that controlled destruction following exclusion or hard blocking is required. It is proposed to excavate within 30m of one sett (Sett 5) under ecological supervision following exclusion or hard blocking, but to retain the remainder of the sett and re-open it following construction. This course of action is proposed due to potential for the majority of the sett to remain intact, and to avoid additional tree felling which would be required to excavate the whole sett.

A total of two setts: Setts 19 (main sett) and Sett 20 (subsidiary) require hard blocking for the duration of construction, following exclusion as required. One sett (Sett 21) requires screening to provide a noise/visual barrier for the duration of construction.

The remainder of setts require monitoring or no mitigation measures. All main setts will be retained and will be kept open in the majority of territories.

Since no new setts were recorded, predicted effects and mitigation detailed in the EIAR remain the same. As such, the EIAR assessment remains valid.

Table 2-10: Badger Sett Updates 2026

Sett No.	No. of entrances (2024)	Activity (2024)	Type	Closest Infrastructure/Activities	Update/Notes 2026
1	3	Inactive	Annex	Proposed access track (25m)	Still inactive.
2	1	Inactive	Potential Outlier	Proposed access track (20m)	New opening noted on vertical bank around corner – not likely to be used as entrance, probably excavated from inside. Still inactive.
3	5	Active	Main	Existing access track to form part of site access route (115m) Substation compound (250m)	Remains active.

Sett No.	No. of entrances (2024)	Activity (2024)	Type	Closest Infrastructure/Activities	Update/Notes 2026
4	3	Active	Annex	Access track (0m) Overlapped by access track and felling buffer.	No signs of use. Currently inactive.
5	5	Inactive	Annex	Access track (12m) Access track felling buffer (5m)	None. Remains inactive.
6	11	Active	Main	Access track (158m)	Still active. Three additional entrances noted, increasing total to 14. New entrances do not alter distance to infrastructure.
7	2	Active	Annex	T5 hard stand (overlaps sett)	Sett present. Seems to have been excavated since last visit; some relatively recent spoil with bedding mixed in but spoil dried hard and cobweb over entrance when observed so not very recently used.
8	1	Active	Subsidiary	T5 hard stand (83m) Turbine felling buffer (20m)	No signs indicating currently active; leaves at entrance but trails still present running along tree line and connecting to sett.
9	2/4	Active	Subsidiary	Hard stand (590m)	No signs of use. Currently inactive. Overgrown.
10	4	Active	Main	Hard stand (623m)	No signs indicating currently active . Overgrown with no trails leading to sett.
11	3	Active	Annex	Hard stand (607m)	Potentially active but no obvious signs of use. Relatively recent spoil. Hard baked earth reduced likelihood of use signs being detected.
12	1	Active	Subsidiary	Hard stand (461m)	No signs of use. Currently inactive.
13	1	Inactive	Outlier	Hard stand (252m)	None. Remains inactive.
14	1	Inactive	Outlier (potential)	Turbine felling buffer (76m) Access track (89m)	Still inactive. Vegetation beginning to obscure entrance.
15	5	Active	Main	Access track (89m) Turbine felling buffer (147m)	Potentially active but not confirmed. One entrance has recent but not fresh spoil. Partially overgrown.

Sett No.	No. of entrances (2024)	Activity (2024)	Type	Closest Infrastructure/Activities	Update/Notes 2026
16	1	Active	Subsidiary	Access track (137m) Hard stand (186m)	Inactive; full of debris and insects living inside. Ground in vicinity is worn, indicating continued use. Trails are slightly overgrown, Snuffles and trails indicate continued presence of badger in this area.
17	1	Active	Subsidiary	Access track (101m) Hard stand (126m)	No signs of use. Currently inactive.
18	4	Inactive	Annex	Access track (127m) Hard stand (155m)	No signs of use. Currently inactive. 1 small latrine with slightly older scat
19	15-17	Active	Main	Access track (10m) Site compound (24m)	One entrance at south-eastern end of sett shows signs of recent use. Active.
20	2	Inactive	Subsidiary	Site compound (27m)	No signs of use. Currently inactive.
21	7	Active	Annex	Site compound (38m)	No signs of use. Currently inactive.

2.3.2.3 Bats

Roost surveys were repeated in line with 2024 roost surveys (covering the core survey area of 300m around proposed turbines, in addition to access tracks and the TDR) in order to reconfirm the baseline. Searches for potential roosting features (PRFs) were conducted during summer 2026. Habitats and features with potential to contain bat roosting features were searched for and examined. This comprised a preliminary roost assessment (PRA) and ground-level tree assessment (GLTA) conducted in accordance with Collins (2023), NatureScot (2021) and BCI (2026). Static detector surveys were also completed in the 2026 bat activity season in accordance with NatureScot (2021).

The core survey area was 300m around proposed turbines, which exceeds the requirement set out in NatureScot (2021) and NIEA Guidelines (Version 1.1) (2024) of 200m plus rotor radius (265m). The core 300m turbine buffer survey area was also expanded to include a GLTA survey focused on trees potentially affected by all other proposed infrastructure and the TDR. A PRA encompassing the proposed development and TDR were also conducted during summer 2026.

The bat boxes in the northern part of the site were also checked. The surveys encompassed checks of PRFs previously identified in 2018 and 2024 surveys which are within the potential ZoI of the current layout.

Previous assessments organised the roost survey results into three groups (PRFs identified in 2018, Additional PRFs identified in 2024 and PRFs identified during surveys of the TDR in 2024). These groups have been retained for continuity and to ensure clarity around updates to features identified during previous surveys.

While some changes have occurred (reduction in the number of PRFs due to both natural pressures and activities not associated with the proposed development), these do not materially alter the impact assessment (see Table 8-1 in EIAR Appendix 8.1-4 Sections 8.9.10.1, 8.9.10.2, 8.9.2.11, 8.9.2.12 and 8.9.3.12).

Since the bat boxes in the northern part of the proposed development were first surveyed in 2017/2018, ongoing degradation has reduced the number of useable bat boxes from 10 to 2, while a number of PRF-I tree features first identified in 2018 are also no longer present (see Table 2-13).

Considering this reduction in PRFs observed during the course of surveys, it is proposed to increase the number of bat boxes included in the proposed enhancement measures (see Table 8-1 in EIAR Appendix 8.1-4) from the existing proposal of 9 boxes up to 18 boxes. The 9 boxes originally proposed are located around the northern part of the proposed development as specified in Table 8-1 in EIAR Appendix 8.1-4. The additional 9 boxes will be distributed across the proposed development in marginal areas with minimal connectivity to the Proposed Wind Farm, with exact locations to be defined by a suitably qualified ecologist/EcOW. Al bat boxes will be installed under ecological supervision.

2.3.2.3.1 Zone of Influence

Current Irish and UK bat-mitigation guidance does not prescribe a universal disturbance distance around bat roosts. Disturbance risk depends on the species present, roost type and importance, season of use, intervening habitat or structures, and the nature, intensity and duration of the works (Marnell et al., 2022; Reason and Wray, 2025). For the purposes of initial assessment, a precautionary 50 m ZoI has been applied to potential construction and decommissioning related disturbance of bat roosts. This distance would be extended where lighting or construction activities with high noise and vibration levels (e.g. piling or rock breaking) are identified as a credible disturbance pathway beyond 50 m. No credible pathway between the proposed development and any PRF for noise, lighting or vibration effects beyond the 50m ZoI was identified.

2.3.2.3.2 Shed on Northern Access Route

The small derelict brick-built shed previously identified within the footprint of the northern internal access track is still present and remains unsuitable for roosting bats.

2.3.2.3.3 Additional PRF identified in 2026

One new tree with PRFs was noted during current surveys (large ash with snapped limbs; potential for PRFs around break points) (Tree S located outside proposed development boundary: 16m south-east). The PRFs in this tree are categorised as PRF-I (suitable for individual or small numbers of bats). In light of it's location outside the proposed development and limited suitability for roosting, the occurrence of this tree outside the ZoI 55m from the closest proposed infrastructure (T1 hard stand) does not alter the existing impact assessment.

2.3.2.3.4 PRFs identified in 2024

No changes to the PRFs at the proposed development identified in 2024 were observed during current surveys.

In order to ensure alignment with current best practice guidance (BCI, 2026; Collins, 2023), the suitability of PRFs have been updated to utilise the PRF-I/PRF-M categorisation framework for trees detailed in Collins (2023). PRF-I refers to PRFs which are only suitable for individual bats or very small number of bats due to size or lack of suitable surrounding habitats. The PRF-M category refers to PRFs which are suitable for multiple bats and may therefore be used as a maternity colony.

Utilising this framework, all tree PRFs identified in 2024 are categorised as PRF-I. The majority of these trees were noted as having low potential for roosting due to features such as ivy which could potentially provide roosting opportunities or obscure PRFs. One tree, namely Tree A was categorised as Low – Moderate due to the presence of two knotholes and prevalent rot, while another (Tree C) was categorised as Moderate due to the presence of a knothole potentially providing room for several bats. Since the PRFs in both these trees are limited in size with potential to accommodate only individual or very small numbers of bats, neither of these trees attain the threshold for PRF-M, i.e. they are classified as PRF-I.

No signs of use by bats such as droppings or staining were noted at any of these PRFs during current and previous surveys. Examination of bat calls recorded on static detectors in the locations where PRF-I trees are present within turbine felling buffers (T1, T2, T4 and T5), showed low numbers of bat calls during the twilight period, which is consistent with the absence of bat emergence (i.e. numbers of calls did not indicate light sampling - where bats make repeated short flights in and out of a roost to check light levels before leaving the roost- nor did they indicate a roost nearby in terms of timing and number of calls). Bat calls recorded during the twilight period were predominantly common pipistrelle, and a lower number of Leisler's bats, both of which are known to emerge earlier, meaning they would have had time to travel to the detector locations from roosts further afield to hunt around twilight.

Best practice guidance as per Collins (2023) and also advocated in BCI (2026) does not require further surveys for tree features categorised as PRF-I.

As detailed in Table 2-11 below, a total of 11 trees with PRF-I features are within proposed turbine felling buffers, in addition to one PRF-I tree on the edge of the T2 buffer. Tree A is located within the T4 felling buffer; Tree C is located within the T5 felling buffer, and the remaining 10 affected PRF-I trees are distributed across the T1, T2 and T5 felling buffers.

Table 2-11: 2024 PRF group

ID	Name	Previous Category	Updated Category	PRF	Status/Location
A	Ash	Low - Moderate	PRF-I	Mature ash with rot in many places. 2 knotholes visible from ground & dense ivy may obscure others	Within T4 bat felling buffer
B	Ash	Low	PRF-I	Ivy covered ash. Potential for PRFs obscured by ivy	Within T5 bat felling buffer
C	Ash	Moderate	PRF-I	Knothole c.3 m up trunk, potentially with room for several bats. No signs of use observed from ground level. Mature ash with rot.	Within T5 bat felling buffer
D	Ash	Low	PRF-I	Dense ivy, potential for crevices behind large fused ivy stems	16m from T5 bat felling buffer
E	Ash	Low	PRF-I	Dense ivy, potential for crevices behind large fused ivy stems	7m from T3 bat felling buffer
F	Hawthorn	Low	PRF-I	Very dense ivy, potential for large ivy stems to form crevices	Within T2 bat felling buffer
G	Ash	Low	PRF-I	Dense ivy, potential for PRFs obscured by ivy	Within T2 bat felling buffer

ID	Name	Previous Category	Updated Category	PRF	Status/Location
H	Ash	Low	PRF-I	Dense ivy, potential for crevices behind large fused ivy stems	Within T2 bat felling buffer
I	Ash	Low	PRF-I	Dense ivy, potential for PRFs obscured by ivy	Within T2 bat felling buffer
J	Ash	Low	PRF-I	Potential for crevices formed by ivy stems and tree branches growing together. Also some rot visible lower down so potential for obscured rot features higher up	At edge of T2 bat felling buffer
K	Ash	Low	PRF-I	Dense ivy, potential for PRFs obscured by ivy	8m from T2 bat felling buffer
L	Ash	Low	PRF-I	Dense ivy, potential for PRFs obscured by ivy	14m from T2 bat felling buffer
M	Ash	Low	PRF-I	Dense ivy, potential for PRFs obscured by ivy	7m from T1 bat felling buffer; 10m from access track
N	Ash	Low	PRF-I	Dense ivy, potential for crevices behind large fused ivy stems	Within T1 bat felling buffer
O	Ash	Low	PRF-I	Dense ivy, potential for PRFs obscured by ivy	Within T1 bat felling buffer
P	Ash	Low	PRF-I	Dense ivy, potential for crevices behind large fused ivy stems	Within T1 bat felling buffer
Q	Ash	Low	PRF-I	Dense ivy, potential for PRFs obscured by ivy	Within T1 bat felling buffer
R	Scots Pine	Low	PRF-I	Trunk snapped 3m above ground. Upper half of trunk horizontal. potential for PRFs at break point.	15m west of substation compound.

Original PRFs identified in 2018

Following resurvey in 2026, the number of PRFs in the 2018 dataset has reduced due to a range of factors including tree felling, limb cutting, and degradation of bat boxes. Other changes such as a localised improvement in connectivity and ivy growth restricting a bat box entrance were also noted, as detailed below.

The only PRFs subject to direct effects which currently remain in place in this group are bat boxes 4 and 5 which are located within the proposed northern access track felling buffer. Due to missing inspection panels, these are no longer suitable for roosting bats.

The majority of bat boxes have fallen from their fastenings since they were first noted in 2018. Currently, only boxes 4 & 5 noted above, and boxes 1 and 10 remain in situ. Box 1 remains useable but access is beginning to be restricted by ivy growth. Box 10 remains useable. Neither of these bat boxes are subject to direct or indirect effects. Box 1 is located along the existing Coillte access track and Box 10 is located 196m away from T11.

As such, considering that no suitable PRFs in the 2018 PRF group are within the proposed development footprint, in addition to classification of all features as PRF-I, none of the PRFs within this group are subject to direct effects and potential for indirect effects is negligible.

See Table 2-12 for details of changes to the 2018 PRF group noted during current surveys.

Table 2-12: 2018 PRFs (updated during current surveys)

ID	Name	Previous Category	Updated Category	PRF	Location	Current Status
1	Ash	Moderate	N/A	Lifting bark and broken limbs	Adjacent to existing northern Coillte forestry access/amenity track	Felled
2	Ash	Moderate	N/A	Broken limb	Adjacent to existing northern Coillte forestry access/amenity track	Felled
3	Bat box 1 and Ash	Moderate	PRF-I	Bat box 1 on ash with cracked limb	Adjacent to existing northern Coillte forestry access/amenity track	Present. Bat box intact. Knothole present above box also identified. Ivy is starting to obstruct bat box entrance.
4	Ash	Moderate	PRF-I	Knot holes	Adjacent to existing northern Coillte forestry access/amenity track	No change
5	Oak	Moderate	PRF-I	Knot holes, broken limbs	Adjacent to existing northern Coillte forestry access/amenity track	No change
6	Ash	Moderate	PRF-I	Broken limbs	Adjacent to existing northern Coillte forestry access/amenity track	No change
7	Bat boxes 2 & 3	No Suitability	N/A	Boxes 2 & 3 on beech	Adjacent to existing northern Coillte forestry access/amenity track	Boxes no longer present

ID	Name	Previous Category	Updated Category	PRF	Location	Current Status
8	Bat boxes 4 & 5	Negligible	N/A	Boxes 4 & 5 on conifer	Adjacent to existing northern Coillte forestry access/amenity track. Within felling buffer.	No change. Both have inspection panels missing.
9	Birch	Low	PRF-I	Lifting bark	In treeline near substation compound	No change
10	Birch	Moderate	PRF-I	Moderate potential in cracked limb. Trunk has cavity but too open and exposed for roosting.	In treeline near substation compound	No change
11	Willow	Negligible	PRF-I	Crack in main stem	In treeline near substation compound	No change
12	Ash	Moderate	PRF-I	Knot holes, broken limbs and hole in stem	No proposed infrastructure nearby (closest proposed infrastructure is substation access track located 90.6m south-east, separated by retained woodland). Closest proposed turbine is T11 located 421m south-west.	Not inspected in 2024 or 2026 (outside ZoI).
13	N/A	N/A	N/A	No.13 not included in original survey	N/A	N/A
14	Oak	Moderate	PRF-I	Broken limbs	In woodland between substation and grid connection	No change
15	Oak	Moderate	PRF-I	Broken limbs	In woodland between substation and grid connection	No change
16	Oak	Moderate	PRF-I	Broken limbs	In woodland between substation and grid connection	No change

ID	Name	Previous Category	Updated Category	PRF	Location	Current Status
17	Oak	Moderate	PRF-I	Broken limbs	In woodland between substation and grid connection	No change
18	Oak	Moderate	PRF-I	Broken limbs	In woodland between substation and grid connection	No change
19	Oak	Moderate	PRF-I	4 oaks in corner of boundary with broken limbs, ivy, cracks in stem	Adjacent to grid connection	No change
20	Oak	Moderate	PRF-I	Group of 6 oak with knot holes, broken limbs	In woodland between substation and grid connection	No change
21	Oak	Moderate	PRF-I	Lifting bark, knot holes	In woodland between substation and grid connection	No change
22	Box 6	Low	N/A	Box 6 on beech	Adjacent to grid connection	Box has fallen from tree
23	Box 7	No Suitability	N/A	Box 7 on beech	N/A	No change. No bat box at this location
24	Beech	Low	PRF-I	Cracked limb	No proposed infrastructure nearby (located beside existing track proposed to form part of 'Looped Walk' amenity trail). Closest proposed turbine is T11 located 413m north-west.	Not inspected in 2024 or 2026 (outside ZoI).
25	Boxes 8 & 9	No Suitability	N/A	Boxes 8 & 9 on oak	Within T11 bat felling buffer	Boxes no longer present.

ID	Name	Previous Category	Updated Category	PRF	Location	Current Status
26	Box 10	Low	PRF-I	Box 10 on birch	No proposed infrastructure nearby. Located 196m away from T11.	Present and intact. Cover/connectivity has improved slightly due to surrounding tree growth. Still sub-optimal after conifer felling. (outside ZoI).
27	Willow	Unknown	N/A	Couldn't access closely (2018) but may be of potential	No proposed infrastructure nearby	No change
28	Ash	Low	PRF-I	Heavy ivy growth	Adjacent to construction access track	No change
29	Ash	Low	PRF-I	Heavy ivy growth	Adjacent to construction access track	No change
30	Ash	Moderate	PRF-I	Moderate potential in crack in branch	No proposed infrastructure nearby (closest is proposed construction access track located 138m south-east, separated by retained treeline). Closest proposed turbine is T05 located 349m north-east.	Not inspected in 2024 or 2026 (outside ZoI).
31	Ash	Low	PRF-I	Line of semi mature ash with relatively heavy ivy growth	No proposed infrastructure nearby (closest is proposed construction access track located 114m south-east, separated by retained treeline). Closest proposed turbine is T05 located 478m north-east.	Not inspected in 2024 or 2026 (outside ZoI).

ID	Name	Previous Category	Updated Category	PRF	Location	Current Status
32	Ash	Low	PRF-I	Line of semi mature ash with relatively heavy ivy growth	Near construction access track	No change
33	Ash	Low	PRF-I	Line of semi mature ash with relatively heavy ivy growth	No proposed infrastructure nearby (closest is proposed construction access track located 98m south-east, separated by retained treeline).	Not inspected in 2024 or 2026 (outside ZoI).
34	Ash	Low	PRF-I	Heavy ivy growth	No proposed infrastructure nearby	No change
35	Ash	Low	PRF-I	Heavy ivy growth	No proposed infrastructure nearby	No change
36	Ash	Low	PRF-I	Heavy ivy growth	No proposed infrastructure nearby (closest is proposed wind farm access track located 221m sotuh-east, separated by retained treelines). Closest proposed turbine is T05 located 290m east.	Not inspected in 2026 (outside ZoI).
37	Ash	Low	PRF-I	Heavy ivy growth	No proposed infrastructure nearby (closest is proposed wind farm access track located 125m east, separated by retained treelines). Closest proposed turbine is T05 located 233m north-east.	Not inspected in 2026 (outside ZoI).
38	Ash	Low	PRF-I	Heavy ivy growth	No proposed infrastructure nearby (closest is 641m – T4 hard stand).	Not inspected in 2024 or 2026 (outside ZoI).
39	Ash	Low	PRF-I	Heavy ivy growth	No proposed infrastructure nearby (closest is 541m – T3 hard stand).	Not inspected in 2024 or 2026 (outside ZoI).

ID	Name	Previous Category	Updated Category	PRF	Location	Current Status
40	Ash	Low	PRF-I	Heavy ivy growth	Construction access along public laneway	No change
41	Oak	Moderate	PRF-I	Cracked limb and ivy cover	Construction access along public laneway	No change
42	Oak	Moderate	PRF-I	Damaged limbs	Construction access along public laneway	Present. Damaged limbs have been cut off.
43	Ash	Low	PRF-I	Ivy cover	Construction access along public laneway	No change
44	Sycamore	Low	PRF-I	Ivy cover	Construction access along public laneway	No change
45	Ash	Low	PRF-I	2 ash ivy cover	No proposed infrastructure nearby	No change
46	Willow	Moderate	PRF-I	Crack in main stem	Adjacent to access track	No change
47	Ash	Low	PRF-I	Ivy cover	No proposed infrastructure nearby	No change
48	Hawthorn	Moderate	PRF-I	Holes in limbs, potentially old wound from cutting	No proposed infrastructure nearby (closest is 204m – T3 hard stand).	Not inspected in 2024 or 2026 (outside ZoI).
49	Ash	Moderate	PRF-I	Knot hole and ivy cover	No proposed infrastructure nearby (closest is 304m – T3 hard stand).	Not inspected in 2024 or 2026 (outside ZoI).
50	Ash	Low	PRF-I	Ivy cover	No proposed infrastructure nearby (closest is 352m – T3 hard stand).	Not inspected in 2024 or 2026 (outside ZoI).
51	Ash	Low	PRF-I	Ivy cover	No proposed infrastructure nearby (closest is 274m – T3 hard stand).	Not inspected in 2026 (outside ZoI).
52	Ash	Moderate	PRF-I	Butt rot and ivy cover	No proposed infrastructure nearby (closest is 274m – T3 hard stand).	Not inspected in 2026 (outside ZoI).

ID	Name	Previous Category	Updated Category	PRF	Location	Current Status
53	Ash	Low	PRF-I	Treeline with several ash and one hawthorn of with heavy ivy	No proposed infrastructure nearby (closest is 126m – construction access track along existing track).	Not inspected in 2026 (outside ZoI).
54	Ash	Low	PRF-I	Ivy cover	No proposed infrastructure nearby	No change
55	Ash	Low	PRF-I	Ivy cover	No proposed infrastructure nearby	No change
56	Ash	Moderate	PRF-I	Knot holes	No proposed infrastructure nearby	No change
57	Ash	Low	PRF-I	Ivy cover	No proposed infrastructure nearby	No change
58	Ash	Moderate	PRF-I	Tear out	No proposed infrastructure nearby	No change
59	Ash	Low	PRF-I	Line of ash trees all with heavy ivy cover but no specific PRFs identified	27m from T1 bat felling buffer	No change
60	Ash	Low	PRF-I	Ivy cover	No proposed infrastructure nearby	No change

2.3.2.3.5 PRFs along TDR

Based on current surveys, the number of PRF Trees remaining within the TDR group has reduced to 9 due to felling of trees and die-off of ivy. When the current unsuitability of TDR-10 is included, this number reduces to 8 trees.

As such, as detailed in Table 2-14 (Column 5 and 6) below a total of 4 trees with potential for occasional use by individual or low numbers of bats (PRF-I) were identified during current surveys as being potentially subject to effects from vegetation trimming associated with the TDR. One of these PRFs (TDR-7) has negligible suitability for roosting. It is noted that while the oak tree at TDR-10 which could potentially be affected by TDR trimming is also noted below as a PRF-I on a precautionary basis, this feature is not currently suitable for roosting (noted due to potential for future suitability).

Table 2-13: Potential tree roosting features (TDR)

ID	Species	Category	PRF Details/Location	Assessment	Update
TDR-1	Ash x 3	Low (PRF-I)	3 Mature ash with dense ivy.	No potential for PRFs over road/within potential ZoI	No change
TDR-2	Ash	Low (PRF-I)	Ivy covered mature ash. Low potential for PRFs in branches higher up closer to trunk.	No potential for PRFs over road/within potential ZoI	Ivy has been cut and killed off. No PRFs under ivy.
TDR-3	Ash	Low (PRF-I)	Ivy covered mature ash. Low potential for PRFs in ivy on trunk.	No potential for PRFs over road/within potential ZoI	No change
TDR-4	Ash	Low (PRF-I)	Dense ivy on trunk and limb. No confirmed PRFs.	Potential for ivy-covered limb to be affected by trimming	No change
TDR-5	Ash	Low (PRF-I)	Ivy-covered ash, limb extends over road. Parts over verge have low potential for obscured PRFs. Sections over road have no potential.	Potential for ivy-covered limb to be affected by trimming	No change
TDR-6	Ash	Low (PRF-I)	Ivy-covered ash; tree has severe ash dieback. 2x limbs extend high over road. Low potential for obscured PRFs.	Potential for limbs to be affected by trimming	Ivy has died off (no signs of cutting). No PRFs under ivy.
TDR-7	Ash	Negligible (PRF-I)	Low height crevice facing road; formed at joint where branch re-grew upward after historical pruning. Negligible due to disturbance, openness and lack of surrounding cover.	Potential for limb to be affected by trimming	No change
TDR-8	Elm & Ash	Negligible (PRF-I)	Ivy-covered elm main stem and ash branches leaning towards road. Potential for obscured PRFs, however lack of connectivity reduces suitability.	Potential for trees to be affected by trimming	Both trees have been felled.
TDR-9	Ash	Negligible (PRF-I)	Dead ash tree with branch extending over road. Branch has lifting bark and cracks. Small crevice sizes and lack of cover/shelter reduce suitability.	Potential for limb to be affected by trimming	No longer present. May have been felled.

ID	Species	Category	PRF Details/Location	Assessment	Update
TDR-10	Oak	Negligible (PRF-I)	Limb over road includes a rotted branch. Currently negligible but suitability may increase if rotted branch remnants dislodge.	Potential for limb to be affected by trimming	No change. Currently not suitable as PRF.
TDR-11	Ash	Low	Potential for PRFs in main trunk. Lower & middle part of trunk covered in ivy, cracking bark visible in some spots, may be more cracked bark under ivy. Ivy could both obscure and also create PRFs.	No potential for main trunk to be affected	Ivy has been cut and killed off. No PRFs under ivy.
TDR-12	Oak	Low	Overhanging limbs. Rot visible on various limbs, hazard beams creating some small spaces, and potentially others not visible from ground; also some lifting bark. No confirmed high-quality PRFs but conditions for them likely to be present throughout tree including non visible areas. Possible PRFs in hazard beam over road but not confirmed.	Potential for limbs to be affected by trimming	No change

2.3.2.4 Conclusion

All potential roost features within the study area are representative of PRF-I features in accordance with Collins (2023). No signs indicating of the presence of bats were recorded at tree PRFs within the proposed development footprint during current or previous surveys, and static detector records do not show and patterns indicative of the presence of roosts within or near the proposed turbine felling buffers.

Previous surveys in 2022 detected one adult male soprano pipistrelle in bat box No. 5. No bats were present in remaining 5 boxes checked during 2022 surveys, but all showed signs of previous use by bats. These findings are in contrast to the current baseline; at present, there are no suitable bat boxes subject to potential effects from the proposed development. Boxes 4 and 5 no longer have inspection panels, leaving these boxes exposed to the elements and unsuitable for roosting, while boxes 2, 3, 4, 6, 7, 8 and 9 have all fallen from their trees. Boxes 1 and 10 are still present and useable but are located away from the proposed development ZoI.

During 2018 EIAR bat surveys, a single soprano pipistrelle was observed emerging from the stand of trees where oak trees 14-21 are located (see Figure 3-3 in Appendix 8.1-4) (exact tree not observed). Oak trees such as these typically provide suitable features for rooting bats and as such were avoided by design. These trees are outside the Proposed Wind Farm and Substation footprint (see Table 3 above and Figure 3-3 in Appendix x).

Roost surveys only recorded marginally suitable roosting features which could potentially be used by individual or very low numbers of bats within the proposed development ZoI on a casual/opportunistic basis, i.e. PRF-I features. No evidence of use of these features by roosting bats was recorded.

No PRF-M features (features which could be used by multiple bats/suitable for a maternity colony) are present within the proposed development ZoI.

Considering the marginal suitability of the PRF-I features affected, in addition to the high number of such features in the locality which are not affected by proposed works, it is highly unlikely that bats could be present or be affected by the proposed works.

Based on these factors, a Regulation 54 derogation licence is not required for bats.

2.3.3 RFI Item b)

You are requested to review the bat impact assessment and to reconsider the recommended 90m buffer zones proposed in the Bat Survey (Aughney, 2019), given the high levels of Leisler's bat and pipistrelle bat species recorded across the site and their elevated collision risk; and update the planning application documentation accordingly.

2.3.4 RFI Item b Response:

The proposed bat felling buffers have been calculated based on the accepted guidance used as the industry standard (SNH, 2019; updated to NatureScot, 2021) which has been utilised to determine bat/turbine felling buffers for a number of wind farm projects consented in recent years, including Moanvane Wind Farm Co. Offaly (ACP- 301619), Fahy Beg Wind Farm, Co. Clare (ACP–317227), Dernacart Wind Farm, Co. Laois (ACP-310312) and Ballinagree Wind Farm, Co. Cork (ACP- 312606).

This guidance advocates the provision of a 50m buffer between turbine blade tips and any surrounding vegetation, and provides a formula to calculate the required buffer based on turbine dimensions and surrounding vegetation:

$$b = \sqrt{(50 + \mathrm{bl})^2 - (\mathrm{hh} - \mathrm{fh})^2}\,.$$

This formula was utilised to calculate suitable buffers for each turbine location based on the height of surrounding vegetation and as such the proposed buffers are robust and in alignment with the procedure advocated in the relevant guidance.

Both SNH (2019) and NatureScot (2021) note the following:

"*The Eurobats guidance recommends a 200m buffer around woodland areas. There is, however, currently no scientific evidence to support this distance in the UK and it is recommended that a distance of 50m between turbine blade tip and nearest woodland (or other key habitat features such as wetlands etc.) is adequate mitigation in most, lower risk situations. Exceptionally, larger buffers may be appropriate, e.g. near major swarming and hibernation sites. The longevity of wind farms should also be taken into account and the maximum growth, or management, of woodland and other relevant habitat features considered in their planning*.

A 50 m buffer distance should be applied as a basic standard mitigation measure for all bat species occurring at proposed wind farms, including all key-holed sites, which may present an increased risk of bat collisions. In practice, the 50m buffer should be applied universally, irrespective of whether curtailment is also considered necessary. Some higher risk species, notably the high-flying ones such as noctules and Leisler's bats frequently fly in open areas however and this form of mitigation is unlikely to be effective for these".

Two points within this text are pertinent to the question of whether 90m buffers are appropriate or effective – firstly, the guidance notes that increased buffers may be required in exceptional circumstances such as where a hibernation or swarming site is present; neither of these are present at the proposed development.

The second point noting that vegetation buffers are unlikely to be effective for Leisler's bat due to their tendency to fly at height in open space directly contradicts the implementation of the 90m buffer advocated for this species in Aughney (2019).

While the recommendation to implement a 90m buffer at specific turbines was made on a precautionary basis, there is no scientific basis to this approach and it is considered that use of accepted guidance in calculating the felling buffers is a robust approach.

In addition, a key condition in the mitigation recommended in Aughney (2019) is that where the 90m buffer cannot be achieved, "*it is recommended that monitoring during the construction phase (1 year) using static units at specific turbines is undertaken to determine if the bat activity levels change due to the changes in the site. This should be reviewed prior to operation of High Risk turbines where the 90m buffer cannot be achieved to determine if curtailment is required from Day 1 of operation*".

As such, there is alternative mitigation specified where a 90m turbine buffer cannot be accommodated within the proposed development boundary, namely monitoring during construction at the specified higher risk turbines to determine whether curtailment is required from the start of operation. It should be noted that the mitigation described above is intended solely for Leisler's bat and is applicable only to the group of turbines identified as higher risk for Leisler's bat as per Table 21 in Aughney (2019), Plate 2 below.

It is proposed to implement the alternative mitigation recommended in Aughney (2019) i.e. one year of static detector monitoring during the construction phase at the relevant turbine locations to determine if curtailment/increased cut-in speeds are required from the start of operation.

High Level Bat Mitigation – Leisler's bats This applies to T7, T9, T10, T11, T12	**High to Moderate Level Bat Mitigation** This applies to T4, T5, T6, T8 This applies to Internal Road Network between T11 – T10, T9-8, T5-6, T1, T3-T5	**Moderate Level Bat Mitigation** This applies to T1, T2, T3 This applies to remaining Internal Road Network	**Low Level Bat Mitigation** This does not apply to any of the turbine locations.
Ensure that wind turbine is >50m away from bat habitat according to English Nature calculation. Increase buffer to 90m for each of the High Risk turbines listed above.	Ensure that wind turbine is >50m away from bat habitat according to English Nature calculation for the linear features types as listed below: Hedgerows: 73m Treelines: 77m Conifer plantations: 79m	Ensure that wind turbine is >50m away from bat habitat according to English Nature calculation for the linear features types as listed below: Hedgerows: 73m Treelines: 77m Conifer plantations: 79m	Where possible, move wind turbine is >50m away from bat habitat according to English Nature calculation for the linear features types as listed below: Hedgerows: 73m Treelines: 77m Conifer plantations: 79m

Table 2-14: Table 21 (excerpt) from Aughney (2019)

The turbines identified as higher risk (for Leisler's bat) in Aughney (2019) were T7, T9, T10, T11 and T12. The proposed layout and number of turbines were revised between the 2018 planning application and the current application (submitted in 2025). Please see Appendix 4 for a side-by-side comparison of the 2018 vs. 2025 layouts.

In terms of the current layout, the turbine locations identified as higher risk in Aughney (2019) align with turbines T6, T8, T9, T10 and T11 (see Table 2-14 below).

Table 2-15: Turbine Location Comparison

Year	Turbine Location												
2019	T1	T2	T3	T4	-	T5	T6	T7	T8	T9	T10	T11	T12
2023	T1	T2	T3	-	T4	-	T5	T6	T7	T8	T9	T10	T11
2026	T1	T2	T3	-	T4	-	T5	T6	-	T8	T9	T10	T11
2026 Detector Code	DRE A	DRE B	DRE C	N/A	DRE D	N/A	DRE E	DRE F	N/A	DRE H	DRE I	DRE J	DRE K

Please note that detector DRE-G was deployed at the confluence between the Fear English River and a bog drain running north along woodland edge to the east of T7 and as such is not included in the table above. This position is considered a more effective survey location than the proposed T7 location since it samples the intersection between a number of commuting/foraging corridors which are connected to the woodland edge south-east of T7, while T7 is surrounded by dense plantation woodland. The DRE-G location also samples open habitat more representative of the conditions which would exist around T7 after felling of the bat buffer (versus the existing closed canopy at the proposed T7 location).

2.3.4.1 Comparison of Bat Activity Levels

Ecobat has not been re-run for a number of reasons: due to initial analysis being undertaken in the first year that Ecobat was in operation (2019) and as such Ecobat was prone to generating highly conservative activity assessments due to low or absent baseline data being available for comparison; issues with reliability identified in more recent times; and the potential for repeated analysis of the same site to skew results.

As such, due to the availability of data from multiple survey years, it is considered more reliable to utilise the raw data and compare results based on average activity levels.

In order to utilise available data spanning the period between initial static detector surveys and current surveys, results from 2019, 2023 and 2026 have been included in the comparison. Three survey years have been included in order to provide a robust indication of activity trends (restricting the comparison to two years would not reliably indicate any trends).

While static detector surveys were also completed in 2022, these results do not fit well within the comparison since the survey locations used in 2022 are poorly aligned with the locations used in the other survey years (less than half of the 2022 static detector locations align with the current turbine locations). Taking into account this poor alignment of survey locations, in combination with the fact that observed bat activity at the site level recorded in 2022 was not notably different to the other survey years, omission of the 2022 results from comparison is considered to be a robust approach and also the most preferable in terms of clarity.

At the site level, activity of Leisler's bat and the two most common pipistrelle species (common and soprano pipistrelle), has varied across survey years. While activity levels have varied, the proportion of overall bat activity attributed to these species has remained relatively stable outside of a decrease in 2026 of the proportion of Leisler's bat calls contributing to the overall number of calls for all species.

Table 2-16: Average calls per night detector comparison: Common Pipistrelle, Soprano Pipistrelle & Leisler's Bat (all detectors)

	Common Pipistrelle		Soprano Pipistrelle		Leisler's Bat	
Year	*Avg. Recordings/night*	*% of species*	*Avg. Recordings/night*	*% of species*	*Avg. Recordings/night*	*% of species*
2019	1084.93	50.63%	632.40	29.51%	409.17	19.09%
2023	675.37	52.73%	313.48	24.48%	263.78	20.59%
2026	969.88	56.72%	474.47	27.75%	199.25	11.65%

Comparisons of activity recorded at the specific detector locations identified in Aughney (2019) as high risk for Leisler's bat are included below for the higher risk/higher activity species, namely Leisler's bat, common and soprano pipistrelle.

2.3.4.2 Common Pipistrelle

Total number of common pipistrelle calls for each comparable detector location are shown below in Table 2-17 to allow direct comparison where turbine or detector names have varied across surveys years. The relevant bar charts are also included below.

The potential for common pipistrelle to be attracted to turbines (Richardson et al., 2021) is noted, along with the related potential for post-construction activity levels/patterns and associated risks to differ from the current baseline.

In order to facilitate comparison of activity levels at these turbine locations across survey years, the number of calls per detector for the locations selected based on Aughney (2019) have also been averaged (see Table 2-16). Based on this analysis, activity at T6/DRE-F varies considerably, jumping from avg. 7.4 calls/night in 2019 to avg. 67.6 per night in 2023 before reducing to avg. 35.2 per night in 2026.

T8/DRE-H remained relatively low and stable across all survey years. T9/DRE-I, T10/DRE-J and T11/DRE-K demonstrated considerable variability but showed an overall downward trend across all survey years (with the caveat that the missing summer season for T11/DRE-K in 2026 may contribute to an underestimate for 2026).

Table 2-17: Average common pipistrelle calls per detector comparison

Detector	Year		
	2019 (30 Nights)	2023 (86 Nights)	2026 (64 Nights) *
T7 [2019] T6/DRE-F	7.4	67.6	35.2
T9 [2019] T8/DRE-H	18.6	13.9	17.3
T10 [2019] T9/DRE-I	107.1	44.3	38.6
T11 [2019] T10/DRE-J	257.8	18.3	86.7
T12 [2019] T11/DRE-K	239.0	98.3	159.7**

* T6, T8, T9 & T10 have 64 nights of data for 2026. T11 has 33 nights of data due to card failure in Round 2.
**Average for T11 in 2026 based on 33 nights of data.

Table 2-18: Total common pipistrelle calls per detector comparison

Detector*	Year		
	2019	2023	2026
T7 [2019] T6/DRE-F	222	5,812	2,251
T9 [2019] T8/DRE-H	557	1,199	1,109
T10 [2019] T9/DRE-I	3,212	3,806	2,470
T11 [2019] T10/DRE-J	7,735	1,571	5,550
T12 [2019] T11/DRE-K	7,171	8,457	5,270**

* As noted in the introduction the turbine layout was revised and reduced from 12 to 11 turbines between 2019 and 2023. This is reflected in the detector locations detailed in column 1.
**under-recorded due to card failure in Round 2

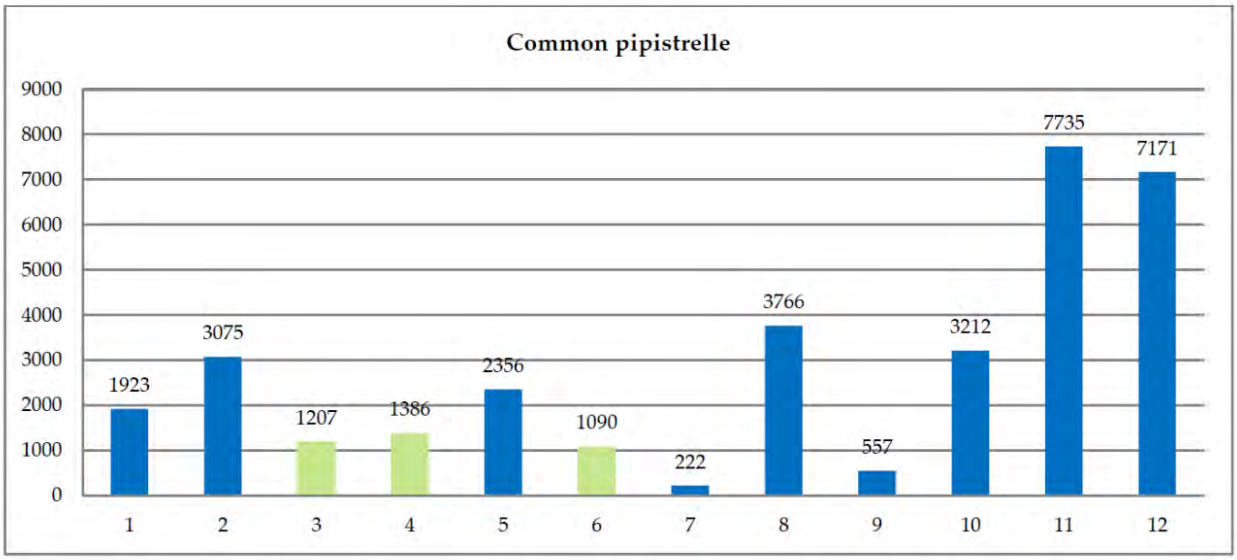


Figure 23: Total number of bat passes recorded for Common pipistrelles at each of the proposed turbine locations in 2019 static surveillance. NOTE: lighter shaded columns indicate locations with only surveillance for 2 of the 3 periods.

Table 2-19: Total common pipistrelle passes per turbine location (2019) extracted from Aughney (2019)

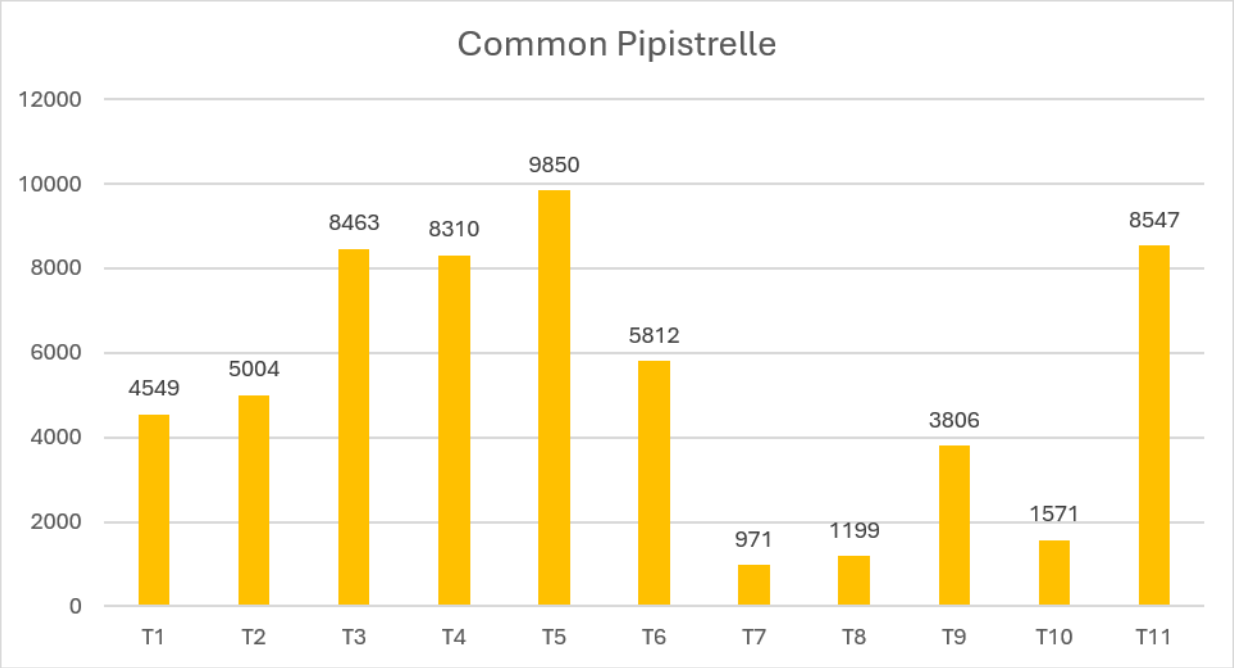


Table 2-20: Total number of bat passes recorded for common pipistrelles at each of the static detector locations during 2023

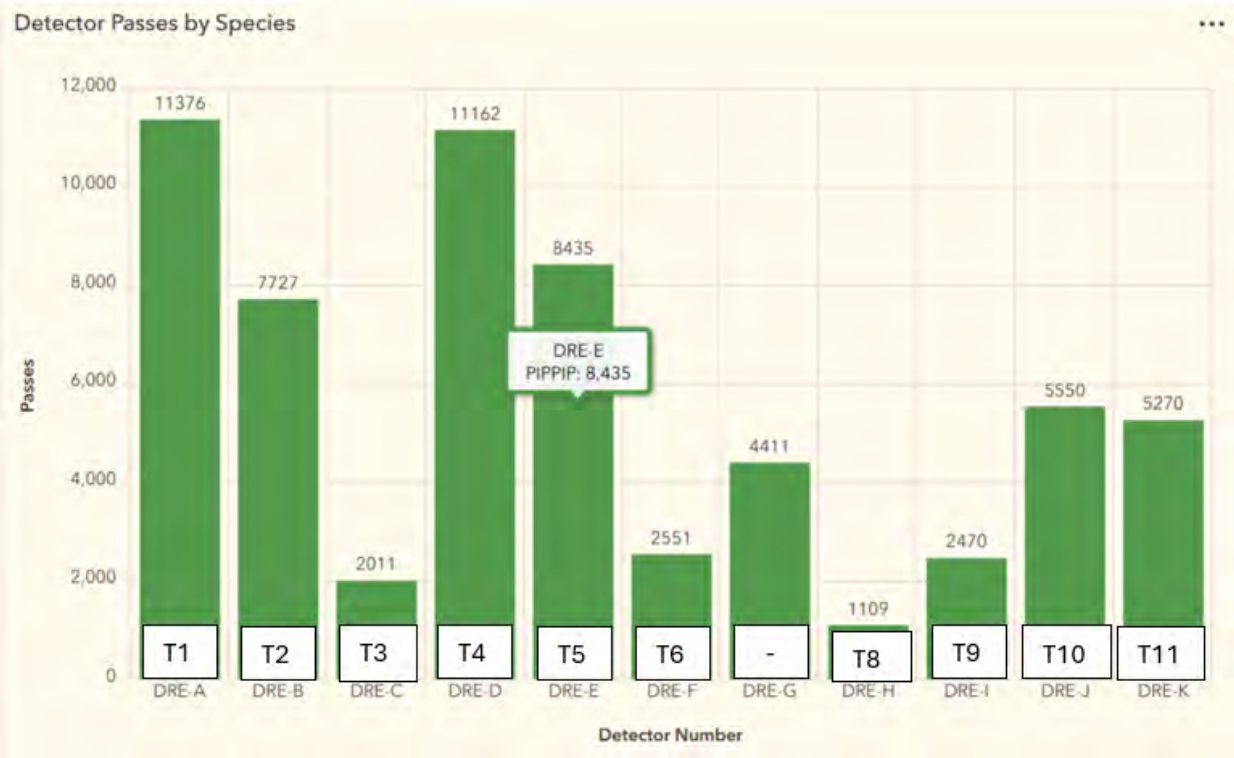


Table 2-21: Total Passes per Detector - Common Pipistrelle (2026)

2.3.4.3 Soprano Pipistrelle

Total number of soprano pipistrelle calls for each comparable detector location are shown below in Table 2-24 to allow direct comparison where turbine or detector names have varied across surveys years. The relevant bar charts are also included below.

In order to facilitate comparison of activity levels at these turbine locations across survey years, the number of calls per detector for the locations selected based on Aughney (2019) have also been averaged (see Table 2-23).

Activity at T6/DRE-F remained consistently low at avg. 5.1 passes/night across 2019 and 2023, but jumped to avg. 97.5 per night in 2026. Both T8/DRE-H and T9/DRE-I remained relatively similar across all survey years, with low levels of activity and only minor fluctuations in activity levels.

Activity at T10/DRE-J dipped considerably in 2023, but the overall trend is relatively consistent.

T11/DRE-K showed a consistent drop in activity levels, reducing from avg. 40.2 calls/night in 2019 to avg. 6.5 in 2026 (with the caveat that the missing summer season for T11/DRE-K in 2026 may contribute to an underestimate for 2026). On a seasonal basis, the highest (peak) activity levels for this species at T11/DRE-K were recorded during the summer survey windows (Round 2) of 2019 and 2023. Considering this pattern, it is likely that activity for Round 2 (Summer) 2026 would also have been higher than the 2026 Spring and Autumn windows.

When the summer survey windows are omitted, activity levels during spring and autumn at T11/DRE-K were consistently lower in 2023 and 2026 vs. 2019.

Table 2-22: Average soprano pipistrelle calls per detector comparison

Detector	Year		
	2019 (30 Nights)	2023 (86 Nights)	2026 (64 Nights) *
T7 [2019] T6/DRE-F	5.1	5.1	97.5
T9 [2019] T8/DRE-H	9.7	6.0	10.9
T10 [2019] T9/DRE-I	14.4	15.1	10.0
T11 [2019] T10/DRE-J	27.8	4.6	22.5
T12 [2019] T11/DRE-K	40.2	10.9	6.5**

* T6, T8, T9 & T10 have 64 nights of data for 2026. T11 has 33 nights of data due to card failure in Round 2.
**Average for T11 in 2026 based on 33 nights of data.

Table 2-23: Total soprano pipistrelle calls per detector comparison

Detector*	Year		
	2019	2023	2026
T7 [2019] T6/DRE-F	152	440	6,243
T9 [2019] T8/DRE-H	291	520	695
T10 [2019] T9/DRE-I	433	1,297	639

Detector*	Year		
	2019	2023	2026
T11 [2019] T10/DRE-J	833	399	1,442
T12 [2019] T11/DRE-K	1,207	936	213**

* As noted in the introduction the turbine layout was revised and reduced from 12 to 11 turbines between 2019 and 2023. This is reflected in the detector locations detailed in column 1.
** under-recorded due to card failure in Round 2

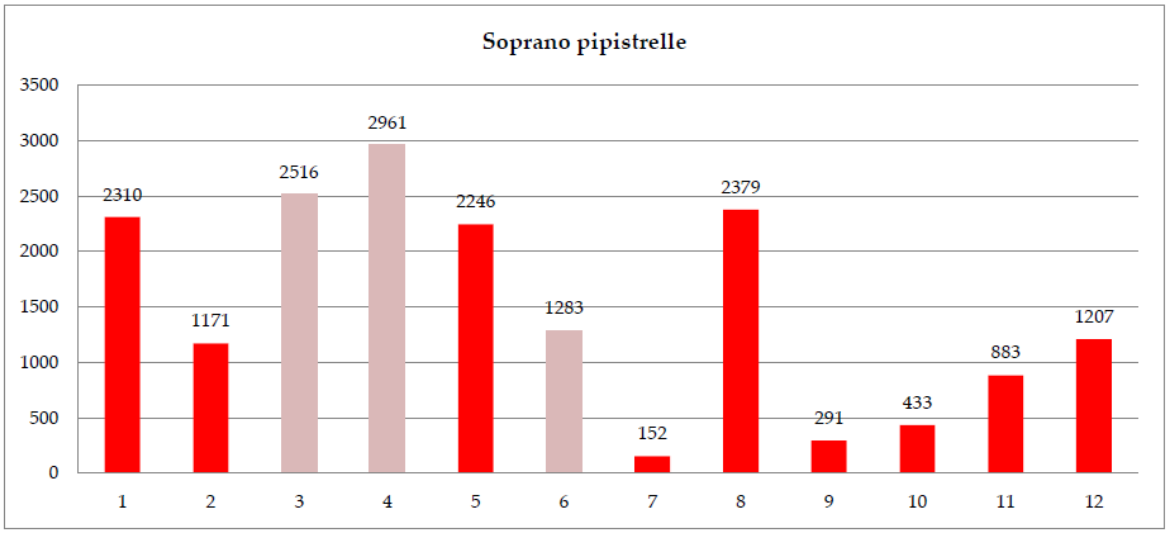


Figure 24: Total number of bat passes recorded for Soprano pipistrelles at each of the proposed turbine locations in 2019 static surveillance. NOTE: lighter shaded columns indicate locations with only surveillance for 2 of the 3 periods.

Table 2-24: Total soprano pipistrelle passes per turbine location (2019) extracted from Aughney (2019)

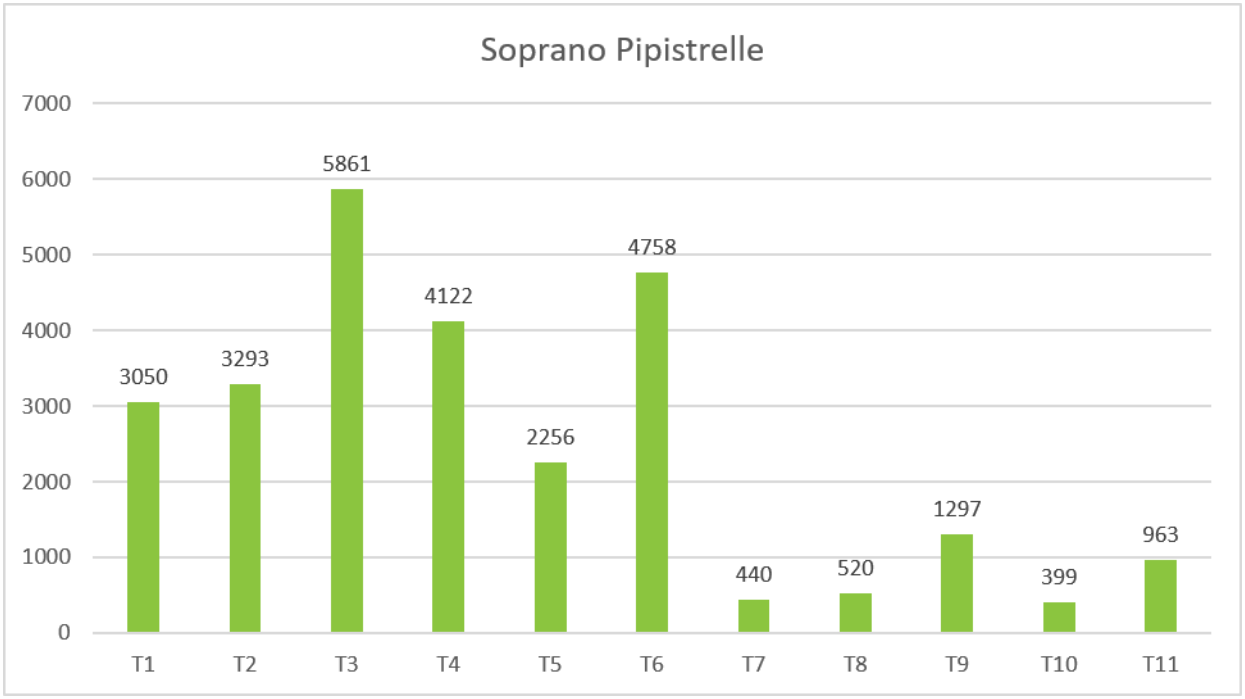


Table 2-25: Total number of bat passes recorded for soprano pipistrelles at each of the static detector locations during 2023

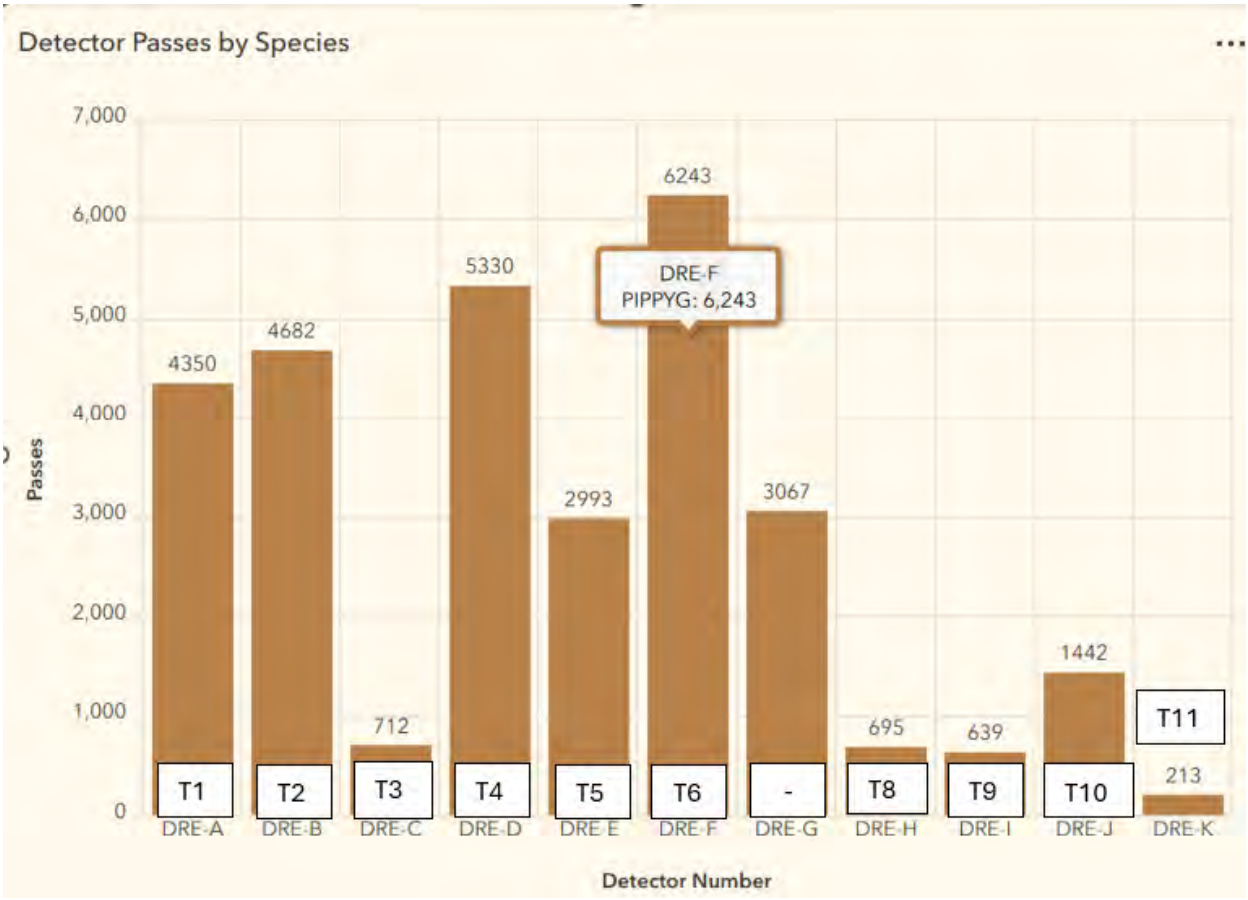


Table 2-26: Total Passes per Detector - Soprano Pipistrelle (2026)

2.3.4.4 Leisler's Bat

Total number of Leisler's bat calls for each comparable detector location are shown below in Table 2-21 to allow direct comparison where turbine or detector names have varied across surveys years. The relevant bar charts are also included below.

In order to facilitate comparison of activity levels at these turbine locations across survey years, the number of calls per detector for the locations selected based on Aughney (2019) have also been averaged (see Table 2-20).

Activity at T6/DRE-F remained consistent across 2019-2023 (avg. calls/night ranged from 24.5 to 24.8), and approximately halved in 2026 to avg. 11.7 per night. T8/DRE-H showed a consistent drop in activity levels, reducing from avg. 32.1 calls/night in 2019 to avg. 14.6 in 2026.

T9/DRE-I showed an increase from avg. 21.4 calls/night to 27.7 calls/night between 2019 and 2026 (peaking at 32.0 in 2023), but the range (21.4 – 32.0 avg. calls/night) was not large.

The overall trend for T10/DRE-J remained relatively consistent (20.0 calls/night in 2019 and 23.1 calls/night in 2026), with an intervening dip to 8.1 calls/night in 2023.

The overall trend for T11/DRE-K also remained relatively consistent (14.0 calls/night in 2019 and 18.4 calls/night in 2026), with an intervening spike to 32.9 calls/night in 2023. Similarly to the other species, the average calls/night for T11/DRE-K are caveated because the missing summer season for T11/DRE-K in 2026 may contribute to an underestimate for 2026, particular since potentially higher activity levels can occur during the summer survey window.

When seasonal activity is examined, it is notable that 2019 surveys observed the highest level of activity in spring (25.9 passes/night), with a lower average (9.4 passes/night) in summer and 6.8 passes/night in autumn.

A more typical seasonal pattern is evident in the 2023 results, with summer activity levels being higher than spring and autumn (30.2 passes/night in spring; 60.7 passes/night in summer, and 2.3 passes/night in autumn).

For 2026, spring was similar to 2023 with 30.6 passes/night, while autumn was higher (closer to 2019 levels) at 7.8 passes/night. As previously noted, no data is available for summer (Round 2) 2026 for T11.

Table 2-27: Average Leisler's bat calls per detector comparison

Detector	Year		
	2019 (30 Nights)	2023 (86 Nights)	2026 (64 Nights) *
T7 [2019] T6/DRE-F	24.5	24.8	11.7
T9 [2019] T8/DRE-H	32.1	22.7	14.6
T10 [2019] T9/DRE-I	21.4	32.0	27.7
T11 [2019] T10/DRE-J	20.0	8.1	23.1
T12 [2019] T11/DRE-K	14.0	32.9	18.4**

* T6, T8, T9 & T10 have 64 nights of data for 2026. T11 has 33 nights of data due to card failure in Round 2.
**Average for T11 in 2026 based on 33 nights of data.

Table 2-28: Total Leisler's bat calls per detector comparison

Detector*	Year		
	2019	2023	2026
T7 [2019] T6/DRE-F	734	2,131	747
T9 [2019] T8/DRE-H	964	1,954	932
T10 [2019] T9/DRE-I	643	2,756	1,774
T11 [2019] T10/DRE-J	601	699	1,477
T12 [2019] T11/DRE-K	421	2,830	606**

* As noted in the introduction the turbine layout was revised and reduced from 12 to 11 turbines between 2019 and 2023. This is reflected in the detector locations detailed in column 1.
** under-recorded due to card failure in Round 2

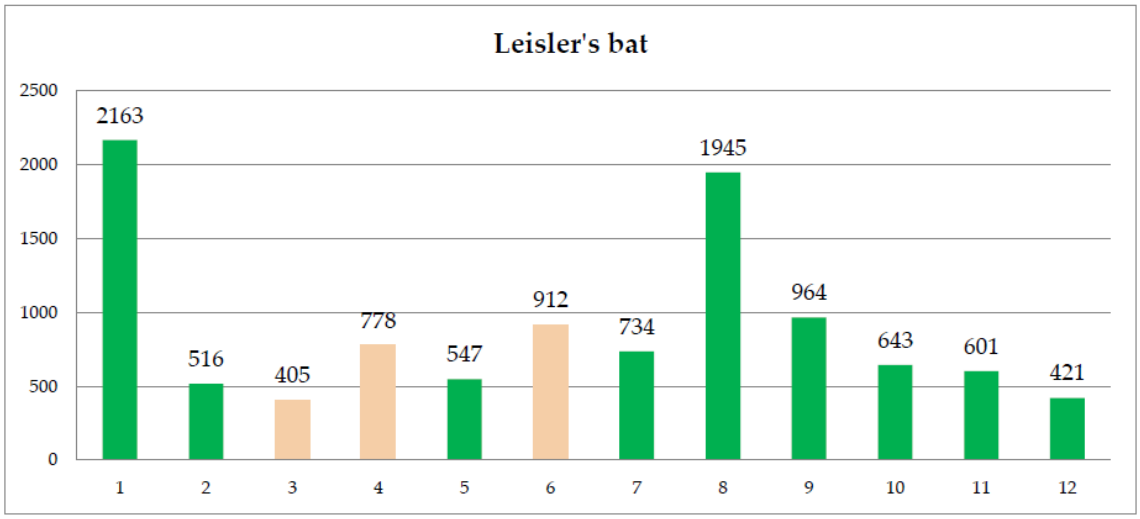


Figure 25: Total number of bat passes recorded for Leisler's bats at each of the proposed turbine locations in 2019 static surveillance. NOTE: lighter shaded columns indicate locations with only surveillance for 2 of the 3 periods.

Table 2-29: Total Leisler's bat passes per turbine location (2019) extracted from Aughney (2019)

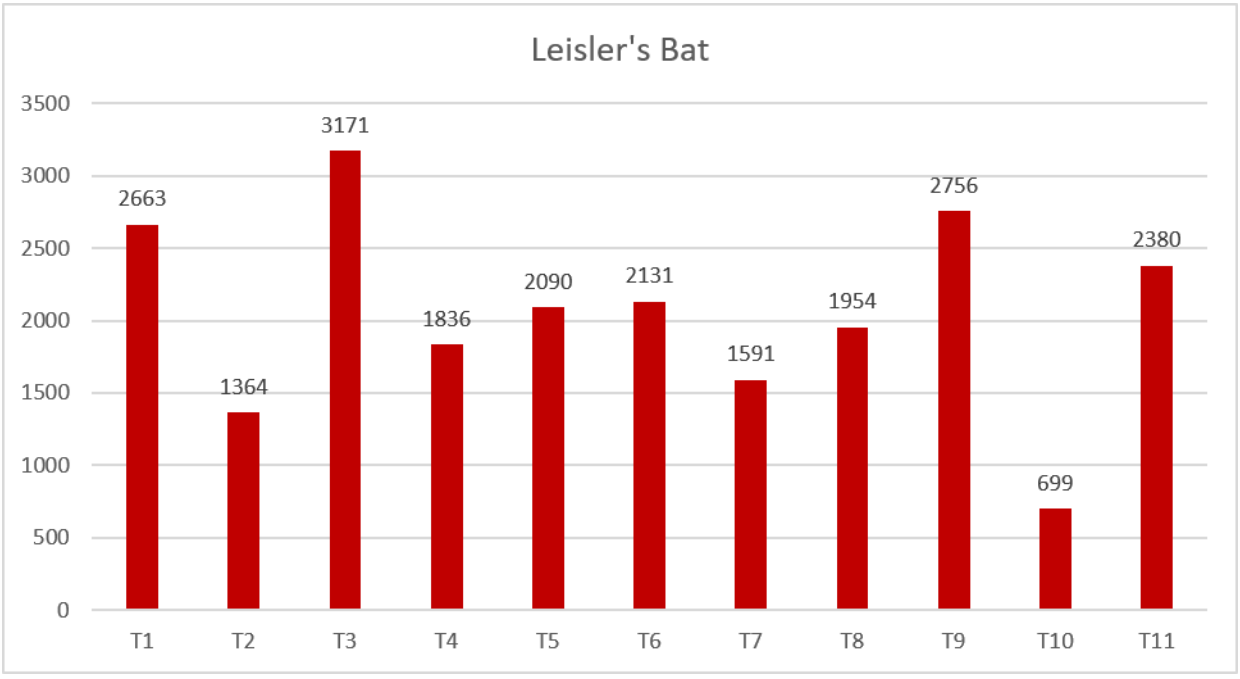


Table 2-30: Total number of bat passes recorded for Leisher's bat at each of the static detector locations during 2023

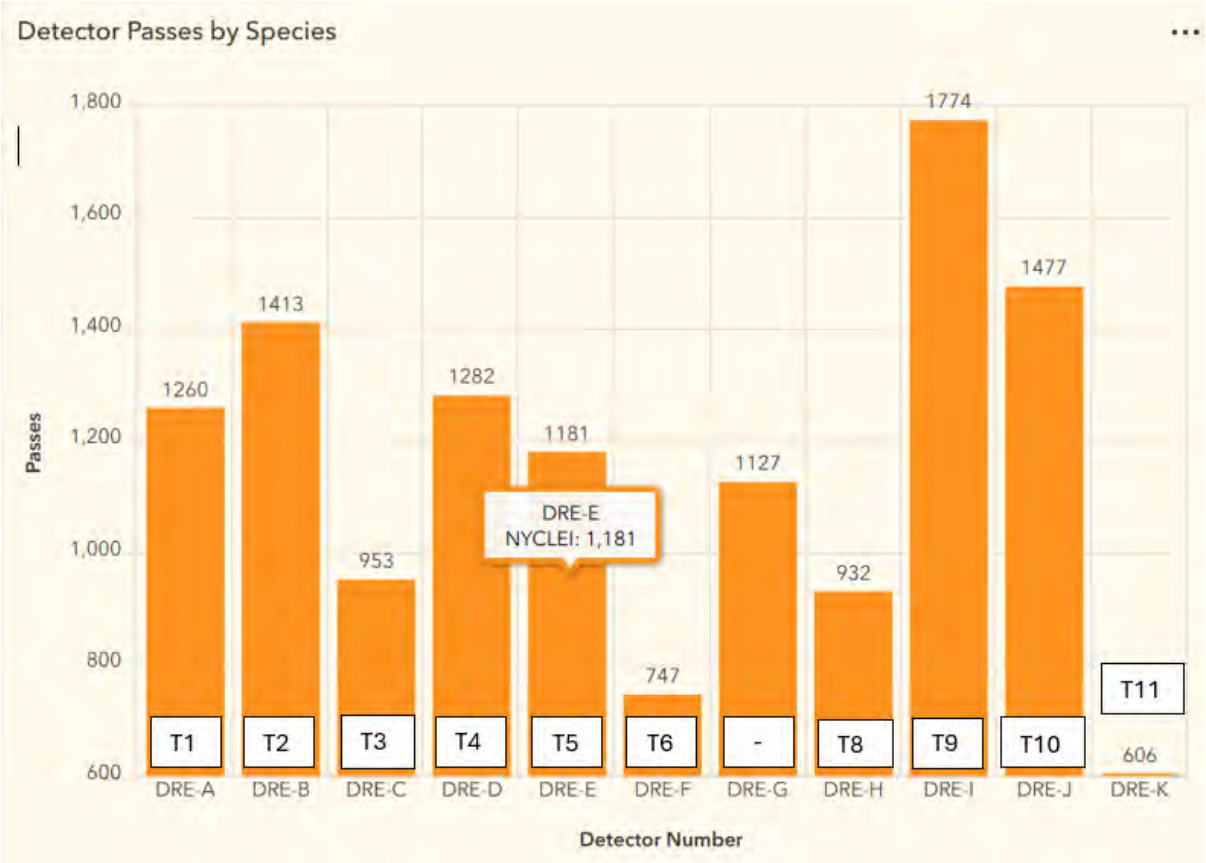


Table 2-31: Total Passes per Detector - Leisler's Bat (2026)

2.3.4.5 Discussion/Conclusion

2.3.4.5.1 Implementation of Pre-Operational Monitoring

Inter-annual variability is evident between the survey years, indicating the potential for variation in activity patterns due to factors such as weather and long-tern climatic patterns. Considering the potential for variability in activity levels, it is considered prudent to adopt the pre-construction/pre-operation monitoring specified as mitigation in Aughney (2019) for T6, T7, T8, T9, T10 and T11 and as such this will be implemented.

This aligns with the approach in the EIAR (monitoring from the outset of operation, triggering curtailment/increased cut-in speeds where collisions or increased activity are detected), but initiates monitoring earlier i.e. during construction. It is further noted that this also aligns with recently published Irish guidance (Bat Conservation Ireland, 2026) which advocates a multifaceted approach rather than relying solely on felling buffers.

While felling buffers are typically recommended as a default measure to reduce potential for bat/turbine collisions, it is generally accepted that additional measures such as curtailment i.e. increased cut-in speeds during specified weather conditions where bats are likely to be more active, may also be required depending on site-specific conditions. Curtailment is defined as implementation of the increased turbine cut-in speeds during specified weather conditions where bat activity is likely to increase as detailed in EIAR Chapter 8-1 Section 8.10.2.5.

2.3.4.5.2 *Percentage of 90m Buffers Achieved Through Felling for Berms & Access Tracks*

Please note that a complete 90m felling buffer cannot be achieved at any of the relevant turbines due to the constraint posed by the proposed development boundary.

However, when the existing proposed felling (for access track buffers and berms) outside the bat felling buffers is considered, along with existing open spaces outside the bat felling buffers which are likely to persist long-term, high percentages of a 90m buffer around specific turbine locations would already be achieved, as detailed below.

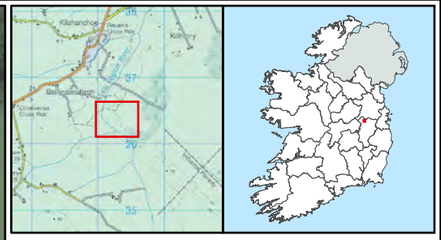
T6

The T6 bat felling buffer radius (84.2m) already achieves a high percentage of the 90m buffer (87.5 %) before any additional felling for access tracks or berms is taken into account. When access track felling on the eastern margin of the felling buffer is considered, the percentage of the 90m buffer achieved increases slightly to 88.3%. There are no existing open spaces within the T6 buffer.

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Legend

- Proposed Development Boundary
- 90m Turbine Buffer
- Felling for Access Tracks/Berms Outside Bat Buffers
- Felling for Bat Buffers
- Access Track
- Passing Bays
- Turbine Hardstanding
- Turbines

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TITLE:	Turbine Buffers T6		
PROJECT:	Drehid Wind Farm RFI		
FIGURE NO:	2.2.		
CLIENT:	North Kildare Wind Farm Ltd.		
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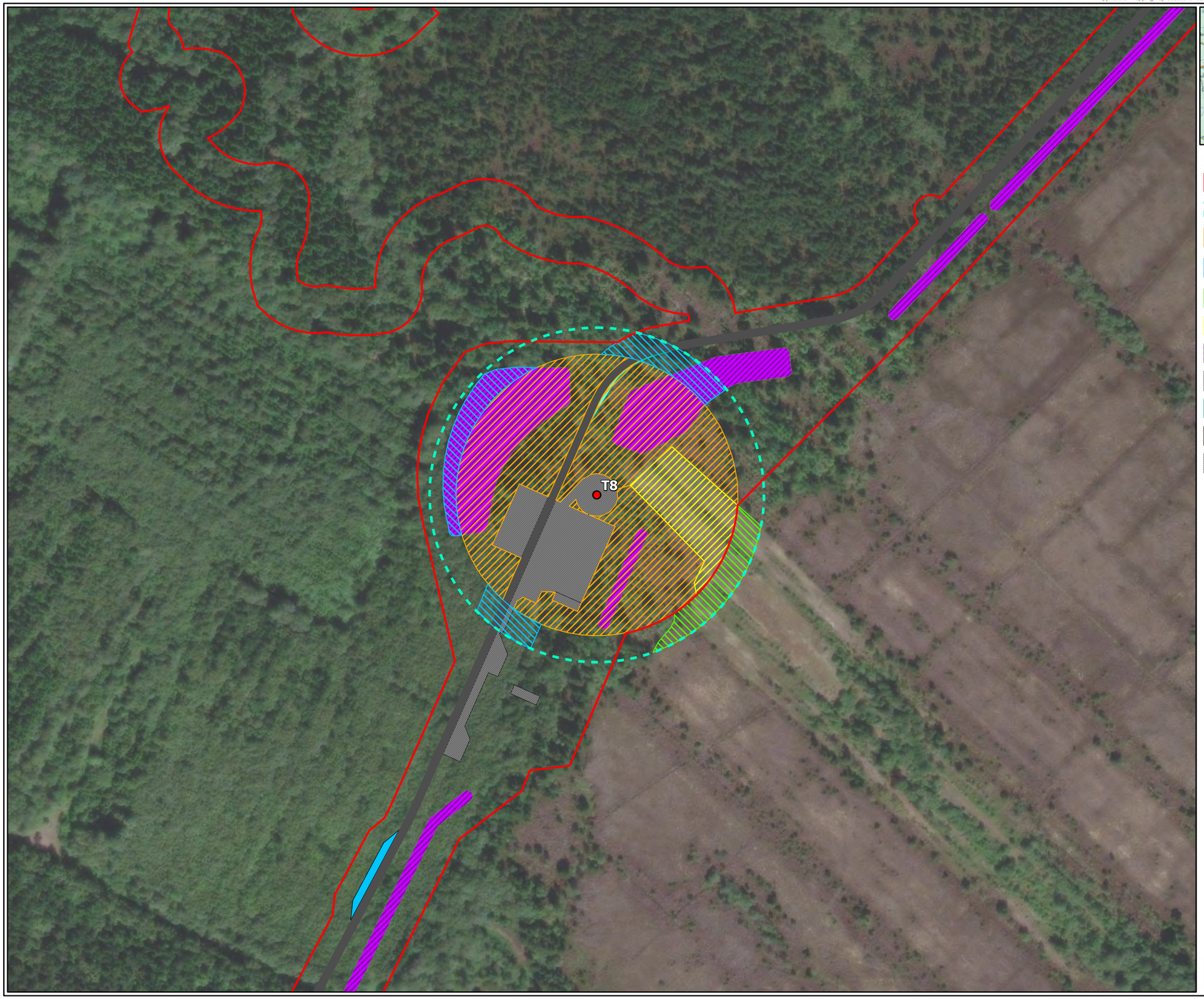
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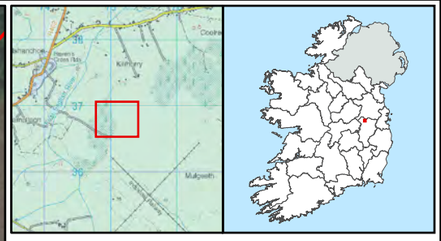
T8

Prior to consideration of proposed access track/berm felling and existing open space likely to persist, the T8 bat felling buffer (75.8m radius) would achieve 70.9% of the 90m buffer. When proposed access track/berm felling and existing open space likely to persist long-term are considered, the percentage of the 90m which would be achieved increases to 84.5%.

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Legend

- Proposed Development Boundary
- 90m Turbine Buffer
- Felling for Bat Buffers
- Felling for Access Tracks/Berms Outside Bat Buffers
- Open Space Outside Bat Buffers
- Open Space Within Bat Buffers
- Berms
- Access Track
- Road widening - Access tracks
- Passing Bays
- Turbine Hardstanding
- Turbines

TITLE:	Turbine Buffers T8		
PROJECT:	Drehid Wind Farm RFI		
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CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:2,000	**REVISION:**	0
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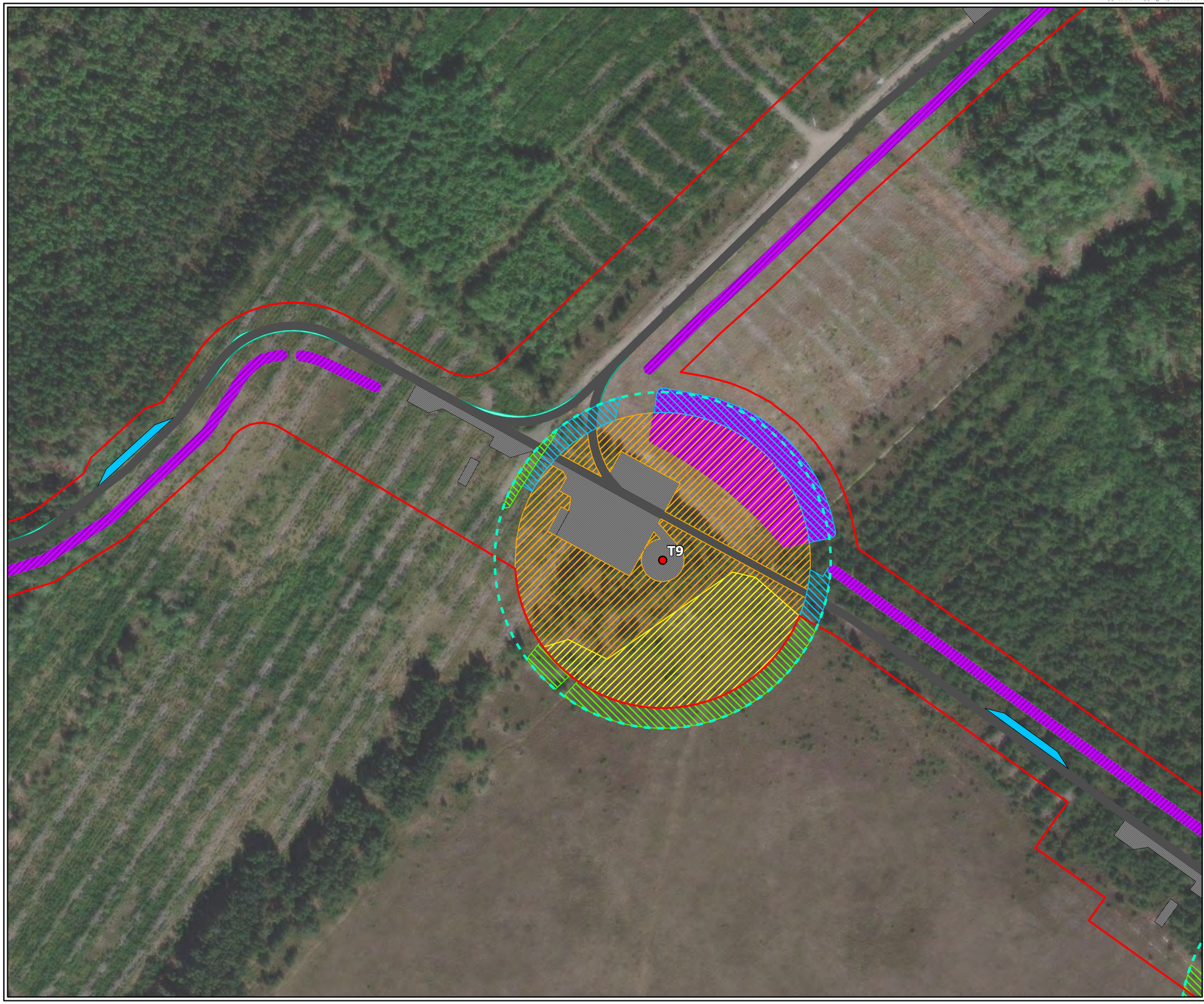
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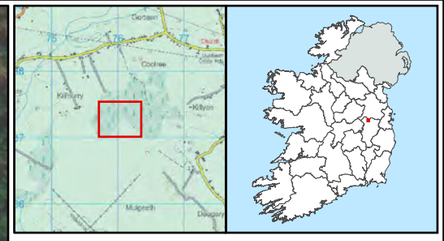
T9

For T9, prior to consideration of proposed access track/berm felling and existing open space likely to persist, the bat felling buffer (79.1m radius) would achieve 77.2% of the 90m buffer. When proposed access track/berm felling and existing open space likely to persist long-term are considered, the percentage of the 90m which would be achieved increases to 94.9%.

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Legend

- Proposed Development Boundary
- 90m Turbine Buffer
- Open Space Within Bat Buffers
- Open Space Outside Bat Buffers
- Felling for Access Tracks/Berms Outside Bat Buffers
- Felling for Bat Buffers
- Berms
- Access Track
- Road widening - Access tracks
- Passing Bays
- Turbine Hardstanding
- Turbines

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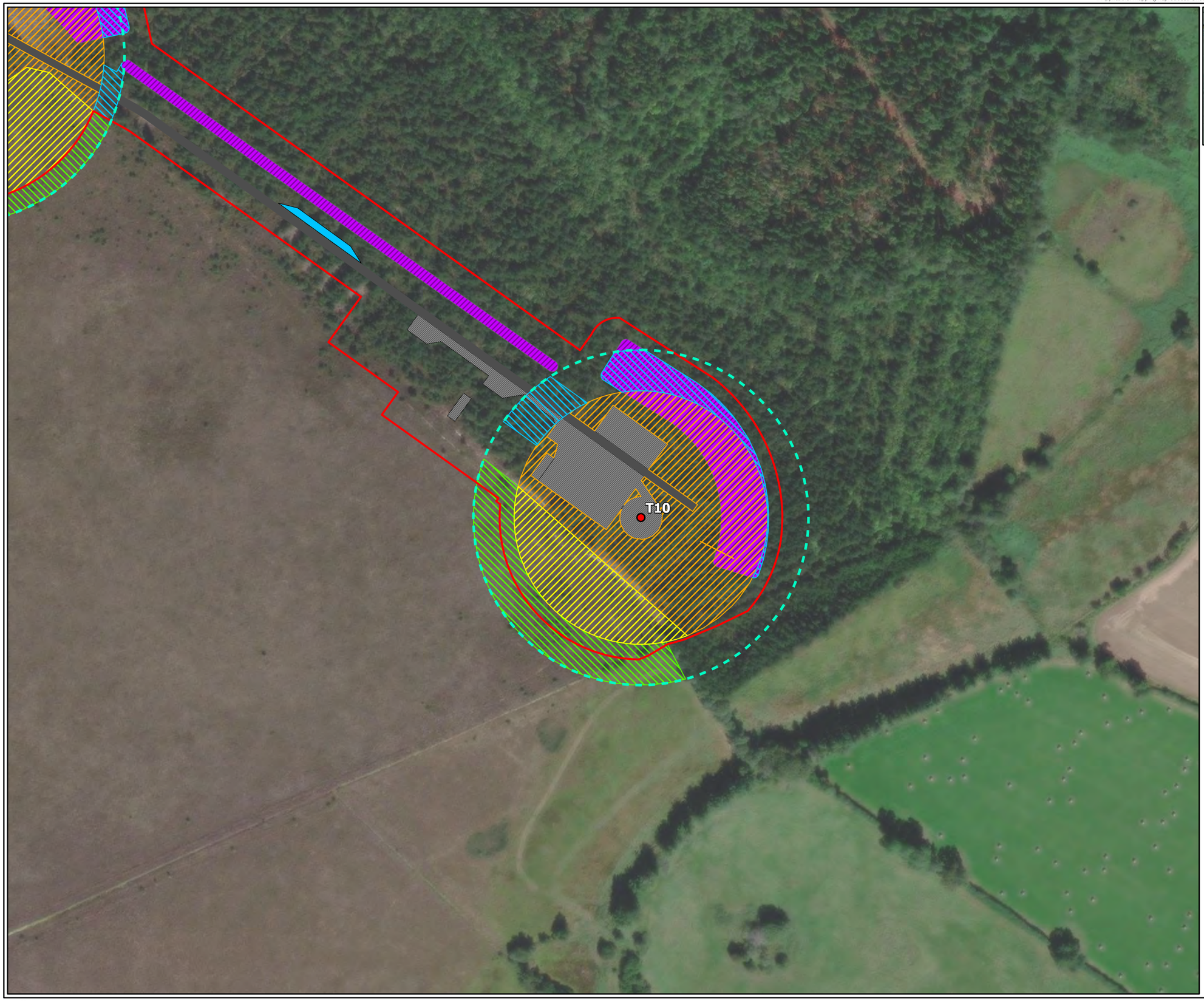
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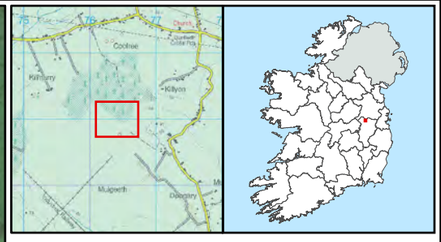
T10

Prior to consideration of proposed access track/berm felling and existing open space likely to persist, the T10 bat felling buffer (68.1m radius) would achieve 57.3% of the 90m buffer. When proposed access track/berm felling and existing open space likely to persist long-term are considered, the percentage of the 90m which would be achieved increases to 79.4%.

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Legend

- Proposed Development Boundary
- 90m Turbine Buffer
- Felling for Bat Buffers
- Felling for Access Tracks/Berms Outside Bat Buffers
- Open Space Outside Bat Buffers
- Open Space Within Bat Buffers
- Berms
- Access Track
- Passing Bays
- Turbine Hardstanding
- Turbines

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PROJECT:	Drehid Wind Farm RFI		
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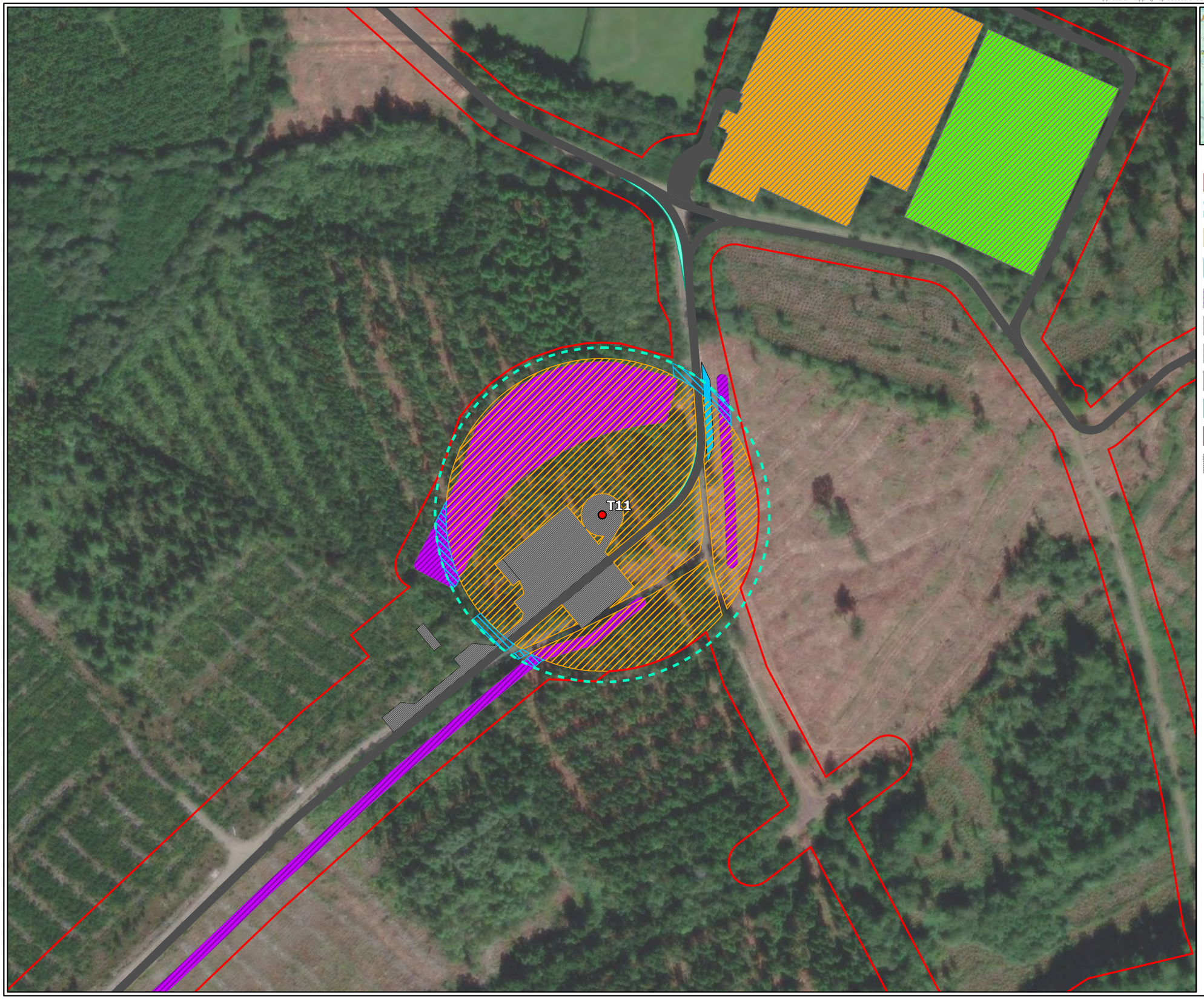
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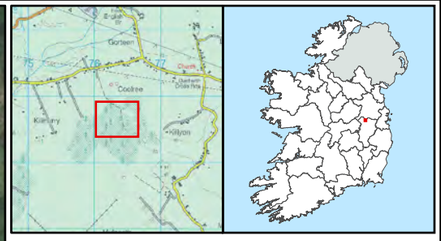
T11

The T11 bat felling buffer radius (84.2m) already achieves a high percentage of the 90m buffer (87.5 %) before any additional felling for access tracks or berms is taken into account. When access track felling on the eastern margin of the felling buffer is considered, the percentage of the 90m buffer achieved increases to 90.2%. There are no existing open spaces within the T11 buffer.

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Legend

- Proposed Development Boundary
- 90m Turbine Buffer
- Felling for Bat Buffers
- Felling for Access Tracks/Berms Outside Bat Buffers
- Berms
- Peat Deposition Area
- Substation
- Access Track
- Road widening - Access tracks
- Passing Bays
- Turbine Hardstanding
- Turbines

TITLE:	Turbine Buffers T11		
PROJECT:	Drehid Wind Farm RFI		
FIGURE NO:	2.6		
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Based on the assessment detailed above, when considering the bat felling buffers in combination with access track/berm felling and existing open space likely to persist long-term, high percentages of the 90m buffers at T6, T8, T9, T10 and T11 would already be achieved. While full 90m buffers cannot be achieved at these turbines, high percentages of these buffers ranging from 79.4% to 94.9% are already inherent within the proposed development design.

The proposed bat felling buffers have been calculated based on the accepted guidance documents used as the industry standard (Natural England, 2014; SNH, 2019; NatureScot, 2021; Bat Conservation Ireland, 2026).

2.3.5 RFI Item c)

You are requested to provide further assessment and evidence base on the approach and effectiveness of the proposed mitigation on the use of treelines and hedgerows to divert bats away from turbine locations.

2.3.6 RFI Item c Response:

The primary mitigation proposed to divert bats away from turbine locations is the removal of vegetation to ensure no trees or shrubs are present within 50m of turbine blade tips in accordance with NatureScot (2021) and Bat Conservation Ireland (2026) guidance. Where this measure is implemented in open agricultural landscapes, felling to establish the buffers is likely to be limited to existing linear wooded features within each turbine buffer as per the current baseline (ongoing use of open spaces for agriculture limits woody vegetation to field boundaries). During the operational phase, it will be necessary to ensure the entirety of all buffers continue to be kept free of vegetation (bat buffer will be kept free of vegetation by mechanical means only; use of herbicides shall not be permitted for this purpose).

The proposed hedgerow planting around turbine buffers in open agricultural habitats is intended primarily to maintain connectivity within agricultural areas of the proposed development where existing hedgerows/treelines would be required to be removed to avoid bat/turbine collisions in accordance with NatureScot (2021). While the removal of hedgerows within buffers surrounding these turbines would satisfy the NatureScot (2021) and BCI (2026) recommendations, a secondary effect would arise due to the interruption of the network of linear wooded habitats used by bats to move around the open agricultural landscape. Improved agricultural grassland provides relatively poor habitat for bats, increasing the relative value of hedgerows and treelines for foraging and commuting in agricultural landscapes. Static detector surveys in 2023 recorded consistent pipistrelle activity (Primarily *Pipistrellus* and *Pygmaeus*) at all detectors placed along field boundaries (T1 – T5). Static detector surveys in 2026 also recorded consistent pipistrelle activity (again, primarily *Pipistrellus* and *Pygmaeus*) at the detectors placed along field boundaries, albeit with T3 (Detector DRE-C) recording lower numbers of these species relative to the other detectors placed along hedgerows (T1, T2, T4 and T5).

Due to the reliance of the majority of Irish bat species on habitat features such as hedgerows to navigate open landscapes, it is considered preferable to provide alternative linear features outside turbine felling buffers rather than leaving gaps which may affect the commuting routes of bats, or leaving hedgerows which end abruptly, potentially guiding bats into turbine buffers rather than around them.

The role of linear features such as hedgerows in providing suitable conditions for bats to utilise agricultural landscapes is well established, with numerous studies confirming the value of these features for bats (Limpens, 1991; Verboom & Huitema, 1997; Verboom et al., 1999; Downs et al., 2006; Lookingbill et al., 2010; Boughey et al., 2011; Hale et al., 2012; Bellamy et al., 2013; Lacoeuilhe et al., 2018).

Linear habitats are particularly important to pipistrelle species for both foraging and commuting, and are also utilised by Myotis species and Plecotus auritus to commute between roosts and foraging areas. The importance of landscape suitability and connectivity as a key factor in the conservation of bats is highlighted by the Model of Bat Landscapes for Ireland (Lundy et al., 2011). While the proposed development is outside the range of lesser horseshoe bat and this species was not recorded during surveys, a key study (Wright et al., 2026) identifying potential habitat corridors and barriers affecting this species highlights the importance of landscape-scale connectivity in bat conservation efforts.

It is also noted that county council ecologists have previously recommended planting of hedgerows to provide alternative commuting routes and long-term continuity of landscape connectivity for bats where turbine felling buffers are proposed to interrupt existing hedgerows (pre-planning consultation with Cork Co. Council; correspondence Ref. PPN21/300; planning Ref. 21/7246) (see Appendix 5).

Based on the established utilisation of linear wooded features by bats, it is assessed to be preferable to provide new hedgerows as alternative commuting routes which avoid the turbine buffers where existing hedgerows are proposed to be interrupted.

It is noted that bat felling buffers and re-routing of hedgerows sit within a wider suite of mitigation measures. While felling buffers are recommended as a general mitigation measure, their effectiveness can be limited in certain situations, for example for Leisler's bat which utilises open space (and as such may be more likely than other species to continue flying through turbine buffers), and common pipistrelle which can be attracted to wind turbines (Richardson et al., 2021). Mitigation for these scenarios is included in the EIAR, namely post-construction collision/activity monitoring, and if required under specific conditions, curtailment during weather conditions when higher levels of bat activity can occur.

2.3.7 RFI Item d)

You are requested to provide an ecohydrological assessment on the potential impacts from the construction turbines TB, T9 and T10 on the hydrological functioning of the proximal Annex I habitat PB1 Raised Bog habitat, specifically Mulgeeth Bog.

2.3.8 RFI Item d Response:

2.3.8.1 Summary of PB1 Raised Bog habitat

2.3.8.1.1 Introduction

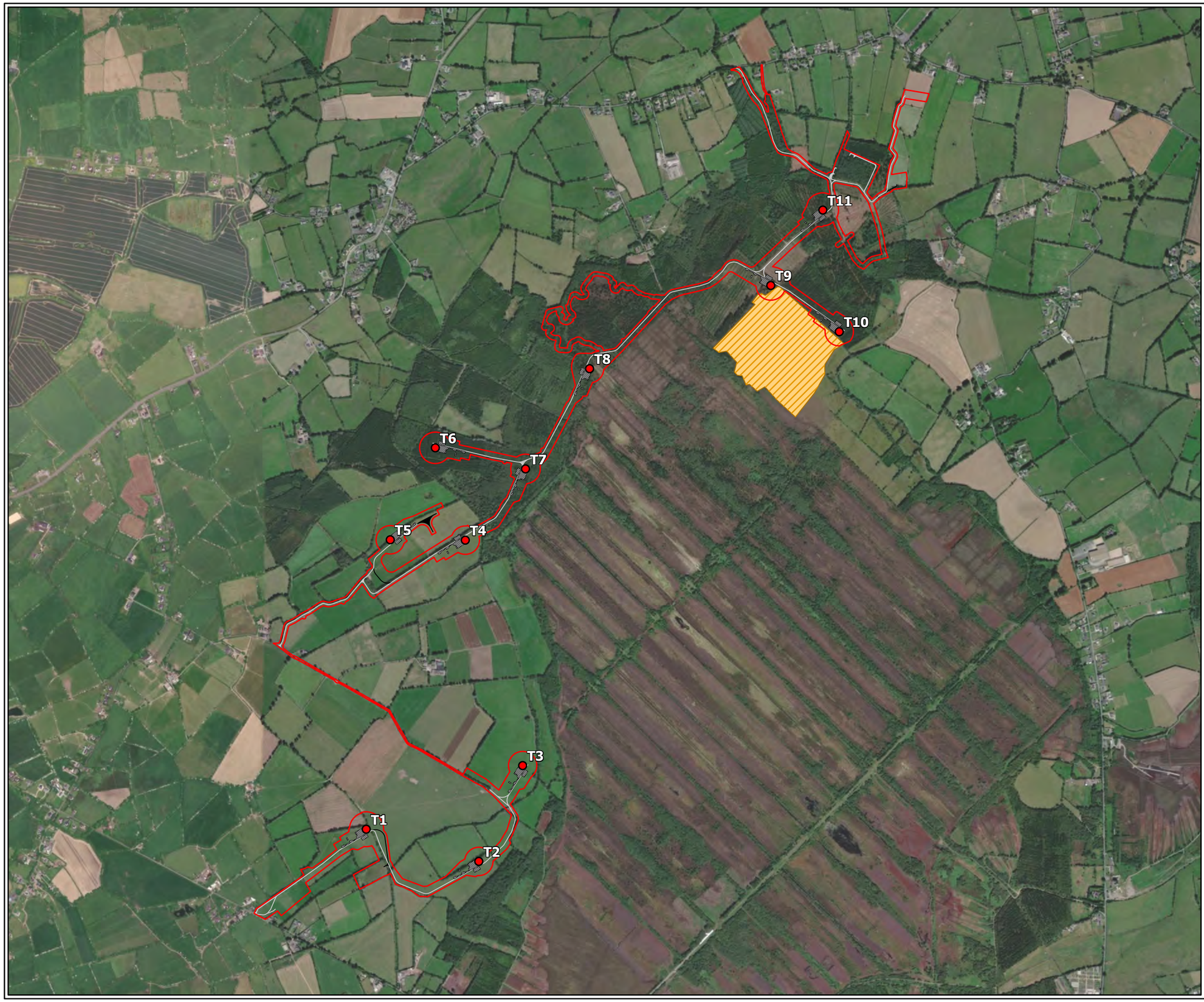
Intact Raised Bog (PB1), representative of Annex I priority habitat "active raised bog [7110]" is present to the south and southwest of T9 and T10. This area would historically have formed part of the northern tip of the much larger Timahoe North Bog. A limited number of drains are present in the southern and marginal areas of this peat mass. These drains are well-vegetated and as such their effectiveness is reduced.

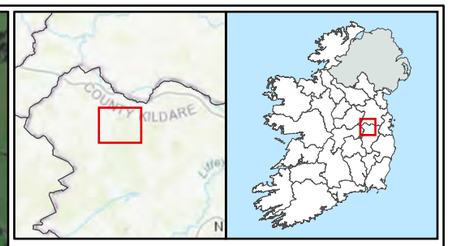
The marginal areas include drains running along the edges of conifer plantations. A network of drains is also present in the surrounding conifer plantations bordering Mulgeeth Bog. The edges of Mulgeeth Bog are currently slightly degraded due to the presence of artificial drainage and forestry.

Proposed turbine T8 is not located near the intact peatland known as Mulgeeth Bog; it is located to the southwest, over one kilometre from T9 and c. 700m from Mulgeeth Bog. T8 is located in Bog woodland (WN7) established on degraded raised bog. Small areas of degraded raised bog/scrub mosaic and cutaway bog supporting Dystrophic Lake (FL1) and Wet heath (HH3) are present immediately east and south-east of T8. The majority of the 700m distance separating T8 from Mulgeeth Bog is comprised of drained but intact raised bog representative of Annex I priority habitat "Degraded raised bogs still capable of natural regeneration [7120]".

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Legend

- Site Boundary
- Mulgeeth Bog
- Turbine Hardstanding
- Access Track
- Temporary Access Track
- Turbines

N W E S

0 0.25 0.5 1 Kilometers

TITLE: Mulgeeth Bog			
PROJECT: Drehid Wind Farm RFI			
FIGURE NO:	2.7		
CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:20,000	**REVISION:**	0
DATE:	14/10/2026	**PAGE SIZE:**	A3

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2.3.8.2 Mulgeeth Bog

Ling heather *Calluna vulgaris* is the dominant species in this area; common cottongrass *Eriophorum angustifolium* and hare's tail cottongrass *Eriophorum vaginatum* are common. Other species include bog asphodel *Narthecium ossifragum*, bell heather *Erica cinerea*, bog rosemary *Andromeda polifolia*, cranberry *Vaccinium oxycoccos* and white-beaked sedge *Rhynchospora alba*.

The latter was noted to be abundant in a shallow marginal drain recolonised by vegetation and was also recorded growing in patches on the bog in association with Sphagnum mosses and areas of low open vegetation. Sphagnum species present include *Sphagnum cuspidatum, S. papillosum, S. magellanicum, S. capillifolium* and *S. subnitens*. Sphagnum cover is high in parts, but not uniformly high across the entire habitat area.

Reindeer lichen *Cladonia rangiferina* is common, and devil's matchsticks lichen *Cladonia floerkeana*, a species which is indicative of disturbance was found in one location. The north-eastern side of the bog is being invaded by lodgepole pine spreading from the adjacent forestry plantation. This negatively impacts the overall conservation condition of the bog.

Due to the high degree of wetness, typical species, large extent, high sphagnum cover in parts, low number and ineffectiveness of drains, this area is classified as active raised bog and as such corresponds to the Annex I priority habitat “active raised bog [7110]”.

The edges of this habitat are clearly delineated by the abutting conifer plantations and drains running along it's north-western and north-eastern boundaries.

As noted in the EIAR, while patches of *Rhynchospora alba* were recorded throughout Mulgeeth Bog, these areas do not correspond to the Annex I habitat 'Depressions on peat substrates of the *Ryhnchosporion* [7150]' due to a lack of other typical/indicator species required to form the Annex I vegetation community, in addition to the absence of characteristic conditions. The only other indicator plants recorded in association with *Rhynchospora alba* were limited to *Sphagnnum* mosses, and as such there were no well-developed examples of this community. It is noted that the list of typical species for this habitat in raised bog was updated in 2019 (NPWS, 2019) and no longer includes *Drosera rotundifolia*.

2.3.8.3 Drained Bog Near T8

An area of raised bog dissected by small drains and also containing several larger arterial drains is present to the west and south-west of the more intact bog Mulgeeth Bog/Annex1 habitat? described above. This bog is still largely intact and retains natural characteristics despite drainage. Vegetation is dominated by taller-growing ling heather closer to large drains. In wetter areas further from the large drains, more open vegetation dominated by hare's tail cottongrass and lower-growing ling heather is present. Bog asphodel, common cottongrass, bell heather, round-leaved sundew and bog rosemary area also present.

White-beaked sedge is abundant in open waterlogged areas. Similarly to Mulgeeth Bog, no areas corresponding to 'Depressions on peat substrates of the Ryhnchosporion [7150]' are present. Rather, extensive areas of white-beaked sedge without other typical/indicator species required to form the Annex I vegetation community are present. White-beaked sedge is known to occur in situations such as this where disturbance has occurred.

Scapillifolium is present, and *Scuspidatum* is present in wet depressions. Sphagnum cover is moderate to high but sporadically distributed. Reindeer lichen is common. The vegetation is lower-growing than the more intact bog and microtopography is less pronounced but there is still a mosaic of heather-dominated vegetation and open pools/sedge/sphagnum-dominated vegetation. Areas closer to the margins where cut banks are present are drier and eroded.

Due to the wet conditions, semi-natural vegetation characteristics and potential for expansion of Sphagnum cover, this section of the bog contains areas with links to the Annex I habitat "Degraded raised bogs still capable of natural regeneration [7120]".

2.3.8.4 Quaternary Geology/Peat:

Peat within the PB1 habitat ranges in thickness from 2.6 to 5.9m (Figure 2-9), with the deepest peat recorded in the southeast of the habitat. Along the edge of the forestry plantation peat depths range from 2.5 to 4.4m. Shear strengths recorded in the peat range from 5 to 30kPa, showing a slight increase in strength with depth, with an average of 12kPa.

Based on the GSI mapping, the peat is underlain by Glacial Till derived from Limestones.

2.3.8.5 Hydrology:

The PB1 habitat is characterised by a general lack of artificial drainage, with surface runoff occurring in a diffuse manner to the north, northwest and northeast. The topography of this area falls at a 0.5% slope to the north, northwest and northeast from a high point in the southeastern portion of the PB1 habitat (where the deepest peat is recorded).

Along the northern edge of the PB1 habitat, forestry drainage is present in the form of furrows orientated in a southwest-northeast direction, and by the presence of a southeast-northwest orientated perimeter drain, approximately 1.0m wide and 1.5m deep (overgrown) along the edge of the forestry. The presence of this drain and the forestry furrows will accelerate any surface runoff around the edge of the PB1 habitat, leading to this area being more of a 'marginal' ecotope when compared to the 'central' ecotope in the middle of the PB1 habitat, where the acrotelm will be significantly thicker and surface water flow significantly slower than around the edges of the habitat (marginal ecotope).

2.3.8.6 Hydrogeology & Ecohydrology:

Among other factors, the ecohydrology of a bog ecosystem relies on the maintenance of high water levels in the peat. The “ground-water” found in peat is viewed as being isolated from “groundwater” in the deeper ground-water body or regional aquifer system within the underlying overburden and bedrock deposits. Within a raised bog such as Mulgeeth Bog, the bog depends on rainfall to remain saturated.

Groundwater levels within the PB1 habitat are typically within 0.3m of the ground level, with seasonal fluctuations bringing the groundwater level up to ground level in the wetter months. Peatland ecosystems are considered to be resilient to seasonal (short-term) fluctuations, which can occur under natural climatic conditions. The elastic storage characteristics of peat (the ability to store and release water through expansion during wet periods and compression during dry periods) provide an important stabilisation mechanism to buffer the effects of prolonged dry periods and maintain ecosystem functioning. As a consequence, the peat surface moves synchronously along with water table fluctuations and helps buffer the effects of drought on vegetation.

Relatively stable groundwater levels are required to maintain the current condition of the habitat, and any permanent reduction in the groundwater level could potentially result in a change in vegetation to that more closely resembling the (Intact) Drained Raised Bog habitat found near T8, where the presence of small drains and larger arterial drains has resulted in lower-growing vegetation than in Mulgeeth Bog. The microtopography of this drained raised bog is also less pronounced, but there is still a mosaic of heather-dominated vegetation and open pools/sedge/sphagnum-dominated vegetation.

While raised bog ecosystems require maintenance of consistent groundwater levels over the long term to prevent the peat mass drying out, the role of surface water and how peatland species influence the flow and storage of water are also important elements of a functioning bog ecosystem. As an ombrotrophic habitat, raised bogs depend on rainfall to remain saturated. As such, the 'groundwater' stored within the peat originated as rainwater. The portion of water stored within the peat is an important element of the overall water resource within a bog, forming a repository which helps the bog remain wet during dry periods. However, this is not the only source of water in a raised bog ecosystem - water is also stored on the surface within pools and vegetation. As such, the water distributed across the surface of the bog also contributes to buffering the effects of dry periods.

Sphagnum mosses form a key element of raised bog ecosystems, storing up to 20 times their dry weight in water in specialised hyaline cells and maintaining the acidic conditions required for peat formation. Hummock forming Sphagnum species in particular are capable of storing larger amounts of water due to being adapted to live higher above the surface of the bog than lawn-forming or pool species. The combination of microtopography, diverse vegetation structures and water retention adaptations of individual plant species combine to form microclimates and an overall wet environment on the bog surface which helps delay desiccation during dry spells.

The abilities of individual species and plant communities to contribute to retention of water in a bog ecosystem provides a first line of defence against drought, but peatland plant species are also adapted to survive prolonged dry periods through various strategies. These include adaptations such as the ability of Sphagnum mosses to regenerate from spores, in-rolled or needle-shaped leaves in graminoids to reduce transpiration, waxy or hairy leaf cuticles to trap moisture, creation of moist microclimates within tussocks, and storage of nutrients underground during dormancy.

As such, considering factors including peat elasticity, surface water retention and drought resilience/recovery potential, it is clear that an intact raised bog such as Mulgeeth Bog is both adapted to retain water and also to recover after extended dry periods reduce the amount of water stored in the bog.

As noted above, surface water will tend to run off faster on the margins of the bog (marginal ecotope) versus the central ecotope. Despite this tendency, all areas of the bog (including the margins) were noted to be wet during multiple site visits during both dry and wet seasons, indicating a high level of overall water retention.

The presence of the conifer plantation (and associated drains) along the northern boundary of the PB1 habitat will have resulted in a slight reduction in the groundwater table within this area. This drawdown will likely have extended to the edges of the PB1 habitat, resulting in a lower groundwater level than that found in the centre of the PB1 habitat.

Permeability within the peat deposit within the PB1 habitat will vary with depth. The upper, less humified layer (the acrotelm) typically has a permeability of around 10^{-2} m/s. The lower, more humified layer (catotelm) typically would have a permeability of around 10^{-4} to 10^{-6}m/s, however this can vary significantly based on the type of vegetation forming the peat and the degree of humification (decomposition) within the peat mass. Where the degree of humification is higher, the permeability is lower. Considering the higher permeability of the acrotelm (typically between 0.1 to 0.5m in depth), this is the horizon where indirect drying out effects are most likely to arise from excavations.

2.3.9 Potential Impacts on PB1 Habitat from Construction at T08, T09 and T10:

Excavations are proposed at T8, T9 and T10 in order to construct the proposed wind turbines. Both the turbine bases and the hardstand platforms at these locations will be piled, which limits the excavation depth to the minimum required to embed the turbine base. The turbine base excavations will be up to 3.5m in depth, as indicated on planning drawing P22-242-0300-0014. No significant excavations are planned for the hardstands. A floating road will be constructed between T9 and T10. Once completed, shallow (<1m deep) surface water interceptor drains, and roadside swales will divert surface water away from the hardstand locations to diffuse outflow locations around the hardstands (as shown on the site layout drawings).

The turbine base at T8 is 700m from the edge of the higher quality intact PB1 habitat at Mulgeeth Bog, and the ground level is approximately 1m lower than Mulgeeth Bog. The area between the T8 turbine base and Mulgeeth Bog is an area of drained raised bog, characterised by a network of drains orientated both northwest-southeast and northeast-southwest forming a grid pattern. Peat depth in this area of drained raised bog (c. 3m) is shallower than at T08 or within the PB1 habitat, indicating that this area has either been excavated or has undergone significant settlement due to drainage (despite evident recovery/recolonisation indicating persistence of the acrotelm in this area of drained raised bog).

The location of the proposed T8 turbine base within degraded and desiccated peat colonised by trees located c. 70m away from the drained raised bog at its closest point means that a significant hydrogeological interaction between these two areas is unlikely. In addition, an area of cutaway bog (recolonised by Wet heath and Dystrophic lake) separates T8 from the drained raised bog to the east (see Figure 8-9 Habitat Map in EIAR Chapter 8-1), providing a buffer which further reduces the likelihood of any indirect effects on the drained raised bog.

Given the disturbance to the drained raised bog between T8 and Mulgeeth Bog, and the distance of 700m between the two, there are not considered to be any potential effects on the hydrological functioning of Mulgeeth Bog from the proposed construction of turbine T08.

The Conceptual Site Model (CSM) for the area of the site around T9 and T10 (Mulgeeth Bog) is shown in Figure 2-9 to Figure 2-11. The figures show in general terms the current baseline conditions, the conditions during construction, and the conditions during the operation of the wind farm.

The excavations at T9 and T10 will extend to a depth of approximately 3.5m bgl (below ground level) to allow for the turbine base to be constructed below ground level. In order to construct the base, groundwater in the excavation will be controlled through the use of mobile pumps. A shallow cut-off drain at the ground surface will also divert surface water away from the excavation to a diffuse outfall point. The excavations for the two turbine bases will be open for a number of weeks (typically 8-10weeks) as the turbine base is constructed. Once the concrete base has been poured and the concrete has cured, the excavations will be backfilled with a low permeability cohesive fill material (permeability $<1x10^{-6}$m/s).

The proposed excavations at T9 and T10 will cause a temporary reduction in the groundwater level at two locations along the northern edge of the PB1 habitat. The edge of this habitat is currently slightly degraded due to the presence of artificial drainage and forestry. The extent of the temporary groundwater lowering will depend on the specific permeability of the peat in the vicinity of the excavation, however it is highly unlikely to extend more than 100m from the turbine base excavation (illustrated on Figure 2-7), or to be noticeable at this distance from the excavation. This is based on a Zone of Influence calculation using the proposed excavation depth and an estimated horizontal hydraulic conductivity of peat of $1x10^{-4}$m/sec, based on a moderately to highly humified peat as would typically be found in deeper peat deposits.

Once the excavations has been backfilled and the pumps removed, the groundwater table will recover to its pre-construction level (Figure 2-11). No permanent lowering of the groundwater table is anticipated as a result of these works.

The construction of the floating road between T9 and T10 will cause a minor amount of settlement of the underlying peat, particularly in the near surface acrotelm layer, which could restrict the near surface water flow within the peat layer. This would have the effect of slowing any water flow within the peat away from the PB1 habitat and may be slightly beneficial in maintaining the water level in the habitat in the long term. However, the majority of this road is to the north of an existing drain, which already intercepts the surface water flow from the PB1 habitat, and as such the floating road is not assessed to have a permanent significant effect on the PB1 habitat.

The temporary lowering of the groundwater level in the peat during the construction period is not assessed to be significant enough to result in permanent effects on Mulgeeth Bog. The potential for negative indirect drying out effects arising from turbine base excavations is likely to be influenced by seasonality of works; if works are undertaken in winter, there is likely to be sufficient rainfall during the excavation period to keep the bog wet to the degree that no noticeable effects on vegetation occur. However, if works are undertaken in a dry period during the summer, there is increased potential for drying out effects.

While there is some potential for drying out effects during drier spells, a number of factors reduce the likelihood of significant effects occurring. These include the shape, extent and relative locations of the proposed excavations; depth of proposed excavations relative to peat porosity, relatively small extent of Mulgeeth Bog potentially affected, and capacity for recovery once baseline hydrogeological conditions are restored.

The shape of the proposed excavations, i.e. circular pits, results in drainage effects being focused on point locations rather than the more extensive linear extent/impact zones which arise from the type of deep extensive linear drains designed specifically to dry out peat. The diameter of the proposed excavations is relatively small (25m at the base). When these factors are considered, the potential zone of influence is limited in comparison to linear drainage features of similar depth which would have a far higher impact. To put the potential zone of influence in context, in the most conservative scenario where the water table is affected up to 100m from the excavations, effects would be limited to 8.6% of the raised bog habitat comprising Mulgeeth Bog and confined to the northern and eastern corners of the bog which include marginal areas affected by conifer plantation drainage.

Considering the marginal locations of these ZoIs in combination with their small extent relative to the main peat mass of Mulgeeth Bog, it is considered that i) potential temporary drying out effects would be limited to isolated marginal areas around the excavations and ii) the remaining 91.4% of the peat mass and raised bog vegetation outside the ZoI provides significant water storage capacity, providing a steady supply of ground and surface water which would further reduce the potential for desiccation within the ZoI during construction.

Considering that the acrotelm which is typically between 0.1 to 0.5m in depth will have been damaged or removed due to drainage and tree planting in the adjacent forestry areas where the proposed turbines T9 and T10 are located, potential hydrogeological connectivity between the intact acrotelm of Mulgeeth Bog and the proposed turbine foundation excavations is further reduced. With reduced connectivity to the acrotelm of Mulgeeth Bog, there is less potential for this higher porosity stratum to dry out as a result of excavations, reducing the overall rate of groundwater drainage into the excavations during construction and reducing potential for effects on the vegetation of Mulgeeth Bog.

The majority of the proposed excavation depth is within the lower permeability humified peat layer (catotelm), which is also likely to result in slower transmission of groundwater into the excavations. Considering the poor connectivity of the acrotelm in combination with the majority of the excavation depth being located in the lower permeability catotelm, the potential for drying out effects in the adjacent Mulgeeth Bog is reduced.

In the event that temporary desiccation of peat and raised bog vegetation occurs due an event such as excavations being undertaken during an extended dry spell, short-term effects on raised bog habitat could occur within the zone of influence. In addition to the mitigation measures already specified within the EIAR, groundwater monitoring will be undertaken within the 100m ZoI in order to record any changes in the water level within the bog.

However, since lowering of the water table associated with the proposed turbine foundation excavations is a temporary effect (limited to 8-10 weeks) and no vegetation or acrotelm is proposed to be removed from Mulgeeth Bog, it is predicted that areas of raised bog within the ZoI subjected to even the most intense episode of desiccation i.e. excavations being undertaken during an extended dry spell would recover over the short term.

A range of factors would facilitate recovery of the raised bog within the ZoI in the event of temporary desiccation arising from excavation works during a dry period. These include the resilience of raised bog habitats to dry periods, drought adaptations of individual plant species such as water storage, underground nutrient storage/dormancy and regeneration from spores, and the large water storage capacity of the peat mass of Mulgeeth Bog outside the ZoI which would contribute to groundwater recharge of peat within the ZoI following backfilling of the excavations.

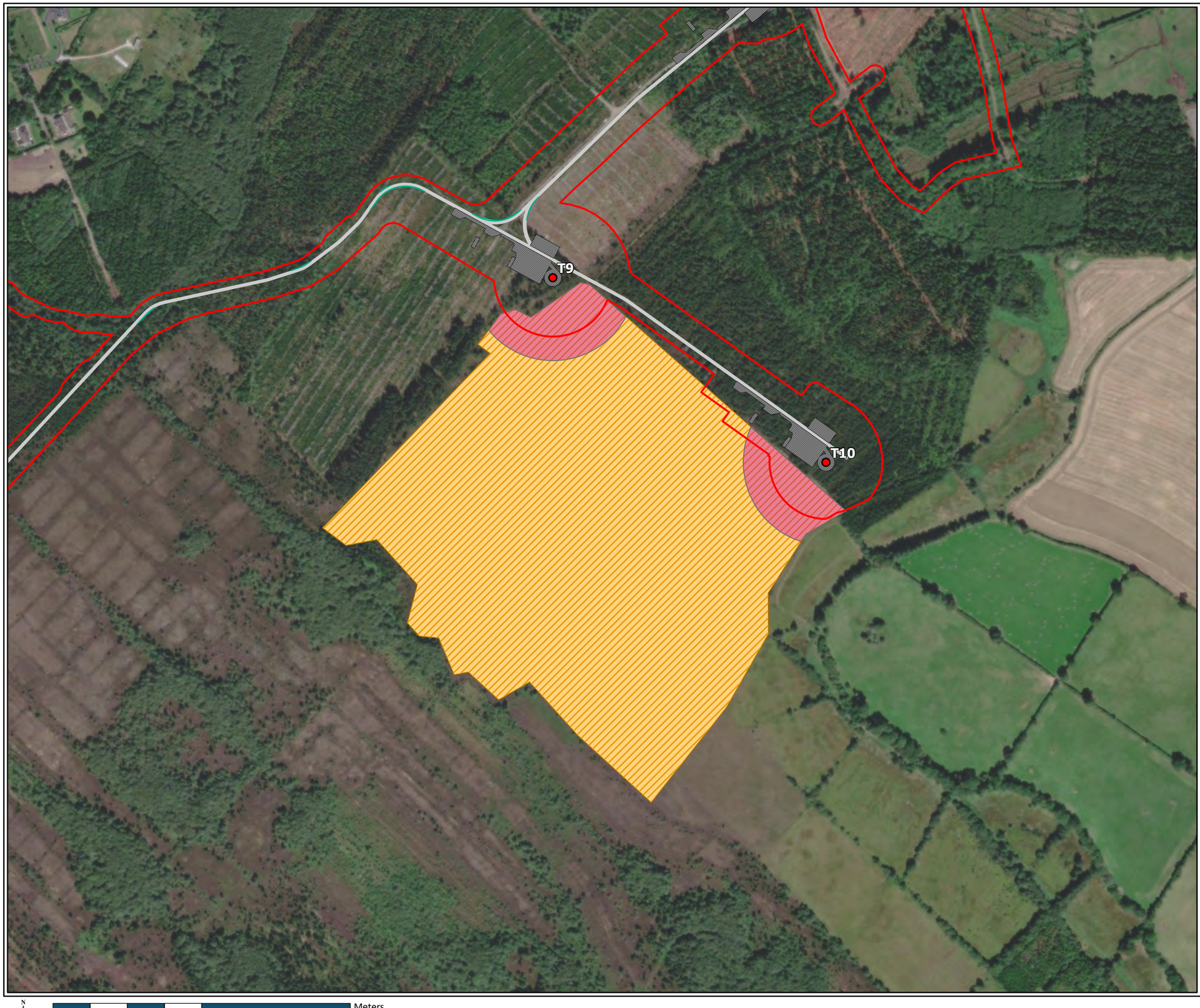
Raised bog can recover provided the acrotelm remains intact and hydrogeological conditions are restored. The seedbank in the intact acrotelm, in addition to reactivation of dormant plants and regrowth of mosses from spores will accelerate the recovery process if desiccation occurs. The limited scale of effects is reiterated; even the most severe drying out within the ZoI would be a localised effect if it occurred and would not negatively affect the ecological functioning of Mulgeeth Bog as a whole.

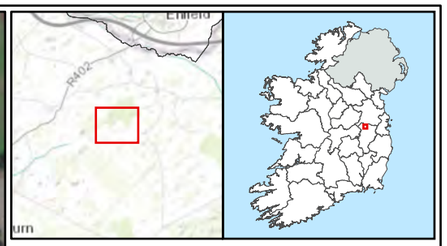
There is no potential for permanent effects on Mulgeeth Bog or any other peatland habitats within or near the proposed development. Any potential indirect effects would be short-term.

Once the turbines bases have been constructed and the excavation backfilled, there will be no long-term change in the groundwater level or surface water runoff from the PB1 habitat due to the presence of these bases or the site drainage associated with T9 and T10. The use of floating road construction for the proposed access track serving T9 and T10 running located in conifer plantation will avoid indirect effects on the PB1 habitat to the south. As such there are not considered to be any residual impacts on the ecohydrological functioning of the PB1 habitat from the construction of the turbine bases at T08, T09 and T10.

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Legend

- Site Boundary
- Mulgeeth Bog
- T9 and T10 Foundations - 100m Buffer
- Road Widening - Access Tracks
- Access Track
- Turbine Hardstanding
- Turbines

TITLE:	T9 and T10 (100m Foundation Buffer)		
PROJECT:	Drehid Wind Farm RFI		
FIGURE NO:	2.8		
CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:5,000	**REVISION:**	0
DATE:	14/10/2026	**PAGE SIZE:**	A3

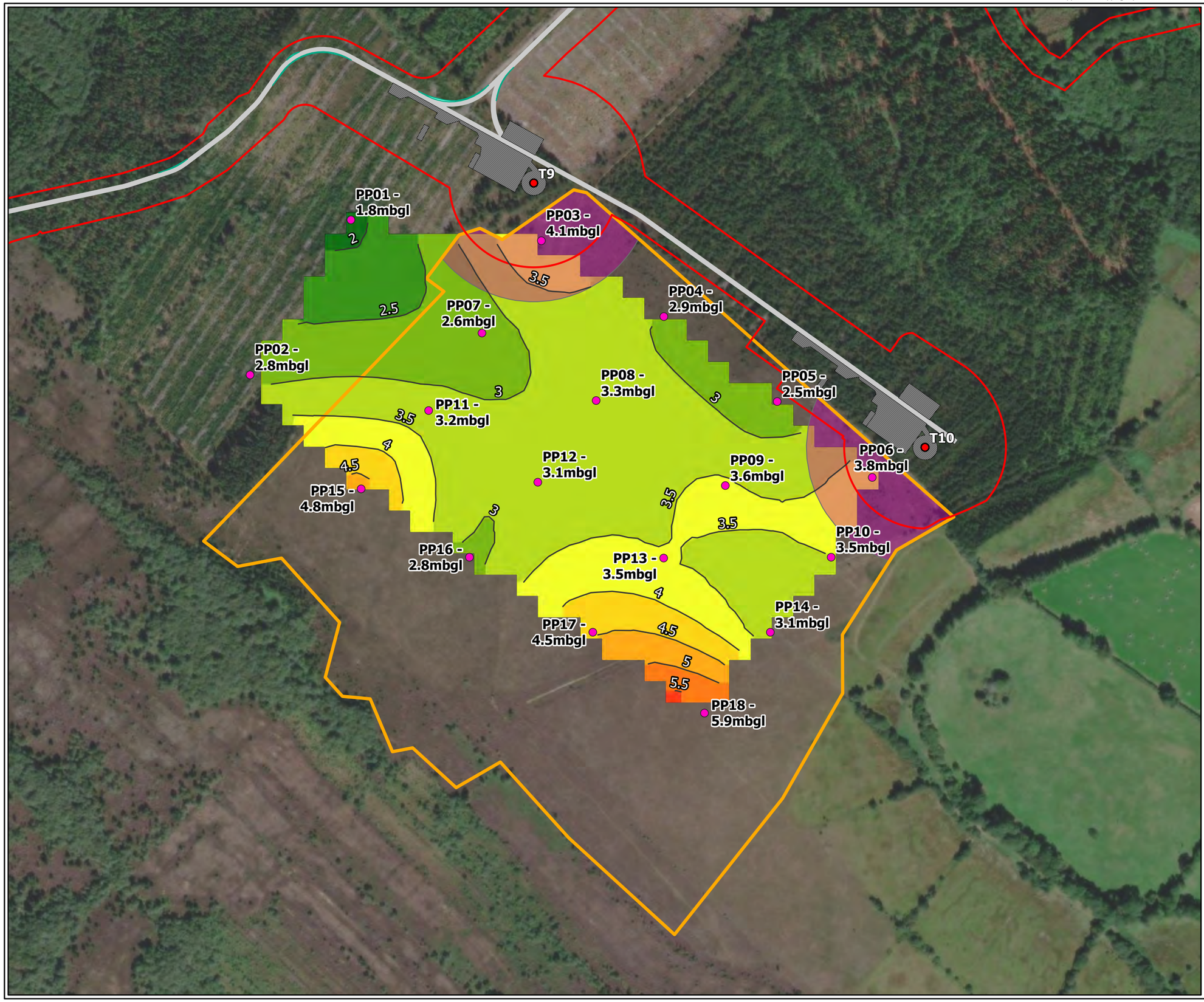
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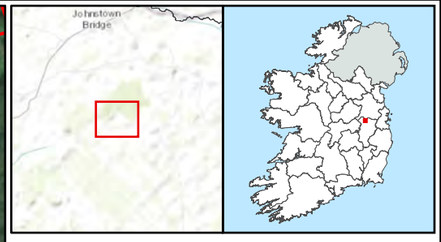
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Legend

- Site Boundary
- Mulgeeth Bog
- T9 and T10 Foundations - 100m Buffer
- Road Widening - Access Tracks
- Access Track
- Turbine Hardstanding

Interpolated Peat Depth Surface (mbgl)

- 1.86 to 2.00
- 2.01 to 2.50
- 2.51 to 3.00
- 3.01 to 3.50
- 3.51 to 4.00
- 4.01 to 4.50
- 4.51 to 5.00
- 5.01 to 5.50
- 5.51 to 5.52
- Interpolated Peat Depth Surface Contours (mBGL)
- Peat Probe Locations and Peat Depths
- Turbines



TITLE:	Peat Depth Contour Plan, Mulgeeth Bog		
PROJECT:	Drehid Wind Farm RFI		
FIGURE NO:	2.9		
CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:3,500	**REVISION:**	0
DATE:	14/10/2026	**PAGE SIZE:**	A3

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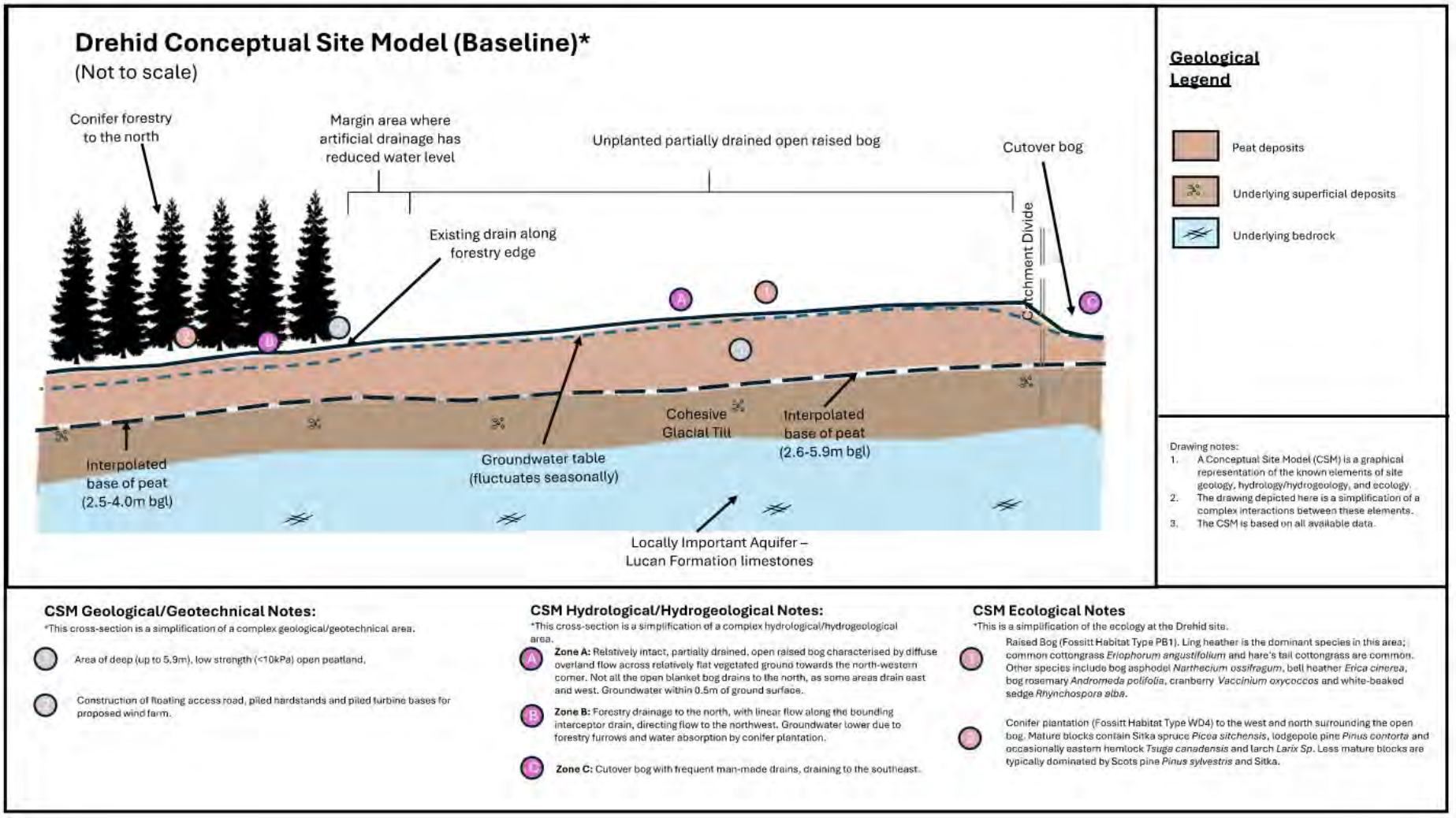


Figure 2-10: Conceptual Site Model (Baseline)

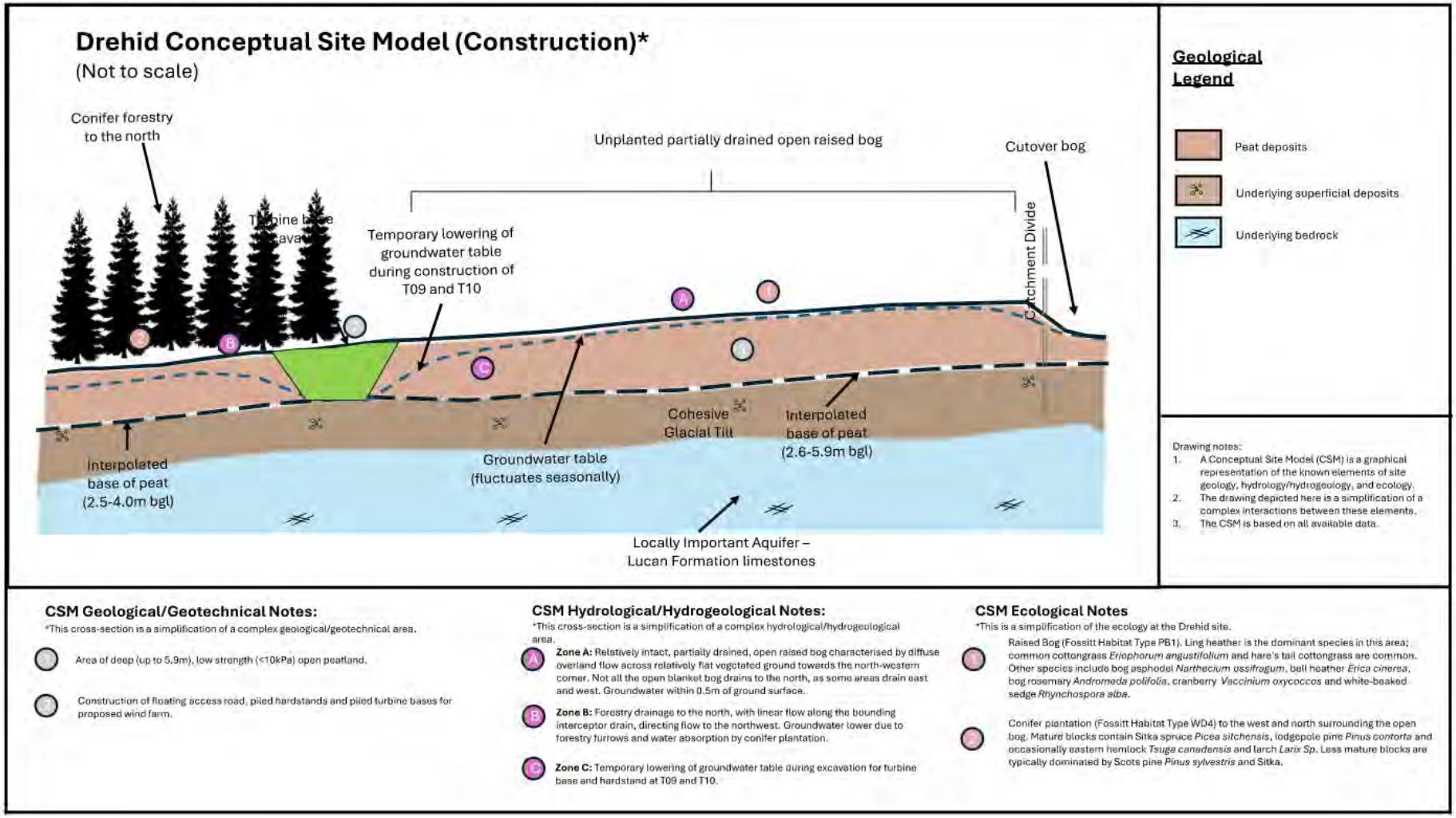


Figure 2-11: Conceptual Site Model (Construction)

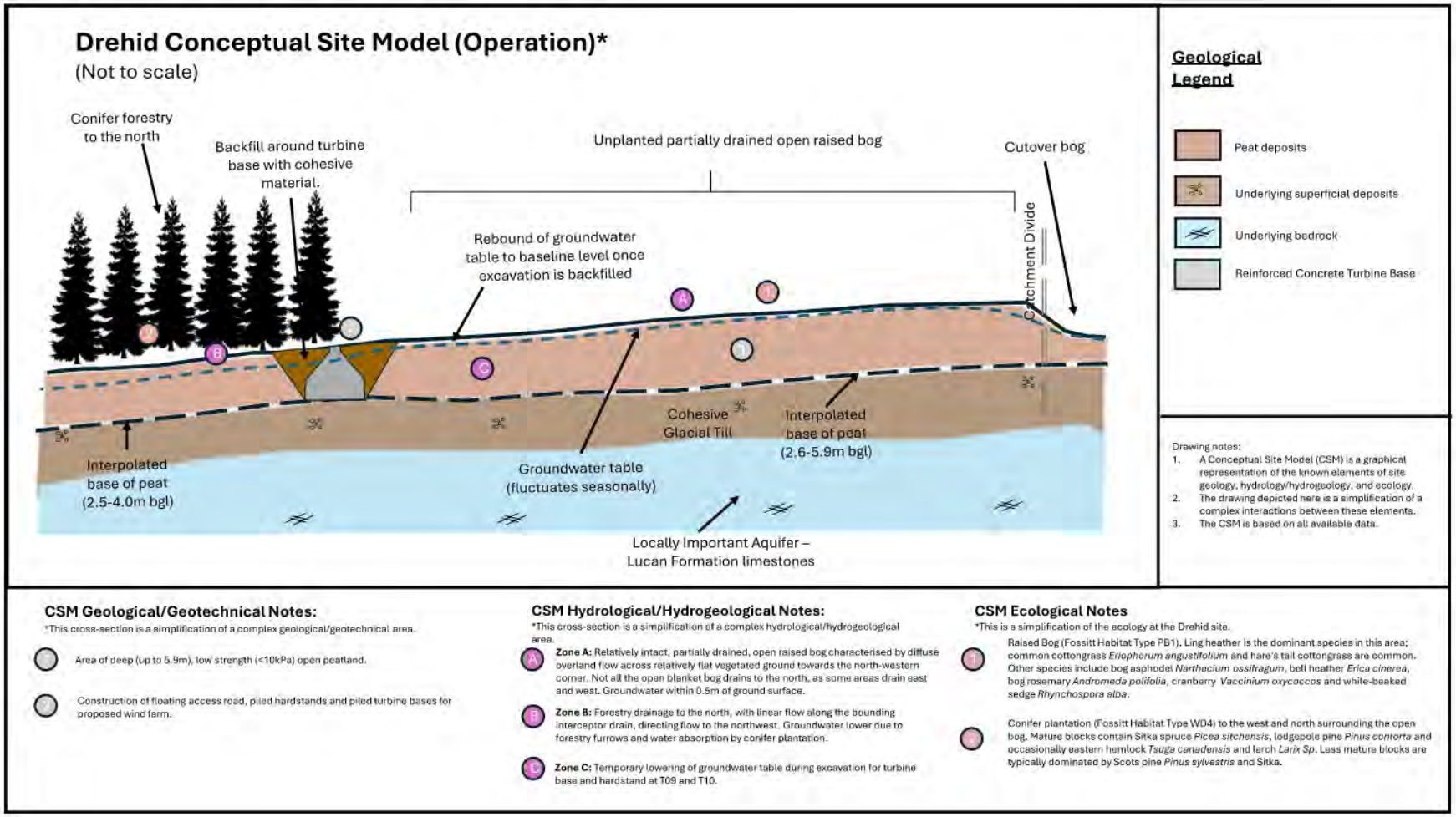


Figure 2-12: Conceptual Site Model (Operation)

2.3.10 *RFI Item e)*

You are requested to provide further information on habitat suitability in the wider environs and landscape connectivity for red squirrel and the likelihood of effectiveness of proposed mitigation to minimise impacts on red squirrel.

2.3.11 *RFI Item e Response:*

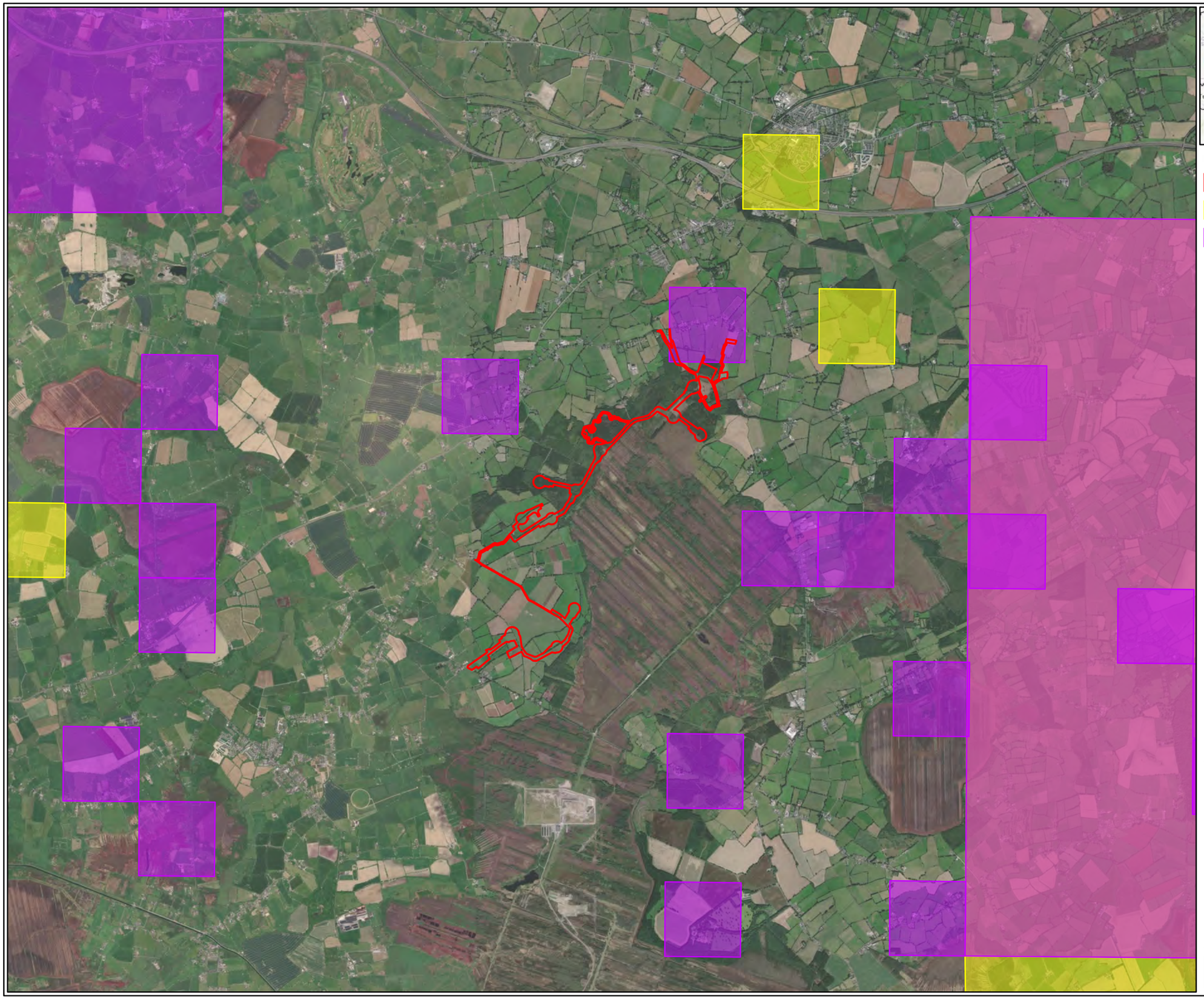
2.3.11.1 Desktop Analysis

Examination of historical records available through the NBDC website indicate the presence of both red and grey squirrel near the proposed development and also further afield, indicating viable connectivity for red squirrel exists between the proposed development and wider region. Blocks of woodland and linear wooded habitats including treelines and hedgerows provide an extensive mosaic of interconnected habitats suitable for red squirrel.

The presence of red squirrel records at Kilshanroe and Coolree (adjacent to the proposed development) occur in parallel with records in areas to the south-east connected by wooded habitats such as Doogary, Mucklon and Hortland. These records, in addition to further records in the wider region provide strong indications that suitable habitat connectivity for red squirrel is present in the area.

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Legend

- Site Boundary
- Grey Squirrel (Sciurus carolinensis)
- Red Squirrel (Sciurus vulgaris)

N
W E
S

Kilometers
0 0.125 0.25 0.5

TITLE:	Red Squirrel and Grey Squirrel Surveys		
PROJECT:	Drehid Wind Farm RFI		
FIGURE NO:	2.13		
CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:50,000	**REVISION:**	0
DATE:	14/10/2026	**PAGE SIZE:**	A3

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2.3.12 Previous Surveys

Previous surveys undertaken between 2017 – 2024 recorded the following signs of squirrel at the proposed development.

A squirrel drey was noted during previous surveys in 2016/17 outside the Proposed Wind Farm boundary north-west of the current proposed T7 turbine location.

During surveys in 2024, squirrel feeding signs in the form of stripped spruce cones were recorded in wooded areas in the north of the Proposed Wind Farm, with the majority of records concentrated in conifer plantation around T6 and T7. One feeding sign was also recorded in conifer plantation north of the proposed substation. These feeding signs were attributed to red squirrel on a precautionary basis. No dreys were observed during these surveys.

2.3.13 Current Baseline Surveys

The mammal survey was updated to provide current information on use of the site by squirrel species. Surveys were undertaken on 09/07/2026, 22-23/07/2026 and 18/08/2026. In addition to searches for field signs, hair traps were also deployed to investigate squirrel activity at the site. A total of six hair traps for squirrels were placed in the vicinity of T6, three of which were placed in trees to target red squirrel and three of which were placed on the ground to target grey squirrels. Surveys were focused on T6 due to the high number of feeding signs noted in this area during previous surveys. The hair traps were constructed from 65mm diameter piping with double sided tape fixed inside at both ends and baited with sunflower seeds.



Figure 2-14: Hair trap placed in willow to target red squirrel

See Figure 2-1 in Appendix 3 for the location of hair traps.

Similarly to previous surveys, abundant squirrel feeding signs in the form of stripped spruce cones were observed in the conifer block where proposed turbine T6 is located. Stripped spruce cones indicative of squirrel feeding were also noted in mixed broadleaved/conifer woodland north-west of T8 during current surveys. Evidence of bark stripping by squirrels was also noted near Hair Trap R3.

No red squirrel hairs were caught in any of the hair traps. All three hair traps for red squirrel contained minuscule droppings identified as pygmy shrew when retrieved. All sunflower seeds had been taken from traps R1 and R2, but not R3. Trap R2 had been filled with moss, indicating an attempt to create a resting place by a bird or small mammal.

Traps G1, G2 and G3 had all seeds removed, and contained grey squirrel hairs. Muddy prints on top of G1 indicated a larger mammal may have interfered with the trap to try and access the seeds. As such, based on current surveys there is no confirmation that red squirrel is present.

The landowner in this area observed a trend over multiple years where large numbers of grey squirrels were initially present, followed by a decrease in grey squirrel numbers and sightings of red squirrels when pine martens began to colonise the area. He noted that more recently, he has not seen many squirrels of either species. Recent trail camera footage and scat confirm that pine martin continue to inhabit the area. These observations align with a widely observed and accepted pattern whereby red squirrel numbers rise when pine martin establish in areas with both red and grey squirrels present. This occurs due to grey squirrels being easier for pine marten to predate, which suppresses their numbers and allows red squirrel populations to recover. Considering the continued presence of pine marten in the area, there is potential for red squirrel numbers to increase in and around the proposed development.

While no confirmation of the presence of red squirrel was obtained during the current survey, the assessment considers this species likely to be present on a precautionary basis due to the presence of suitable habitat and previous records in the surrounding area, continued presence of pine marten and the narrow spatial focus of the hair trap survey.

2.3.13.1 Connectivity and Habitat Suitability

2.3.13.1.1 Habitats in Immediate Environs

An abundance of suitable habitat suitable for red squirrel is present, in both the immediate and wider environs of the proposed development. It is noted that while the habitat loss assessment presented in the EIAR focused only on the land ownership boundary (which itself is larger than the proposed development planning boundary), there are additional areas of woodland beyond the land ownership boundary in the immediate area (see Figure 2-14 below) which contribute to the overall habitat resource for red squirrel in the immediate area.

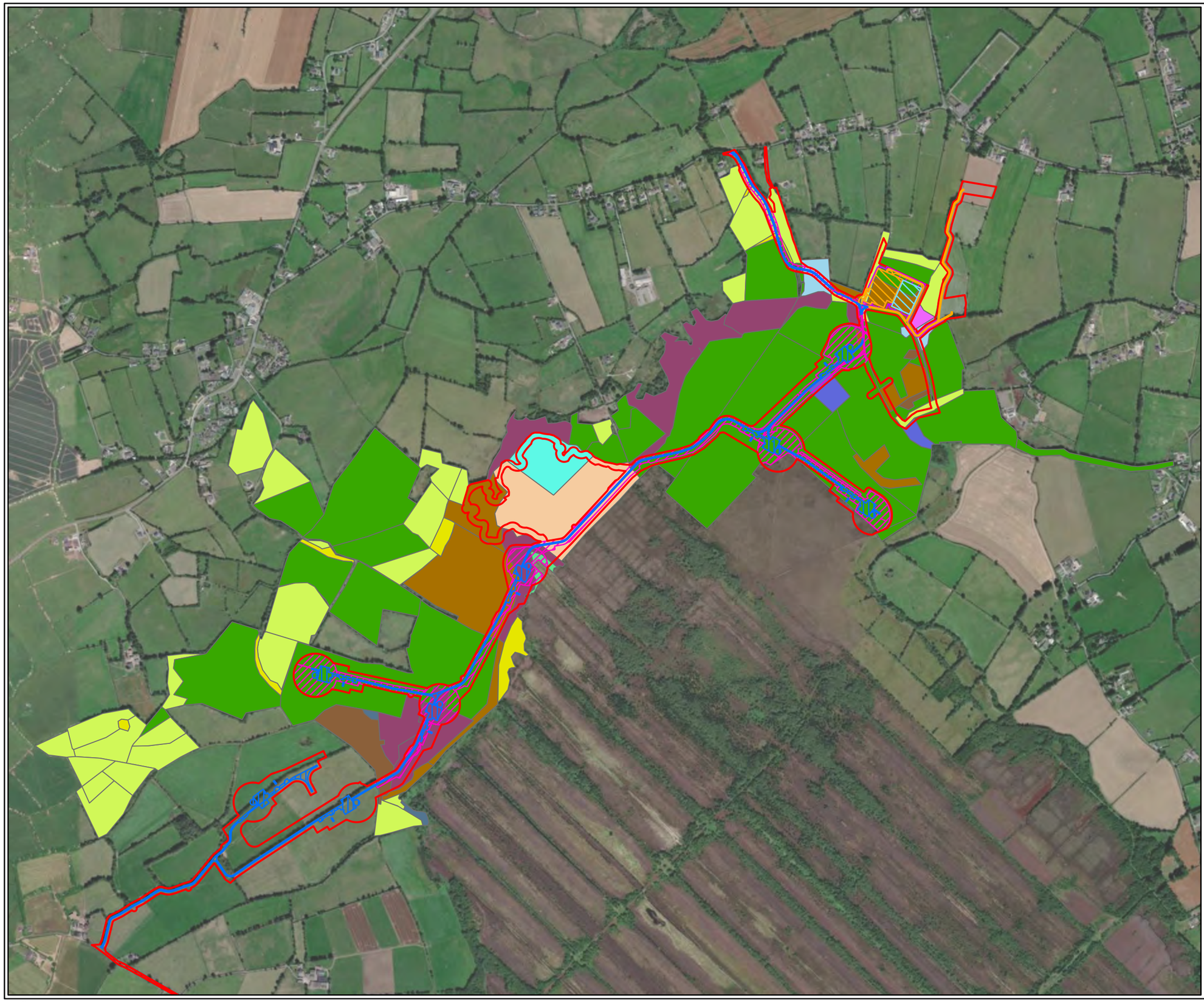
The combined area of all blocks of wooded habitat in which the proposed development is located (see Figure 2-14 below) measure 258.7 ha in area. This excludes the patchy/linear wooded habitats to the south associated with Timahoe Bog (these areas are discussed later in terms of landscape connectivity). The total proposed felling area is 24.4 ha, or 9.4% of the overall area of 258.7 ha of woodland present in the locality noted above. The remaining 90.6% of wooded habitat in the immediate environs provides a suitable mosaic for red squirrel, being comprised of conifer plantation, mixed broadleaved/conifer woodland, broadleaved woodland and other suitable habitats for red squirrel.

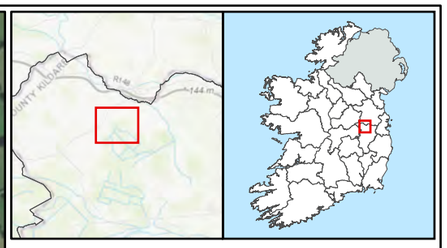
The majority of proposed felling is comprised of commercial conifer plantation (total of 14.9 ha comprised of felling for proposed wind farm/associated buffers, in addition to proposed substation). This area represents c. 5.8% of the of the overall area of 258.7 ha of woodland present in the locality noted above. Commercial conifer plantation is subject to periodic interventions including thinning, harvesting and re-planting, and as such represents a transient habitat which undergoes periodic changes and disturbance as a normal part of it's management.

Considering the relatively small proportion of habitat loss and availability of suitable alternative habitats, the potential effect of habitat loss for red squirrels present in the area is minimal, and similar to the periodic disturbance and habitat changes associated with ongoing forestry management in the area. It is considered unlikely that the carrying capacity of the habitat in this area for red squirrel will be significantly affected, and as such, construction of the proposed development is unlikely to trigger migration of the local population.

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Legend

- Site Boundary
- Wind Farm Felling Outside Infrastructure (Woodland Only)
- Peat Deposition Area Permanent Footprint
- Substation/Grid Felling Outside Permanent Footprint
- Substation/Grid Connection Permanent Footprint
- Wind Farm Permanent Footprint

Woodland Habitats in Immediate Environs

- HD1/WS1 - Dense bracken/Scrub Mosaic
- WD1 - (Mixed) broadleaved woodland
- WD1/WD4 - (Mixed) broadleaved woodland/Conifer plantation Mosaic
- WD2 - Mixed broadleaved/conifer woodland
- WD3 - (Mixed) conifer woodland
- WD3/PB1 - (Mixed) conifer woodland/ Raised Bog Mosaic
- WD4 - Conifer plantation
- WD4/WN7 - Conifer plantation/Bog woodland Mosaic
- WN7 - Bog woodland
- WN7/WS1 - Bog woodland/Scrub Mosaic
- WS1 - Scrub
- WS1/PB1 - Scrub/Raised bog Mosaic
- WS2 - Immature woodland

TITLE:	Red Squirrel Habitat in Immediate Environs
PROJECT:	Drehid Wind Farm RFI
FIGURE NO:	2.15
CLIENT:	North Kildare Wind Farm Ltd.
SCALE:	1:14,500
REVISION:	0
DATE:	14/10/2026
PAGE SIZE:	A3

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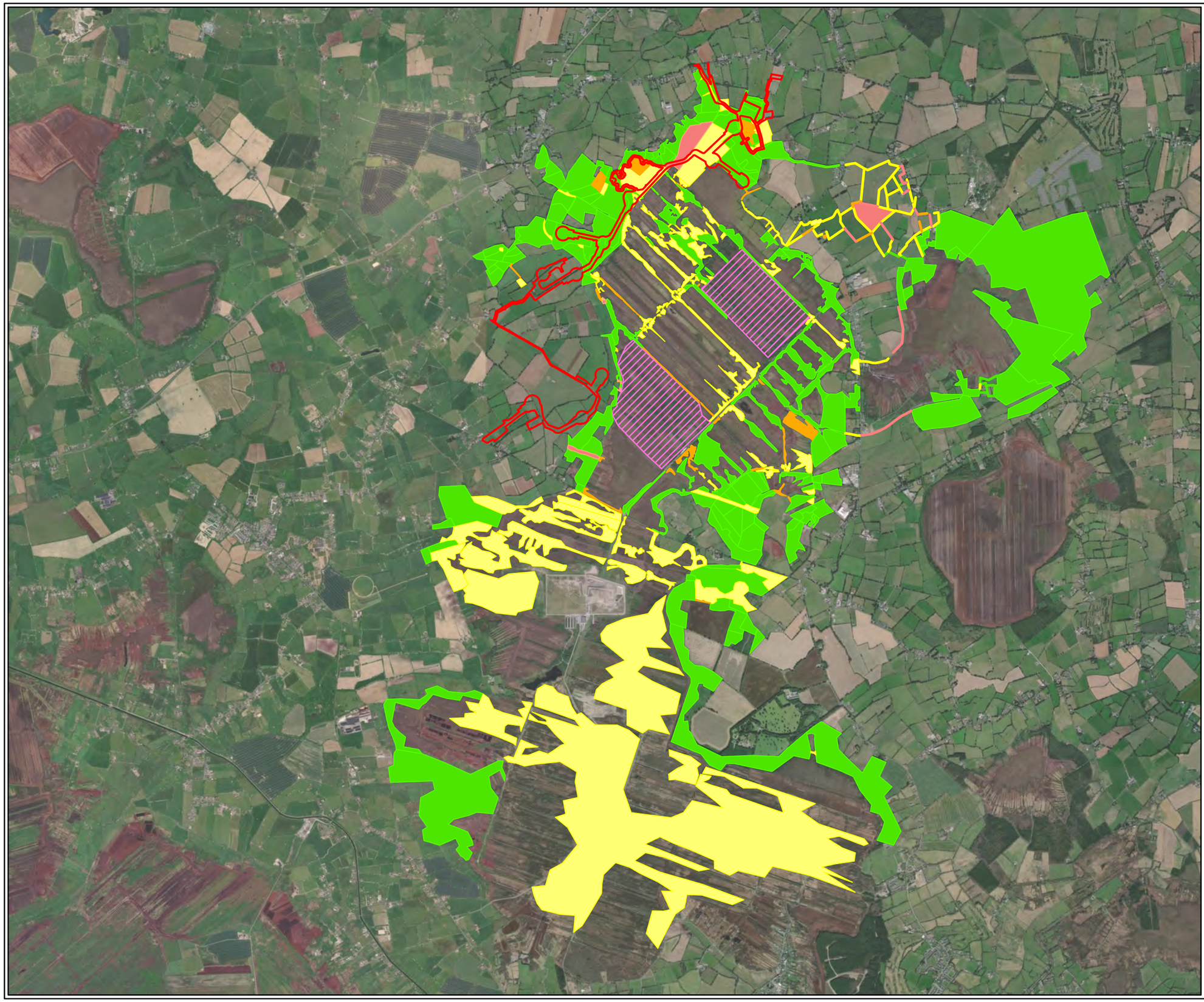
2.3.13.1.2 Habitats in Wider Environs

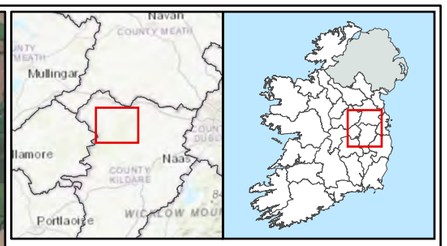
In the event that red squirrels were compelled to move further afield, there are suitable corridors to the south and east which would allow this. When landscape-scale connectivity and availability of suitable displacement habitats in the wider environs are examined, it is evident that a mosaic of suitable habitat corridors comprised of bog woodland, confer plantation, bog woodland, scrub and hedgerow/treelines extends to the south and east, running within and along the margins of Timahoe Bog. The suitability and strength of these connecting habitats varies, with the weakest links comprised of dense bracken or scrub. Weak links are limited however, and the overall formation of landscape features provides multiple routes for red squirrels to move south/east or vice versa, allowing both migration and also population exchange. Corridors of suitable habitat running across Timahoe North Bog remain in place following construction of the Timahoe North Solar Farm. As such, construction of this solar farm has not cut off connectivity for red squirrel potentially migrating along the strips of wooded habitat running through this bog. See Figure 2-16 for a detailed map of wooded and closed habitats suitable for red squirrel in the wider region. The connectivity strength of individual features is depicted on Figure 2-15.

The types of wooded habitat present in the wider region are shown on Figure 2- 14. This demonstrates that blocks of suitable wooded habitat and mosaics including broadleaved woodland and conifer plantation are widespread in the region and are interconnected via a network of wooded corridors and hedgerows. The cutover bogs in the region provide both connectivity and suitable habitats, with naturally both established birch woodland in both linear and extensive forms and conifer plantations being concentrated in these areas. Some connectivity also exists via hedgerows running through agricultural lands. When the proposed felling extent (24.4 ha) is placed in the context of this area of mapped suitable habitat in the wider environs (1,848 ha in extent), it represents just 1.3% of suitable habitat in the wider environs.

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Legend

- Site Boundary
- Timahoe North Solar Footprint

Connectivity Strength

- High
- Mod-High
- Moderate
- Low-Mod
- High
- Mod-High
- Moderate
- Low-Mod

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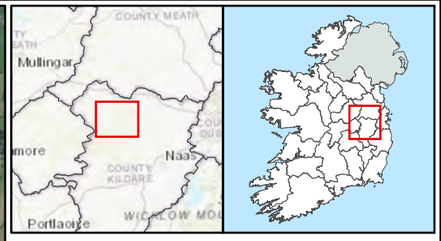
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TITLE:	Habitat Connectivity for Red Squirrel in Wider Environs		
PROJECT:	Drehid Wind Farm RFI		
FIGURE NO:	2.16		
CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:45,000	**REVISION:**	0
DATE:	14/10/2026	**PAGE SIZE:**	A3

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Legend

- Site Boundary
- Timahoe North Solar Footprint

Woodland/Closed Habitat Type

- Broadleaved
- Broadleaved/Scrub
- Conifer
- Conifer/Scrub
- Dense Bracken
- Hedgerow
- Hedgerow/Treeline
- Mixed Conifer/Broadleaved
- Scrub
- Scrub (Riparian)
- Scrub/Dense Bracken
- Hedgerow
- Hedgerow/Treeline
- Treeline

N W E S

0 0.5 1 2 Kilometers

TITLE:	High Level Habitats for Red Squirrel Wider Environs		
PROJECT:	Drehid Wind Farm RFI		
FIGURE NO:	2.17		
CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:41,000	**REVISION:**	0
DATE:	14/10/2026	**PAGE SIZE:**	A3

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These maps are not exhaustive; further suitable habitats and connected corridors are present further afield. It is not practicable to continue mapping the habitat network indefinitely and as such a sample area covering connected habitats in the local region has been mapped. Mapping was undertaken using GIS and recent aerial imagery, and confirmed during site visits undertaken on 22-23/07/2026 and 18/08/2026.

While the proposed development would open a gap in woodland connectivity along a north-east to south-west axis associated with proposed access tracks and turbines, this gap would reduce during the operational phase, reducing potential effects over time. The longest sections of gaps are associated with proposed access tracks, and would average between 27 – 30m at the time of construction due to felling buffers and peat deposition berms. During the operational phase, these gaps will reduce through a combination of tree planting and natural revegetation, reducing the gaps created by access tracks to the track width (4.5m), which is similar to the existing baseline that includes the network of forestry tracks at the site.

The creation of these gaps during the construction phase will result in limited habitat fragmentation, although the majority of the wooded area in which the proposed development is located will not be affected due to the location of most infrastructure along the southern margins. Similarly, connectivity for in or out-migrating squirrels would be reduced over the short term prior to revegetation of the access track margins.

As noted above, it is not considered likely that the proposed development will cause habitat loss, fragmentation or disturbance at sufficient magnitude to cause red squirrels potentially inhabiting the area to leave. Considering the factors discussed above, a *Long-term Slight* Reversible effect at the Local scale is predicted for red squirrel in terms of habitat loss, fragmentation or disturbance.

2.3.13.2 Mitigation & Enhancement

The proposed mitigation to avoid effects on red squirrel is considered to be robust and fit for purpose, which is specifically to avoid injury or disturbance to red squirrels during their breeding season. The proposed mitigation comprises a restriction on felling during periods when red squirrel may have young in dreys (peak period January to March), or if felling is required during January to March, surveys by a qualified ecologist to determine whether any occupied dreys are present. If necessary, a license under the Wildlife Act will be sought.

It is proposed to replant hedgerows outside the margins of turbine felling buffers in open agricultural habitats. This measure will also benefit red squirrel by maintaining landscape connectivity over the long term.

As part of the construction phase, excavated peat will be reused to construct berms. In order to further enhance site biodiversity, berms located in wooded areas outside bat felling buffers will be planted with native whips using the following mix: 20% downy birch (*Betula pubescens*), 10% holly (*Ilex aquifolium*), 15% rowan (*Sorbus aucuparia*), 20% scots pine (*Pinus sylvestris*), 10% pedunculate oak (*Quercus robus*), 10% sessile oak (*Q. petraea*) and 15% willow (*Salix cinerea*). This measure will also benefit red squirrel by reducing habitat fragmentation over the long term.

2.3.14 RFI Item f)

You are requested to review the extent of felling proposals particularly with respect to mature broadleaved vegetation due to the scarcity of such habitat in the wider environs.

2.3.15 *RFI Item f Response:*

2.3.15.1 Habitat Areas

The proposed layout design sought to minimise tree felling and has avoided higher-value habitats such as mature broadleaved woodland as much as possible.

As detailed in EIAR Sections 8.9.1.3.1 and 8.9.1.4, loss of woodland habitat associated with the proposed wind farm and substation is comprised primarily of lower value conifer plantation: 14.91 ha (60 %) of the overall proposed wooded habitat loss associated with the proposed wind farm and substation (24.85 ha) is conifer plantation.

When mixed broadleaved/conifer woodland is included to give the overall figure for loss of artificial wooded habitats dominated by conifers (19.88 ha), the percentage of overall wooded habitat loss represented by planted conifer-dominated habitats is 80 %.

Areas of wooded habitat proposed to be felled which include broadleaved trees are overwhelmingly characterised by an absence of mature trees, being comprised of either immature broadleaved plantation, mixed conifer/broadleaved plantation where the broadleaved element is dominated by self-seeded birch trees, or bog woodland dominated by semi-mature and mature birch trees. Commercial conifer plantation (including the mixed conifer/broadleaved plantation at the proposed development) is subject to periodic interventions including thinning, harvesting and re-planting, and as such represents a transient habitat which undergoes periodic changes and disturbance as a normal part of it's management.

A total of 171.12 ha of wooded habitats are present within the habitat survey study area. This is dominated by commercial plantations including WD4 Conifer plantation (95.53 ha) and WD2 Mixed broadleaved/conifer woodland (26.93 ha) with this combined total of 122.46 ha representing 71.6 % of wooded habitat cover within the study area.

The next largest areas of wooded habitat types within the study area are WD3 (Mixed) Conifer woodland (12.13 ha) and WD1 Mixed broadleaved woodland (11.66 ha). The total area of mature broadleaved woodland within the study area (see Areas 1-6 on Figure x) is 5.90 ha. The remaining 5.76 ha of WD1 is comprised of immature oak plantation (affected by proposed felling) along the proposed northern access track and semi-mature low-growing woodland which has recolonised a former agricultural field east of T4 (not affected by proposed felling).

The majority of proposed felling is comprised of commercial conifer plantation (WD2 and WD4), which are subject to periodic felling during the normal course of commercial forestry management.

Proposed felling would affect three marginal areas of mature broadleaved woodland (see Areas 1, 2 and 3 described below and mapped in Figure 2-17). Together, these areas account for 0.43 ha (49.4 %) of all proposed felling of (Mixed) broadleaved woodland. The remainder of felling affecting this habitat is comprised of immature oak plantation near the northern site access route and a stand of birch trees growing between conifer plantation and existing access track just south-east of the proposed substation.

Please note that the boundary between two areas of WD3 (Mixed) Conifer woodland and WD2 Mixed broadleaved/conifer woodland was redrawn based on refinement of habitat mapping arising from current surveys. This has resulted in an increase of 3.73 ha in the total extent of WD2, and a reduction in the total extent of WD3. These changes in total extent of these habitat types within the study area, in addition to related effects on percentages of habitat loss are accounted for accordingly in Table 2-33.

Table 2-32: Wooded habitat and proposed felling extents

Habitat	Total Extent of Habitat within Study Area	Area loss in Hectares (ha)/Length in metres	Percentage Loss of Total Habitat Type within Survey Area
WD4 Conifer plantation	95.53 ha	13.82 ha (wind farm) 1.09 ha (substation)	14 % 1 %
WD2 Mixed broadleaved/conifer woodland	26.93[2] ha	3.25 ha (wind farm) 1.72 ha (substation)	12 % 6 %
WD3 (Mixed) Conifer woodland	12.13[3] ha	1.32 ha (wind farm)	11 %
WS2 Immature woodland	2.08 ha	0.32 ha (wind farm)	15 %
WN7 Bog woodland	9.71 ha	1.31 ha (wind farm)	13 %
WS1 Scrub	0.06 ha	0.04 ha (wind farm)	63 %
WS2 Immature woodland	2.08 ha	0.15 ha (substation)	7 %
WN7/WS1 Bog woodland/Scrub Mosaic	4.66 ha	0.16 ha (wind farm)	3 %
WD4/WN7 Conifer plantation/Bog woodland Mosaic	1.87 ha	0.18 ha (wind farm)	9 %
WD1 Mixed broadleaved woodland	11.66 ha	0.65 ha (wind farm) 0.22 ha (substation)	6 % 2 %
WS1/PB1 Scrub/Raised bog Mosaic	0.49 ha	0.33 ha (wind farm)	67 %
WS1/GS2 Scrub/Dry meadows & grassy verges Mosaic	0.81 ha	0.29 ha (wind farm)	35 %
WL1 Hedgerows	4,256 m	16 m (wind farm)	0.4 %
WL2 Treelines	2,330 m	70 m (wind farm)	3 %
WL1/WL2 Hedgerows/Treelines Mosaic	12,845 m	690 m (wind farm)	5 %

[2] The total area of WD2 has increased by 3.73 ha from the previous figure of 23.20 ha due to refinement of habitat mapping in an area outside the proposed development footprint (see Appendix 3)
[3] The total area of WD3 has decreased by 3.73 ha from the previous figure of 15.86 ha due to refinement of habitat mapping in an area outside the proposed development footprint (see Appendix 3)

2.3.15.2 Mature Broadleaved Woodland within Study Area

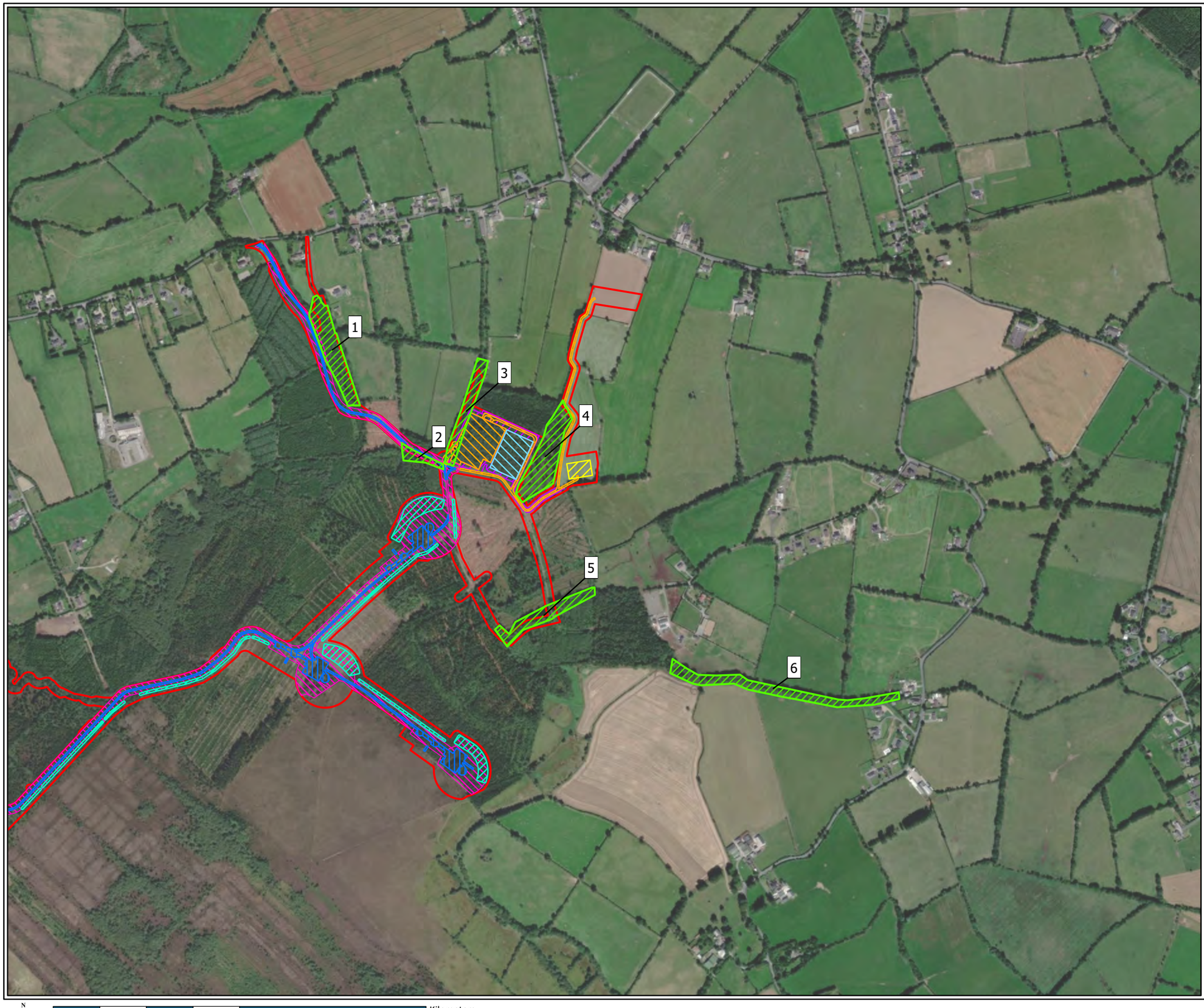
The northern area of the proposed development site supports woodland habitats. As such, proposed turbines 6 – 11, associated access tracks and other infrastructure in the north of the site are all located within woodland. The remainder of the proposed development is located within agricultural land which lacks woodland habitats. As such, discussion of mature broadleaved woodland is restricted to the northern part of the site.

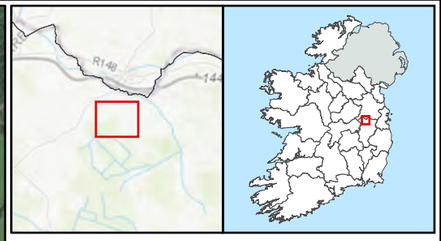
The following section details the blocks of mature broadleaved woodland present in the northern part of the habitat survey study area. These are the only areas of mature broadleaved woodland within the habitat survey study area. The location and extent of these areas are mapped below in Figure 2-17.

The presence of non-Annex I bog woodland at varying stages of maturity is also noted; however, this type of woodland is an early successional stage colonising drained and cutover peatland. The downy birch trees which dominate this habitat are fast-growing and short-lived pioneer species and as such these woodlands represent the early stages of woodland establishment rather than mature broadleaved woodland.

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Legend

- Site Boundary
- Mixed Broadleaved Woodland
- Substation/Grid Felling Outside Permanent Footprint
- Substation/Grid Connection Permanent Footprint
- Peat Deposition Area Permanent Footprint
- Substation/Grid Connection Temporary Compound
- Wind Farm Felling Outside Permanent Footprint
- Wind Farm Permanent Footprint
- Wind Farm Berm Footprints in Open Habitats

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TITLE:	Mature Broadleaved Woodland - Item F		
PROJECT:	Drehid Wind Farm RFI		
FIGURE NO:	2.18		
CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:10,000	**REVISION:**	0
DATE:	14/10/2026	**PAGE SIZE:**	A3

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2.3.15.2.1 Area 1

The linear area of mixed broadleaved woodland along the existing Coillte access track (Area 1) is depicted as woodland in 1st edition OS mapping (1829-1842) but is not included in the inventory of ancient and long-established woodland (Perrin et al., 2010). Since it was not identified as ancient woodland during national surveys (Perrin et al., 2008; 2010), it is likely that this block of woodland was originally planted. This is corroborated by the presence of ash and oak trees of similar age along the existing Coillte access track. While this block is likely to have been planted originally, it has acquired semi-natural characteristics over time, including growth of self-seeded trees and typical woodland ground flora and shrubs including pignut *Conopodium majus*, enchanter's nightshade *Circaea lutetiana*, guelder rose *Viburnum opulus*, and false brome *Brachypodium sylvaticum.* These species were recorded along the existing Coillte track margins, where a higher diversity of ground flora was attributed to the access track mimicking the more open conditions found in woodland clearings. This is reinforced by the presence of other non-woodland specialist species including selfheal *Prunella vulgaris* and common figwort. The more enclosed area making up the western side of this block has lower diversity of ground flora, with brambles and leaf litter dominating.

This block would be affected by limited felling on it's western margin associated with the proposed turbine delivery access track buffer. The felling proposed in this area is marginal, limited in extent and will not result in any habitat fragmentation. It is assessed that one larger/mature tree may need to be felled on the western margin, with the remainder of clearance limited to branch trimming or removal of smaller trees. The total area of this mixed broadleaved woodland block which would be affected is 0.077 ha or 5.7% of the overall extent of this stand (total area = 1.35 ha). This equates to 0.04% of the total extent of wooded habitats within the habitat survey study area or 1.3% of the total area of mature broadleaved woodland comprised of Areas 1-6.

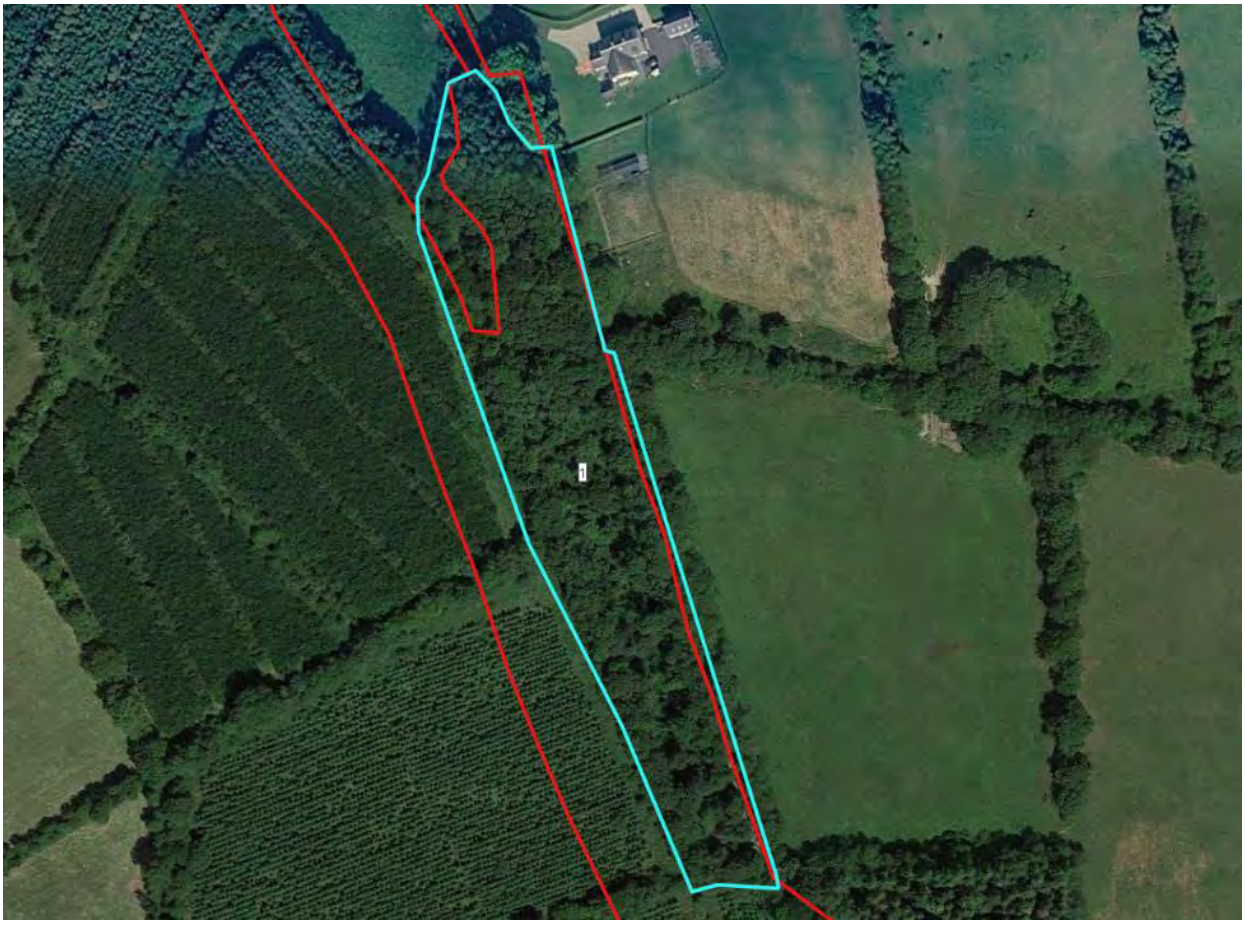


Figure 2-19: Area 1 highlighted in blue

2.3.15.2.2 Area 2

A small stand of mixed broadleaved woodland beside an existing access track (Area 2) will also be affected by the proposed turbine delivery access track felling buffer. A total of 0.13 ha (50%) of this 0.26 ha stand would be affected by proposed felling (representative of 0.08% of the total extent of wooded habitats within the habitat survey study area or 2.2% of the total area of mature broadleaved woodland comprised of Areas 1-6).

This proposed felling is anticipated to affect only two larger/mature trees adjacent to the existing track, with two larger/mature trees further back being retained and the remainder of felling being limited to smaller trees. This area is not depicted as woodland in 1st edition OS mapping (1829-1842) and as such is of relatively recent origin and is not long-established woodland. This recently established small woodland block is likely to have developed when self-seeded trees established in an unmanaged/unplanted marginal area between the existing access track and surrounding forestry blocks.



Figure 2-20: Area 2 highlighted in blue

2.3.15.2.3 Area 3

The linear stand of mixed broadleaved woodland which includes ash, willow, birch and Scot's pine running along the western margin of the proposed substation (Area 3) is formed by a mature treeline bordering the field to the west and more recent growth of self-seeded trees between this treeline and the conifer plantation (WD2 and WD4) to the east. This is evident in aerial imagery from 1995[4] and aligns with habitat surveys. An access track runs through this woodland, connecting with the L5012 to the north. This area is not depicted as woodland in 1st edition OS mapping (1829-1842) and is not characterised by mature specimen trees such as those found in Areas 4, 5 and 6. As such, it is relatively recently established. The access track is depicted running through open fields to the east and west in the 1st edition OS mapping.

This area of mixed broadleaved woodland would also be affected by proposed felling for the substation footprint and associated buffer. A total of 0.22 ha (26.6% of 0.84 ha total of Area 3) of this mixed broadleaved woodland is proposed to be felled. This equates to 0.13% of the total extent of wooded habitats within the habitat survey study area or 3.7% of the total area of mature broadleaved woodland comprised of Areas 1-6.

The design of the proposed substation was constrained as far as possible to minimise felling of this habitat and maintain connectivity of the wider woodland habitat network. As such, proposed felling of the substation is limited to the eastern margin and southern section of this woodland block. The area of this woodland block with the highest land take for the proposed substation is the southern end overlapped by proposed access routes to the substation. Following construction, existing trees along the field boundary will remain in place maintaining woodland connectivity. In a short section at the south of Area 3, woodland connectivity would be limited to the retained treeline following felling. In the majority of Area 3 to the north, the retained woodland following felling would have a width of 14m – 27m to the west of the substation, increasing in width from south to north.

[4] Geohive Map Viewer [accessed 09/10/2026]
https://www.arcgis.com/apps/webappviewer/index.html?id=3ae19cc156bf4706a929304bf8fcc4f6



Figure 2-21: Area 3 highlighted in blue

2.3.15.2.4 Area 4

The woodland blocks with the most mature broadleaved trees have been avoided by the proposed layout. This includes the stand of mature broadleaved woodland east of the proposed substation (Area 4). This stand is dominated by mature pedunculate oaks. Mature beech and birch trees area also present. Oak saplings, dense thickets of birch saplings and brambles are present in the shrub layer.

The proposed substation and grid connection layout was designed specifically to avoid felling of mature trees in this stand, which is depicted as woodland in 1st edition OS mapping (1829-1842). As such, this stand will not be affected by proposed felling as no trees shall be removed.



Figure 2-22: Area 4 highlighted in blue

2.3.15.2.5 Areas 5 and 6

The avenues comprised of mature beech trees (areas 5 and 6) are not overlapped by or adjacent to any proposed felling areas and therefore no trees shall be felled or trimmed within either of these areas as a result of the proposed development.



Figure 2-23: Area 5 highlighted in blue



Figure 2-24: Area 5 highlighted in blue

2.3.15.3 Summary of woodland habitats

In summary, proposed felling will primarily affect conifer plantations and immature or pioneer (birch) woodland rather than woodland comprised of mature broadleaved trees. A total of 0.43 ha of broadleaved woodland which includes larger/mature trees will be affected by proposed felling. This represents just 7.3% of the mature broadleaved woodland on site and just 0.2% of the combined coverage of wooded habitat types within the study area. It is also noted that while proposed felling would affect some mature broadleaved trees, all of the longer-established larger broadleaved trees i.e. the trees along the existing Coillte track (eastern margin of Area 1), the mature oaks and beeches in Area 4 and the beech avenues making up Areas 5 and 6 have been avoided.

2.3.15.4 Linear Habitat

The proposed linear habitat loss discussed under two separate headings below due to the different characteristics and origins of treelines/hedgerows in agricultural lands vs. self-seeded treelines which have grown along access track margins and emerged after adjacent conifer plantation was felled.

2.3.15.4.1 Hedgerows/Treelines in Agricultural Land

The details of the proposed treeline/hedgerow felling (including broadleaved trees) assessed in EIAR Sections 8.9.1.3 and 8.9.1.4 are reproduced above in Table 2-33. The dominant species in linear wooded habitats is typically ash, with mature beech trees also present in some sections. These larger trees are interspersed with or alternate with sections of lower-growing trees including wild plum, hawthorn and holly, while other species including bramble, guelder rose and field rose form an understory thicket.

The amount of broadleaved felling associated with linear habitats is relatively minor when assessed in the context of the extensive network of hedgerows/treelines comprised of mature broadleaved trees which exists in the wider environs of the proposed development.

The total length of linear wooded habitat proposed to be removed is 776m, comprised of 16m of hedgerow (0.4% of total hedgerows in study area), 70m of treeline (3% of total treelines in study area) and 690m of hedgerow/treeline mosaic (5% of total in study area). These lengths are primarily comprised of felling for turbine handstands and provision of vegetation-free buffers for bats around proposed turbines in accordance with NatureScot (2025) and Bat Conservation Ireland (2026) guidance.

The majority of linear habitat felling is associated with field boundaries. As detailed above, the total length of linear habitat felling represents a relatively small proportion of the habitat within the study area. When the scale of assessment is expanded beyond the site, the proportion of linear broadleaved felling and associated effects shrinks even further. Mature hedgerows/treelines with large mature broadleaved trees are common in this part of Kildare, and as such it cannot reasonably be asserted that these habitats are scarce in the wider environs.

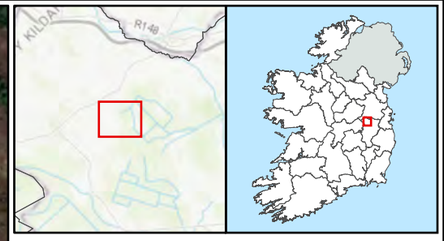


Figure 2-25: WL1/WL2 Hedgerows/Treeline Mosaic

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World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA
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Legend

- Proposed Development Boundary
- Linear Wooded Habitat Within Bat Felling Buffers
- Turbines

TITLE:	Linear Habiat Felling - Item F		
PROJECT:	Drehid Wind Farm RFI		
FIGURE NO:	2.26		
CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:10,000	**REVISION:**	0
DATE:	14/10/2026	**PAGE SIZE:**	A3

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2.3.15.4.2 Treelines in Coillte Lands

Two treelines left behind after felling of adjacent conifer plantation are present near the proposed T11 and would be affected by the proposed T11 bat felling buffer. These are comprised of oak, ash and birch.

It is noted that the oak treelines within the T11 felling buffer does not contain any veteran or mature trees, and felling would only affect a total of four oak trees. The treeline sections overlapped by the T11 felling buffer are comprised of two sections, one made up of two oaks, one ash and one birch, and the other formed from three oaks.

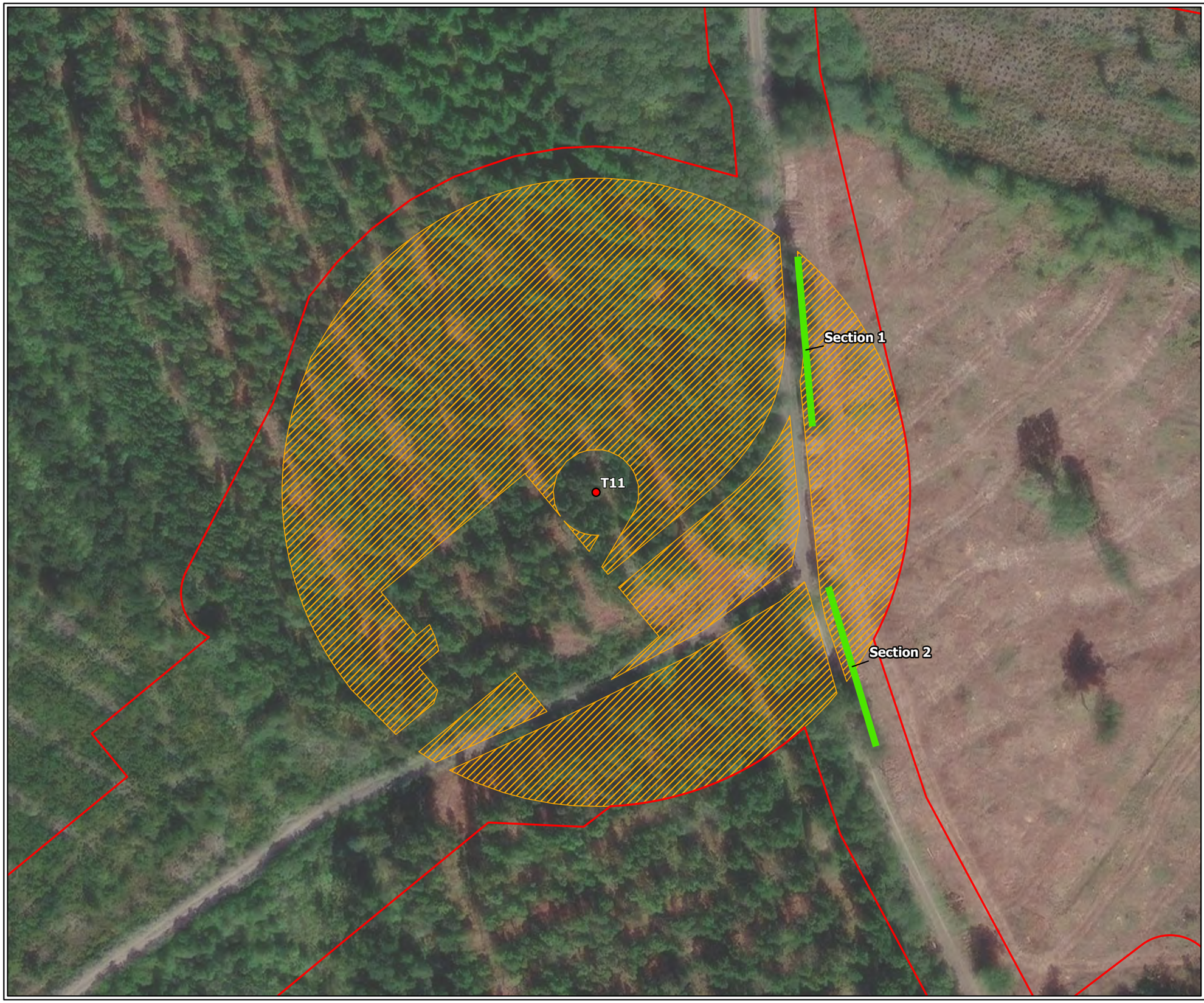
The two oaks within the first section are respectively 10m and 12m tall, and are c. 30-40 years old, making them barely mature. Both of these trees would be felled.

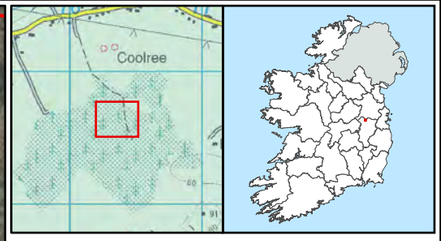
The three oaks in the second section are respectively 10m, 7m and 4m tall, with the 10m and 7m trees also being c. 30-40 years old and the 4m tree being younger, c. 10 – 15 years old. The 10m and 4m trees are proposed to be felled. The 7m tree is outside the T11 bat felling buffer.

These trees grew alongside a block of conifer planation which has since been felled, leaving the oaks standing to form a treeline. As such, they are not old trees and do not represent a long-established treeline. Due to their relatively young age and small girth, they are not mature trees.

World Imagery: Microsoft, Vantor
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA
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Legend

- Proposed Development Boundary
- Felling for Bat Buffers
- WL2 - Treelines
- Turbines

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TITLE:	Treelines overlapped by T11 90m Felling Bat Buffer		
PROJECT:	Drehid Wind Farm RFI		
FIGURE NO:	2.27		
CLIENT:	North Kildare Wind Farm Limited		
SCALE:	1:1,000	**REVISION:**	0
DATE:	22/10/2026	**PAGE SIZE:**	A3

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Figure 2-28: 10m Oak in section 1



Figure 2-29: 12m Oak in section 1



Figure 2-30: Three Oaks forming section 2

2.3.15.5 Proposed Tree Planting

Proposed hedgerow and treeline planting as described in EIAR Section 8.10.1.4 specifies planting of native species of native provenance. It is noted that trees of local provenance are not always available; however, if the board desires, trees of local provenance can be sought as a first preference.

New hedgerows will be planted along the outer perimeter of turbine buffers at T1, T2, T4 and T5 within the proposed wind farm site to mitigate linear wooded habitat loss and enhance and maintain connectivity in the agricultural landscape. Ash is not currently proposed to be used due to it's vulnerability to ash dieback disease (ADB). However, if proven ADB resistant varieties of ash are available at the time of planting they can be used, in addition to other large-growing native species such as Alder and Oak. Smaller thicket-forming species such as elder, hazel and blackthorn will also be planted. Semi-mature specimens (heavy standard size) of native provenance will be included to accelerate establishment of new linear wooded habitats.

As part of the construction phase, excavated peat will be reused to construct berms. In order to further enhance site biodiversity, berms located in wooded areas outside bat felling buffers will be planted with native bog woodland whips. These planted berms will add to the existing linear habitats in the area and will provide further foraging, cover and commuting habitat for mammals and other fauna.

Within wooded areas, bog woodland bare root whips (60-90cm in height), sourced from native stock and disease free will be planted on selected berms outside bat felling buffers. Whips will be planted at 1m centres with the following mix: 20% downy birch (*Betula pubescens*), 10% holly (*Ilex aquifolium*), 15% rowan (*Sorbus aucuparia*), 20% scots pine (*Pinus sylvestris*), 10% pedunculate oak (*Quercus robus*), 10% sessile oak (*Q. petraea*) and 15% willow (*Salix cinerea*). Rabbit/hare protection will be put in place alongside weed suppressing leaf mulch. Any whips that die will be replaced (during the operational phase).

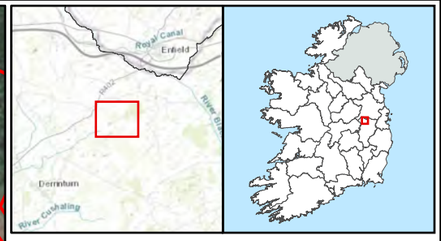
The total area of berms outside bat felling buffers proposed to be planted with broadleaved species as described above is 2.49 ha, which exceeds the proposed are of mixed broadleaved woodland felling (0.87 ha) by 1.62 ha.

These berm areas proposed to be used for tree planting are shown in Figure 2-20 below.

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Legend

- Proposed Development Boundary
- Broadleaved Planting on Berms (Outside Bat Felling Buffers)
- Turbines

TITLE:	Broadleaved Planting on Berms Outside Felling Bat Buffers		
PROJECT:	Drehid Wind Farm RFI		
FIGURE NO:	2.31		
CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:8,000	**REVISION:**	0
DATE:	22/10/2026	**PAGE SIZE:**	A3

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2.3.15.6 Conclusion

When the proposed felling is examined in detail, it is evident that felling of mature broadleaved trees represents a very small proportion of the overall felling area. Within the category of (Mixed) Broadleaved woodland, a total of 5.76 ha (49.4%) of the total for this habitat type within the study area is comprised of immature oak plantation along the proposed northern access route. The remaining 5.9 ha (50.6%) of the total for this habitat type within the study area is comprised of woodland which contains some mature broadleaved trees (of varying stages of maturity).

The extent of each of these categories which would be affected by proposed felling are respectively 0.44 ha for immature oak plantation, and 0.43 ha for woodland containing mature broadleaved trees. The total proposed felling of areas with mature broadleaved trees equates to just 6% of the total area (5.9 ha) supporting this category within the study area.

The extent of proposed felling for areas with mature broadleaved trees represents just 1.7 % of the total proposed felling area (24.85 ha) (which is dominated by intensively managed conifer plantations), and just 0.2 % of the total wooded habitat areas within the study area (171.1 ha).

2.3.16 *RFI Item g)*

You are requested to review the impact of the amenity trail in the context of cumulative loss of woodland habitat, habitat fragmentation, edge effects, wildlife disturbance and displacement.

2.3.16.1 RFI Item g Response:

The proposed amenity trail utilises the proposed and existing access tracks running through the site.

The 'entrance trail' and 'looped walk' sections of the proposed amenity trail both utilise existing forestry tracks which are already used by walkers[5].

The 'windfarm walk' will utilise both existing access tracks (350m to be upgraded) and new sections of access track which will serve the proposed turbine locations T8-T11. See Figure 2-21 for identification of individual trail sections.

The 'woodland walk' section of the amenity trail branching off into the woodland north of T8 did not overlap any existing or proposed access tracks.

This section of the trail was envisaged as an existing section of trail which could be included in the amenity trail network with minimal intervention (trimming of low branches and laying of improved surfacing in areas with poor ground conditions if necessary). However, due to the passage of time since the original proposal, it is assessed that more significant interventions including increased trimming and felling of small trees would now be required to open up this trail.

[5] Upgrades to sections of these trails are proposed to facilitate turbine deliveries where the proposed northern access route for turbine deliveries overlaps these trails: 237 metres of the existing 'entrance trail' and 117 metres of the existing 'looped walk' respectively are proposed to be upgraded in this way.

It has therefore now been decided to omit this section of the trail at this point for several reasons, including the following:

A significant number of sites now provide extensive walking trails in the wider local area, including locations such as the Royal Canal greenway, Donadea Forest Park and Lullymore Heritage & Discovery Park. A total of 4.3 km of amenity trails will still be provided after omitting the 'woodland walk' amenity trail section, with the entire route of the revised trail (woodland walk trail omitted) being suitable for cycling, walking and running.

The omission of the 'woodland walk' amenity trail section would also be beneficial in ecological terms since construction and operational disturbance would then be limited to existing and proposed access tracks and the footprint of the proposed wind farm. The proposed wind farm access track network utilises existing forestry tracks, in addition to new proposed wind farm access tracks running through wooded habitats (primarily conifer woodland, with limited sections traversing birch woodland and mixed broadleaved/conifer woodland). The broadleaved component of these habitats is comprised of downy birch. As such, proposed felling of broadleaved trees affected by new wind farm access tracks is limited to semi-mature downy birch.

The proposed new access tracks in the north of the site which overlap the proposed amenity trails are located in marginal areas of forestry blocks, which helps to minimise habitat fragmentation. If the 'woodland walk' amenity trail section was retained, this would result in habitat fragmentation due to it's route through interior sections of conifer and mixed/broadleaved conifer woodland, particularly in light of the continued development of woody vegetation since the initial proposal to include this section of trail.

In light of the proposed omission of the 'woodland walk' amenity trail section, all other sections of the proposed amenity trail are either pre-existing or utilise proposed/upgraded wind farm access tracks. As such, the assessment of potential effects including those of cumulative habitat loss, habitat fragmentation, edge effects and disturbance/displacement are covered by the assessment of the proposed wind farm (including proposed access tracks) as detailed in EIAR Chapter 8-1 Sections 8.9.1 and 8.9.2. Potential habitat loss/alteration effects are assessed for ornithological receptors in Chapter 8-2. **Following omission of the 'woodland 'walk' amenity trail section, all proposed amenity trails either utilise existing forestry tracks or sit within the proposed wind farm infrastructure footprint. As such, there is no additional habitat loss associated with amenity trails beyond the habitat loss already assessed in the EIAR for proposed wind farm infrastructure and associated buffers.**

The cumulative loss of woodland habitat associated with construction of new access track sections is assessed within the habitat loss assessment (EIAR Chapter 8-1 Sections 8.9.1.3 & 8.9.1.4), while the effects of habitat fragmentation and disturbance/displacement are implicit within the assessment of individual key ecological receptors assessed in EIAR Chapter 8-1 Section 8.9.1. As per the previous paragraph, the proposed amenity trails utilise existing tracks or sit within the proposed wind farm infrastructure footprint and as such are encompassed by the assessments of the proposed wind farm infrastructure contained within the EIAR.

There is limited potential for red squirrel to be affected by habitat fragmentation associated with construction of wind farm access tracks; however, due to the linear nature and relatively small width of these tracks (4.5m), in addition to re-establishment of vegetation along track verges during the operational phase, these effects are not predicted to be significant (see response to Biodiversity Item E in the current F.I. response for further details). In addition, the construction of new tracks is consistent with the existing baseline which includes forestry tracks and occasional felling of conifer blocks. The remainder of mammal species present are adapted to use a mosaic of habitats including wooded, linear and open habitats and as such would not be significantly affected by the limited habitat fragmentation associated with the proposed development.

The assessment of alterations to habitat features used by bats such as woodland edges and canopies is implicit within the assessment of potential effects on bats contained in EIAR Chapter 8-1 Sections 8.9.1.10.1, 8.9.1.10.2, 8.9.2.11.3 & 8.9.2.12. Landscape-scale connectivity for bats relating to woodland habitats will be maintained due to the limited extent of felling, in addition to the emergence of new edge habitats arising from felling which will be suitable for commuting and foraging. Due to all proposed amenity trails utilising either existing forestry tracks or proposed wind farm access tracks, there is no additional felling beyond the proposed wind farm felling proposed specifically for amenity trails.

The overall effect of disturbance and displacement during construction will be limited due to the limited footprint of the proposed development relative to the overall habitat resource in the wider area. Potential edge effects are likely to be positive due to increased structural and floristic diversity associated with recolonisation of track margins where monocultural conifer plantation or low-diversity pioneer birch woodland previously existed. Increased plant and insect diversity is evident along the existing tracks at the site, which mimic woodland clearings and create a mosaic of wooded and open habitats. In summary, all proposed amenity trails either utilise existing forestry tracks or sit within the proposed wind farm infrastructure footprint and as such are encompassed by the assessments of the proposed wind farm infrastructure contained within EIAR Chapter 8-1 and Chapter 8-2.

Operational phase effects associated with use of the proposed amenity trail are anticipated to be similar to the existing baseline where members of the public utilise the Coillte access roads as walking trails.

Amenity use may increase during the operational phase, with potential for increased disturbance to wildlife associated with human presence and in particular, dogs. Potential increased human and canine presence may result in slightly increased levels of disturbance to wildlife; however, this is not predicted to result in significant effects on mammal species relative to the existing baseline.

Potential for disturbance to ground-nesting birds requires consideration. Wader surveys did not identify any key breeding locations within or near the proposed development. There is suitable habitat for breeding snipe on Mulgeeth Bog, and breeding territories were recorded in this area during previous surveys but not during summer 2026. The large extent of Mulgeeth Bog provides a natural buffer between the amenity trail running from T9 to T10, and as such, potential disturbance would be limited to the north-eastern edge of the bog near T9/T10. Walkers and dogs are unlikely to venture onto the bog due to it's wetness and difficult terrain. There is limited potential for disturbance to breeding woodcock; however, this cryptic species is unlikely to nest near the amenity trails.

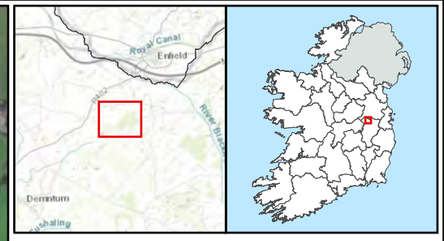
As such, some level of disturbance/displacement could occur for breeding Snipe and Woodcock; however, operational effect significance is not predicted to increase above the levels identified regarding operational disturbance for these species within the EIAR Chapter 8-2 (Long-term Moderate for Snipe; Long-term Not significant for Woodcock). Additionally, there is some potential for disturbance of breeding Meadow Pipit and Skylark although this is predicted to result in Imperceptible effects due to the large amount of displacement habitat present in the immediate environs.

It is proposed to include signage along the amenity trails warning dog walkers of the potential risk of disturbing ground-nesting birds and requiring that dogs be kept on leads.

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Legend

- Site Boundary
- Entrance Trail (700m)
- Looped Walk (1.2km)
- Windfarm Walk (2.4km)
- Woodland Walk (1.7km) - (Removed)

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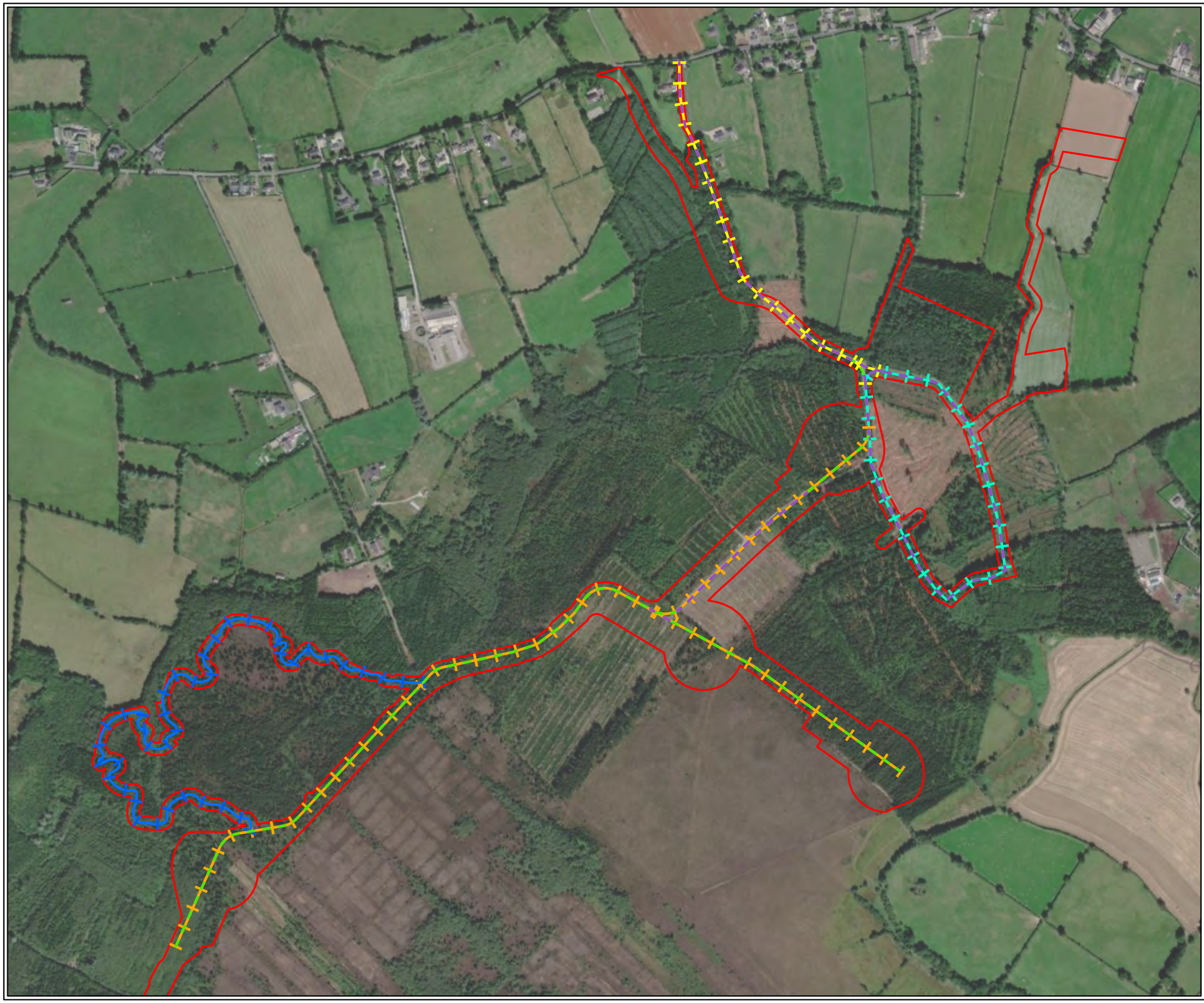
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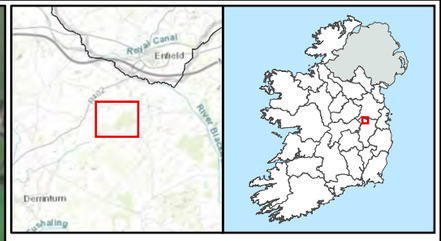
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PROJECT:	Drehid Wind Farm RFI		
FIGURE NO:	2.32		
CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:7,500	**REVISION:**	0
DATE:	14/10/2026	**PAGE SIZE:**	A3

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Legend

- Site Boundary
- Entrance Trail (700m)
- Looped Walk (1.2km)
- Windfarm Walk (2.4km)
- Woodland Walk (1.7km) - (Removed)
- Areas Overlaping Existing Access Track
- Areas Overlaping New Access Track

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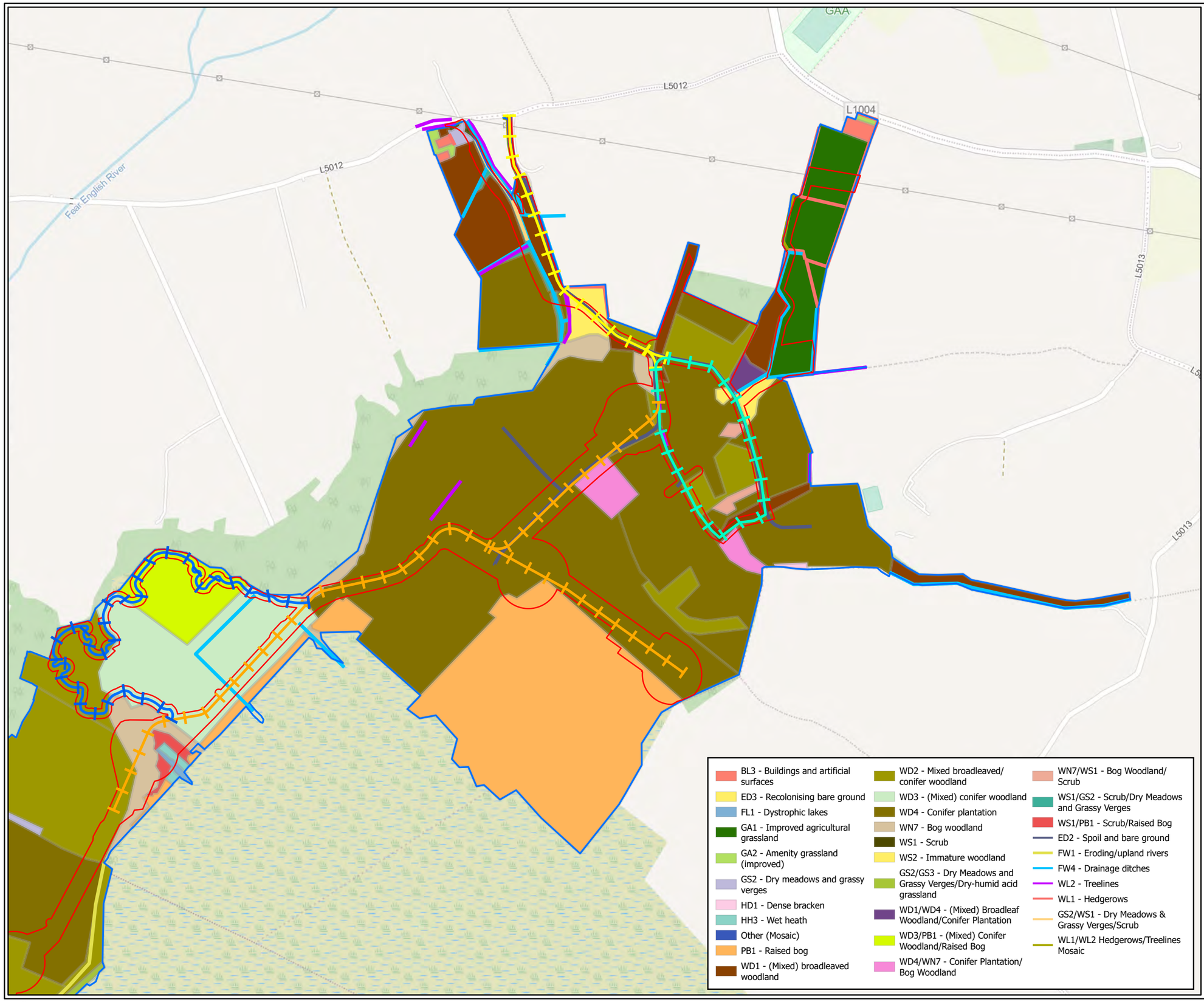
TITLE:	Amenity Trail Overlap with Proposed Access Tracks		
PROJECT:	Drehid Wind Farm RFI		
FIGURE NO:	2.33		
CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:7,500	**REVISION:**	0
DATE:	14/10/2026	**PAGE SIZE:**	A3

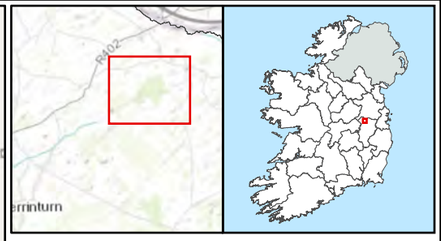
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Legend

- Proposed Development Boundary
- Study Area Boundary
- Entrance Trail (700m)
- Looped Walk (1.2km)
- Windfarm Walk (2.4km)
- Woodland Walk (1.7km) - (Removed)

N W E S

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TITLE:	Amenity Trail over Habitats	
PROJECT:	Drehid Wind Farm RFI	
FIGURE NO:	2.34	
CLIENT:	North Kildare Wind Farm Ltd.	
SCALE:	1:9,537	**REVISION:** 0
DATE:	14/10/2026	**PAGE SIZE:** A3

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3. RFI ITEM 2: WATER FRAMEWORK DIRECTIVE

It is requested that you provide a standalone Water Framework Directive Compliance Report.

3.1 RFI Item 2 Response:

In response to this request, a standalone Water Framework Directive Compliance Report has been prepared for the Proposed Development and has been included within Appendix 6 of this RFI Response Report.

The report assesses the Proposed Development having regard to the requirements of the Water Framework Directive and should be read in conjunction with the EIAR and associated planning application documentation.

4. RFI ITEM 3: FLOOD RISK:

Turbine 6 is noted to be located in Flood Zones A and B. The Planning System and Flood Risk Management Guidelines for Planning Authorities state that development in Zone A should be avoided and/or only considered in exceptional circumstances and where the justification test has been applied. Only water compatible development is considered appropriate. The guidelines state that in Zone B less vulnerable development should only be considered if adequate lands or sites are not available in Zone C and subject to a flood risk assessment.

You are requested to provide the following:

4.1.1 RFI Item (a):

supporting detail and evidence as to why it considers that turbines are 'largely considered to be water compatible' having regard to what is defined as 'water compatible' in the guidelines (Table 3.1),

4.1.2 *RFI Item (a) Response:*

The EIAR provided a high level conservative flood model which illustrated that Turbine T6 was located in Flood Zone B. In accordance with The Flood Risk Management Guidelines the approach was to increase the ground levels in this area so that the Turbine base of T6 would be above the indicative Flood Levels and compensation for the loss of Flood Plain would be provided adjacent to the turbine hard standing.

Following the request from ACP, FT commissioned a Site-Specific Flood Risk Assessment (SSFRA) in accordance with the Flood Risk Management Guidelines. The SSFRA undertook detailed surveys of adjacent waterbodies. The SSFRA is included as Appendix 7 to this submission. The SSFRA has determined that Turbine T6 falls outside Flood Zone A and B and is located in Flood Zone C. Therefore there is no requirement to submit supporting detail and evidence that turbines are defined as 'water compatible in the context of Table 3.1. of the Guidelines.

4.1.3 *RFI Item (b):*

details of alternative locations/absence of alternative locations with low flood probability within the application site which were considered for the turbine location and reasoning for the chosen turbine location, and,

4.1.4 *RFI Item (b) Response:*

As per response above and in accordance with the SSFRA submitted as Appendix 7 to this report. Turbine 6 is not located in Flood Zone A or B. Therefore a justification is not required in this instance.

4.1.5 RFI Item (c):

what exceptional circumstances arise in the current proposal to justify the location of the turbine in an identified area of flood risk. This should be supported by a justification test in accordance with the details provided in Box 5.1 of the guidelines

4.1.6 RFI Item (c) Response:

"The EIAR provided a high level conservative flood model which illustrated that Turbine T6 was located in Flood Zone B. In accordance with The Flood Risk Management Guidelines the approach was to increase the ground levels in this area so that the Turbine base of T6 would be above the indicative Flood Levels and compensation for the loss of Flood Plain would be provided adjacent to the turbine hard standing.

Following the request from ACP, FT commissioned a Site-Specific Flood Risk Assessment (SSFRA) in accordance with the Flood Risk Management Guidelines. The SSFRA undertook detailed surveys of adjacent waterbodies. The SSFRA is included as Appendix 7 to this submission. The SSFRA has determined that Turbine T6 falls outside Flood Zone A and B and is located in Flood Zone C.

Therefore, a Justification Test in accordance with Box 5.1 of the Guidelines is not requires in this instance.

Whilst part of the hardstanding does fall within Flood Zone B, the hardstanding will be built at grade and therefore will not restrict flows in the area. Furthermore, given the expected flood heights in the area of 100 – 200 mm above grade, the proposed drainage infrastructure associated with the hardstanding area will provide adequate storm water storage to reduce existing flood extents.

5. RFI ITEM 4: NOISE

(a)

As per the details provided in Table 7.1.2 in Appendix 7 of the EIAR the noise assessment is based on baseline noise measurements at 5 no. monitoring locations (N1 to NS) that are in excess of 7 years old (at the time of the lodgement of the application to the Commission). The measurements at the other two monitoring locations (N6 and N7) are in excess of 6 years old (at the time of the lodgement).

Please provide up to date baseline noise measurements of the existing environment. Any amendments to the noise assessment including amendments to the EIAR and relevant appendices resulting from the noise measurements should be clearly delineated.

(b)

(i) You are requested to clarify the nature and extent of the noise mitigation

measures to be employed at the northern site entrance to protect the properties to the east and west during the construction of the said entrance and access track.

(ii) Please clarify and amend, as appropriate, the details provided under the heading 'Adjacent Dwellings' on page 31 of Chapter 13 (Traffic and Transportation) of the EIAR including details of the proposed entrance(s) referred to and proposed mitigation measures.

(c) You are requested to submit a mitigation strategy for operational Amplitude Modulation and Tonal Noises.

5.1.1 RFI Item (a):

(a) As per the details provided in Table 7.1.2 in Appendix 7 of the EIAR the noise assessment is based on baseline noise measurements at 5 no. monitoring locations (N1 to NS) that are in excess of 7 years old (at the time of the lodgement of the application to the Commission). The measurements at the other two monitoring locations (N6 and N7) are in excess of 6 years old (at the time of the lodgement).

Please provide up to date baseline noise measurements of the existing environment. Any amendments to the noise assessment including amendments to the EIAR and relevant appendices resulting from the noise measurements should be clearly delineated.

5.1.2 *RFI Item (a) Response:*

5.1.3 Baseline Noise Survey

Full details of the updated noise survey are provided below as part of this RFI Response, with calibration certificates presented in Appendix 8. The baseline noise measurements are consistent with the prevailing background noise measured during previous surveys. Therefore no change is required to the operational noise assessment in the EIAR.

Baseline noise measurements

In response to the RFI item 4 (a) a baseline noise survey in the vicinity of the proposed Wind Farm was conducted at six locations between 16th July and 13th August 2026.

Previous baseline measurements were undertaken at five locations for the original EIAR between November 2017 to January 2018, supplemented by a further two noise monitoring locations in response to an RFI request. The latter was conducted in May and June 2019.

Details of the latest round of noise monitoring is presented here.

Selection of monitoring locations

Section 2.2.5 of the Institute of Acoustics', A Good Practice Guide to the Application of ETUS-R-97 for the Assessment at Rating of Wind Turbine Noise (2013) regarding use of proxy locations states "When choosing a location that will serve as a proxy for others, the basis for selection is that it can reasonably be claimed, from inspection and observation, to be representative of the non-surveyed locations, in line with the criteria of Section 2.5. Measurement locations outside a property's curtilage (such as an adjacent field) may be used when access to a representative property cannot be obtained, provided that such a location can be justified as being representative. No general guidance can therefore be given on the number of measurement locations as this will be site-specific." Section 2.5 of the GPG is summarised in Table 5-1 with the applicability of the proxy locations selected for Drehid Wind Farm.

Table 5-1: IOA GPG Section 2.5 criteria and applicability to Drehid Wind Farm monitoring locations

Requirements of IOA GPG Section 2.5	Drehid Wind Farm Monitoring Locations
2.5.1 Where possible, measurements should be made in the vicinity of a dwelling in an area frequently used for rest and recreation.	This was adhered to where possible. In some instances, access to the dwellings of interest were denied.
2.5.2 Equipment should be placed at outdoor positions where noise levels are representative of typical 'low' levels likely to be experienced in the vicinity of a dwelling (or group of dwellings if the measurements are intended to be applied to more than one dwelling). The overriding consideration is that it can reasonably be claimed, from inspection and observation, that there are no other suitable noise-sensitive locations, in the vicinity of any selected location and close to a dwelling, where background noise levels would be expected to be consistently lower than the levels at the selected position.	This was adhered to where possible. In some instances, access to the dwellings of interest were denied. However, each monitoring location was selected to be representative of typical 'low' noise levels likely to be experienced in the vicinity of the dwelling, so far as practicable.
2.5.3 Ideally the position should be one which would be exposed to noise from the wind turbines whilst being best screened from other noise sources such as nearby roads or vegetation.	The locations were in open areas or within the curtilage of a property, set back from local roads and vegetation/forestry and in the direction of the proposed windfarm

Requirements of IOA GPG Section 2.5	Drehid Wind Farm Monitoring Locations
2.5.4 The background surveys provide the basis for setting both daytime and night-time noise limits: the measurement position must therefore reasonably represent external areas (for daytime noise) and also building façades containing windows (for night-time noise).	The locations being used to derive limits are representative of external areas and façade locations.
2.5.5 In most locations, background noise levels will be determined by wind in trees and vegetation and noise sources external to the property such as traffic noise. The presence of local noise sources such as boiler flues, garden fountains, domestic drains, watercourses and farm equipment should be identified.	There were some local noise sources described within the location description below for each location. There were no watercourses noted adjacent to the monitoring locations.
2.5.6 Where it is not possible to exclude the influence of variable local noise sources by selecting monitoring position, it is generally possible to identify such data from inspection of noise level time histories and therefore to exclude it from the data set used to derive noise limits	Attendance at the monitoring location during installation, checks, battery changes and equipment collection did not identify any variable noise sources. Atypical data was removed from data analysis.
2.5.7 In all cases, microphones should be supported at a height of 1.2 – 1.5 metres above the ground and no closer than 3.5 metres to any significant reflecting surface (such as a building or fence), except the ground. The position should be within 20 metres of the dwelling unless there are particular reasons for measuring at a more distant position (such as the presence of vegetation or denial of access); if so, the reasons should be explained.	The microphones were elevated on tripods at an approximate height of 1.5 m and no closer than 3.5 m to any significant reflecting surface. Where possible, the noise monitors were located within 20 m of the dwelling. When the noise monitors were located at more distant locations, this was due to either the refusal of access or presence of vegetation.
2.5.8 A resident at a selected property may request that measurements are made at a position which is considered inappropriate; perhaps because the preferred location(s) are inconvenient (it might obstruct lawn mowing, for example). In this situation the consultant should clearly explain the reasons why the measurements could be compromised; if no agreement can be reached, an alternative property or location should be sought. The assistance of the EHO may help to resolve these situations.	This was not an issue.

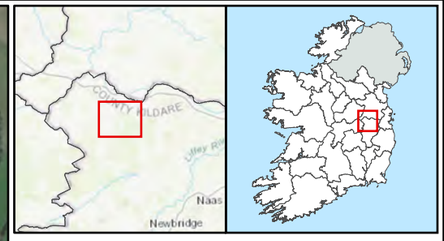
Monitoring locations

Six noise monitoring locations were selected for obtaining a detailed representation of the background noise levels in the area. The chosen noise monitoring locations were representative of the range of different noise environments in the vicinity of the proposed Drehid Wind Farm development, as well as being located at some of the closest dwellings (or their representative proxies) to the proposed wind farm development. The position of the noise monitoring locations are shown in Figure 5-1, below.

Earthstar Geographics
Esri, HERE, Garmin, FAO, NOAA, USGS
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Legend

- Proposed Development Boundary
- Noise Monitoring Locations

TITLE:	Noise Monitoring Locations		
PROJECT:	Drehid Wind Farm SID RFI		
FIGURE NO:	5.1		
CLIENT:	Statkraft Ireland		
SCALE:	1:25,000	**REVISION:**	0
DATE:	19/08/2026	**PAGE SIZE:**	A3

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Table 5-2: Noise monitoring locations

Location ID	ITM X	ITM Y	Description	Photograph
N1	673074	733917	Located to the rear of a residential property (R126), approximately 20m from the façade.	Plate 5-1
N2	673963	734968	Access to R106 was not permitted and a proxy location was used in a nearby field. The noise monitoring location is approximately 330m from the façade of the property.	Plate 5-2
N3	672866	735487	Access was not possible to the same location as previously (R100). A proxy location was chosen which was approximately 100m from R100 and approximately 40m from the adjacent property façade (R98).	Plate 5-3
N4	673474	736541	Located to the front of a residential property (R87) approximately 40m from the façade.	Plate 5-4
N5	676832	738397	Located to the rear of a residential property (R30) approximately 15m from the façade.	Plate 5-5
N6	675843	738401	Located north of the site south of a local road through Kilwarden. The monitoring location was in a field between two houses, approximately 30m from R32 façade and approximately 80m from R31 facade.	Plate 5-6

Location N1, at receiver R126. This location represents the background noise at properties south of the proposed development along the L5025 local road. The noise monitor was located at the rear of the dwelling, approximately 20m from the façade. The area consists of mowed grass with trees and bushes surrounding the perimeter. The monitoring location was approximately 40m from the local road. The rain gauge was also set up at this location. There was a pony at the property in a fenced off area near the noise meter. Noise sources noted during equipment collection and deployment included traffic on the nearby local road, distant road traffic noise, noise from light breeze in nearby trees, birdsong, and a tractor lawnmower at an adjacent property.



Plate 5-1: Monitoring location N1

Location N2, at proxy location for receiver R106. This location was chosen to represent noise at a single property along a cul de sac within the Drehid townland (see Figure 5-1, above). The noise monitor was situated in a field near R106, as access was not permitted to the previous location. This noise monitoring location was located in a field off a cul de sac, approximately 330m from property R106. There was short vegetation in the field.

Noise sources noted during equipment deployment and collection included distant road traffic noise, aircraft, cows in next field and birdsong, insect noise and light breeze in tall trees near the road.

Upon collection the meter had been knocked over when the field was mowed. It is understood from data analysis that this occurred on the previous day to the equipment collection. The noise meter calibrated correctly. Noise data after the equipment was knocked over has been excluded from the presented noise data.



Plate 5-2: Monitoring location N2

Location N3: As access was not permitted to the same monitoring location as the original EIAR, a proxy location in an adjacent field was chosen. This is approximately 40m from the closest residential location (R98), and approximately 100m from the previous measurement location at receiver R100.

Noise sources noted during equipment deployment and collection included distant road traffic noise, agricultural machinery, birdsong, bees, distant dog barking and sheep and cows in nearby fields.



Plate 5-3: Monitoring location N3

Location N4, at receiver R87. The noise monitor was in a field next to this property and approximately 40m from the property façade. The noise monitor was approximately 500m south of the R402 regional road. There are trees along the road to the property and at the boundary of the property. The field had been recently mown at the start of the measurement period.

Noise sources noted during equipment deployment and collection included distant road traffic noise, aircraft, dog barking at nearby house, cows and birdsong.



Plate 5-4: Monitoring location N4

Location N5, at receiver R30. This location was chosen as the noise environment is representative of the noise environment present at the proposed wind farm. The noise monitor was situated to the rear of the dwelling approximately 15 m from the façade. This location is adjacent to a working farm.

Noise sources noted during equipment deployment and collection included road traffic noise, aircraft and noise from livestock.



Plate 5-5: Monitoring location N5

Location N6, at receiver (R32). This location was in a field next to the property, north of the site and next to a local road. The noise monitor was located approximately the same distance as the adjacent property from the local road. There are trees at the boundary of the field next to the road and near the adjacent property. The noise monitor was approximately 30m from the façade of receiver R32. This was also the location of the second rain gauge.

Noise sources noted during equipment deployment and collection included hedge trimming activities on the local road, occasional traffic on the adjacent local road, distant road traffic noise, aircraft, some wind in nearby trees and agricultural machinery.



Plate 5-6: Monitoring location N6

Monitoring Equipment

Baseline noise monitoring was carried out using Larson Davis SoundExpert LxT Class 1 noise meters, and Svantek 307 Class 1 sound level meters. Details of the noise monitoring equipment are presented in Table 5-3, below. The sound level meters were fitted with 1/2" microphones. The microphones connected to the Svantek sound level meters were fitted with open-pored polyurethane foam with a minimum diameter of 130mm. The Larson Davis noise meter microphones also have a secondary windshield. Calibration certificates for each sound level meter are provided in Appendix 8.

Table 5-3: Noise monitoring equipment

Monitoring Location	Meter Type	Serial No	Measurement Period
N1	Svantek 307	104985	16th July 2026 to 13th August 2026
N2	Larson Davis Sound Expert LxT	6872	22nd July to 13th August 2026
N3	Svantek 307	119092	16th July 2026 to 13th August 2026
N4	Svantek 307	104990	16th July 2026 to 13th August 2026
N5	Svantek 307	119173	16th July 2026 to 13th August 2026
N6	Larson Davis Sound Expert LxT	6026	22nd July to 13th August 2026

Two rain gauges, Campbell Scientific tipping bucket rain gauges, RainVue10 with CR350 series data loggers, were installed at the site. -The first at location N1 on the first day of deployment and the second at location N6, during the second day of deployment. Wind data was obtained from a Lidar unit installed at the site for the duration of the noise survey.

Monitoring Protocol

Baseline noise measurements were undertaken at six locations surrounding the proposed wind farm. Equipment was installed in two lots:

1) from 16th July to 13th August 2026

2) from 22nd July to 13th August 2026

The following monitoring protocol was carried out at each of the monitoring locations:

1. The sound level meters were calibrated on-site and set to log L_{A90} statistics on a fast time weighted response every ten minutes.
2. Each sound level meter microphone was mounted at 1.5 m above ground level and fitted with an enhanced windshield. Each microphone was placed at least 3.5 m from reflecting surfaces to obtain 'free field' conditions.
3. Wind speed and wind direction measurements were taken from a Lidar Unit installed at the site. Wind speed was measured at a range of heights and data from anemometers at 102m was used for the wind speed data up at the proposed hub height of 100.5 m. The wind shear was calculated from hub heights of 60m and 90m, which is the approach used for the EIAR.

   The standardised 10 m wind speed was obtained from the turbine hub height wind speed by correcting it to 10 m height using a ground roughness factor of 0.05 m. Roughness length (or logarithmic) shear profile:

$$U_1 = U_2 \frac{ln\left({}^{H_1}/_{z}\right)}{ln\left({}^{H_2}/_{z}\right)}$$

where U1 is the wind speed to be calculated, U2 is the measured wind speed, H1 is the height of the measured wind speed to be calculated (10m), H2 is the height of the measured wind speed and z is the ground roughness length (m). A roughness length of 0.05m is used to standardise hub height wind speeds to 10m height in the IEC 61400-11:2012 standard.

4. The L_{A90} statistic measurements were synchronised with the 10 m standardised wind speeds derived from the on-site meteorological mast data.

5. As described earlier, logging rain gauges were also installed, and similarly logged rainfall events over successive 10 minute intervals, also synchronised to the noise level and wind speed measurements.

6. After the monitoring was completed, the noise meters were re-tested using the calibration noise source to ensure that the meters had not drifted.

Analysis of the baseline data

Following collection of the site data, the following protocol was used to analyse the baseline data:

1. The raw baseline L_{A90} noise data was reviewed to determine whether there are any periods of non-consistent noise level due to equipment malfunction. If there was any data which was inconsistent, these noise level data points were removed from the raw data set and detailed in the report.

2. The raw noise level data was then correlated with the time synchronised wind speed and rainfall data. Preliminary data analysis was used to remove datasets (L_{A90}, wind speed and occurrence of rainfall event) which contain a rainfall event as these data sets are required to be removed from further analysis in line with best practice as outlined in the IOA Good Practice Guide and Supplementary Guidance Note 2 on Data Processing.

3. The prevailing background noise was determined for daytime periods 07:00-23:00. Early morning periods were also excluded to remove the dawn chorus, which is not prevalent through that whole year, with data recorded between 04:00 and 07:00 was removed from further analysis.

4. Once the dawn chorus, rainfall events have been accounted for, the remaining data was graphed using a wind speed based plot to establish whether there are any remaining data outliers, representing atypical noise sources or events. At locations N1 and N5 outliers were removed from the data due to activities in the garden at the property for N1 and due to farming activities at N5.

5. Once the remaining data sets were found to be representative of the noise environment, they were analysed to ensure that sufficient data remained to provide sufficient data coverage over the necessary wind speeds. The IOA Good Practice Guide (May 2013) recommendation is for a minimum of 200 valid data points during daytime and night time hours and with no fewer than five valid data sets across each 1 m/s wind speed from turbine cut-in to rated power. Where integer wind speeds have less than five valid data sets, the prevailing background noise trend will not be extended beyond the range covered by adequate data sets. See Section 'Data Sets Available for Determination of Prevailing Background Noise Levels' for details. As the noise survey took place in summer, it was difficult to achieve the higher windspeeds normally required for noise measurements. The maximum rated power of the proposed Nordex N133 turbine occurs at 7m/s and the noise survey covers this windspeed range.

6. A 'best fit' trend (not higher than a fourth order polynomial) was then derived to present the assumed prevailing background noise level at each monitoring location. See 'Results' section below for details.

Measurement periods

The IOA GPG states "The duration of a background noise survey is determined only by the need to acquire sufficient valid data over the range of wind speeds. It is unlikely that this requirement can be met in less than 2 weeks." If insufficient wind data is collected after two weeks, the monitoring period will be extended subject to acquiring sufficient valid data over the range of wind speeds. As the noise monitoring needed to take place in summer time to meet the requirements of the RFI, noise monitoring at the higher windspeeds was not possible. However, the sufficient noise data was obtained up to and above the windspeed corresponding to the highest sound power of the proposed turbine, and this meets the recommendations of the IOA GPG.

Definition of time periods

The following periods were analysed for this report, consistent with the original EIAR:

Daytime hours	07:00 – 23:00
Night-time hours	23:00 – 07:00

Data available for determination of prevailing background noise levels

The Wind Energy Development Guidelines (Department of Environment, Heritage and Local Government, 2006) do not provide the specific periods which are represented by daytime and night-time hours, therefore the definitions from ETSU-R-97 are taken as 07:00 to 23:00 hrs for daytime and 23:00 to 07:00 hrs for night-time.

Prevailing background noise levels were derived for daytime and night-time periods. The number of valid datasets are shown in Tables 4-4 and 4-5 with wind speed ranges greyed out which did not satisfy the guideline of at least 5 data points in any 1 m/s wind speed bin.

Results

Prevailing background noise level in dB L_{A90} relative to standardised 10 m height wind speeds are provided for each monitoring location. The prevailing background noise level is plotted as a dotted line for each daytime and night-time periods at each monitoring location. In all cases, the highest order of polynomial used is a fourth order polynomials provided lines of best fit to the scatter data. Table 5-6 presents the derived prevailing background noise for all noise monitoring locations.

The results are consistent with the 2017/2018 baseline noise measurements. In the EIAR, the prevailing daytime background noise at all locations were greater than L_{A90} 30 dBA, with the exception of N2, which had daytime prevailing noise levels less than L_{A90} 30 dBA up to 4m/s. In the updated survey, the prevailing daytime background noise at all locations are also greater than L_{A90} 30 dBA, except for location N2. At N2 the background noise is less than L_{A90} 30 dBA up to 3m/s. Therefore this indicates a slight increase in the background noise at N2, which would be expected given the passage of time.

As the original EIAR indicated that the prevailing background noise at N2 was <30 dB L_{A90} up to 4m/s, the assessment in the original EIAR therefore represents a more conservative prevailing background noise environment and derived noise limits at N2. Accordingly, no changes are required to the noise limits that were applied to the noise assessment in the original EIAR.

Based on the current baseline noise measurements in the vicinity of the wind farm, as outlined in this report, there are no changes required to the noise assessment undertaken and operational noise does not require further assessment.

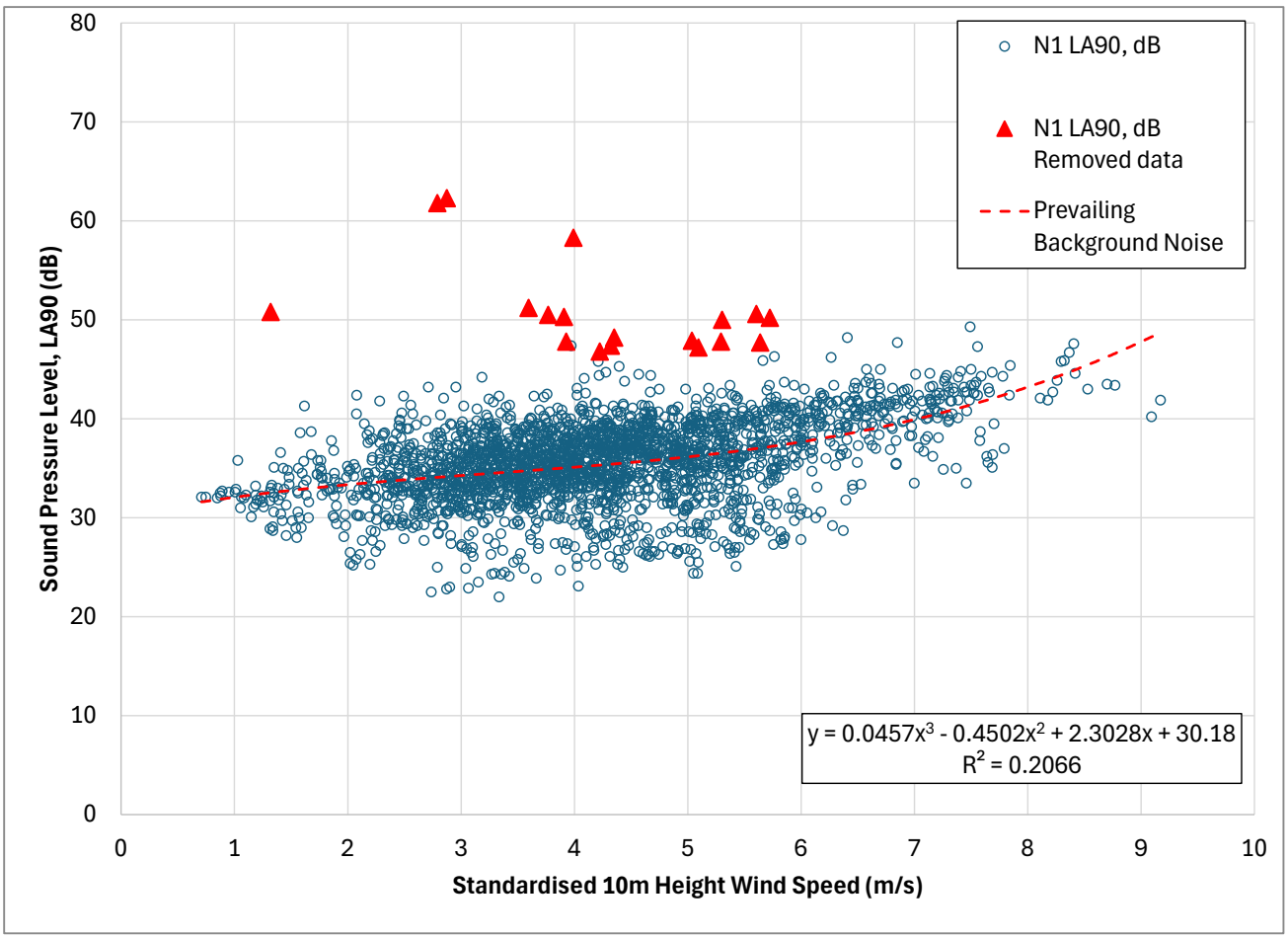


Figure 5-2: Prevailing daytime background (L_{A90}) noise levels at N1

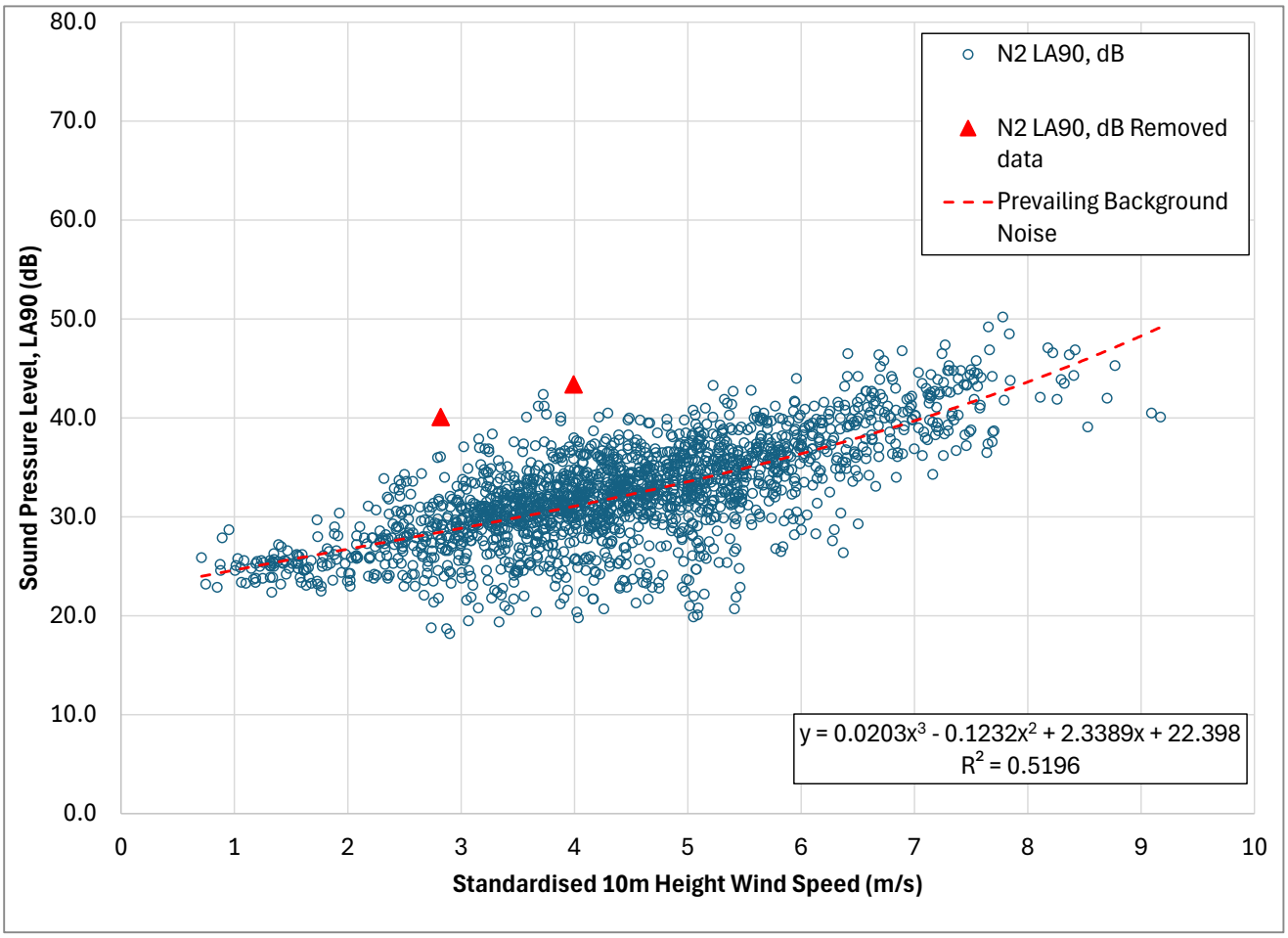


Figure 5-3: Prevailing daytime background (L_{A90}) noise levels at N2

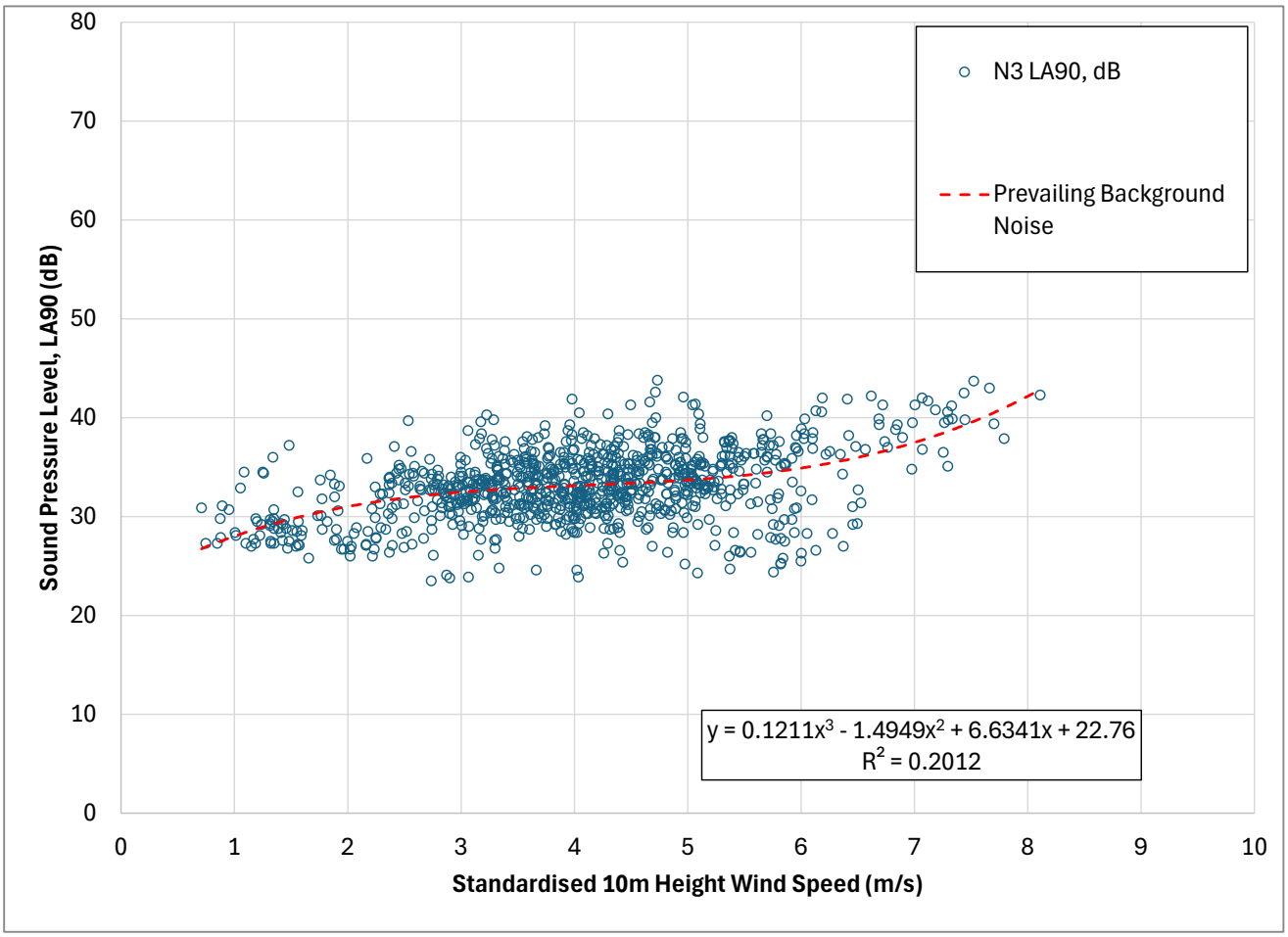


Figure 5-4: Prevailing daytime background (L_{A90}) noise levels at N3

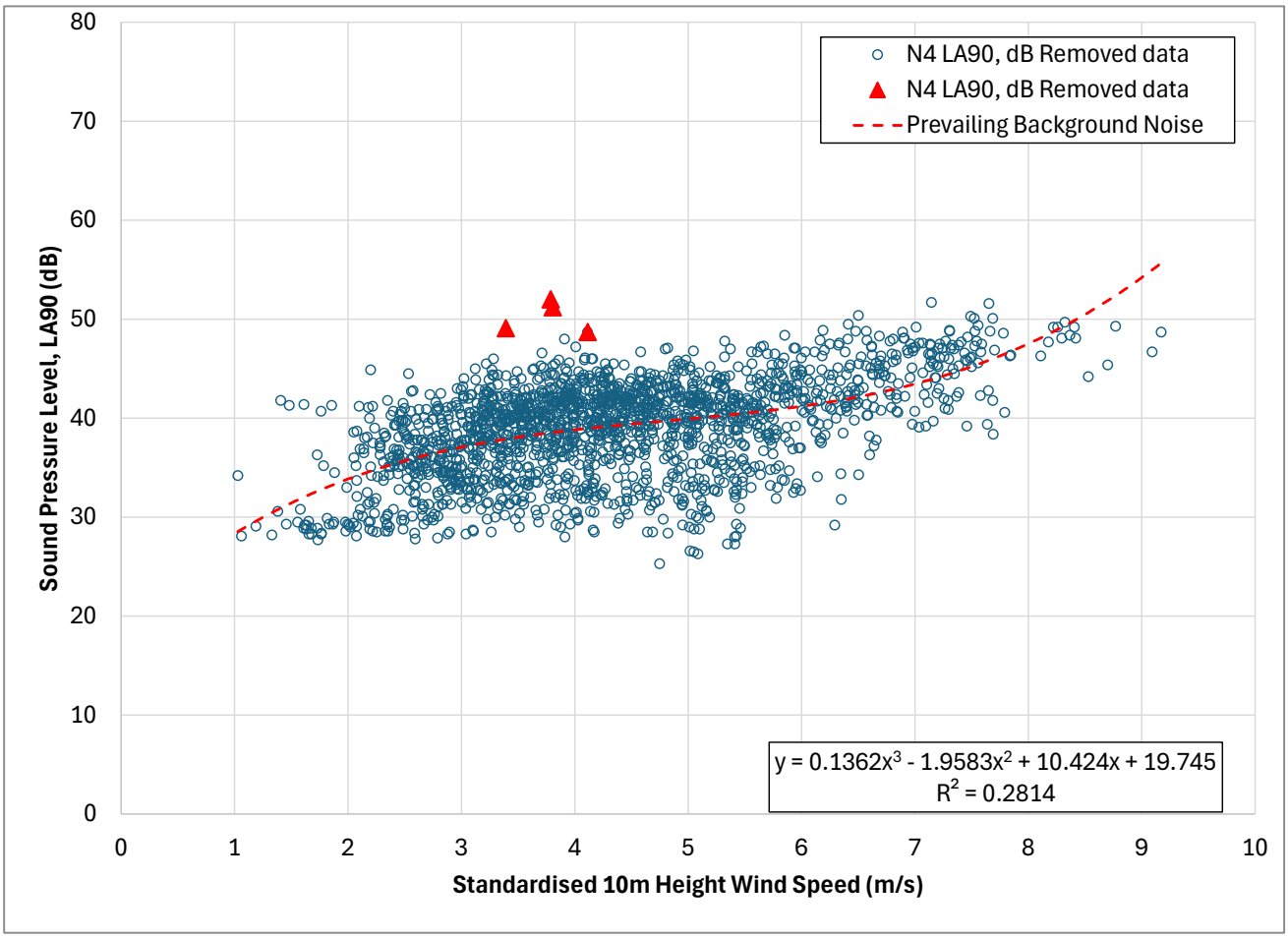


Figure 5-5: Prevailing daytime background (L_{A90}) noise levels at N4

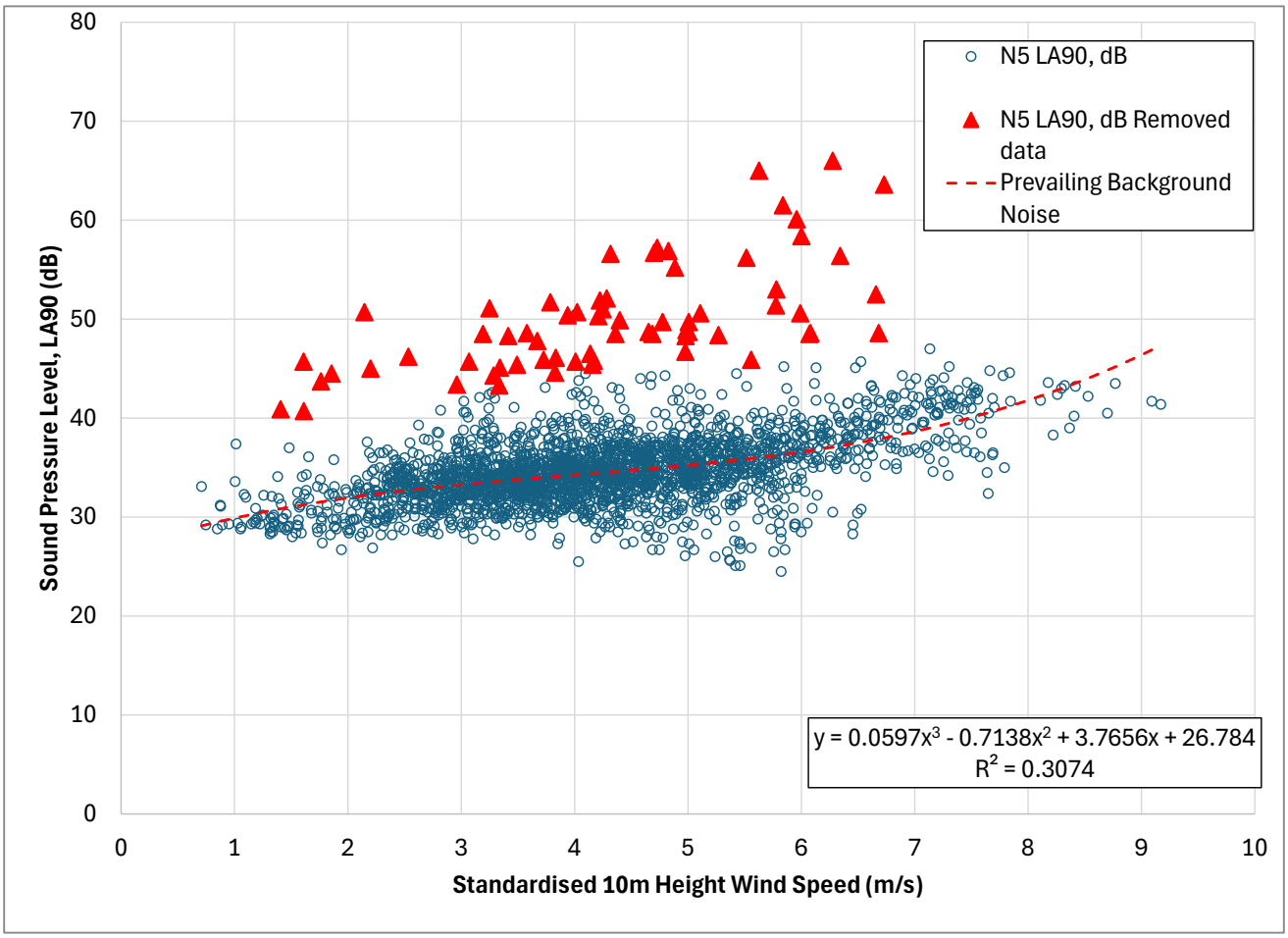


Figure 5-6: Prevailing daytime background (L_{A90}) noise levels at N5

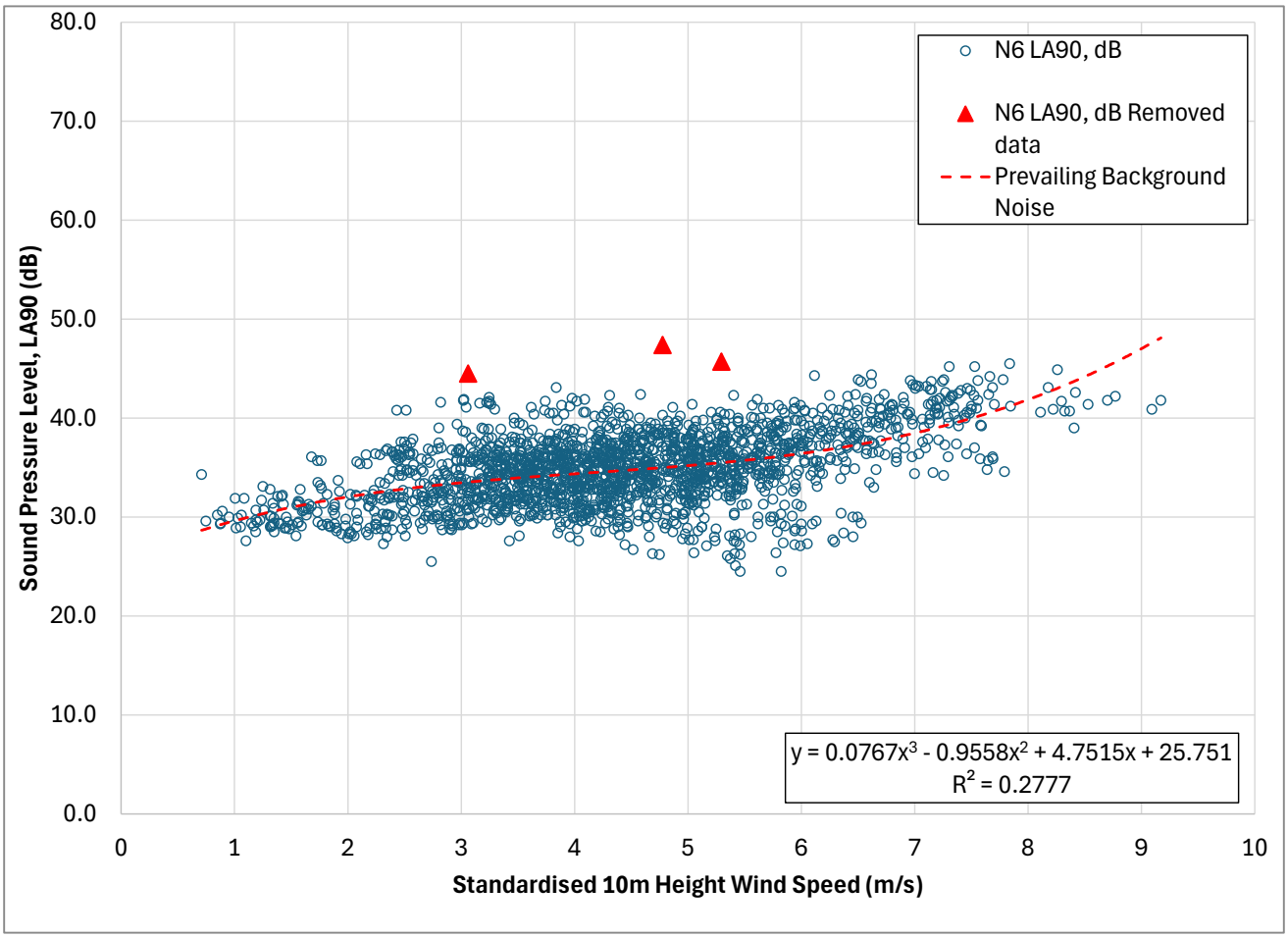


Figure 5-7: Prevailing daytime background (L_{A90}) noise levels at N6

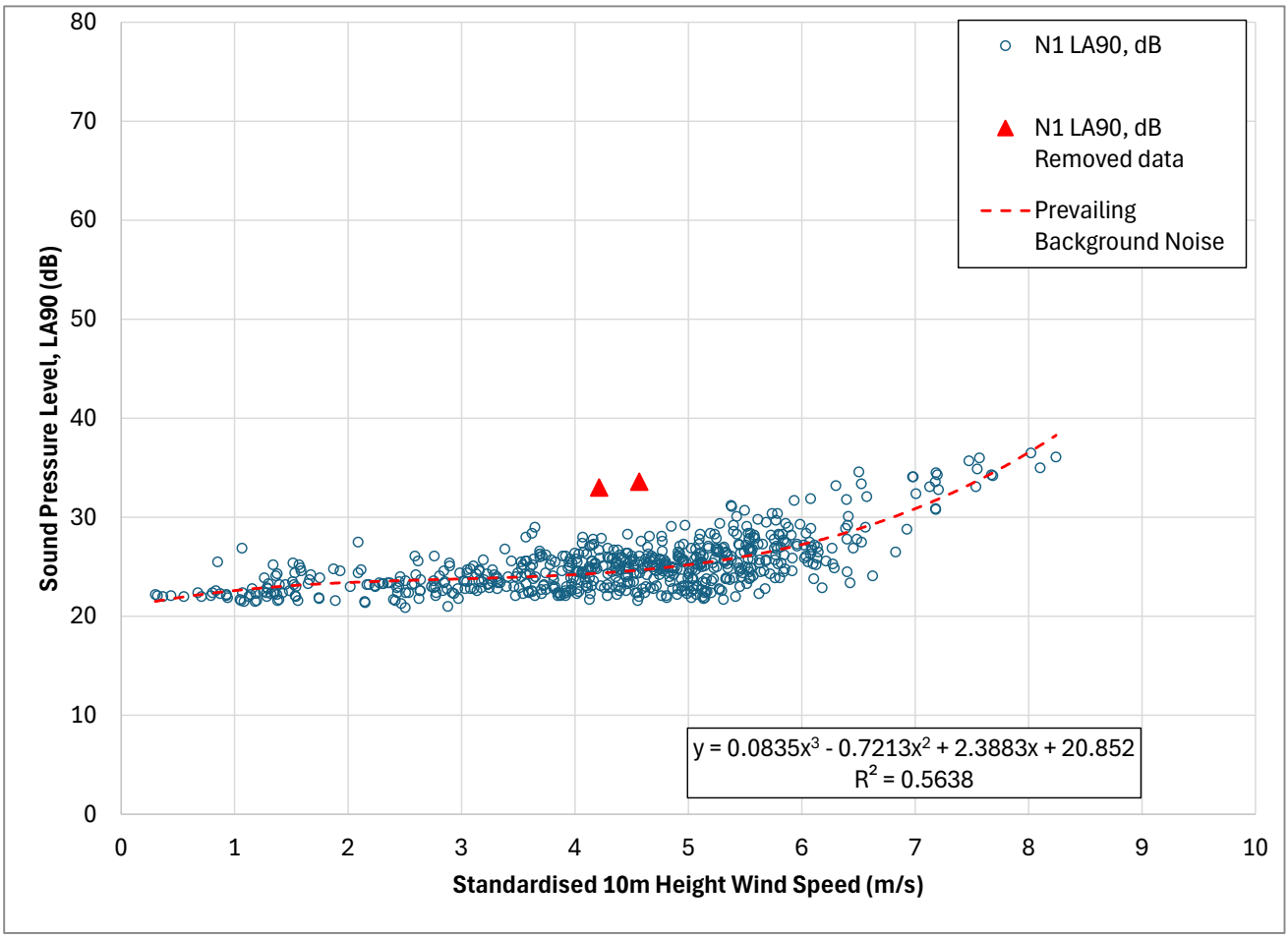


Figure 5-8: Prevailing night time background (L_{A90}) noise levels at N1

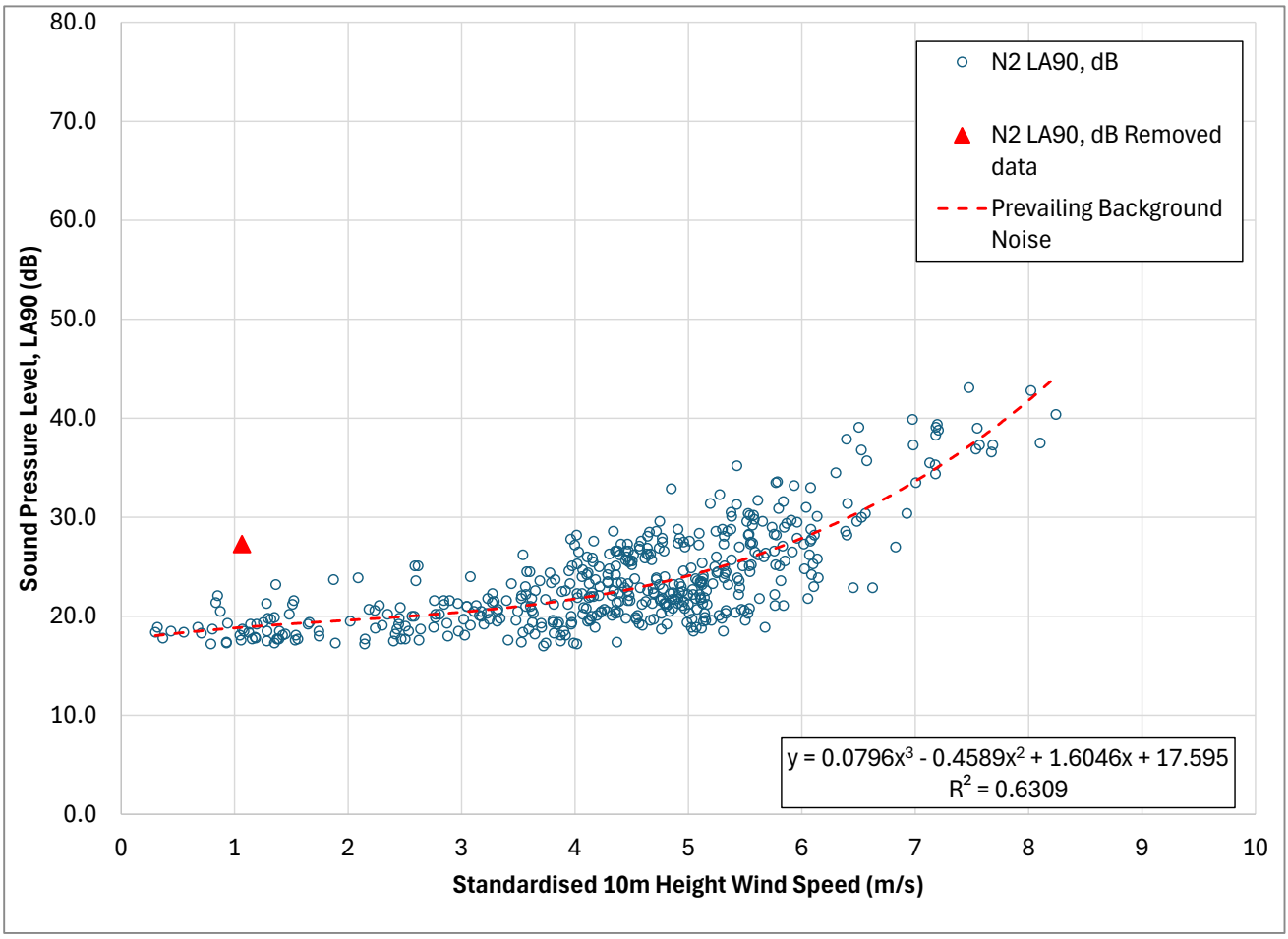


Figure 5-9: Prevailing night time background (L_{A90}) noise levels at N2

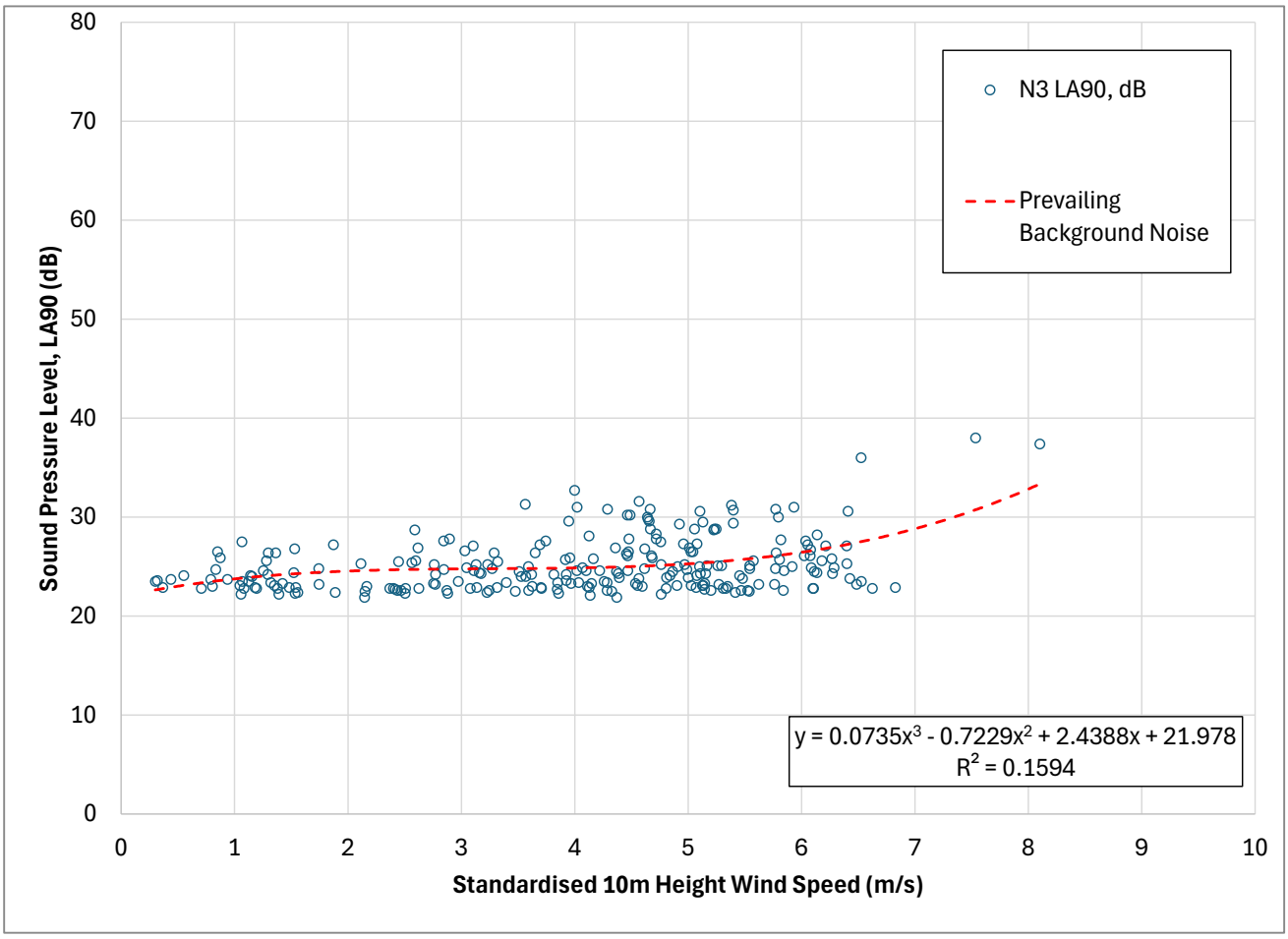


Figure 5-10: Prevailing night time background (L_{A90}) noise levels at N3

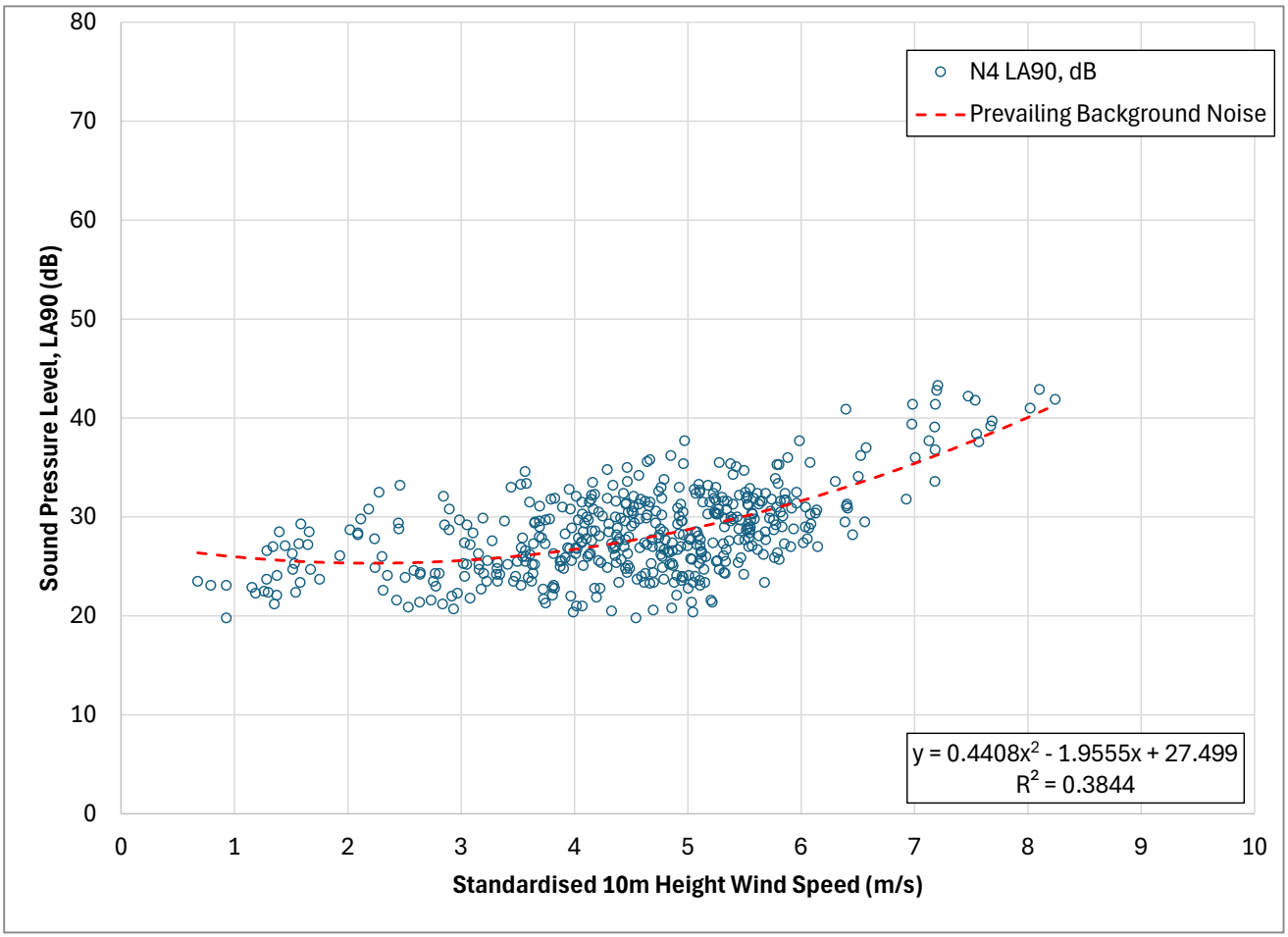


Figure 5-11: Prevailing night time background (L_{A90}) noise levels at N4

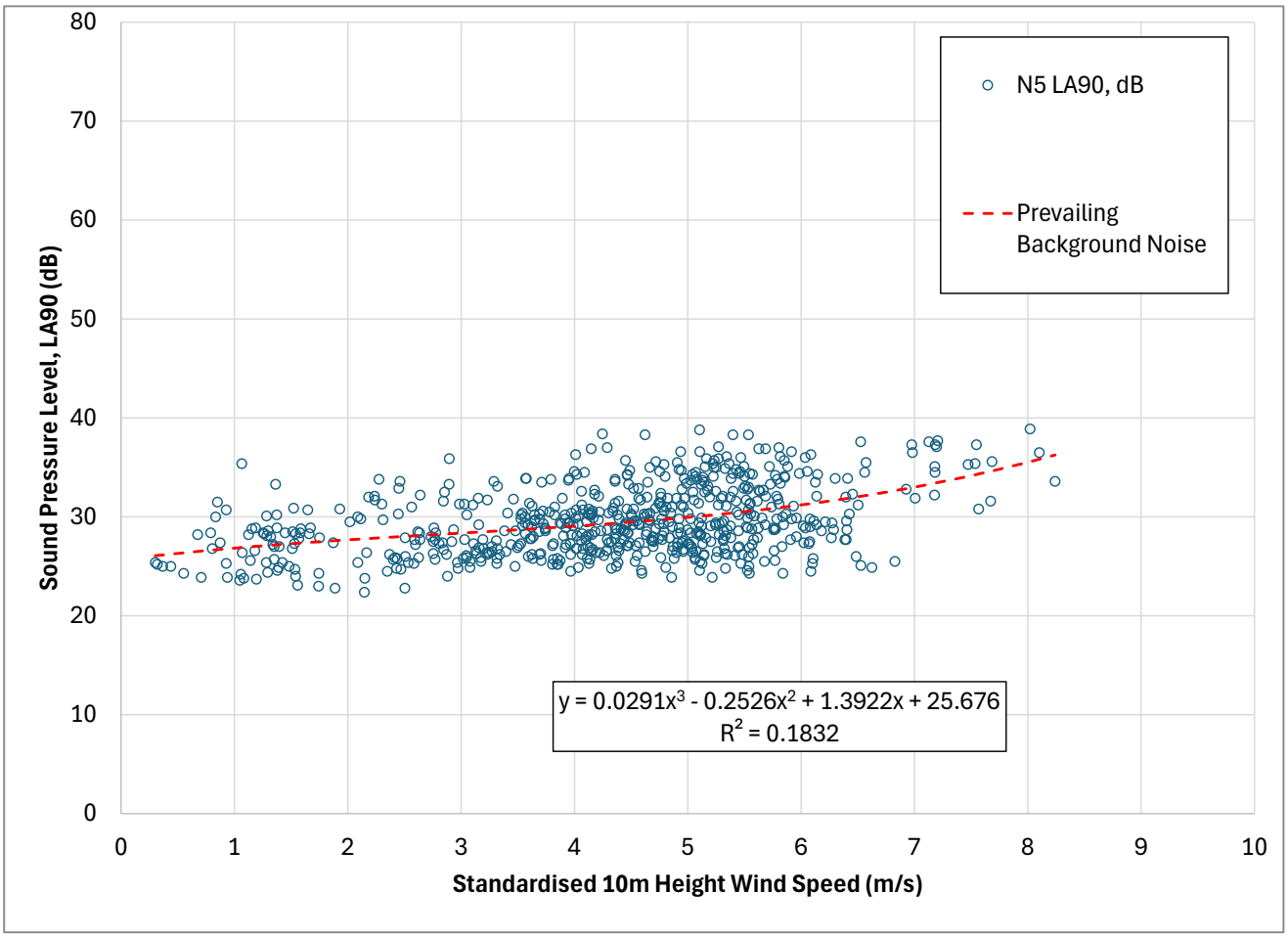


Figure 5-12: Prevailing night time background (L_{A90}) noise levels at N5

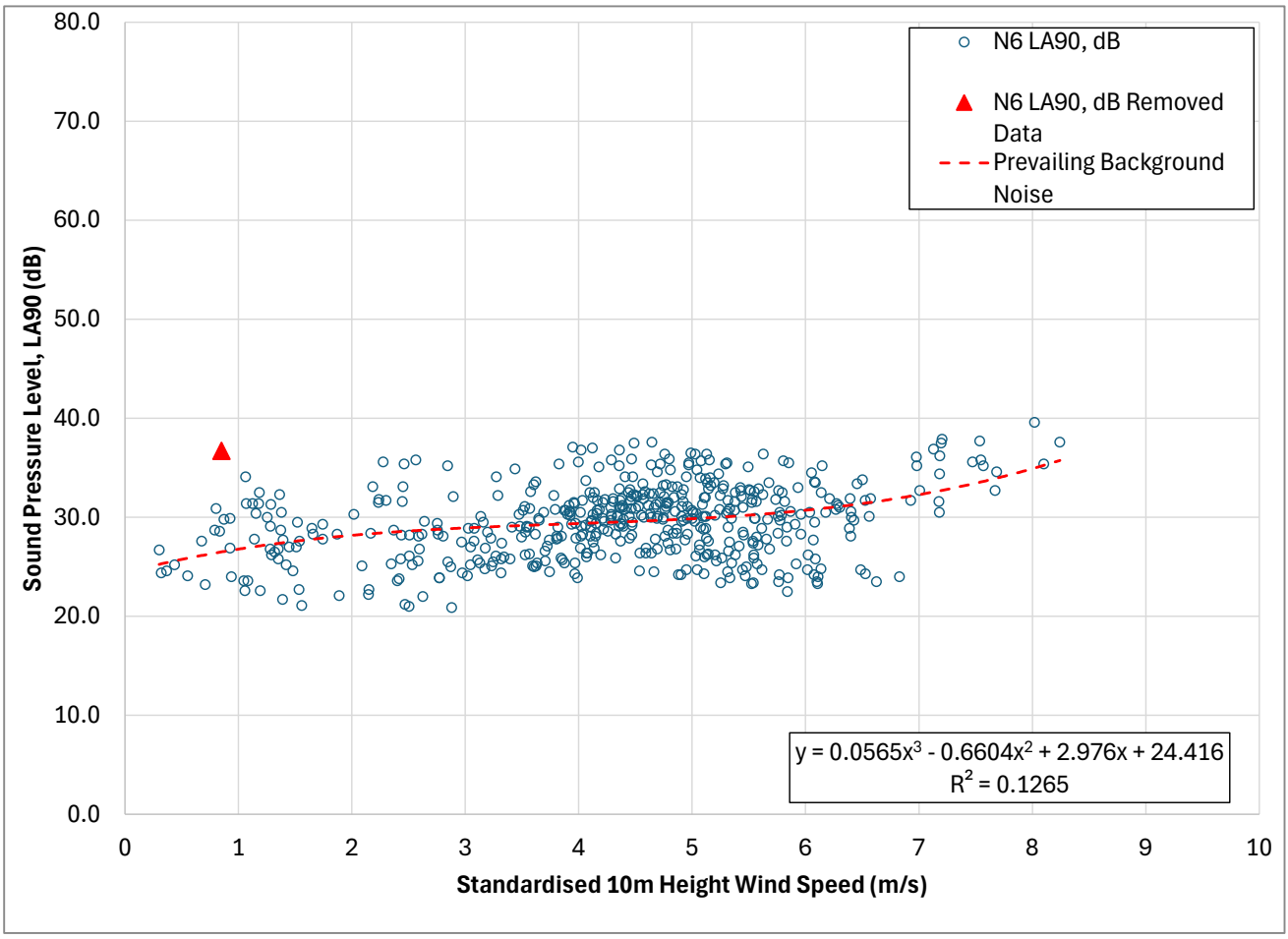


Figure 5-13: Prevailing ight time background (L_{A90}) noise levels at N6

Table 5-4: Number of valid datasets: all noise monitoring locations - night time

Wind Speed (at standardised 10 m height), m/s	Valid Datasets					
	N1	N2	N3	N4	N5	N6
0	4	4	4	0	4	4
1	42	37	29	16	42	37
2	43	28	19	27	43	31
3	74	49	35	48	74	53
4	162	125	53	128	162	133
5	196	150	65	160	196	151
6	104	71	38	79	104	79
7	19	19	4	16	19	19
8	8	8	2	8	8	8
9	0	0	0	0	0	0
10	0	0	0	0	0	0
Total Number of Data Points	652	491	249	482	652	515
	Greyed areas did not satisfy the criteria of at least 5 data points in any 1 m/s wind speed bin, but covers the cut in and highest wind speed of the proposed turbines					

Table 5-5: Number of valid datasets: all noise monitoring locations - day time

Wind Speed (at standardised 10 m height), m/s	Valid Datasets					
	N1	N2	N3	N4	N5	N6
0	0	0	0	0	0	0
1	8	47	42	8	48	47
2	126	117	69	126	177	130
3	426	327	192	423	539	332
4	552	580	318	552	761	589
5	400	468	218	403	547	490
6	202	233	82	205	243	246
7	124	126	28	124	124	127
8	30	30	5	30	30	30
9	5	5	0	5	5	5
10	0	0	0	0	0	0
Total Number of Data Points	1873	1933	954	1876	2474	1996
	Greyed areas did not satisfy the criteria of at least 5 data points in any 1 m/s wind speed bin, but covers the cut in and highest wind speed of the proposed turbines					

Table 5-6: Prevailing Background Noise

Locat-ion	Period	Prevailing Background Noise $L_{A90,10min}$ (dB) at Standardised 10 m Height Wind Speed (m/s)									
		1	2	3	4	5	6	7	8	9	10
N1	Daytime	32.1	33.4	34.3	35.1	36.2	37.7	39.9	43.2	47.8	47.8§
	Night time	22.6	23.4	23.8	24.2	25.2	27.3	30.9	36.5	36.5§	36.5§
N2	Daytime	24.6	26.7	28.9	31.1	33.6	36.4	39.7	43.6	48.3	48.3§
	Night time	18.8	19.6	20.4	21.8	24.1	27.9	33.6	41.8	41.8§	41.8§
N3	Daytime	28.0	31.0	32.5	33.1	33.7	34.9	37.5	42.2	42.2§	42.2§
	Night time	23.8	24.6	24.8	24.9	25.3	26.5	26.5§	26.5§	26.5§	26.5§
N4	Daytime	28.3	33.8	37.1	38.8	39.9	41.2	43.5	47.5	54.2	54.2§
	Night time	25.4*	25.4	25.6	26.7	28.7	31.6	35.4	40.1	40.1§	40.1§
N5	Daytime	29.9	31.9	33.3	34.2	35.2	36.6	38.6	41.8	46.4	46.4§
	Night time	26.8	27.7	28.4	29.1	30.0	31.2	33.0	35.5	35.5§	35.5§
N6	Daytime	29.6	32.0	33.5	34.4	35.2	36.4	38.5	41.9	47.0	47.0§
	Night time	26.8	28.2	28.9	29.4	29.8	30.7	32.3	34.9	34.9§	34.9§

* - indicates the lowest derived background noise level is adopted for all wind speeds below where this derived minimum occurs, in accordance with the IOA GPG.

§ - noise level restricted to the highest derived point

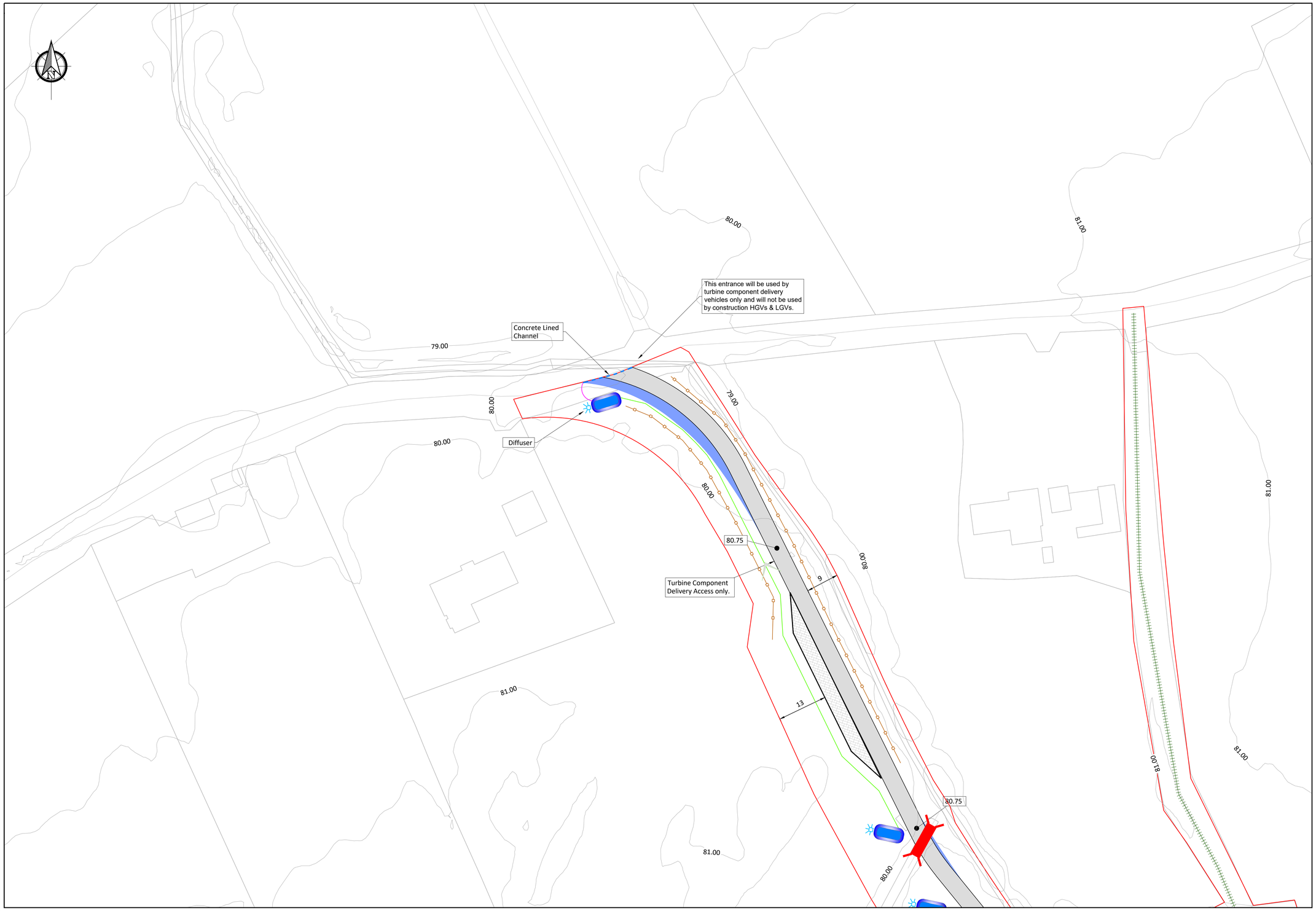
5.1.4 *RFI Item (b i):*

You are requested to clarify the nature and extent of the noise mitigation measures to be employed at the northern site entrance to protect the properties to the east and west during the construction of the said entrance and access track.

5.1.5 *RFI Item (b i) Response:*

5.1.6 Nature and Extent of mitigation to northern site entrance

Chapter 7 of the EIAR, Noise and Vibration Chapter Section 7.6.1 of the EIAR identified mitigation measures for the northern site entrance, including either phasing of works so no more than one item of plant operated at once or by the addition of a noise barrier. The extent of the noise barrier either side of the TDR access track is indicated on the Northern site entrance Drawing number: P22-242-0300-0017 Rev B *Site Entrance to Accommodate TDR*, as shown in Figure 4-14, below. The minimum height of this barrier is 2m above ground level to achieve the required noise mitigation. Barriers should have a minimum mass per unit surface area of greater than 7kg/m^2, with no gaps at the joints.

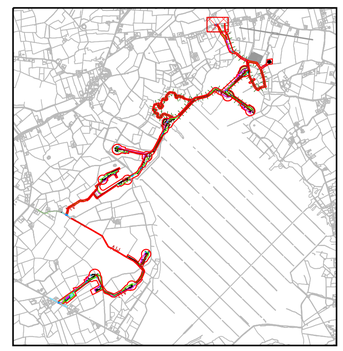


Legend

- Planning Site Boundary
- Land Holding Boundary
- Proposed Internal Access Track (Temporary Widening Areas)
- Temporary Construction Phase Surfaces (Temporary Widening Areas)
- Existing Public Road to be used for Construction and Operation Phase
- Proposed Internal Collector Cable (MV)
- Existing Ground Contour
- Interceptor Drain With Diffuse Outflow
- Roadside Swale
- Stilling Pond and Diffuse
- Proposed Culvert
- Existing Culvert
- Temporary Bridge Crossing
- Proposed Berms
- Proposed Amenity Trail
- Temporary Noise Barriers

Notes.

1. All dimensions in metres.
2. Entrance surfaces to be graded -2.5% with fall towards the development to ensure surface water does not discharge to public road.
3. Proposed entrance geometry is designed according to turbine delivery vehicle swept path analysis with consideration for vehicle overrun and load oversail extents.
4. This entrance will be used by turbine component delivery vehicles only and will not be used by construction HGVs & LGVs.
5. Advanced warning signage will be erected at appropriate distances on approach to the entrance in accordance with the latest Irish Traffic Signs Manual at construction stage.



KEY PLAN

0m 5m 10m 15m 20m 25m 30m 35m 40m 45m 50m

Scale 1:500

If Applicable : Ordnance Survey Ireland Licence No. EN 0001218 © Ordnance Survey Ireland and Government of Ireland
OSI SHEETS 3122-C, 3122-D,3187-A,3187-B,3187-C,3187-D,3188-A,3188-B,3188-C,3188-D,3253-A,3253-B,3253-C,3253-D,

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Rev.	Description	App By	Date
A	ISSUE FOR PLANNING	JH	11.03.25
B	ISSUE FOR FURTHER INFORMATION	JH	20.08.26

PROJECT	DREHID WIND FARM & SUBSTATION
CLIENT	NORTH KILDARE WIND FARM Ltd.
SHEET	SITE ENTRANCE TO ACCOMMODATE TDR
Date	11.03.25
Project number	P22-242
Scale (@ A1-)	1:500
Drawn by	CS
Drawing Number	P22-242-0300-0017
Checked by	BC
Rev	B

O:\ACAD\2022\P22-242\P22-242-0300-0017

Thursday, August 20, 2026

5.1.7 *RFI Item (b ii):*

Please clarify and amend, as appropriate, the details provided under the heading 'Adjacent Dwellings' on page 31 of Chapter 13 (Traffic and Transportation) of the EIAR including details of the proposed entrance(s) referred to and proposed mitigation measures.

5.1.8 *RFI Item (b ii) Response:*

5.1.9 The Details on noise mitigation within Traffic and Transportation Chapter

The following summarises comments on the above noise mitigation measures identified in the traffic chapter. Reference should be made to the Noise Chapter for mitigation measures, in addition to the Compendium on Mitigation which summarises all mitigation at the site.

> *"All construction traffic shall follow the identified haul route, as such, any temporary noise from construction will be moving away from the dwelling on entering the site."*

The main southern site entrance haul route was moved eastwards to be located away from the property west of the site entrance. As stated in the traffic chapter, construction traffic will follow the haul routes within the site. The relevant section of the Haul route near the southern entrance as submitted with the application is indicated in *Drawing P22-242-0300-0015 Rev A Site Access Main Entrance*.

> *"A noise attenuation barrier will also be put in place along the boundary of the site to reduce any further temporary noise impacts on the dwelling. This can be done in consultation/agreement with the neighbouring residents if permitted. "*

Details of noise mitigation required for construction noise are detailed in Chapter 7 of the EIAR: Noise and Vibration Chapter, Section 7.6.1 Mitigation. This also details the extent, height and properties of the noise barriers required for noise mitigation to meet the construction noise limits.

The main areas where noise barriers are required are east and west of the main southern site entrance. Mitigation for the northern site entrance are already addressed in item B(i)

The extent of noise barriers at the southern entrance are summarised in the drawing: Main southern site entrance: P22-242-0300-0015 Rev A Site access main entrance. Details of noise mitigation at the Northern site entrance are addressed in the previous section in response to item b(i) Nature and Extent of Noise Mitigation to Northern Site Entrance. Full details on the noise mitigation at the southern entrance are presented in the noise chapter and summarised in the Compendium on Mitigation and are therefore not reproduced here.

> *"A commitment is given that no construction traffic vehicles will loiter outside the dwelling. "*

The above commitment in the Traffic chapter regarding traffic vehicles "loitering" or idling outside residential properties is detailed in the Mitigation measures in the Noise Chapter, based on best practice guidance outlined in BS5228-1: Code of practice for noise and vibration control on construction and open sites: Part 1: Noise. The noise chapter states that for night deliveries "vehicles on local roads do not wait outside residential properties with their engines idling "

> *"The residents will be kept informed of the traffic movements during construction by way of leaflet drops so they are aware of different stages of development/construction. "*

The traffic chapter refers to informing residents of traffic movements during construction by way of leaflet drops. Further details on consultation with the local community is detailed in the noise chapter, Chapter 7 Noise and Vibration Chapter, Section 7.6.1 Mitigation measures during construction, based on best practice in BS5228-1. The local community will be consulted routinely, with residents being advised on construction activities through a Community Liaison Officer, appointed prior to the project commencement. Community liaison is also set out in the CEMP Section 4.3.2 Noise and Vibration Management: Construction Stage Mitigation Measures.

> *"Commitment to keep speed below 20-30kph beside the dwelling to reduce noise/vibration from passing trucks. "*

The traffic chapter specified a commitment to limit HGV speeds outside the dwelling adjacent to the southern site entrance during the project to reduce noise/vibration from passing trucks. This limit will be applied to trucks entering the southern site entrance during the construction of the proposed development.

5.1.10 RFI Item (c):

(c) You are requested to submit a mitigation strategy for operational Amplitude Modulation and Tonal Noises.

5.1.11 *RFI Item (c) Response:*

5.1.12 Mitigation Strategy for Amplitude modulation and Tonal Noise

At the planning stage, it is not possible to predict the occurrence of amplitude modulation (AM) or tonal noise from wind turbines. During the operational phase of the wind farm, the operator will implement a formal strategy for managing complaints relating to AM and tonal noise, and implementing mitigation measures, as required.

The operator will investigate complaints relating to AM and tonal noise in collaboration with the turbine manufacturer. The following steps provide the protocol that will be applied to noise complaint investigations relating to AM and tonal noise, and the implementation of mitigation measures:

1. On receiving a complaint, a file will be opened by the wind farm operator where all correspondence, records and notes of meetings will be logged to ensure an accurate record is kept of the handling of the complaint.
2. The operator will acknowledge receipt of the complaint and seek more information on the issue from the complainant.
3. The operator will record the complaint details (type of noise issue, date/time, location, description, weather conditions, etc.) and request that the complainant completes a detailed Noise Record Log, covering periods when the noise occurs at the dwelling/residence. The Noise Record Log template will be based on best practice guidance outlined in ISO TS 15666 (2021) Acoustics — Assessment of noise annoyance by means of social and socio-acoustic surveys and Wind Energy Ireland (WEI) guidance.
4. The completed Noise Record Log will then be used to determine the specific conditions under which the complaint occurs.
5. In collaboration with the turbine manufacturer, the Noise Record Log will be reviewed alongside available records of turbine operational conditions and meteorological conditions for the relevant periods, to determine whether an operational correlation is identifiable and mitigation measures can be evaluated.

6. If the Noise Record Log review and operational correlation are insufficient to identify the issue and/or to evaluate mitigation, it will be determined if noise measurements are required.
7. If it is determined that noise measurements are required, they will be conducted by a competent acoustician, who has relevant experience in investigating wind turbine noise complaints and is a member of a recognised acoustics professional body.
8. The noise monitoring methodology will be based on best practice guidance at the time of the survey and will be agreed with the Planning Authority, in advance of monitoring. Current best practice for operational noise measurements and AM/tonal noise from wind farms includes:

    - The Institute of Acoustics (IOA) Supplementary Guidance Note 5 (SGN 5): Post Completion Measurements: This provides guidance on good practice on the principles for measuring wind turbine noise after the wind farm has been constructed.
    - Analyse for tones using a robust objective approach, such as the method outlined in UK Department for Energy Security and Net Zero (2026) document Assessment and Rating of Wind Turbine Noise Appendix B – Tonal Analysis (or equivalent agreed methodology).
    - Analyse for AM using a robust objective approach, such as the Institute of Acoustics (IOA) Noise Working Group (Wind Turbine Noise), Amplitude Modulation Working Group (2016), Final Report, A Method for Rating Amplitude Modulation in Wind Turbine Noise, Version 1, or equivalent agreed methodology.

9. Following the investigation (Steps 5-8 above), mitigation measures appropriate to the cause/source identified will be implemented, as required. Mitigation measures will typically be applied at the relevant turbine(s) and will be appropriate to the particular circumstances of the case. Mitigation measures may include:

    - Repairs to any broken/damaged equipment/components identified within the turbine(s).
    - Engineering modifications to mechanical and/or electrical components; and/or.
    - Software-based operational controls via the turbine control system (e.g., adjustments to operating modes, rotor speeds and/or blade pitch regulation).

10. Follow up noise monitoring will be undertaken to determine the effectiveness of the mitigation measures implemented, as required.
11. On completion of the investigation and implementation of mitigation measures, the wind farm operator will continue to have open communication with the complainant and will prepare a technical report to be submitted to the Planning Authority. The report will document the complaint details, the investigation undertaken, the analysis performed (including any follow-up monitoring/analysis, where required), the findings, and any proposed or implemented mitigation measures.

6. RFI ITEM 5: SENSITIVE RECEPTORS

You are requested to submit a table setting out the separation distances of the turbines from the nearest sensitive receptors. The sensitive receptors are to be appropriately labelled to allow for comparative analysis of the details provided in Table 7.3.1 of Appendix 7 (noise sensitive location details) and Table A12-1-1 of Appendix 12 (receptors assessed for shadow flicker).

6.1 RFI Item 5 Response:

Below in Table 6-1 is the full list of noise sensitive locations from Table 7.3.7 of Appendix 7 of the Noise and Vibration Chapter, and this is correlated with the visual receptors assessed for shadow flicker from Table A12-1-1 of Appendix 12 of the EIAR. The table summarises the separation distances from the noise sensitive locations to the nearest turbines.

Table 6-1 also shows what Noise Sensitive receptors were not considered in the Shadow flicker assessment with a footnote explaining why they were not assessed.

In summary Table 6-1, below, identifies the following noise receptors,

- R255 and R268 fall outside the 10 rotor diameter and is not considered within the shadow flicker assessment.
- R258 and R271 are both Schools and are located outside of the area where shadow flicker was predicted to occur.
- R288 is a caravan identified at time of original assessment which did not have an Eircode or a planning history and therefore was not included in the Shadow Flicker assessment. However, for robustness, we include an assessment of same now in Table 5-2 and Table 5-3, below.
- The remaining 3 no. Receptors R285, R286 and, R287 are all planning applications;
    - R285, planning permission lapsed in May 2023 and a follow up application was refused in November 2024. However again for robustness, we include an assessment of same in Table 5-2 and Table 5-3 below.
    - R286 is a planning application which should have been included in the Shadow Flicker assessment as planning was granted in October 2023. Please see Table 5-2 and Table 5-3 below for assessment.
    - R 287 is a caravan that has been recently identified, which does not have an Eircode or a planning history and therefore was not included in the Shadow Flicker Assessment. However, for robustness, we include an assessment of same now in Table 5-2 and Table 5-3 below.

Table 6-2 carries out an assessment of shadow flicker on the above properties and Table 6-3 updates the original Shadow Flicker assessment in Chapter 12 of the EIAR, with the additional four properties assessed.

Table 6-1: Noise Sensitive Locations and Corresponding Shadow Flicker Receptors from EIAR

Receptor ID from Noise Chapter	Visual Receptor from EIAR	Distance to turbine (m)										
		T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11
1	SFAL184	5031	4891	4326	3456	3719	3198	2955	2322	1432	1591	961
6	SFAL183	4998	4861	4295	3422	3684	3163	2921	2287	1403	1569	936
8	SFAL180	5026	4876	4311	3461	3731	3214	2960	2328	1412	1550	934
9	SFAL179	4899	4774	4208	3313	3568	3043	2813	2177	1328	1529	880
10	SFAL177	5001	4854	4288	3433	3702	3185	2932	2300	1391	1536	914
11	SFAL178	4859	4741	4175	3268	3519	2992	2768	2132	1305	1523	869
12	SFAL175	5060	4899	4334	3505	3781	3269	3004	2376	1434	1545	948
13	SFAL176	4830	4715	4150	3236	3486	2958	2737	2100	1286	1514	857
14	SFAL174	4823	4710	4145	3230	3478	2950	2730	2093	1282	1512	856
15	SFAL173	4779	4672	4108	3180	3425	2895	2682	2044	1258	1506	849
16	SFAL170	4917	4778	4212	3342	3606	3087	2841	2208	1320	1491	854
17	SFAL171	4764	4660	4095	3164	3407	2876	2666	2028	1250	1504	847
18	SFAL172	4697	4609	4046	3087	3319	2784	2592	1954	1239	1528	875
19	SFAL169	4742	4641	4077	3140	3381	2849	2642	2005	1240	1502	845
20	SFAL167	4855	4727	4161	3273	3531	3008	2772	2137	1279	1477	828
21	SFAL168	4726	4628	4063	3123	3363	2830	2626	1988	1231	1499	842
23	SFAL165	5044	4875	4310	3499	3781	3273	2998	2373	1413	1504	923
24	SFAL166	4764	4651	4086	3171	3421	2893	2672	2035	1226	1463	806
25	SFAL164	5059	4883	4319	3519	3805	3299	3019	2396	1424	1500	933
26	SFAL163	4726	4617	4052	3130	3378	2850	2631	1994	1199	1448	790
27	SFAL162	4699	4595	4031	3100	3344	2814	2602	1964	1189	1451	794
28	SFAL161	4656	4557	3993	3053	3294	2763	2556	1918	1165	1442	787
30	SFAL160	5061	4877	4314	3530	3821	3320	3031	2412	1424	1480	933

Receptor ID from Noise Chapter	Visual Receptor from EIAR	Distance to turbine (m)										
		T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11
31	SFAL158	4552	4470	3908	2939	3169	2633	2444	1807	1131	1449	811
32	SFAL157	4471	4407	3846	2850	3068	2529	2359	1725	1131	1480	866
34	SFAL154	4338	4290	3732	2710	2917	2375	2223	1594	1101	1483	912
35	SFAL153	4522	4421	3856	2922	3168	2640	2424	1786	1032	1324	676
37	SFAL151	4287	4251	3695	2655	2854	2309	2172	1548	1120	1517	968
38	SFAL149	4270	4237	3681	2637	2834	2289	2156	1532	1123	1524	982
39	SFAL145	4233	4204	3649	2599	2794	2248	2119	1498	1118	1524	995
40	SFAL144	4206	4181	3627	2572	2763	2217	2093	1474	1121	1532	1014
41	SFAL143	4181	4163	3610	2545	2731	2185	2069	1454	1138	1554	1049
45	SFAL136	3732	3737	3191	2094	2270	1722	1627	1034	1053	1496	1170
46	SFAL132	3647	3643	3096	2009	2196	1651	1538	937	982	1424	1137
47	SFAL125	4752	4480	3932	3359	3704	3268	2885	2340	1272	1074	916
49	SFAL126	3584	3575	3026	1948	2144	1601	1473	867	935	1375	1119
51	SFAL113	4840	4548	4006	3480	3833	3409	3013	2484	1422	1184	1091
52	SFAL108	4781	4492	3949	3416	3768	3342	2948	2418	1356	1120	1028
53	SFAL115	3604	3562	3006	1979	2205	1672	1490	859	752	1194	943
54	SFAL106	4747	4461	3917	3378	3730	3304	2910	2379	1316	1084	990
55	SFAL105	4716	4432	3887	3346	3698	3271	2878	2347	1285	1052	962
56	SFAL103	4483	4222	3671	3080	3424	2989	2605	2063	997	800	680
57	SFAL96	4463	4189	3640	3084	3435	3011	2615	2089	1032	791	756
58	SFAL99	3467	3416	2859	1849	2089	1565	1356	721	694	1125	963
59	SFAL101	3116	3339	2892	1646	1567	1125	1446	1342	2158	2555	2437
60	SFAL100	3107	3340	2900	1656	1563	1135	1472	1387	2213	2609	2493
61	SFAL97	3431	3387	2831	1809	2044	1518	1318	685	736	1163	1014

Receptor ID from Noise Chapter	Visual Receptor from EIAR	Distance to turbine (m)										
		T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11
62	SFAL93	3044	3286	2851	1610	1504	1091	1447	1396	2248	2638	2539
63	SFAL92	3047	3226	2755	1509	1489	995	1250	1092	1911	2303	2205
64	SFAL91	3030	3258	2815	1570	1482	1049	1388	1319	2170	2559	2463
65	SFAL85	4347	4068	3521	2981	3337	2922	2517	2004	960	684	740
66	SFAL89	3007	3239	2799	1555	1461	1035	1381	1327	2188	2575	2485
67	SFAL87	2988	3224	2786	1544	1444	1024	1378	1336	2205	2591	2505
68	SFAL86	2994	3162	2686	1442	1436	932	1173	1016	1854	2241	2160
69	SFAL84	2966	3205	2770	1528	1424	1009	1370	1340	2218	2601	2521
70	SFAL83	2955	3198	2767	1527	1415	1009	1378	1360	2243	2625	2549
71	SFAL82	2929	3197	2781	1554	1408	1044	1445	1469	2370	2749	2679
72	SFAL80	2887	3135	2708	1472	1350	956	1339	1351	2258	2634	2574
73	SFAL79	2864	3131	2716	1490	1342	983	1390	1436	2356	2728	2675
74	SFAL78	2837	3107	2695	1472	1318	967	1381	1440	2369	2739	2691
75	SFAL77	2834	3109	2701	1481	1320	979	1399	1466	2397	2766	2720
76	SFAL73	2789	2999	2551	1305	1234	784	1131	1131	2062	2428	2397
77	SFAL74	2800	3089	2691	1482	1301	989	1425	1520	2463	2828	2790
78	SFAL68	2746	2957	2509	1264	1191	743	1098	1119	2064	2425	2406
79	SFAL59	2614	2956	2603	1458	1199	1028	1511	1720	2713	3059	3065
80	SFAL58	2640	3004	2669	1550	1269	1137	1624	1845	2838	3184	3186
82	SFAL56	2485	2806	2441	1286	1037	857	1343	1582	2596	2929	2963
83	SFAL55	4099	3746	3226	2909	3295	2961	2501	2110	1241	810	1245
83A	SFAL53	4114	3750	3236	2950	3339	3014	2550	2173	1321	887	1330
83B	SFAL50	4067	3679	3178	2968	3363	3065	2590	2253	1462	1020	1507
86	SFAL52	3917	3552	3038	2772	3164	2854	2383	2034	1253	810	1334

Receptor ID from Noise Chapter	Visual Receptor from EIAR	Distance to turbine (m)										
		T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11
87	SFAL51	2166	2498	2153	1057	754	724	1219	1581	2636	2934	3037
89	SFAL43	1933	2440	2281	1579	1176	1477	1925	2398	3466	3732	3885
92	SFAL40	1861	2387	2256	1624	1221	1558	1992	2484	3554	3810	3979
93	SFAL39	1816	2334	2194	1557	1154	1498	1928	2426	3496	3749	3923
94	SFAL38	1771	2307	2197	1624	1224	1593	2012	2523	3592	3839	4024
98	SFAL34	1534	2093	2031	1614	1229	1668	2044	2595	3661	3881	4107
99	SFAL33	1209	1706	1585	1204	852	1359	1669	2259	3308	3497	3770
100	SFAL32	1315	1852	1772	1403	1036	1518	1856	2432	3489	3690	3945
101	SFAL31	1289	1820	1733	1365	1002	1489	1821	2401	3456	3654	3913
102	SFAL30	1428	1991	1943	1584	1209	1672	2029	2594	3656	3865	4107
103	SFAL29	1396	1958	1911	1565	1193	1662	2013	2582	3642	3848	4095
104	SFAL28	1214	1760	1700	1407	1056	1558	1873	2462	3512	3701	3973
105	SFAL27	1011	1471	1335	1068	772	1314	1557	2172	3199	3362	3671
106	SFAL26	946	1106	765	693	683	1155	1174	1810	2750	2849	3236
107	SFAL25	641	1269	1464	1788	1562	2111	2289	2922	3906	4018	4389
118	SFAL23	950	1520	1855	2320	2095	2644	2821	3456	4431	4530	4916
122	SFAL22	890	1445	1797	2309	2098	2648	2809	3446	4411	4501	4897
125	SFAL21	756	1271	1658	2272	2093	2641	2768	3405	4346	4417	4835
126	SFAL20	861	1381	1765	2348	2155	2705	2846	3483	4434	4511	4922
127	SFAL19	942	1470	1848	2402	2198	2748	2901	3538	4496	4580	4984
128	SFAL18	825	1338	1728	2329	2143	2693	2826	3464	4409	4483	4898
129	SFAL17	751	1248	1648	2288	2117	2665	2783	3421	4355	4422	4844
131	SFAL16	944	1458	1848	2425	2227	2777	2924	3561	4514	4594	5002
132	SFAL15	881	1385	1782	2387	2198	2748	2884	3522	4467	4541	4956

Receptor ID from Noise Chapter	Visual Receptor from EIAR	Distance to turbine (m)										
		T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11
132	SFAL1	1101	887	1447	2587	2598	3079	3003	3596	4335	4283	4819
134	SFAL14	697	1152	1577	2281	2130	2675	2771	3408	4326	4380	4816
135	SFAL13	934	1437	1835	2432	2239	2789	2930	3567	4516	4592	5004
136	SFAL12	641	1048	1495	2257	2127	2667	2742	3377	4278	4321	4768
138	SFAL11	954	1434	1849	2476	2290	2840	2973	3611	4553	4623	5042
140	SFAL10	660	1001	1475	2294	2180	2716	2773	3406	4290	4323	4781
204	SFAL81	2944	3256	2872	1674	1474	1188	1626	1703	2617	2994	2925
233	SFAL140	4042	4071	3530	2403	2547	1997	1953	1380	1327	1764	1332
237	SFAL117	3266	3448	2976	1730	1708	1217	1458	1238	1959	2370	2209
238	SFAL114	4821	4530	3988	3456	3808	3382	2988	2458	1395	1161	1062
239	SFAL104	3169	3402	2960	1715	1625	1194	1524	1420	2223	2624	2493
240	SFAL139	4050	4075	3533	2411	2559	2009	1958	1381	1307	1744	1307
241	SFAL138	4109	4129	3586	2469	2620	2070	2014	1431	1315	1747	1290
242	SFAL124	3315	3497	3024	1779	1757	1265	1502	1269	1967	2381	2207
243	SFAL142	4154	4142	3590	2516	2697	2149	2043	1432	1158	1579	1087
244	SFAL118	3258	3470	3015	1767	1705	1247	1538	1375	2127	2536	2380
245	SFAL94	3064	3242	2770	1524	1505	1010	1264	1099	1910	2304	2201
246	SFAL120	3275	3478	3017	1769	1720	1250	1525	1340	2076	2486	2325
247	SFAL122	3288	3469	2996	1751	1730	1238	1475	1247	1956	2369	2201
248	SFAL150	4179	4182	3634	2540	2707	2157	2074	1475	1254	1678	1189
249	SFAL102	3132	3373	2937	1695	1592	1175	1520	1441	2263	2660	2539
250	SFAL146	4061	4080	3537	2422	2576	2026	1965	1381	1278	1712	1269
251	SFAL112	3243	3456	3001	1753	1690	1233	1526	1368	2127	2534	2382
252	SFAL90	3026	3279	2852	1615	1493	1098	1470	1441	2305	2693	2599

Receptor ID from Noise Chapter	Visual Receptor from EIAR	Distance to turbine (m)										
		T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11
253	SFAL88	2998	3272	2859	1633	1483	1124	1523	1533	2416	2800	2715
254	SFAL62	2614	2915	2530	1342	1131	876	1341	1516	2504	2851	2856
255[1]	N/A	3346	3557	3100	1853	1793	1332	1615	1428	2144	2559	2380
256	SFAL129	3352	3542	3073	1827	1794	1311	1559	1333	2023	2440	2256
257	SFAL109	3230	3437	2979	1731	1675	1211	1497	1333	2092	2499	2350
258[2]	N/A	3226	3445	2995	1747	1676	1226	1531	1388	2159	2565	2418
259	SFAL127	3330	3514	3041	1796	1772	1282	1521	1287	1980	2395	2217
260	SFAL134	3693	3683	3133	2057	2249	1705	1582	974	955	1397	1089
261	SFAL95	3072	3310	2872	1629	1530	1109	1455	1388	2228	2621	2514
262	SFAL130	3362	3555	3087	1841	1805	1324	1576	1353	2042	2459	2273
263	SFAL110	3249	3434	2964	1718	1691	1203	1452	1243	1975	2384	2228
264	SFAL116	3259	3454	2989	1742	1702	1225	1489	1294	2030	2440	2282
265	SFAL98	3089	3337	2905	1666	1553	1147	1505	1449	2289	2683	2573
266	SFAL141	4054	4078	3536	2415	2564	2014	1961	1383	1301	1737	1298
267	SFAL148	4156	4165	3618	2516	2678	2128	2054	1460	1274	1701	1223
268[1]	N/A	3361	3568	3108	1860	1807	1341	1614	1415	2120	2536	2352
269	SFAL111	3245	3442	2978	1731	1688	1213	1482	1296	2040	2449	2294
270	SFAL107	3234	3422	2953	1707	1676	1191	1446	1246	1987	2396	2244
271[2]	N/A	3207	3438	2994	1748	1662	1227	1550	1432	2219	2623	2482
272	SFAL60	2604	2892	2499	1301	1105	825	1284	1452	2441	2787	2795
27 3	SFAL137	4079	4074	3524	2441	2617	2068	1971	1366	1153	1582	1118
274	SFAL152	4309	4268	3711	2678	2881	2337	2194	1567	1111	1502	943
275	SFAL128	3344	3531	3061	1815	1786	1300	1545	1315	2006	2423	2241
276	SFAL121	3283	3475	3008	1762	1726	1245	1502	1296	2018	2430	2265

Receptor ID from Noise Chapter	Visual Receptor from EIAR	Distance to turbine (m)										
		T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11
277	SFAL5	811	851	1402	2412	2365	2876	2862	3479	4294	4283	4783
278	SFAL6	792	877	1421	2406	2349	2865	2862	3482	4307	4302	4796
279	SFAL9	660	986	1465	2296	2187	2722	2774	3406	4287	4317	4778
280	SFAL4	915	784	1350	2443	2434	2926	2873	3477	4249	4215	4735
281	SFAL8	707	1061	1533	2335	2214	2752	2817	3451	4341	4376	4832
282	SFAL3	995	809	1373	2495	2498	2983	2916	3514	4268	4225	4753
283	SFAL2	1016	804	1366	2499	2508	2990	2916	3512	4257	4210	4742
284	SFAL7	803	742	1302	2359	2336	2835	2798	3408	4201	4179	4689
285[3]	N/A	3505	3476	2923	1876	2093	1558	1390	767	816	1251	1047
286[3]	N/A	3063	3247	2780	1533	1504	1017	1282	1130	1945	2339	2235
287[4]	N/A	3705	3699	3151	2068	2256	1711	1596	992	982	1425	1111
288[4]	N/A	879	1430	1786	2310	2101	2652	2809	3446	4409	4497	4895
289[5] (Also location 274)	SFAL152	4312	4271	3714	2682	2884	2341	2198	1570	1113	1504	944

1. Outside 10x rotor diameter considered for shadow flicker
2. School, outside calculated shadow cast area
3. Included as planning application for house, not currently constructed
4. Caravan
5. R274 and R289 represent same residential property which was assessed for SF as per R274.

Table 6-2: Noise Sensitive Locations not considered in Shadow Flicker Assessment in EIAR

Shadow Flicker Receptor ID	Noise ID	Type	Comment	Total Theoretical Hours Per Year (HH:MM)	Theoretical Maximum Level Per Day (HH:MM)	More Realistic Hours Per Year (HH:MM)
N/A	255	Residential	Was not considered in the Shadow Flicker assessment, however this residential is outside 10x rotor diameter considered for shadow flicker.	N/A- outside 10 Rotor	N/A- outside 10 Rotor	N/A- outside 10 Rotor
N/A	258	Commercial (school)	Was not considered in the Shadow Flicker assessment, this is a school. No (zero) shadow flicker occurrence is predicted (confirmed after modelling).	00:00	00:00	00:00
N/A	268	Residential	Was not considered in the Shadow Flicker assessment, however this residential is outside 10x rotor diameter considered for shadow flicker.	N/A- outside 10 Rotor	N/A- outside 10 Rotor	N/A- outside 10 Rotor
N/A	271	Commercial (school)	Was not considered in the Shadow Flicker assessment, this is a school and no shadow flicker occurrence is predicted.	00:00	00:00	00:00

Shadow Flicker Receptor ID	Noise ID	Type	Comment	Total Theoretical Hours Per Year (HH:MM)	Theoretical Maximum Level Per Day (HH:MM)	More Realistic Hours Per Year (HH:MM)
N/A	285	Residential	Was not considered in the Shadow Flicker assessment as planning permission lapsed in May 2023 and a follow up application was refused in November 2024. 19h 36min per year of shadow flicker occurrence is predicted (confirmed after modelling) when using the more realistic assumptions. Over 30min / day also predicted.	71:30:00	00:43	19:36
N/A	286	Residential	This is a planning application which should have been included in the Shadow Flicker assessment as planning was granted in October 2023. Please see Table 5-2 and 5-3 for assessment. 3h 54min per year of shadow flicker occurrence is predicted (confirmed after modelling) when using the more realistic assumptions. Over 30min / day also predicted.	15:15	00:31	03:54

Shadow Flicker Receptor ID	Noise ID	Type	Comment	Total Theoretical Hours Per Year (HH:MM)	Theoretical Maximum Level Per Day (HH:MM)	More Realistic Hours Per Year (HH:MM)
N/A	287	Residential	Was not considered in the Shadow Flicker assessment as this is a caravan that has been recently identified, which does not have an Eircode or a planning history and therefore was not included in the Shadow Flicker Assessment. 9h 57min per year of shadow flicker occurrence is predicted (confirmed after modelling) when using the more realistic assumptions. Over 30min / day also predicted.	36:55:00	00:37	09:57
N/A	288	Residential	Was not considered in the Shadow Flicker assessment as this is a caravan which has no Eircode and no planning history. If considered as a receptor, 9h 53min per year of shadow flicker occurrence is predicted (confirmed after modelling) when using the more realistic assumptions. Over 30min / day also predicted.	27:41:00	00:38	09:53
N/A	289/274	Residential	Represented by shadow flicker assessment at SFAL152			

Table 6-3: Shadow Flicker Predicted Levels by Receptor including additional Noise Sensitive Locations

SFAL ID	Coordinates (ITM)		Total Theoretical Days Per Year	Theoretical Maximum Level Per Day (HH:MM) - in red when >30 min	Theoretical Maximum Level Per Year (HH:MM) - in orange when >30 h	More Realistic-case level Per Year (HH:MM) - in red when >30 h
	X	Y				
SFAL1	674229	733318	0	0:00	0:00	0:00
SFAL2	674221	733407	0	0:00	0:00	0:00
SFAL3	674181	733414	0	0:00	0:00	0:00
SFAL4	674105	733473	0	0:00	0:00	0:00
SFAL5	673885	733540	0	0:00	0:00	0:00
SFAL6	673827	733558	0	0:00	0:00	0:00
SFAL7	674026	733568	0	0:00	0:00	0:00
SFAL8	673479	733745	67	0:35	25:21	9:02
SFAL9	673557	733756	87	0:36	34:50	12:11
SFAL10	673535	733767	71	0:35	28:26	10:06
SFAL11	673064	733801	63	0:31	23:04	7:33
SFAL12	673456	733840	54	0:34	20:13	7:12
SFAL13	673046	733865	83	0:39	40:19	13:27
SFAL14	673338	733870	42	0:30	13:47	4:49
SFAL15	673094	733888	83	0:42	43:48	14:36
SFAL16	673019	733891	92	0:39	43:50	14:50
SFAL17	673227	733922	107	0:42	45:19	15:07
SFAL18	673133	733930	87	0:44	48:49	16:21
SFAL19	672999	733933	88	0:38	34:28	12:02
SFAL20	673088	733937	96	0:43	50:30	17:06
SFAL21	673196	733960	124	0:51	65:56	22:09
SFAL22	673010	734039	62	0:39	26:01	9:17
SFAL23	672931	734086	50	0:35	19:07	6:44
SFAL24	672628	734257	32	0:24	8:00	2:38
SFAL25	673229	734530	65	0:53	38:26	10:56

SFAL ID	Coordinates (ITM)		Total Theoretical Days Per Year	Theoretical Maximum Level Per Day (HH:MM) - in red when >30 min	Theoretical Maximum Level Per Year (HH:MM) - in orange when >30 h	More Realistic-case level Per Year (HH:MM) - in red when >30 h
	X	Y				
SFAL26	674154	735244	104	0:48	62:15	14:53
SFAL27	673494	735298	66	0:33	25:32	8:23
SFAL28	673100	735309	108	0:34	41:13	11:50
SFAL29	672901	735379	60	0:30	19:28	6:55
SFAL30	672874	735398	54	0:30	17:11	6:08
SFAL31	673104	735405	103	0:36	42:47	14:07
SFAL32	673063	735408	119	0:35	44:41	14:20
SFAL33	673274	735416	110	0:39	46:09	15:38
SFAL34	672816	735488	42	0:27	12:20	4:24
SFAL35	672743	735543	38	0:27	10:36	3:42
SFAL36	672746	735583	39	0:27	11:08	3:52
SFAL37	672747	735636	36	0:27	10:01	3:28
SFAL38	672759	735750	37	0:28	10:44	3:39
SFAL39	672820	735850	36	0:28	11:16	3:39
SFAL40	672753	735858	34	0:27	9:56	3:11
SFAL41	672742	735902	32	0:26	9:06	2:49
SFAL42	672735	735966	32	0:26	9:03	2:41
SFAL43	672799	735976	36	0:29	11:02	3:16
SFAL44	672717	736095	31	0:26	8:29	2:29
SFAL45	677379	736252	23	0:06	1:45	0:33
SFAL46	677365	736267	26	0:08	2:20	0:44
SFAL47	677336	736303	35	0:12	4:54	1:34
SFAL48	677315	736344	41	0:18	8:32	2:44
SFAL49	672736	736334	32	0:25	8:31	2:18
SFAL50	677277	736530	82	0:36	39:26	13:12
SFAL51	673497	736488	184	0:49	115:44	29:38
SFAL52	677063	736582	66	0:41	32:10	10:34
SFAL53	677213	736711	83	0:53	47:03	16:41

SFAL ID	Coordinates (ITM)		Total Theoretical Days Per Year	Theoretical Maximum Level Per Day (HH:MM) - in red when >30 min	Theoretical Maximum Level Per Year (HH:MM) - in orange when >30 h	More Realistic-case level Per Year (HH:MM) - in red when >30 h
	X	Y				
SFAL54	672936	736693	71	0:26	19:29	5:08
SFAL55	677152	736770	80	0:59	52:02	18:31
SFAL56	673461	736805	130	0:40	54:27	13:20
SFAL57	672981	736840	32	0:26	8:48	2:22
SFAL58	673200	736910	83	0:30	28:39	6:43
SFAL59	673325	736912	73	0:34	24:08	5:54
SFAL60	673596	736942	119	0:56	65:29	15:53
SFAL61	677477	737007	40	0:33	15:06	4:56
SFAL62	673532	736945	70	0:43	33:48	8:30
SFAL63	677503	737018	40	0:31	13:27	4:21
SFAL64	677540	737041	37	0:29	12:11	3:52
SFAL65	677551	737088	36	0:30	11:55	3:39
SFAL66	677578	737106	35	0:28	11:08	3:21
SFAL67	677486	737125	93	0:32	29:49	9:50
SFAL68	673958	737094	112	1:00	66:38	15:41
SFAL69	677645	737163	32	0:26	9:13	2:43
SFAL70	677585	737168	35	0:28	11:01	3:15
SFAL71	677503	737174	87	0:31	27:04	8:52
SFAL72	677650	737196	33	0:27	9:48	2:53
SFAL73	673957	737137	106	0:59	58:52	13:50
SFAL74	673556	737135	79	0:38	41:17	9:33
SFAL75	677602	737203	35	0:29	11:09	3:17
SFAL76	677590	737237	35	0:28	10:35	3:06
SFAL77	673620	737175	67	0:38	36:02	8:06
SFAL78	673648	737180	63	0:37	32:42	7:17
SFAL79	673660	737208	57	0:37	28:07	6:11
SFAL80	673757	737236	39	0:31	15:48	3:21

SFAL ID	Coordinates (ITM)		Total Theoretical Days Per Year	Theoretical Maximum Level Per Day (HH:MM) - in red when >30 min	Theoretical Maximum Level Per Year (HH:MM) - in orange when >30 h	More Realistic-case level Per Year (HH:MM) - in red when >30 h
	X	Y				
SFAL81	673398	737260	73	0:32	28:39	6:39
SFAL82	673645	737272	47	0:33	20:36	4:25
SFAL83	673772	737304	4	0:03	0:09	0:01
SFAL84	673797	737316	0	0:00	0:00	0:00
SFAL85	676970	737369	212	0:51	132:15	41:07
SFAL86	674162	737327	50	0:36	20:22	5:15
SFAL87	673811	737338	0	0:00	0:00	0:00
SFAL88	673600	737337	35	0:24	11:25	2:25
SFAL89	673829	737357	33	0:27	9:29	2:29
SFAL90	673712	737373	0	0:00	0:00	0:00
SFAL91	673848	737379	34	0:27	9:55	2:35
SFAL92	674108	737386	46	0:32	16:36	4:15
SFAL93	673770	737393	0	0:00	0:00	0:00
SFAL94	674110	737402	45	0:31	15:48	4:02
SFAL95	673792	737421	0	0:00	0:00	0:00
SFAL96	677025	737480	187	0:48	97:41	30:05
SFAL97	675303	737455	198	0:54	115:39	31:06
SFAL98	673732	737437	0	0:00	0:00	0:00
SFAL99	675352	737472	206	0:52	122:55	33:16
SFAL100	673810	737457	0	0:00	0:00	0:00
SFAL101	673866	737466	0	0:00	0:00	0:00
SFAL102	673762	737481	0	0:00	0:00	0:00
SFAL103	676966	737567	204	0:51	109:06	32:50
SFAL104	673806	737519	0	0:00	0:00	0:00
SFAL105	677254	737608	127	0:36	45:26	13:26
SFAL106	677283	737622	121	0:35	43:34	12:49
SFAL107	674052	737577	48	0:30	14:47	3:41
SFAL108	677321	737631	87	0:34	32:05	9:29

SFAL ID	Coordinates (ITM)		Total Theoretical Days Per Year	Theoretical Maximum Level Per Day (HH:MM) - in red when >30 min	Theoretical Maximum Level Per Year (HH:MM) - in orange when >30 h	More Realistic-case level Per Year (HH:MM) - in red when >30 h
	X	Y				
SFAL109	673946	737578	0	0:00	0:00	0:00
SFAL110	674067	737591	48	0:29	14:56	3:44
SFAL111	674001	737591	42	0:28	12:50	3:12
SFAL112	673913	737592	0	0:00	0:00	0:00
SFAL113	677385	737650	81	0:32	27:57	8:11
SFAL114	677356	737652	86	0:33	29:12	8:33
SFAL115	675352	737623	153	0:47	71:28	19:33
SFAL116	674013	737605	44	0:28	13:22	3:20
SFAL117	674086	737607	52	0:30	16:27	4:07
SFAL118	673915	737606	0	0:00	0:00	0:00
SFAL119	677490	737665	72	0:28	21:43	6:19
SFAL120	673970	737623	0	0:00	0:00	0:00
SFAL121	674029	737628	46	0:28	14:00	3:30
SFAL122	674093	737629	54	0:30	16:55	4:14
SFAL123	677425	737691	74	0:29	23:04	6:37
SFAL124	674087	737656	56	0:30	16:54	4:14
SFAL125	677209	737706	138	0:39	52:55	14:57
SFAL126	675175	737678	88	0:37	36:04	10:12
SFAL127	674077	737671	56	0:29	16:37	4:09
SFAL128	674053	737687	54	0:28	15:25	3:52
SFAL129	674038	737696	0	0:00	0:00	0:00
SFAL130	674020	737707	0	0:00	0:00	0:00
SFAL131	677548	737774	32	0:26	9:04	2:41
SFAL132	675160	737751	86	0:36	33:53	9:16
SFAL133	677501	737797	34	0:28	10:30	3:06
SFAL134	675210	737781	96	0:38	38:43	10:28
SFAL135	677583	737820	31	0:26	8:33	2:31
SFAL136	675138	737851	82	0:33	29:24	7:53
SFAL137	675290	738164	106	0:35	46:03	10:52

SFAL ID	Coordinates (ITM)		Total Theoretical Days Per Year	Theoretical Maximum Level Per Day (HH:MM) - in red when >30 min	Theoretical Maximum Level Per Year (HH:MM) - in orange when >30 h	More Realistic-case level Per Year (HH:MM) - in red when >30 h
	X	Y				
SFAL138	675140	738199	105	0:30	37:17	8:56
SFAL139	675099	738201	106	0:28	32:22	7:51
SFAL140	675071	738201	77	0:27	20:23	4:52
SFAL141	675109	738202	105	0:28	32:01	7:44
SFAL142	675355	738219	89	0:32	33:56	7:58
SFAL143	675405	738229	86	0:35	32:47	7:48
SFAL144	675452	738237	80	0:36	27:41	6:43
SFAL145	675485	738251	67	0:37	24:43	6:11
SFAL146	675140	738249	101	0:29	36:14	8:32
SFAL147	677150	738295	48	0:34	17:55	4:31
SFAL148	675227	738269	96	0:31	35:56	8:23
SFAL149	675521	738277	58	0:35	24:27	6:08
SFAL150	675271	738278	89	0:29	31:19	7:18
SFAL151	675545	738285	64	0:37	26:23	6:37
SFAL152	675583	738292	73	0:39	31:14	7:48
SFAL153	676045	738300	61	0:52	43:03	9:32
SFAL154	675634	738301	101	0:41	40:56	9:59
SFAL155	677036	738365	66	0:36	26:03	6:30
SFAL156	677290	738377	40	0:28	11:53	2:59
SFAL157	675789	738376	73	0:45	47:44	10:51
SFAL158	675929	738396	53	0:42	29:59	6:32
SFAL159	677004	738428	87	0:36	33:45	8:04
SFAL160	676842	738427	71	0:43	43:16	9:48
SFAL161	676085	738431	10	0:09	1:09	0:14
SFAL162	676139	738451	0	0:00	0:00	0:00

SFAL ID	Coordinates (ITM)		Total Theoretical Days Per Year	Theoretical Maximum Level Per Day (HH:MM) - in red when >30 min	Theoretical Maximum Level Per Year (HH:MM) - in orange when >30 h	More Realistic-case level Per Year (HH:MM) - in red when >30 h
	X	Y				
SFAL163	676186	738455	0	0:00	0:00	0:00
SFAL164	676786	738465	59	0:39	31:24	6:56
SFAL165	676739	738481	49	0:37	23:59	5:10
SFAL166	676228	738475	0	0:00	0:00	0:00
SFAL167	676369	738497	0	0:00	0:00	0:00
SFAL168	676115	738495	0	0:00	0:00	0:00
SFAL169	676135	738502	0	0:00	0:00	0:00
SFAL170	676465	738509	0	0:00	0:00	0:00
SFAL171	676167	738508	0	0:00	0:00	0:00
SFAL172	676030	738507	0	0:00	0:00	0:00
SFAL173	676189	738514	0	0:00	0:00	0:00
SFAL174	676256	738527	0	0:00	0:00	0:00
SFAL175	676688	738534	25	0:20	6:20	1:18
SFAL176	676265	738529	0	0:00	0:00	0:00
SFAL177	676566	738545	0	0:00	0:00	0:00
SFAL178	676302	738541	0	0:00	0:00	0:00
SFAL179	676367	738549	0	0:00	0:00	0:00
SFAL180	676597	738555	0	0:00	0:00	0:00
SFAL181	676775	738570	35	0:27	12:28	2:38
SFAL182	675770	738566	39	0:29	14:36	3:06
SFAL183	676499	738585	0	0:00	0:00	0:00
SFAL184	676530	738604	0	0:00	0:00	0:00
SFAL185	676557	738972	0	0:00	0:00	0:00
Noise ID 285	675253	737559	0	71:30:00	00:43	19:36
Noise ID 286	674075	737404	0	15:15	00:31	03:54
Noise ID 287	675191	737802	0	36:55:00	00:37	09:57
Noise ID 288	673026	734027	0	27:41:00	00:38	09:53

SFAL ID	Coordinates (ITM)		Total Theoretical Days Per Year	Theoretical Maximum Level Per Day (HH:MM) - in red when >30 min	Theoretical Maximum Level Per Year (HH:MM) - in orange when >30 h	More Realistic-case level Per Year (HH:MM) - in red when >30 h
	X	Y				
Totals			Number of Receptors that may Experience:			
			Any Shadow Flicker	>30 Mins / Day	>30 Hours / Theorethical Maximum	>30 Hours / Year More realistic case
			147	84	57	5

Of the nine locations considered in the EIAR noise assessment which were not considered in the EIAR shadow flicker assessment, four were excluded as part of the shadow flicker assessment due to being either outside of the study area or outside of the area over which shadows may be cast.

One location was considered as two locations within the noise assessment, but as a single location within the shadow flicker assessment and therefore has been assessed.

The remaining four locations have been assessed, and while realistic annual levels are below the 30 hour threshold, in the absence of mitigation daily levels may exceed the 30 mins per day threshold.

In summary, shadow flicker is present at an additional four properties, compared to the Shadow Flicker assessment carried out in the original EIAR. In line with the approach detailed in the EIAR, a "zero shadow flicker" strategy will be implemented using turbine control software to cease turbine operation during periods when shadow flicker is predicted to occur at these properties. Where this mitigation strategy is adopted, then minimal (as close to zero as possible) shadow flicker would occur (except potentially short periods when the rotor comes to a stop) at these additional properties.

This response should be considered as an addendum to the original Shadow Flicker assessment contained in Chapter 12 of the original EIAR submitted.

7. RFI ITEM 6: LANDSCAPE

You are requested to consider the proposed variation to the Kildare County Development Plan 2023-2029 to replace the Landscape Character Assessment (2004) with the Landscape Character Assessment (2025). The variation comprises of amendments to Chapter 12 Landscape, Recreation and Amenity of the Written Statement (Volume 1), Appendix 2 Wind Energy Strategy and the insertion of a new Appendix 13 Landscape Character Assessment (2025). Any alterations to the EIAR and associated appendices to be clearly delineated.

7.1 RFI Item 6 Response:

In response to the request by ACP to consider the proposed variation to the Kildare County Development Plan 2023-2029 to replace the Landscape Character Assessment (2004) with the Landscape Character Assessment (2025), by way of response, a direct comparison between the landscape, visual and wind energy related sections of the Kildare County Development Plan (2023-2029) and its latest variation (variation 4) will be undertaken to determine if the changes alter the findings of the original LVIA.

The new Landscape Character Assessment that has been introduced as part of Variation 4 of the CDP has identified Landscape Character Types (LCT) as a higher tier of landscape unit than the Landscape Character Areas (LCA) identified in the current CDP, as shown in Figure 7-1, Figure 7-2, Figure 7-3 and Figure 7-5, below.

These LCT are an additional, rather than replacement, layer of characterisation that relates to generic landscape character that is not as geographically specific as the LCA layer. The proposed wind farm development is contained in the 'Peatland and Semi-natural Vegetation' LCT abutting the 'Lowland Plains' LCT to the north, Figure 6-1, below. The LCT are a building block for landscape policy and their introduction does not have any specific bearing on the findings of the original LVIA.

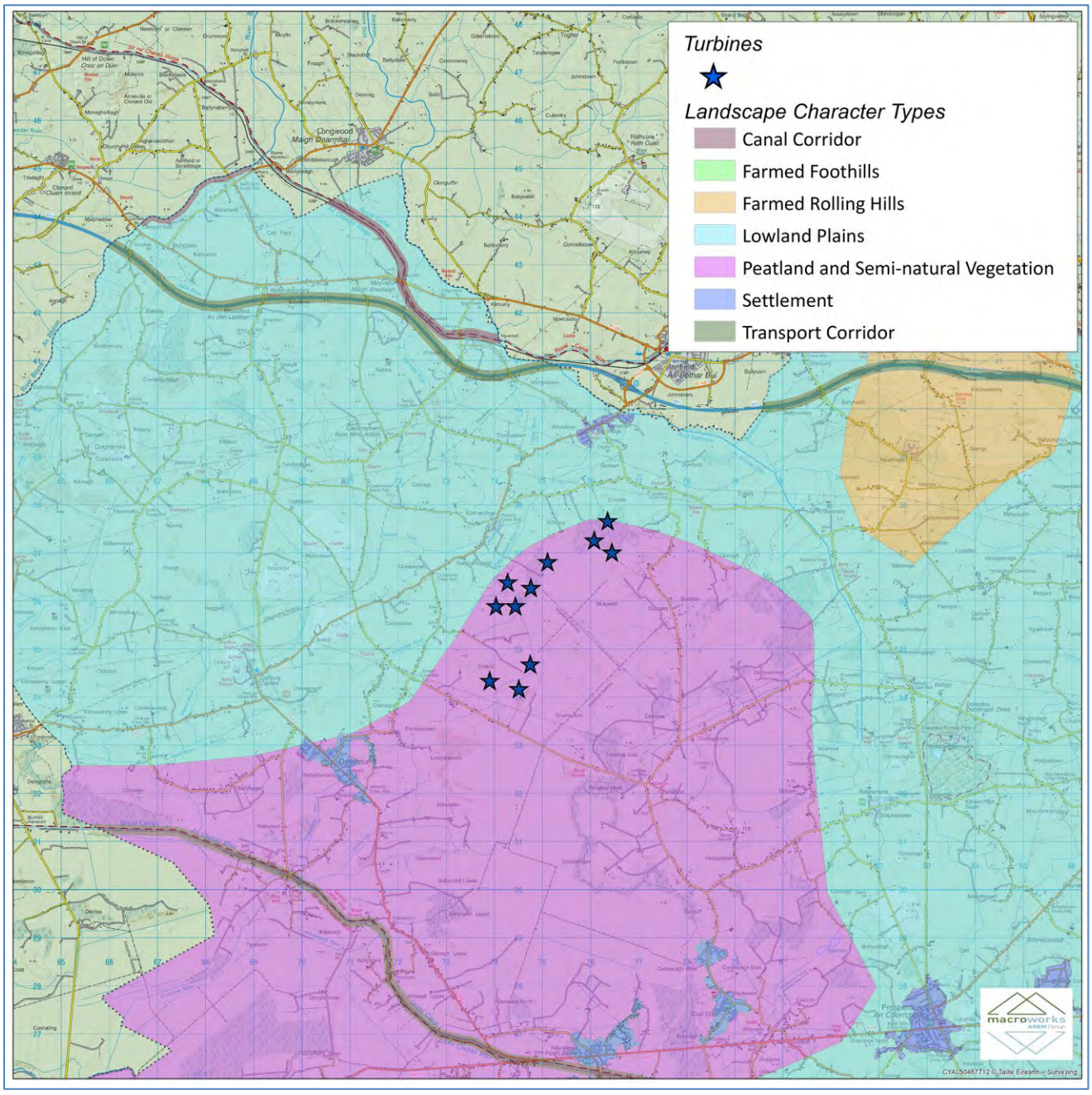


Figure 7-1: Landscape Character Types (LCT) from the Kildare Landscape Character Assessment 2025 subject of Variation 4 of the Kildare CDP

The original LVIA identified that the proposed Drehid Wind Farm is wholly contained within the 'Western Boglands' LCA, albeit at the northern fringes of this LCA, where it coincides with the 'North-Western Lowlands' LCA. Both of these LCAs have different names in the new Landscape Character Assessment and the boundary between them has been rationalised slightly so that they are divided more accurately between peatland and farmland. The former 'Western Boglands' has become the 'Bog of Allen' and 'North Western Lowlands' has become 'Carbury Boyne Lowlands'.

The proposed wind farm continues to skirt the boundary between the two relevant LCA's and now shares turbines between them, Figure 6-2, below. Seven of the turbines remain in the 'Bog of Allen' LCA, three are contained within the Carbury Boyne Lowlands LCA and one sits right on the border between them. As with the original LVIA, both remain relevant to the assessment and the change of names and adjustment of boundaries does not result in a change of findings for the LVIA. However, it is also important to reiterate that in landscape planning terms, borders between LCAs are seldom abrupt and the border landscape character will invariably be experienced as a transitional combination of characteristics from both units, as is the case here.

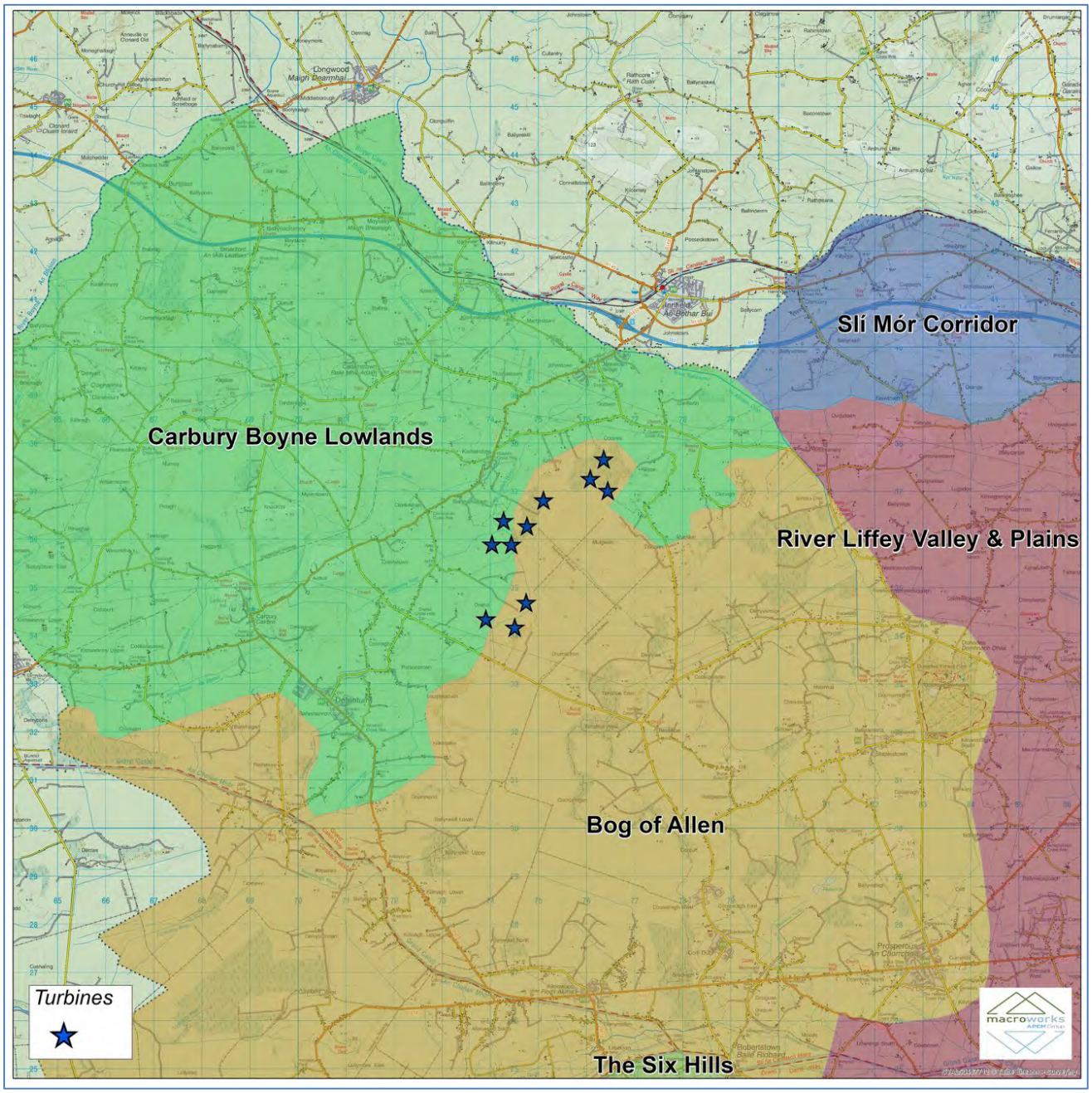


Figure 7-2: Landscape Character Areas (LCA) from the Kildare Landscape Character Assessment 2025 subject of Variation 4 of the Kildare CDP

In terms of landscape sensitivity, the original LVIA noted that the former 'Western Boglands' LCA, now 'Bog of Allen' LCA, was categorised as being of 'High' Sensitivity and the former 'North Western Lowlands' LCA, now 'Carbury Boyne lowlands' LCA, was of 'Low' sensitivity, as shown in Figure 7-3, below.

These have been reclassified in the 2025 Landscape Character Assessment as being a more closely aligned 'Medium to High' and 'Medium' sensitivity. This is considered to be an appropriately rationalised change as it is difficult to justify a High sensitivity landscape unit abutting a Low sensitivity one without some consideration of the transitional zone between them. The fact that more turbines are now contained in the lower sensitivity Carbury Boyne Lowlands LCA could be considered an improved policy environment for the proposed wind farm. However, in a situation where almost all of the turbines lie within 500m of the LCA / Sensitivity border, this subtle zoning change is not of material consequence to the LVIA.

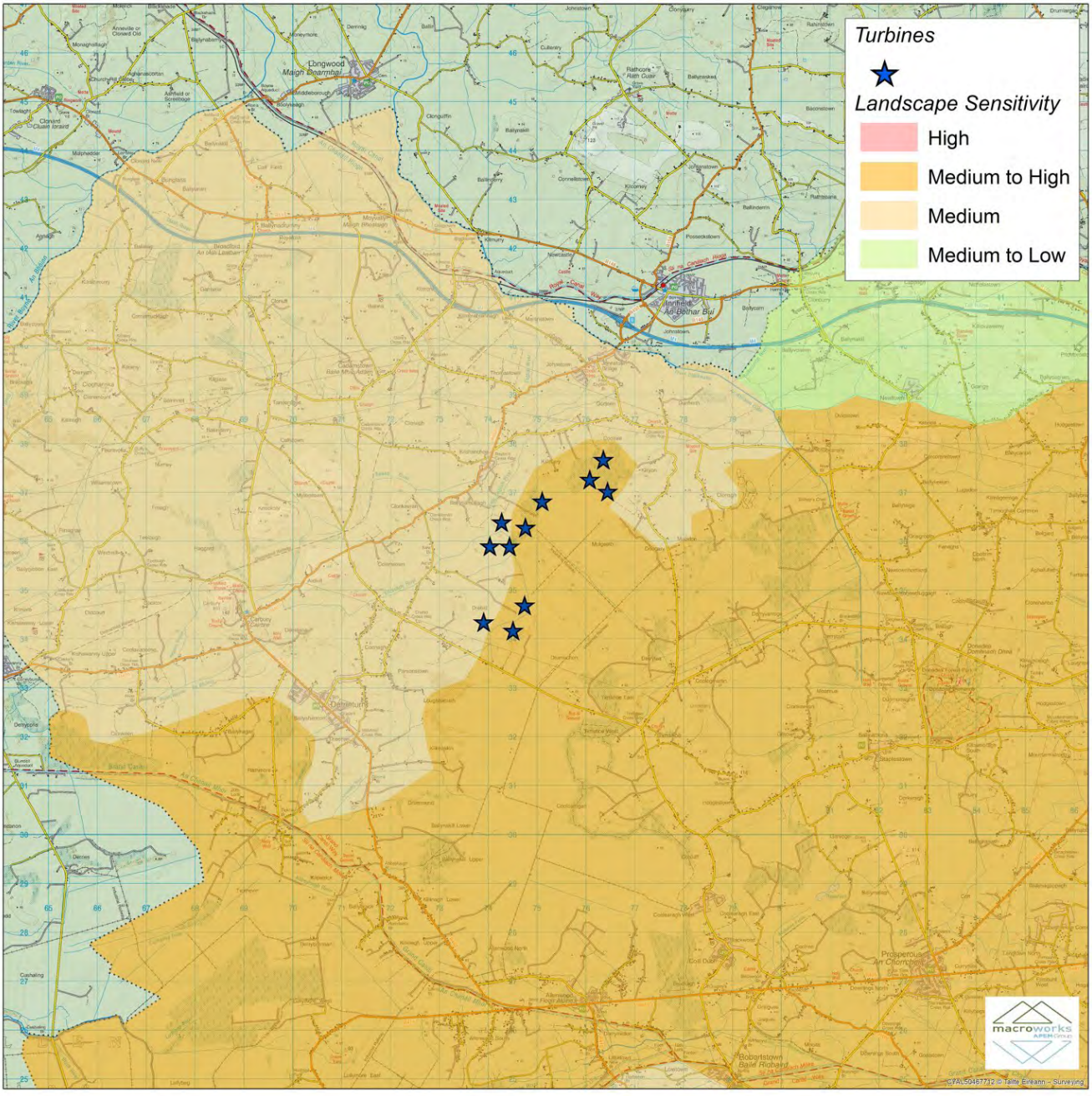


Figure 7-3: Landscape Character Sensitivity map from the Kildare Landscape Character Assessment 2025 subject of Variation 4 of the Kildare CDP

Landscape Compatibility relating to the Landscape's ability to absorb change without significantly altering its landscape character or type, was part of the adopted CDP and that remains a part of Variation 4, albeit a landscape compatibility map has now been provided to supplement the landscape compatibility tables. The new landscape Compatibility Map (Map V1-13.2B) identifies that the Bog of Allen LCA has 'Medium to 'Low' compatibility and the Carbury Boyne Lowlands LCA has 'Medium' compatibility.

The original LVIA identified from Table 13.3 of the CDP that 'Wind Energy' development, specifically, has a 'Medium' compatibility rating in the Western Boglands LCA (now Bog of Allen LCA) and that is unchanged in Variation 4. However, the North western Lowland (now Carbury Boyne Lowlands) had a 'High' compatibility to absorb Wind Energy development and that has now been reduced to 'Medium' compatibility in Variation 4, extract shown in Figure 6-4, below. Whilst this is slightly less favourable for wind energy development, it can be considered that it has gone from an area deemed positively disposed toward wind energy development to one where a balance of caution and compatibility is generally reflected in landscape policy i.e. it is far from unfavourable. Thus, the compatibility change is not considered to materially alter the findings of the original LVIA.

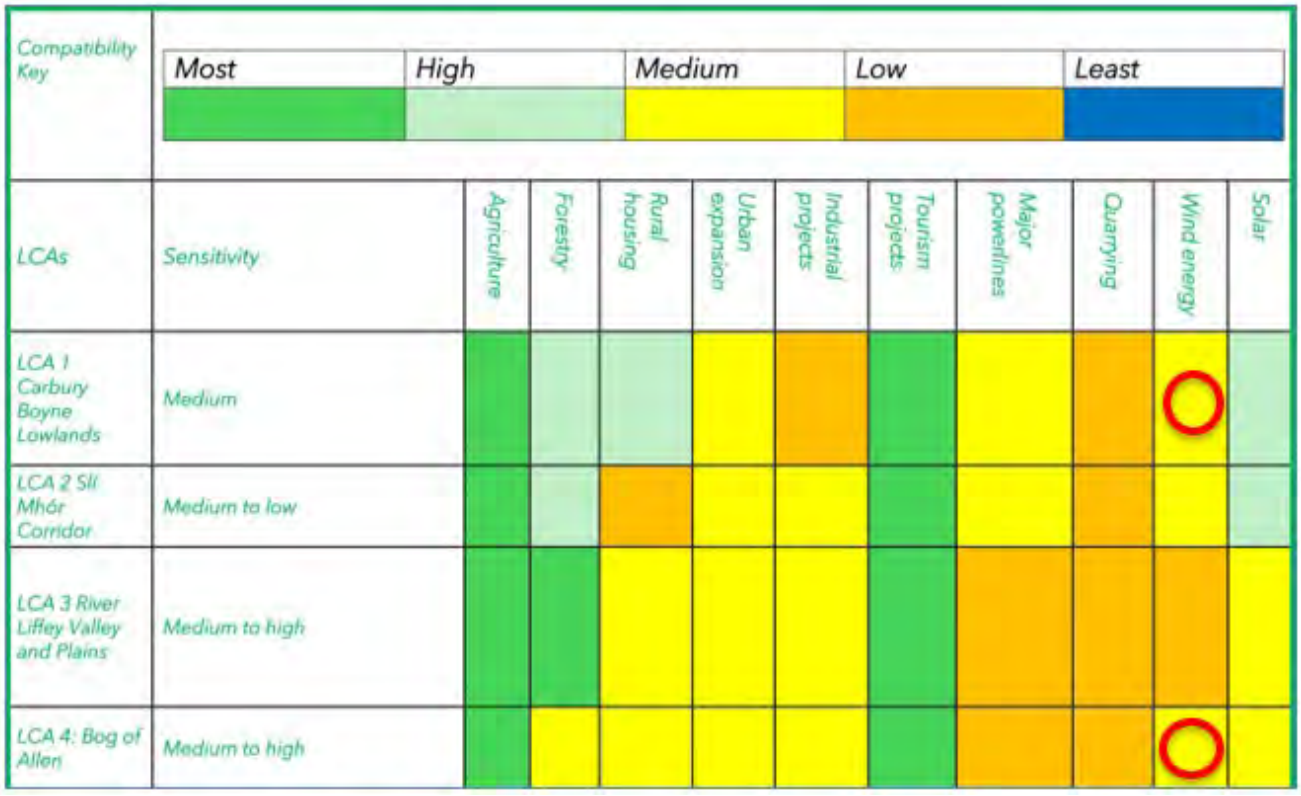


Figure 7-4: Excerpt from the updated Table 13.4 in Variation 4 of the Kildare CDP – LCA sensitivity and Land Use

The adopted CDP contains a similar compatibility table (Table 13.4 in Variation 4 of the Kildare CDP) to that described above for LCAs and land use types, but instead balancing 'principal Landscape Sensitivity Factors' and land use types, but limiting the consideration to 300m from the principle landscape sensitivity factor, which somewhat surprisingly included scenic routes and scenic views. This table has now been removed by Variation 4 with Table reference 13.4 now assigned to LCA / land use compatibility described above.

The previous Table 13.4 in Variation 4 of the Kildare CDP, identified that wind energy development was 'Compatible only in certain circumstances" in Peat Bogs and 'Compatible only in exceptional circumstances' in 'mixed forestry', both of which are relevant landscape features for the proposed development. The removal of original Table 13.4 could therefore be seen as positive for the proposed development, but its removal does not change the findings of the original LVIA, which gave it limited weight in determining overall landscape sensitivity.

7.1.1 Appendix 2 - Wind Energy Strategy

The original wind energy strategy contained in Appendix 2 of the adopted CDP had the proposed wind farm wholly contained within an area identified as '*Zone 2 – Open for Consideration'* for Wind Energy development abutting a border to an area deemed 'Acceptable in Principle' for wind energy development, as shown in Figure 6-5, below. That wind energy strategy border now corresponds to the border between the 'Bog of Allen' LCA (Open for Consideration) and 'Carbury Boyne Lowlands' LCA (Acceptable in Principle).

There has been some subtle rationalisation of the border between the LCAs, and therefore the wind energy Zones. The net effect is that the proposed wind farm is in a marginally improved scenario in terms of the Kildare Wind Energy Strategy as three of the turbines are now within the acceptable in principle Area, one sits on the border and most of the remainder are within 500m of that border. Again, borders between LCA's and wind energy deployment areas should be read as transition zones and not abrupt boundaries. Consequently, the subtle change in the boundary position between the 'Acceptable in Principle' area and the 'Open for Consideration' area does not materially alter the findings of the original LVIA.

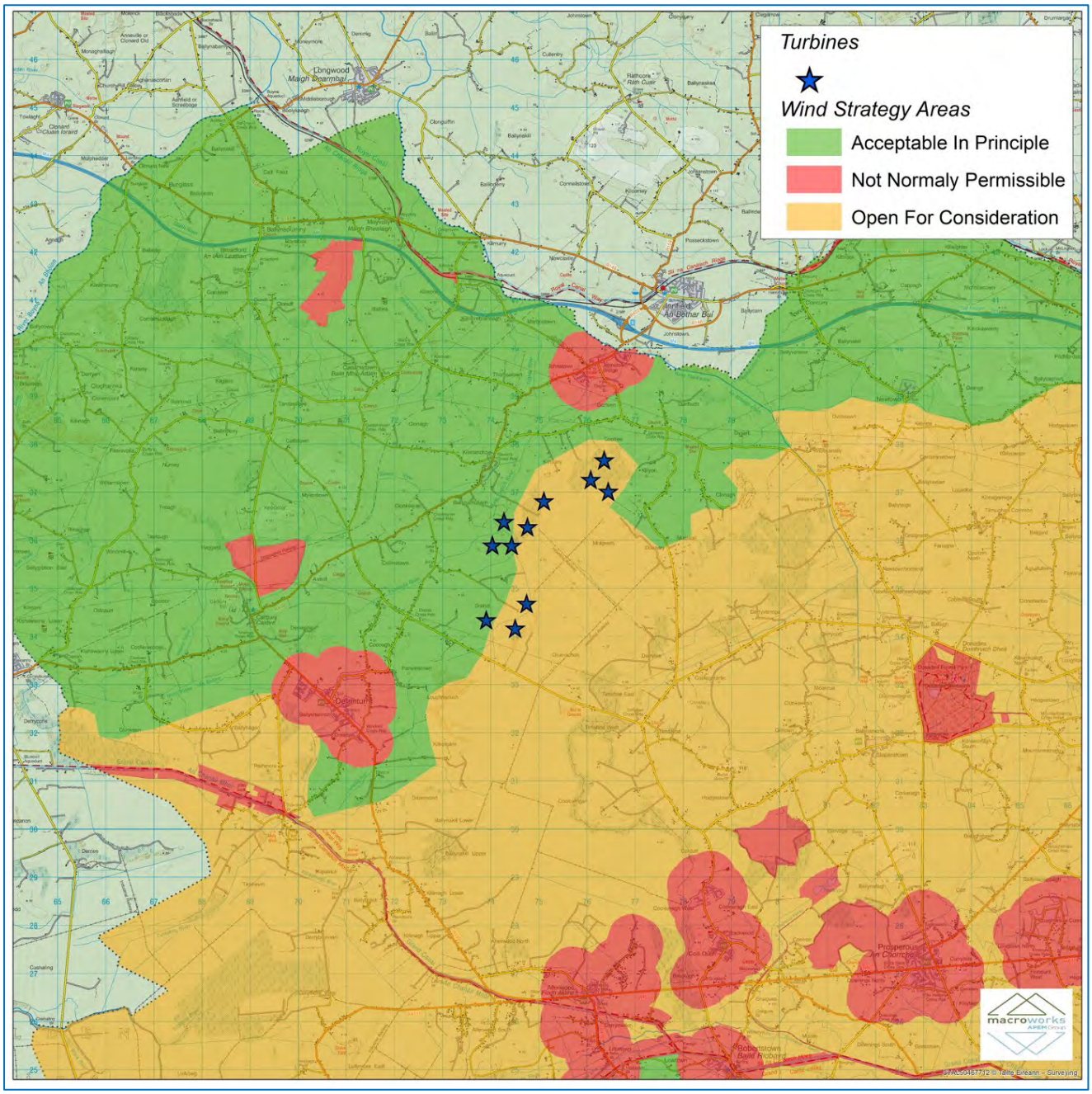


Figure 7-5: Revised Wind Energy deployment zones under Variation 4 of the Kildare CDP

7.1.2 Conclusion

On review of the new Kildare Landscape Character Assessment, Wind Energy Strategy and landscape related policies and mapping changes brought about by Variation 4 of the Kildare County Development Plan (2023-2029), it is considered that it does not materially alter the findings of the original LVIA for the proposed Drehid Wind Farm.

8. QRFI ITEM 7: MITIGATION MEASURES

You are requested to submit a compendium of proposed mitigation measures.

8.1 RFI Item 7 Response:

In response to the request by ACP to submit a compendium of proposed mitigation measures, a Compendium of Mitigation Measures has been prepared for the Proposed Development, and is provided in Appendix 9 of this RFI Response Report.

The Compendium of Mitigation Measures consolidates the mitigation measures identified within the Environmental Impact Assessment Report (EIAR) and associated documentation previously submitted with the planning application. The measures are presented by environmental topic as they appear within the EIAR, and should be read in conjunction with the EIAR and associated planning application documentation.

9. CONCLUSION

In summary, it is submitted that the items for which An Comision Pleanála sought additional information on have been comprehensively addressed in this submission.

We submit that the proposed development of 11 no. wind turbines and ancillary development within the townlands of Ballynamullagh, Kilmurry, Coolree, Killyon, Mulgeeth and Drehid, County Kildare, represents a robust proposal, which has been prepared in full accordance with the statutory and best practice requirements, has appraised all relevant potential impacts on the surrounding environment, in line with European, national, regional and local energy and planning policy, and is in accordance with the proper sustainable development of the area.

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FEHILY TIMONEY

DESIGNING AND DELIVERING
A SUSTAINABLE FUTURE

APPENDIX 1

Further Information Request from An Coimisiún Pleanála received 2nd April 2026

Our Case Number: ACP-322845-25

Your Reference: North Kildare Wind Farm Limited

An Coimisiún Pleanála

Fehily Timoney & Company Consultants
Core House
Pouladuff Road
Ballyphehane
Co. Cork
T12D773

Date: 02 April 2026

Re: Proposed development of 11 wind turbines and ancillary development within the townlands of Ballynamullagh, Kilmurry, Coolree, Killyon, Mulgeeth and Drehid, County Kildare (www.drehidwindfarmSID.ie)

Dear Sir / Madam,

I have been asked by An Coimisiún Pleanála to refer further to the above mentioned proposed development which is before the Commission for consideration.

Please be advised that the Commission, in accordance with section 37F(1)(a) of the Planning and Development Act 2000, as amended, hereby requires you to furnish the following further information in relation to the proposed development:

Biodiversity

(a) It is fundamental that biodiversity baseline data are fit for purpose, up-to-date and sufficient. Where the lifespan of ecological survey data exceeds the typical validity period as set out in recognised guidelines, the applicant is required to provide up to date information or justification on the sufficiency of the information provided with respect to site condition, species mobility, species population and distribution trends and clearly disclose any limitations in reporting.

Therefore, the following is requested:

Teil	**Tel**	(01) 858 8100
Glao Áitiúil	**LoCall**	1800 275 175
Facs	**Fax**	(01) 872 2684
Láithreán Gréasáin	**Website**	www.pleanala.ie
Ríomhphost	**Email**	communications@pleanala.ie

64 Sráid Maoilbhríde
Baile Átha Cliath 1
D01 V902

64 Marlborough Street
Dublin 1
D01 V902

Avifauna

i. As per NatureScot, 2025 guidelines *Recommended bird survey methods to inform impact assessment of onshore windfarms*, survey data is collected within five years of planned submission, and within three years where bird species populations are rapidly changing. You are requested to review the ornithological assessment particularly with respect to rapidly changing species recorded including Curlew, Lapwing and Golden Plover.

ii. An Coimisiún Pleanála shares the concerns of the Department of Housing Local Government and Heritage, Development Applications Unit in their submission dated **14th August 2025**, relating to the absence of rationale for the selection of transects for breeding waders. The Commission also has concerns relating to the variability in survey effort during the survey period. Please provide reasoning to support your rationale and to update the breeding bird survey transects to ensure survey effort is compliant with best practice and representative of the diversity of habitats across the site and bird species associated with same.

iii. An Coimisiún Pleanála shares the concerns of the Department with respect to the adequacy of the barn owl survey. You are required to update the barn owl surveys with respect to best practice guidelines appropriate to wind farm development.

iv. With respect to the request items i-iii listed above, you are requested to update the planning application documentation including the ornithological impact assessment, collision risk assessment and cumulative effects, as required.

Fauna

v. An assessment of the status of existing or new features to support mobile species such as otter, badger and bat, is requested to update the planning application documentation and liaison with the NPWS if Regulation 54 derogations are required.

(b) You are requested to review the bat impact assessment and to reconsider the recommended 90m buffer zones proposed in the Bat Survey (Aughney, 2019), given the high levels of Leisler's bat and pipistrelle bat species recorded across the site and their elevated collision risk; and update the planning application documentation accordingly.

(c) You arerequested to provide further assessment and evidence base on the approach and effectiveness of the proposed mitigation on the use of treelines and hedgerows to divert bats away from turbine locations.

(d) You are requested to provide an ecohydrological assessment on the potential impacts from the construction turbines T8, T9 and T10 on the hydrological functioning of the proximal Annex I habitat PB1 Raised Bog habitat, specifically Mulgeeth Bog.

(e) You are requested to provide further information on habitat suitability in the wider environs and landscape connectivity for red squirrel and the likelihood of effectiveness of proposed mitigation to minimise impacts on red squirrel.

(f) You are requested to review the extent of felling proposals particularly with respect to mature broadleaved vegetation due to the scarcity of such habitat in the wider environs.

(g) You are requested to review the impact of the amenity trail in the context of cumulative loss of woodland habitat, habitat fragmentation, edge effects, wildlife disturbance and displacement.

Water Framework Directive

It is requested that you provide a standalone Water Framework Directive Compliance Report.

Flood Risk

Turbine 6 is noted to be located in Flood Zones A and B. The *Planning System and Flood Risk Management Guidelines for Planning Authorities* state that development in Zone A should be avoided and/or only considered in exceptional circumstances and where the justification test has been applied. Only water compatible development is considered appropriate. The guidelines state that in Zone B less vulnerable development should only be considered if adequate lands or sites are not available in Zone C and subject to a flood risk assessment.

Teil	**Tel**	(01) 858 8100		
Glao Áitiúil	**LoCall**	1800 275 175		
Facs	**Fax**	(01) 872 2684	64 Sráid Maoilbhríde	64 Marlborough Street
Láithreán Gréasáin	**Website**	www.pleanala.ie	Baile Átha Cliath 1	Dublin 1
Ríomhphost	**Email**	communications@pleanala.ie	D01 V902	D01 V902

You are requested to provide the following:

(a) supporting detail and evidence as to why it considers that turbines are 'largely considered to be water compatible' having regard to what is defined as 'water compatible' in the guidelines (Table 3.1),

(b) details of alternative locations/absence of alternative locations with low flood probability within the application site which were considered for the turbine location and reasoning for the chosen turbine location, and,

(c) what exceptional circumstances arise in the current proposal to justify the location of the turbine in an identified area of flood risk. This should be supported by a justification test in accordance with the details provided in Box 5.1 of the guidelines

Noise

(a) As per the details provided in Table 7.1.2 in Appendix 7 of the EIAR the noise assessment is based on baseline noise measurements at 5 no. monitoring locations (N1 to N5) that are in excess of 7 years old (at the time of the lodgement of the application to the Commission). The measurements at the other two monitoring locations (N6 and N7) are in excess of 6 years old (at the time of the lodgement).

Please provide up to date baseline noise measurements of the existing environment. Any amendments to the noise assessment including amendments to the EIAR and relevant appendices resulting from the noise measurements should be clearly delineated.

(b) (i) You are requested to clarify the nature and extent of the noise mitigation measures to be employed at the northern site entrance to protect the properties to the east and west during the construction of the said entrance and access track.

(ii) Please clarify and amend, as appropriate, the details provided under the heading 'Adjacent Dwellings' on page 31 of Chapter 13 (Traffic and Transportation) of the EIAR including details of the proposed entrance(s) referred to and proposed mitigation measures.

(c) You are requested to submit a mitigation strategy for operational Amplitude Modulation and Tonal Noises.

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Sensitive Receptors

You are requested to submit a table setting out the separation distances of the turbines from the nearest sensitive receptors. The sensitive receptors are to be appropriately labelled to allow for comparative analysis of the details provided in Table 7.3.1 of Appendix 7 (noise sensitive location details) and Table A12-1-1 of Appendix 12 (receptors assessed for shadow flicker).

Landscape

You are requested to consider the proposed variation to the Kildare County Development Plan 2023-2029 to replace the Landscape Character Assessment (2004) with the Landscape Character Assessment (2025). The variation comprises of amendments to Chapter 12 Landscape, Recreation and Amenity of the Written Statement (Volume 1), Appendix 2 Wind Energy Strategy and the insertion of a new Appendix 13 Landscape Character Assessment (2025). Any alterations to the EIAR and associated appendices to be clearly delineated.

Mitigation Measures

You are requested to submit a compendium of proposed mitigation measures.

The further information referred to above should be received by the Commission within **6 months** from the date of this notice (i.e. no later than the **1st October 2026).**
In this regard, please submit 3 hard copies and one electronic copy of the above information.

Please note that following its examination of any information lodged in response to this request for additional information, the Commission will then decide whether or not to invoke its powers under section 37F(2) of the Planning and Development Act 2000, as amended, requiring you to publish notice of the furnishing of any additional information and to allow for inspection or purchase of same and the making of further written submissions in relation to same to the Commission.

If you have any queries in relation to the matter, please contact the undersigned officer of the Commission. Please quote the above mentioned An Coimisiún Pleanála reference number in any correspondence or telephone contact with the Commission.

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Yours faithfully,



Lauren Murphy
Executive Officer
Direct Line: 01-8737275

PA11

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DESIGNING AND DELIVERING
A SUSTAINABLE FUTRE

APPENDIX 2

Bird Report Summer 2026

DESIGNING AND DELIVERING
A SUSTAINABLE FUTURE

DREHID WIND FARM SUBSTATION SID - FURTHER INFORMATION RESPONSE

ORNITHOLOGICAL SURVEYS SUMMER 2026 BASELINE REOPORT

Prepared for:

North Kildare Wind Farm Ltd.

DESIGNING AND DELIVERING
A SUSTAINABLE FUTURE

Date: **September 2026**

Document No:

P26094-FT-EBD-XX-RP-EN-0001

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1. INTRODUCTION

This report details the methodologies employed and survey results obtained for ornithological surveys undertaken at the proposed Drehid wind farm site during the Summer 2026 breeding season. Surveys were undertaken to update the baseline and ensure the availability of current data to inform the planning process.

The Proposed Wind Farm is wholly located in County Kildare and includes lands in the townlands of Ballynamullagh, Kilmurry, Killyon, Coolree, Mulgeeth and Drehid. The site is accessed from the M4 motorway until Enfield, then along the R402 for ca. 7.7 km and finally along the local road (L5025) to the entrance of the site. The site lies c. 2.8 km south of the motorway M4 at Enfield and 1.2 km southeast of the regional road R402 linking the M4 to the R420 east of Tullamore in County Offaly. The Proposed Substation, including the loop-in connection to the existing Kinnegad-Rinawade overhead line, and the access tracks approaching from the main site entrance are wholly located in County Kildare and includes lands in the townlands of Ballynamullagh, Kilmurry, Coolree and Mulgeeth.

The site of the proposed development is located in relatively low-lying, relatively flat land with the majority of proposed turbines located beneath the 80 m contour line. The landcover is classified by Tailte Eireann's National Land Cover map as improved grassland, treelines, hedgerows, transitional forest, coniferous forest, broadleaved forest and woodland, mixed forest, scrub, bare peat, bare soil and disturbed ground, and artificial surfaces (forest roads). The National Land Cover Map for the wind farm site is illustrated in Figure 2.1. The east of the site is adjacent to a cutover bog (Timahoe Bog). The Fear English River bisects the site, flowing south to north before it enters the Blackwater River at Johnstown Bridge. The landscape is classified as being of low sensitivity from a landscape perspective.

The site of the Proposed Substation is located in commercial forestry at the northern extent of the wind farm site. The proposed loop-in connection to the existing overhead line is situated in agricultural lands, approximately 415m northeast of the Proposed development compound.

This report provides update ornithological baseline information to inform responses to the further information request letter ACP-322845-25 dated 08 April 2026. The following avian-specific requests were contained within this letter:

Biodiversity

(a)

It is fundamental that biodiversity baseline data are fit for purpose, up-to-date and sufficient. Where the lifespan of ecological survey data exceeds the typical validity period as set out in recognised guidelines, the applicant is required to provide up to date information or justification on the sufficiency of the information provided with respect to site condition, species mobility, species population and distribution trends and clearly disclose any limitations in reporting.

Therefore, the following is requested:

Avifauna

i.

As per NatureScot, 2025 guidelines Recommended bird survey methods to inform impact assessment of onshore windfarms, survey data is collected within five years of planned submission, and within three years where bird species populations are rapidly changing. You are requested to review the ornithological assessment particularly with respect to rapidly changing species recorded including Curlew, Lapwing and Golden Plover.

ii.

An Coimisiún Pleanala shares the concerns of the Department of Housing Local Government and Heritage, Development Applications Unit in their submission dated 14th August 2025, relating to the absence of rationale for the selection of transects for breeding waders. The Commission also has concerns relating to the variability in survey effort during the survey period. Please provide reasoning to support your rationale and to update the breeding bird survey transects to ensure survey effort is compliant with best practice and representative of the diversity of habitats across the site and bird species associated with same.

iii.

An Coimisiún Pleanala shares the concerns of the Department with respect to the adequacy of the barn owl survey. You are required to update the barn owl surveys with respect to best practice guidelines appropriate to wind farm development.

iv.

With respect to the request items i-iii listed above, you are requested to update the planning application documentation including the ornithological impact assessment, collision risk assessment and cumulative effects, as required.

2. METHODOLOGY

2.1 Vantage Point Surveys

Vantage Point (VP) surveys utilised the same methodology as the pre-planning surveys undertaken between October 2021 - March 2023.

The current surveys were carried out at the proposed Drehid Wind Farm site during the 2026 breeding season between April to August 2026, in accordance with NatureScot (2025) methodology for the assessment of onshore Wind Farms. A total of two VP locations overlooking the Drehid wind farm flight activity study area were used during the VP survey (see Figure 2-1). These were chosen to cover specific viewsheds of the Proposed Wind Farm and to encompass a 500m buffer zone around the proposed turbine layout of the wind farm. NatureScot (2025) states that viewsheds should cover a 500 m circular buffer drawn around each proposed turbine location (see Figure 2-1 for combined viewshed coverage of the 500m turbine buffer).

The flight activity study area, comprised of the combined viewsheds, overlaps the Proposed Wind farm and the Proposed Substation. This 'flight activity study area, or 'study area' is utilised as a geographic descriptor when detailing the results of flight activity surveys (Section 3.1).

The combined viewshed coverage of the 500m turbine buffer is 95.91%.

The main purpose of VP survey watches is to collect data on target species that will enable estimates to be made of:

- The time spent flying over the defined survey area;
- The relative use of different parts of the defined survey area; and
- The proportion of flying time spent within the upper and lower height limits as determined by the rotor diameter and rotor hub height.

VP locations were based on observations from walkover/reconnaissance surveys, viewshed analysis (using GIS) and collated information on known feeding and roosting sites from both desktop review and consultation. The number and location of vantage points was selected in order to achieve visibility of the entire study area and important features for birds in close proximity to the site (e.g., lakes, wetlands).

In line with recommended best practice (NatureScot, 2025; Band et al. 2007 and Band, 2024), viewshed analysis was undertaken using ArcMap, to calculate a theoretical zone of visibility from each vantage point. Visibility is calculated from each vantage point along an invisible layer suspended at the predicted lowermost height passed through by the rotor blade tips, using an observer height of 1.5 m. We note the following from SNH guidance in respect of priority areas for viewshed analysis (emphasis added):

> *"Where the key purpose is to estimate the risk of collision with turbines, it is the visibility of the airspace to be occupied by the turbine rotors (the collision risk volume) that is of prime importance. Therefore, it is recommended that visibility be calculated using the least visible part of this airspace, i.e. an imaginary layer suspended at the lowermost height passed through by the rotor blade tips (typically about 20-30m above ground level). Predicting visibility at this level is a simple task using GIS, however it should be noted that the baseline should take account of any forestry or other features that will potentially obstruct the view. For example, forestry may be 10-30m high and if viewshed height is taken as 20-30m ground level the visible area could be overestimated if there is forestry within the viewshed. Being able to view all or most of the site to ground level can be helpful in gauging overall bird activity and usage of the site but is not as important as being able to view the collision risk volume"*

NatureScot (2025), watches were conducted to sample diurnal and crepuscular activity of target species. Data recorded included flight activity of target species (flight height, duration, directionality) in addition to metrics such as flock size (per recorded transit) and time of observation.

Detailed notes of each observation of a target bird species was recorded including behaviour, gender (where possible), numbers, flight height, associated habitat and the period of time spent within the study area. Successful foraging events were also noted if they arose.

Flight activity was captured digitally using Arc Field Maps, synched and stored securely for subsequent mapping, analysis and reporting.

The Vantage Point survey schedule can be found in Table 2-2, and Vantage Point survey results can be found in Section 3.1.

Binoculars and telescopes were used to scan for target species. Flight heights were estimated visually as allowed for in NatureScot (2025) guidance.

VP surveys involved carrying out 2 x 3-hour VPs at each VP every month. As per NatureScot (2025) guidance, the requisite 36 hours were carried out at each vantage point during the breeding period.

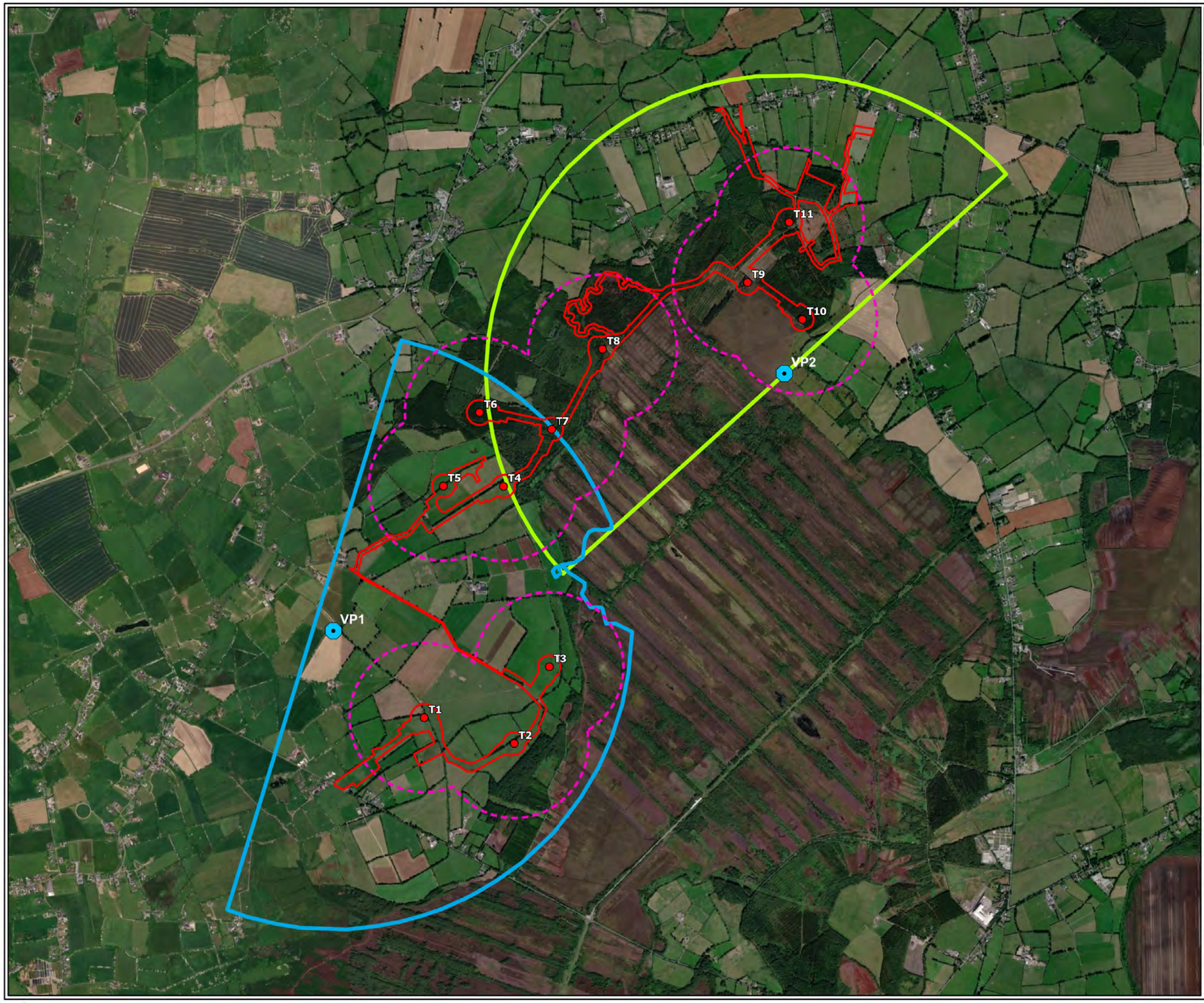
The bird activity recorded both inside and outside the Proposed Wind Farm and Proposed Substation site boundaries was used as part of the overall analysis and assessment of target species usage of the study area. Details of vantage point locations can be found in Table 2-1 below. All surveys were conducted during suitable weather conditions.

Table 2-1: Vantage Point Locations (ITM)

Vantage Point	Eastings (ITM)	Northings (ITM)
VP 1	673136	735084
VP 2	676257	736663

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Legend

- Proposed Development Boundary
- VP2 Viewshed
- VP1 Viewshed
- 500m
- VP Locations
- Turbine Locations

N
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0 0.5 1 2 Kilometers

TITLE:	Vantage Point Locations and Viewshed Analysis		
PROJECT:	Drehid Wind Farm and Substation		
FIGURE NO:	2.1		
CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:25,000	**REVISION:**	0
DATE:	01/05/2025	**PAGE SIZE:**	A3

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Table 2-2: VP Survey Schedule & Weather Details

VP	Date	Start	Finish	Wind	Visibility	Cloud	Rain
2	07/05/2026	07:40	10:40	F3	Good	5/8	Drizzle - Momentary
2	07/05/2026	10:40	13:40	F3	Good	5/8	Light Rain - Occasional
1	11/05/2026	09:45	12:45	F2	Good	7/8	Dry
1	12/05/2026	09:30	12:30	F3	Good	5/8	Dry
2	22/05/2026	10:45	16:45	F3	Excellent	6/8	Dry
1	29/05/2026	11:08	17:08	F4	Good	2/8	Dry
1	12/06/2026	08:50	14:50	F4	Good – occasional heat haze	4/8	Drizzle - Occasional
2	18/06/2026	14:45	20:45	F4	Good	6/8	Drizzle - Frequent
2	17/07/2026	12:05	18:05	F1	Poor (heat haze)	1/8	Dry
1	10/07/2026	08:48	14:48	F3	Good, reducing due to heat haze heat	2/8	Dry
2	05/08/2026	08:44	14:44	F5	Very good; heat haze at times	6/8	Light Rain - Momentary
2	18/08/2026	10:35	16:35	F3	Very good	7/8	Light Rain - Momentary
1	04/09/2026	13:55	19:55	F4	Very good	5/8	Rain - sporadic & heavy
2	04/09/2026	07:25	13:25	F4	Good. Slight heat haze developed later in watch.	7/8	Dry

2.2 Breeding Bird Transect Surveys

For general breeding birds the method utilised was based on the existing British Trust for Ornithology (BTO) Breeding Bird Survey (BBS or CBS; Bibby et al. 2000). A total of four evenly distributed transects were used to provide a robust sample of breeding bird activity at the proposed development (see Figure 2-2). The transects surveyed ranged between c. 1 - 1.5 km in length.

Birds were counted over two visits during the 2026 breeding season, each timed to coincide with the early part of the breeding season (April to mid-May) and later part of the season (mid-May to July). Surveyors recorded all birds seen or heard as they walked methodically along the transect routes.

Birds observations were recorded digitally using Arc Field Maps, synched and stored securely for subsequent mapping, analysis and reporting. The exact location of each bird observation was recorded, allowing subsequent GIS analysis to process the data within the framework of distance bands measured at right angles to the transect line used for breeding surveys (within 25 m, between 25 m-100 m and over 100 m from the transect line) and those seen in flight only. Recording birds in distance bands gives a measure of bird detectability and allows relative population densities to be estimated if required (BTO, 2018).

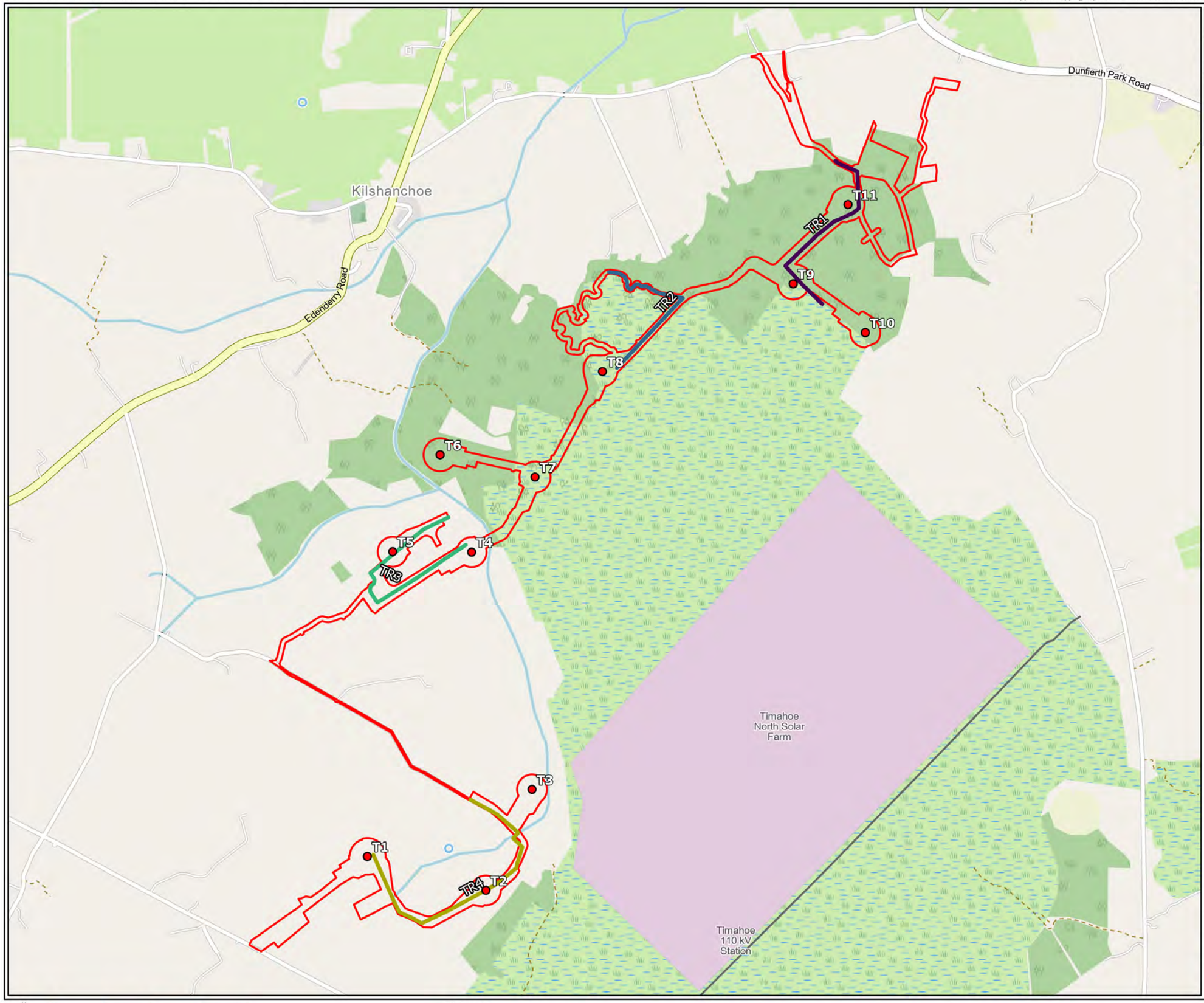
Table 2-3 below details the breeding bird transect survey schedule, and includes the weather conditions for each survey.

Table 2-3: Breeding Bird Transect Survey Details

Date	Cloud (Oktas)	Rain	Visibility	Wind Speed (Beaufort)	Transect	Start	End
11/05/2026	7/8	Dry	Not Recorded	F3	3	07:20	07:55
11/05/2026	8/8	Drizzle	Not Recorded	F3	4	08:25	09:00
12/05/2026	7/8	Dry	Not Recorded	F3	1	07:10	07:40
12/05/2026	7/8	Dry	Not Recorded	F3	2	08:20	09:00
22/05/2026	6/8	Dry	Excellent	F3	1	09:22	10:12
29/05/2026	7/8	Dry	Good	F3	2	09:33	10:20
22/07/2026	4/8	Dry	Excellent	F2	3	07:00	07:30
23/07/2026	4/8	Dry	Excellent	F1	4	07:00	07:43

Site Boundary: ; OpenStreetMap Style: Sources: Map data © OpenStreetMap contributors, Microsoft, Esri Community Maps contributors, Map layer by Esri; World Topographic Map: Esri, HERE, Garmin, FAO, USGS
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Legend

- Site Boundary
- Transect ID
  - TR1
  - TR2
  - TR3
  - TR4
- Turbine Locations

TITLE:	Breeding Survey Transects		
PROJECT:	Drehid SID - RFI		
FIGURE NO:	2.2		
CLIENT:	Statkraft Ireland Ltd.		
SCALE:	1:19,000	**REVISION:**	0
DATE:	03/09/2026	**PAGE SIZE:**	A3

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2.3 Breeding Wader Survey

Transect surveys to assess the presence of breeding wader populations were completed during the 2026 breeding season. A number of methods were combined from published literature including Bibby et al, (2000), Gilbert et al, (1998), O'Brien & Wilson (2011) and NatureScot (2025) to estimate numbers of target species breeding in potentially suitable habitats within and adjacent to the proposed development.

Methods utilised were grouped into two categories; those for breeding lapwing *Vanellus vanellus* and those for other species such as curlew *Numenius arquata*, common snipe *Gallinago gallinago*, redshank *Tringa totanus*, common sandpiper *Actitis hypoleucos* and ringed plover *Charadrius hiaticula*. For each species, a pre-defined matrix of suitable habitats was created and used to select target habitats for survey (Table 2-4).

Table 2-4: Target Species and associated suitable breeding habitat

Target Species	Suitable Breeding Habitat
Lapwing	Lowland wet grassland, arable farmland, cutover bog with pools and wet grassland
Snipe	Wet pastures, marsh, bogs (intact and cutover) and fens
Redshank	Bog
Curlew	Bog
Common Sandpiper	Streams/rivers in bog
Ringed Plover	Cutover bog, milled peat with exposed gravel

Survey methods for lapwing followed those in Bibby et al. (2000) where the primary count unit for breeding birds is defined as an incubating female. In addition, displaying birds, birds standing guard near nests or distraction displays were also recorded as indications of occupied territories. Extensive areas of open ground were covered from roads, farm tracks or roadsides (where possible); larger areas of open ground not visible from easily accessible vantage points were walked using transects.

Surveys were carried out during the time periods recommended in Bibby et al. (2000) although territorial behaviour noted outside these periods was also utilised in the assessment. For all additional species of wader the employed method was the same and utilised transects walked through suitable habitat within three hours of dawn or dusk. Count units were predefined for each target species and included in the method statement provided to surveyors (See Table 2-5).

Table 2-5: Count Units for each Wading Species

Species	Unit
Lapwing	Incubating Bird
Common Snipe	Drumming or Chipping Bird
Redshank	Alarming Bird
Ringed Plover	Presence or Absence/ Fledged Young late in season
Common Sandpiper	Presence or Absence/ Fledged young late in season
Curlew	Territorial Activity

All suitable habitats for waders were visited and observations were made along five transects (Figure 2-3), between the months of April - July 2026.

All species encountered (seen or heard) were recorded and their abundance, behaviour, sex/age and breeding status noted. Any species occurring more than 100 m from the observer, or flying over the site and not using it, were recorded as 'additional' species to further inform the baseline survey. Table 2-6 details survey dates and weather conditions.

Table 2-6: Breeding Wader Survey Details

Date	Cloud (Oktas)	Rain	Visibility	Wind Speed (Beaufort)	Transect	Start	End
28/04/2026	2/8	Dry	Excellent	F2	Wader 1	06:00	06:55
28/04/2026	2/8	Dry	Excellent	F2	Wader 2	07:20	08:02
28/04/2026	2/8	Dry	Excellent	F2	Wader 3	08:20	09:05
11/05/2026	7/8	Dry	Very Good	F3	Wader 4	07:20	07:55
11/05/2026	8/8	Drizzle	Very Good	F3	Wader 5	08:25	09:00
05/06/2026	3/8	Dry	Excellent	F2	Wader 1	06:00	06:45
05/06/2026	3/8	Dry	Excellent	F3	Wader 2	07:05	07:35
05/06/2026	3/8	Dry	Excellent	F3	Wader 3	07:46	08:35
10/07/2026	0/8	Dry	Excellent	F1	Wader 1	07:46	08:40
10/07/2026	0/8	Dry	Excellent	F1	Wader 2	09:11	10:03
10/07/2026	0/8	Dry	Excellent	F2	Wader 3	10:19	11:08
22/07/2026	4/8	Dry	Excellent	F2	Wader 4	07:00	07:30
23/07/2026	4/8	Dry	Excellent	F1	Wader 5	07:00	07:43

Site Boundary: ; OpenStreetMap Style: Sources: Map data © OpenStreetMap contributors, Microsoft, Esri Community Maps contributors, Map layer by Esri; World Topographic Map: Esri, HERE, Garmin, FAO, USGS
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Legend

- Site Boundary
- Transect ID
  - Wader 1
  - Wader 2
  - Wader 3
  - Wader 4
  - Wader 5
- Turbine Locations

TITLE:	Breeding Wader Survey		
PROJECT:	Drehid SID - RFI		
FIGURE NO:	2.3		
CLIENT:	Statkraft Ireland Ltd.		
SCALE:	1:19,000	**REVISION:**	0
DATE:	03/09/2026	**PAGE SIZE:**	A3

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N W E S

0 0.5 1 2 Kilometers

2.4 Woodcock Survey

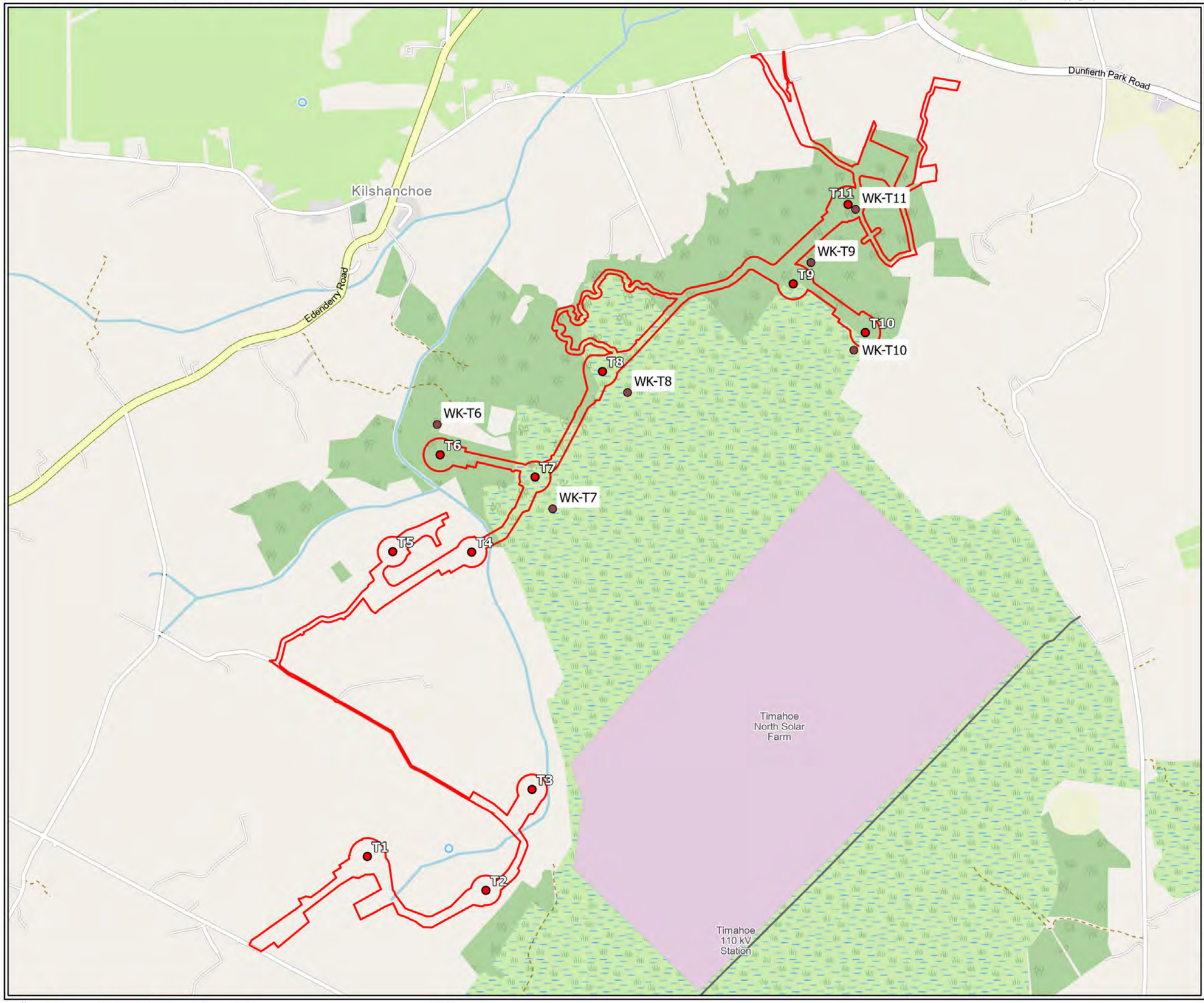
Dusk watches for woodcock were carried out from fixed points overlooking suitable woodcock breeding habitat during the 2026 breeding season. The survey methodology utilised was the method used for the UCC Breeding Woodcock Survey (adapted from Hoodless et al. 2009). A total of six points (see Figure 2-3) located in woodland clearings or facing woodland edges in areas where proposed turbines are located were used as survey points from which the surveyor observed woodcock activity. All specimens encountered (seen or heard) were recorded and their abundance, behaviour, sex/age and breeding status noted. Table 2-7 details the survey dates and weather conditions.

Table 2-7: Woodcock Survey Details 2026

Date	VP	Cloud (Oktas)	Precipitation	Visibility	Wind Speed (Beaufort)	Start	End
09/06/2026	WK-T8	2/8	Dry	Very Good	F1	19:57	23:04
12/06/2026	WK-T9	4/8	Drizzle - Occasional	Good	F4	20:13	23:16
18/06/2026	WK-T9	1/8	Dry	Very Good	F3	20:15	23:16
22/06/2026	WK-T8	3/8	Dry	Excellent	F1	20:21	23:10
24/06/2026	WK-T11	0/8	Dry	Excellent	F1	20:27	23:07
25/06/2026	WK-T7	0/8	Dry	Excellent	F1	20:31	23:23
27/06/2026	WK-T10	1/8	Dry	Good	F1	21:02	23:11
17/07/2026	WK-T6	0/8	Light rain at end of watch	Excellent - Good	F1	20:18	23:18

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Legend

- Site Boundary
- Turbine Locations
- Woodcock Point Counts

TITLE:	Woodcock Survey		
PROJECT:	Drehid SID - RFI		
FIGURE NO:	2.4		
CLIENT:	Statkraft Ireland Ltd.		
SCALE:	1:19,000	**REVISION:**	0
DATE:	03/09/2026	**PAGE SIZE:**	A3

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2.5 Barn Owl Survey

A barn owl survey was carried out during the breeding season of 2026 in accordance with the guidance documents '*Survey and Mitigation Standards for Barn Owls to inform the Planning, Construction and Operation of National Road Projects*' (TII, 2021) and *'Recommended bird survey methods to inform impact assessment of onshore windfarms*' (NatureScot, 2025).

An initial desk-based assessment collated available information including aerial imagery, desktop records, previous survey results and information from local residents.

A core study area of 2 km was defined in accordance with NatureScot (2025) raptor survey requirements.

Following the initial desktop assessment, a recce survey to identify potentially suitable barn owl nest locations and search for signs of barn owl such as pellets, white-wash and moulted feathers was undertaken during daylight on June 15th and 23rd, and July 2nd and 8th.

Watches at potentially suitable breeding locations including a barn (in use for agricultural activities), an abandoned thatched cottage and a disused house were undertaken on June 23rd, July 2nd and 8th. Watch details and locations are presented in Table 2-8 and Figure 2-5. Watches were undertaken during suitable conditions (dry, clear weather with good visibility and absence of string winds).

In addition to barn owl sign searches and vantage point watches, autonomous audio recording devices (audio moths) were deployed at five locations in the vicinity of potential breeding locations to increase the potential of detecting barn owl activity. Deployment details are presented in Table 2-8 and Figure 2-5.

Table 2-8: Barn Owl Survey Details

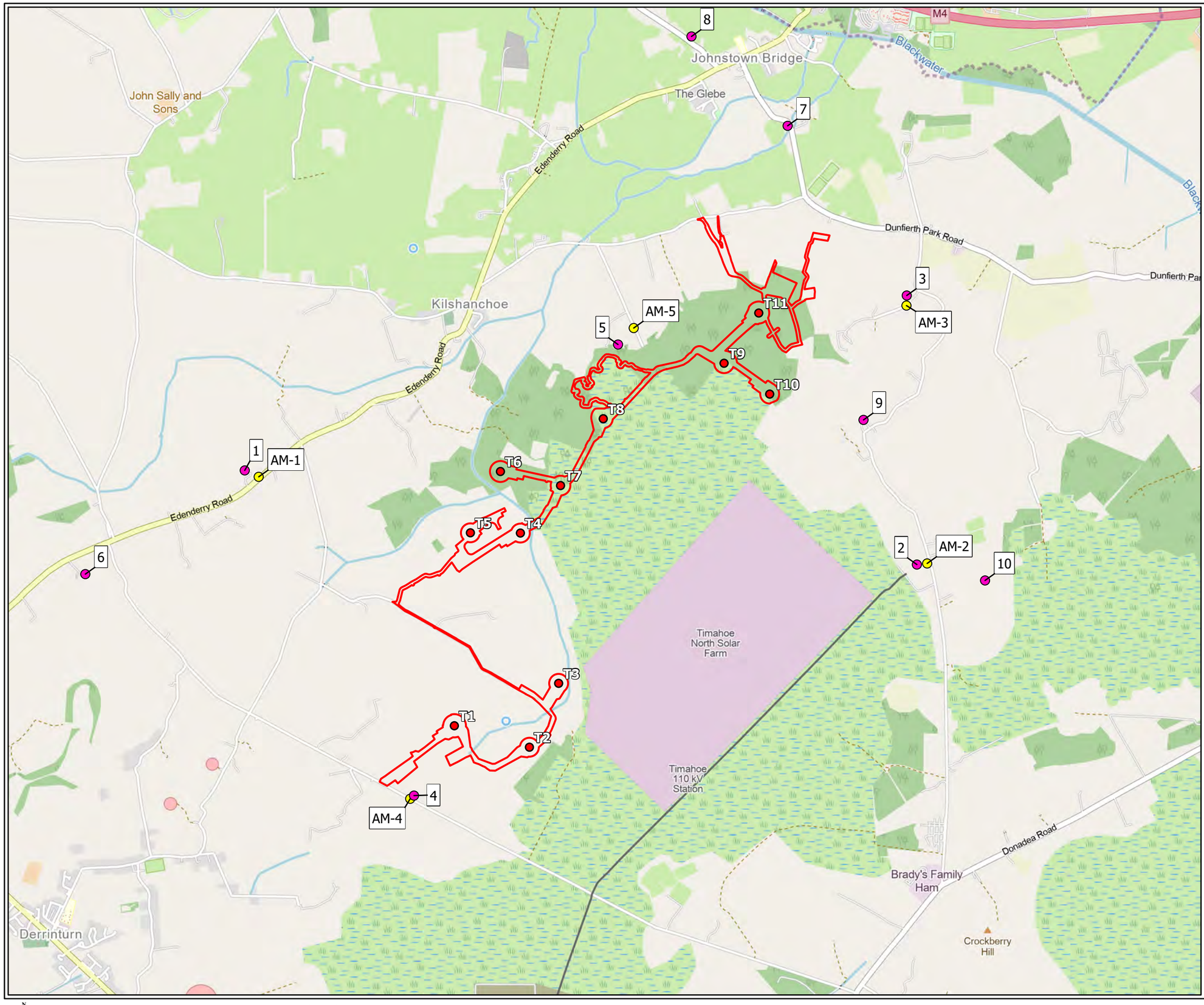
No.	Description	Notes	Recce/Sign Search Effort	Watches	Audio Moth Deployment
1	Active Barn	Suitable location.	15/06/2026 23/06/2026 02/07/2026 08/07/2026	08/07/2026 16:27 - 22:33	23/06/2026 to 10/07/2026 (23:00 - 03:00)
2	Abandoned BnM Worker Accommodation	Suitable location.		N/A	
3	Shed Building	Follow up inspection due to previous reports of barn owl in area. Shed not suitable.		N/A	
4	Active Barn	Follow up inspection due to previous reports of barn owl in area. Suitability limited.		N/A	
5	Abandoned Thatched Cottage	Suitable location.		23/06/2026 16:33 - 22:51	
6	Active Barn	Suitable location.		N/A	

No.	Description	Notes	Recce/Sign Search Effort	Watches	Audio Moth Deployment
7	Disused House	Abandoned house overlooking ideal hunting fields. Suitable location.		02/07/2026 16:27 - 22:24	N/A[1]
8	Old Ruin Structure	Local information indicates barn owl previously used this structure. Suitability limited.		N/A	
9	Barn/Cattle Shed	Suitable location.		N/A	
10	Barn/Cattle Shed	Suitable location.		N/A	

[1] Watches and audio moth deployment focused on higher potential locations closer to the proposed development. The exception to this was Site 9 located 710m from the proposed development. No suitable watch or deployment locations were available for this site. Due to the distance from the proposed development exceeding the higher end of the disturbance buffers (250m) noted in Goodship & Furness (2022), this is not considered to represent a material constraint.

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Legend

- Site Boundary
- Turbine Locations
- Audio Moth Survey
- Barn Owl Survey

N W E S

0 0.5 1 2 Kilometers

TITLE:	Barn Owl Survey		
PROJECT:	Drehid Wind Farm RFI		
FIGURE NO:	2.5		
CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:30,000	**REVISION:**	0
DATE:	28/09/2026	**PAGE SIZE:**	A3

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3. RESULTS

The height bands between 0-30m and 50-170m indicated in the flight activity results tables below are overlapped by the proposed rotor-sweep. The maximum and minimum tip heights for T1 are 14.9m and 147.9m respectively. The maximum and minimum tip heights for the remaining turbines T2 - T11 are 34m and 167m respectively.

3.1 Vantage Point Survey Results

Table 3-1: VP Survey Results – Buzzard Flight Lines

VP	Bird ID	Date	Obs. Time	No. Birds	Species	0-30m (s)	30-40m (s)	40-50m (s)	50-170m (s)	>170m (s)	Total Flight Time	Notes
1	3	12/05/2026	09:32	2	Buzzard	0	0	0	210	0	210	Adult pair soaring together, then flew out of site. Foraging.
2	5	22/05/2026	10:26	1	Buzzard	0	80	0	0	0	80	Soaring ESE. Adult Male Commuting.
2	8	22/05/2026	10:55	1	Buzzard	0	0	0	71	0	71	Soaring. Unsexed Adult. Commuting.
2	12	22/05/2026	12:12	1	Buzzard	0	9	0	0	0	9	Hovering before heading W. Unsexed Adult.
2	14	22/05/2026	13:31	1	Buzzard	0	12	0	0	0	12	Adult Male Commuting.
2	15	22/05/2026	13:32	1	Buzzard	0	0	15	0	0	15	Being mobbed by 2 Ravens heading E. Unsexed Adult Commuting.
2	16	22/05/2026	13:36	1	Buzzard	0	45	0	0	0	45	Soaring Adult Male.
2	17	22/05/2026	14:16	1	Buzzard	0	46	0	0	0	46	Unsexed Adult Commuting.
2	23	22/05/2026	16:07	1	Buzzard	0	0	43	0	0	43	Soaring Adult Male.
1	24	29/05/2026	11:49	1	Buzzard	0	49	0	0	0	49	Soaring Unsexed Adult.
1	25	29/05/2026	12:58	1	Buzzard	0	0	92	0	0	92	No notes.

VP	Bird ID	Date	Obs. Time	No. Birds	Species	0-30m (s)	30-40m (s)	40-50m (s)	50-170m (s)	>170m (s)	Total Flight Time	Notes
1	26	29/05/2026	13:29	1	Buzzard	17	0	0	0	0	17	Skirting the hedge line before being lost out of sight. Adult Male Foraging.
1	27	29/05/2026	14:44	1	Buzzard	0	0	0	319	0	319	Soaring at a height. Adult Male Commuting.
1	28	29/05/2026	15:23	1	Buzzard	0	0	42	0	0	42	Traveling. Adult Male Commuting.
1	29	29/05/2026	16:02	1	Buzzard	0	0	0	233	0	233	Being mobbed by Ravens at quite a height before drifting E out of sight. Unsexed Adult Commuting.
1	30	29/05/2026	16:12	1	Buzzard	31	0	0	0	0	31	Landed in tree line. Adult Male Commuting.
1	31	29/05/2026	16:28	1	Buzzard	9	0	0	0	0	9	Perched bird leaving low over fields. Adult Male Commuting.
1	32	29/05/2026	16:29	1	Buzzard	0	0	34	0	0	34	Adult Female Commuting.
1	33	12/06/2026	09:17	1	Buzzard	11	0	0	0	0	11	Being mobbed by 3 Rooks. Adult Male Commuting.
1	39	12/06/2026	13:10	1	Buzzard	0	135	0	0	0	135	Soaring and calling. Adult Male Commuting.
2	42	18/06/2026	16:09	1	Buzzard	0	19	0	0	0	19	Adult Male Commuting.
2	49	18/06/2026	19:29	1	Buzzard	0	19	0	0	0	19	Soaring briefly over this treeline. Adult Female Commuting.
2	51	17/07/2026	12:39	1	Buzzard	0	12	0	0	0	12	Adult Male Commuting.
2	52	17/07/2026	15:42	2	Buzzard	0	371	0	0	0	371	Ad female and Ad Male birds circling and calling throughout. the male had a significant moult in the tail and primary area.
2	53	17/07/2026	16:04	1	Buzzard	0	0	0	19	0	19	Adult Male Commuting.
1	55	10/07/2026	10:31	1	Buzzard	43	0	0	0	0	43	Soaring Unsexed Adult. Commuting.

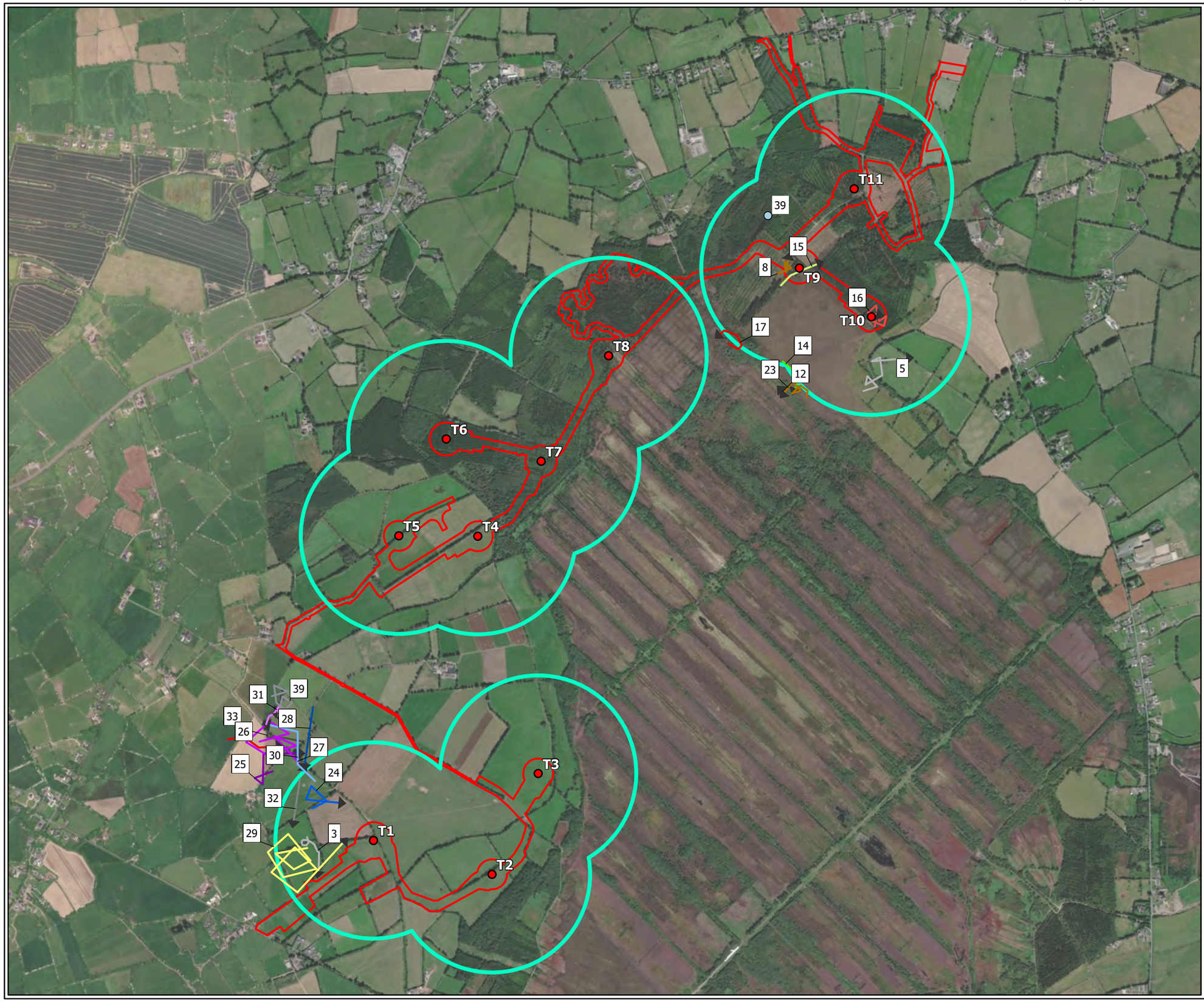
VP	Bird ID	Date	Obs. Time	No. Birds	Species	0-30m (s)	30-40m (s)	40-50m (s)	50-170m (s)	>170m (s)	Total Flight Time	Notes
1	56	10/07/2026	12:09	1	Buzzard	8	0	0	0	0	8	Travelling with intent to a treeline presumably landed. Unsexed Adult Commuting.
1	57	10/07/2026	12:56	1	Buzzard	68	0	0	0	0	68	Adult Male Commuting.
2	59	05/08/2026	10:54	1	Buzzard	0	98	0	0	0	98	Soaring. Unsexed Adult Commuting.
2	63	05/08/2026	12:54	1	Buzzard	0	41	0	0	0	41	Unsexed Adult Commuting.
2	65	18/08/2026	10:54	2	Buzzard	19	0	0	0	0	19	Adult Male and Juvenile calling. Commuting.
2	66	18/08/2026	11:35	1	Buzzard	0	77	0	0	0	77	Adult female circling. Commuting.
2	68	18/08/2026	12:49	1	Buzzard	14	0	0	0	0	14	Unsexed Adult Commuting.
2	69	18/08/2026	13:29	1	Buzzard	67	0	0	0	0	67	Unsexed Adult Commuting.
2	71	18/08/2026	14:51	1	Buzzard	210	0	0	0	0	210	Soaring
2	72	04/09/2026	09:01	1	Buzzard	44	0	0	0	0	44	Adult Male Commuting.
2	73	04/09/2026	10:57	1	Buzzard	23	0	0	0	0	23	Unsexed Adult Commuting.
1	79	04/09/2026	15:51	1	Buzzard	13	0	0	0	0	13	Flew in and perched in treeline. Adult Female Commuting.
1	80	04/09/2026	16:36	1	Buzzard	95	0	0	0	0	95	Soaring, presumably the same bird from earlier. Adult Female Commuting.

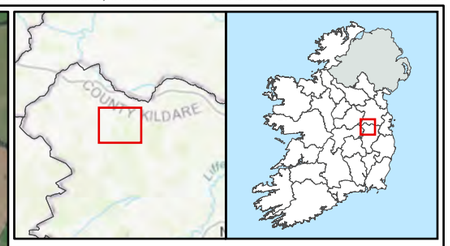
Table 3-2: VP Survey Results – Buzzard Points

VP	Bird ID	Date	Obs. Time	No. Birds	Species	Notes
1	39	18/08/2026	10:55	1	Buzzard	Calling throughout begging from this location. Unsexed Juvenile. Perched.

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Legend

- Site Boundary
- Turbine 500m

Flightlines

- 3, 12/05/2026, 09:32
- 5, 22/05/2026, 10:26
- 8, 22/05/2026, 10:55
- 12, 22/05/2026, 12:12
- 14, 22/05/2026, 13:31
- 15, 22/05/2026, 13:32
- 16, 22/05/2026, 13:36
- 17, 22/05/2026, 14:16
- 23, 22/05/2026, 16:07
- 24, 29/05/2026, 11:49
- 25, 29/05/2026, 12:58
- 26, 29/05/2026, 13:29
- 27, 29/05/2026, 14:44
- 28, 29/05/2026, 15:23
- 29, 29/05/2026, 16:02
- 30, 29/05/2026, 16:12
- 31, 29/05/2026, 16:28
- 32, 29/05/2026, 16:29
- 33, 12/06/2026, 09:17
- 39, 12/06/2026, 13:10
- 39, 18/08/2026, 10:55
- Turbine Locations

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DATE:	07/09/2026	**PAGE SIZE:**	A3

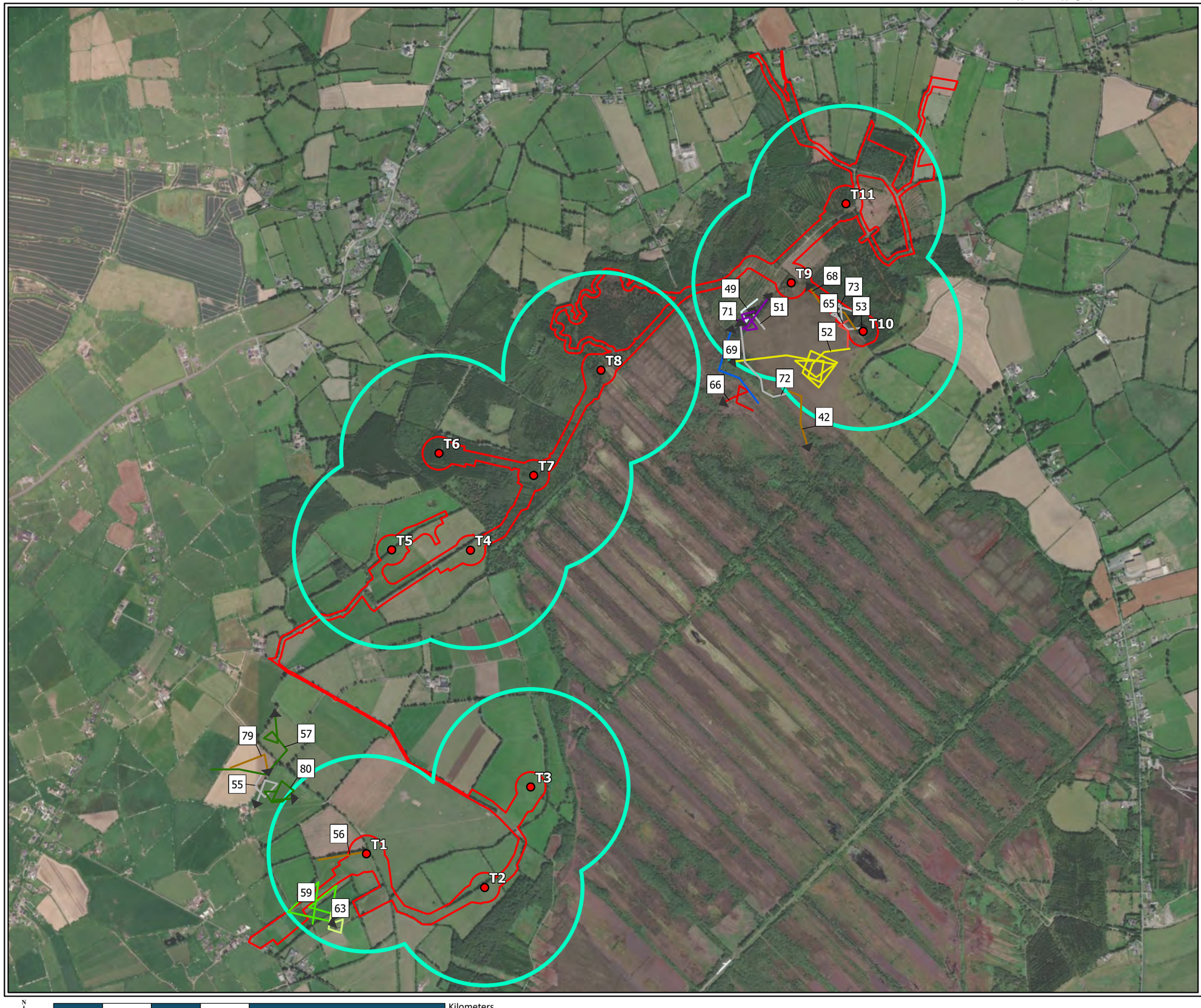
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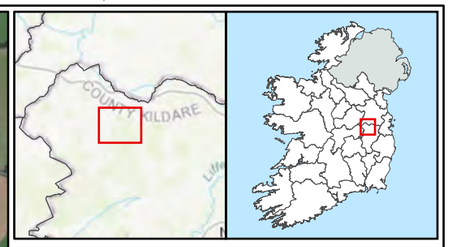
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Site Boundary: ; World Imagery: Microsoft, Vantor; World Topographic Map: Esri, HERE, Garmin, FAO, USGS, NGA
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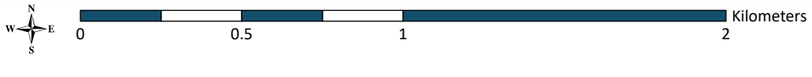


Legend

- Site Boundary
- Turbine 500m

Flightlines

- 42, 18/06/2026, 16:09
- 49, 18/06/2026, 19:29
- 51, 17/07/2026, 12:39
- 52, 17/07/2026, 15:42
- 53, 17/07/2026, 16:04
- 55, 10/07/2026, 10:31
- 56, 10/07/2026, 12:09
- 57, 10/07/2026, 12:56
- 59, 05/08/2026, 10:54
- 63, 05/08/2026, 12:54
- 65, 18/08/2026, 10:54
- 66, 18/08/2026, 11:35
- 68, 18/08/2026, 12:49
- 69, 18/08/2026, 13:29
- 71, 18/08/2026, 14:51
- 72, 04/09/2026, 09:01
- 73, 04/09/2026, 10:57
- 79, 04/09/2026, 15:51
- 80, 04/09/2026, 16:36
- Turbine Locations



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PROJECT:	Drehid SID - RFI
FIGURE NO:	3.2
CLIENT:	Statkraft Ireland Ltd.
SCALE:	1:19,000
REVISION:	0
DATE:	08/09/2026
PAGE SIZE:	A3

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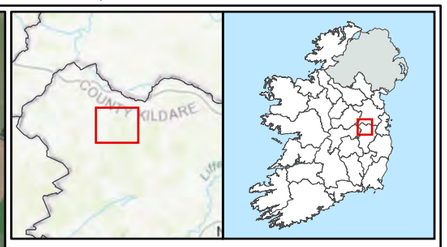
Table 3-3: VP Survey Results – Other Raptors - Flight Lines

VP	Bird ID	Date	Obs. Time	No. Birds	Species	0-30m (s)	30-40m (s)	40-50m (s)	50-170m (s)	>170m (s)	Total Flight Time	Notes
2	2	07/05/2026	08:11	1	Kestrel	0	420	0	0	0	420	Hovering over site, changed location slightly a few times, then flew NW over canopy. Unsexed Adult Foraging.
2	22	22/05/2026	15:43	1	Sparrowhawk	25	0	0	0	0	25	Adult Male Commuting.
1	38	12/06/2026	12:03	1	Sparrowhawk	0	0	0	39	0	39	Soaring while being mobbed by a Raven Adult Male Commuting.
2	41	18/06/2026	15:23	1	Sparrowhawk	0	0	51	0	0	51	Circling around this area moving East. Adult Male Commuting.
2	43	18/06/2026	16:27	1	Peregrine	43	0	0	0	0	43	Rather tatty looking Juvenile Female moving through. Commuting.
2	54	17/07/2026	16:29	1	Sparrowhawk	11	0	0	0	0	11	Adult Male Foraging.
2	58	05/08/2026	10:11	1	Peregrine	150	0	0	0	0	150	Adult Male, actively hunting Starlings along the hedgerows as marked in the flight lines. Appeared to have caught one and headed off SE.
1	81	04/09/2026	17:21	1	Sparrowhawk	4	0	0	0	0	4	Hunting along hedgeline. Unsexed Juvenile Foraging.

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Legend

- Site Boundary
- Turbine 500m

Flightlines

- Kestrel, 2, 07/05/2026, 08:11
- Peregrine, 43, 18/06/2026, 16:27
- Peregrine, 58, 05/08/2026, 10:11
- Sparrowhawk, 22, 22/05/2026, 15:43
- Sparrowhawk, 38, 12/06/2026, 12:03
- Sparrowhawk, 41, 18/06/2026, 15:23
- Sparrowhawk, 54, 17/07/2026, 16:29
- Sparrowhawk, 81, 04/09/2026, 17:21
- Turbine Locations

Kilometers
0 0.5 1 2

TITLE: Other Raptors- Flightlines			
PROJECT: Drehid SID - RFI			
FIGURE NO:	3.3		
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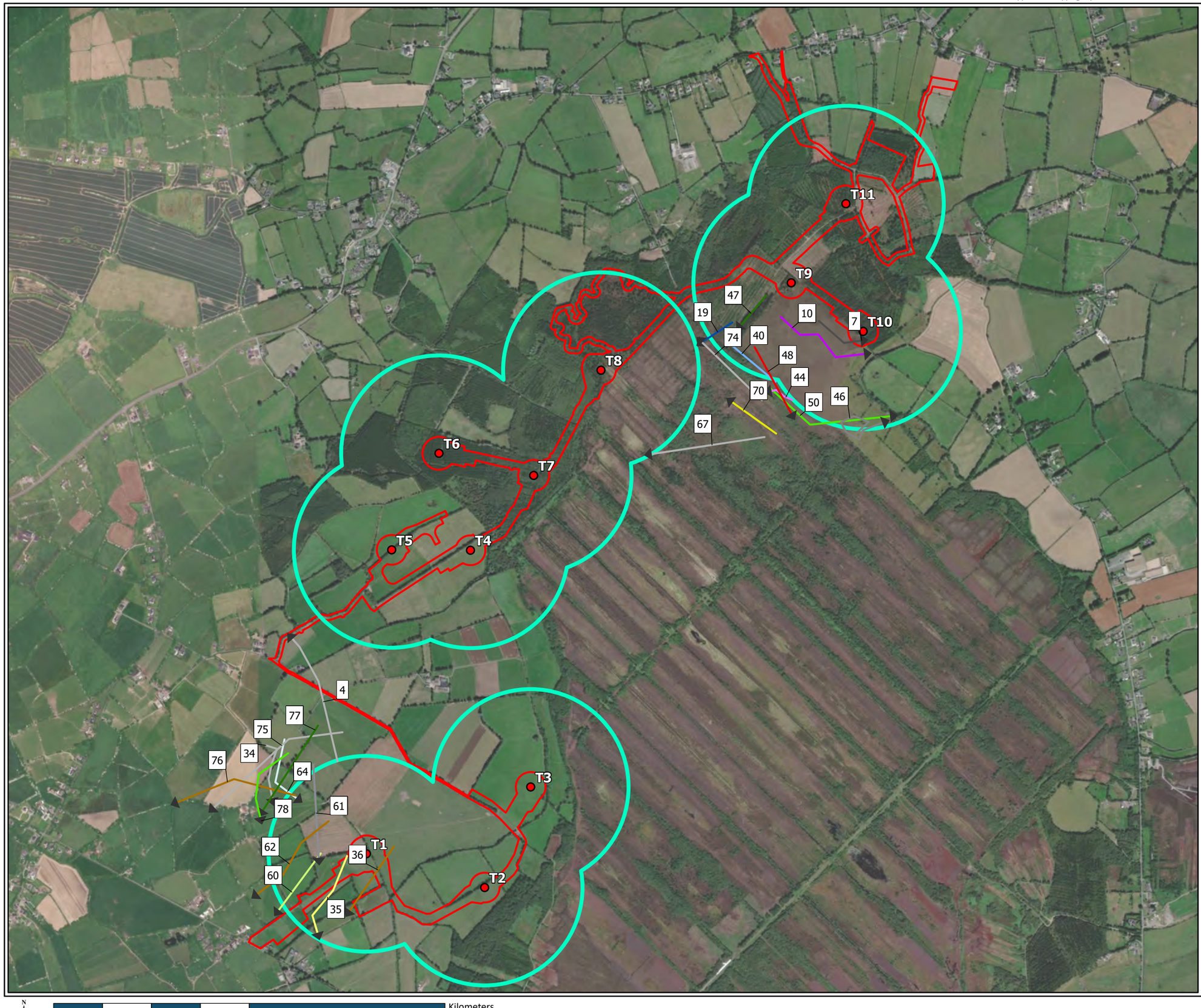
Table 3-4: VP Survey Results – Gulls - Flight Lines

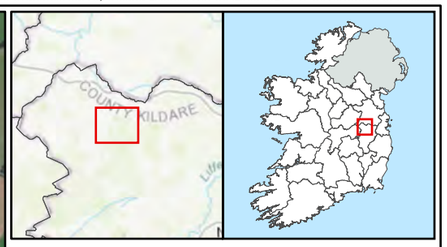
VP	Bird ID	Date	Obs. Time	No. Birds	Species	0-30m (s)	30-40m (s)	40-50m (s)	50-170m (s)	>170m (s)	Total Flight Time	Notes
1	4	12/05/2026	12:22	1	Herring Gull	0	0	0	12	0	12	Flying over site. Unsexed Adult Commuting.
2	7	22/05/2026	10:52	1	Lesser Black-backed Gull	0	34	0	0	0	34	3 calendar year bird - Unsexed Adult Commuting.
2	10	22/05/2026	11:33	12	Lesser Black-backed Gull	0	54	0	0	0	54	Mixed ages. 11x Ad Type and 1x 2nd year bird Commuting.
2	19	22/05/2026	15:11	2	Lesser Black-backed Gull	0	0	0	33	0	33	Unsexed Adults Commuting.
1	34	12/06/2026	09:58	1	Herring Gull	43	0	0	0	0	43	2 calendar year bird Commuting. Unsexed Juvenile.
1	35	12/06/2026	10:29	1	Lesser Black-backed Gull	0	0	81	0	0	81	Unsexed Adult Commuting.
1	36	12/06/2026	10:54	5	Herring Gull	0	0	66	0	0	66	Unsexed Adult Commuting.
2	40	18/06/2026	15:13	1	Lesser Black-backed Gull	0	78	0	0	0	78	Unsexed Adult Commuting.
2	44	18/06/2026	17:11	1	Lesser Black-backed Gull	20	0	0	0	0	20	Unsexed Adult Commuting.
2	46	18/06/2026	18:09	1	Lesser Black-backed Gull	0	0	0	98	0	98	Unsexed Adult Commuting.
2	47	18/06/2026	18:26	4	Herring Gull	0	18	0	0	0	18	3x calendar year birds, 1 Adult Commuting.
2	48	18/06/2026	18:42	1	Lesser Black-backed Gull	40	0	0	0	0	40	Unsexed Adult Commuting.
2	50	18/06/2026	19:54	3	Herring Gull	0	84	0	0	0	84	3 Unsexed Adults Commuting.
2	60	05/08/2026	11:29	1	Herring Gull	21	0	0	0	0	21	Unsexed Adult Commuting.

VP	Bird ID	Date	Obs. Time	No. Birds	Species	0-30m (s)	30-40m (s)	40-50m (s)	50-170m (s)	>170m (s)	Total Flight Time	Notes
2	61	05/08/2026	12:11	3	Lesser Black-backed Gull	55	0	0	0	0	55	2 Adults and a 1x calendar year bird commuting
2	62	05/08/2026	12:49	1	Lesser Black-backed Gull	23	0	0	0	0	23	Unsexed Adult Commuting.
2	64	05/08/2026	14:00	1	Lesser Black-backed Gull	19	0	0	0	0	19	Unsexed Adult Commuting.
2	67	18/08/2026	12:05	1	Lesser Black-backed Gull	28	0	0	0	0	28	Unsexed Adult Commuting.
2	70	18/08/2026	14:00	1	Lesser Black-backed Gull	43	0	0	0	0	43	Unsexed Adult Commuting.
2	74	04/09/2026	11:24	7	Lesser Black-backed Gull	0	53	0	0	0	53	2 Juveniles present with 5 Adults. Commuting.
1	75	04/09/2026	14:08	1	Lesser Black-backed Gull	66	0	0	0	0	66	Unsexed Adult Commuting.
1	76	04/09/2026	14:22	6	Lesser Black-backed Gull	78	0	0	0	0	78	5 Adults, 1 Juvenile. Commuting.
1	77	04/09/2026	14:51	1	Lesser Black-backed Gull	33	0	0	0	0	33	Unsexed Adult Commuting.
1	78	04/09/2026	15:45	2	Lesser Black-backed Gull	55	0	0	0	0	55	Unsexed Adult Commuting.

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Legend

- Site Boundary
- Turbine 500m

Flightlines

- Herring Gull, 4, 12/05/2026, 12:22
- Herring Gull, 34, 12/06/2026, 09:58
- Herring Gull, 36, 12/06/2026, 10:54
- Herring Gull, 47, 18/06/2026, 18:26
- Herring Gull, 50, 18/06/2026, 19:54
- Herring Gull, 60, 05/08/2026, 11:29
- Lesser Black-backed Gull, 7, 22/05/2026, 10:52
- Lesser Black-backed Gull, 10, 22/05/2026, 11:33
- Lesser Black-backed Gull, 19, 22/05/2026, 15:11
- Lesser Black-backed Gull, 35, 12/06/2026, 10:29
- Lesser Black-backed Gull, 40, 18/06/2026, 15:13
- Lesser Black-backed Gull, 44, 18/06/2026, 17:11
- Lesser Black-backed Gull, 46, 18/06/2026, 18:09
- Lesser Black-backed Gull, 48, 18/06/2026, 18:42
- Lesser Black-backed Gull, 61, 05/08/2026, 12:11
- Lesser Black-backed Gull, 62, 05/08/2026, 12:49
- Lesser Black-backed Gull, 64, 05/08/2026, 14:00
- Lesser Black-backed Gull, 67, 18/08/2026, 12:05
- Lesser Black-backed Gull, 70, 18/08/2026, 14:00
- Lesser Black-backed Gull, 74, 04/09/2026, 11:24
- Lesser Black-backed Gull, 75, 04/09/2026, 14:08
- Lesser Black-backed Gull, 76, 04/09/2026, 14:22
- Lesser Black-backed Gull, 77, 04/09/2026, 14:51
- Lesser Black-backed Gull, 78, 04/09/2026, 15:45

Turbine Locations

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DATE:	08/09/2026	**PAGE SIZE:**	A3

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Table 3-5: VP Survey Results –Other Species - Flight Lines

VP	Bird ID	Date	Obs. Time	No. Birds	Species	0-30m (s)	30-40m (s)	40-50m (s)	50-170m (s)	>170m (s)	Total Flight Time	Notes
2	1	07/05/2026	07:40	1	Snipe	6	0	0	0	0	6	Flushed by surveyor. Unsexed Adult.
2	6	22/05/2026	10:31	1	Snipe	11	0	0	0	0	11	Calling. Unsexed Adult.
2	9	22/05/2026	11:04	2	Swift	29	0	0	0	0	29	Unsexed Adult Foraging.
2	11	22/05/2026	11:54	5	Swift	16	0	0	0	0	16	Unsexed Adult Foraging.
2	13	22/05/2026	12:34	1	Snipe	11	0	0	0	0	11	Unsexed Adult.
2	20	22/05/2026	15:17	1	Snipe	10	0	0	0	0	10	Calling. Adult Male Commuting.
2	21	22/05/2026	15:22	1	Cormorant	0	72	0	0	0	72	Unsexed Adult Commuting.
2	45	18/06/2026	17:49	1	Mallard	33	0	0	0	0	33	Adult Male Commuting.

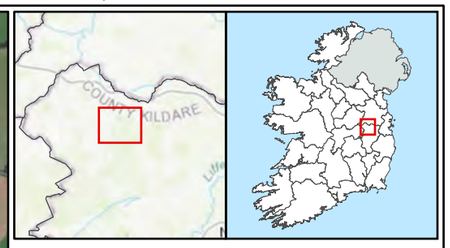
Table 3-6: VP Survey Results –Other Species – Points

VP	Bird ID	Date	Obs. Time	No. Birds	Species	Notes
2	16	18/06/2026	14:24	1	Snipe	In song around this point throughout. Unsexed Adult.
2	17	18/06/2026	15:21	1	Snipe	In song and short bursts of display flight. Unsexed Adult.
2	6	22/05/2026	15:22	58	Swift	Minimum of 58 birds moved through this point throughout. Unsexed Adults Commuting.
1	37	05/08/2026	12:59	11	Swift	Passing through (minimum count). Unsexed Adults Commuting.

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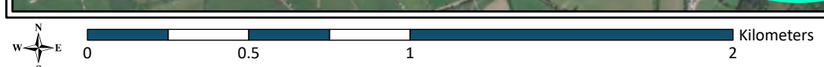


Legend

- Site Boundary
- Turbine 500m

Flightlines

- Cormorant, 21, 22/05/2026, 15:22
- Mallard, 45, 18/06/2026, 17:49
- Snipe, 1, 07/05/2026, 07:40
- Snipe, 6, 22/05/2026, 10:31
- Snipe, 13, 22/05/2026, 12:34
- Snipe, 20, 22/05/2026, 15:17
- Swift, 9, 22/05/2026, 11:04
- Swift, 11, 22/05/2026, 11:54
- Snipe, 16, 18/06/2026, 14:24
- Snipe, 17, 18/06/2026, 15:21
- Swift, 6, 22/05/2026, 15:22
- Swift, 37, 05/08/2026, 12:59
- Turbine Locations



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DATE:	08/09/2026	**PAGE SIZE:**	A3

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3.2 Breeding Bird Transect Survey Results

The results of the summer 2026 breeding bird transect surveys at the proposed development are shown in Table 3-7 to Table 3-10.

A total of 33 species were observed during summer 2026 breeding bird surveys. Of these, one is Red-listed under BoCCI (Gilbert et al., 2021): meadow pipit. A further 8 are Amber-listed under the BoCCI: goldcrest, herring gull, house sparrow, skylark, spotted flycatcher, swallow, and willow warbler. The remaining 24 species are Green-listed under BoCCI. No annex I species were recorded during these surveys.

Table 3-7: Transect 1 Results

Species	Round 1			Round 2		
	0-25	25-100	100m +/ FO	0-25	25-100	100m +/ FO
Blackbird	2					1
Blackcap		1		4		
Blue Tit	1					
Chaffinch	2					
Cuckoo						1
Common Crossbill					1	
Coal Tit				3		
Goldcrest	1			2		
Great Spotted Woodpecker				1		
Great Tit	1					
Hooded Crow			2			
Lesser Redpoll		1				
Mistle Thrush						2
Meadow Pipit		1				3
Robin	1	1		1		
Raven			1			
Skylark						1
Siskin		1				
Song Thrush	1	1		1		
Wren	3	1		3	1	

Species	Round 1			Round 2		
	0-25	25-100	100m +/ FO	0-25	25-100	100m +/ FO
Willow Warbler	2	2		1		

Table 3-8: Transect 2 Results

Species	Round 1			Round 2		
	0-25	25-100	100m +/ FO	0-25	25-100	100m +/ FO
Blackbird	3	1		1	1	
Bullfinch	1					
Blue Tit	1					
Chaffinch	2			5	1	
Cuckoo					1	1
Coal Tit	2	2				
Goldcrest	4	2		1		
House Sparrow	1					
Jay				1	1	
Lesser Redpoll	1					
Mistle Thrush				1		
Meadow Pipit		2	1		4	
Robin	2			1		
Raven						2
Song Thrush	1	2		1		
Whitethroat					1	
Woodpigeon			3	1		
Wren	1	2		3		
Willow Warbler		1			1	1

Table 3-9: Transect 3 Results

Species	Round 1			Round 2		
	0-25m	25-100m	100m + / FO	0-25m	25-100m	100m + / FO
Blue Tit				1		
Blackbird	4			3		
Bullfinch				1		
Chiffchaff	2	1		1		
Chaffinch	1			1		
Dunnock	2	1				
Great Tit	1			2		
Linnet				1		
Hooded Crow			1			
Herring Gull			1			
Robin	3			2		
Raven			2			1
Spotted Flycatcher				1		
Song Thrush	1	3			1	
Woodpigeon					1	
Wren	4			4		
Willow Warbler	1	1		1		

Table 3-10: Transect 4 Results

Species	Round 1			Round 2		
	0-25m	25-100m	100m + / FO	0-25m	25-100m	100m + / FO
Blackbird	5	1		2		
Blackcap	1					
Blue Tit	1			2	1	
Chiffchaff	1	1				
Chaffinch	3			2		
Coal Tit				1		
Dunnock					1	
Goldcrest	2			1		
Great Tit	1					
Hooded Crow				1		2
House Sparrow	1					
Magpie					1	
Meadow Pipit					1	
Robin	2	1		2		
Raven		1	1			
Skylark	1	2			2	1
Swallow	1	2	1			
Song Thrush		2				
Woodpigeon		1				1
Wren	2	3		1		

3.3 Breeding Wader Survey Results

Breeding wader surveys recorded minimal wader activity, with the only record comprising an individual snipe flushed form cutover bog outside the proposed development site and outside the 500m turbine buffer to the south of wader transect 3. This bird was observed on 28/04/26. No behaviour indicative of breeding was observed.

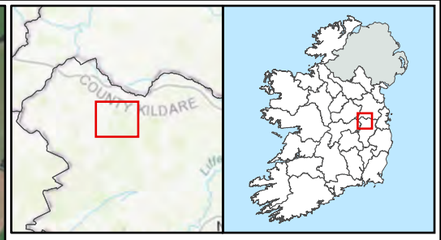
As detailed above in Table 3-5 and Table 3-6, snipe activity was observed during VP surveys at VP2 during May and June 2026. One adult was flushed by the surveyor on 07/05/2026. Three records of flight activity were recorded on 22/05/2026. On 18/07/2026, two snipe adults were noted in song at separate locations in and around Mulgeeth bog. One of these birds also engaged in short bursts of display flight.

All snipe activity observed during VP surveys was focused on Mulgeeth bog. While vocalisations and display flights potentially indicative of territorial behaviour were recorded, the surveyor noted there were no reliable indications that breeding occurred in this area during summer 2026.

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Legend

- Site Boundary
- Turbine 500m
- Turbine Locations
- Snipe, 28/04/2026, 08:00

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3.4 Woodcock Survey Results

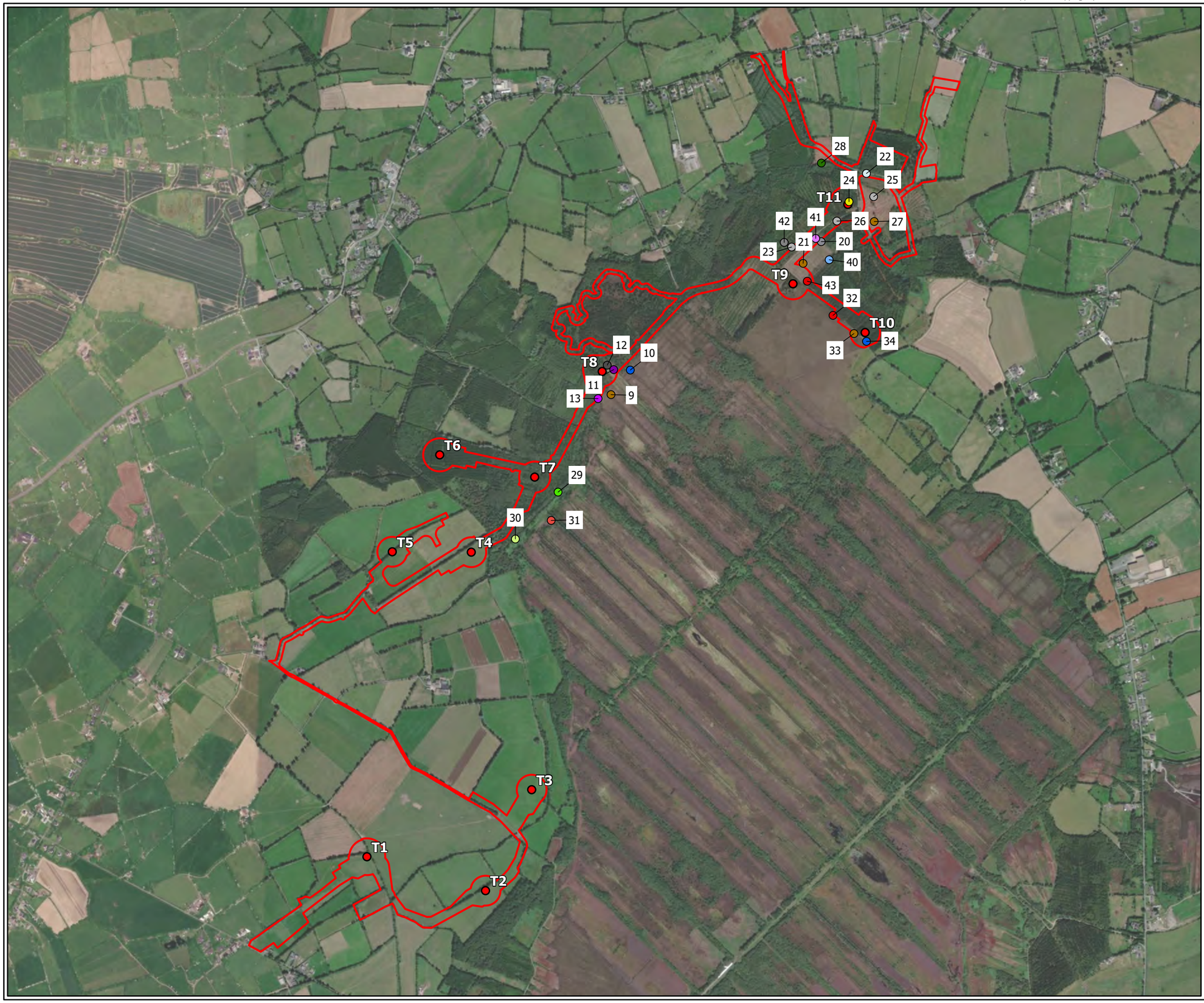
Table 3-11: Woodcock Survey Results

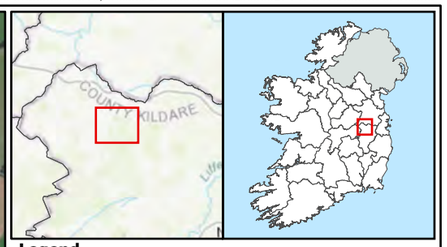
VP	ID	Date	Obs. Time	No. Birds	Species	Notes	Gender	Behaviour
WK-T8	9	09/06/2026	22:06	2	Woodcock	1 Bird Roding in this area	Unsexed Adult	Display
WK-T8	11	09/06/2026	22:31	1	Woodcock	Minimum of 1 bird (possibly 2) moving back and forth calling over this track	Unsexed Adult	Commuting
WK-T8	12	09/06/2026	22:40	3	Woodcock	2 birds together followed by a third shortly after heading out over the bog calling	Unsexed Adult	Commuting
WK-T8	13	09/06/2026	22:42	1	Woodcock	1 bird seen multiple times at this location heading back and forth throughout the watch	Unsexed Adult	Commuting
WK-T9	40	12/06/2026	20:53		Woodcock	-	Unsexed Adult	Commuting
WK-T9	41	12/06/2026	21:10		Woodcock	-	Unsexed Adult	Commuting
WK-T9	42	12/06/2026	21:47		Woodcock	-	Unsexed Adult	Commuting
WK-T9	43	12/06/2026	22:25		Woodcock	-	Unsexed Adult	Commuting
WK-T9	20	18/06/2026	21:58	2	Woodcock	2 birds lifted from here 15 mins apart	Unsexed Adult	Roosting
WK-T9	21	18/06/2026	22:16	1	Woodcock	-	Unsexed Adult	Commuting
WK-T9	22	18/06/2026	22:25	1	Woodcock	On the walk back to the car - not in WK-T9 survey area	Unsexed Adult	Commuting
WK-T9	23	18/06/2026	22:42	1	Woodcock	-	Unsexed Adult	Commuting
WK-T8	10	22/06/2026	22:13	2	Woodcock	Calling throughout. Using this area multiple times through the watch	Unsexed Adult	Commuting

VP	ID	Date	Obs. Time	No. Birds	Species	Notes	Gender	Behaviour
WK-T11	24	24/06/2026	20:57	1	Woodcock	Calling	Unsexed Adult	Commuting
WK-T11	25	24/06/2026	21:16	2	Woodcock	-	Unsexed Adult	Commuting
WK-T11	26	24/06/2026	21:18	1	Woodcock	Calling	Unsexed Adult	Commuting
WK-T11	27	24/06/2026	21:34	2	Woodcock	-	Unsexed Adult	Commuting
WK-T11	28	24/06/2026	22:08	2	Woodcock	-	Unsexed Adult	Commuting
WK-T7	29	25/06/2026	21:51	2	Woodcock	-	Unsexed Adult	Commuting
WK-T7	30	25/06/2026	21:51	1	Woodcock	-	Unsexed Adult	Commuting
WK-T7	31	25/06/2026	22:05	1	Woodcock	-	Unsexed Adult	Commuting
WK-T10	32	27/06/2026	21:48	1	Woodcock	-	Unsexed Adult	Commuting
WK-T10	33	27/06/2026	22:35	1	Woodcock	-	Unsexed Adult	Commuting
WK-T10	34	27/06/2026	22:41	1	Woodcock	-	Unsexed Adult	Commuting

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Legend

- Site Boundary
- Turbine Locations
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- 10,22/06/2026,22:13
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- 13,09/06/2026,22:42
- 20,18/06/2026,21:58
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- 31,25/06/2026,22:05
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3.5 Barn Owl Survey

No barn owl activity or signs of barn owl were recorded during surveys. Potentially suitable habitat and breeding locations were confirmed to be present in the locality. However, current surveys did not obtain any evidence of barn owl activity or use of potential breeding/roosting locations in the area surrounding the proposed development.

The existing EIAR ornithology report desktop study noted the following:

According to the NBDC and local records, barn owls are present within the surrounding environment, with NBDC records as recent as 2023. An adult was recorded in 100m grid square N770372 outside the proposed wind farm boundary to the east in February 2023. A barn owl was recorded in 100m grid square N765385 at Muckloon outside the proposed wind farm boundary to the north in August 2018. In July 2021, a group of three juveniles and one adult was observed in grid square N751372 (located in woodland north of T8 outside the proposed wind farm boundary). In August 2022, a family unit of five individuals was observed in grid square N757398 (north of Johnstown Bridge).

A barn owl nest in N742365 (in woodland north of T6 outside proposed wind farm boundary) is indicated in an NBDC record from June 2021. Further consultation with the landowner at this location indicated a barn owl box has been installed here but has not been occupied to date by barn owl.

The current desktop study notes the following updates:

A new desktop record comprising three recently fledged juveniles is noted to have been made at Thomastown, Enfield (N735397) on 16/07/2025. This record is associated with a building located 2.7 km north-west of the proposed development.

The barn owl nest box at N742365 in woodland north of T6 outside the proposed development was confirmed to have remained inactive by the landowner up to the present. This nest box is located c. 100m from the proposed T6 felling buffer.

Due to the recent record of confirmed breeding from Thomastown near Enfield, barn owl are confirmed to be present in the wider area. Current surveys did not obtain any evidence of barn owl activity or use of potential breeding/roosting locations in the area surrounding the proposed development.

4. REFERENCES

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APPENDIX 3

Ecological Baseline Report
Summer 2026

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DREHID WIND FARM SUBSTATION SID - FURTHER INFORMATION RESPONSE

ECOLOGICAL SURVEYS 2026 BASELINE REPORT

Prepared for:

Kildare Wind Farm Ltd.

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Date: **October 2026**

Document No:

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1. INTRODUCTION

This report details the methodologies employed and survey results obtained for ecological surveys undertaken at the proposed Drehid wind farm site during Summer 2026. Surveys were undertaken to reconfirm/update the baseline as required and ensure the availability of current data to inform the planning process.

The Proposed Wind Farm is wholly located in County Kildare and includes lands in the townlands of Ballynamullagh, Kilmurry, Killyon, Coolree, Mulgeeth and Drehid. The site is accessed from the M4 motorway until Enfield, then along the R402 for ca. 7.7 km and finally along the local road (L5025) to the entrance of the site. The site lies c. 2.8 km south of the motorway M4 at Enfield and 1.2 km southeast of the regional road R402 linking the M4 to the R420 east of Tullamore in County Offaly. The Proposed Substation, including the loop-in connection to the existing Kinnegad-Rinawade overhead line, and the access tracks approaching from the main site entrance are wholly located in County Kildare and includes lands in the townlands of Ballynamullagh, Kilmurry, Coolree and Mulgeeth.

The site of the proposed development is located in relatively low-lying, relatively flat land with the majority of proposed turbines located beneath the 80 m contour line. The landcover is classified by Tailte Eireann's National Land Cover map as improved grassland, treelines, hedgerows, transitional forest, coniferous forest, broadleaved forest and woodland, mixed forest, scrub, bare peat, bare soil and disturbed ground, and artificial surfaces (forest roads). The National Land Cover Map for the wind farm site is illustrated in Figure 2.1. The east of the site is adjacent to a cutover bog (Timahoe Bog). The Fear English River bisects the site, flowing south to north before it enters the Blackwater River at Johnstown Bridge. The landscape is classified as being of low sensitivity from a landscape perspective.

The site of the Proposed Substation is located in commercial forestry at the northern extent of the wind farm site. The proposed loop-in connection to the existing overhead line is situated in agricultural lands, approximately 415m northeast of the Proposed development compound.

This report provides update ornithological baseline information to inform responses to the further information request letter ACP-322845-25 dated 08 April 2026. The following avian-specific requests were contained within this letter:

Biodiversity

(a)

It is fundamental that biodiversity baseline data are fit for purpose, up-to-date and sufficient. Where the lifespan of ecological survey data exceeds the typical validity period as set out in recognised guidelines, the applicant is required to provide up to date information or justification on the sufficiency of the information provided with respect to site condition, species mobility, species population and distribution trends and clearly disclose any limitations in reporting.

Therefore, the following is requested:

Avifauna

v.

An assessment of the status of existing or new features to support mobile species such as otter, badger and bat, is requested to update the planning application documentation and liaison with the NPWS if Regulation 54 derogations are required.

2. METHODOLOGY

In order to update/reconfirm the baseline, a general ecological site walkover was undertaken. This encompassed a survey for habitats and invasive species, in addition to any other key ecological receptors. Dedicated mammal surveys focused primarily on otter, badger and red squirrel were also undertaken.

2.1 Habitat & Botanical Survey

Botanical surveys and habitat classifications for the areas containing the Proposed Wind Farm were repeated during 09/07/2026, 22-23/07/2026 and 18-19/08/2026 in order to update/re-confirm baseline conditions.

The classification of habitats recorded during the field survey is based on the 'A Guide to Habitats in Ireland' (Fossitt, 2000).

During habitat surveys, a search for non-native invasive plant species was undertaken. The survey focused primarily on the identification of invasive species listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (As Amended).

2.2 General Ecology Walkover

Observations of interest were recorded during ecological walkovers of the Proposed Wind Farm site, and any incidental observations of other species made during surveys were recorded.

2.3 Mammal Survey

Mammal surveys of the Proposed Wind Farm were undertaken on 09/07/2026, 22-23/07/2026 and 18-19/08/2026 in order to update/re-confirm baseline conditions. Mammal surveys covering the entire development footprint and surrounding suitable habitats within 200m of turbine locations, 150m of bat felling buffers as applicable and within 150m of all other infrastructure were undertaken to determine the presence or absence protected mammal species in close proximity to the development footprint and TDR.

Sightings, tracks or signs (including droppings, resting places, burrows and setts) of mammals occurring within, or in the vicinity, of the development footprint were recorded and saved using Arc Field Maps.

Surveys were undertaken in accordance with the NRA's (2009) 'Ecological Surveying Techniques for Protected Flora and Fauna During the Planning of National Road Schemes' and the JNCC's (2004) 'Common Standards Monitoring Guidance for Mammals'. Regard was also had to the following:

- Harris S, Cresswell P and Jefferies D (1989) Surveying Badgers, Mammal Society.
- O'Mahony D, O'Reilly C and Turner P (2006). National Pine Marten Survey of Ireland 2005.
- Gurnell J and Pepper H (1994) Red squirrel conservation: Field study methods. Research Information Note 255. Forestry Commission, Edinburgh.
- Reid N, Harrison AT and Robb GN (2009) Northern Ireland Irish hare survey 2009. Northern Ireland Environment Agency Research and Development Series No. 09/04.
- Morris PA (2006) The New Hedgehog Book. Whittet Book, Stowmarket

2.3.1 Otter

Surveys to re-confirm/update the otter baseline were undertaken on 09/07/2026, 22-23/07/2026 and 18/08/2026. This comprised inspections of the previously identified otter holts (H1 and H2), in addition to trail camera surveys at H2 (see Figure 2-1). The trail camera surveys were carried out under licence No. 032/2026. Surveys focused on identification of signs such as holts, spraints, couches, prints, and other signs.

All watercourses within 150m of proposed works were covered by the survey, including sections extending up and down stream within 150m. Each otter sign encountered, such as spraints (droppings), was logged by type, location, condition, and approximate age. The frequency of otter marking and the number of sprainting sites were noted to assess habitat use and activity levels.

It is further noted that the general mammal survey extending to 150m from all proposed works locations also examined all suitable drains within the survey area to search for holts and otter signs.

2.3.2 Badger

Badger setts identified during the previous round of surveys (2024 pre-planning surveys) were revisited in order to re-confirm their status, and a survey for badger signs and setts was conducted across the entire mammal survey study area (200m of turbine locations, 150m of bat felling buffers as applicable and within 150m of all other infrastructure).

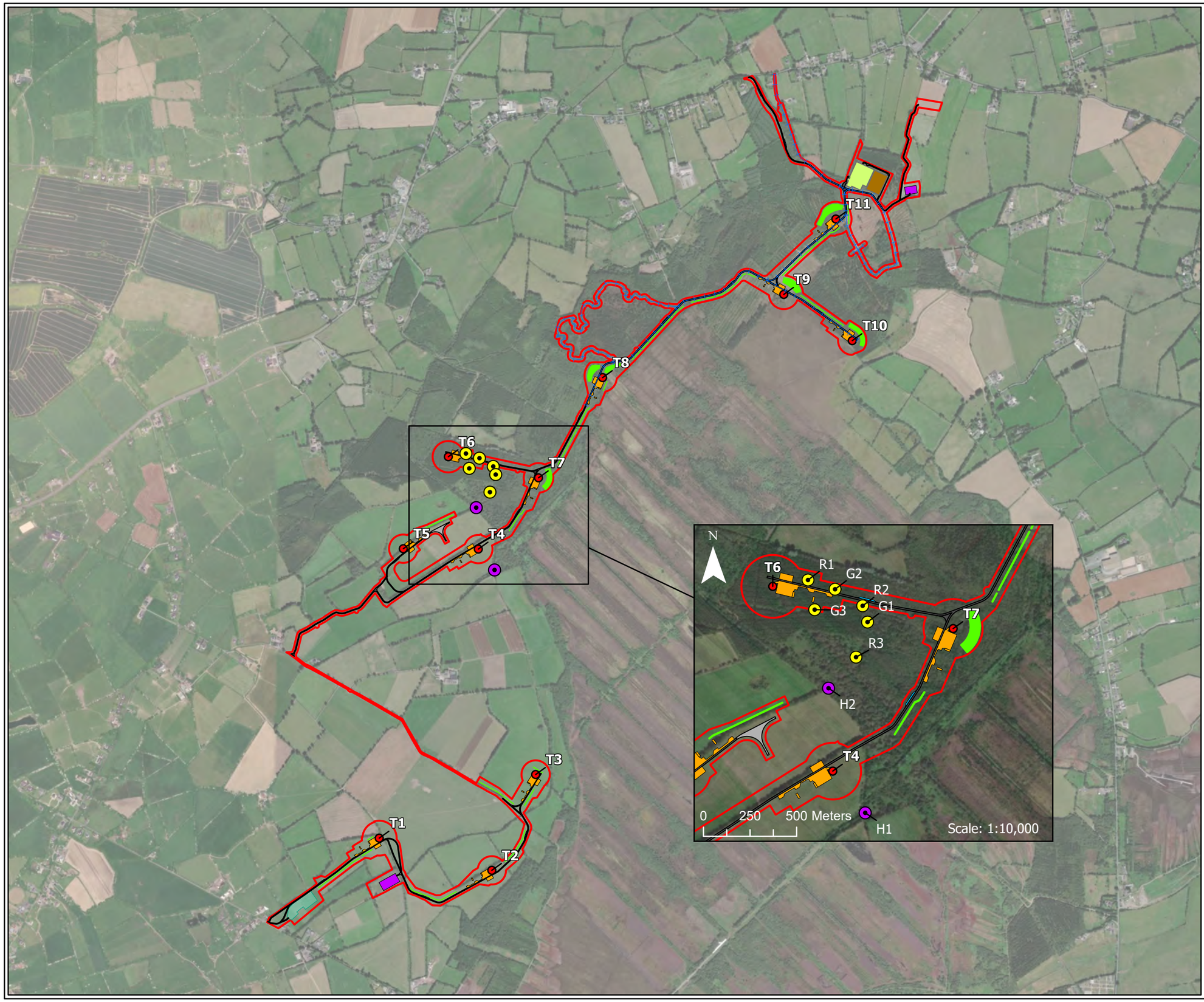
2.3.3 Red Squirrel

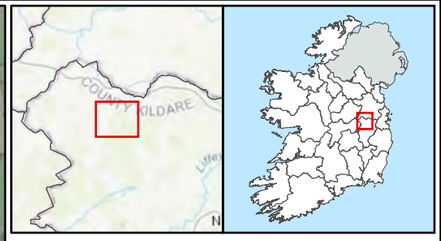
The mammal survey encompassed a search for signs of red squirrel including feeding signs, bark stripping and dreys. Trees were also examined for their potential to host dreys.

A hair trap survey targeting both red and grey squirrel was also undertaken. A total of six hair traps for squirrels were placed in the vicinity of T6 (due to previous surveys recording an abundance of feeding signs in this area), three of which were placed in trees to target red squirrel and three of which were placed on the ground to target grey squirrels (see Figure 1). The hair traps were constructed from 65mm diameter piping with double sided tape fixed inside at both ends and baited with sunflower seeds.

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Legend

- Site Boundary
- Berms
- Turbine Hardstanding
- Passing Bays
- Construction Compound
- Blade Transfer Area
- Temporary Access Track
- Access Track
- Peat Deposition Area
- Substation
- Recreation and Amenity Trail
- Turbines
- Mammal Features
- Hair Traps

TITLE:	Trail Camera and Hair Trap Locations		
PROJECT:	Drehid Wind Farm RFI		
FIGURE NO:	2.1		
CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:20,000	**REVISION:**	0
DATE:	01/10/2026	**PAGE SIZE:**	A3

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2.4 Bat Surveys

2.4.1 Roost Surveys

Roost surveys were repeated in line with 2024 roost surveys (covering the core survey are of 300m around proposed turbines, in addition to access tracks and the TDR) in order to reconfirm the baseline.

Searches for potential roosting features (PRFs) were conducted during summer 2026. Habitats and features with potential to contain bat roosting features were searched for and examined. This comprised a preliminary roost assessment (PRA) and ground-level tree assessment (GLTA) conducted in accordance with Collins (2023) and NatureScot (2021).

The core survey area was 300m around proposed turbines, which exceeds the requirement set out in NatureScot (2021) and NIEA Guidelines (Version 1.1) (2024) of 200m plus rotor radius (265m). A GLTA survey focused on trees potentially affected by the TDR and PRA encompassing the northern site access route were also conducted during summer 2026.

Bat boxes in the northern part of the site were also checked. The surveys encompassed checks of PRFs previously identified in 2018 and 2024 surveys which are within the potential ZoI of the current layout.

The schedule for 2026 roost surveys is detailed in Table 2-1 below.

Table 2-1: Roost survey schedule 2026

Survey	Date	Weather
PRA	09/07/2026	Dry; visibility excellent
GLTA	22/07/2026	Dry; visibility excellent
GLTA	23/07/2026	Dry; visibility excellent
GLTA	18/08/2026	Dry; visibility excellent
GLTA	19/08/2026	Occasional showers; visibility excellent

2.4.2 Static Detector Surveys

Passive Static Bat Surveys involve leaving a static bat detector unit (with ultrasonic microphone) in a specific location and set to record for a specified round of time (i.e., a bat detector is left in the field, there is no observer present and bats which pass the monitoring unit are recorded and their calls are stored for analysis post surveying). The bat detector is effectively used as a bat activity data logger. This results in a far greater sampling effort over a shorter round of time. Bat detectors with ultrasonic microphones are used as the ultrasonic calls produced by bats cannot be heard by human hearing.

Song Meter SM4BAT Full spectrum bat recorders use Real Time recording as a technique to record bat echolocation calls and using specific software, the recorded calls are identified. It is these sonograms (2-d sound pictures) that are digitally stored on the SD card (or micro SD cards depending on the model) and downloaded for analysis. Full spectrum bat recorders were utilised for all the static surveys as recommended in the revised SNH (2021) guidelines. These results are depicted on a graph showing the number of bat passes per species per hour/night. Each bat pass does not correlate to an individual bat but is representative of bat activity levels. Some species such as the pipistrelles will continuously fly around a habitat and therefore it is likely that a series of bat passes within a similar time frame is one individual bat. On the other hand, Leisler's bats tend to travel through an area quickly and therefore an individual sequence or bat pass is more likely to be indicative of individual bats.

Per NautreScot 2021 guidance, static units (Song Meter SM4BAT) were programmed to commence half an hour before sunset and finish half an hour after sunrise to ensure that bat species that emerge early in the evening and return to roosts late are recorded. Detectors were left out for a minimum of 10 consecutive nights across each of two survey rounds: spring (April-May) and autumn (mid-August-October), and 30 consecutive nights during one survey round: summer (June-mid-August) during the 2026 bat activity season. To account for nights with unsuitable weather conditions, detectors were deployed longer than the minimum required 10 consecutive nights (SNH, 2021) to ensure that enough data could be gathered during suitable weather conditions. Data was gathered over a total of 64 nights during bat activity season.

NatureScot (2021) guidance states that "Detectors should be placed at all known turbine locations at wind farms containing less than ten proposed turbines. Where developments have more than ten turbines, detectors should be placed within the developable area at ten potential turbine locations plus a third of additional potential turbine sites up to a maximum of 40 detectors for the largest developments".

A total of 11 detectors were deployed to cover 10 proposed turbine locations (T1, T2, T3, T4, T5, T6, T8, T9 T10 & T11) for all survey rounds in 2023. The detectors were placed at or close to proposed turbine locations in analogous habitats (see Figure 2-2 and Table 2-2). The 11th detector was placed at the confluence between the Fear English River and a bog drain running north along woodland edge to the east of T7.

This position is considered a more effective survey location than the proposed T7 location since it samples the intersection between a number of commuting/foraging corridors which are connected to the woodland edge south-east of T7, while T7 is surrounded by dense plantation woodland.

The data was analysed with Kaleidoscope 5.3.9g software (Bats of Europe 5.2.1).

No data was recorded for Round 3 at T3 due to the detector (DRE-C) being damaged by livestock. Detector DRE-K experienced a card failure during Round 2 and did not record any data. Due to the wide temporal and spatial ranges covered by the remaining detectors/rounds, these occurrences are not considered to represent significant survey limitations.

Table 2-2: Static Detector Deployment 2026

Detector	Prefix	Deployment	Collection	Nights Recorded	Round
T1	DRE-A	20/05/2026	05/06/2026	16	1
T1	DRE-A	29/06/2026	29/07/2026	23	2
T1	DRE-A	24/08/2026	07/09/2026	14	3
T2	DRE-B	20/05/2026	05/06/2026	16	1
T2	DRE-B	29/06/2026	29/07/2026	30	2
T2	DRE-B	24/08/2026	07/09/2026	14	3
T3	DRE-C	20/05/2026	05/06/2026	16	1
T3	DRE-C	29/06/2026	29/07/2026	30	2
T3	DRE-C	24/08/2026	07/09/2026	0[1]	3
T4	DRE-D	20/05/2026	05/06/2026	16	1
T4	DRE-D	29/06/2026	29/07/2026	30	2
T4	DRE-D	24/08/2026	07/09/2026	14	3
T5	DRE-E	20/05/2026	05/06/2026	14	1
T5	DRE-E	29/06/2026	29/07/2026	30	2
T5	DRE-E	24/08/2026	07/09/2026	14	3
T6	DRE-F	20/05/2026	06/05/2026	16	1
T6	DRE-F	29/06/2026	29/07/2026	30	2
T6	DRE-F	24/08/2026	07/09/2026	14	3
Watercourse Confluence	DRE-G	20/05/2026	05/06/2026	16	1
Watercourse Confluence	DRE-G	29/06/2025	29/07/2026	30	2
Watercourse Confluence	DRE-G	24/08/2026	07/09/2026	14	3
T8	DRE-H	20/05/2026	05/06/2026	16	1
T8	DRE-H	29/06/2026	29/07/2026	30	2
T8	DRE-H	24/08/2026	07/09/2026	14	3
T9	DRE-I	20/05/2026	05/06/2026	16	1
T9	DRE-I	29/06/2026	29/07/2026	30	2
T9	DRE-I	24/08/2026	07/09/2026	14	3
T10	DRE-J	20/05/2026	05/06/2026	16	1
T10	DRE-J	29/06/2026	29/07/2026	30	2
T10	DRE-J	24/08/2026	07/09/2026	14	3

[1] Detector was damaged by livestock and did not record

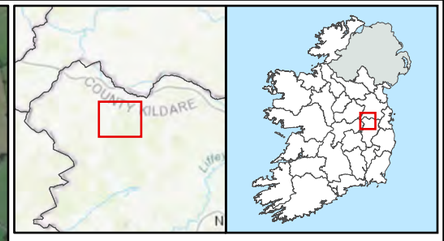
Detector	Prefix	Deployment	Collection	Nights Recorded	Round
T11	DRE-K	20/05/2026	05/06/2026	16	1
T11	DRE-K	29/06/2026	29/07/2026	0[2]	2
T11	DRE-K	24/08/2026	07/09/2026	14	3

[2] No recordings due to card failure

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Legend

- Site Boundary

Static Detector Deployment

- Round 1
- Round 2
- Round 3
- Turbines

TITLE:	Static Detector Locations 2026
PROJECT:	Drehid Wind Farm RFI
FIGURE NO:	2.2
CLIENT:	North Kildare Wind Farm Ltd.
SCALE:	1:20,000
REVISION:	0
DATE:	22/09/2026
PAGE SIZE:	A3

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3. RESULTS

3.1 Habitat Survey

The majority of habitat polygons remain unchanged since pre-planning surveys in 2023/24. Regarding recently re-planted conifer plantations and immature woodland, an increase in the density of vegetation recolonising bare ground between planted tree whips was observed. This is characterised by increased bramble cover and density of grassy vegetation in areas which have been replanted for longer (c. 4-5 years). In one more recently replanted block dating from 2024, the revegetation between the replanted Scot's pine trees is characterised by a dense carpet of birch saplings.

Additional species recorded in the woodland habitats not previously observed included pignut *Conopodium majus*, enchanter's nightshade *Circaea lutetiana*, common figwort *Scrophularia nodosa*, guelder rose *Viburnum opulus*, selfheal *Prunella vulgaris* and false brome *Brachypodium sylvaticum*. The majority of these were associated with existing track verges.

Despite these changes, the habitat classifications for these woodlands have not changed.



Plate 3-1: Dense birch growth under replanted Scot's pine forestry

The agricultural habitats within the proposed development remain largely unchanged, with hedgerows/treelines still present in the same locations and improved agricultural grassland comprising the highest land cover.

One small field to the east of T3 classified as GA1/GS4 Improved agricultural grassland/Wet grassland Mosaic has been left unmanaged in the intervening period and become more wild in character, with a notable abundance of insects observed during current surveys. The field is dominated by Yorkshire fog *Holcus lanatus*, purple loosestrife *Lythrum salicaria*, creeping thistle *Cirsium arvense* and broadleaved dock *Rumex obtusifolius*. Creeping buttercup *Ranunculus repens* was also noted. The abundance of purple loosestrife is indicative of more semi-natural conditions developing, while the docks and thistles indicate past agricultural management. This field is outside the proposed development site.

Some minor reclassifications have been made following surveys:

3.1.1 WD1 (Mixed) broadleaved woodland changed to ED3 Recolonising bare ground

Several large ash trees on the edge of the Coillte woodland in the north of the site have been felled, leaving a gap in the canopy. The remaining habitat is dominated by recolonising bare ground. This area is outside the proposed infrastructure footprint but is located along the existing Coillte track which forms part of the 'Entrance Trail' section of the proposed amenity trail. This update does not materially affect the habitat loss calculations due to the small extent of the area affected (0.05 ha).

3.1.2 Extent of WD3 (Mixed) conifer woodland reduced/WD2 mixed broadleaved/conifer woodland increased

Current surveys indicated the boundary between these habitats to the north of proposed turbine T8 should be relocated to provide more accurate mapping. The affected area is outside the proposed wind farm footprint. While the area of WD2 proposed to be felled remains unchanged, the increase in the mapped extent of WD2 reduces the proportion of WD2 loss relative to the overall extent of this habitat within the study area. Conversely, the decrease in the mapped extent of WD3 increases the proportion of WD3 loss relative to the overall extent of this habitat within the study area (the area of WD3 proposed to be felled remains unchanged).

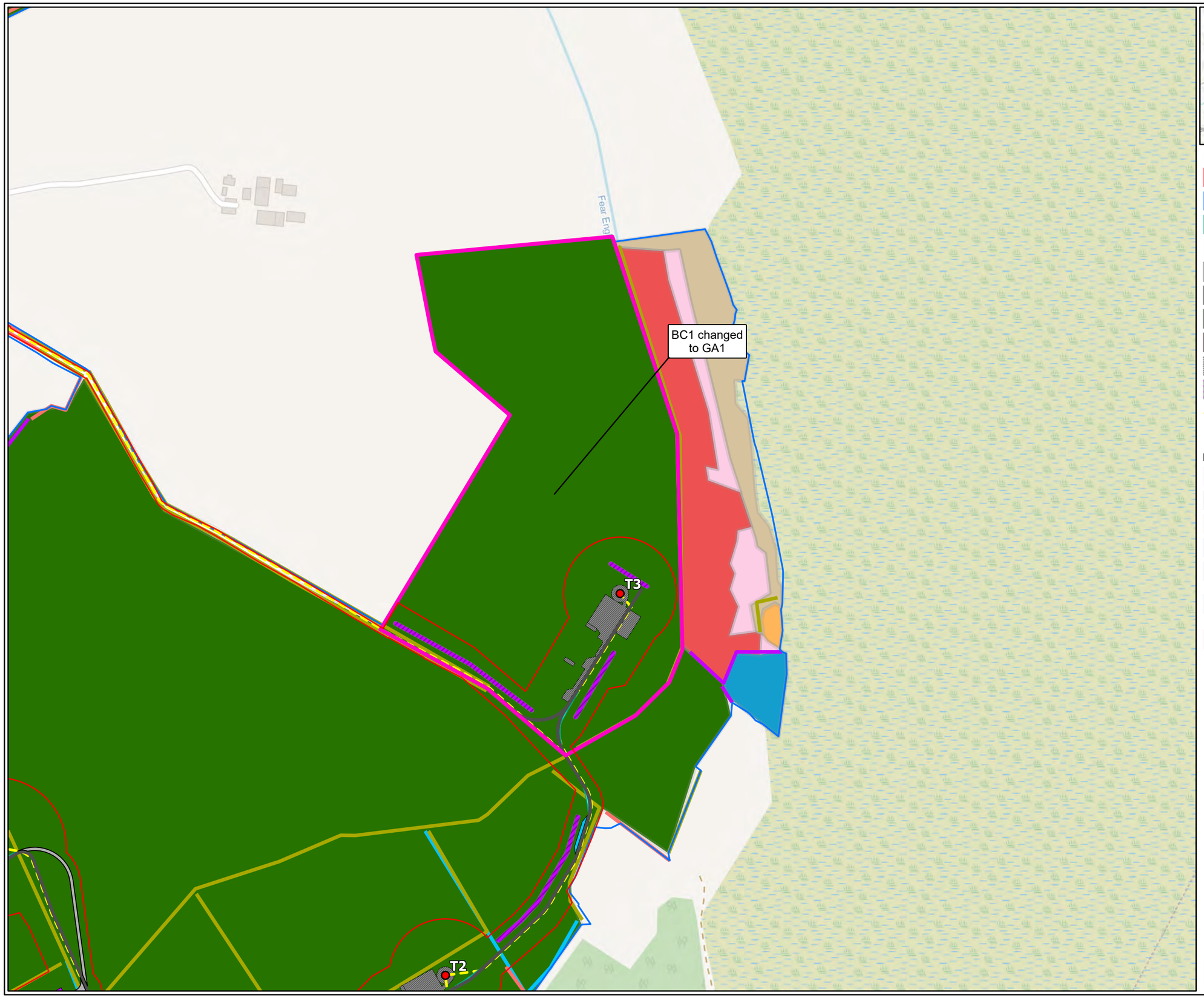
3.1.3 BC1 arable crops changed to GA1 Improved agricultural grassland

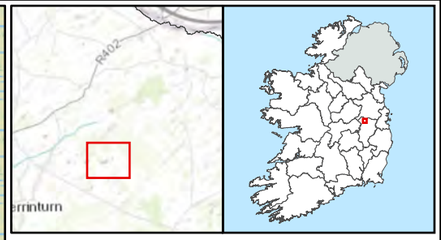
A large field in the south of the site has been converted from arable land back to improved agricultural grassland. The proposed turbine T3 is located in this field. This change in habitat type will result in an increase in loss of GA1 Improved agricultural grassland, and reduction in the loss of BC1 Arable crops areas to zero. Neither of these habitats are key ecological receptors. As such, the impact assessment remains unaffected by this change.

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Legend

- Proposed Development Boundary
- Study Area Boundary
- Road widening - Access tracks
- Road widening - Temp. Access Tracks
- Access Track
- Temporary Access Track
- Construction Compound
- Passing Bays
- Turbine Hardstanding
- Berms
- Cable Route
- Turbines

Habitats

- GA1 - Improved agricultural grassland
- HD1 - Dense bracken
- Other (Mosaic)
- PB1 - Raised bog
- WN7 - Bog woodland
- GA1/GS2 - Improved Agricultural Grassland/Dry Meadows and Grassy Verges
- GA1/GS4 - Improved Agricultural Grassland/Wet Grassland
- FW4 - Drainage ditches
- WL2 - Treelines
- WL1 - Hedgerows
- WL1/WL2 Hedgerows/Treelines Mosaic

TITLE:	Habitat Map Page 1		
PROJECT:	Drehid Wind Farm and Substation		
FIGURE NO:	3.1		
CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:5,000	**REVISION:**	0
DATE:	16/09/2026	**PAGE SIZE:**	A3

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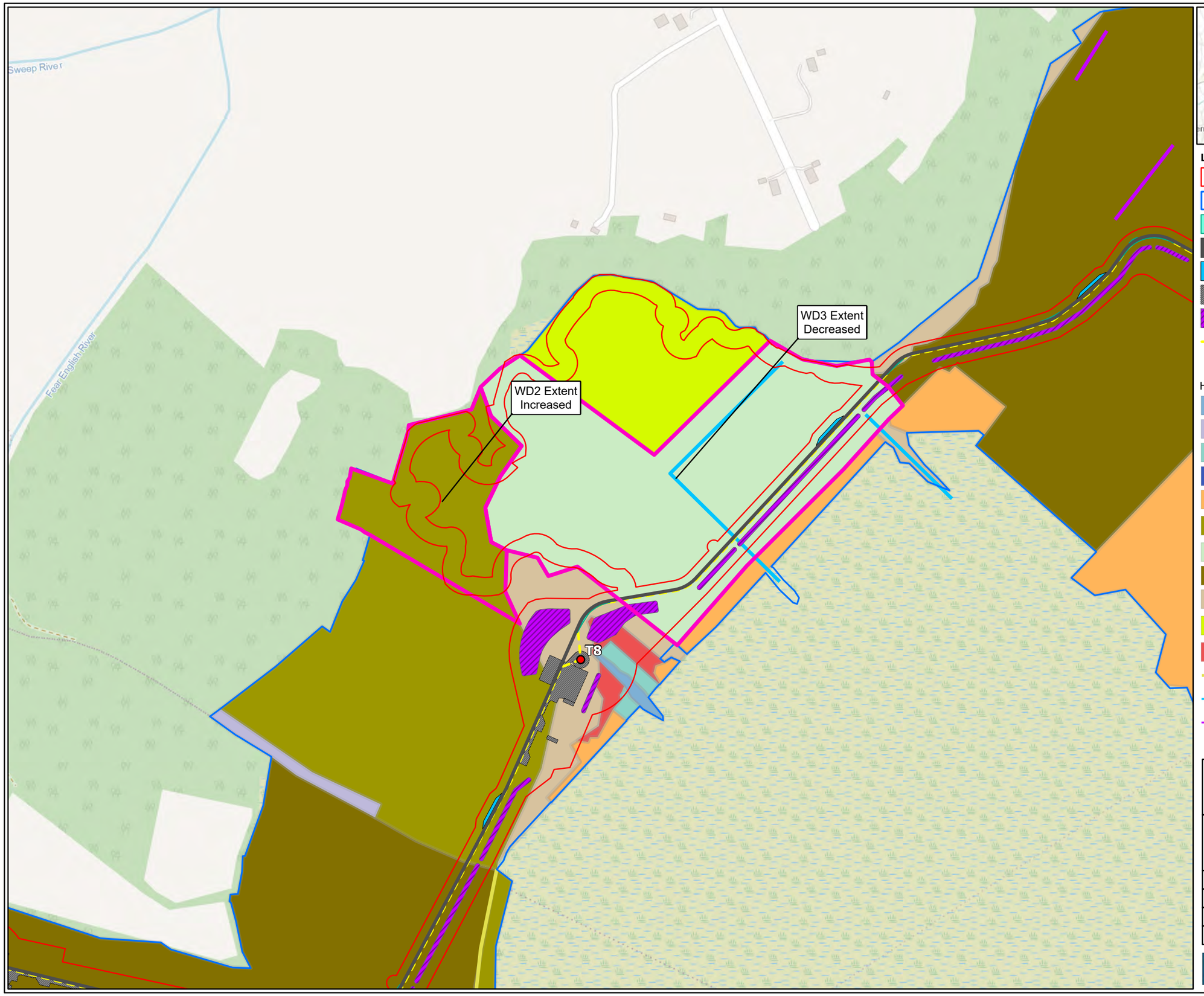
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Legend

- Proposed Development Boundary
- Study Area Boundary
- Road widening - Access tracks
- Access Track
- Passing Bays
- Turbine Hardstanding
- Berms
- Cable Route
- Turbines

Habitats

- FL1 - Dystrophic lakes
- GS2 - Dry meadows and grassy verges
- HH3 - Wet heath
- Other (Mosaic)
- PB1 - Raised bog
- WD2 - Mixed broadleaved/conifer woodland
- WD3 - (Mixed) conifer woodland
- WD4 - Conifer plantation
- WN7 - Bog woodland
- WD3/PB1 - (Mixed) Conifer Woodland/ Raised Bog
- WS1/PB1 - Scrub/Raised Bog
- FW1 - Eroding/upland rivers
- FW4 - Drainage ditches
- WL2 - Treelines

TITLE:	Habitat Map Page 2		
PROJECT:	Drehid Wind Farm and Substation		
FIGURE NO:	3.1		
CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:5,000	**REVISION:**	0
DATE:	16/09/2026	**PAGE SIZE:**	A3

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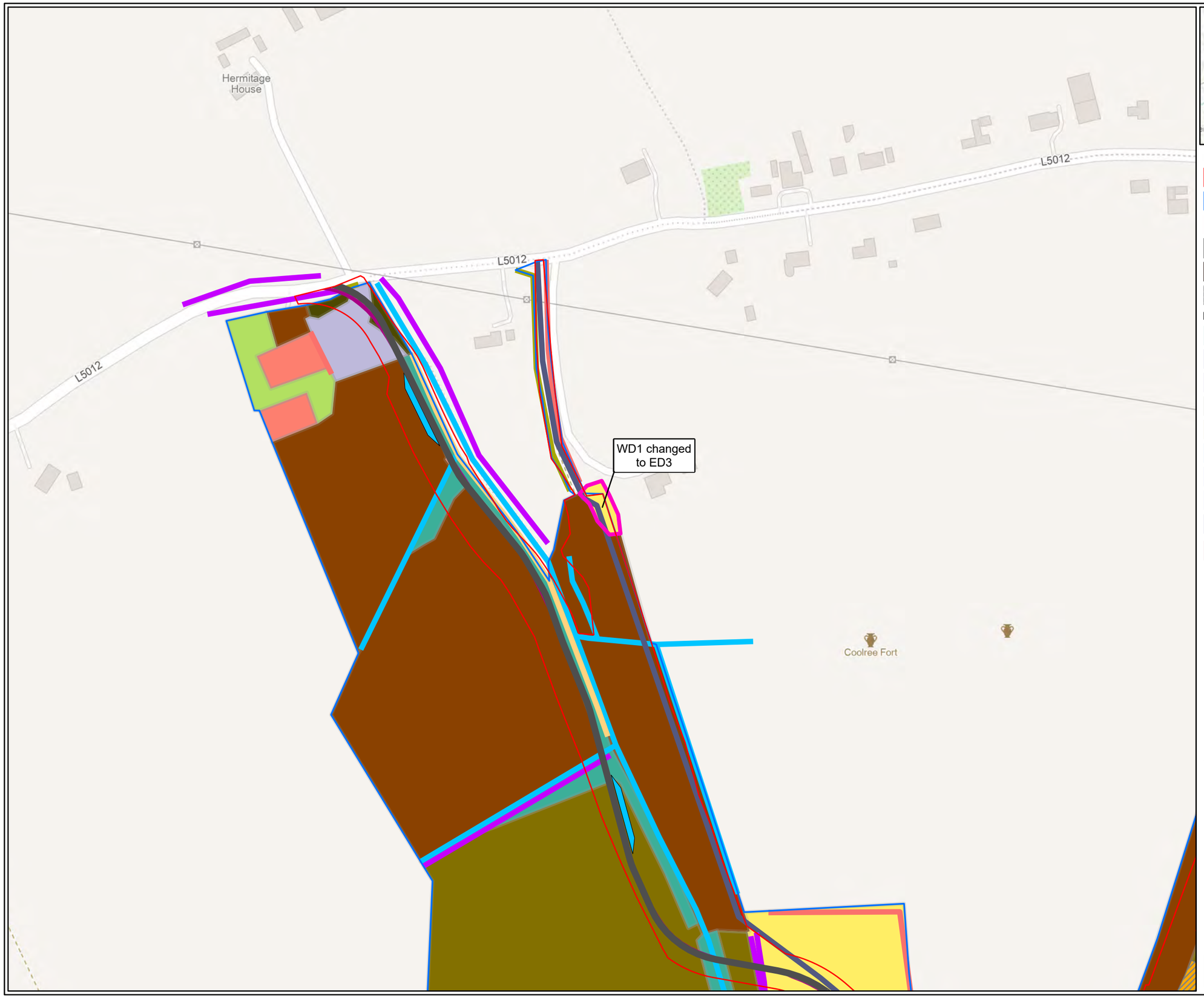
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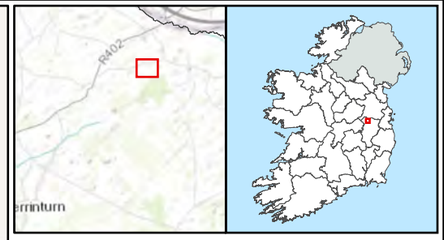
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Legend

- Proposed Development Boundary
- Study Area Boundary
- Road widening - Temp. Access Tracks
- Access Track
- Passing Bays
- Substation

Habitats

- BL3 - Buildings and artificial surfaces
- ED3 - Recolonising bare ground
- GA2 - Amenity grassland (improved)
- GS2 - Dry meadows and grassy verges
- Other (Mosaic)
- WD1 - (Mixed) broadleaved woodland
- WD4 - Conifer plantation
- WS1 - Scrub
- WS2 - Immature woodland
- WS1/GS2 - Scrub/Dry Meadows and Grassy Verges
- ED2 - Spoil and bare ground
- FW4 - Drainage ditches
- WL2 - Treelines
- WL1 - Hedgerows
- GS2/WS1 - Dry Meadows & Grassy Verges/Scrub
- WL1/WL2 Hedgerows/Treelines Mosaic

TITLE:	Habitat Map Page 3
PROJECT:	Drehid Wind Farm and Substation
FIGURE NO:	3.1
CLIENT:	North Kildare Wind Farm Ltd.
SCALE:	1:2,500
REVISION:	0
DATE:	16/09/2026
PAGE SIZE:	A3

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3.2 Turbine Delivery Route Habitats

No changes affecting the habitat classifications at TDR nodes have occurred.

3.3 Invasive Species

The growth or *Rhododendron ponticum* in woodland south of proposed turbine T8 remains similar to previous surveys and has not increased in extent or spread.

Sycamore is still present within mixed broadleaved/conifer woodland within the proposed substation footprint and is present in open parts of recently replanted conifer plantation to the south of the proposed substation. It is also present in hedgerows at TDR points of interest.

Butterfly bush is still present along existing forestry tracks north of T9 and south of the proposed substation, and shows some signs of continued growth and spread along access tracks in this area.

The following material changes are noted for the wind farm site invasive species baseline:

The desktop record for *Rhododendron* noted in conifer plantation c. 170m north-east of T9 (N762373) was determined to be incorrect. No evidence of *Rhododendron* was observed in this area during current surveys.

In addition, the location of the snowberry *Symphoricarpos albus* linear growth given in the EIAR Chapter 8-1 Section 8.7.5.2 (c. 150m from proposed T7 - T8 access track) was noted to be incorrect due to a GIS error. The correct location is c. 530m north-west of the proposed T7 - T8 access track.

3.4 Mammal Survey

The habitats onsite have remained relatively stable since previous surveys and as such the underlying site conditions which support local mammal populations are similar to those recorded during previous surveys.

During current surveys, juvenile red foxes were seen on two occasions, once near proposed T6 and once at the Fear English River near otter holt H1. Irish hare droppings were noted on cutover bog habitats in the winder environs of the proposed development. Wood mouse was recorded in trail camera footage. The presence of pygmy shrew was confirmed by droppings left in the hair traps installed on branches to target red squirrel.

3.4.1 Otter

The feature known as H1 was identified as a potential otter holt based on visual assessment during initial surveys (2018) due to its location and general suitability for mammals (although noted to be sub-optimal due to obstructing root). As such it was brought forward for assessment in the EIAR on a precautionary basis. However, no previous surveys or current surveys have recorded any evidence that this feature is used by otter or any other mammal species. As such, based on repeated observations, it is no longer classified as a holt.

During current surveys, the H1 entrance showed no signs of use when observed on 09/07/2026. Sticks were lightly placed across the entrance[3] to detect any use by mammals. These remained in place during subsequent visits on 22/07/2026 and 19/08/2026. This pattern of inactivity aligns with previous surveys, which noted a lack of activity at H1 and also noted the same tree root obstructing the entrance, restricting access and severely reducing potential for use by otter.

As part of the otter survey, any new features (holes/burrows) along the bank were examined. None of the features examined showed any signs of use by otter, nor were any found to be suitable for otter.

Otter spraints were recorded beside the Fear English River c. 144m south-east of T4 near the interface between wooded habitats occupying the north of the proposed development and the agricultural habitats to the south. Dried spraints deposited on mud were observed at this location on 09/07/2026, and a new spraint was observed on a cobble in the same location on 19/08/2026.

The pattern of fresh spraint being deposited at this location during the monitoring period demonstrates that otters continue to commute along the river channel. As such, since repeated observations support the conclusion that H1 is not an otter holt and since no new holts or couches were identified in this area, otter activity on this section of the Fear English River is limited to commuting.

It is noted that the Fear English potentially provides only limited foraging during winter, and either very poor or non-existent foraging in summer when water levels are low (previous aquatic and general ecology walkover surveys noted absence of suitable conditions for fish in summer, and when water levels are higher in winter, marginal habitat for salmonids, and no suitability for lampreys and crayfish). It's primary value to otter is as a commuting corridor.

H2 located further downstream was previously confirmed to be used by otters. This feature was also observed and monitored by trail camera between 09/07/2026 and 22/07/2026. There were no signs of recent use at H2, and no otter signs in the vicinity during current surveys. A badger was recorded on camera investigating this feature on one occasion. This feature which is located over 150m from the closest proposed infrastructure was noted as being active during previous surveys in 2022 due to the presence of a wetted trail running into the holt and multi-age spraints observed nearby. It was also noted to be active in 2023, but no signs confirming otter as the occupant were observed at this time. Due to its location over 150m from proposed infrastructure, there is no potential for disturbance to otters potentially occupying this holt.

3.4.2 Red Squirrel

Similarly to previous surveys, abundant squirrel feeding signs in the form of stripped spruce cones were observed in the conifer block where proposed turbine T6 is located. Stripped spruce cones indicative of squirrel feeding were also noted in mixed broadleaved/conifer woodland north-west of T8 during current surveys. Evidence of bark stripping by squirrels was also noted near Hair Trap R3.

No red squirrel hairs were caught in any of the hair traps. All three hair traps for red squirrel contained minuscule droppings identified as pygmy shrew when retrieved. All sunflower seeds had been taken from traps R1 and R2, but not R3. Trap R2 had been filled with moss, indicating an attempt to create a resting place by a bird or small mammal.

[3] These sticks were easily removable and as such did not present an obstacle to mammal access.

Traps G1, G2 and G3 had all seeds removed, and contained grey squirrel hairs. Muddy prints on top of G1 indicated a larger mammal may have interfered with the trap to try and access the seeds. As such, based on current surveys there is no confirmation that red squirrel is present.

The landowner in this area observed a trend over multiple years where large numbers of grey squirrels were initially present, followed by a decrease in grey squirrel numbers and sightings of red squirrels when pine martens began to colonise the area. He noted that more recently, he has not seen many squirrels of either species. Recent trail camera footage and scat confirm that pine martin continue to inhabit the area. These observations align with a widely observed and accepted pattern whereby red squirrel numbers rise when pine martin establish in areas with both red and grey squirrels present. This occurs due to grey squirrels being easier for pine marten to predate, which suppresses their numbers and allows red squirrel populations to recover. Considering the continued presence of pine marten in the area, there is potential for red squirrel numbers to increase in and around the proposed development.

While no confirmation of the presence of red squirrel was obtained during the current survey, the assessment considers this species likely to be present on a precautionary basis due to the presence of suitable habitat and previous records in the surrounding area, continued presence of pine marten and the narrow spatial focus of the hair trap survey.

3.4.3 Badger

Badger activity remains similar to previous surveys, although fewer setts were confirmed to be active during current surveys (see Table 3-1). No additional setts were recorded. Additional entrances were noted at Setts 2 and 6, but the distance to proposed infrastructure or status of sett did not change for either.

Badger signs such as snuffle holes and latrines were noted throughout the study area, and badger activity was captured on trail cameras as noted above in Section 3.5.1.

Table 3-1: Badger Setts

Sett No.	No. of entrances (2024)	Activity (2024)	Type	Closest Infrastructure/Activities	Notes (2024)	Update/Notes 2026
1	3	Inactive	Annex	Biodiversity enhancement (tree planting) (38m)	N/A	Still inactive.
2	1	Inactive	Potential Outlier	Biodiversity enhancement (tree planting) (156m)	N/A	New opening noted on vertical bank around corner – not likely to be used as entrance, probably excavated from inside. Still inactive.
3	5	Active	Main	Borrow pit access track (192m) Peat deposition area (240m)	N/A	Remains active.
4	3	Active	Annex	Amenity trail (50m) Peat deposition area (56m)	N/A	No signs of use. Currently inactive.
5	5	Inactive	Annex	Access track (12m) Access track felling buffer (5m)	N/A	None. Remains inactive.
6	11	Active	Main	Access track (158m)	N/A	Still active. Three additional entrances noted, increasing total to 14. New entrances do not alter distance to infrastructure.
7	2	Active	Annex	Hard stand (overlaps sett)	N/A	Sett present. Seems to have been excavated since last visit; some relatively recent spoil with bedding mixed in but spoil dried hard and cobweb over entrance when observed so not very recently used.
8	1	Active	Subsidiary	Hard stand (83m) Turbine felling buffer (20m)	N/A	Doesn't currently appear active; leaves at entrance but trails still present running along tree line and connecting to sett.

Sett No.	No. of entrances (2024)	Activity (2024)	Type	Closest Infrastructure/Activities	Notes (2024)	Update/Notes 2026
9	2/4	Active	Subsidiary	Hard stand (590m)	2 disused entrances c. 18m from 2 active entrances - potentially same sett or separate sett.	No signs of use. Currently inactive. Overgrown.
10	4	Active	Main	Hard stand (623m)	N/A	Doesn't currently appear active. Overgrown with no trails leading to sett.
11	3	Active	Annex	Hard stand (607m)	N/A	Potentially active but no obvious signs of use. Relatively recent spoil. Hard baked earth reduced likelihood of use signs being detected.
12	1	Active	Subsidiary	Hard stand (461m)	N/A	No signs of use. Currently inactive.
13	1	Inactive	Outlier	Hard stand (252m)	N/A	None. Remains inactive.
14	1	Inactive	Outlier (potential)	Turbine felling buffer (76m) Access track (89m)	Potential sett, included on precautionary basis	Still inactive. Vegetation beginning to obscure entrance.
15	5	Active	Main	Access track (89m) Turbine felling buffer (147m)	N/A	Potentially active but not confirmed. One entrance has recent but not fresh spoil. Partially overgrown.
16	1	Active	Subsidiary	Access track (137m) Hard stand (186m)	N/A	Inactive; full of debris and insects living inside. Ground in vicinity is worn, indicating continued use. Trails are slightly overgrown, Snuffles and trails indicate continued presence of badger in this area.

Sett No.	No. of entrances (2024)	Activity (2024)	Type	Closest Infrastructure/Activities	Notes (2024)	Update/Notes 2026
17	1	Active	Subsidiary	Access track (101m) Hard stand (126m)	N/A	No signs of use. Currently inactive.
18	4	Inactive	Annex	Access track (127m) Hard stand (155m)	Fresh digging by smaller mammal near sett	No signs of use. Currently inactive. 1 small latrine with slightly older scat
19	15-17	Active	Main	Access track (10m) Site compound (24m)	High number of entrances, some dug out from inside onto vertical bank not used for access.	One entrance at south-eastern end of sett shows signs of recent use. Active.
20	2	Inactive	Subsidiary	Site compound (27m)	N/A	No signs of use. Currently inactive.
21	7	Active	Annex	Site compound (38m)	N/A	No signs of use. Currently inactive.

3.5 Other Species

Due to the habitats onsite remaining broadly similar to previous surveys, potentially suitable habitats for amphibians and lizards remain similar.

3.5.1 Note on Marsh Fritillary Habitat

The marsh fritillary habitats on the woodland/bog interface south east of proposed turbine T7 outside the proposed development site remain in a similar condition to previous survey windows, with abundant dense patches of devils' bit scabious *Succisa pratensis* occurring throughout these areas.

Small patches of devils' bit scabious also still occur on the forestry track which bisects the proposed development site for a short distance (46m). The areas of devils' bit scabious along the forestry track remain unsuitable for marsh fritillary due to their limited extent and low density.

As such, no material changes to the baseline have occurred regarding marsh fritillary habitat.

3.6 Bat Surveys

3.6.1 Roost Survey Results

Table 3-1 to Table 3-3 below provide up to date information on potential roost features. The majority of features detailed below were identified during previous surveys. Just one new tree/feature (tree S at the end of Table 3-1) was observed during current surveys. This is Tree S, which contains two broken limbs classified as PRF-I (features which could support individual or small number of bats) is outside the proposed development. No other changes relating to the additional PRFs identified at the proposed development from 2024 onward were observed.

The number of PRFs within the 2018 dataset has reduced due to a range of factors including tree felling, limb cutting, and degradation of bat boxes. See Table 3-2 for details.

The number of PRFs along the TDR has also reduced, due to factors including die-off of ivy and tree felling. See Table 3-3 for details.

The small derelict brick-built shed previously identified within the footprint of the northern internal access track is still present and remains unsuitable for roosting bats.

Table 3-1: Additional PRFs identified in 2024/2026

ID	Name	Old Category	Updated Category	PRF	Location	Update
A	Ash	Low - Moderate	PRF-I	Mature ash with rot in many places. 2 knotholes visible from ground & dense ivy may obscure others	Within T4 bat felling buffer	No change
B	Ash	Low	PRF-I	Ivy covered ash. Potential for PRFs obscured by ivy	Within T5 bat felling buffer	No change

ID	Name	Old Category	Updated Category	PRF	Location	Update
C	Ash	Moderate	PRF-I	Knothole c.3 m up trunk, potentially with room for several bats. No signs of use observed from ground level. Mature ash with rot.	Within T5 bat felling buffer	No change
D	Ash	Low	PRF-I	Dense ivy, potential for crevices behind large fused ivy stems	16m from T5 bat felling buffer	No change
E	Ash	Low	PRF-I	Dense ivy, potential for crevices behind large fused ivy stems	7m from T3 bat felling buffer	No change
F	Hawthorn	Low	PRF-I	Very dense ivy, potential for large ivy stems to form crevices	Within T2 bat felling buffer	No change
G	Ash	Low	PRF-I	Dense ivy, potential for PRFs obscured by ivy	Within T2 bat felling buffer	No change
H	Ash	Low	PRF-I	Dense ivy, potential for crevices behind large fused ivy stems	Within T2 bat felling buffer	No change
I	Ash	Low	PRF-I	Dense ivy, potential for PRFs obscured by ivy	Within T2 bat felling buffer	No change
J	Ash	Low	PRF-I	Potential for crevices formed by ivy stems and tree branches growing together. Also some rot visible lower down so potential for obscured rot features higher up	At edge of T2 bat felling buffer	No change
K	Ash	Low	PRF-I	Dense ivy, potential for PRFs obscured by ivy	8m from T2 bat felling buffer	No change
L	Ash	Low	PRF-I	Dense ivy, potential for PRFs obscured by ivy	14m from T2 bat felling buffer	No change
M	Ash	Low	PRF-I	Dense ivy, potential for PRFs obscured by ivy	7m from T1 bat felling buffer; 10m from access track	No change
N	Ash	Low	PRF-I	Dense ivy, potential for crevices behind large fused ivy stems	Within T1 bat felling buffer	No change
O	Ash	Low	PRF-I	Dense ivy, potential for PRFs obscured by ivy	Within T1 bat felling buffer	
P	Ash	Low	PRF-I	Dense ivy, potential for crevices behind large fused ivy stems	Within T1 bat felling buffer	No change

ID	Name	Old Category	Updated Category	PRF	Location	Update
Q	Ash	Low	PRF-I	Dense ivy, potential for PRFs obscured by ivy	Within T1 bat felling buffer	No change
R	Scots Pine	Low	PRF-I	Trunk snapped 3m above ground. Upper half of trunk horizontal. Potential for PRFs at break point.	15m west of substation compound.	No change
S	Ash	N/A	PRF-I	Large ash with snapped limbs. Potential for PRFs around break points.	Outside proposed development boundary (16m south-east/55m from the closest proposed infrastructure T1 hard stand). Outside ZoI.	N/A

Table 3-2: PRFs identified in 2018

ID	Name	Previous Category	Updated Category	PRF	Location	Current Status
1	Ash	Moderate	N/A	Lifting bark and broken limbs	Adjacent to existing northern Coillte forestry access/amenity track	Felled
2	Ash	Moderate	N/A	Broken limb	Adjacent to existing northern Coillte forestry access/amenity track	Felled
3	Bat box 1 and Ash	Moderate	PRF-I	Bat box 1 on ash with cracked limb	Adjacent to existing northern Coillte forestry access/amenity track	Present. Bat box intact. Knothole present above box also identified. Ivy is starting to obstruct bat box entrance.
4	Ash	Moderate	PRF-I	Knot holes	Adjacent to existing northern Coillte forestry access/amenity track	No change
5	Oak	Moderate	PRF-I	Knot holes, broken limbs	Adjacent to existing northern Coillte forestry access/amenity track	No change
6	Ash	Moderate	PRF-I	Broken limbs	Adjacent to existing northern Coillte forestry access/amenity track	No change

ID	Name	Previous Category	Updated Category	PRF	Location	Current Status
7	Bat boxes 2 & 3	No Suitability	N/A	Boxes 2 & 3 on beech	Adjacent to existing northern Coillte forestry access/amenity track	Boxes no longer present
8	Bat boxes 4 & 5	Negligible	N/A	Boxes 4 & 5 on conifer	Adjacent to existing northern Coillte forestry access/amenity track. Within felling buffer.	No change. Both have inspection panels missing.
9	Birch	Low	PRF-I	Lifting bark	In treeline near substation compound	No change
10	Birch	Moderate	PRF-I	Moderate potential in cracked limb. Trunk has cavity but too open and exposed for roosting.	In treeline near substation compound	No change
11	Willow	Negligible	PRF-I	Crack in main stem	In treeline near substation compound	No change
12	Ash	Moderate	PRF-I	Knot holes, broken limbs and hole in stem	No proposed infrastructure nearby (closest proposed infrastructure is substation access track located 90.6m south-east, separated by retained woodland). Closest proposed turbine is T11 located 421m south-west.	Not inspected in 2024 or 2026 (outside ZoI).
13	N/A	N/A	N/A	No.13 not included in original survey	N/A	N/A
14	Oak	Moderate	PRF-I	Broken limbs	In woodland between substation and grid connection	No change
15	Oak	Moderate	PRF-I	Broken limbs	In woodland between substation and grid connection	No change
16	Oak	Moderate	PRF-I	Broken limbs	In woodland between substation and grid connection	No change
17	Oak	Moderate	PRF-I	Broken limbs	In woodland between substation and grid connection	No change

ID	Name	Previous Category	Updated Category	PRF	Location	Current Status
18	Oak	Moderate	PRF-I	Broken limbs	In woodland between substation and grid connection	No change
19	Oak	Moderate	PRF-I	4 oaks in corner of boundary with broken limbs, ivy, cracks in stem	Adjacent to grid connection	No change
20	Oak	Moderate	PRF-I	Group of 6 oak with knot holes, broken limbs	In woodland between substation and grid connection	No change
21	Oak	Moderate	PRF-I	Lifting bark, knot holes	In woodland between substation and grid connection	No change
22	Box 6	Low	N/A	Box 6 on beech	Adjacent to grid connection	Box has fallen from tree
23	Box 7	No Suitability	N/A	Box 7 on beech	N/A	No change. No bat box at this location
24	Beech	Low	PRF-I	Cracked limb	No proposed infrastructure nearby (located beside existing track proposed to form part of 'Looped Walk' amenity trail). Closest proposed turbine is T11 located 413m north-west.	Not inspected in 2024 or 2026 (outside ZoI).
25	Boxes 8 & 9	No Suitability	N/A	Boxes 8 & 9 on oak	Within T11 bat felling buffer	Boxes no longer present.
26	Box 10	Low	PRF-I	Box 10 on birch	No proposed infrastructure nearby. Located 196m away from T11.	Present and intact. Cover/connectivity has improved slightly due to surrounding tree growth. Still sub-optimal after conifer felling. (outside ZoI).
27	Willow	Unknown	N/A	Couldn't access closely (2018) but may be of potential	No proposed infrastructure nearby	No change
28	Ash	Low	PRF-I	Heavy ivy growth	Adjacent to construction access track	No change

ID	Name	Previous Category	Updated Category	PRF	Location	Current Status
29	Ash	Low	PRF-I	Heavy ivy growth	Adjacent to construction access track	No change
30	Ash	Moderate	PRF-I	Moderate potential in crack in branch	No proposed infrastructure nearby (closest is proposed construction access track located 138m south-east, separated by retained treeline). Closest proposed turbine is T05 located 349m north-east.	Not inspected in 2024 or 2026 (outside ZoI).
31	Ash	Low	PRF-I	Line of semi mature ash with relatively heavy ivy growth	No proposed infrastructure nearby (closest is proposed construction access track located 114m south-east, separated by retained treeline). Closest proposed turbine is T05 located 478m north-east.	Not inspected in 2024 or 2026 (outside ZoI).
32	Ash	Low	PRF-I	Line of semi mature ash with relatively heavy ivy growth	Near construction access track	No change
33	Ash	Low	PRF-I	Line of semi mature ash with relatively heavy ivy growth	No proposed infrastructure nearby (closest is proposed construction access track located 98m south-east, separated by retained treeline).	Not inspected in 2024 or 2026 (outside ZoI).
34	Ash	Low	PRF-I	Heavy ivy growth	No proposed infrastructure nearby	No change
35	Ash	Low	PRF-I	Heavy ivy growth	No proposed infrastructure nearby	No change
36	Ash	Low	PRF-I	Heavy ivy growth	No proposed infrastructure nearby (closest is proposed wind farm access track located 221m south-east, separated by retained treelines). Closest proposed turbine is T05 located 290m east.	Not inspected in 2026 (outside ZoI).

ID	Name	Previous Category	Updated Category	PRF	Location	Current Status
37	Ash	Low	PRF-I	Heavy ivy growth	No proposed infrastructure nearby (closest is proposed wind farm access track located 125m east, separated by retained treelines). Closest proposed turbine is T05 located 233m north-east.	Not inspected in 2026 (outside ZoI).
38	Ash	Low	PRF-I	Heavy ivy growth	No proposed infrastructure nearby (closest is 641m – T4 hard stand).	Not inspected in 2024 or 2026 (outside ZoI).
39	Ash	Low	PRF-I	Heavy ivy growth	No proposed infrastructure nearby (closest is 541m – T3 hard stand).	Not inspected in 2024 or 2026 (outside ZoI).
40	Ash	Low	PRF-I	Heavy ivy growth	Construction access along public laneway	No change
41	Oak	Moderate	PRF-I	Cracked limb and ivy cover	Construction access along public laneway	No change
42	Oak	Moderate	PRF-I	Damaged limbs	Construction access along public laneway	Present. Damaged limbs have been cut off.
43	Ash	Low	PRF-I	Ivy cover	Construction access along public laneway	No change
44	Sycamore	Low	PRF-I	Ivy cover	Construction access along public laneway	No change
45	Ash	Low	PRF-I	2 ash ivy cover	No proposed infrastructure nearby	No change
46	Willow	Moderate	PRF-I	Crack in main stem	Adjacent to access track	No change
47	Ash	Low	PRF-I	Ivy cover	No proposed infrastructure nearby	No change
48	Hawthorn	Moderate	PRF-I	Holes in limbs, potentially old wound from cutting	No proposed infrastructure nearby (closest is 204m – T3 hard stand).	Not inspected in 2024 or 2026 (outside ZoI).
49	Ash	Moderate	PRF-I	Knot hole and ivy cover	No proposed infrastructure nearby (closest is 304m – T3 hard stand).	Not inspected in 2024 or 2026 (outside ZoI).
50	Ash	Low	PRF-I	Ivy cover	No proposed infrastructure nearby (closest is 352m – T3 hard stand).	Not inspected in 2024 or 2026 (outside ZoI).

ID	Name	Previous Category	Updated Category	PRF	Location	Current Status
51	Ash	Low	PRF-I	Ivy cover	No proposed infrastructure nearby (closest is 274m – T3 hard stand).	Not inspected in 2026 (outside ZoI).
52	Ash	Moderate	PRF-I	Butt rot and ivy cover	No proposed infrastructure nearby (closest is 274m – T3 hard stand).	Not inspected in 2026 (outside ZoI).
53	Ash	Low	PRF-I	Treeline with several ash and one hawthorn of with heavy ivy	No proposed infrastructure nearby (closest is 126m – construction access track along existing track).	Not inspected in 2026 (outside ZoI).
54	Ash	Low	PRF-I	Ivy cover	No proposed infrastructure nearby	No change
55	Ash	Low	PRF-I	Ivy cover	No proposed infrastructure nearby	No change
56	Ash	Moderate	PRF-I	Knot holes	No proposed infrastructure nearby	No change
57	Ash	Low	PRF-I	Ivy cover	No proposed infrastructure nearby	No change
58	Ash	Moderate	PRF-I	Tear out	No proposed infrastructure nearby	No change
59	Ash	Low	PRF-I	Line of ash trees all with heavy ivy cover but no specific PRFs identified	27m from T1 bat felling buffer	No change
60	Ash	Low	PRF-I	Ivy cover	No proposed infrastructure nearby	No change

Based on current surveys, the number of PRF trees remaining within the TDR group has reduced to 9 due to felling of trees and die-off of ivy.

As such, as detailed in Table 3-3 (Column 5) below a total of 5 trees with potential for occasional use by individual or low numbers of bats (PRF-I) were identified during current surveys as being potentially subject to effects from vegetation trimming associated with the TDR. Two of these PRFs (TDR-7 and TDR-10) have negligible suitability for roosting.

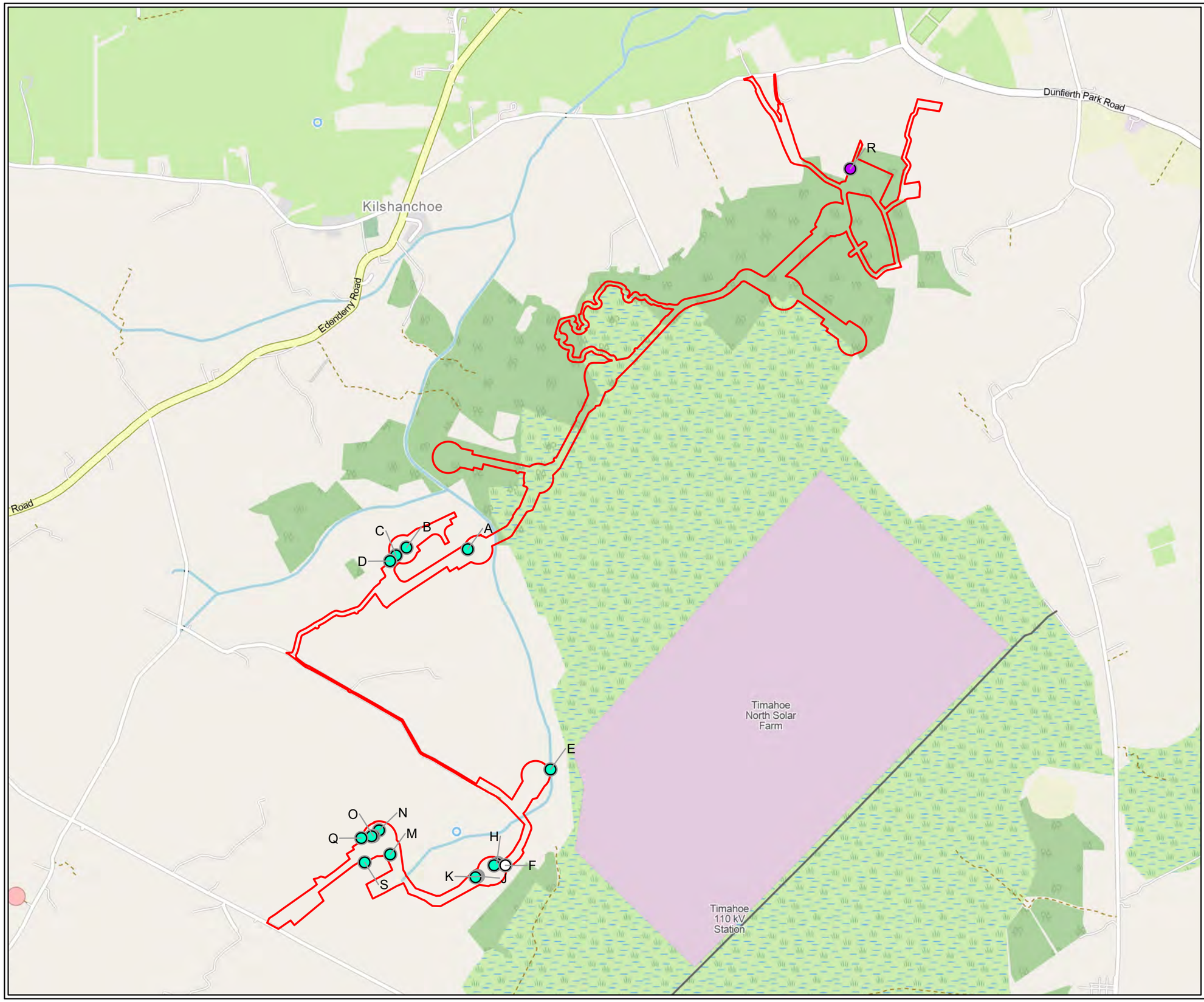
Table 3-3: Potential tree roosting features (TDR)

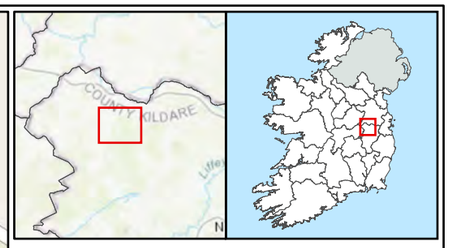
ID	Species	Category	PRF Details/Location	Assessment	Update
TDR-1	Ash x 3	Low (PRF-I)	3 Mature ash with dense ivy. ITM 671104.9651 735678.923	No potential for PRFs over road/within potential ZoI	No change
TDR-2	Ash	Low (PRF-I)	Ivy covered mature ash. Low potential for PRFs in branches higher up closer to trunk. ITM 671206.9425 735499.9708	No potential for PRFs over road/within potential ZoI	Ivy has been cut and killed off. No PRFs under ivy.
TDR-3	Ash	Low (PRF-I)	Ivy covered mature ash. Low potential for PRFs in ivy on trunk. ITM 671255.5922 735340.9953	No potential for PRFs over road/within potential ZoI	No change
TDR-4	Ash	Low (PRF-I)	Dense ivy on trunk and limb. No confirmed PRFs. ITM 671756.9492 734777.7934	Potential for ivy-covered limb to be affected by trimming	No change
TDR-5	Ash	Low (PRF-I)	Ivy-covered ash, limb extends over road. Parts over verge have low potential for obscured PRFs. Sections over road have no potential. ITM 671708.0452 734827.1371	Potential for ivy-covered limb to be affected by trimming	No change
TDR-6	Ash	Low (PRF-I)	Ivy-covered ash; tree has severe ash dieback. 2x limbs extend high over road. Low potential for obscured PRFs. ITM 671793.4526 734734.0131	Potential for limbs to be affected by trimming	Ivy has died off (no signs of cutting). No PRFs under ivy.
TDR-7	Ash	Negligible (PRF-I)	Low height crevice facing road; formed at joint where branch re-grew upward after historical pruning. Negligible due to disturbance, openness and lack of surrounding cover. ITM 674163.3012 737966.7739	Potential for limb to be affected by trimming	No change
TDR-8	Elm & Ash	Negligible (PRF-I)	Ivy-covered elm main stem and ash branches leaning towards road. Potential for obscured PRFs, however lack of connectivity reduces suitability. ITM 675085.0239 738228.3364	Potential for trees to be affected by trimming	Both trees have been felled.

ID	Species	Category	PRF Details/Location	Assessment	Update
TDR-9	Ash	Negligible (PRF-I)	Dead ash tree with branch extending over road. Branch has lifting bark and cracks. Small crevice sizes and lack of cover/shelter reduce suitability. ITM 675566.1019 738333.3761	Potential for limb to be affected by trimming	No longer present. May have been felled.
TDR-10	Oak	Negligible (PRF-I)	Limb over road includes a rotted branch. Currently negligible but suitability may increase if rotted branch remnants dislodge. ITM 675628.1653 738353.2615	Potential for limb to be affected by trimming	No change. Currently not suitable as PRF.
TDR-11	Ash	Low	Potential for PRFs in main trunk. Lower & middle part of trunk covered in ivy, cracking bark visible in some spots, may be more cracked bark under ivy. Ivy could both obscure and also create PRFs. ITM 675747.7619 738421.7238	No potential for main trunk to be affected	Ivy has been cut and killed off. No PRFs under ivy.
TDR-12	Oak	Low	Overhanging limbs. Rot visible on various limbs, hazard beams creating some small spaces, and potentially others not visible from ground; also some lifting bark. No confirmed high-quality PRFs but conditions for them likely to be present throughout tree including non visible areas. Possible PRFs in hazard beam over road but not confirmed. ITM 675791.1378 738434.2169	Potential for limbs to be affected by trimming	No change

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Legend

Proposed Development Boundary

Potential Bat Roosts Examined

- Ash
- Hawthorn
- Scots Pine

N W E S

0 0.5 1 2 Kilometers

TITLE: Additional PRF's Identified in 2024/2026			
PROJECT: Drehid Wind Farm RFI			
FIGURE NO:	3.2		
CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:20,000	**REVISION:**	0
DATE:	18/09/2026	**PAGE SIZE:**	A3

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Johnstownbridge GAA

Dunfierth 110kV Substation

Kilshanchoe

R402

Proposed Timahoe North Substation

T1 T2 T3 T4 T5 T6 T7 T8 T9 T10 T11



Legend

- Proposed Development Boundary

Potential Bat Roosts Examined

- Ash
- Bat Box
- Beech
- Birch
- Hawthorn
- Oak
- Sycamore
- Willow
- Turbine Locations

TITLE:	PRF's Identified in 2018		
PROJECT:	Drehid Wind Farm and Substation		
FIGURE NO:	3.3		
CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:20,000	**REVISION:**	0
DATE:	01/05/2025	**PAGE SIZE:**	A3

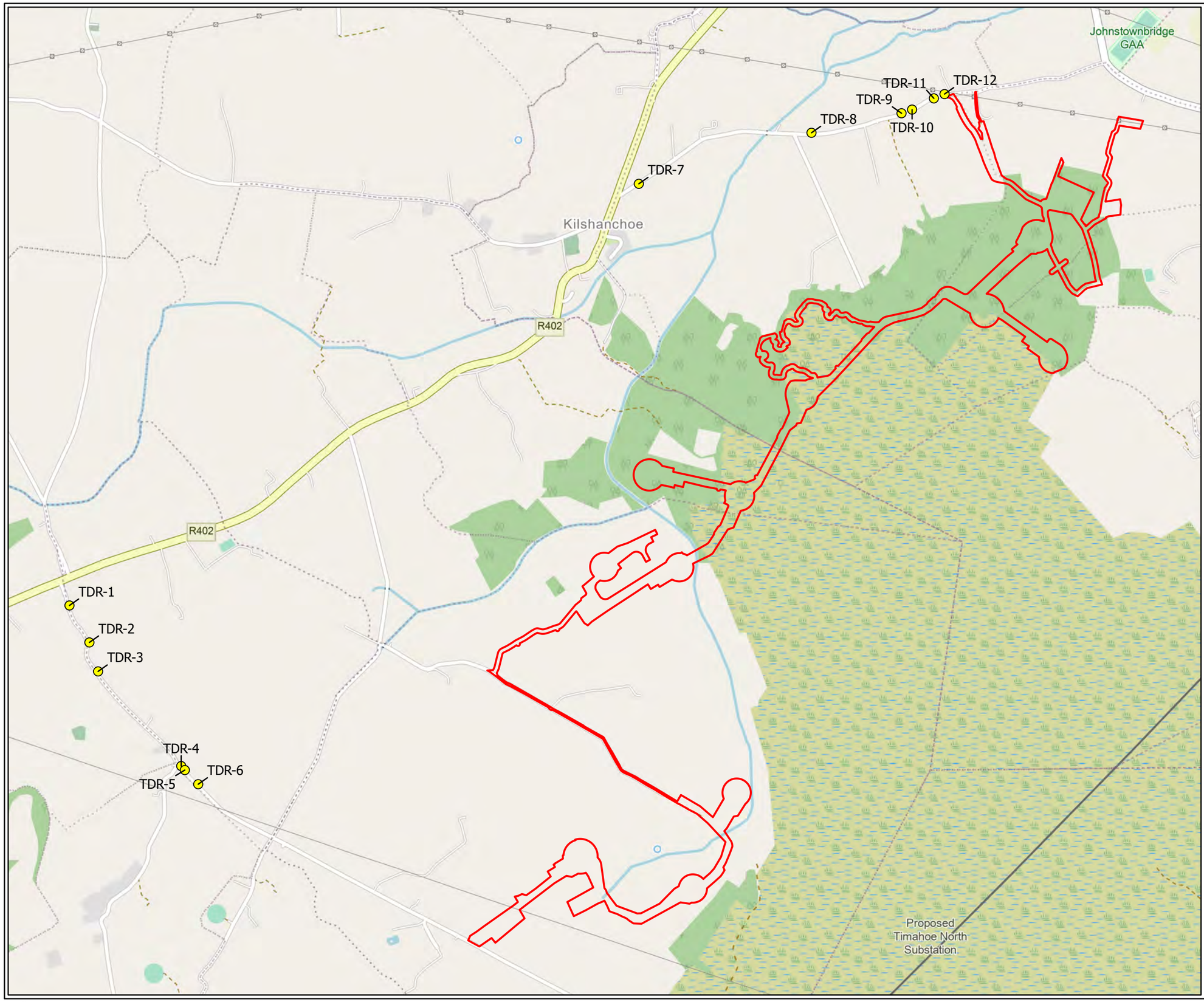
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N W E S

0 0.5 1 2 Kilometers

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Legend

- Proposed Development Boundary
- PRFs Identified along TDR

N W E S

0 0.5 1 2 Kilometers

TITLE:	PRF's Identified Along TDR		
PROJECT:	Drehid Wind Farm and Substation		
FIGURE NO:	3.4		
CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:20,000	**REVISION:**	0
DATE:	18/09/2026	**PAGE SIZE:**	A3

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3.6.2 Static Detector Survey Results

Overall, eight bat species were recorded (common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, Leisler's bat, brown long-eared bat, Natterer's bat, Daubenton's bat and whiskered bat). Manual verification of acoustic data ensured accurate species identification. A total of 109,439 recordings were made across all species.

3.6.2.1 Common Pipistrelle

The total number of recordings for common pipistrelle at the Proposed Development was 62,072 no. recordings; 56.72% of total recordings. These were recorded over 64 no. nights which gives an average of 969.88 no. recordings per night.

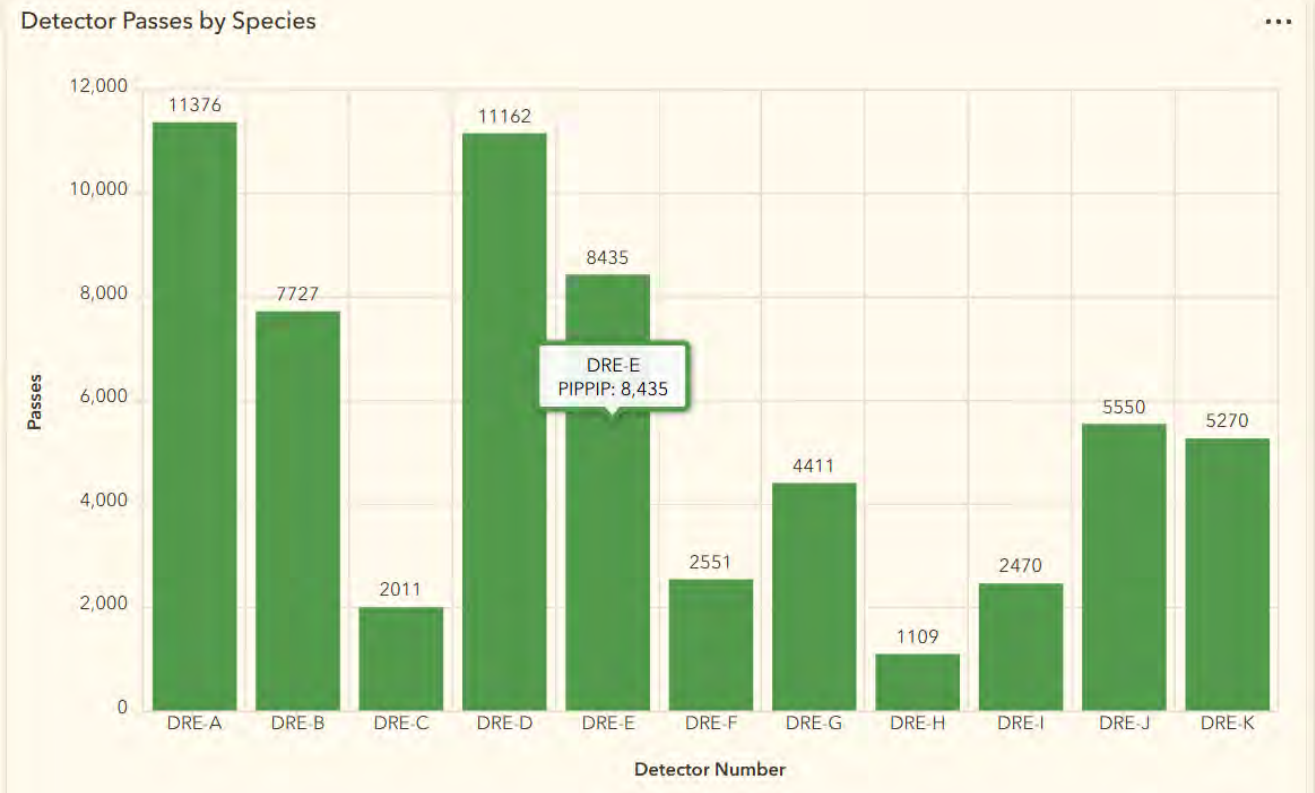


Plate 3-2: Total Passes per Detector - Common Pipistrelle

3.6.2.2 Soprano Pipistrelle

The total number of recordings of soprano pipistrelle recorded at the Proposed Development was 30,366 no. recordings; 27.75% of total recordings. These were recorded over 64 no. nights. This gives an average of 474.47 no. recordings per night.

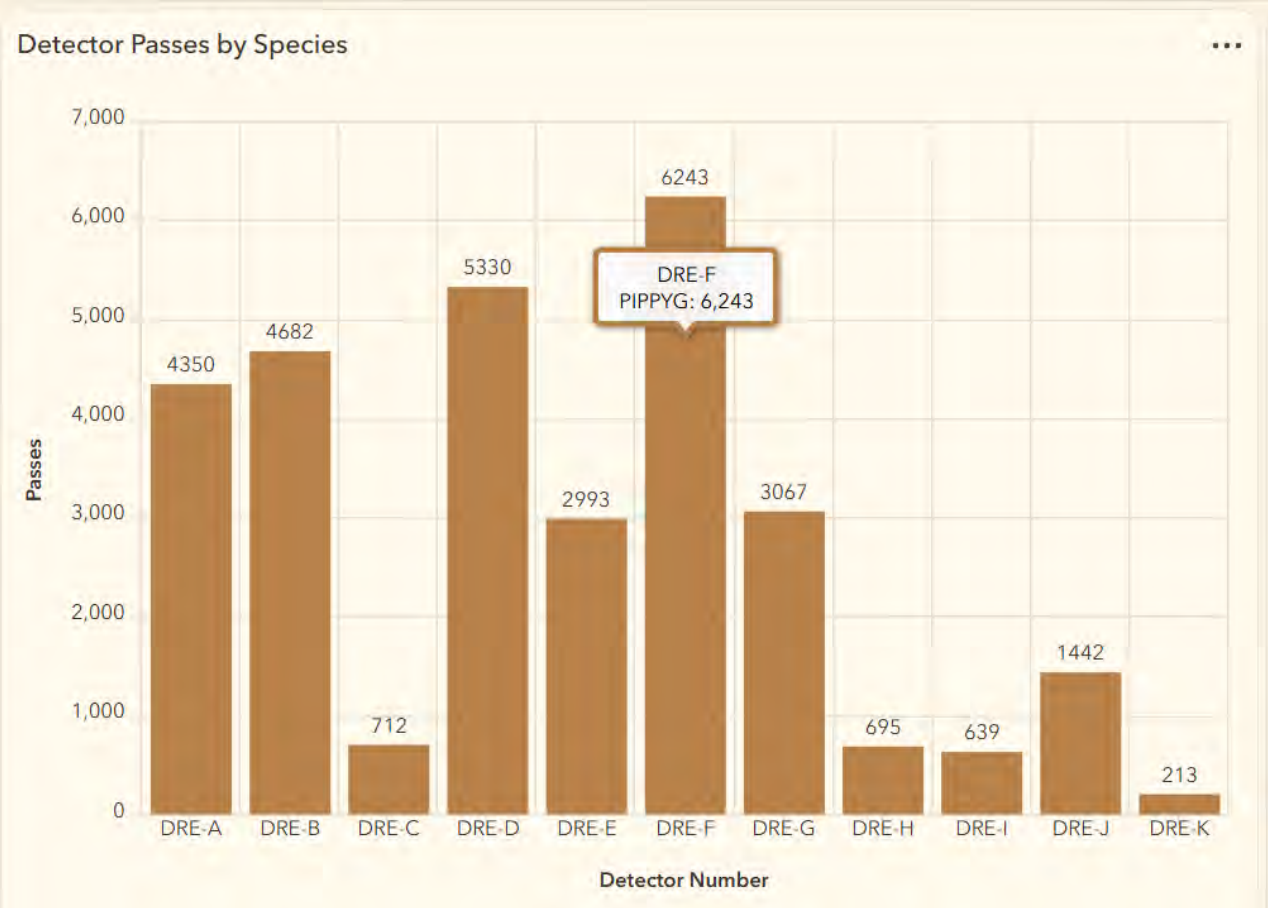


Plate 3-3: Total Passes per Detector - Soprano Pipistrelle

3.6.2.3 Leisler's Bat

The total number of recordings for Leisler's bat at the Proposed Development was 12,752 no. recordings; 11.65% of total recordings. These were recorded over 64 no. nights which gives an average of 199.25 no. recordings per night.

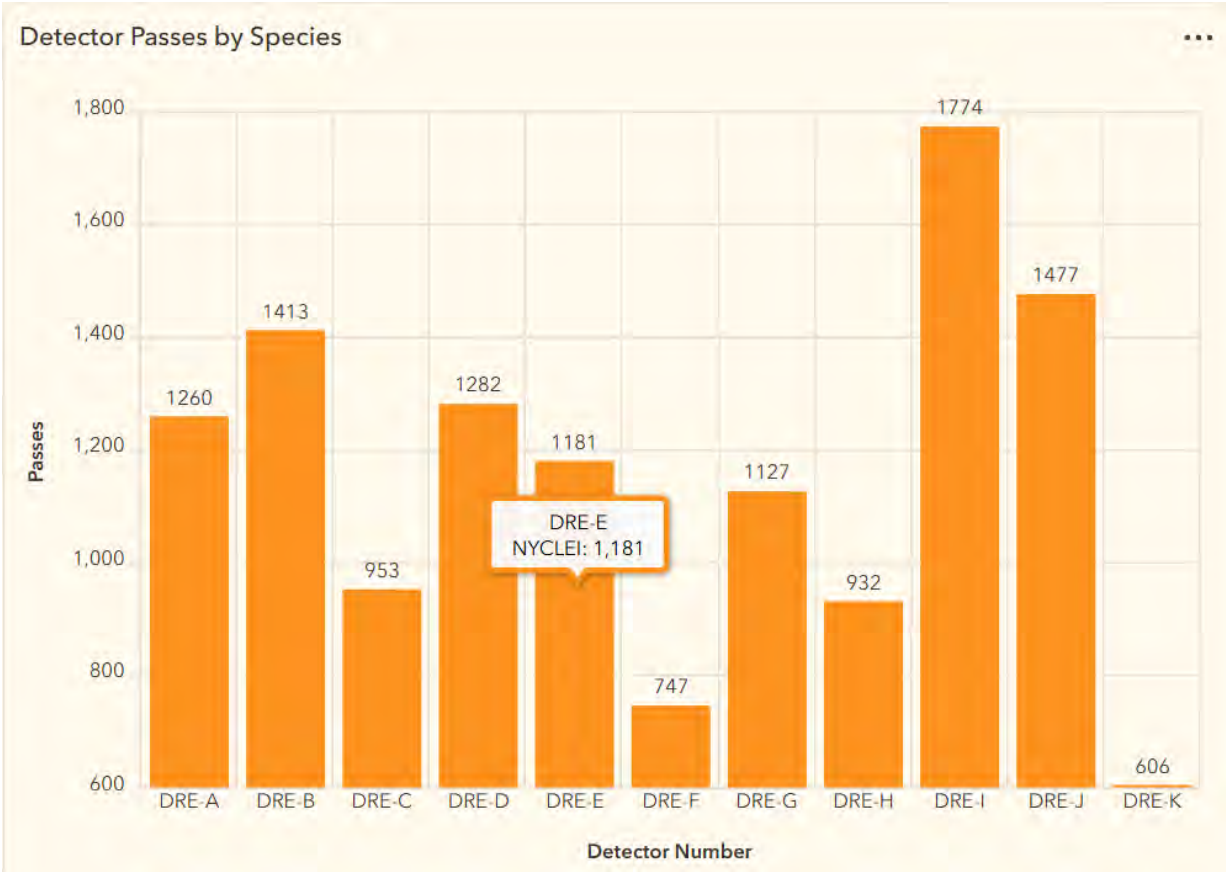


Plate 3-4: Total Passes per Detector - Leisler's Bat

3.6.2.4 Brown Long-Eared Bat

The total number of recordings for brown long-eared bat at the Proposed Development was 409 no. recordings; 0.37% of total recordings. These were recorded over 64 no. nights which gives an average of 6.39 no. recordings per night.

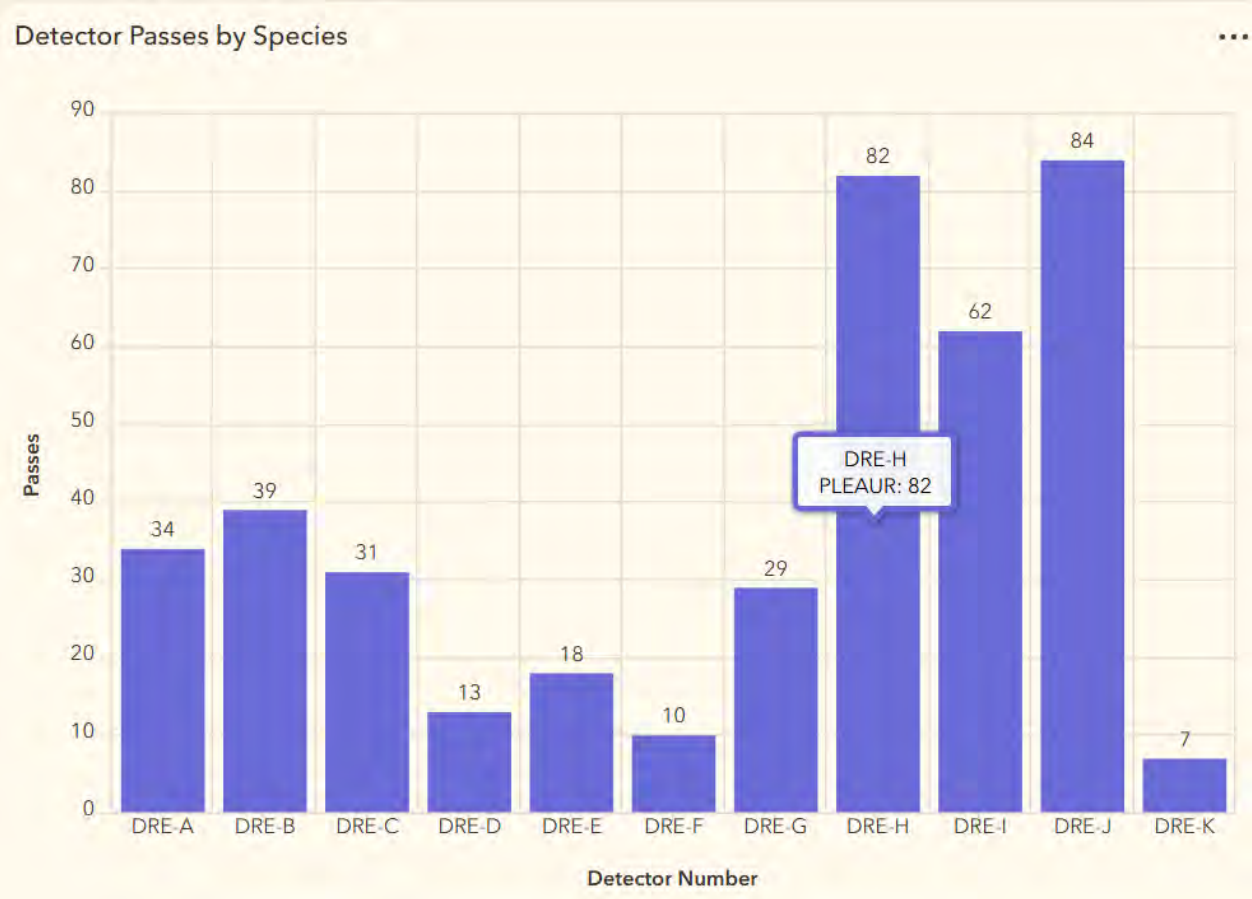


Plate 3-5: Total Passes per Detector - Brown Long-eared Bat

3.6.2.5 Daubenton's Bat

The total number of recordings for Daubenton's bat at the Proposed Development was 3,490 no. recordings; 3.19% of total recordings. These were recorded over 64 no. nights which gives an average of 54.53 no. recordings per night.

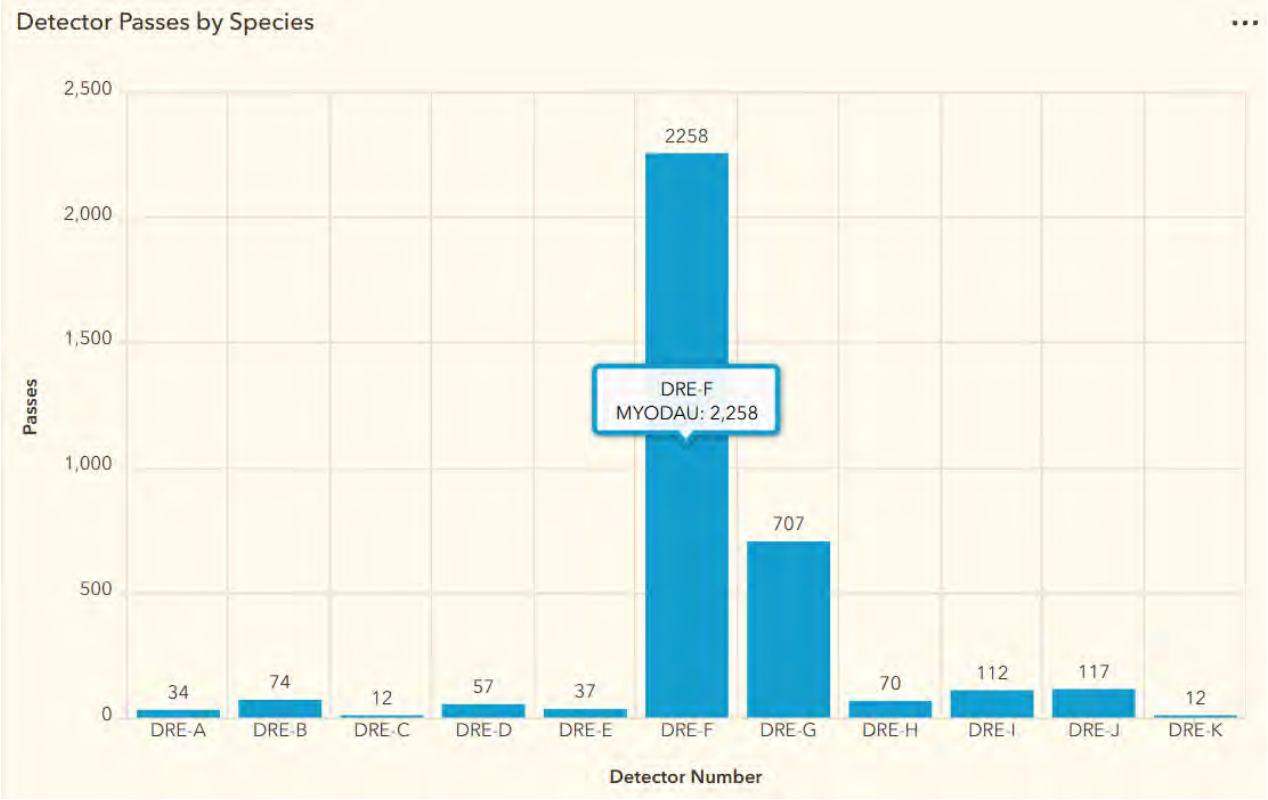


Plate 3-6: Total Passes per Detector - Daubenton's Bat

3.6.2.6 Whiskered Bat

The total number of recordings for whiskered bat at the Proposed Development was 149 no. recordings; 0.14% of total recordings. These were recorded over 64 no. nights which gives an average of 2.33 no. recordings per night.

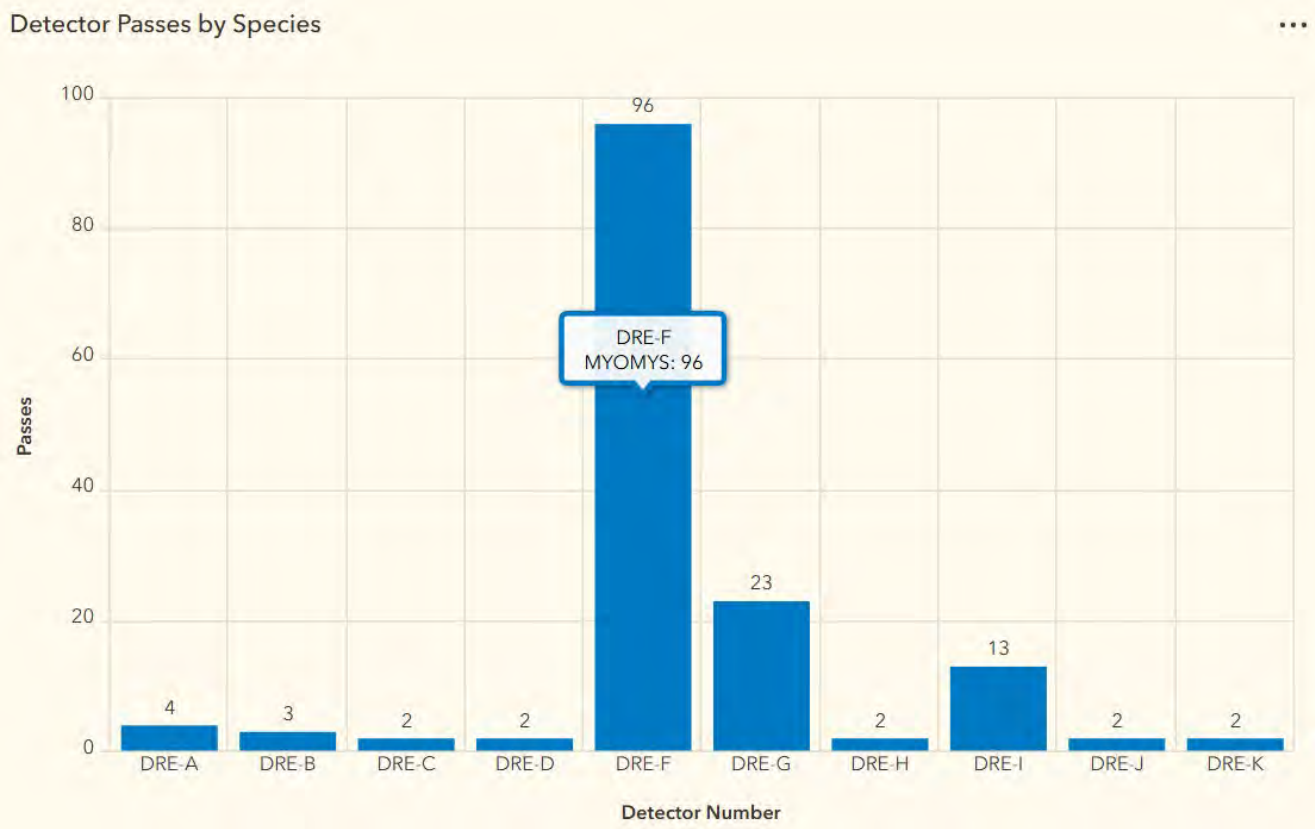


Plate 3-7: Total Passes per Detector - Whiskered Bat

3.6.2.7 Natterer's Bat

The total number of recordings for Natterer's bat at the Proposed Development was 133 no. recordings; 0.12% of total recordings. These were recorded over 64 no. nights which gives an average of 2.08 no. recordings per night.

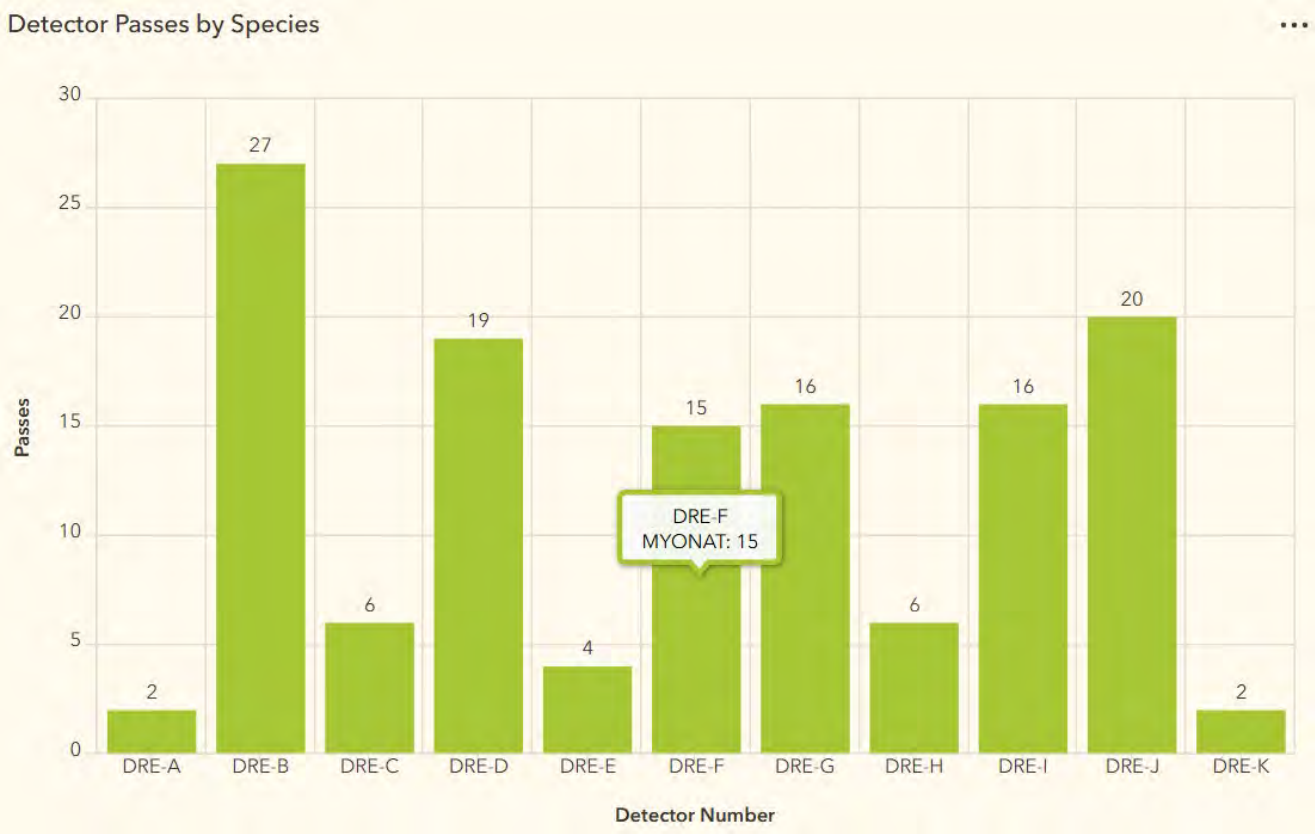


Plate 3-8: Total Passes per Detector - Natterer's Bat

3.6.2.8 Nathusius' Pipistrelle

The total number of recordings for Nathusius' pipistrelle at the Proposed Development was 68 no. recordings; 0.06% of total recordings. These were recorded over 64 no. nights which gives an average of 1.06 no. recordings per night.

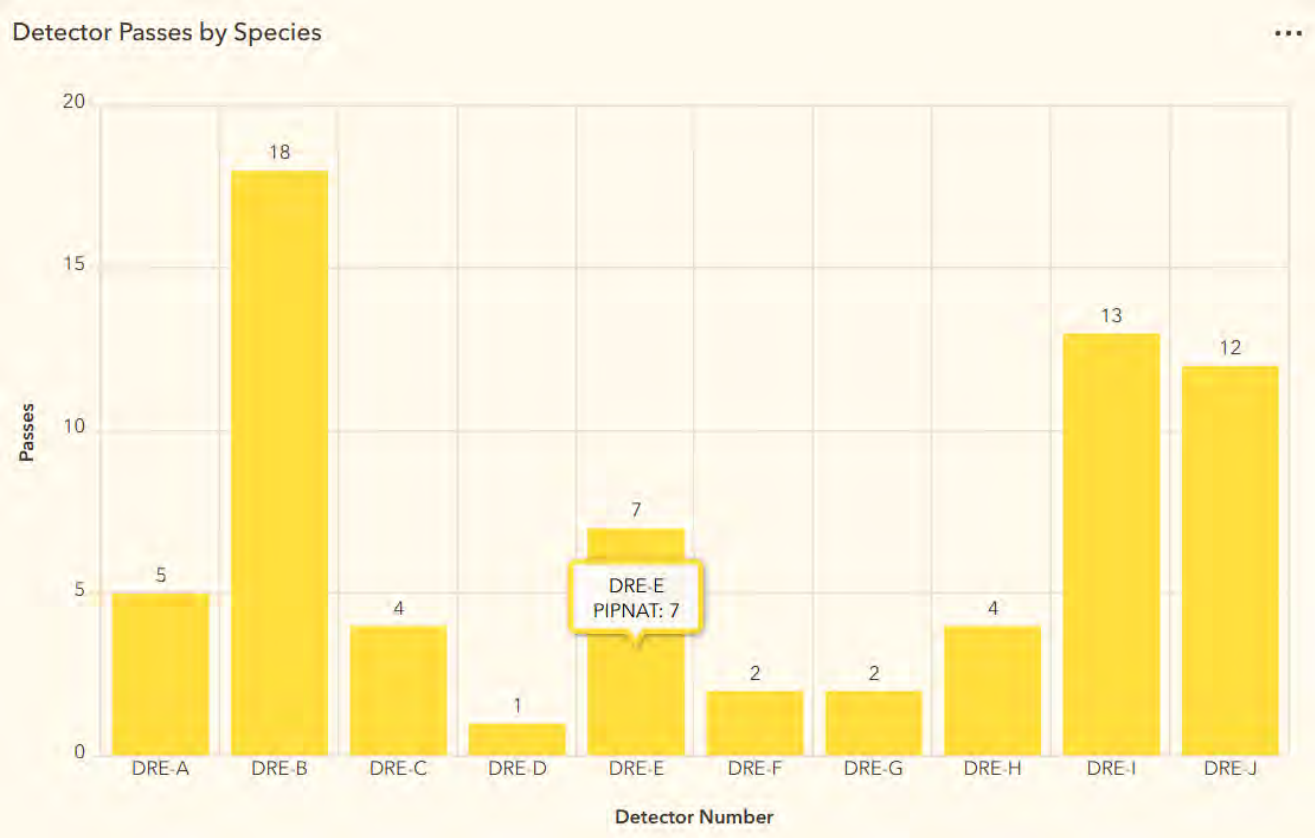


Plate 3-9: Total Passes per Detector - 3.6.2.8 Nathusius' Pipistrelle

The graphs within Plate 3-10 to Plate 3-20 below show the number of bat passes (per species) recorded at each static detector location over the three surveillance periods.

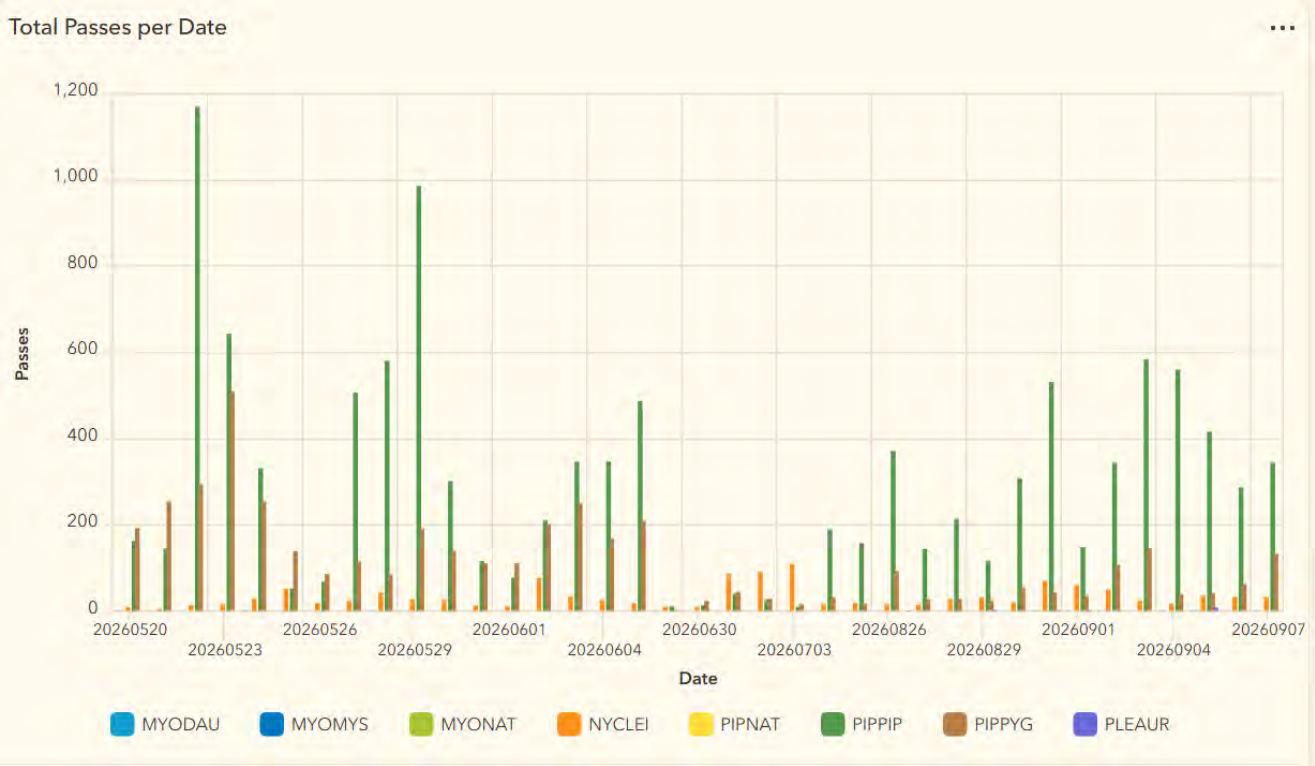


Plate 3-10: Total number of nightly passes recorded at static location DRE-A (T1)

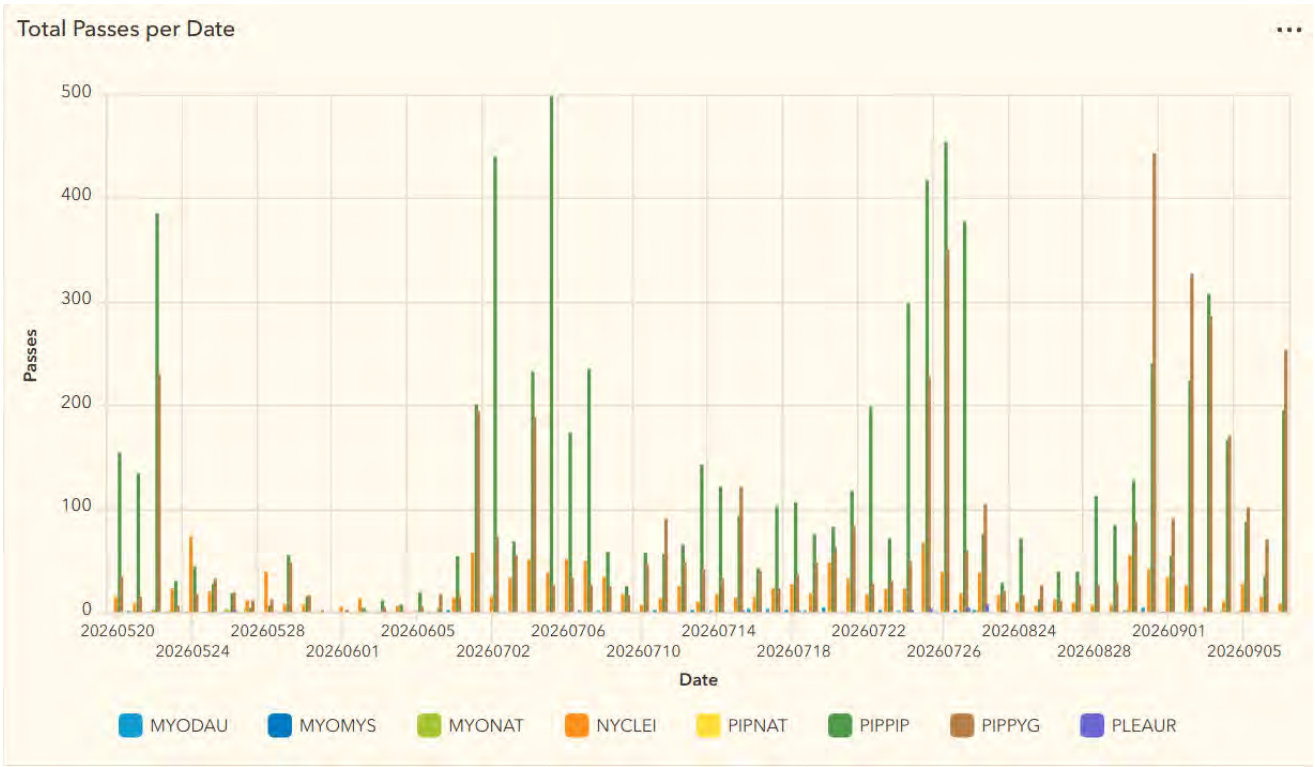


Plate 3-11: Total number of nightly passes recorded at static location DRE-B (T2)

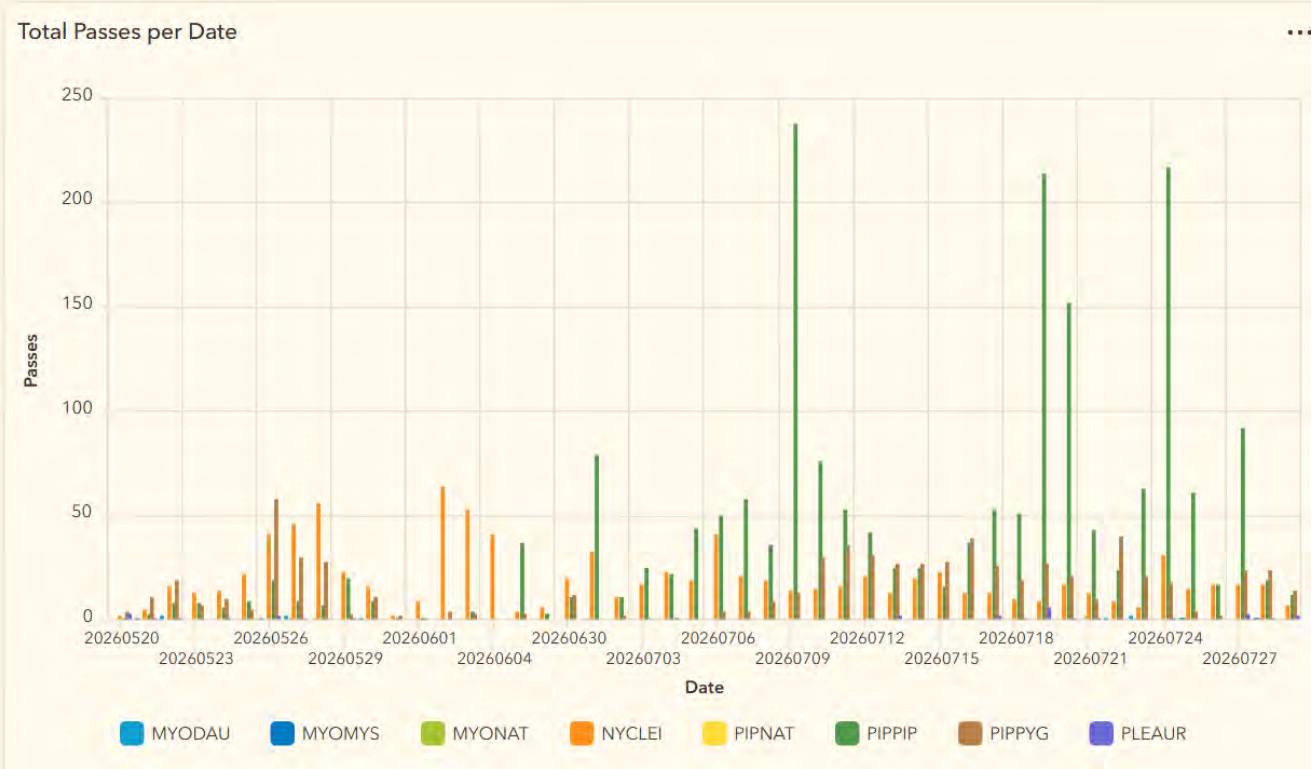


Plate 3-12: Total number of nightly passes recorded at static location DRE-C (T3)

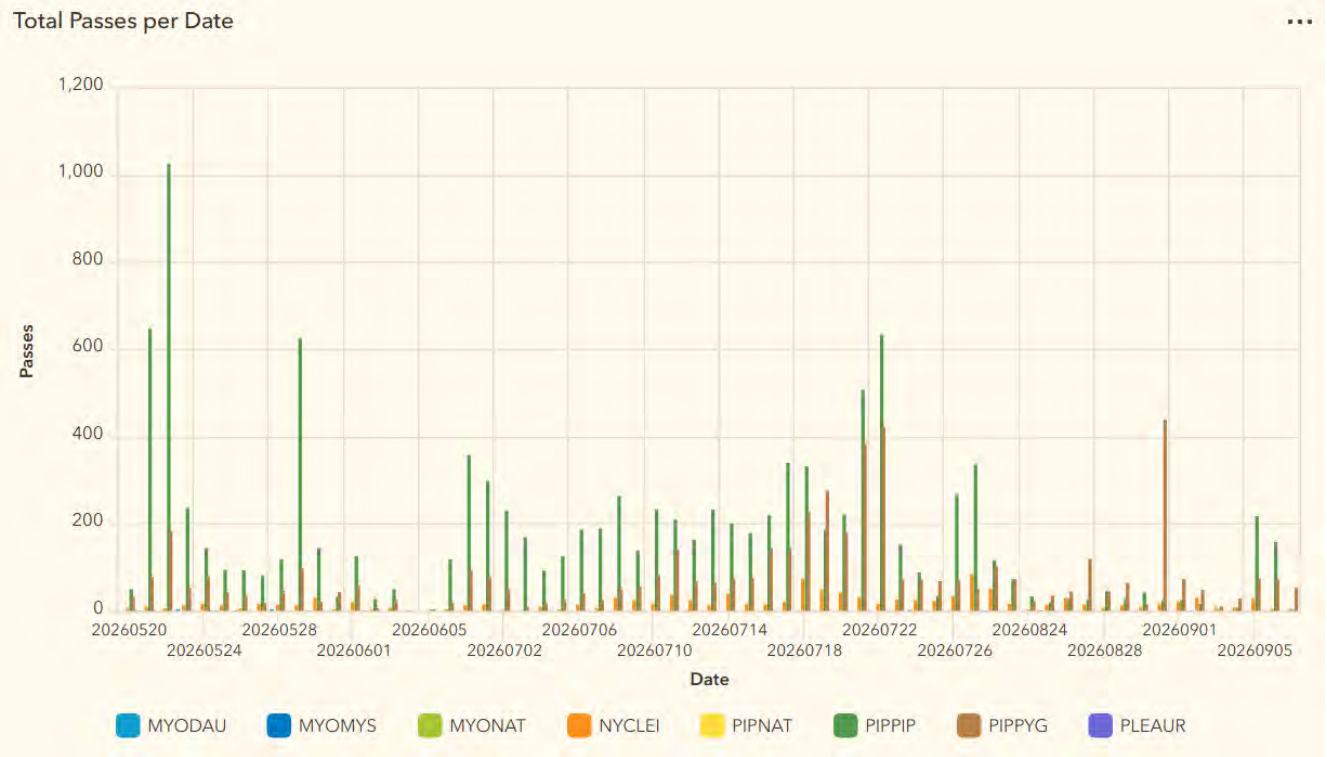


Plate 3-13: Total number of nightly passes recorded at static location DRE-D (T4)

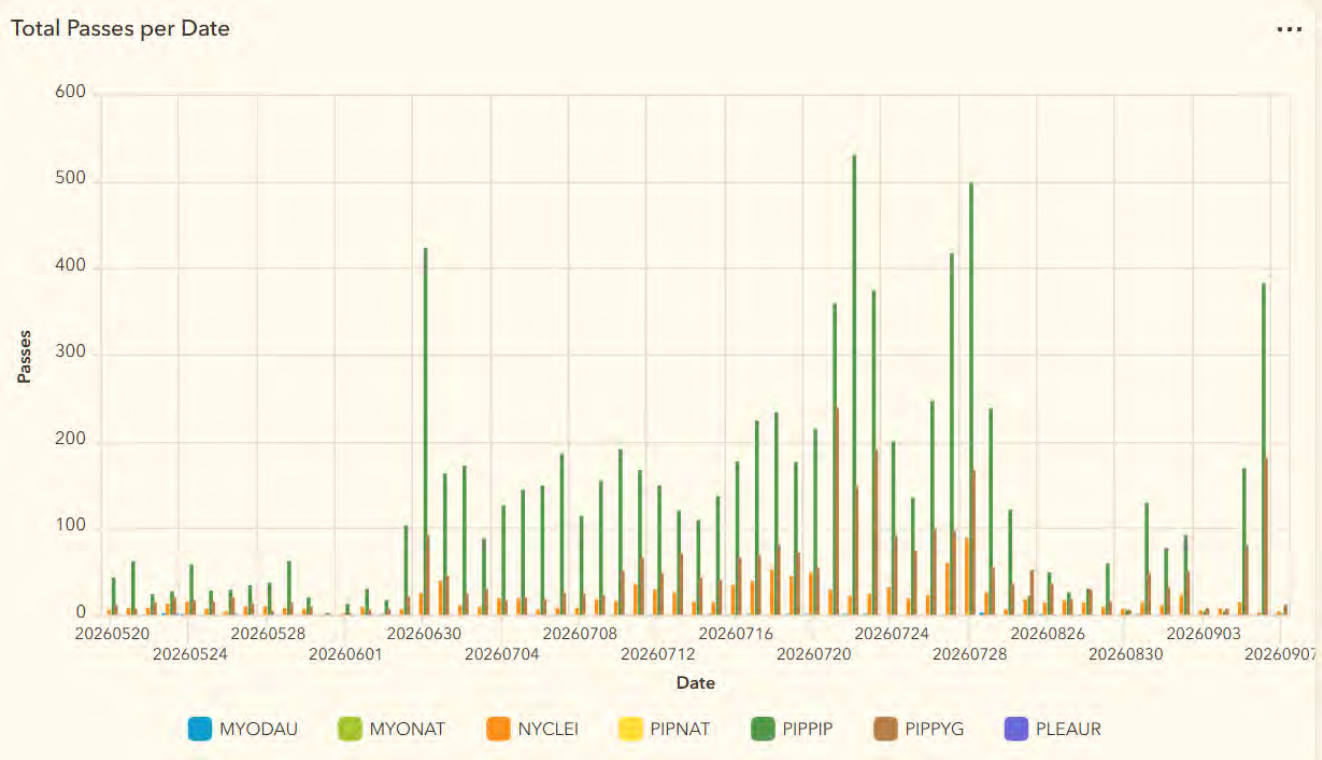


Plate 3-14: Total number of nightly passes recorded at static location DRE-E (T5)

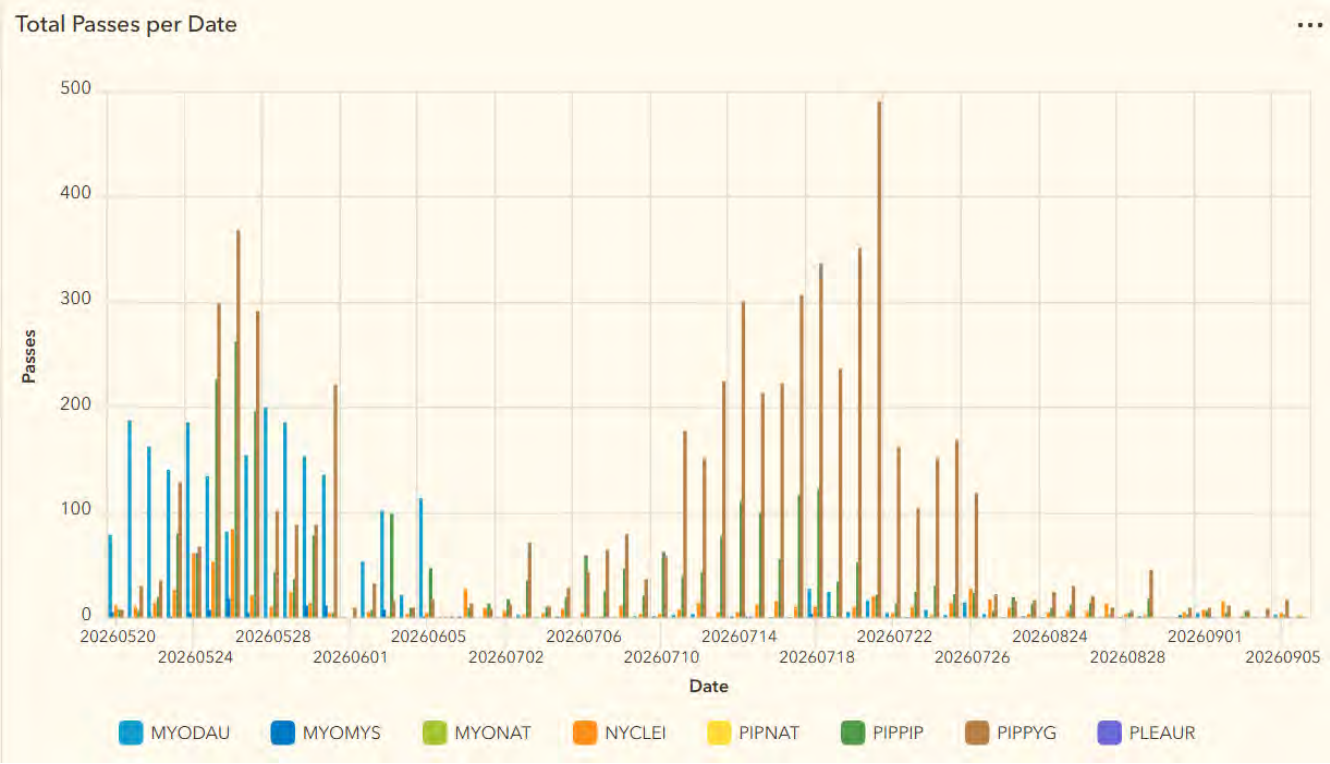


Plate 3-15: Total number of nightly passes recorded at static location DRE-F (T6)

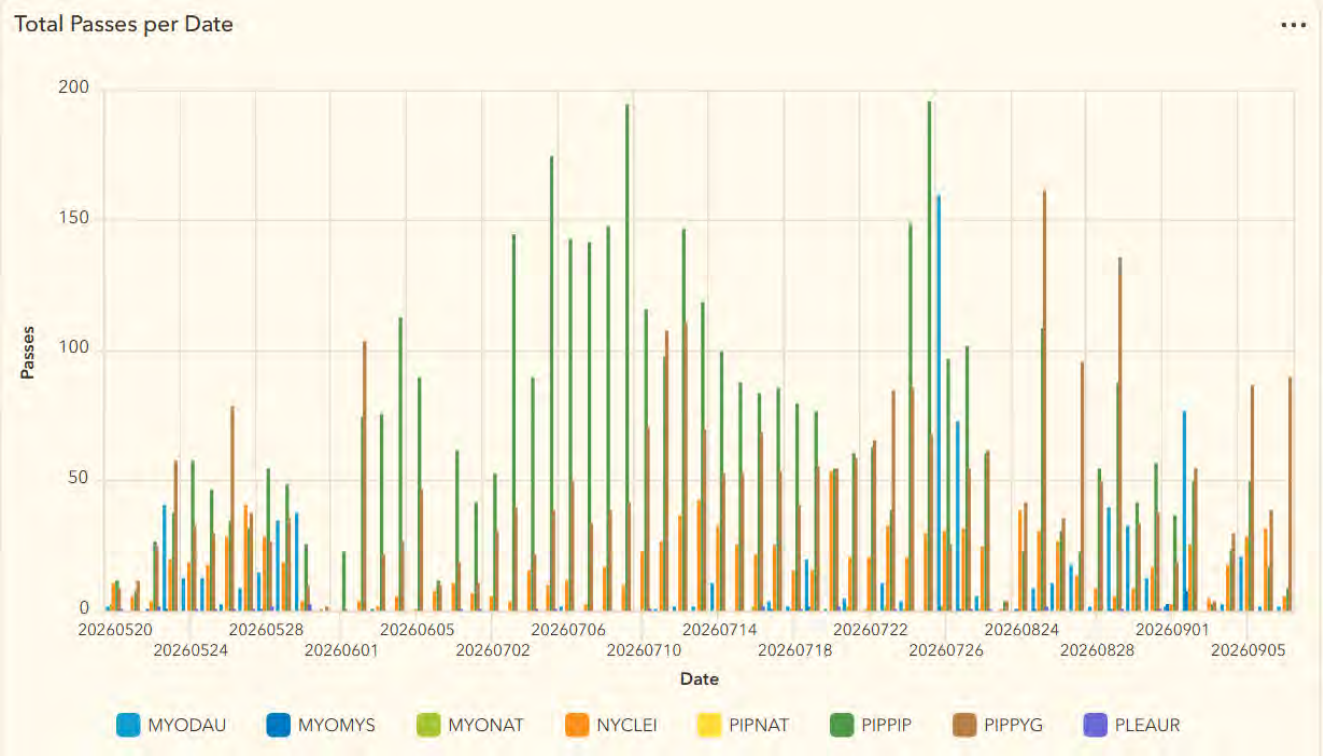


Plate 3-16: Total number of nightly passes recorded at static location DRE-G (Watercourse Confluence)

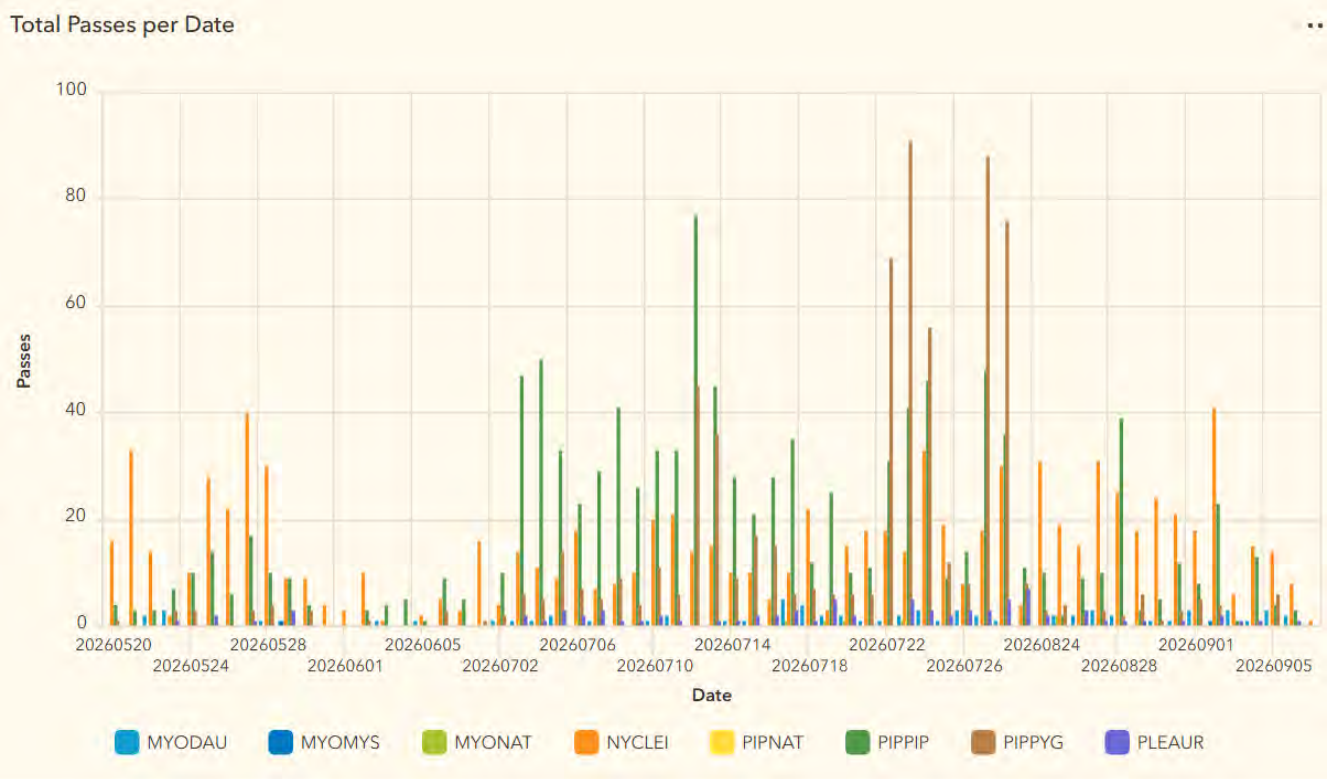


Plate 3-17: Total number of nightly passes recorded at static location DRE-H (T8)

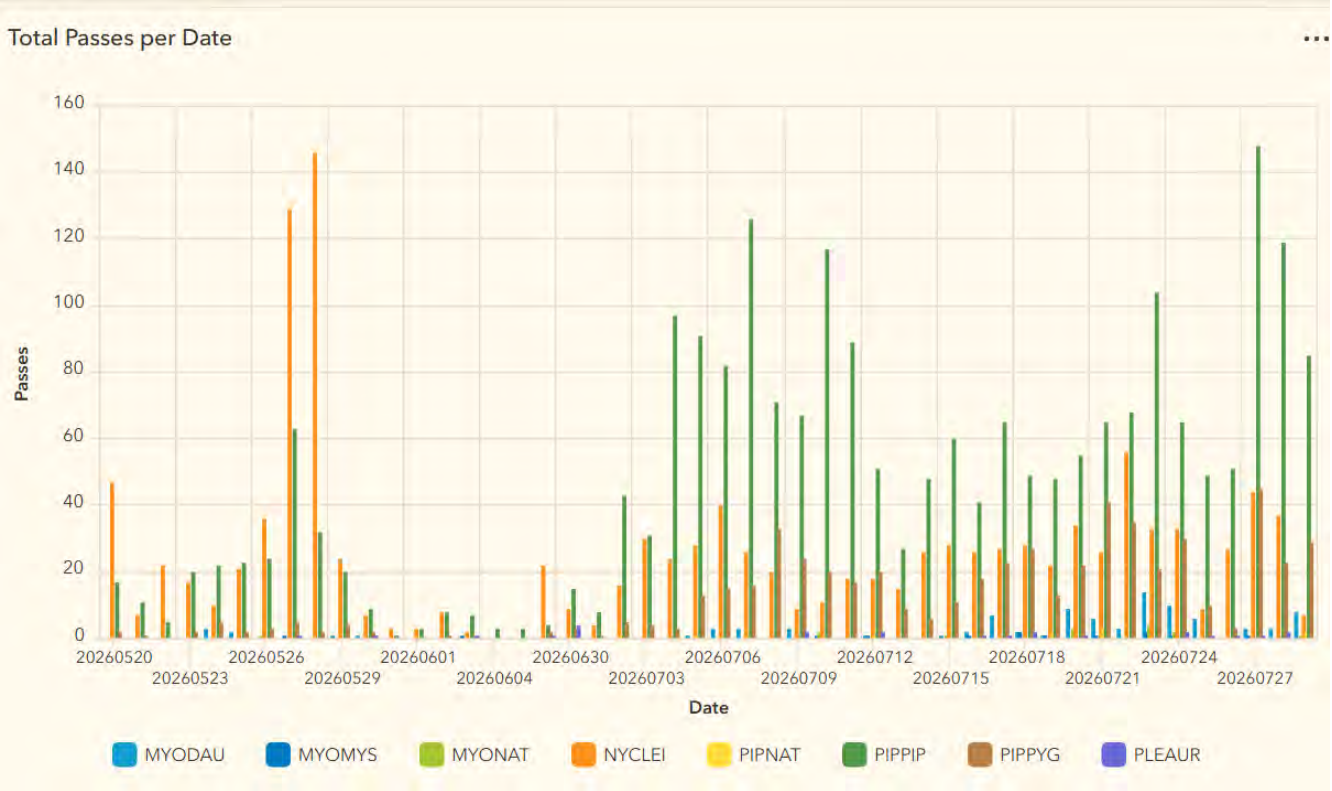


Plate 3-18: Total number of nightly passes recorded at static location DRE-I (T9)

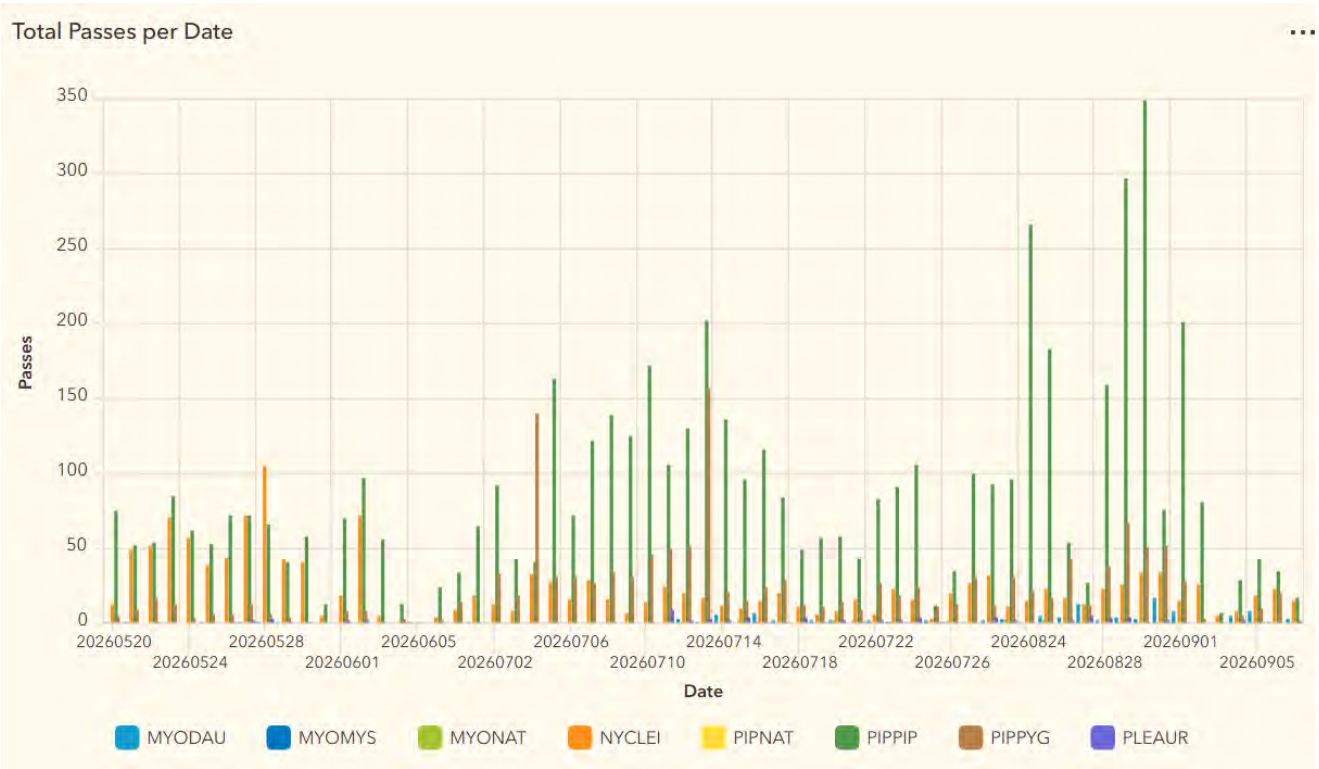


Plate 3-19: Total number of nightly passes recorded at static location DRE-J (T10)

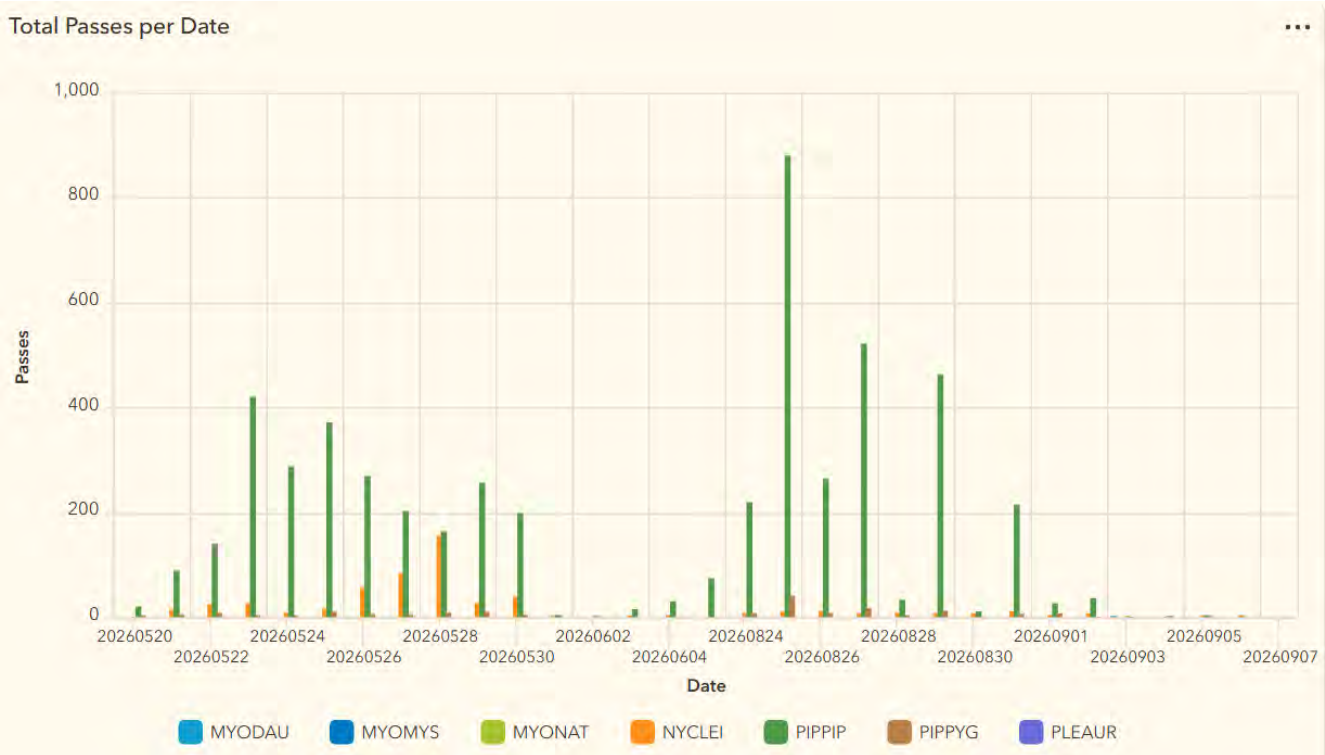


Plate 3-20: Total number of nightly passes recorded at static location DRE-K (T11)

3.6.3 Discussion

Activity patterns for the majority of species have remained similar to previous surveys.

The exception to this is the increased occurrence of Daubenton's bat, specifically at detector DRE-F located near T6. Detector DRE-G also noted higher levels of Dubenton's bat activity; however, levels were lower than DRE-F and DRE-G was located beside the Fear English River where Dubenton's bat activity could be expected to occur.

As indicated in Plate 3-20 below, the majority of this activity occurred in Round 1 (20/05/2026 to 05/06/2026).

When Daubenton's activity at DRE-F is examined in more detail (see Plate 3-21 below), the majority of dates (12) recorded between 100 - 200 calls per date/night at DRE-F, with three dates recording between 50-100 calls and two dates recording under 50 calls. These numbers of calls are relatively low, and based on the nightly distribution of calls, the majority of activity occurred between 23:00 and 01:00 (57.9% of calls), with the next most active period being 01:00 to 03:00 (28.6%). The remaining 13.6% of call were relatively evenly distributed across the earlier and later parts of the night (22:00 - 23:00 and 03:00 - 04:00).

The pattern of activity recorded at DRE-F is indicative of Daubenton's bats foraging along the drain adjacent to T6, with number of calls per night and temporal distribution of calls indicating one or several bats foraging in this area regularly during May 2026.

This drain running through conifer plantation was consistently dry when observed across spring/summer/autumn and as such does not provide the aquatic foraging characteristically used by Daubenton's bat. However, it is possible that this species uses the network of forestry drains to travel to this location to forage aerially. The drain beside T6 is wide, with willow growing along its length forming a canopy. Foraging could potentially occur above or below this canopy since it is relatively open underneath.

There are no potential roost features in the wider area, and as such the activity recorded is considered indicative of opportunistic feeding during the early part of the activity season. Daubenton's bat is considered low risk in terms of potential for turbine collisions due to it habitually low flight pattern. As such, the increased activity observed at DRE-F during 2026 Round 1 does not signify an increased risk of collision for this species.

Regarding loss of foraging habitat within the T6 bat felling buffer i.e. the section of drain enclosed by willow canopy within the T6 bat felling buffer, this is marginal foraging habitat for Duabenton's bat. Considering the recorded activity indicates opportunistic/sporadic use by individual or very low numbers of bats restricted to a single season (Spring 2026) (this pattern of activity was not observed during any previous surveys) in combination with the marginal suitability of this feature, the existing impact assessment in terms of habitat loss/alteration remains valid.

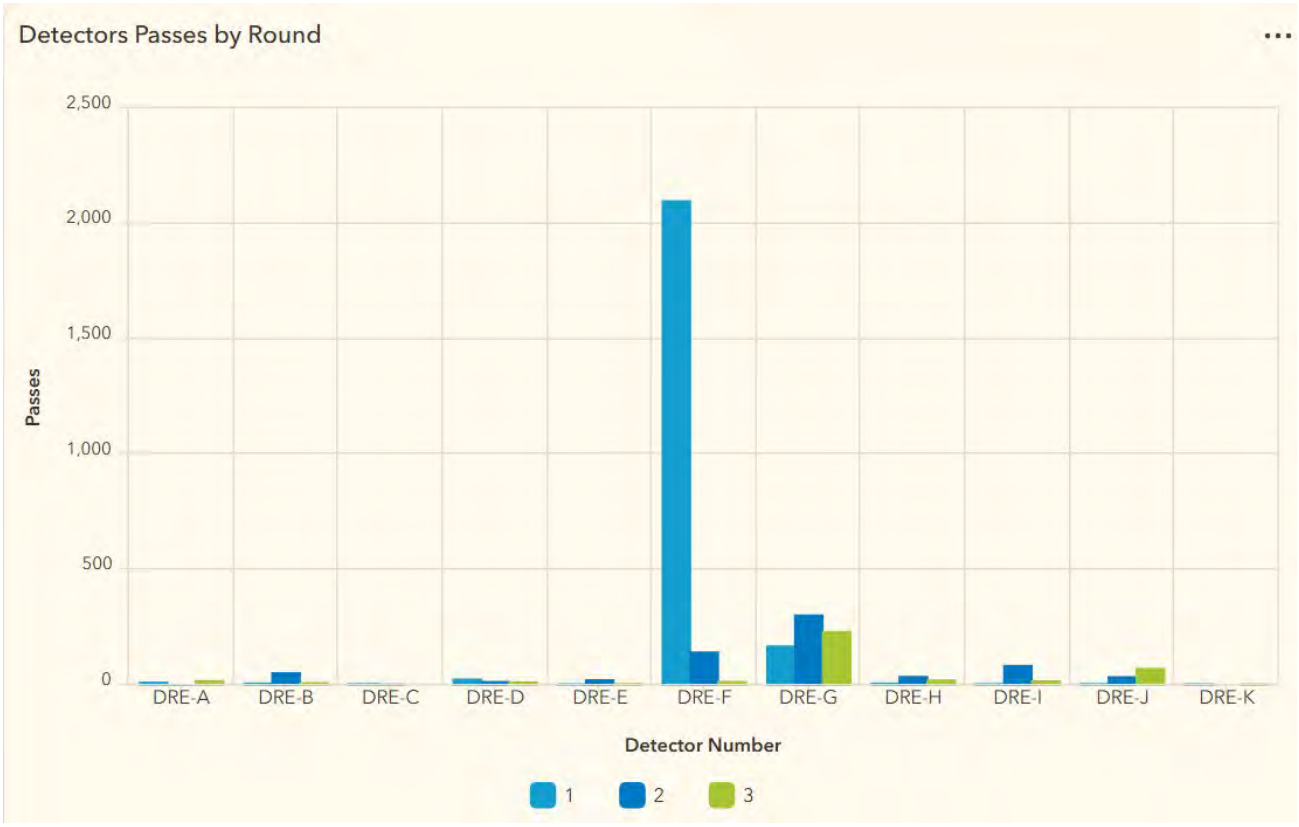


Plate 3-21: Total Daubenton's bat passes per detector/round (2026 bat activity season)

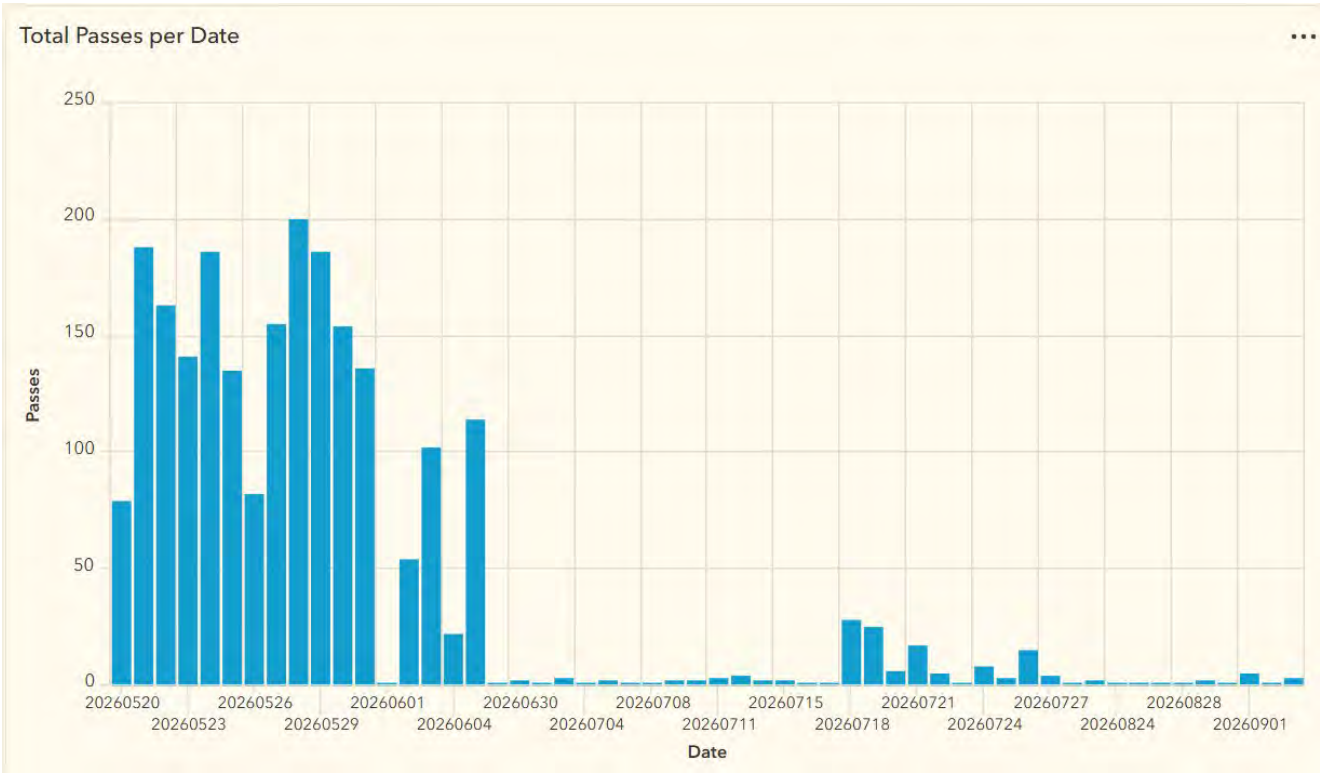


Plate 3-22: Daubenton's bat passes at DRE-F across 2026 bat activity season

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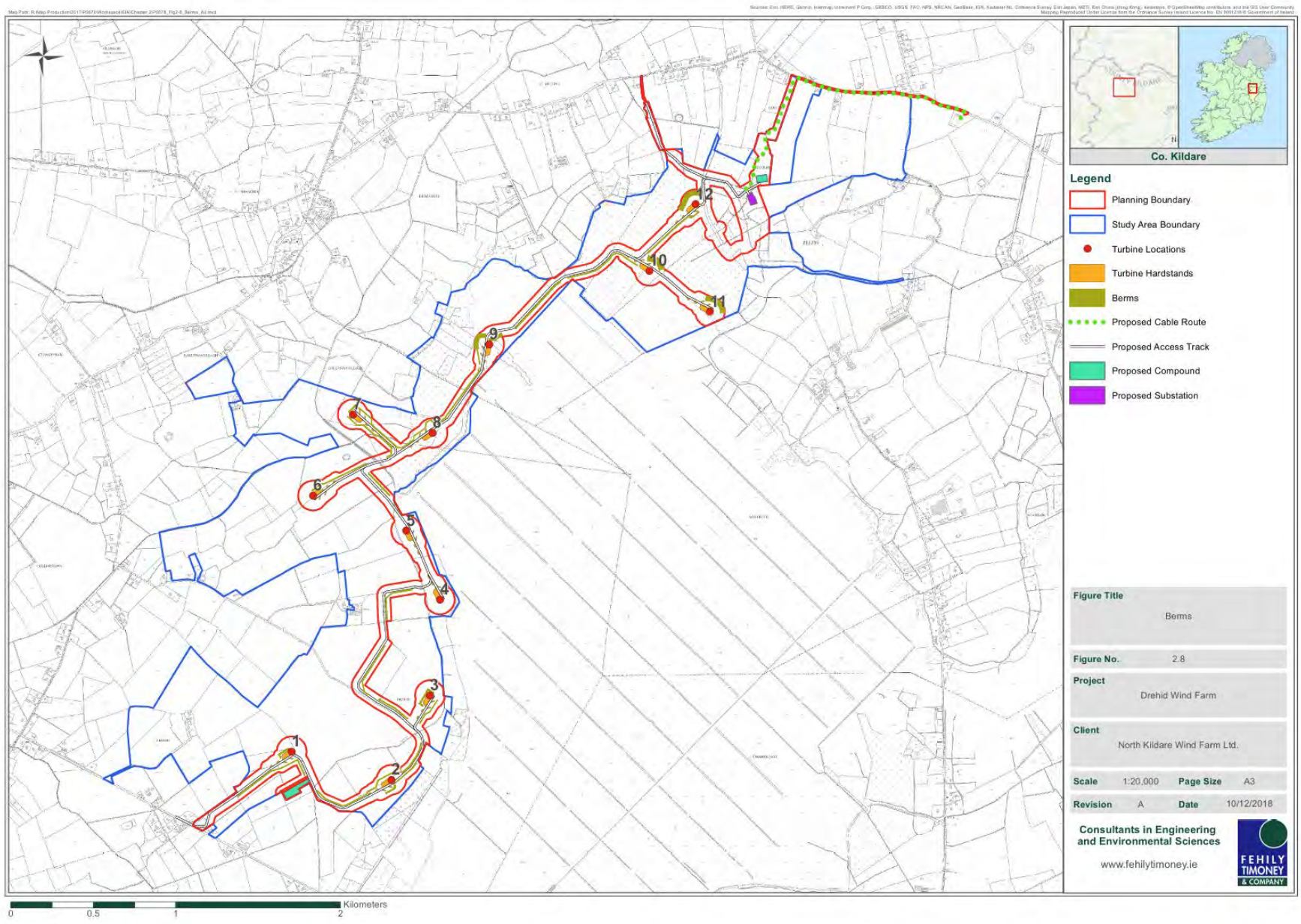
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APPENDIX 4

Wind Farm Layout
Comparison 2018 v 2025

2018 Layout:

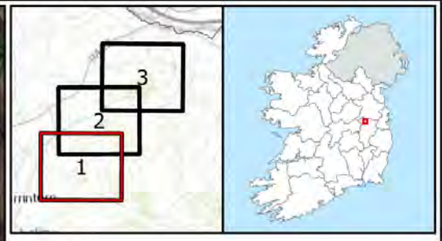

Co. Kildare
Legend
Planning Boundary
Study Area Boundary
Turbine Locations
Turbine Hardstands
Berms
Proposed Cable Route
Proposed Access Track
Proposed Compound
Proposed Substation
Figure Title
Berms
Figure No. 2.8
Project
Drehid Wind Farm
Client
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2025 Layout:

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Legend

- Proposed Development Boundary
- Road widening - Access tracks
- Road widening - Temp. Access Tracks
- Access Track
- Temporary Access Track
- Blade Transfer Area
- Construction Compound
- Passing Bays
- Turbine Hardstanding
- Turbine Swept Path
- Berms
- Cable Route
- Turbines

TITLE:	Site Layout		
PROJECT:	Drehid Wind Farm and Substation		
FIGURE NO:	2.2		
CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:10,000	**REVISION:**	0
DATE:	19/05/2025	**PAGE SIZE:**	A3

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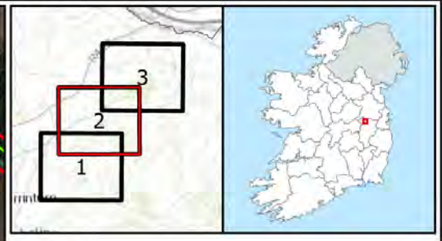
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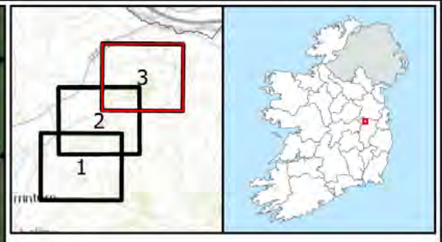
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Legend

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- Road widening - Access tracks
- Road widening - Temp. Access Tracks
- Access Track
- Temporary Access Track
- Construction Compound
- Passing Bays
- Turbine Hardstanding
- Turbine Swept Path
- Peat Deposition Area
- Substation
- Berms
- Cable Route
- Grid Connection Route
- Turbines

TITLE:	Site Layout		
PROJECT:	Drehid Wind Farm and Substation		
FIGURE NO:	2.2		
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DESIGNING AND DELIVERING A SUSTAINABLE FUTURE

APPENDIX 5

Pre-planning correspondance from Cork Co. Co. Ecologists.

From: Ian McDermott <Ian.McDermott@CorkCoCo.ie>
Sent: Tuesday 11 May 2021 14:40
To: Eamon Hutton <eamon.hutton@ftco.ie>
Cc: Sharon Casey <Sharon.Casey@CorkCoCo.ie>; Greg Simpson <Greg.Simpson@CorkCoCo.ie>
Subject: 2359 - Annagh Wind Farm - Pre-planning Consultation PPN 21/300

Hi Eamon,

I hope this email finds you well.

I am emailing you on behalf of the Cork County Council Ecology Office in response to your email to Sharon Casey on the 28th of April 2021.

I have reviewed the extract of the pre-planning presentation and have the following comments. These comments are made without prejudice and are based on a review of publicly available information. I do not have access to any site-specific ecological data.

Key concerns from an ecological perspective are:

- Potential for impact on sites designated or proposed to be designated for protection of biodiversity;
- Potential for impact on habitats of high natural value; and
- Potential for the proposed development to give rise to negative effects on populations of protected species.

Without direct knowledge of the site, issues we will be likely to be looking closely at are:

- Assessment of impact on designated sites. Based on the information presented and a review of online systems, it appears that the site is located adjacent to and hydrologically connected to the Blackwater River (Cork/Waterford) Special Area of Conservation (Site Code: 2170) and proximal to two Special Protection Areas. Without completing detailed AA screening, this proposal is likely to trigger a requirement for AA, and it is therefore advised that you would commence the necessary survey and assessment work to compile a Natura Impact Statement in respect of this project. The NIS should be prepared by persons with competence and experience in the fields of deployment of water pollution protection measures, and Habitats Directive reporting and the qualifications and experience of contributors to the NIS should be cited in the document. The NIS shall include details relating to the environmental measures / procedures which will be implemented at the site during the construction and operational phase. It should be clear from the submitted information, how and when environmental protection measures will be implemented, and who will be responsible for overseeing these.

- Potential for the project to give rise to negative effects on freshwater habitats. To this end, there should be a focus at design stage on providing for an appropriately designed surface water management system which minimises risk of release of contaminants to surface waters and ensures that there is no increase in surface water run-off from the site.

- Assessment of impact on habitats. Aerial imagery and the information provided in the report you referred to this office indicates that the proposed development primarily comprises agricultural land (grassland & broadleaf plantations), which are potentially utilised by a number of protected and/or species of conservation concern. I note that it is generally recommended that development on peat habitats is avoided and the site should be

- recommended that development on peat habitats is avoided and the site should be designed to avoid direct intervention within intact peat habitats and on other habitats of high natural/conservation value. The design and site layout should be informed by your ecological assessment.

- Any species-specific surveys which are deemed to be required including bird surveys must be completed by qualified and experienced practitioners following recognised best practise methods. I note biodiversity survey findings summary results presented in submitted documentation date from 2019 to 2021 in relation to ornithological surveys. It should be noted that the information gathered during the survey stage should be used to inform design to ensure that areas around known breeding sites and key foraging areas for sensitive bird species are avoided. Please present mapping of any habitat loss respective to foraging and breeding sites as part of assessment.

- With regard to bat activity, if commuting and foraging routes of bats relative to proposals could be presented and if these routes could also be presented respective of habitats on site including any habitat loss associated with the development. Furthermore, I note that should it be proposed that the loss of ecological corridors for bats be offset through planting, then I would recommend that any such planting should be done as to provide the continued use of the site by bats. This should be done in such a way that while maintaining connectivity to the wider landscape, it should also provide a route that divert bats away from the turbine locations as to reduce the potential risk of mortality, while continuing to link bats to foraging and/or roosting habitat.

- Cumulative impacts assessed should also consider solar projects within the area having regard to cumulative impacts on protected species and habitats of high natural value.

- Decommissioning and reinstatement should be considered in detail and shall include opportunities for biodiversity enhancement where possible.

It is recommended that Ecological Impact Assessment (stand alone or within an EIAR) and the NIS should be prepared taking account of National and EU Guidelines as well as recent case law. Methodologies used for site surveys should be specified within the submitted reports.

Regards,

Ian McDermott
Ecologist
T: 021 4285991
E: ian.mcdermott@corkcoco.ie

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APPENDIX 6

Waterframework Directive Compliance Report

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DESIGNING AND DELIVERING
A SUSTAINABLE FUTURE

DREHID WIND FARM SID - FURTHER INFORMATION RESPONSE

Water Framework Directive Compliance Report

Prepared for:

North Kildare Wind Farm Ltd.

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DESIGNING AND DELIVERING
A SUSTAINABLE FUTURE

Date: October 2026

Document No:

P26094-FT-EGN-XX-RP-EN-0004

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1. INTRODUCTION

1.1 Introduction

This report presents a Water Framework Directive (WFD) Compliance Assessment for the proposed Drehid Wind Farm development, Co. Kildare (hereinafter referred to as the "Proposed Development"), prepared in response to a request for further information issued by An Coimisiún Pleanála (ACP) on 2 April 2026 in respect of the planning application submitted by North Kildare Wind Farm Limited (ACP Ref. 322845-25).

The purpose of this WFD Compliance Assessment is to determine whether the proposed development has the potential to:

- result in deterioration in the status of any surface water or groundwater body; and/or
- prevent the achievement of the environmental objectives established under the Water Framework Directive.

This compliance assessment has been undertaken having regard to the requirements of the Water Framework Directive (Directive 2000/60/EC) and relevant guidance and considers potential impacts on surface water and groundwater bodies in the context of WFD compliance.

1.2 Statement of Authority

This document was prepared by Serhii Bevz, with assistance from André Goncalves, both of Fehily Timoney and Company (FT).

Serhii Bevz holds a Master's degree in Environmental Science and has over 20 years' experience in environmental assessment, including the preparation of Environmental Impact Assessment Reports (EIAR) and specialist assessments relating to surface water, groundwater and the Water Framework Directive.

André is an Environmental Engineer with FT. André holds a Bachelor's degree in Environmental Engineering from the University Presidente Antonio Carlos - Brazil and a M.Sc. in Applied Environmental Geoscience from University College Cork, UCC. André has 6 years consultancy experience. André has experience preparing Environmental Impact Assessment Reports (EIARs) water chapters for waste, infrastructure and renewable energy projects along with completing Water Framework Directive Assessments.

2. METHODOLOGY

2.1 Legislation

Directive 2000/60/EC of the European Parliament and of the Council, establishing a framework for Community action in the field of water policy (the Water Framework Directive, WFD), is the principal legislative instrument governing the protection and management of surface waters and groundwater within the European Union.

The Directive establishes a comprehensive framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater, with the objective of preventing further deterioration and protecting, enhancing and restoring the status of all water bodies.

Under the WFD, water bodies are classified according to defined status indicators. For surface waters, overall status is determined by ecological status and chemical status, with ecological status assessed through biological, hydromorphological and physicochemical quality elements. For groundwater, status is defined by quantitative status and chemical status.

Article 4 of the Directive sets out the environmental objectives which are legally binding on Member States. These include:

- the requirement to prevent deterioration in the status of all surface water and groundwater bodies;
- the requirement to protect, enhance and restore all water bodies with the aim of achieving at least good ecological and chemical status for surface waters and good quantitative and chemical status for groundwater;
- the requirement to protect and enhance groundwater, including the prevention or limitation of the input of pollutants and the maintenance of a balance between abstraction and recharge; and
- the requirement to progressively reduce pollution from priority substances and cease or phase out emissions of priority hazardous substances.

The classification system applied under the Directive follows the “one-out, all-out” principle, whereby the overall status of a water body is determined by the lowest status assigned to any individual quality element.

The Directive also requires the identification and protection of water dependent protected areas, including areas designated for the abstraction of water intended for human consumption, habitats and species protected under European legislation and other areas requiring specific protection under Community law.

Article 4(7) of the Directive provides for limited exemptions to the environmental objectives in cases where new modifications or sustainable development activities may lead to deterioration in status or prevent the achievement of good status. Such exemptions are subject to strict conditions, including the demonstration that all practicable mitigation measures have been implemented, that the reasons for the modification are of overriding public interest or that the benefits outweigh the environmental objectives, and that no significantly better environmental options are available.

The Water Framework Directive (2000/60/EC) has been transposed into Irish law through a series of statutory instruments which establish the legal framework for the protection, classification and management of surface waters and groundwater.

The principal legislative instruments relevant to the implementation of the WFD in Ireland are as follows:

- European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003), as amended.

  These Regulations provide the initial transposition of the Water Framework Directive into Irish law. They establish the framework for river basin management planning, including the characterisation of water bodies, identification of pressures and the development of monitoring programmes.

- European Union (Water Policy) Regulations 2014 (S.I. No. 350 of 2014), as amended.

  These Regulations provide additional legal and institutional arrangements for the implementation of the Water Framework Directive in Ireland, including the establishment of governance structures to support River Basin Management Planning.

- European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272 of 2009), as amended.

  These Regulations set out the environmental objectives for surface waters, including the classification of ecological and chemical status and the environmental quality standards applicable to surface water bodies. They also establish the legal requirement to prevent deterioration in status and to achieve good status objectives.

- European Communities Environmental Objectives (Groundwater) Regulations 2010 (S.I. No. 9 of 2010), as amended.

  These Regulations implement the requirements of the Groundwater Directive (2006/118/EC) and establish environmental objectives for groundwater, including the assessment of chemical and quantitative status, the setting of threshold values, and the requirement to prevent or limit the input of pollutants into groundwater.

- European Communities (Technical Specifications for Chemical Analysis and Monitoring of Water Status) Regulations 2011 (S.I. No. 489 of 2011).

  These Regulations specify the technical standards and quality assurance requirements for the monitoring and analysis of water status under the WFD.

- European Union (Good Agricultural Practice for Protection of Waters) Regulations 2025 (S.I. No. 588 of 2025), as amended by the European Union (Good Agricultural Practice for Protection of Waters) (Amendment) Regulations 2026 (S.I. No. 119 of 2026).

  These Regulations (commonly referred to as the Nitrates Regulations) establish measures to protect waters from pollution arising from agricultural sources, including controls on nutrient application, storage and management.

- European Union (Drinking Water) Regulations 2023 (S.I. No. 99 of 2023).

  These Regulations transpose Directive (EU) 2020/2184 on the quality of water intended for human consumption. They establish parametric standards and monitoring requirements to ensure the protection of drinking water supplies. In the context of the Water Framework Directive, these Regulations are relevant to safeguard water bodies used for abstraction.

2.2 Policy

The assessment of compliance with the WFD has been informed by relevant national, regional and local policy frameworks relating to the protection and management of water resources.

At a national level, water management policy in Ireland is guided by River Basin Management Plans (RBMPs). The current Third Cycle River Basin Management Plan 2022-2027, also referred to as the Water Action Plan 2024, provides the primary policy mechanism for the implementation of the WFD in Ireland and establishes environmental objectives and a Programme of Measures for all water bodies.

The RBMP adopts a catchment based approach, identifying water bodies that are 'At Risk' of failing to meet their environmental objectives and prioritising targeted actions within defined Areas for Action. These include Areas for Restoration (AFA), where coordinated measures are required to improve water quality, and Areas for Protection, where existing good or high status is to be maintained.

The RBMP sets out measures to:

- prevent deterioration in the status of surface water and groundwater bodies;
- restore water bodies currently at less than good status;
- protect water bodies that are already achieving good or high status; and
- address significant pressures, including agricultural runoff, wastewater discharges and hydromorphological alterations.

At a regional level, the Eastern and Midland Regional Spatial and Economic Strategy (RSES) 2019-2031 provides strategic guidance for sustainable development within the region, including the protection of water resources and the integration of catchment-based water management.

At a local level, the Kildare County Development Plan (CDP) 2023-2029 sets out policies and objectives to protect, enhance and restore water quality throughout the County. The CDP includes provisions to:

- Protect and enhance surface water and groundwater quality and support the implementation of the RBMP and associated programmes of measures.
- Ensure that development proposals do not negatively impact the quality or status of receiving waterbodies and that water quality objectives under the WFD can be achieved and maintained.
- Manage, protect and enhance groundwater and surface water resources, including compliance with the County Kildare Groundwater Protection Scheme and relevant groundwater protection measures.
- Maintain appropriate riparian buffer zones adjacent to rivers, streams and watercourses to preserve ecological functions, protect water quality and support sustainable public access where appropriate.
- Protect recognised salmonid watercourses and other sensitive aquatic habitats from pollution and inappropriate development.
- Promote the implementation of Sustainable Urban Drainage Systems (SuDS) and nature based drainage solutions as an integral component of all new developments to control runoff rates, improve water quality and reduce flood risk.
- Require developments to minimise stormwater runoff through infiltration, attenuation, rainwater harvesting, permeable paving, swales, wetlands and other sustainable drainage measures.
- Support the conservation, protection and enhancement of Natural Water Retention Measures (NWRMs) and other green/ blue infrastructure features that contribute to water quality improvement, flood attenuation and biodiversity enhancement.
- Ensure that adequate water supply and wastewater treatment infrastructure are available to serve development and that all new development is designed to protect receiving waters from adverse environmental impacts.
- Support the implementation of the Local Authority Waters Programme (LAWPRO), Water Safety Plans and other initiatives aimed at improving and protecting water quality throughout the County.

2.3 Guidelines

This compliance assessment has been undertaken with reference to relevant national and international guidance relating to Environmental Impact Assessment (EIA) and the assessment of potential effects on the water environment.

The preparation of this compliance assessment has had regard to the Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Environmental Protection Agency, 2022), which provide overarching guidance on assessment scope, methodology and the evaluation of significant environmental effects, including those relating to surface water and groundwater.

In the absence of specific national guidance for WFD compliance assessment in Ireland, this compliance assessment has been informed by established best practice guidance, including:

- UK Environment Agency, Water Framework Directive Assessment: Estuarine and Coastal Waters (UK Environment Agency, 2016).
- UK Planning Inspectorate, Nationally significant infrastructure projects: advice on the Water Framework Directive (UK Planning Inspectorate, 2026).

These documents provide a structured framework for the assessment of potential impacts on WFD quality elements, including the identification of receptors, assessment of impact pathways, and evaluation of potential effects on water body status and environmental objectives.

The guidance has been applied in a manner appropriate to the Irish regulatory context, having regard to the requirements of the WFD and its transposition into Irish legislation.

2.4 Desktop Study

A desk based review of available information was undertaken to inform this Water Framework Directive Compliance Assessment. This included the review of published datasets, mapping and relevant online sources relating to surface water and groundwater, WFD water body status, and hydrological features.

The key data sources used in this compliance assessment are summarised in Table 2-1, together with a brief description and the date of access.

Table 2-1: Key Data Sources Used for the Desk Based Assessment

Data sources	Description	Date accessed
EPA Catchments.ie	Catchment and sub-catchment boundaries, waterbody delineation, WFD status, risk, objectives and significant pressures.	October 2026
EPA Water Framework Directive datasets	Ecological and chemical status, supporting quality elements, environmental objectives and pressure information for relevant surface water and groundwater bodies.	October 2026
EPA Surface Water Monitoring Data	Available biological and physicochemical monitoring information for relevant surface waterbodies.	October 2026
EPA Protected Areas datasets	Drinking Water Protected Areas, Shellfish Waters and Bathing Waters relevant to the receiving water environment.	October 2026

Data sources	Description	Date accessed
Geological Survey Ireland (GSI)	Groundwater body information, bedrock aquifer classification and groundwater vulnerability mapping.	October 2026
GSI Source Protection Area datasets	Public Water Supply and Group Water Scheme Source Protection Areas.	October 2026
OPW Flood Maps	Historical flood event information	October 2026
National Parks and Wildlife Service (NPWS)	European and national designated sites, including SACs, SPAs, NHAs and pNHAs.	October 2026

2.5 Site Investigation

The WFD Compliance Assessment has been informed by site specific hydrological and hydrogeological along with ecological surveys undertaken in support of the proposed development. These surveys provide information on the existing drainage conditions and hydrological and hydrogeological features along with habitats and species occurring within and adjacent to the proposed development site and have been used, where relevant, to inform the characterisation of the receiving environment and identification of receptors relevant to the WFD.

Hydrological site surveys were undertaken on 10 August 2018 and 14-15 October 2024 and included:

- Identification and assessment of existing drainage features, rivers, streams and watercourse crossings;
- Assessment of surface water drainage conditions, flow pathways and hydrological connectivity with downstream receiving waterbodies; and
- Identification of significant hydrological features, including elements of the OPW Arterial Drainage Network.

Site investigations were undertaken on 31 July and 1 August 2018, 21 February 2023, 27 October 2023, 23 and 26 January 2024, and 30 September 2024 and included:

- Geological and hydrogeological walkover inspections;
- Peat depth, condition and stability assessments; and
- Ground-condition investigations at proposed infrastructure locations.

Aquatic ecology surveys were undertaken during 2018, 2019, 2021 and 2023 and included:

- Aquatic habitat and fisheries habitat assessments;
- Electrofishing surveys;
- Biological water-quality assessments, including aquatic macroinvertebrate surveys; and
- Assessment of aquatic habitats for protected and notable species.

Ten aquatic survey locations were selected for detailed assessment, with five additional locations (Sites A-E) surveyed in December 2023, particularly in the vicinity of proposed watercourse crossings.

The aquatic ecology survey locations are presented in Figure 2-1.

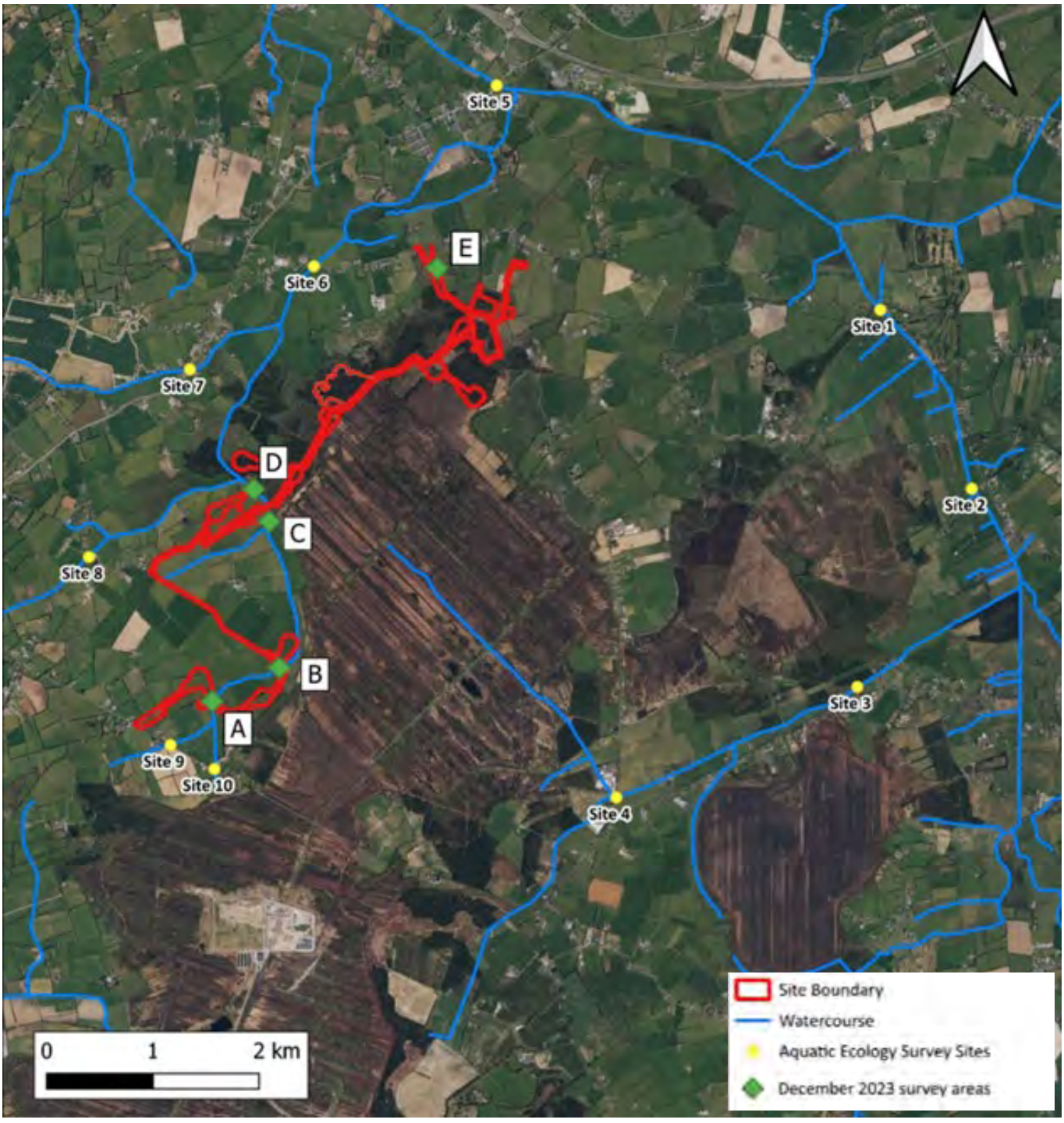


Figure 2-1: Aquatic ecology survey locations

Invasive non-native species (INNS) surveys were undertaken between 2021 and 2024 and included:

- Identification and recording of invasive plant species within and adjacent to the proposed development site;
- Mapping of invasive species occurrences in relation to proposed infrastructure and access routes; and
- Assessment of the distribution and extent of recorded invasive species.

2.6 Methodology

The WFD Compliance Assessment has been undertaken using a structured, stepwise approach consistent with current best practice guidance. The methodology is designed to identify potential interactions between the proposed development and the water environment, and to assess whether the proposed development could result in deterioration in water body status or prevent the achievement of WFD environmental objectives.

2.6.1 Step 1 - Screening

Screening is undertaken to identify whether the proposed development has the potential to interact with any surface water or groundwater bodies and whether further assessment under the WFD is required.

The screening stage involves a high level review of the proposed development and the receiving environment to determine the potential for source-pathway-receptor linkages. This includes:

- identification of potential impact sources associated with construction and operational phases;
- identification of potential pathways, including surface runoff, drainage networks, infiltration and groundwater flow;
- identification of the zone or zones of influence, taking into account the nature of the proposed activities, site drainage characteristics and hydrological connectivity;
- identification of surface water and groundwater bodies within the identified zone of influence;
- identification of receptors, including surface water bodies, groundwater bodies and any associated protected areas; and
- identification of activities or characteristics of the proposed development that can be screened out of further assessment where no plausible linkage exists.

Where no plausible Source-Pathway-Receptor linkage is identified, the potential for impact on the water environment is excluded from further assessment. Where such linkages are identified, the relevant water bodies and receptors are carried forward to the scoping stage for further consideration.

2.6.2 Step 2 - Scoping

Scoping is undertaken to identify the surface water and groundwater bodies and associated receptors that may be affected by the proposed development and therefore require detailed assessment under the WFD.

This stage builds on the screening process and involves a more detailed consideration of potential source-pathway-receptor linkages, taking into account the nature of the proposed development, its location and the characteristics of the receiving environment.

Scoping includes identification of relevant WFD water bodies within the zone of influence of the proposed development and an initial assessment of potential impacts on WFD receptors. For the purposes of this assessment, receptors are defined with reference to WFD quality elements and include:

- hydromorphology
- biology (habitats)
- biology (fish)
- water quality
- water dependent protected areas
- invasive non-native species (INNS), where relevant

Each potential impact is considered in terms of its nature, duration and the likelihood of interaction with identified receptors. Where a pathway has been identified but the potential for impact on a receptor is considered negligible, based on the nature, scale and duration of the proposed activities, the receptor is scoped out of further assessment.

Where potential impacts on WFD receptors cannot be excluded, the relevant water bodies and receptors are scoped into the assessment and carried forward to the impact assessment stage.

2.6.3 Step 3 - Impact Assessment

The impact assessment stage comprises a detailed evaluation of the potential effects of the proposed development on the surface water and groundwater bodies and receptors identified through the screening and scoping stages.

The assessment is undertaken in the context of the relevant River Basin Management Plan and is based on the baseline characteristics of the identified water bodies, including their current WFD status, risk classification and identified pressures.

The assessment considers the aspects of the proposed development with the potential to affect the water environment, including construction and operational activities and evaluates their interaction with identified receptors through established source-pathway-receptor linkages.

Impacts are assessed in terms of their nature, scale, duration and geographical extent, including the magnitude of any potential change within affected water bodies. The assessment considers the potential for effects on WFD receptors, including hydromorphology, biological quality elements, water quality, groundwater quality and quantity and water dependent protected areas.

The assessment specifically evaluates the potential for the proposed development to result in:

- deterioration in the status of a surface water or groundwater body, including deterioration of individual WFD quality elements; and
- prevention of the achievement of the environmental objectives established for the water body under the Water Framework Directive.

In accordance with established WFD principles, deterioration is considered to occur where the status of any individual quality element falls by one class, even if this does not result in a change in the overall status of the water body.

The assessment is supported by the available evidence base, including baseline monitoring data, published datasets and professional judgement and identifies any potential risks to WFD compliance prior to the implementation of mitigation measures.

2.6.4 Step 4 - Cumulative Effects Assessment

The cumulative effects assessment considers the pressures associated with the proposed development in the context of the existing pressure environment of the relevant surface water and groundwater bodies. The assessment is undertaken on a waterbody specific basis, having regard to the current WFD status, risk classification, environmental objectives and significant pressures and issues.

The pressures identified through the impact assessment are considered in combination with the existing pressures affecting each waterbody. The assessment examines whether the proposed development could increase or otherwise interact with these pressures and whether the resulting combined effects could cause deterioration of the relevant WFD quality elements or compromise achievement of the applicable environmental objectives.

2.6.5 Step 5 - Mitigation Measures

Mitigation measures are identified where required to avoid, prevent or reduce potential adverse effects on surface water and groundwater bodies and WFD receptors identified during the impact assessment stage.

Mitigation measures are developed in accordance with established best practice and are informed by the findings of the EIA Screening Report and documents submitted for the proposed development. These measures address potential impacts arising from construction and operational activities.

Mitigation is incorporated through a combination of design measures, standard construction controls and operational management practices. The effectiveness of mitigation measures is considered in terms of their ability to prevent deterioration in WFD quality elements and to ensure compliance with the environmental objectives of the WFD.

The implementation of mitigation measures is secured through project design, construction management plans and operational procedures, as set out in the EIAR and supporting documentation.

2.6.6 Step 6 - WFD Compliance Assessment

The assessment of WFD compliance is undertaken following the implementation of the mitigation measures identified in Step 5.

This stage evaluates the extent to which mitigation measures reduce or eliminate potential impacts on surface water and groundwater bodies and WFD receptors, taking into account their effectiveness.

The assessment specifically considers whether, following mitigation, the proposed development:

- will result in deterioration in the status of any surface water or groundwater body, including deterioration of individual WFD quality elements; or
- will prevent the achievement of the environmental objectives established for the relevant water bodies under the Water Framework Directive.

Where residual effects remain, these are identified and assessed in the context of compliance with the WFD.

2.6.7 Step 7 - Derogation, Article 4(7)

Where the assessment identifies that the proposed development may result in deterioration in the status of a surface water or groundwater body, or may prevent the achievement of WFD environmental objectives, the provisions of Article 4(7) of the Water Framework Directive are considered.

Article 4(7) provides for limited exemptions to the environmental objectives of the Water Framework Directive in cases where new modifications or sustainable development activities may lead to deterioration in status or prevent the achievement of good status.

Where applicable, the assessment will consider whether the conditions of Article 4(7) can be met, including:

- demonstration that all practicable mitigation measures have been implemented to minimise adverse effects;
- demonstration that the reasons for the proposed development are of overriding public interest, or that the benefits of the development outweigh the environmental objectives;
- demonstration that the beneficial objectives served by the proposed development cannot reasonably be achieved by alternative means that represent a significantly better environmental option; and
- confirmation that the objectives of the Water Framework Directive are not permanently compromised.

Where a derogation is required, the justification for the application of Article 4(7) will be clearly set out, supported by the relevant evidence.

2.7 Limitations and Assumptions

The WFD Compliance Assessment has been undertaken using the most recent available datasets published by the Environmental Protection Agency (EPA), National Parks and Wildlife Service (NPWS) and other relevant sources. WFD classification data is reported at water body level and reflects conditions across the reporting cycle (2019-2024), as such, it may not capture localised or short term variations in water quality.

Hydromorphological quality elements are not classified for the surface water bodies considered, and therefore their influence on ecological status cannot be determined from the available data. In addition, classification data for certain biological elements, including fish, is not available for the water bodies.

Aquatic ecology surveys were undertaken between 2018 and 2023, with detailed assessments conducted at selected locations. Consequently, the survey findings may not fully reflect aquatic conditions or localised variations outside the surveyed locations.

The identified limitations and assumptions have been taken into account in undertaking the WFD Compliance Assessment.

3. RECEIVING ENVIRONMENT

3.1 Hydrological and Hydrogeological Setting

Regionally, the proposed development site is located within the Boyne Catchment (Catchment ID 07) and forms part of the wider River Boyne catchment, which ultimately drains to the Irish Sea in Drogheda, Co. Louth.

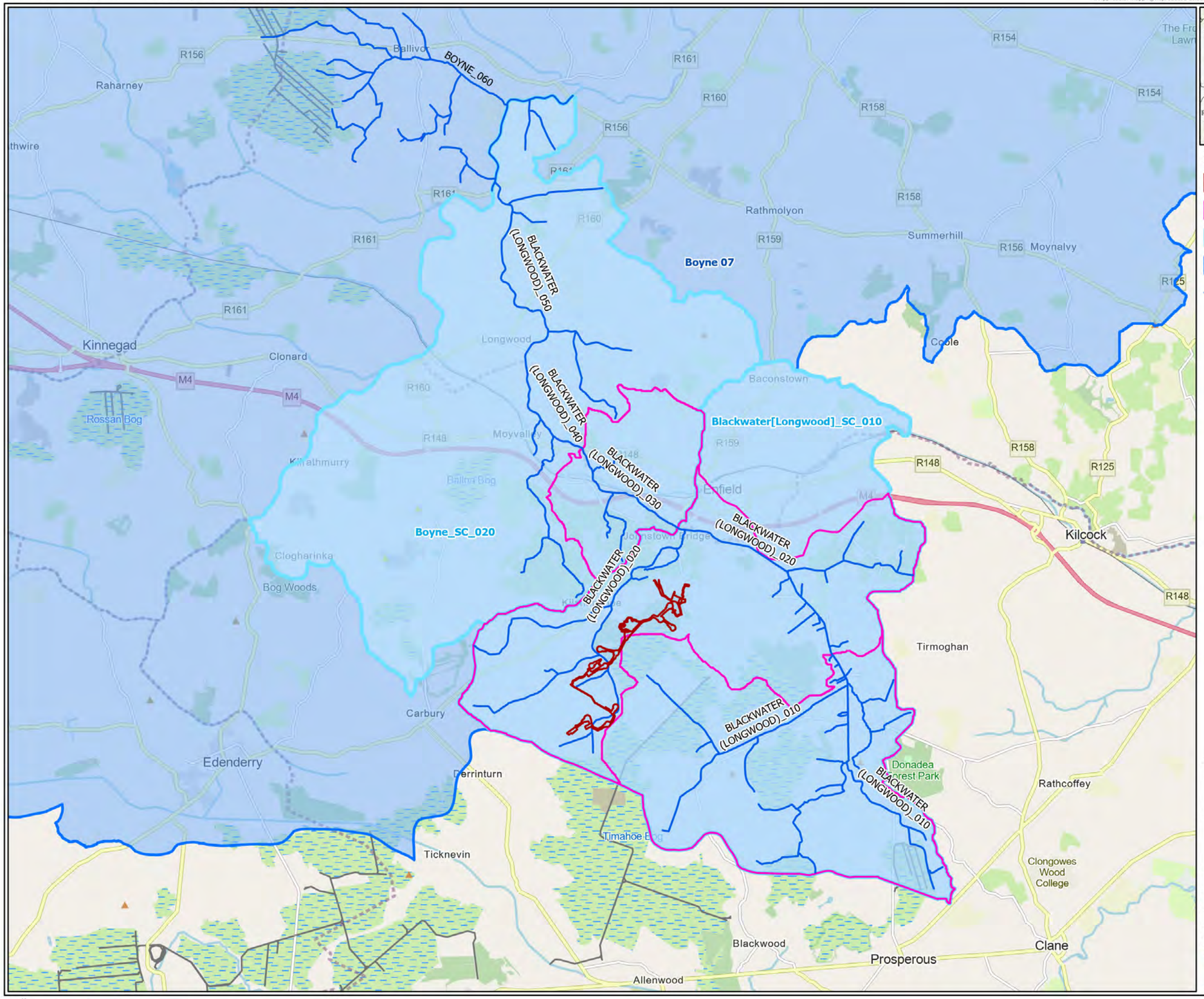
At a local scale, the main proposed development site is situated within the Blackwater [Longwood]_SC_010 (ID 07_6) sub-catchment. The site lies predominantly within the Blackwater (Longwood)_020 river sub-basin, associated with the Blackwater (Longwood)_020 (IE_EA_07B020100) river waterbody. A short section of the proposed access track extends into the adjacent Blackwater (Longwood)_010 river sub-basin, associated with the Blackwater (Longwood)_010 (IE_EA_07B020060) river waterbody.

A section of the proposed Turbine Delivery Route (TDR) is located within the Boyne_SC_020 sub-catchment (ID 07_16) and the Blackwater (Longwood)_030 river sub-basin, associated with the Blackwater (Longwood)_030 (IE_EA_07B020200) river waterbody.

The Blackwater (Longwood)_010 (IE_EA_07B020060) river waterbody drains downstream into Blackwater (Longwood)_020 (IE_EA_07B020100), which subsequently flows through Blackwater (Longwood)_030 (IE_EA_07B020200), Blackwater (Longwood)_040 (IE_EA_07B020300) and Blackwater (Longwood)_050 (IE_EA_07B020600), before joining the River Boyne at Boyne_060 (IE_EA_07B040900), approximately 10.2 km north-east of the proposed development site (Figure 3-1).

Environmental Protection Agency
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Legend

- Site Boundary
- WFD River Sub-Basins
- WFD Subcatchments
- WFD Catchment
- WFD River Waterbodies

N W E S

0 2 4 8 Kilometers

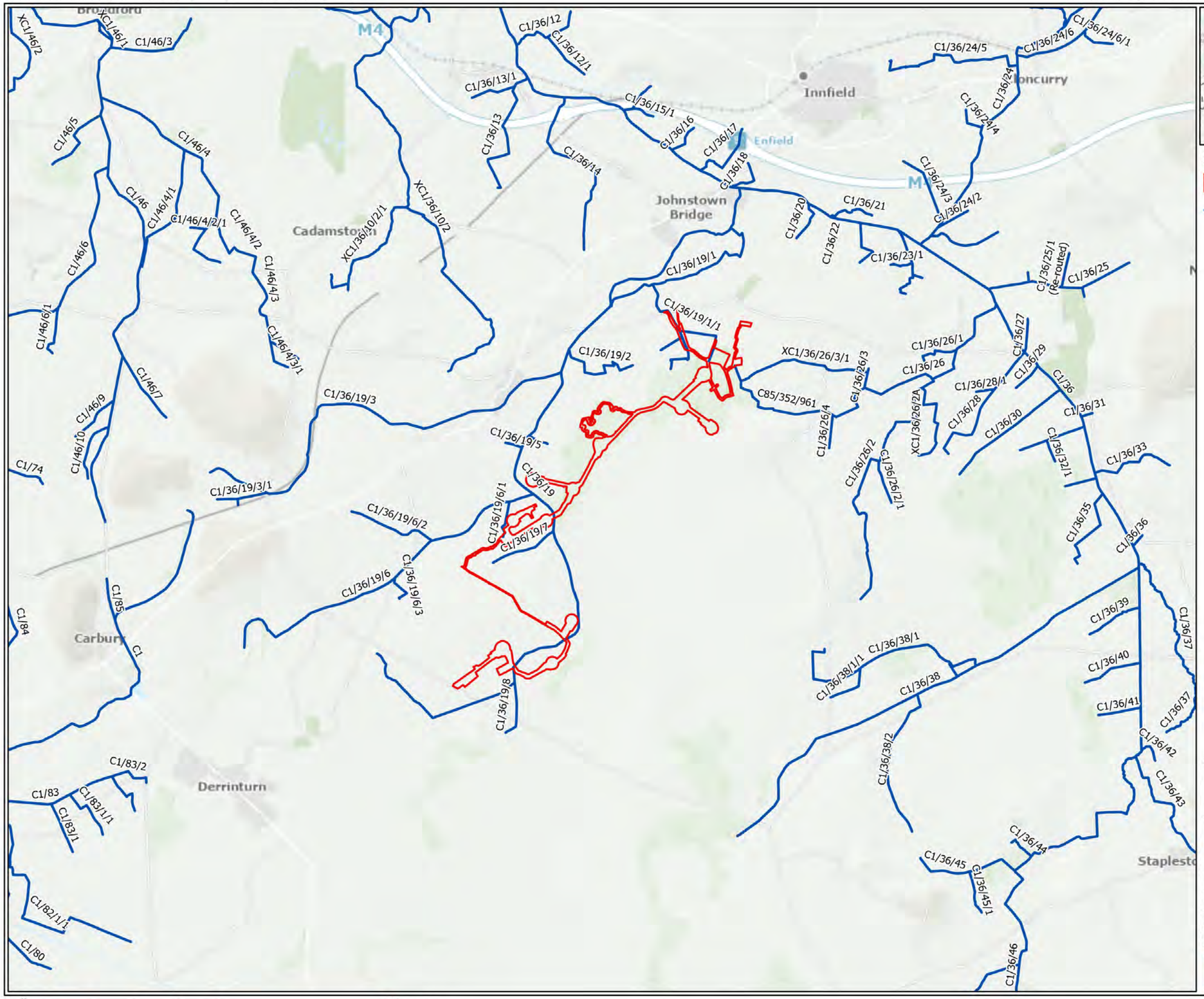
TITLE:	Site Location		
PROJECT:	Drehid Wind Farm RFI		
FIGURE NO:	3.1		
CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:110,000	**REVISION:**	0
DATE:	20/10/2026	**PAGE SIZE:**	A3

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The Blackwater (Longwood)_020 river waterbody forms part of an Office of Public Works (OPW) Arterial Drainage Scheme (ADS). The associated drainage network includes channels that are not individually classified as WFD river waterbodies but discharge into Blackwater (Longwood)_020. A limited number of drainage channels, including C1/36/38/1 and C1/36/35, discharge into Blackwater (Longwood)_010, which also forms part of the ADS drainage network (Figure 3-2).

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Legend

- Site Boundary
- Arterial Drainage Channels

TITLE:	Arterial Drainage Schemes (ADS)		
PROJECT:	Drehid Wind Farm RFI		
FIGURE NO:	3.2		
CLIENT:	North Kildare Wind Farm Ltd.		
SCALE:	1:45,000	**REVISION:**	0
DATE:	20/10/2026	**PAGE SIZE:**	A3

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The proposed development is located within the Trim Groundwater Body (IE_EA_G_002). The underlying bedrock is classified by Geological Survey Ireland (GSI) as a Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones (Ll). Groundwater vulnerability across the proposed development site ranges from Low to High, reflecting variations in the nature and thickness of the overlying peat and glacial deposits.

Groundwater movement is influenced by the relatively flat topography and the presence of peat and glacial deposits overlying limestone bedrock, with groundwater generally discharging towards local rivers and their tributaries.

The flood risk characteristics of the proposed development site have been examined through a Site-Specific Flood Risk Assessment (SSFRA), informed by Office of Public Works (OPW) flood mapping, historical flood records, National Indicative Fluvial Mapping (NIFM) and site-specific hydraulic modelling.

The majority of the proposed development site is located outside areas identified as being at risk of fluvial flooding. However, areas of historic benefitting lands and indicative fluvial flood extents occur within parts of the site, particularly in the northern and eastern areas associated with the Fear English River and adjacent low-lying land.

Based on OPW flood mapping, one proposed turbine is located within indicative Flood Zones A and B. However, site-specific hydraulic modelling as part of the updated SSFRA identified potential fluvial flooding associated with the Fear English River in the vicinity of this turbine during the 1% and 0.1% Annual Exceedance Probability (AEP) flood events, while confirming that the turbine ? is located outside the modelled flood extents. The remaining proposed turbine locations, associated infrastructure and proposed substation are also located outside indicative flood zones.

Geological Survey Ireland (GSI) groundwater flood probability mapping indicates that the proposed development site is not located within an area identified as susceptible to groundwater flooding.

3.2 WFD Status, Risk Classification and Environmental Objectives

The surface water and groundwater bodies identified form the basis for the WFD Compliance Assessment. The current WFD status, risk classification and environmental objectives of these water bodies are summarised in Table 3-1.

Table 3-1: WFD Status, Risk Classification and Environmental Objectives of Water Bodies

Waterbody		Overall WFD Status				WFD Risk	EO
		2010-2015	2013-2018	2016-2021	2019-2024		
Blackwater (Longwood)_010	R	Poor	Poor	Poor	Poor	At Risk	Good
Blackwater (Longwood)_020	R	Moderate	Moderate	Poor	Moderate	At Risk	Good
Blackwater (Longwood)_030	R	Unassigned	Moderate	Moderate	Moderate	At Risk	Good

Waterbody		Overall WFD Status				WFD Risk	EO
		2010-2015	2013-2018	2016-2021	2019-2024		
Blackwater (Longwood)_040	R	Moderate	Moderate	Moderate	Moderate	At Risk	Good
Blackwater (Longwood)_050	R	Moderate	Moderate	Moderate	Moderate	At Risk	Good
Boyne (Boyne_060)	R	Moderate	Good	Good	Good	Not At Risk	Good
Trim IE_EA_G_002	GW	Good	Good	Good	Good	At Risk	Good

R - River waterbody
GW - groundwater
EO - Environmental Objective

The 2019-2024 WFD classification period indicates that the Blackwater (Longwood)_010 river waterbody is currently classified as 'Poor' status and is identified as 'At Risk' of failing to achieve its environmental objective of 'Good' status. This waterbody has consistently remained at Poor status throughout all assessment cycles since 2010-2015.

The Blackwater (Longwood)_020 river waterbody is currently classified as 'Moderate' status and is identified as 'At Risk' of failing to achieve its environmental objective. Following a deterioration to Poor status during the 2016-2021 assessment cycle, the waterbody improved to Moderate status in the current reporting period.

The Blackwater (Longwood)_030 river waterbody is currently classified as 'Moderate' status and is identified as 'At Risk' of failing to achieve its environmental objective. Since being assigned a status classification in the 2013-2018 assessment cycle, the waterbody has consistently remained at Moderate status.

The Blackwater (Longwood)_040 and Blackwater (Longwood)_050 river waterbodies are both currently classified as 'Moderate' status and are identified as 'At Risk' of failing to achieve their environmental objectives. Both waterbodies have maintained Moderate status throughout all assessment cycles since 2010-2015.

The Boyne (Boyne_060) river waterbody is currently classified as 'Good' status and is considered 'Not At Risk' of failing to achieve its environmental objective. The waterbody has maintained ‘Good’ status since the 2013-2018 assessment cycle, representing an improvement from Moderate status during the 2010-2015 period.

The Trim Groundwater Body (IE_EA_G_002) is currently classified as having ‘Good’ Status and has maintained this classification throughout the assessment cycles since 2010-2015. The groundwater body was identified as 'At Risk' of failing to achieve its environmental objectives under the 2016-2021 WFD risk assessment.

All waterbodies assessed have an environmental objective of achieving and maintaining at least 'Good' status under the requirements of the Water Framework Directive.

A breakdown of the ecological status and supporting quality elements for the relevant surface water bodies is presented in Table 3-2.

Table 3-2: Biological and Supporting Physicochemical Quality Elements Breakdown (2019-2024)

WFD element	BW_010	BW_020	BW_030	BW_040	BW_050	Boyne_060
Biological status	Poor	Moderate	—	Moderate	Moderate	Good
Invertebrates	Poor	Moderate	Moderate	Moderate	Moderate	Good
Supporting chemistry conditions	Moderate	Pass	—	Pass	Pass	Pass
General physicochemical conditions	Moderate	Pass	—	Pass	Pass	Pass
Oxygenation conditions	Pass	Pass	—	Pass	Pass	Pass
Acidification conditions	Pass	Pass	—	Pass	Pass	Pass
Nutrient conditions	Moderate	Pass	—	Pass	Pass	Pass
Nitrogen conditions	Moderate	Moderate	—	Moderate	Moderate	Moderate
Phosphorus conditions	Moderate	Good	—	High	High	High

BW_010 - Blackwater (Longwood)_010
BW_020 - Blackwater (Longwood)_020
BW_030 - Blackwater (Longwood)_030
BW_040 - Blackwater (Longwood)_040
BW_050 - Blackwater (Longwood)_050

Biological quality across the Blackwater (Longwood) river waterbodies is generally characterised by Moderate invertebrate conditions, with poorer conditions recorded in Blackwater (Longwood)_010. In contrast, the downstream Boyne_060 waterbody achieves Good biological status.

Supporting physicochemical conditions generally achieve Pass classifications across the assessed waterbodies where data are available. However, some nutrient-related limitations are present, particularly in Blackwater (Longwood)_010, where both nitrogen and phosphorus conditions are classified as Moderate. Moderate nitrogen conditions are also recorded in the remaining assessed waterbodies, notwithstanding their overall Pass classifications for nutrient conditions.

The Blackwater (Longwood)_010 and Blackwater (Longwood)_020 river waterbodies are identified as being subject to significant anthropogenic pressures, with morphological alterations and organic pollution identified as the associated significant issues.

The Blackwater (Longwood)_030 river waterbody is identified as being subject to significant agricultural pressures, with nutrients identified as the associated significant issue. Blackwater (Longwood)_040 is subject to significant anthropogenic and peat-related pressures, with organic pollution and unknown impacts identified as the associated significant issues. Blackwater (Longwood)_050 is subject to significant agricultural and hydromorphological pressures, with morphological alterations, organic pollution and nutrients identified as the associated significant issues.

All five Blackwater (Longwood) river waterbodies are located within the Blackwater (Longwood) Area for Action (AFA_ID 0651), identified under the third WFD cycle as an Area for Restoration, with the Local Authority Waters Programme (LAWPRO) designated as the lead organisation.

No significant pressures or associated issues have been identified for the downstream Boyne_060 river waterbody. This waterbody is located within the Boyne Area for Action (AFA_ID 0654), identified as an Area for Restoration, with Meath County Council designated as the lead organisation.

Ecological surveys undertaken in support of the proposed development identified the presence of invasive non-native species (INNS) within and adjacent to the proposed development site, including Rhododendron (*Rhododendron ponticum*), Cherry Laurel (*Prunus laurocerasus*), Sycamore (Acer pseudoplatanus), Butterfly Bush (*Buddleja davidii*) and Snowberry (*Symphoricarpos albus*). Recorded occurrences were associated with existing and proposed access tracks, woodland habitats and sections of the Turbine Delivery Route (TDR).

The Trim Groundwater Body (IE_EA_G_002) is classified as having 'Good' quantitative and chemical status. The significant pressures identified for this groundwater body include agriculture, anthropogenic pressures and domestic wastewater discharges, with chemical quality diminution, forestry and nutrients identified as associated significant issues.

3.3 WFD Protected Areas

The WFD Register of Protected Areas includes areas designated for the protection of habitats or species where the maintenance or improvement of water status is an important factor in their protection. These include relevant Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) supporting water-dependent habitats and species.

The River Boyne and River Blackwater SAC (Site Code 002299) and River Boyne and River Blackwater SPA (Site Code 004232) are located approximately 10.2 km downstream of the proposed development site. Both designated sites are hydrologically connected to the proposed development via the Blackwater (Longwood) river system. The SAC supports water-dependent qualifying interests, including Alkaline Fens, River Lamprey (*Lampetra fluviatilis*), Atlantic Salmon (*Salmo salar*) and Otter (*Lutra lutra*). The SPA is designated for Kingfisher (*Alcedo atthis*).

Ballynafagh Lake SAC (Site Code 001387) and Ballynafagh Bog SAC (Site Code 000391) are located approximately 9.7 km and 10.6 km from the proposed development site, respectively. No hydrological connectivity has been identified between the proposed development and these designated sites.

The nearest nationally designated site is the Royal Canal proposed Natural Heritage Area (pNHA) (Site Code 002103), located approximately 3.3 km from the proposed development, with no identified hydrological connectivity. Carbury Bog NHA (Site Code 001388) is located approximately 3.8 km from the site, also with no identified hydrological connectivity. Hodgestown Bog NHA (Site Code 001393) is located approximately 8.2 km from the proposed development, upstream within the Blackwater (Longwood)_010 river system. Molerick Bog NHA (Site Code 001582) is located approximately 12.7 km from the proposed development, with no identified hydrological connectivity.

No groundwater-dependent terrestrial ecosystems (GWDTEs) have been identified within or immediately adjacent to the proposed development site.

Aquatic ecological surveys undertaken within the Blackwater (Longwood)_010, Blackwater (Longwood)_020 and Blackwater (Longwood)_030 river waterbodies recorded fish species of conservation importance, including Atlantic Salmon (*Salmo salar*), Brown Trout (*Salmo trutta*) and Brook Lamprey (*Lampetra planeri*). Atlantic Salmon was recorded within Blackwater (Longwood)_030, while Brown Trout was recorded within all three waterbodies. White-clawed Crayfish (*Austropotamobius pallipes*) was also recorded in low numbers within Blackwater (Longwood)_010 and Blackwater (Longwood)_030.

Aquatic habitat quality varied across the surveyed watercourses, with marginal salmonid nursery habitat identified within Blackwater (Longwood)_020 and unsuitable salmonid habitat recorded in several smaller upstream channels. Evidence of Otter (*Lutra lutra*) activity, including spraints, prints and holt features, was also recorded within the river network. No confirmed breeding holts were identified within the proposed development footprint.

The Boyne_060 (IE_EA_07B040900) river waterbody is identified as a Drinking Water Protected Area under the WFD. None of the other identified river waterbodies are designated as Drinking Water Protected Areas.

A Public Water Supply Source Protection Zone (SPZ) associated with the Johnstown Wellfield Public Water Supply (PWS) is located within the northern part of the proposed development site, encompassing the proposed substation area and adjacent infrastructure. The proposed substation is located within the Inner Source Protection Zone.

A further SPZ associated with the Enfield Public Water Supply is located approximately 3.2 km north-east of the proposed development site, within the Blackwater (Longwood)_020 river sub-basin and the Trim Groundwater Body (IE_EA_G_002).

The Boyne_060 river waterbody is also designated as a Salmonid Water. The remaining identified river waterbodies are not designated as Salmonid Waters. No designated shellfish waters, bathing waters or nutrient-sensitive river or lake waterbodies have been identified among the receiving waterbodies considered in this assessment.

4. SCREENING

Screening has been undertaken to identify whether the proposed development has the potential to interact with surface water and groundwater bodies and to determine whether further assessment under the WFD is required.

The screening process is based on the identification of potential Source-Pathway-Receptor linkages, taking into account the nature of the proposed development, the characteristics of the receiving environment and the hydrological and hydrogeological setting of the site.

Potential sources of impact associated with the construction and operational phases of the proposed development have been identified and screened to determine whether a Source-Pathway-Receptor (SPR) linkage to a WFD water body is present.

Potential sources of impact associated with the construction, operational and decommissioning phases of the Proposed Development have been identified based on the proposed activities and infrastructure, as presented in Table 4-1.

Table 4-1: Potential Sources of Impact Associated with the Proposed Development

Ref.	Potential Source	Description of Construction Activities
Construction Phase		
C1	Forestry felling, vegetation clearance and site preparation	Felling of commercial forestry, removal of vegetation and preparation of areas required to facilitate construction of the proposed development.
C2	Turbine foundation and crane hardstanding construction	Excavation and construction of turbine foundations, including piling where required, and construction of associated crane hardstandings.
C3	Access track and site entrance construction	Construction of new access tracks and site entrances, including associated ground preparation, excavation, surfacing and drainage works.
C4	Watercourse crossings and culvert construction	Construction of proposed clear-span bridges, installation of culverts and associated works at existing watercourse and drainage crossings.
C5	Construction drainage infrastructure	Installation and operation of temporary construction drainage infrastructure, including interceptor drains, swales, settlement ponds and associated surface water management systems.
C6	Substation construction	Site preparation, excavation and construction of the proposed 110 kV substation, including associated buildings, electrical infrastructure, culverting of an existing OPW arterial drain and ancillary works.
C7	Underground electrical and communications cable installation	Excavation of cable trenches, installation of underground electrical and communications cables, including grid connection infrastructure, and associated reinstatement works.
C8	Temporary construction compounds and ancillary facilities	Establishment and operation of temporary construction compounds and associated facilities, including material storage, fuel and chemical storage, refuelling areas, waste management and blade set-down areas.
C9	Excavated material and peat management	Handling, temporary stockpiling, transportation (within the development site) and deposition of excavated peat, soil and other

Ref.	Potential Source	Description of Construction Activities
Construction Phase		
		materials, including works associated with the proposed peat deposition area.
C10	Construction traffic and vehicle movements	Movement of construction vehicles, heavy goods vehicles and delivery traffic along public roads, site access routes and internal construction roads, including transportation of turbine components.
C11	Turbine Delivery Route accommodation and road upgrading works	Physical works along the TDR to facilitate turbine component deliveries, including provision of temporary over-run and load-bearing surfaces, modifications to existing road junctions and roundabouts, vegetation trimming and associated road accommodation works.
C12	Recreational amenity trail construction	Provision of the recreational amenity trail along existing forestry tracks and existing or proposed access tracks, including associated track upgrades, surfacing and ancillary works, where required.
Operational Phase		
O1	Operation and maintenance of wind turbines	Operation, inspection, servicing and maintenance of wind turbines and associated equipment, including handling of lubricants, hydraulic fluids and other operational materials.
O2	Operation and maintenance of substation	Operation and maintenance of the 110 kV substation and associated facilities, including transformers, operational storage areas, sanitary facilities and wastewater holding tank.
O3	Permanent access tracks, hardstandings and drainage infrastructure	Presence, operation and maintenance of permanent access tracks, crane hardstandings and surface water drainage infrastructure, including associated runoff collection, conveyance and discharge.
O4	Operation and maintenance of recreational amenity trail	Use and maintenance of the proposed recreational amenity trail and associated infrastructure.
Decommissioning Phase		
D1	Wind turbine dismantling and removal	Disconnection, dismantling and removal of above-ground wind turbine components, including crane operations, component handling and preparation for off-site transportation.
D2	Turbine foundation backfilling and site reinstatement	Backfilling and grading of retained turbine foundations, including associated ground disturbance, soil placement and revegetation of disturbed areas.
D3	On-site turbine cable removal and reinstatement	Removal of electrical and fibre optic cables connecting the wind turbines from existing underground ducts, including localised excavation at cable pulling pits and joint bays, cable extraction and subsequent reinstatement of disturbed surfaces.
D4	Decommissioning traffic and material transportation	Movement of construction vehicles, heavy goods vehicles and associated machinery for the transportation of dismantled turbine components, recovered cables and other decommissioning materials from the site.

The identification of a potential source does not, in itself, establish that an impact on a WFD waterbody could occur. Accordingly, an SPR screening assessment has been undertaken to identify potential pressures associated with each source and determine whether credible hydrological or hydrogeological pathways exist through which these pressures could affect relevant WFD surface water or groundwater bodies. The results of the SPR screening assessment are presented in Table 4-2.

Table 4-2: Screening of Source-Pathway-Receptor Linkages

Source Ref.	Potential Pressure	Pathway	Primary Receptor	Scoped In / Out
Construction Phase				
C1	Sediment mobilisation; altered surface runoff; accidental contaminant releases	Surface runoff through existing drainage features and watercourses; infiltration to groundwater	Blackwater (Longwood)_010; Blackwater (Longwood)_020; Trim GWB	In
C2	Sediment mobilisation; concrete-related contamination; accidental contaminant releases; groundwater disturbance	Surface runoff to drainage features and watercourses; infiltration through exposed subsoils; groundwater interaction within excavations	Blackwater (Longwood)_020; Trim GWB	In
C3	Sediment mobilisation; altered runoff and infiltration; accidental contaminant releases	Surface runoff to existing drainage features and watercourses; infiltration through disturbed ground	Blackwater (Longwood)_020; Blackwater (Longwood)_010; Trim GWB	In
C4	Sediment mobilisation; localised channel disturbance; altered flow conveyance; concrete-related contamination; accidental contaminant releases; potential localised groundwater disturbance	Direct interaction with drainage channels; surface runoff to connected watercourses; infiltration through disturbed ground; potential groundwater interaction within excavations	Blackwater (Longwood)_020; Trim GWB	In
C5	Sediment mobilisation; altered surface water conveyance; potential contaminated discharge	Temporary drainage infrastructure and associated outfalls to existing drains and watercourses; infiltration where applicable	Blackwater (Longwood)_020; Blackwater (Longwood)_010; Trim GWB	In
C6	Sediment mobilisation; concrete-related contamination; accidental contaminant releases; groundwater disturbance; channel modification; altered flow conveyance and drainage connectivity	Surface runoff and drainage connections; infiltration through disturbed soils; groundwater interaction within excavations	Blackwater (Longwood)_020; Trim GWB	In

Source Ref.	Potential Pressure	Pathway	Primary Receptor	Scoped In / Out
Construction Phase				
C7	Sediment mobilisation; accidental contaminant releases; localised groundwater disturbance	Surface runoff from cable trenches; infiltration through disturbed ground; groundwater interaction where excavations intercept groundwater	Blackwater (Longwood)_020; Blackwater (Longwood)_010; Trim GWB	In
C8	Accidental releases of fuels, oils and chemicals; contaminated runoff; wastewater releases	Surface runoff through site drainage; infiltration through soils and subsoils	Blackwater (Longwood)_020; Trim GWB	In
C9	Sediment mobilisation; peat and soil runoff; nutrient release; altered local drainage.	Surface runoff from stockpiles and deposition areas to connected drainage features; infiltration through underlying soils and subsoils	Blackwater (Longwood)_020; Trim GWB	In
C10	Accidental fuel and oil releases; contaminated road runoff; sediment mobilisation	Surface runoff through internal track drainage and public road drainage networks; infiltration where applicable	Blackwater (Longwood)_020; Blackwater (Longwood)_010; Trim GWB	In
C11	Sediment mobilisation; accidental contaminant releases; localised changes to surface runoff	Surface runoff through existing roadside drainage and connected watercourses	Blackwater (Longwood)_020; Blackwater (Longwood)_030; Trim GWB	In
C12	Sediment mobilisation; localised changes to surface runoff; accidental contaminant releases during works associated with the provision of the recreational amenity trail	Surface runoff from disturbed areas and ancillary facility construction to connected drainage features; infiltration where applicable	Blackwater (Longwood)_020; Trim GWB	In
Operational Phase				
O1	Accidental releases of lubricants, hydraulic fluids and transformer oils	Surface runoff from turbine locations through connected drainage features; infiltration through underlying soils and subsoils	Blackwater (Longwood)_020; Trim GWB	In
O2	Accidental releases of transformer oils, fuels and other contaminants; wastewater leakage; contaminated firewater	Substation surface water drainage network; surface runoff; infiltration to groundwater	Blackwater (Longwood)_020; Trim GWB	In

Source Ref.	Potential Pressure	Pathway	Primary Receptor	Scoped In / Out
Construction Phase				
O3	Altered runoff characteristics; changes to infiltration and drainage conveyance; potential deterioration in runoff quality	Permanent access tracks, hardstandings, drainage infrastructure and associated outfalls; infiltration where applicable	Blackwater (Longwood)_020; Blackwater (Longwood)_010; Trim GWB	In
O4	No distinct WFD-relevant pressure identified from routine recreational use and maintenance	No credible pathway identified	Blackwater (Longwood)_020; Trim GWB	Out
Decommissioning Phase				
D1	Accidental releases of fuels, oils and operational fluids; localised sediment mobilisation	Surface runoff from turbine dismantling areas through connected drainage features; infiltration through disturbed ground	Blackwater (Longwood)_020; Trim GWB	In
D2	Sediment mobilisation; localised changes to surface runoff and infiltration	Surface runoff from foundation reinstatement areas to connected drainage features; infiltration through disturbed soils	Blackwater (Longwood)_020; Trim GWB	In
D3	Sediment mobilisation; accidental contaminant releases; localised groundwater disturbance	Surface runoff from cable pulling pits and joint bays; infiltration and groundwater interaction within localised excavations	Blackwater (Longwood)_020; Blackwater (Longwood)_010; Trim GWB	In
D4	Accidental fuel and oil releases; contaminated road runoff	Surface runoff through internal track drainage and public road drainage networks; infiltration where applicable	Blackwater (Longwood)_020; Blackwater (Longwood)_010; Trim GWB	In

The screening assessment demonstrates that potential Source-Pathway-Receptor (SPR) linkages exist between the Proposed Development and the water environment. These linkages arise primarily through surface water runoff, existing and proposed drainage infrastructure, sediment mobilisation during ground disturbance, accidental releases of contaminants, infiltration through disturbed soils and subsoils, and potential groundwater interaction within excavations.

The identified pathways reflect the nature of the Proposed Development, including forestry felling and vegetation clearance; excavation and construction of turbine foundations, access tracks, watercourse crossings and the proposed substation; installation of underground electrical infrastructure; management of excavated peat and soils; temporary construction drainage and compounds; and associated construction traffic and road accommodation works. During operation, potential pathways are associated primarily with accidental contaminant releases, permanent access tracks and hardstandings, substation infrastructure, and the operation and maintenance of surface water drainage systems. Potential interactions during decommissioning arise from turbine dismantling, localised excavation and reinstatement, cable removal and associated vehicle movements.

On this basis, potential interactions with both surface water and groundwater bodies cannot be excluded.

The spatial extent of these potential interactions is defined through the identification of the zone of influence. The zone of influence represents the area within which the Proposed Development could interact with surface water and groundwater bodies during the construction, operational and decommissioning phases.

The majority of the Proposed Development, including all eleven turbines, the proposed substation, temporary construction compounds and most of the proposed access tracks, is located within the Blackwater (Longwood)_020 catchment. A section of proposed access track is located within the Blackwater (Longwood)_010 catchment. Blackwater (Longwood)_030 is also identified as a primary receptor in relation to the proposed Turbine Delivery Route accommodation works, where potential interactions may occur through existing roadside drainage and connected watercourses.

Downstream river waterbodies, including Blackwater (Longwood)_040, Blackwater (Longwood)_050 and the Boyne_060, are included within the wider zone of influence due to hydrological connectivity, where the identified source and pathway could result in the downstream transport of sediment or contaminants.

For groundwater, the zone of influence includes the Trim Groundwater Body (IE_EA_G_002). Potential interactions relate primarily to accidental contaminant releases and infiltration through disturbed or exposed ground, together with potential groundwater interaction associated with excavations for turbine foundations, the substation, underground cables and watercourse crossing infrastructure. Operational pathways may also arise from the handling and storage of potentially contaminating substances and infiltration associated with permanent infrastructure.

On this basis, the following receptors are included within the zone of influence and are carried forward to the scoping stage:

- Blackwater (Longwood)_010 (IE_EA_07B020060)
- Blackwater (Longwood)_020 (IE_EA_07B020100)
- Blackwater (Longwood)_030 (IE_EA_07B020200)
- Blackwater (Longwood)_040 (IE_EA_07B020300)
- Blackwater (Longwood)_050 (IE_EA_07B020600)
- Boyne_060 (IE_EA_07B040900)
- Trim GWB (IE_EA_G_002)

5. SCOPING

5.1 Introduction

Scoping has been undertaken to identify the WFD receptors that may be affected by the proposed development and therefore require detailed assessment. This stage builds on the screening process and considers the potential for interaction between the proposed development and the water environment, taking into account the nature of the identified linkages and the characteristics of the receiving environment.

The scoping assessment has been carried out by testing the potential for each identified source to affect relevant WFD receptors, including surface water and groundwater quality elements and protected areas. This approach enables the identification of receptors that may be subject to impact and distinguishes those that can be excluded from further assessment.

The scoping assessment is presented in the following sections, which assess each source against the relevant WFD receptors and identify whether these receptors are scoped in or out of the subsequent impact assessment.

5.2 Hydromorphology

Hydromorphological quality elements relate to the physical characteristics of surface waterbodies, including channel form, bed and bank structure, hydrological regime and longitudinal connectivity.

The potential for the Proposed Development to affect these quality elements was assessed by considering the sources of potential impacts and associated pathways identified during screening. Sources were scoped in where a credible pathway for hydromorphological alteration was identified and scoped out where no such pathway existed or the potential effects were considered negligible, taking account of the nature, location, scale and duration of the proposed works. The results are presented in Table 5-1.

Table 5-1: WFD Scoping Assessment - Hydromorphological Quality Elements

Source Ref.	Receptor	Scoping Justification	Scoped In / Out
Construction Phase			
C1	BW_010; BW_020	Forestry felling and vegetation clearance may alter interception, runoff generation and flow contributions to receiving watercourses, potentially affecting downstream hydrological conditions.	In
C2	BW_020	Turbine foundation excavation and hardstanding construction may alter infiltration, surface runoff and local drainage patterns, potentially affecting downstream flow conditions.	In
C3	BW_010; BW_020	Access track and site entrance construction may alter ground permeability and runoff generation, potentially affecting the timing and magnitude of flows reaching receiving watercourses.	In
C4	BW_020	Culvert installation may alter channel morphology, flow conveyance and longitudinal connectivity, while associated watercourse crossing works may result in localised changes to bank conditions.	In
C5	BW_010; BW_020	Temporary construction drainage infrastructure may alter runoff collection, flow routing and discharge patterns, potentially affecting downstream hydrological conditions.	In

Source Ref.	Receptor	Scoping Justification	Scoped In / Out
C6	BW_020	Culverting of an existing arterial drain associated with substation construction may alter channel morphology, flow conveyance and drainage connectivity.	In
C7	BW_010; BW_020	Cable trenching may temporarily disturb local drainage and runoff patterns; however, the localised and temporary nature of the works is not expected to materially affect the hydrological regime or morphological conditions of receiving waterbodies.	Out
C8	BW_020	Temporary construction compounds primarily present water quality pressures, with no distinct modification of watercourse morphology, flow conveyance or drainage connectivity anticipated.	Out
C9	BW_020	Excavated material handling, temporary stockpiling and peat deposition may alter local drainage pathways and runoff characteristics, potentially affecting flow routing to receiving watercourses.	In
C10	BW_010; BW_020	Construction traffic primarily presents sediment and contamination pressures, with no direct modification of watercourse morphology, flow regime or hydrological connectivity anticipated.	Out
C11	BW_020; BW_030	Turbine Delivery Route accommodation works are localised, with existing watercourse crossings and drainage arrangements retained. No material changes to channel morphology or flow conveyance are anticipated.	Out
C12	BW_020	Works associated with the provision of the recreational amenity trail are not expected to materially alter watercourse morphology, flow conveyance or drainage connectivity, given the localised nature and limited extent of the works.	Out
Operational Phase			
O1	BW_020	Routine turbine operation and maintenance will not introduce distinct changes to watercourse morphology, flow conveyance or drainage connectivity.	Out
O2	BW_020	Routine substation operation and maintenance will not introduce further changes to channel morphology, flow conveyance or drainage connectivity.	Out
O3	BW_010; BW_020	Permanent access tracks, hardstandings and drainage infrastructure may alter runoff generation, flow routing and drainage connectivity, potentially affecting downstream hydrological conditions.	In
Decommissioning Phase			
D1	BW_020	Turbine dismantling and removal within existing hardstandings will not result in material changes to watercourse morphology, flow conveyance or drainage connectivity.	Out
D2	BW_020	Foundation backfilling and reinstatement may result in localised temporary changes to surface runoff; however, the limited nature and extent of the works are not considered capable of materially affecting the hydrological regime or morphological conditions of receiving waterbodies.	Out

Source Ref.	Receptor	Scoping Justification	Scoped In / Out
D3	BW_010; BW_020	Cable extraction from retained ducts and localised reinstatement are not expected to materially alter watercourse morphology, flow conveyance or drainage connectivity.	Out
D4	BW_010; BW_020	Decommissioning traffic will primarily use existing infrastructure, with no material changes to watercourse morphology, flow conveyance or drainage connectivity anticipated.	Out

BW_010 - Blackwater (Longwood)_010
BW_020 - Blackwater (Longwood)_020
BW_030 - Blackwater (Longwood)_030

The scoping assessment identified potential hydromorphological pressures associated with vegetation clearance, earthworks, access infrastructure, watercourse crossings, drainage modifications and peat and spoil management during construction, as well as permanent infrastructure during operation. These sources have been carried forward for detailed assessment of their potential effects on the hydromorphological quality elements of the receiving waterbodies.

5.3 Biology (Habitats)

The Biology (Habitats) receptor relates to aquatic and riparian habitats supporting the biological quality elements of the receiving WFD surface waterbodies.

The potential for the Proposed Development to affect these habitats was assessed by considering the sources of potential impacts and associated pathways identified during screening. Sources were scoped in where a credible pathway for habitat disturbance or deterioration was identified and scoped out where no such pathway existed or the potential effects were considered negligible, taking account of the nature, location, scale and duration of the proposed works. The results are presented in Table 5-2.

Table 5-2: WFD Scoping Assessment - Biological Quality Elements (Habitats)

Source Ref.	Receptor	Scoping Justification	Scoped In / Out
Construction Phase			
C1	BW_010; BW_020; BW_030; BW_040; BW_050; Boyne_060	Forestry felling and vegetation clearance may mobilise sediment and nutrients through surface runoff, potentially affecting aquatic habitats through increased suspended solids, nutrient inputs and downstream sediment deposition.	In
C2	BW_020; BW_030; BW_040; BW_050; Boyne_060	Turbine foundation excavation, piling where required, and hardstanding construction may generate sediment-laden runoff, concrete-related contamination and accidental pollutant releases, potentially affecting downstream aquatic habitat conditions.	In

Source Ref.	Receptor	Scoping Justification	Scoped In / Out
C3	BW_010; BW_020; BW_030	Access track and site entrance construction, including ground preparation, excavation and surfacing, may mobilise sediment and contaminants into connected watercourses, potentially affecting aquatic habitats through increased suspended solids and sediment deposition.	In
C4	BW_020	Watercourse crossing works, including clear-span bridge construction and culvert installation, may result in localised disturbance of riparian and aquatic habitats, sediment mobilisation and accidental contaminant releases, potentially affecting habitat conditions and connectivity at crossing locations and downstream.	In
C5	BW_010; BW_020; BW_030; BW_040	Installation and operation of temporary construction drainage may convey sediment-laden or contaminated runoff to receiving watercourses, potentially affecting aquatic habitats through increased suspended solids, pollutant inputs and sediment deposition.	In
C6	BW_020; BW_030; BW_040; BW_050; Boyne_060	Substation construction, including culverting of an existing OPW arterial drain, may disturb connected aquatic habitats and generate sediment-laden or contaminated runoff, potentially affecting habitat conditions locally and downstream.	In
C7	BW_010; BW_020; BW_030	Cable trenching and reinstatement may mobilise sediment and contaminants through disturbed ground and connected drainage pathways, potentially affecting aquatic habitats within receiving watercourses.	In
C8	BW_020; BW_030; BW_040; BW_050; Boyne_060	Temporary construction compounds, fuel and chemical storage, refuelling and wastewater management may result in accidental pollutant releases entering connected watercourses, potentially affecting downstream aquatic habitat conditions.	In
C9	BW_020; BW_030; BW_040; BW_050; Boyne_060	Handling, temporary stockpiling and deposition of excavated peat and spoil may generate sediment-laden or nutrient-enriched runoff, potentially affecting aquatic habitats through increased suspended solids, nutrient inputs and downstream sediment deposition.	In
C10	BW_010; BW_020; BW_030	Construction traffic may mobilise sediment and generate contaminated runoff or accidental fuel and oil releases, potentially affecting aquatic habitats through connected road and site drainage networks.	In
C11	BW_020; BW_030; BW_040	Turbine Delivery Route accommodation works, including localised road and verge modifications, may mobilise sediment and contaminants into roadside drainage and connected watercourses, potentially affecting downstream aquatic habitats.	In
C12	BW_020	Works associated with the provision of the recreational amenity trail may result in limited, localised ground disturbance and temporary sediment mobilisation. However, the nature and extent of the works are not considered capable of materially affecting aquatic habitat conditions within receiving WFD waterbodies.	Out

Source Ref.	Receptor	Scoping Justification	Scoped In / Out
Operational Phase			
O1	BW_020; BW_030; BW_040; BW_050; Boyne_060	Turbine operation and maintenance may result in accidental releases of lubricants, hydraulic fluids or other operational substances, potentially affecting aquatic habitats through contaminated runoff entering connected drainage networks.	In
O2	BW_020; BW_030; BW_040; BW_050; Boyne_060	Substation operation may result in accidental transformer oil releases, wastewater leakage or contaminated firewater entering connected drainage systems, potentially affecting downstream aquatic habitat conditions.	In
O3	BW_010; BW_020; BW_030	Permanent access tracks, hardstandings and drainage infrastructure may alter runoff characteristics and convey sediment or pollutants to receiving watercourses, potentially affecting aquatic habitat conditions.	In
Decommissioning Phase			
D1	BW_020; BW_030	Turbine dismantling and removal may mobilise sediment and result in accidental releases of fuels, oils or operational fluids, potentially affecting aquatic habitats through contaminated surface runoff.	In
D2	BW_020	Foundation backfilling, soil placement and reinstatement may generate sediment-laden or nutrient-enriched runoff, potentially affecting aquatic habitats through increased suspended solids, nutrient inputs and downstream sediment deposition.	In
D3	BW_010; BW_020	Cable extraction and localised excavation at pulling pits and joint bays may mobilise sediment or result in accidental pollutant releases, potentially affecting aquatic habitats through connected drainage pathways.	In
D4	BW_010; BW_020; BW_030	Decommissioning traffic and material transportation may generate sediment-laden or contaminated runoff and accidental fuel or oil releases, potentially affecting aquatic habitats within connected watercourses.	In

BW_010 - Blackwater (Longwood)_010
BW_020 - Blackwater (Longwood)_020
BW_030 - Blackwater (Longwood)_030
BW_040 - Blackwater (Longwood)_040
BW_050 - Blackwater (Longwood)_050

The scoping assessment identified potential pressures on aquatic and riparian habitats associated with vegetation clearance, earthworks, watercourse crossings, construction drainage, excavated material management and accidental contaminant releases during construction. During operation, potential effects may arise from accidental pollutant releases and changes in runoff characteristics, while decommissioning activities may result in temporary sediment mobilisation and contaminant releases.

These sources have been carried forward for detailed assessment of their potential effects on aquatic and riparian habitats within the receiving WFD waterbodies.

5.4 Biology (Fish)

The Biology (Fish) receptor relates to fish populations and the environmental conditions supporting them within the receiving WFD surface waterbodies, including habitat quality, water quality and connectivity.

The potential for the Proposed Development to affect this receptor was assessed by considering the sources of potential impacts and associated pathways identified during screening. Sources were scoped in where a credible pathway for effects on fish or their supporting habitats was identified and scoped out where no such pathway existed or the potential effects were considered negligible, taking account of the nature, location, scale and duration of the proposed works. The results are presented in Table 5-3.

Table 5-3: WFD Scoping Assessment - Biological Quality Elements (Fish)

Source Ref.	Receptor	Scoping Justification	Scoped In / Out
Construction Phase			
C1	BW_010; BW_020; BW_030; BW_040; BW_050; Boyne_060	Forestry felling and vegetation clearance may mobilise sediment and nutrients through surface runoff, potentially affecting fish through increased suspended solids, nutrient inputs and sediment deposition within downstream habitats.	In
C2	BW_020; BW_030; BW_040; BW_050; Boyne_060	Turbine foundation excavation, piling where required, and hardstanding construction may generate sediment-laden runoff, concrete-related contamination and accidental pollutant releases, potentially affecting fish through suspended solids, sediment deposition and pollutant exposure.	In
C3	BW_010; BW_020; BW_030	Access track and site entrance construction, including ground preparation, excavation and surfacing, may mobilise sediment and contaminants into connected watercourses, potentially affecting fish through increased suspended solids, sediment deposition and deterioration of habitat conditions.	In
C4	BW_020	Watercourse crossing works, including clear-span bridge construction and culvert installation, may result in localised habitat disturbance, sediment mobilisation and accidental pollutant releases. Culvert works may also affect fish passage and connectivity, while sediment deposition and contamination could affect fish habitat conditions locally and downstream.	In
C5	BW_010; BW_020; BW_030	Installation and operation of temporary construction drainage may convey sediment-laden or contaminated runoff to receiving watercourses, potentially affecting fish through increased suspended solids, sediment deposition and pollutant exposure.	In
C6	BW_020; BW_030; BW_040; BW_050; Boyne_060	Substation construction, including culverting of an existing OPW arterial drain, may generate sediment-laden runoff, concrete-related contamination and accidental pollutant releases. Culverting may also alter local aquatic connectivity, potentially affecting fish and their habitats within connected watercourses.	In

Source Ref.	Receptor	Scoping Justification	Scoped In / Out
C7	BW_010; BW_020; BW_030	Cable trenching and reinstatement may mobilise sediment and contaminants through disturbed ground and connected drainage pathways, potentially affecting fish through increased suspended solids, sediment deposition and pollutant exposure.	In
C8	BW_020; BW_030; BW_040; BW_050; Boyne_060	Temporary construction compounds, fuel and chemical storage, refuelling and wastewater management may result in accidental pollutant releases entering connected watercourses, potentially affecting fish through toxic exposure and deterioration of water quality.	In
C9	BW_020; BW_030; BW_040; BW_050; Boyne_060	Handling, temporary stockpiling and deposition of excavated peat and spoil may generate sediment-laden or nutrient-enriched runoff, potentially affecting fish through increased suspended solids, nutrient inputs and sediment deposition within downstream habitats.	In
C10	BW_010; BW_020; BW_030	Construction traffic may mobilise sediment and generate contaminated runoff or accidental fuel and oil releases, potentially affecting fish through increased suspended solids and pollutant exposure.	In
C11	BW_020; BW_030; BW_040	Turbine Delivery Route accommodation works, including localised road and verge modifications, may mobilise sediment and contaminants into connected watercourses, potentially affecting fish through increased suspended solids, sediment deposition and pollutant exposure.	In
C12	BW_020	Works associated with the provision of the recreational amenity trail may result in limited, localised ground disturbance and temporary sediment mobilisation. However, the nature and extent of the works are not considered capable of materially affecting fish or their habitat conditions within receiving WFD waterbodies.	Out
Operational Phase			
O1	BW_020; BW_030; BW_040; BW_050; Boyne_060	Turbine operation and maintenance may result in accidental releases of lubricants, hydraulic fluids or other operational substances entering connected watercourses, potentially affecting fish through toxic exposure and deterioration of water quality.	In
O2	BW_020; BW_030; BW_040; BW_050; Boyne_060	Substation operation may result in accidental transformer oil releases, wastewater leakage or contaminated firewater entering connected drainage systems, potentially affecting fish through toxic exposure and deterioration of water quality.	In
O3	BW_010; BW_020; BW_030	Permanent access tracks, hardstandings and drainage infrastructure may alter runoff characteristics, flow conditions and pollutant conveyance, potentially affecting fish habitat conditions and water quality within receiving watercourses.	In

Source Ref.	Receptor	Scoping Justification	Scoped In / Out
Decommissioning Phase			
D1	BW_020; BW_030	Turbine dismantling and removal may mobilise sediment and result in accidental releases of fuels, oils or operational fluids, potentially affecting fish through increased suspended solids and toxic exposure.	In
D2	BW_020	Foundation backfilling, soil placement and reinstatement may generate sediment-laden or nutrient-enriched runoff, potentially affecting fish through increased suspended solids, nutrient inputs and sediment deposition within downstream habitats.	In
D3	BW_010; BW_020	Cable extraction and localised excavation at pulling pits and joint bays may mobilise sediment or result in accidental pollutant releases, potentially affecting fish through increased suspended solids and deterioration of water quality.	In
D4	BW_010; BW_020; BW_030	Decommissioning traffic and material transportation may generate sediment-laden or contaminated runoff and accidental fuel or oil releases, potentially affecting fish through increased suspended solids and toxic exposure.	In

BW_010 - Blackwater (Longwood)_010
BW_020 - Blackwater (Longwood)_020
BW_030 - Blackwater (Longwood)_030
BW_040 - Blackwater (Longwood)_040
BW_050 - Blackwater (Longwood)_050

The scoping assessment identified potential pressures on fish associated with sediment and nutrient mobilisation, watercourse crossing works, construction drainage and accidental contaminant releases during construction. During operation, potential effects may arise from accidental pollutant releases and changes in runoff characteristics, while decommissioning activities may result in temporary sediment mobilisation and contaminant releases.

These sources have been carried forward for detailed assessment of their potential effects on fish and the environmental conditions supporting fish populations within the receiving WFD waterbodies.

5.5 Water Quality

The Water Quality receptor relates to the physicochemical and chemical quality elements of receiving surface waterbodies, together with the chemical and quantitative status of the Trim Groundwater Body.

The potential for the Proposed Development to affect these receptors was assessed by considering the sources of potential impacts and associated pathways identified during screening. Sources were scoped in where a credible pathway for deterioration of surface water quality or groundwater status was identified and scoped out where no such pathway existed or the potential effects were considered negligible, taking account of the nature, location, scale and duration of the proposed works. The results are presented in Table 5-4.

Table 5-4: WFD Scoping Assessment - Water Quality (Surface Water) and Groundwater Status

Source Ref.	Receptor	Scoping Justification	Scoped In / Out
Construction Phase			
C1	BW_010; BW_020; BW_030; BW_040; BW_050; Boyne_060; Trim GWB	Forestry felling and vegetation clearance may mobilise sediment and nutrients into connected watercourses. Ground disturbance and accidental contaminant releases may also provide pathways to groundwater.	In
C2	BW_020; BW_030; BW_040; BW_050; Boyne_060; Trim GWB	Turbine foundation excavation, piling and hardstanding construction may generate sediment-laden runoff, concrete-related contamination and accidental pollutant releases. Excavations may also interact with groundwater, potentially affecting groundwater quality and flow conditions.	In
C3	BW_010; BW_020; BW_030; Trim GWB	Access track and site entrance construction may generate sediment-laden or contaminated runoff. Ground disturbance, accidental contaminant releases and changes to infiltration may also affect groundwater quality and local recharge conditions.	In
C4	BW_020; BW_030; BW_040; Trim GWB	Bridge and culvert construction may mobilise sediment and result in concrete-related contamination or accidental pollutant releases. Associated excavations may also interact with shallow groundwater, potentially affecting groundwater quality and flow conditions.	In
C5	BW_010; BW_020; BW_030; BW_040; Trim GWB	Temporary construction drainage may convey sediment-laden or contaminated runoff to connected watercourses. Changes to drainage and infiltration may also affect groundwater recharge and quality.	In
C6	BW_020; BW_030; BW_040; BW_050; Boyne_060; Trim GWB	Substation construction may generate sediment-laden runoff, concrete-related contamination and accidental pollutant releases. Excavations within the Johnstown Public Water Supply Inner Source Protection Zone may also affect groundwater quality and flow conditions.	In
C7	BW_010; BW_020; BW_030; Trim GWB	Cable trenching may mobilise sediment and contaminants into connected watercourses. Excavations and potential preferential groundwater flow pathways may also affect groundwater quality and movement.	In
C8	BW_020; BW_030; BW_040; BW_050; Boyne_060; Trim GWB	Fuel and chemical storage, refuelling, waste management and welfare facilities may result in accidental pollutant releases, potentially affecting surface water and groundwater quality through runoff and infiltration.	In

Source Ref.	Receptor	Scoping Justification	Scoped In / Out
C9	BW_020; BW_030; BW_040; BW_050; Boyne_060; Trim GWB	Peat and spoil handling, stockpiling and deposition may generate sediment-laden or nutrient-enriched runoff. Infiltration of dissolved organic matter, nutrients or other mobilised constituents may also affect groundwater quality.	In
C10	BW_010; BW_020; BW_030; Trim GWB	Construction traffic may generate sediment-laden or contaminated runoff and accidental fuel or oil releases, potentially affecting surface water quality and groundwater quality where contaminants infiltrate to ground.	In
C11	BW_020; BW_030; BW_040; Trim GWB	Turbine Delivery Route accommodation works may mobilise sediment and contaminants into connected drainage systems. Accidental releases to disturbed ground may also provide a pathway to groundwater.	In
C12	BW_020; Trim GWB	Works associated with the provision of the recreational amenity trail may result in limited, localised ground disturbance and sediment mobilisation. However, given the nature and limited extent of the works, potential effects on surface water and groundwater quality are considered negligible.	Out
Operational Phase			
O1	BW_020; BW_030; BW_040; BW_050; Boyne_060; Trim GWB	Turbine operation and maintenance may result in accidental releases of lubricants, hydraulic fluids or other operational substances, potentially affecting surface water and groundwater quality through runoff and infiltration.	In
O2	BW_020; BW_030; BW_040; BW_050; Boyne_060; Trim GWB	Substation operation may result in accidental transformer oil releases, wastewater leakage or contaminated firewater, potentially affecting surface water and groundwater quality through drainage connections and infiltration.	In
O3	BW_010; BW_020; BW_030; Trim GWB	Permanent access tracks, hardstandings and drainage infrastructure may alter runoff characteristics and convey sediment or contaminants to connected watercourses. Changes to infiltration and drainage patterns may also affect groundwater recharge and quality.	In
Decommissioning Phase			
D1	BW_020; BW_030; BW_040; Trim GWB	Turbine dismantling and removal may mobilise sediment and result in accidental fuel, oil or operational-fluid releases, potentially affecting surface water and groundwater quality.	In

Source Ref.	Receptor	Scoping Justification	Scoped In / Out
D2	BW_020; Trim GWB	Foundation backfilling and reinstatement may generate sediment-laden or nutrient-enriched runoff. Ground disturbance and changes to infiltration may also affect localised groundwater quality and recharge conditions.	In
D3	BW_010; BW_020; Trim GWB	Cable extraction and localised excavation may mobilise sediment and contaminants. Excavations may also interact with groundwater, potentially affecting groundwater quality and flow conditions.	In
D4	BW_010; BW_020; BW_030; Trim GWB	Decommissioning traffic may generate contaminated runoff and accidental fuel or oil releases, potentially affecting surface water quality and groundwater quality where contaminants infiltrate to ground.	In

BW_010 - Blackwater (Longwood)_010
BW_020 - Blackwater (Longwood)_020
BW_030 - Blackwater (Longwood)_030
BW_040 - Blackwater (Longwood)_040
BW_050 - Blackwater (Longwood)_050

The scoping assessment identified potential water quality pressures associated with sediment and nutrient mobilisation, concrete-related contamination, accidental pollutant releases, construction drainage and groundwater interaction during construction. During operation, potential effects may arise from accidental contaminant releases, runoff conveyed through permanent drainage infrastructure and changes to infiltration and groundwater recharge conditions, while decommissioning activities may result in temporary sediment mobilisation and accidental pollutant releases.

These sources have been carried forward for detailed assessment of their potential effects on the physicochemical and chemical quality elements of the receiving surface waterbodies and, where potential pathways have been identified, the chemical and quantitative status of the Trim Groundwater Body.

5.6 Protected Areas

The Protected Areas receptor relates to water-dependent areas and uses requiring specific protection under the WFD, including European sites and Drinking Water Protected Areas.

The potential for the Proposed Development to affect these receptors was assessed by considering the sources of potential impacts and associated hydrological and hydrogeological pathways identified during screening. Sources were scoped in where a credible pathway for effects on the protection objectives or supporting environmental conditions of relevant Protected Areas was identified and scoped out where no such pathway existed or the potential effects were considered negligible, taking account of the nature, location, scale and duration of the proposed works. The results are presented in Table 5-5.

Table 5-5: WFD Scoping Assessment - Protected Areas

Source Ref.	Receptor	Scoping Justification	Scoped In / Out
Construction Phase			
C1	SAC; SPA; BDWP; JPWS	Forestry felling and vegetation clearance may mobilise sediment and nutrients into connected watercourses, potentially affecting downstream protected areas. Ground disturbance and accidental contaminant releases may also affect groundwater quality.	In
C2	SAC; SPA; BDWP; JPWS	Turbine foundation excavation, piling and hardstanding construction may generate sediment-laden runoff, concrete-related contamination and accidental pollutant releases affecting downstream protected areas. Excavations may also affect groundwater conditions.	In
C3	JPWS	Access track and site entrance construction may result in ground disturbance and accidental contaminant releases, potentially affecting groundwater quality and recharge conditions.	In
C4	JPWS	Bridge and culvert construction may involve excavations interacting with shallow groundwater, potentially affecting groundwater quality and flow conditions.	In
C5	JPWS	Temporary construction drainage may alter infiltration and groundwater recharge conditions and provide pathways for contaminant migration, potentially affecting groundwater conditions.	In
C6	SAC; SPA; BDWP; JPWS	Substation construction may generate sediment-laden runoff, concrete-related contamination and accidental pollutant releases affecting downstream protected areas. Excavations within the Johnstown Inner Source Protection Zone may also affect groundwater quality and flow conditions.	In
C7	JPWS	Cable trenching and associated excavations may create preferential groundwater flow pathways and result in contaminant migration, potentially affecting groundwater quality and movement.	In
C8	SAC; SPA; BDWP; JPWS	Fuel and chemical storage, refuelling, waste management and welfare facilities may result in accidental pollutant releases, potentially affecting downstream protected areas through connected watercourses and groundwater quality through infiltration.	In
C9	SAC; SPA; BDWP; JPWS	Peat and spoil handling, stockpiling and deposition may generate sediment-laden or nutrient-enriched runoff affecting downstream protected areas. Infiltration of dissolved organic matter, nutrients or other mobilised constituents may also affect groundwater quality.	In
C10	JPWS	Construction traffic may result in accidental fuel or oil releases to ground, potentially affecting groundwater quality.	In
C11	JPWS	Turbine Delivery Route accommodation works may result in ground disturbance and accidental pollutant releases, potentially affecting groundwater quality.	In
C12	JPWS	Works associated with the provision of the recreational amenity trail may result in limited, localised ground disturbance. However, given the nature	Out

Source Ref.	Receptor	Scoping Justification	Scoped In / Out
		and limited extent of the works, potential effects on groundwater quality are considered negligible.	
Operational Phase			
O1	SAC; SPA; BDWP; JPWS	Turbine operation and maintenance may result in accidental releases of lubricants, hydraulic fluids or other operational substances, potentially affecting downstream protected areas and groundwater quality.	In
O2	SAC; SPA; BDWP; JPWS	Substation operation may result in accidental transformer oil releases, wastewater leakage or contaminated firewater, potentially affecting downstream protected areas and groundwater quality.	In
O3	JPWS	Permanent access tracks, hardstandings and drainage infrastructure may alter infiltration and groundwater recharge conditions and provide pathways for contaminant migration, potentially affecting groundwater conditions.	In
Decommissioning Phase			
D1	JPWS	Turbine dismantling and removal may result in accidental fuel, oil or operational-fluid releases, potentially affecting groundwater quality.	In
D2	JPWS	Foundation backfilling and reinstatement may result in ground disturbance and changes to infiltration and groundwater recharge conditions, potentially affecting groundwater conditions.	In
D3	JPWS	Cable extraction and localised excavation may interact with groundwater and provide pathways for contaminant migration, potentially affecting groundwater quality and flow conditions.	In
D4	JPWS	Decommissioning traffic may result in accidental fuel or oil releases to ground, potentially affecting groundwater quality.	In

SAC - River Boyne and River Blackwater SAC (002299)
SPA - River Boyne and River Blackwater SPA (004232)
BDWP - Boyne_060 Drinking Water Protected Area.
JPWS - Johnstown Wellfield Public Water Supply and associated Source Protection Zones

The scoping assessment identified potential pressures on Protected Areas associated with sediment and nutrient mobilisation, concrete-related contamination, accidental pollutant releases, construction drainage and groundwater interaction during construction. During operation, potential effects may arise from accidental contaminant releases and changes to infiltration and groundwater recharge conditions, while decommissioning activities may result in temporary groundwater disturbance and contaminant releases.

These sources have been carried forward for detailed assessment of their potential effects on the protection objectives and supporting environmental conditions of the River Boyne and River Blackwater SAC and SPA, the Boyne_060 Drinking Water Protected Area and Johnstown Public Water Supply.

5.7 Invasive Non-Native Species (INNS)

Invasive Non-Native Species (INNS) have the potential to affect the ecological status of surface waterbodies where activities facilitate their introduction or spread.

The potential for the proposed development to introduce or spread INNS has been assessed by considering the potential sources and associated pathways identified during screening. The results of this assessment are presented in Table 5-6.

Table 5-6: WFD Scoping Assessment - Invasive Non-Native Species

Source Ref.	Receptor	Scoping Justification	Scoped In / Out
Construction Phase			
C1	BW_010; BW_020; BW_030	Forestry felling and vegetation clearance may disturb existing INNS and facilitate the transfer of seeds, plant fragments or contaminated soil through machinery and runoff to connected watercourses.	In
C2	BW_020; BW_030	Turbine foundation excavation and hardstanding construction may facilitate INNS introduction or spread through machinery movements, soil disturbance and imported materials, particularly near recorded infestations.	In
C3	BW_010; BW_020; BW_030	Access track and site entrance construction may disturb recorded INNS populations and facilitate their spread through vegetation clearance, machinery movements and soil handling.	In
C4	BW_020; BW_030; BW_040	Bridge and culvert construction may facilitate the introduction or spread of aquatic and riparian INNS through machinery, equipment and disturbance of watercourse channels and margins.	In
C5	BW_010; BW_020; BW_030; BW_040	Temporary construction drainage may provide pathways for the transport of invasive plant fragments or seeds from disturbed areas into connected watercourses.	In
C6	BW_020; BW_030; BW_040	Substation construction may disturb recorded non-native species within the development footprint and facilitate their spread through vegetation clearance, excavation, machinery and drainage works.	In
C7	BW_010; BW_020; BW_030	Cable trenching and reinstatement may facilitate INNS spread through soil disturbance, excavation, machinery movements and the transfer of potentially contaminated materials.	In
C8	BW_020; BW_030	Construction compounds and associated activities may introduce or transfer INNS through machinery, vehicles and the movement or storage of potentially contaminated materials.	In
C9	BW_020; BW_030; BW_040	Peat and spoil excavation, handling, stockpiling and deposition may facilitate the transfer of invasive plant material or contaminated soil, with potential dispersal to connected watercourses.	In
C10	BW_010; BW_020; BW_030	Construction traffic may transfer invasive plant seeds, fragments or contaminated soil between work areas and potentially facilitate their spread to connected watercourses.	In
C11	BW_030	Turbine Delivery Route accommodation works may disturb recorded INNS, including Cherry Laurel, and facilitate their spread through vegetation clearance, machinery movements and roadside drainage.	In

Source Ref.	Receptor	Scoping Justification	Scoped In / Out
C12	BW_020	Works associated with the provision of the recreational amenity trail may involve limited vegetation disturbance and machinery movements. However, given the nature and limited extent of the works, potential INNS-related effects on receiving waterbodies are considered negligible.	Out
Operational Phase			
O1	BW_020; BW_030	Routine turbine operation and equipment maintenance are not expected to involve substantial vegetation clearance, soil disturbance or movement of potentially infested material. Potential INNS-related effects are considered negligible.	Out
O2	BW_020; BW_030	Routine substation operation and equipment maintenance are not expected to involve substantial vegetation clearance, soil disturbance or movement of potentially infested material. Potential INNS-related effects are considered negligible.	Out
O3	BW_010; BW_020; BW_030	Maintenance of permanent access tracks, hardstandings, drainage infrastructure and adjoining vegetation may disturb or transfer invasive plant material, potentially facilitating its spread to connected watercourses.	In
Decommissioning Phase			
D1	BW_020; BW_030	Turbine dismantling and removal may facilitate INNS introduction or spread through machinery, equipment and material movements between work areas.	In
D2	BW_020	Foundation backfilling and reinstatement may disturb or transfer invasive plant material through soil handling, machinery movements and revegetation activities.	In
D3	BW_010; BW_020	Cable extraction and associated localised excavations may facilitate INNS spread through soil disturbance, machinery and equipment movements.	In
D4	BW_010; BW_020; BW_030	Decommissioning traffic may transfer invasive plant material or contaminated soil between work areas, potentially facilitating its spread to connected watercourses.	In

BW_010 - Blackwater (Longwood)_010
BW_020 - Blackwater (Longwood)_020
BW_030 - Blackwater (Longwood)_030

The scoping assessment identified potential pathways for the introduction and spread of INNS associated with vegetation clearance, ground disturbance, excavation, soil and spoil handling, machinery movements and works within or adjacent to watercourses during construction. These pathways are supported by the recorded presence of invasive and non-native plant species within and adjacent to the Proposed Development.

During operation, potential INNS-related effects are principally associated with maintenance of access tracks, drainage infrastructure and adjoining vegetation. Decommissioning activities may also facilitate the transfer of invasive plant material through machinery movements, soil disturbance and material handling.

The relevant sources have been carried forward for detailed assessment of their potential effects on the biological quality elements and ecological status of the receiving surface waterbodies.

6. IMPACT ASSESSMENT

The impact assessment has been undertaken to evaluate the potential effects of the proposed development on the identified WFD receptors and to determine compliance with the objectives of the WFD.

This assessment builds on the scoping stage and considers the receptors carried forward for detailed assessment, namely surface water quality and groundwater quality and quantity. The assessment focuses on the potential for the proposed development to cause deterioration in the status of any water body and to compromise the achievement of WFD environmental objectives.

The assessment has been carried out by considering the nature of the proposed development, the identified pathways for interaction with the water environment and the characteristics of the receiving water bodies. The construction, operational and decommissioning phases have been considered.

The assessment is undertaken with reference to the key WFD compliance tests, including the requirement to prevent deterioration in water body status and to ensure that the proposed development does not jeopardise the achievement of good status or potential.

6.1 Hydromorphology

The scoping assessment identified potential pathways by which the proposed development could affect the hydromorphological supporting conditions of the receiving waterbodies. These pathways relate to construction activities, including vegetation clearance, earthworks, access infrastructure, watercourse crossings, drainage modifications and peat and spoil management, as well as permanent infrastructure during operation. Potential effects include alterations to local hydraulic conditions, watercourse continuity, channel morphology and surface runoff characteristics.

The potential effects of the sources carried forward from the scoping assessment on the hydromorphological conditions of the receiving waterbodies are assessed in Table 6-1.

Table 6-1: Potential Impacts on Hydromorphology (Pre-Mitigation)

Source Ref	Receptor	Potential Impact	Duration	Magnitude
Construction Phase				
C1	BW_010; BW_020	Forestry felling and vegetation clearance will reduce vegetation interception and evapotranspiration within affected areas, potentially increasing surface runoff and altering the timing of flows entering connected drainage channels. Given the distributed nature of the works and the existing drainage network, changes to the hydrological regime of receiving watercourses are expected to be limited.	Short to long term	Small
C2	BW_020	Turbine foundation excavation and hardstanding construction will locally modify infiltration and surface runoff pathways. These changes may result in limited alterations to runoff contributions to connected drainage channels. Hydraulic modelling confirms that turbines are outside the modelled flood zone and that the proposed development does not materially obstruct flood conveyance in this area.	Short to long term	Small

Source Ref	Receptor	Potential Impact	Duration	Magnitude
C3	BW_010; BW_020	Access track and site entrance construction will introduce compacted and surfaced areas, locally reducing infiltration and modifying runoff pathways. Associated drainage works may alter the timing and distribution of runoff entering existing drainage channels. The effects are expected to be localised, without substantial alteration of receiving watercourse morphology or flow conveyance.	Long term	Small
C4	BW_020	Construction of two new clear-span bridges and replacement of an existing culvert with a bridge will introduce localised changes to hydraulic conditions at the Fear English River crossings. Hydraulic modelling predicts no change in flood levels at Bridge 1 and small changes at Bridges 2 and 3, with a maximum increase of 0.13 m at Bridge 3 during the 0.1% AEP event. The clear-span structures avoid direct modification of the riverbed and maintain channel continuity. Installation of additional drainage culverts may result in localised changes to channel geometry and flow conveyance.	Long term	Small
C5	BW_010; BW_020	Installation and operation of construction drainage infrastructure will locally modify the collection, routing and discharge of surface runoff. Interceptor drains, swales and associated drainage features may concentrate or redirect flows entering existing drainage channels, resulting in temporary changes to local flow conditions.	Short term	Small
C6	BW_020	Culverting of the existing OPW arterial drain associated with substation construction will introduce a permanent modification to the affected drainage channel. The culverted section will have an altered channel form and may experience localised changes in hydraulic conveyance and drainage connectivity.	Long term	Small
C9	BW_020	Excavated peat and soil handling, temporary stockpiling and deposition may modify local ground levels, surface runoff generation and drainage pathways. Temporary stockpiles may redirect runoff during construction, while permanent peat deposition may result in lasting changes to local drainage characteristics. Effects on receiving watercourse flows are expected to be limited and localised.	Short to long term	Small
Operational Phase				
O3	BW_010; BW_020	Permanent access tracks, crane hardstandings and surface water drainage infrastructure will maintain localised changes to infiltration, runoff generation and flow routing. The retained drainage network will continue to convey runoff towards existing drainage channels, with potential changes to the timing and distribution of flows. Substantial alteration of the hydrological regime of receiving waterbodies is not anticipated.	Long term	Small

BW_010 - Blackwater (Longwood)_010
BW_020 - Blackwater (Longwood)_020

The potential impacts identified have been assessed against the environmental objectives of the Water Framework Directive (WFD) to determine whether they could result in deterioration of the hydromorphological quality elements of the affected river waterbodies or compromise the achievement of their environmental objectives. The results of the hydromorphological deterioration assessment are presented in Table 6-2.

Table 6-2: WFD Deterioration Assessment - Hydromorphology (Pre-Mitigation)

Receptor	Pre-Mitigation WFD Assessment
Blackwater (Longwood)_010 (IE_EA_07B020060)	Forestry felling, access infrastructure, construction drainage and permanent development infrastructure may result in localised changes to surface runoff generation, drainage pathways and flow routing. These changes are assessed as small in magnitude and are not expected to materially alter the hydrological regime, channel morphology or longitudinal continuity of the receiving waterbody. Accordingly, deterioration of the hydromorphological conditions supporting ecological status, or compromise of the achievement of the waterbody's WFD environmental objectives, is not anticipated.
Blackwater (Longwood)_020 (IE_EA_07B020100)	Construction activities and permanent infrastructure may result in localised changes to runoff generation, drainage connectivity and hydraulic conditions. The proposed clear-span river bridges will maintain channel continuity and avoid direct modification of the riverbed. Hydraulic modelling identifies localised changes in flood levels, with a maximum predicted increase of approximately 0.13 m at Bridge 3 during the 0.1% AEP event. Culverting of an existing man-made OPW arterial drain at the proposed substation will permanently modify the affected drainage channel. Given the localised nature and small assessed magnitude of these effects, deterioration of hydromorphological conditions at waterbody scale, or compromise of the achievement of the waterbody's WFD environmental objectives, is not anticipated.

The assessment indicates that the proposed development may result in localised changes to surface runoff characteristics, drainage pathways and hydraulic conditions within the receiving catchments. The proposed clear-span bridges will maintain river channel continuity, while the Site-Specific Flood Risk Assessment (SSFRA) identifies only minor, localised changes in modelled flood levels, without a significant increase in downstream flood risk.

Given the limited extent and small magnitude of the identified effects, the proposed development is not predicted to result in deterioration of the hydromorphological conditions supporting ecological status in Blackwater (Longwood)_010 or Blackwater (Longwood)_020, or to compromise the achievement of their WFD environmental objective.

6.2 Biology (Habitats)

The scoping assessment identified potential pathways by which construction, operational and decommissioning activities could affect aquatic and riparian habitats within the receiving watercourses. These pathways are principally associated with sediment mobilisation and deposition, elevated suspended solids, contaminated runoff, accidental pollutant releases and associated changes in water quality and aquatic habitat conditions. Potential effects may arise from vegetation clearance, earthworks, infrastructure and drainage construction, watercourse crossings, material handling and storage, and runoff from permanent infrastructure.

The potential effects of the sources carried forward from the scoping assessment on the Biology (Habitats) receptor are assessed in Table 6-3.

Table 6-3: Potential Impacts on Biology (Habitats) (Pre-Mitigation)

Source Ref.	Receptor	Potential Impact	Duration	Magnitude
Construction Phase				
C1	BW_010; BW_020; BW_030; BW_040; BW_050; Boyne_060	Forestry felling and vegetation clearance may generate sediment-laden and nutrient-enriched runoff, resulting in increased suspended solids, sediment deposition and nutrient inputs to connected watercourses. These changes could reduce aquatic habitat quality, particularly through deposition of fine sediment on channel substrates. Effects are expected to be greatest within receiving watercourses closest to the works and diminish downstream through dilution and sediment settlement.	Short term	Small
C2	BW_020; BW_030; BW_040; BW_050; Boyne_060	Turbine foundation excavation, piling where required, and hardstanding construction may generate sediment-laden runoff, concrete-related contamination and accidental pollutant releases. Increased suspended solids, fine sediment deposition and elevated pH associated with concrete contamination could adversely affect aquatic habitat and substrate conditions. Effects would be most pronounced in watercourses receiving runoff directly, with reduced potential for effects farther downstream.	Short term	Moderate
C3	BW_010; BW_020; BW_030	Access track and site entrance construction may mobilise sediment and contaminants through ground disturbance, excavation and surfacing works. Sediment-laden runoff entering connected watercourses could increase suspended solids and cause localised deposition on aquatic substrates, temporarily reducing habitat quality.	Short term	Small
C4	BW_020	Bridge and culvert construction may disturb riparian vegetation and channel margins and generate sediment-laden or contaminated runoff. Localised sediment deposition and physical disturbance could reduce aquatic habitat quality at crossing locations, while accidental releases of concrete-related materials or other pollutants could adversely affect receiving watercourse conditions. The proposed clear-span bridges will maintain the existing riverbed and channel continuity.	Short term	Moderate
C5	BW_010; BW_020; BW_030; BW_040	Installation and operation of temporary construction drainage infrastructure may convey sediment-laden or contaminated runoff into connected watercourses. Increased suspended solids, sediment deposition and pollutant inputs could temporarily affect aquatic habitat and substrate conditions, particularly within watercourses receiving drainage discharges.	Short term	Small

Source Ref.	Receptor	Potential Impact	Duration	Magnitude
C6	BW_020; BW_030; BW_040; BW_050; Boyne_060	Substation construction, including culverting of the existing OPW arterial drain, may cause localised disturbance of the affected drainage channel and generate sediment-laden or contaminated runoff. Sediment deposition, concrete-related contamination and accidental pollutant releases could adversely affect aquatic habitat conditions within connected watercourses. Physical modification of the arterial drain will also result in a permanent localised change to its channel characteristics.	Short to long term	Moderate
C7	BW_010; BW_020; BW_030	Underground cable trenching and reinstatement may mobilise sediment and contaminants through disturbed ground and connected drainage pathways. Increased suspended solids and sediment deposition could temporarily reduce aquatic habitat quality within receiving watercourses.	Short term	Small
C8	BW_020; BW_030; BW_040; BW_050; Boyne_060	Accidental releases of fuels, oils, chemicals or wastewater from construction compounds, refuelling and material storage areas could enter connected drainage networks and receiving watercourses. Such releases could cause acute contamination of water and sediments, potentially reducing aquatic habitat quality and affecting aquatic communities. The severity and downstream extent would depend on the nature and quantity of the released substance.	Short term / event-based	Moderate
C9	BW_020; BW_030; BW_040; BW_050; Boyne_060	Handling, temporary stockpiling and deposition of excavated peat and spoil may generate sediment-laden or nutrient-enriched runoff. Increased suspended solids, fine sediment deposition and nutrient inputs could alter substrate conditions and reduce aquatic habitat quality within receiving watercourses. Effects are expected to diminish downstream through dilution and sediment settlement.	Short term	Small
C10	BW_010; BW_020; BW_030	Construction traffic and vehicle movements may generate sediment-laden or contaminated runoff and accidental fuel or oil releases. Pollutants entering connected drainage networks could cause localised increases in suspended solids or contamination of receiving watercourses, temporarily affecting aquatic habitat conditions.	Short term / event-based	Small
C11	BW_020; BW_030; BW_040	Turbine Delivery Route accommodation works, including localised road and verge modifications, may mobilise sediment and contaminants into roadside drainage systems connected to receiving watercourses. Increased suspended solids, sediment deposition or accidental pollutant inputs could temporarily reduce aquatic habitat quality locally and downstream.	Short term	Small

Source Ref.	Receptor	Potential Impact	Duration	Magnitude
Operational Phase				
O1	BW_020; BW_030; BW_040; BW_050; Boyne_060	Turbine operation and maintenance may result in accidental releases of lubricants, hydraulic fluids or other operational substances. Contaminated runoff entering connected drainage systems could adversely affect water and sediment quality, potentially causing localised or downstream deterioration of aquatic habitat conditions.	Event-based	Moderate
O2	BW_020; BW_030; BW_040; BW_050; Boyne_060	Substation operation and maintenance may result in accidental transformer oil releases, wastewater leakage or contaminated firewater entering connected drainage systems. Such releases could cause acute contamination of receiving watercourses and sediments, adversely affecting aquatic habitat conditions locally and downstream.	Event-based	Moderate
O3	BW_010; BW_020; BW_030	Runoff from permanent access tracks, hardstandings and drainage infrastructure may convey suspended solids and other pollutants to connected watercourses. Intermittent sediment and pollutant inputs could result in localised changes to aquatic habitat and substrate conditions.	Long term / intermittent	Small
Decommissioning Phase				
D1	BW_020; BW_030	Turbine dismantling and removal may mobilise sediment and result in accidental releases of fuels, oils or operational fluids. Sediment-laden or contaminated runoff entering connected watercourses could temporarily reduce aquatic habitat quality and alter water and sediment conditions.	Short term / event-based	Small
D2	BW_020	Foundation backfilling, soil placement and site reinstatement may generate sediment-laden or nutrient-enriched runoff. Increased suspended solids, nutrient inputs and fine sediment deposition could temporarily reduce aquatic habitat quality and alter substrate conditions within receiving watercourses.	Short term	Small
D3	BW_010; BW_020	Cable extraction and localised excavation at pulling pits and joint bays may mobilise sediment and contaminants through connected drainage pathways. Increased suspended solids, sediment deposition or accidental pollutant releases could temporarily affect aquatic habitat conditions.	Short term	Small

Source Ref.	Receptor	Potential Impact	Duration	Magnitude
D4	BW_010; BW_020; BW_030	Decommissioning traffic and transportation of dismantled infrastructure may generate sediment-laden or contaminated runoff and accidental fuel or oil releases. These could cause temporary increases in suspended solids or pollutant exposure, adversely affecting aquatic habitat conditions within connected watercourses.	Short term / event-based	Small

BW_010 - Blackwater (Longwood)_010
BW_020 - Blackwater (Longwood)_020
BW_030 - Blackwater (Longwood)_030
BW_040 - Blackwater (Longwood)_040
BW_050 - Blackwater (Longwood)_050

The potential impacts identified have been assessed against the environmental objectives of the WFD to determine whether they could result in deterioration of the biological quality elements supported by aquatic habitats within the receiving surface waterbodies or compromise the achievement of their WFD environmental objectives. The results of the Biology (Habitats) deterioration assessment are presented in Table 6-4.

Table 6-4: WFD Deterioration Assessment - Biology (Habitats) (Pre-Mitigation)

Receptor	Pre-Mitigation WFD Assessment
BW_010 - Blackwater (Longwood)_010	Forestry felling, access infrastructure, construction drainage, cable installation and associated decommissioning activities may generate sediment-laden or contaminated runoff, potentially increasing suspended solids, sediment deposition and pollutant exposure within receiving aquatic habitats. Although the identified effects are predominantly small in magnitude and temporary or intermittent, uncontrolled sediment mobilisation or accidental pollutant releases could adversely affect biological quality elements supporting ecological status. Consequently, deterioration of biological quality elements at waterbody scale, or compromise of the achievement of the waterbody's WFD environmental objectives, cannot be excluded at the pre-mitigation stage.
BW_020 - Blackwater (Longwood)_020	Turbine foundation excavation, watercourse crossings, substation construction, drainage works and peat and spoil management may result in sediment mobilisation, nutrient inputs, concrete-related contamination and accidental pollutant releases. Watercourse crossing works and culverting of the existing OPW arterial drain may also cause localised physical disturbance of aquatic habitats. Certain construction and operational impacts are assessed as moderate in magnitude, particularly those involving direct habitat disturbance or potentially consequential pollution events. Without mitigation, deterioration of biological quality elements at waterbody scale, or compromise of the achievement of the waterbody's WFD environmental objectives, cannot be excluded.
BW_030 - Blackwater (Longwood)_030	Sediment-laden runoff, nutrient inputs and accidental pollutant releases associated with construction, operational and decommissioning activities may be conveyed downstream through connected watercourses, potentially affecting aquatic habitat and substrate conditions. Although downstream dilution, dispersion and sediment settlement may reduce sediment-related effects, the magnitude and extent of accidental pollutant releases cannot be reliably determined in the absence of mitigation. Accordingly, deterioration of biological quality elements at waterbody scale, or compromise of the achievement of the waterbody's WFD environmental objectives, cannot be excluded at the pre-mitigation stage.

Receptor	Pre-Mitigation WFD Assessment
BW_040 - Blackwater (Longwood)_040	Sediment mobilisation, nutrient-enriched runoff and accidental pollutant releases from construction drainage, turbine foundation works, substation construction, temporary compounds, peat and spoil management and operational activities may affect downstream aquatic habitat conditions. While sediment-related effects are expected to diminish with downstream transport, potentially harmful pollutants may remain capable of affecting aquatic habitats depending on the nature and magnitude of a release. Consequently, deterioration of biological quality elements at waterbody scale, or compromise of the achievement of the waterbody's WFD environmental objectives, cannot be excluded without mitigation.
BW_050 - Blackwater (Longwood)_050	Potential effects are associated with downstream transport of sediment, nutrients and accidental pollutant releases from forestry felling, turbine foundation construction, substation works, temporary compounds, peat and spoil management and operational activities. The downstream location of the waterbody is expected to reduce the magnitude of sediment-related effects through dilution and settlement. However, the potential consequences of uncontrolled pollutant releases remain uncertain. Therefore, deterioration of biological quality elements at waterbody scale, or compromise of the achievement of the waterbody's WFD environmental objectives, cannot be excluded at the pre-mitigation stage.
Boyne_060	The waterbody represents the most downstream receptor identified in the Biology (Habitats) scoping assessment. Sediment, nutrients and accidental pollutant releases associated with construction and operational activities may be transported through the connected river network. Although substantial attenuation of sediment-related effects is anticipated over the intervening distance, the potential consequences of significant accidental pollutant releases cannot be excluded solely on the basis of downstream separation. Accordingly, deterioration of biological quality elements supporting the waterbody's current Good ecological status, or compromise of the achievement and maintenance of its WFD environmental objectives, cannot be excluded at the pre-mitigation stage.

The assessment identifies potential effects on aquatic and riparian habitats associated with sediment mobilisation, nutrient inputs, accidental pollutant releases and localised physical disturbance during construction, operation and decommissioning. While sediment-related effects are generally expected to be greatest within watercourses closest to the proposed development and diminish downstream, uncontrolled pollutant releases could adversely affect aquatic habitat conditions within connected receiving waterbodies.

In the absence of mitigation, the potential for deterioration of the biological quality elements supporting ecological status, or compromise of the achievement of WFD environmental objectives, cannot be excluded for the six assessed surface waterbodies. The mitigation measures required to prevent or minimise these effects are considered in the subsequent assessment of WFD compliance.

6.3 Biology (Fish)

The scoping assessment identified potential pathways by which construction, operational and decommissioning activities could affect fish populations and the environmental conditions supporting them within the receiving watercourses. These pathways are principally associated with sediment mobilisation, increased suspended solids and turbidity, nutrient inputs, accidental pollutant releases and associated deterioration of water quality and aquatic habitat conditions. Potential effects on fish include disturbance of spawning substrates, reduced habitat suitability and exposure to contaminants, with particular consideration given to salmonid habitats within the Fear English River and downstream connected watercourses.

The potential effects of the sources carried forward from the scoping assessment on the Biology (Fish) receptor are assessed in Table 6-5.

Table 6-5: Potential Impacts on Biology (Fish) (Pre-Mitigation)

Source Ref.	Receptor	Potential Impact	Duration	Magnitude
Construction Phase				
C1	BW_010; BW_020; BW_030; BW_040; BW_050; Boyne_060	Forestry felling and vegetation clearance may mobilise sediment and nutrients into connected watercourses. Increased suspended solids and turbidity could impair fish respiration and feeding, while fine sediment deposition could reduce spawning substrate quality and affect egg and juvenile survival. Effects would be greatest in receiving reaches closest to the works, with sediment-related effects generally diminishing downstream.	Short term	Small
C2	BW_020; BW_030; BW_040; BW_050; Boyne_060	Turbine foundation excavation, piling where required, and hardstanding construction may generate sediment-laden runoff, concrete-related contamination and accidental pollutant releases. Elevated suspended solids and sediment deposition could affect fish respiration, feeding and spawning habitat conditions, while elevated pH or other contaminants could cause physiological stress or toxicity.	Short term	Moderate
C3	BW_010; BW_020; BW_030	Access track and site entrance construction may mobilise sediment and contaminants into connected watercourses. Increased suspended solids and turbidity could temporarily impair fish feeding and respiration, while fine sediment deposition could reduce the suitability of spawning and nursery habitats.	Short term	Small
C4	BW_020	Watercourse crossing works, including clear-span bridge construction and culvert installation, may cause localised disturbance of channel margins and riparian areas, sediment mobilisation and accidental pollutant releases. These effects could impair fish feeding and spawning habitat conditions at crossing locations and within connected downstream reaches. The proposed clear-span bridges will retain the existing riverbed and channel continuity, reducing the potential for direct interference with fish passage.	Short term	Moderate
C5	BW_010; BW_020; BW_030; BW_040	Installation and operation of temporary construction drainage may convey sediment-laden or contaminated runoff to receiving watercourses. Increased suspended solids, turbidity and sediment deposition could impair fish respiration and feeding and reduce spawning substrate quality, while pollutant inputs could cause additional physiological stress.	Short term	Small

Source Ref.	Receptor	Potential Impact	Duration	Magnitude
C6	BW_020; BW_030; BW_040; BW_050; Boyne_060	Substation construction, including culverting of the existing OPW arterial drain, may generate sediment-laden runoff, concrete-related contamination and accidental pollutant releases. Increased suspended solids, sediment deposition and pollutant exposure could adversely affect fish health and spawning habitat conditions within connected watercourses. Culverting may also alter local habitat and movement conditions within the affected drain, where fish are present.	Short to long term	Moderate
C7	BW_010; BW_020; BW_030	Underground cable trenching and reinstatement may mobilise sediment and contaminants through disturbed ground and connected drainage pathways. Increased suspended solids and fine sediment deposition could temporarily impair fish respiration and feeding and reduce spawning habitat suitability within receiving watercourses.	Short term	Small
C8	BW_020; BW_030; BW_040; BW_050; Boyne_060	Accidental releases of fuels, oils, chemicals or wastewater from temporary construction compounds, refuelling and material storage areas could enter connected watercourses. Depending on the nature and quantity of the substance released, exposure could cause physiological stress, impaired fish health or mortality, with potential effects extending downstream.	Short term / event-based	Moderate
C9	BW_020; BW_030; BW_040; BW_050; Boyne_060	Handling, temporary stockpiling and deposition of excavated peat and spoil may generate sediment-laden or nutrient-enriched runoff. Increased suspended solids and turbidity could impair fish respiration and feeding, while fine sediment deposition could reduce spawning substrate quality and egg survival. Nutrient and organic matter inputs could also contribute to reduced dissolved oxygen concentrations.	Short term	Small
C10	BW_010; BW_020; BW_030	Construction traffic may generate sediment-laden or contaminated runoff and accidental fuel or oil releases. Suspended solids and pollutant inputs entering connected drainage networks could temporarily affect fish respiration, feeding and health within receiving watercourses.	Short term / event-based	Small

Source Ref.	Receptor	Potential Impact	Duration	Magnitude
C11	BW_020; BW_030; BW_040	Turbine Delivery Route accommodation works, including localised road and verge modifications, may mobilise sediment and contaminants into roadside drainage systems connected to receiving watercourses. Increased suspended solids and turbidity could temporarily affect fish feeding and respiration, while sediment deposition could reduce spawning habitat quality.	Short term	Small
Operational Phase				
O1	BW_020; BW_030; BW_040; BW_050; Boyne_060	Turbine operation and maintenance may result in accidental releases of lubricants, hydraulic fluids or other operational substances. Pollutants entering connected drainage networks could cause toxic exposure, physiological stress or mortality in fish, depending on the nature and magnitude of the release.	Event-based	Moderate
O2	BW_020; BW_030; BW_040; BW_050; Boyne_060	Substation operation may result in accidental transformer oil releases, wastewater leakage or contaminated firewater entering connected drainage systems. Such releases could cause toxic exposure, deterioration of water quality and associated adverse effects on fish health and survival within receiving watercourses.	Event-based	Moderate
O3	BW_010; BW_020; BW_030	Runoff from permanent access tracks, hardstandings and drainage infrastructure may convey suspended solids and other pollutants to connected watercourses. Intermittent increases in turbidity, sediment deposition or pollutant concentrations could affect fish respiration, feeding and habitat suitability.	Long term / intermittent	Small
Decommissioning Phase				
D1	BW_020; BW_030	Turbine dismantling and removal may mobilise sediment and result in accidental releases of fuels, oils or operational fluids. Increased suspended solids or pollutant exposure could temporarily impair fish feeding and respiration or adversely affect fish health within connected watercourses.	Short term / event-based	Small
D2	BW_020	Foundation backfilling, soil placement and site reinstatement may generate sediment-laden or nutrient-enriched runoff. Increased suspended solids and fine sediment deposition could impair fish respiration and feeding and reduce spawning substrate quality, while nutrient and organic matter inputs could affect dissolved oxygen conditions.	Short term	Small

Source Ref.	Receptor	Potential Impact	Duration	Magnitude
D3	BW_010; BW_020	Cable extraction and localised excavation at pulling pits and joint bays may mobilise sediment and contaminants through connected drainage pathways. Increased suspended solids, sediment deposition or accidental pollutant releases could temporarily affect fish health and spawning habitat conditions within receiving watercourses.	Short term	Small
D4	BW_010; BW_020; BW_030	Decommissioning traffic and transportation of dismantled infrastructure may generate sediment-laden or contaminated runoff and accidental fuel or oil releases. Increased suspended solids and pollutant exposure could temporarily affect fish respiration, feeding and health within connected receiving watercourses.	Short term / event-based	Small

BW_010 - Blackwater (Longwood)_010
BW_020 - Blackwater (Longwood)_020
BW_030 - Blackwater (Longwood)_030
BW_040 - Blackwater (Longwood)_040
BW_050 - Blackwater (Longwood)_050

The potential impacts identified have been assessed against the WFD environmental objectives to determine whether, in the absence of mitigation, they could result in deterioration of the fish biological quality element within the receiving surface waterbodies or compromise the achievement of their WFD environmental objectives. The results of the pre-mitigation deterioration assessment are presented in Table 6-6.

Table 6-6: WFD Deterioration Assessment - Biology (Fish) (Pre-Mitigation)

Receptor	Pre-Mitigation WFD Assessment
BW_010 - Blackwater (Longwood)_010	Forestry felling, access track construction, temporary drainage works, cable installation, construction traffic and associated decommissioning activities may generate sediment-laden or contaminated runoff entering connected watercourses. Increased suspended solids and turbidity could impair fish respiration and feeding, while fine sediment deposition could adversely affect spawning substrates and egg survival where suitable habitat is present. Although the identified impacts are predominantly small in magnitude and temporary or intermittent, uncontrolled sediment mobilisation or accidental pollutant releases could adversely affect fish populations. Consequently, deterioration of the fish biological quality element at waterbody scale, or compromise of the achievement of the waterbody's WFD environmental objectives, cannot be excluded at the pre-mitigation stage.
BW_020 - Blackwater (Longwood)_020	Construction activities, including turbine foundation excavation, watercourse crossing works, substation construction, drainage installation and peat and spoil management, may result in sediment mobilisation, increased turbidity, nutrient inputs, concrete-related contamination and accidental pollutant releases. These effects could impair fish respiration and feeding, reduce spawning habitat quality and affect egg and juvenile survival. Watercourse crossing works and culverting of the existing OPW arterial drain may also cause localised disturbance of aquatic habitats and fish movement conditions, where fish are present. Operational and decommissioning activities introduce further potential for intermittent pollutant inputs.

Receptor	Pre-Mitigation WFD Assessment
	Given the moderate magnitude assigned to certain pre-mitigation impacts and the potential consequences of uncontrolled pollution events, deterioration of the fish biological quality element at waterbody scale, or compromise of the achievement of the waterbody's WFD environmental objectives, cannot be excluded.
BW_030 - Blackwater (Longwood)_030	Sediment-laden runoff, nutrient inputs and accidental pollutant releases associated with construction, operational and decommissioning activities may be conveyed downstream through connected watercourses. Increased suspended solids and sediment deposition could affect fish feeding, respiration and spawning substrate conditions, while contaminant exposure could adversely affect fish health and survival. Although dilution, dispersion and sediment settlement may reduce sediment-related effects with downstream transport, the consequences of significant accidental pollutant releases remain uncertain in the absence of mitigation. Accordingly, deterioration of the fish biological quality element at waterbody scale, or compromise of the achievement of the waterbody's WFD environmental objectives, cannot be excluded at the pre-mitigation stage.
BW_040 - Blackwater (Longwood)_040	Sediment mobilisation, nutrient-enriched runoff and accidental pollutant releases associated with forestry felling, turbine foundation construction, temporary drainage, substation works, peat and spoil management, turbine delivery route accommodation works and operational activities may affect downstream fish populations. Potential effects include impaired respiration and feeding, degradation of spawning substrates and adverse physiological responses to pollutants. While sediment-related effects are expected to diminish with downstream transport, potentially harmful contaminants may remain capable of affecting fish depending on the nature and magnitude of a release. Consequently, deterioration of the fish biological quality element at waterbody scale, or compromise of the achievement of the waterbody's WFD environmental objectives, cannot be excluded without mitigation.
BW_050 - Blackwater (Longwood)_050	Potential impacts are associated with downstream transport of sediment, nutrients and accidental pollutant releases from forestry felling, turbine foundation construction, substation works, temporary construction compounds, peat and spoil management and operational activities. Increased suspended solids and fine sediment deposition could affect fish feeding and spawning habitat conditions, while accidental pollutant releases could cause physiological stress or toxicity. Although downstream dilution and sediment settlement are expected to reduce sediment-related effects, the potential consequences of uncontrolled pollutant releases cannot be reliably excluded. Therefore, deterioration of the fish biological quality element at waterbody scale, or compromise of the achievement of the waterbody's WFD environmental objectives, cannot be excluded at the pre-mitigation stage.
Boyne_060	Boyne_060 is the most downstream receptor identified in the Biology (Fish) scoping assessment. Potential effects are associated with the downstream transport of sediment, nutrients and accidental pollutants from construction and operational activities. Increased suspended solids and sediment deposition could affect fish habitat conditions where sufficient concentrations reach the waterbody, while significant accidental pollutant releases could adversely affect fish health and survival. Although sediment-related effects are expected to be substantially attenuated along the intervening watercourse network, downstream separation alone does not establish that the consequences of uncontrolled pollutant releases would be negligible. Accordingly, deterioration of the fish biological quality element supporting the waterbody's current Good ecological status, or compromise of the achievement and maintenance of its WFD environmental objectives, cannot be excluded at the pre-mitigation stage.

The assessment identifies potential effects on fish populations associated with sediment mobilisation, increased suspended solids and turbidity, nutrient inputs, accidental pollutant releases and localised disturbance of aquatic habitats. These effects could impair fish respiration and feeding, affect spawning substrate conditions and egg survival, or result in physiological stress and toxicity, depending on the nature, magnitude and duration of exposure.

Although sediment-related effects are generally expected to diminish with downstream transport, the potential consequences of uncontrolled pollutant releases and localised habitat disturbance remain uncertain. In the absence of mitigation, deterioration of the fish biological quality element, or compromise of the achievement of WFD environmental objectives, cannot be excluded for the six assessed surface waterbodies. The effectiveness of the proposed mitigation measures in addressing these pathways will inform the subsequent determination of WFD compliance.

6.4 Water Quality

6.4.1 Surface Water Quality

The scoping assessment identified potential pathways by which construction, operational and decommissioning activities could affect surface water quality within receiving waterbodies. These pathways are principally associated with sediment mobilisation, increased suspended solids and turbidity, nutrient inputs, changes in dissolved oxygen and pH, and accidental releases of fuels, oils, concrete-related substances and other contaminants. Such effects could alter the physicochemical conditions supporting ecological status and, depending on the substances released, potentially affect chemical status.

The potential effects of the sources carried forward from the scoping assessment on surface water quality are assessed in Table 6-7.

Table 6-7: Potential Impacts on Surface Water Quality (Pre-Mitigation)

Source Ref.	Receptor	Potential Impact	Duration	Magnitude
Construction Phase				
C1	BW_010; BW_020; BW_030; BW_040; BW_050; Boyne_060	Forestry felling, vegetation clearance and site preparation may mobilise sediment and nutrients through surface runoff and connected drainage networks. Increased suspended solids and turbidity, together with nutrient inputs from disturbed soils and peat, could temporarily alter water clarity, nutrient concentrations and associated physicochemical conditions. Sediment-related effects would generally be greatest within receiving reaches closest to the works and diminish downstream.	Short term	Small
C2	BW_020; BW_030; BW_040; BW_050; Boyne_060	Turbine foundation excavation, piling where required, and crane hardstanding construction may generate sediment-laden runoff, excavation water and concrete-related contamination. Discharges could increase suspended solids and turbidity or alter pH, while accidental releases of fuels, oils or other substances could adversely affect physicochemical conditions and, depending on the substances involved, chemical status.	Short term / event-based	Moderate

Source Ref.	Receptor	Potential Impact	Duration	Magnitude
C3	BW_010; BW_020; BW_030	Access track and site entrance construction may mobilise sediment and contaminants from disturbed ground and exposed surfaces. Runoff entering connected watercourses could increase suspended solids and turbidity and introduce hydrocarbons or other pollutants, causing temporary deterioration of local water quality conditions.	Short term	Small
C4	BW_020; BW_030; BW_040	Bridge and culvert construction may mobilise sediment through ground disturbance and works adjacent to drainage channels and watercourses. Runoff, concrete-related contamination or accidental pollutant releases could increase suspended solids and turbidity, alter pH and adversely affect physicochemical or chemical conditions within receiving waters. Effects would be greatest near crossing locations, with potential downstream transport through connected watercourses.	Short term / event-based	Moderate
C5	BW_010; BW_020; BW_030; BW_040	Installation and operation of temporary construction drainage infrastructure may mobilise or convey sediment-laden and contaminated runoff to receiving watercourses. Potential effects include increased suspended solids and turbidity, sediment transport and changes in pollutant concentrations within connected surface waters.	Short term	Small
C6	BW_020; BW_030; BW_040; BW_050; Boyne_060	Substation construction, including excavation, concrete works and culverting of the existing OPW arterial drain, may generate sediment-laden runoff and accidental pollutant releases. These could increase suspended solids and turbidity, alter pH or introduce hydrocarbons and other contaminants into connected watercourses. Water quality effects would be greatest near the works, with potential downstream transport of pollutants.	Short term / event-based	Moderate
C7	BW_010; BW_020; BW_030	Underground cable trenching, installation and reinstatement may mobilise sediment and contaminants through disturbed ground and connected drainage pathways. Runoff from excavations could temporarily increase suspended solids and turbidity or introduce pollutants into receiving surface waters.	Short term	Small
C8	BW_020; BW_030; BW_040; BW_050; Boyne_060	Temporary construction compounds, fuel and chemical storage, refuelling, wastewater management and associated activities may result in accidental pollutant releases. Contaminated runoff entering connected watercourses could alter pH, oxygenation conditions or other physicochemical characteristics and, where relevant substances are present, affect chemical status. The magnitude and downstream extent would depend on the nature and quantity of the release.	Short term / event-based	Moderate

Source Ref.	Receptor	Potential Impact	Duration	Magnitude
C9	BW_020; BW_030; BW_040; BW_050; Boyne_060	Excavated peat and spoil handling, temporary stockpiling and deposition may generate sediment-laden or nutrient-enriched runoff. Increased suspended solids, turbidity and nutrient concentrations could affect physicochemical conditions, while mobilisation of organic matter may contribute to increased oxygen demand and reduced dissolved oxygen concentrations. Sediment-related effects would generally diminish with downstream transport.	Short term	Small
C10	BW_010; BW_020; BW_030	Construction traffic and vehicle movements may generate sediment-laden road runoff or accidental fuel and oil releases. Pollutants conveyed through internal track drainage and roadside drainage networks could temporarily increase suspended solids or introduce hydrocarbons and other contaminants into receiving watercourses.	Short term / event-based	Small
C11	BW_020; BW_030; BW_040	Turbine Delivery Route accommodation works may mobilise sediment and contaminants from disturbed road surfaces, verges and drainage features. Runoff entering connected watercourses could temporarily increase suspended solids and turbidity or introduce hydrocarbons and other pollutants.	Short term	Small
Operational Phase				
O1	BW_020; BW_030; BW_040; BW_050; Boyne_060	Turbine operation and maintenance may result in accidental releases of lubricants, hydraulic fluids or other operational substances. Pollutants conveyed through connected drainage networks could adversely affect physicochemical conditions and, depending on the substances and concentrations involved, chemical status. Significant uncontrolled releases could affect downstream water quality.	Event-based	Moderate
O2	BW_020; BW_030; BW_040; BW_050; Boyne_060	Substation operation and maintenance may result in accidental transformer oil releases, wastewater leakage or contaminated firewater entering connected drainage systems. Such releases could introduce hydrocarbons, organic matter or other contaminants, potentially affecting dissolved oxygen, other physicochemical conditions and, where relevant, chemical status within receiving surface waterbodies.	Event-based	Moderate
O3	BW_010; BW_020; BW_030	Runoff from permanent access tracks, hardstandings and drainage infrastructure may intermittently convey suspended solids and other pollutants into receiving watercourses. Potential effects include localised increases in turbidity, sediment transport and pollutant concentrations, with associated changes in physicochemical water quality conditions.	Long term / intermittent	Small

Source Ref.	Receptor	Potential Impact	Duration	Magnitude
Decommissioning Phase				
D1	BW_020; BW_030; BW_040	Turbine dismantling and removal may mobilise sediment and result in accidental releases of fuels, oils or operational fluids. Runoff entering connected drainage networks could increase suspended solids and turbidity or introduce contaminants, temporarily affecting physicochemical conditions and potentially chemical status, depending on the substances released.	Short term / event-based	Small
D2	BW_020	Turbine foundation backfilling, soil placement and reinstatement may generate sediment-laden or nutrient-enriched runoff. Increased suspended solids, turbidity and nutrient concentrations could temporarily affect physicochemical conditions within connected receiving waters, while mobilisation of organic matter may increase oxygen demand.	Short term	Small
D3	BW_010; BW_020	Cable extraction and localised excavation at pulling pits and joint bays may mobilise sediment or result in accidental pollutant releases. Runoff through connected drainage pathways could temporarily increase suspended solids and turbidity or introduce contaminants into receiving watercourses.	Short term	Small
D4	BW_010; BW_020; BW_030	Decommissioning traffic and transportation of dismantled infrastructure may generate contaminated road runoff and accidental fuel or oil releases. Pollutants entering roadside drainage and connected watercourses could temporarily increase suspended solids or introduce hydrocarbons and other contaminants, affecting local water quality conditions.	Short term / event-based	Small

BW_010 - Blackwater (Longwood)_010
BW_020 - Blackwater (Longwood)_020
BW_030 - Blackwater (Longwood)_030
BW_040 - Blackwater (Longwood)_040
BW_050 - Blackwater (Longwood)_050

The potential impacts identified have been assessed against the WFD environmental objectives to determine whether, in the absence of mitigation, they could result in deterioration of the physicochemical conditions supporting ecological status or chemical status of the receiving surface waterbodies, or compromise the achievement of their WFD environmental objectives. The results of the pre-mitigation surface water quality deterioration assessment are presented in Table 6-8.

Table 6-8: WFD Deterioration Assessment - Surface Water Bodies (Pre-Mitigation)

Receptor	Pre-Mitigation WFD Assessment
BW_010 - Blackwater (Longwood)_010	Forestry felling, access track construction, temporary drainage works, cable installation, construction traffic and associated decommissioning activities may generate sediment-laden, nutrient-enriched or contaminated runoff entering connected watercourses. These inputs could increase suspended solids and turbidity, alter nutrient concentrations and, depending on the nature of any pollutant release, adversely affect oxygenation or other physicochemical conditions. Although the identified impacts are predominantly small in magnitude and temporary or intermittent, uncontrolled sediment mobilisation and accidental pollutant releases could affect the physicochemical conditions supporting ecological status. Where relevant substances are released, effects on chemical status may also arise. Consequently, deterioration of the relevant WFD quality elements, or compromise of the achievement of the waterbody's environmental objectives, cannot be excluded at the pre-mitigation stage.
BW_020 - Blackwater (Longwood)_020	Construction activities, including turbine foundation excavation, watercourse crossing works, substation construction, drainage installation and peat and spoil management, may result in sediment mobilisation, nutrient inputs, concrete-related contamination and accidental pollutant releases. These could increase suspended solids and turbidity, alter nutrient concentrations, pH and dissolved oxygen conditions, or introduce contaminants into receiving waters. Operational and decommissioning activities introduce further potential for intermittent pollutant inputs, including hydrocarbons and contaminated runoff. Certain construction and operational impacts are assessed as moderate in magnitude, particularly those associated with concrete-related contamination and accidental pollution events. In the absence of mitigation, deterioration of the physicochemical supporting quality elements or, where relevant, chemical status, or compromise of the achievement of the waterbody's WFD environmental objectives, cannot be excluded.
BW_030 - Blackwater (Longwood)_030	Sediment-laden runoff, nutrient inputs, concrete-related contamination and accidental pollutant releases associated with construction, operational and decommissioning activities may be conveyed downstream through connected watercourses. These inputs could affect suspended solids, turbidity, nutrient concentrations, pH and dissolved oxygen conditions, with potential implications for the physicochemical supporting quality elements. Accidental releases of relevant pollutants could also affect chemical status. Although sediment settlement, dilution and dispersion may reduce some downstream effects, the consequences of significant uncontrolled pollutant releases remain uncertain. Accordingly, deterioration of the relevant WFD quality elements, or compromise of the achievement of the waterbody's environmental objectives, cannot be excluded at the pre-mitigation stage.
BW_040 - Blackwater (Longwood)_040	Sediment mobilisation, nutrient-enriched runoff, concrete-related contamination and accidental pollutant releases associated with forestry felling, turbine foundation construction, watercourse crossing works, temporary drainage, substation construction, peat and spoil management, turbine delivery route accommodation works and operational activities may affect downstream water quality. Potential effects include increased suspended solids and turbidity, changes in nutrient concentrations, pH and oxygenation conditions, and the introduction of contaminants. While sediment-related effects are expected to diminish with downstream transport, the consequences of uncontrolled releases of dissolved or persistent pollutants cannot be reliably excluded. Therefore, deterioration of the physicochemical supporting quality elements or, where relevant, chemical status, or compromise of the achievement of the waterbody's WFD environmental objectives, cannot be excluded without mitigation.

Receptor	Pre-Mitigation WFD Assessment
BW_050 - Blackwater (Longwood)_050	Potential impacts are associated with downstream transport of sediment, nutrients and accidental pollutant releases from forestry felling, turbine foundation construction, substation works, temporary construction compounds, peat and spoil management and operational activities. Such inputs could affect suspended solids, turbidity, nutrient concentrations and other physicochemical conditions within the receiving waterbody. Depending on the substances involved, significant accidental pollutant releases could also affect chemical status. Although downstream dilution and sediment settlement are expected to reduce sediment-related effects, these processes do not necessarily eliminate the potential consequences of dissolved or persistent contaminants. Consequently, deterioration of the relevant WFD quality elements, or compromise of the achievement of the waterbody's environmental objectives, cannot be excluded at the pre-mitigation stage.
Boyne_060	Boyne_060 is the most downstream receptor identified in the surface water quality scoping assessment. Potential effects are associated with the downstream transport of sediment, nutrients and accidental pollutants from construction and operational activities. Although sediment-related effects are expected to be attenuated along the intervening watercourse network, significant uncontrolled pollutant releases could potentially affect physicochemical conditions or, where relevant substances are involved, chemical status. The magnitude and consequences of such releases cannot be reliably excluded solely on the basis of downstream separation. Accordingly, deterioration of the relevant WFD quality elements supporting the waterbody's current Good ecological status, deterioration of chemical status where applicable, or compromise of the achievement and maintenance of its WFD environmental objectives, cannot be excluded at the pre-mitigation stage.

The assessment identifies potential effects on surface water quality associated with sediment mobilisation, nutrient inputs, concrete-related contamination and accidental pollutant releases during construction, operation and decommissioning. These effects could alter physicochemical conditions supporting ecological status, including nutrient concentrations, oxygenation and pH, or potentially affect chemical status where relevant substances are released.

Although sediment-related effects are generally expected to diminish with downstream transport, the potential consequences of uncontrolled pollutant releases remain uncertain. In the absence of mitigation, deterioration of the relevant WFD quality elements, or compromise of the achievement of WFD environmental objectives, cannot be excluded for the six assessed surface waterbodies. The effectiveness of the proposed mitigation measures in addressing these pathways will inform the subsequent determination of WFD compliance.

6.4.2 Groundwater Quality and Quantity

The scoping assessment identified potential pathways by which construction, operational and decommissioning activities could affect the chemical and quantitative status of the Trim Groundwater Body (IE_EA_G_002). These pathways are principally associated with the infiltration of contaminants following accidental releases of fuels, oils, chemicals, wastewater and concrete-related substances, together with potential localised changes in groundwater levels and flow associated with excavation and temporary dewatering activities. Particular consideration is given to the Johnstown Wellfield Public Water Supply Source Protection Zone (SPZ), within which part of the proposed development is located. Such effects could affect groundwater chemical status, while impacts on quantitative status are expected to be limited given that no groundwater abstraction is proposed.

The potential effects of the sources carried forward from the scoping assessment on groundwater quality and quantity are assessed in Table 6-9.

Table 6-9: Potential Impacts on Groundwater Quality and Quantity (Pre-Mitigation)

Source Ref.	Receptor	Potential Impact	Duration	Magnitude
Construction Phase				
C1	Trim GWB	Forestry felling, vegetation clearance and associated ground disturbance may expose soils and create pathways for the infiltration of contaminants following accidental releases. Mobilisation of dissolved nutrients and organic constituents may also affect shallow groundwater quality locally.	Short term	Small
C2	Trim GWB	Turbine foundation excavation, piling where required, and hardstanding construction may interact with shallow groundwater and temporarily alter local groundwater levels or flow. Excavations could facilitate the migration of fuels, oils, concrete-related substances or other contaminants into groundwater, potentially affecting chemical quality.	Short term / event-based	Moderate
C3	Trim GWB	Access track and site entrance construction may disturb soils and alter local infiltration and recharge characteristics. Accidental releases of fuels, oils or other contaminants onto exposed ground could infiltrate and affect shallow groundwater quality.	Short term	Small
C4	Trim GWB	Bridge and culvert construction may involve excavations interacting with shallow groundwater, potentially causing localised changes in groundwater levels or flow. Accidental releases of concrete-related substances, fuels or oils could infiltrate through disturbed ground and affect groundwater chemical quality.	Short term / event-based	Small
C5	Trim GWB	Installation and operation of temporary construction drainage may alter local infiltration and recharge patterns and, where groundwater is intercepted, affect shallow groundwater levels. Contaminated runoff entering exposed ground or drainage excavations could also affect groundwater quality.	Short term	Small
C6	Trim GWB	Substation construction, including excavation, concrete works and culverting of the existing OPW arterial drain, may disturb ground and interact with shallow groundwater. Excavations and accidental releases could facilitate contaminant migration, while temporary groundwater interception could affect local flow conditions. Particular sensitivity arises from the substation's location within the Johnstown Wellfield Public Water Supply Source Protection Zone.	Short term / event-based	Moderate

Source Ref.	Receptor	Potential Impact	Duration	Magnitude
C7	Trim GWB	Underground cable trenching and associated excavations may temporarily intercept shallow groundwater or create preferential pathways for groundwater movement. Accidental contaminant releases to exposed ground could affect groundwater quality, while localised changes in groundwater flow may occur during excavation and reinstatement.	Short term	Small
C8	Trim GWB	Fuel and chemical storage, refuelling, waste management and welfare facilities within temporary construction compounds may result in accidental releases of hydrocarbons, chemicals or wastewater. Infiltration through soils or disturbed ground could contaminate shallow groundwater, with the severity depending on the nature and quantity of the substance released and the underlying hydrogeological conditions.	Event-based	Moderate
C9	Trim GWB	Excavated peat and spoil handling, temporary stockpiling and deposition may mobilise dissolved organic matter, nutrients and other constituents that could infiltrate into shallow groundwater. Ground disturbance and material deposition may also alter local infiltration and recharge characteristics.	Short term	Small
C10	Trim GWB	Construction traffic may result in accidental fuel or oil releases onto exposed or permeable ground. Infiltration of hydrocarbons or other contaminants could affect groundwater quality locally.	Short term / event-based	Small
C11	Trim GWB	Turbine Delivery Route accommodation works may involve localised ground disturbance and accidental pollutant releases. Contaminants deposited onto disturbed or permeable ground could infiltrate and affect shallow groundwater quality.	Short term / event-based	Small
Operational Phase				
O1	Trim GWB	Turbine operation and maintenance may result in accidental releases of lubricants, hydraulic fluids or other operational substances. Where contaminants reach permeable ground, infiltration could affect groundwater chemical quality locally.	Event-based	Moderate
O2	Trim GWB	Substation operation may result in accidental transformer oil releases, wastewater leakage or contaminated firewater. Infiltration of these substances could affect groundwater chemical quality, with particular sensitivity associated with the Johnstown Wellfield Public Water Supply Source Protection Zone.	Event-based	Moderate

Source Ref.	Receptor	Potential Impact	Duration	Magnitude
O3	Trim GWB	Permanent access tracks, hardstandings and drainage infrastructure may alter local infiltration and recharge patterns over the operational lifetime. Runoff containing hydrocarbons or other pollutants could also infiltrate through adjoining ground, potentially affecting groundwater quality. Material changes to groundwater quantity at groundwater body scale are not anticipated from these localised alterations.	Long term / intermittent	Small
Decommissioning Phase				
D1	Trim GWB	Turbine dismantling and removal may result in accidental releases of fuels, oils or operational fluids onto exposed or permeable ground. Subsequent infiltration could affect groundwater chemical quality locally.	Short term / event-based	Small
D2	Trim GWB	Foundation backfilling, soil placement and reinstatement may disturb soils and temporarily alter infiltration and recharge characteristics. Dissolved nutrients, organic constituents or contaminants mobilised during ground disturbance could infiltrate and affect shallow groundwater quality.	Short term	Small
D3	Trim GWB	Cable extraction and localised excavation may temporarily interact with shallow groundwater or create preferential flow pathways. Accidental pollutant releases or mobilisation of contaminants within excavated ground could affect groundwater quality, while temporary changes in local groundwater flow may occur.	Short term	Small
D4	Trim GWB	Decommissioning traffic and transportation activities may result in accidental fuel or oil releases onto exposed or permeable ground. Infiltration of hydrocarbons or other contaminants could affect groundwater chemical quality locally.	Short term / event-based	Small

The identified potential impacts relate principally to groundwater chemical quality, including the potential infiltration of contaminants following accidental pollutant releases. Although excavation, temporary groundwater interception and changes in infiltration may result in localised effects on groundwater levels and flow, these are not expected to materially affect the quantitative status of the Trim Groundwater Body (IE_EA_G_002), given the absence of permanent groundwater abstraction or significant groundwater drainage.

The potential impacts identified have been assessed against the WFD environmental objectives to determine whether, in the absence of mitigation, they could result in deterioration of the chemical or quantitative status of the Trim Groundwater Body or compromise the achievement of its WFD environmental objectives. Particular consideration is given to the Johnstown Wellfield Public Water Supply Source Protection Zone, which overlaps with the proposed development infrastructure. The results of the pre-mitigation groundwater deterioration assessment are presented in Table 6-10.

Table 6-10: WFD Deterioration Assessment - Groundwater Bodies (Pre-Mitigation)

Groundwater Body	Pre-Mitigation WFD Assessment
Chemical Status	
Trim Groundwater Body (IE_EA_G_002)	Construction, operational and decommissioning activities present potential pathways for contaminant infiltration, principally associated with accidental releases of fuels, oils, chemicals, wastewater and concrete-related substances. Excavations and disturbed ground may facilitate contaminant migration into groundwater. Particular sensitivity arises where development infrastructure is located within the Johnstown Wellfield Public Water Supply Source Protection Zone. Although potential impacts are generally expected to be localised, adverse effects on groundwater chemical quality cannot be excluded in the absence of mitigation. The extent to which contamination could affect groundwater body chemical status would depend on the nature, concentration, spatial extent and persistence of pollutants, including their implications for applicable groundwater chemical status criteria and drinking water protection objectives. Consequently, the potential for deterioration of chemical status or compromise of the relevant WFD environmental objectives cannot be excluded in the absence of mitigation.
Quantitative Status	
Trim Groundwater Body (IE_EA_G_002)	Excavation, temporary groundwater interception and changes in infiltration or drainage patterns may result in localised and temporary changes in groundwater levels and flow. However, no permanent groundwater abstraction or significant groundwater drainage is proposed. The identified effects are not expected to materially alter groundwater recharge, groundwater resource availability or groundwater-dependent conditions at groundwater body scale. Consequently, deterioration of quantitative status or compromise of the associated WFD environmental objectives is not anticipated, even in the absence of mitigation.

The assessment identifies potential effects on groundwater quality associated with contaminant infiltration and migration following accidental releases of fuels, oils, chemicals, wastewater and concrete-related substances during construction, operation and decommissioning. These effects could adversely affect groundwater chemical quality, particularly where development infrastructure overlaps the Johnstown Wellfield Public Water Supply Source Protection Zone. Excavation, temporary groundwater interception and changes in infiltration may also result in localised effects on groundwater levels and flow.

Although effects on groundwater levels, flow and recharge are expected to be localised and temporary, with deterioration of quantitative status not anticipated, the potential consequences of uncontrolled pollutant releases remain uncertain. In the absence of mitigation, deterioration of groundwater chemical status, or compromise of the associated WFD environmental objectives, cannot be excluded for the Trim Groundwater Body (IE_EA_G_002). The effectiveness of the proposed mitigation measures in addressing these pathways will inform the subsequent determination of WFD compliance.

6.5 Protected Areas

The scoping assessment identified potential pathways by which construction, operational and decommissioning activities could affect the environmental objectives and protection requirements of WFD Protected Areas associated with the receiving surface water and groundwater environment. The relevant Protected Areas comprise the River Boyne and River Blackwater SAC (002299), the River Boyne and River Blackwater SPA (004232), the Boyne_060 (IE_EA_07B040900) Drinking Water Protected Area and the Johnstown Wellfield Public Water Supply Source Protection Zone (SPZ). These pathways are principally associated with sediment mobilisation, increased suspended solids and turbidity, nutrient inputs, accidental releases of fuels, oils, chemicals, wastewater and concrete-related substances, and changes to drainage and groundwater conditions. Such effects could adversely affect water quality, aquatic habitats and groundwater conditions relevant to the conservation objectives and drinking water protection requirements of the identified Protected Areas.

The potential effects of the sources carried forward from the scoping assessment on WFD Protected Areas are assessed in Table 6-11.

Table 6-11: Potential Impacts on Protected Areas (Pre-Mitigation)

Source Ref.	Receptor	Potential Impact	Duration	Magnitude
Construction Phase				
C1	SAC; SPA; BDWP; JPWS	Forestry felling and vegetation clearance may mobilise sediment and nutrients into connected watercourses, potentially affecting downstream water quality and aquatic conditions supporting designated interests and drinking water protection. Ground disturbance and accidental contaminant releases may also affect groundwater quality within the source protection area.	Temporary	Small
C2	SAC; SPA; BDWP; JPWS	Turbine foundation excavation, piling and hardstanding construction may generate sediment-laden runoff, concrete-related contamination and accidental pollutant releases, potentially affecting downstream protected waters. Excavations and groundwater ingress may also create pathways for contamination or localised changes in groundwater conditions relevant to public water supply protection.	Temporary	Moderate
C3	JPWS	Access track and site entrance construction may disturb soils, alter local infiltration and facilitate accidental contaminant migration to groundwater, potentially affecting groundwater quality and recharge conditions within the source protection area.	Temporary	Small
C4	JPWS	Bridge and culvert excavations may interact with shallow groundwater, potentially creating pathways for contaminant migration and causing localised changes to groundwater flow conditions relevant to source protection.	Temporary	Moderate

Source Ref.	Receptor	Potential Impact	Duration	Magnitude
C5	JPWS	Temporary construction drainage may modify local infiltration and groundwater recharge patterns and facilitate contaminant migration through disturbed ground, potentially affecting groundwater conditions within the source protection area.	Temporary	Small
C6	SAC; SPA; BDWP; JPWS	Substation construction, including excavation, concrete works and culverting of an existing arterial drain, may generate sediment-laden runoff and accidental contaminant releases affecting downstream protected waters. Excavations within the Johnstown Inner Source Protection Zone may also affect groundwater quality and local flow conditions, with potential implications for public water supply protection.	Temporary	Moderate
C7	JPWS	Cable trenching and associated excavations may create preferential groundwater flow pathways and facilitate contaminant migration, potentially affecting groundwater quality and local movement within the source protection area.	Temporary	Small
C8	SAC; SPA; BDWP; JPWS	Fuel and chemical storage, refuelling, waste management and welfare facilities may result in accidental releases of hydrocarbons, chemicals or wastewater. Contaminants may reach downstream protected waters through drainage pathways or infiltrate to groundwater, potentially affecting protected aquatic conditions and drinking water source quality.	Temporary	Moderate
C9	SAC; SPA; BDWP; JPWS	Peat and spoil handling, stockpiling and deposition may generate sediment-laden or nutrient-enriched runoff affecting downstream protected waters. Infiltration of dissolved organic matter, nutrients or other mobilised constituents may also affect groundwater quality relevant to public water supply protection.	Temporary	Small
C10	JPWS	Construction vehicle movements may result in accidental fuel or oil releases to ground, with potential infiltration and localised deterioration of groundwater quality within the source protection area.	Temporary	Small
C11	JPWS	Turbine Delivery Route accommodation works may involve localised ground disturbance and accidental pollutant releases, potentially affecting groundwater quality where a pathway to the source protection area exists.	Temporary	Small

Source Ref.	Receptor	Potential Impact	Duration	Magnitude
Operational Phase				
O1	SAC; SPA; BDWP; JPWS	Turbine operation and maintenance may result in accidental releases of lubricants, hydraulic fluids or other operational substances. Migration through surface drainage or infiltration could affect downstream protected waters or groundwater quality relevant to drinking water protection.	Long-term	Moderate
O2	SAC; SPA; BDWP; JPWS	Substation operation may result in accidental transformer oil releases, wastewater leakage or contaminated firewater. Migration through drainage connections or infiltration could affect downstream protected waters and groundwater quality, particularly within the Johnstown Inner Source Protection Zone.	Long-term	Moderate
O3	JPWS	Permanent access tracks, hardstandings and drainage infrastructure may modify infiltration and groundwater recharge patterns or provide pathways for contaminant migration, potentially affecting groundwater conditions relevant to public water supply protection.	Long-term	Small
Decommissioning Phase				
D1	JPWS	Turbine dismantling and removal may result in accidental releases of fuels, oils or operational fluids, with potential infiltration to groundwater and localised effects on drinking water source quality.	Temporary	Small
D2	JPWS	Foundation backfilling and site reinstatement may disturb ground and modify local infiltration and recharge conditions, potentially affecting groundwater conditions within the source protection area.	Temporary	Small
D3	JPWS	Cable extraction and associated localised excavations may interact with groundwater or create preferential pathways for contaminant migration, potentially affecting groundwater quality and local flow conditions.	Temporary	Small
D4	JPWS	Decommissioning vehicle movements and material transportation may result in accidental fuel or oil releases to ground, potentially affecting groundwater quality through infiltration within the source protection area.	Temporary	Small

SAC - River Boyne and River Blackwater SAC (002299)
SPA - River Boyne and River Blackwater SPA (004232)
BDWP - Boyne_060 Drinking Water Protected Area.
JPWS - Johnstown Wellfield Public Water Supply and associated Source Protection Zones

The potential impacts identified have been assessed against the relevant WFD Protected Area objectives and applicable protection standards to determine whether, in the absence of mitigation, they could compromise the conservation objectives of the River Boyne and River Blackwater SAC and SPA or the drinking water protection objectives associated with the Boyne_060 Drinking Water Protected Area and Johnstown Wellfield Public Water Supply. The results of the pre-mitigation Protected Areas assessment are presented in Table 6-12.

Table 6-12: WFD Deterioration Assessment - Protected Areas (Pre-Mitigation)

WFD Protected Area	Pre-Mitigation WFD Assessment
River Boyne and River Blackwater SAC (002299)	Construction and operational activities present potential pathways for sediment, nutrient and contaminant inputs to hydrologically connected watercourses, principally through forestry clearance, excavation, substation construction, spoil handling, construction compounds and accidental pollutant releases. Such inputs could affect water quality and aquatic habitat conditions supporting the water-dependent qualifying interests of the SAC. Although the magnitude of effects at the designated site would depend on pollutant characteristics, downstream transport, dilution and exposure, adverse effects on the environmental conditions supporting the relevant conservation objectives cannot be excluded in the absence of mitigation. Consequently, the potential for compromise of the relevant conservation objectives and associated WFD Protected Area requirements cannot be excluded in the absence of mitigation.
River Boyne and River Blackwater SPA (004232)	Sediment, nutrient and contaminant inputs arising from construction and operational activities could affect downstream water quality and aquatic habitat conditions relevant to the water-dependent supporting environment of the SPA. The potential consequences would depend on the nature, extent and persistence of any changes in water quality and their relevance to the site's special conservation interests. Although downstream dilution and attenuation may reduce the magnitude of potential effects, the consequences of uncontrolled pollutant releases remain uncertain. Consequently, the potential for compromise of the relevant conservation objectives and associated WFD Protected Area requirements cannot be excluded in the absence of mitigation.
Boyne_060 (IE_EA_07B040900) Drinking Water Protected Area	Construction and operational activities may introduce sediment, nutrients, hydrocarbons, concrete-related substances or other contaminants into hydrologically connected watercourses. These substances could be transported downstream into Boyne_060, potentially affecting raw water quality and increasing the treatment requirements associated with drinking water abstraction. The extent of any effect would depend on the nature and concentration of pollutants, downstream dilution and attenuation, and their persistence at the relevant abstraction location. Consequently, the potential for compromise of the applicable drinking water protection objectives cannot be excluded in the absence of mitigation.
Johnstown Wellfield Public Water Supply and associated Source Protection Zones	Construction, operational and decommissioning activities present potential pathways for groundwater contamination, principally through accidental releases of fuels, oils, chemicals, wastewater and concrete-related substances, together with contaminant migration through disturbed ground and excavations. Localised changes to groundwater levels, flow and recharge may also arise from excavation, temporary drainage and permanent infrastructure. Particular sensitivity arises where the proposed development infrastructure is located within the Johnstown Inner Source Protection Zone. Although quantitative effects are expected to be localised and are not anticipated to materially affect groundwater resource availability, adverse effects on groundwater chemical quality and drinking water source protection cannot be excluded in the absence of mitigation. Consequently, the potential for compromise of the relevant drinking water protection objectives cannot be excluded in the absence of mitigation.

The assessment identifies potential effects on WFD Protected Areas associated with sediment and nutrient mobilisation, concrete-related contamination and accidental pollutant releases during construction and operation, together with potential groundwater contamination and localised changes in groundwater conditions during construction, operation and decommissioning. These effects could adversely affect water quality and aquatic habitat conditions supporting the conservation objectives of the River Boyne and River Blackwater SAC and SPA, as well as the drinking water protection objectives associated with Boyne_060 and Johnstown Wellfield Public Water Supply.

Although downstream dilution and attenuation may reduce the magnitude of potential effects on surface water receptors, the consequences of uncontrolled pollutant releases remain uncertain. Effects on groundwater levels, flow and recharge are expected to be localised, but potential impacts on groundwater quality cannot be excluded. In the absence of mitigation, compromise of the relevant conservation objectives or drinking water protection requirements cannot be excluded for the identified WFD Protected Areas. The effectiveness of the proposed mitigation measures in addressing these pathways will inform the subsequent determination of WFD compliance.

6.6 Invasive Non-Native Species (INNS)

The scoping assessment identified potential pathways by which construction, operational and decommissioning activities could facilitate the introduction or spread of Invasive Non-Native Species (INNS) within receiving surface waterbodies. These pathways are principally associated with vegetation clearance, ground disturbance, excavation, soil and spoil handling, machinery and equipment movements, and works within or adjacent to watercourses. During operation, potential pathways are primarily associated with maintenance of access tracks, drainage infrastructure and adjoining vegetation. The recorded presence of invasive and non-native plant species within and adjacent to the proposed development increases the potential for their transfer and dispersal.

The introduction or spread of INNS could adversely affect aquatic and riparian habitats, alter biological communities and potentially compromise the biological quality elements supporting ecological status. The potential effects of the sources carried forward from the scoping assessment on INNS introduction and spread are assessed in Table 6-13.

Table 6-13: Potential Impacts on Introduction and Spread of INNS (Pre-Mitigation)

Source Ref.	Receptor	Potential Impact	Duration	Magnitude
Construction Phase				
C1	BW_010; BW_020; BW_030	Forestry felling and vegetation clearance may disturb existing INNS populations and facilitate the transfer of invasive plant seeds, fragments or contaminated soil through machinery movements, vegetation handling and surface runoff. Dispersal to connected watercourses could promote the establishment or spread of INNS within aquatic and riparian habitats.	Long-term	Moderate

Source Ref.	Receptor	Potential Impact	Duration	Magnitude
C2	BW_020; BW_030	Turbine foundation excavation, piling and hardstanding construction may facilitate INNS introduction or spread through soil disturbance, machinery movements and imported materials, particularly where works interact with recorded infestations. The establishment or spread of INNS could affect riparian vegetation and associated aquatic habitat conditions.	Long-term	Moderate
C3	BW_010; BW_020; BW_030	Access track and site entrance construction may disturb existing INNS populations and transfer invasive plant material through vegetation clearance, soil handling and machinery movements. Subsequent dispersal through drainage pathways could facilitate colonisation of connected watercourse margins.	Long-term	Moderate
C4	BW_020; BW_030; BW_040	Bridge and culvert construction may introduce or spread aquatic and riparian INNS through contaminated machinery and equipment, channel disturbance and works along watercourse margins. These activities could facilitate establishment or dispersal within receiving watercourses, potentially affecting aquatic habitats and biological communities.	Long-term	Moderate
C5	BW_010; BW_020; BW_030; BW_040	Temporary construction drainage may provide pathways for the transport of invasive plant seeds or fragments from disturbed areas into connected watercourses, potentially facilitating downstream dispersal and establishment within aquatic and riparian habitats.	Long-term	Small
C6	BW_020; BW_030; BW_040	Substation construction may disturb existing non-native plant populations and facilitate their transfer through vegetation clearance, excavation, machinery movements and drainage works. Dispersal to connected watercourses could contribute to the spread or establishment of INNS within downstream riparian habitats.	Long-term	Moderate
C7	BW_010; BW_020; BW_030	Cable trenching and reinstatement may facilitate INNS spread through excavation, soil disturbance, machinery movements and the transfer of potentially contaminated materials. These activities could introduce invasive plant material into previously unaffected areas with subsequent dispersal towards connected watercourses.	Long-term	Small
C8	BW_020; BW_030	Construction compounds and associated activities may introduce or transfer INNS through machinery, vehicles and the movement or storage of potentially contaminated materials. Subsequent dispersal could facilitate establishment within adjoining habitats and connected watercourses.	Long-term	Small

Source Ref.	Receptor	Potential Impact	Duration	Magnitude
C9	BW_020; BW_030; BW_040	Peat and spoil excavation, handling, stockpiling and deposition may disturb and transfer invasive plant material or contaminated soil. Runoff and material movements could facilitate dispersal to connected watercourses, potentially promoting the establishment or spread of INNS within aquatic and riparian habitats.	Long-term	Moderate
C10	BW_010; BW_020; BW_030	Construction traffic may transfer invasive plant seeds, fragments or contaminated soil between work areas through vehicle and machinery movements. Subsequent dispersal through adjoining drainage pathways could facilitate the spread of INNS towards receiving watercourses.	Long-term	Small
C11	BW_030	Turbine Delivery Route accommodation works may disturb recorded INNS, including Cherry Laurel, through vegetation clearance and roadside works. Machinery movements and drainage pathways could facilitate the transfer and spread of invasive plant material towards connected watercourses.	Long-term	Small
Operational Phase				
O3	BW_010; BW_020; BW_030	Maintenance of permanent access tracks, hardstandings, drainage infrastructure and adjoining vegetation may disturb or transfer invasive plant material. Machinery movements, vegetation management and drainage pathways could facilitate the continued spread of INNS to connected watercourses and riparian habitats.	Long-term	Small
Decommissioning Phase				
D1	BW_020; BW_030	Turbine dismantling and removal may facilitate INNS introduction or spread through machinery, equipment and material movements between work areas. The transfer of contaminated material could contribute to establishment or dispersal within adjoining habitats and connected watercourses.	Long-term	Small
D2	BW_020	Foundation backfilling and site reinstatement may disturb or transfer invasive plant material through soil handling, machinery movements and revegetation activities, potentially facilitating establishment or spread within disturbed areas and adjoining habitats.	Long-term	Small
D3	BW_010; BW_020	Cable extraction and associated localised excavations may facilitate INNS spread through soil disturbance and machinery or equipment movements. Transfer of invasive plant material could contribute to colonisation of disturbed ground and subsequent dispersal towards connected watercourses.	Long-term	Small

Source Ref.	Receptor	Potential Impact	Duration	Magnitude
D4	BW_010; BW_020; BW_030	Decommissioning traffic may transfer invasive plant material or contaminated soil between work areas, potentially facilitating the introduction or spread of INNS through adjoining drainage pathways to connected watercourses.	Long-term	Small

BW_010 - Blackwater (Longwood)_010
BW_020 - Blackwater (Longwood)_020
BW_030 - Blackwater (Longwood)_030
BW_040 - Blackwater (Longwood)_040

The potential impacts identified have been assessed against the relevant WFD biological quality elements and ecological status objectives to determine whether, in the absence of mitigation, the introduction or spread of INNS could adversely affect aquatic and riparian habitats, alter biological communities or result in deterioration of ecological status within the receiving surface waterbodies. The assessment also considers whether the potential establishment and persistence of INNS could compromise the achievement of the relevant WFD environmental objectives. The results of the pre-mitigation INNS assessment are presented in Table 6-14.

Table 6-14: WFD Deterioration Assessment - INNS (Pre-Mitigation)

Surface Waterbody	Pre-Mitigation WFD Assessment
Blackwater (Longwood)_010 (BW_010)	Forestry felling, access track construction, temporary drainage, cable trenching, construction traffic and decommissioning activities could facilitate the introduction or spread of INNS through vegetation disturbance, soil handling, machinery movements and the transfer of invasive plant material. Operational maintenance of access tracks and drainage infrastructure may also contribute to their dispersal. Establishment of INNS within riparian or aquatic habitats could alter vegetation communities, habitat structure and ecological conditions supporting biological quality elements. Although the extent of potential establishment and its consequences for ecological status are uncertain, deterioration of the relevant biological quality elements or compromise of the achievement of WFD environmental objectives cannot be excluded in the absence of mitigation.
Blackwater (Longwood)_020 (BW_020)	Construction activities, including forestry clearance, turbine foundation excavation, access track construction, watercourse crossing works, substation construction, cable trenching and spoil handling, could facilitate the introduction or spread of INNS through disturbed vegetation, contaminated soil, machinery movements and drainage pathways. Operational maintenance and decommissioning activities may provide further opportunities for dispersal. The establishment and persistence of INNS could affect aquatic and riparian habitat conditions, alter biological communities and potentially influence the biological quality elements supporting ecological status. Given the range of identified pathways and the uncertainty regarding establishment and subsequent ecological effects, deterioration of the relevant biological quality elements or compromise of the achievement of WFD environmental objectives cannot be excluded in the absence of mitigation.
Blackwater (Longwood)_030 (BW_030)	Construction activities, including forestry clearance, turbine foundation excavation, access track construction, bridge and culvert works, substation construction, spoil handling and Turbine Delivery Route accommodation works, could facilitate INNS introduction or spread. The recorded presence of invasive and non-native plant species, including Cherry Laurel along the delivery route, provides a potential source of invasive material that could be transferred through vegetation clearance, soil disturbance, machinery movements and drainage pathways.

Surface Waterbody	Pre-Mitigation WFD Assessment
	Operational maintenance and decommissioning activities could also contribute to dispersal. Establishment within connected aquatic and riparian habitats could alter vegetation communities and habitat conditions supporting ecological status. Consequently, deterioration of the relevant biological quality elements or compromise of the achievement of WFD environmental objectives cannot be excluded in the absence of mitigation.
Blackwater (Longwood)_040 (BW_040)	Bridge and culvert construction, temporary construction drainage, substation construction and peat and spoil handling could facilitate the transport of invasive plant material towards connected watercourses. Potential pathways include disturbance of watercourse margins, machinery and equipment movements, surface runoff and drainage discharges. Although fewer INNS-related sources have been identified for this waterbody than for the upstream receptors, the introduction or establishment of INNS could affect aquatic and riparian habitat conditions and associated biological communities. The likelihood and extent of establishment remain uncertain. Consequently, deterioration of the relevant biological quality elements or compromise of the achievement of WFD environmental objectives cannot be excluded in the absence of mitigation.

The assessment identifies potential effects associated with the introduction and spread of Invasive Non-Native Species (INNS) through vegetation clearance, ground disturbance, soil and spoil handling, machinery movements, drainage pathways and works within or adjacent to watercourses during construction, operation and decommissioning. These activities could facilitate the transfer, establishment and persistence of INNS within aquatic and riparian habitats, potentially altering habitat structure, biological communities and ecological conditions supporting the relevant WFD biological quality elements.

Although the introduction or spread of INNS does not necessarily result in deterioration of ecological status, the potential consequences of their establishment and persistence remain uncertain. In the absence of mitigation, deterioration of the relevant WFD biological quality elements, or compromise of the achievement of WFD environmental objectives, cannot be excluded for the assessed surface waterbodies. The effectiveness of the proposed mitigation measures in preventing the introduction and spread of INNS will inform the subsequent determination of WFD compliance.

7. CUMULATIVE EFFECTS

The cumulative assessment considers whether the potential pressures associated with the proposed development, in combination with the existing significant pressures affecting the identified WFD waterbodies, could result in deterioration of WFD status or compromise achievement of their environmental objectives.

The assessment considers construction, operational and decommissioning activities separately and examines the potential interaction between project related pressures and the significant pressures and issues identified within the receiving waterbodies. Particular consideration is given to the nature, magnitude, duration and spatial extent of potential effects, the relevant hydrological pathways and the sensitivity of the receiving waterbodies.

Existing significant pressures identified by the EPA include agricultural activities, nutrient enrichment, anthropogenic pressures, extractive industry pressures and hydromorphological pressures affecting the Blackwater (Longwood) catchment. The cumulative assessment also considers other permitted and existing developments within the wider catchment as identified in the EIAR, including solar farm developments, the Drehid Waste Management Facility extension, residential developments in Enfield and Johnstown Bridge, and the Ballivor and Cushaling Wind Farm developments.

The potential cumulative effects have been assessed against the relevant WFD quality elements and environmental objectives to determine whether, in the absence of mitigation, they could contribute to deterioration of waterbody status or compromise the achievement of WFD environmental objectives. The results of the pre-mitigation cumulative assessment are presented in Table 7-1.

Table 7-1: WFD Deterioration Assessment - Cumulative Effects (Pre-Mitigation)

Receptor	Potential Interaction with Existing Pressure Environment	Cumulative WFD Assessment
Construction Phase		
Blackwater (Longwood)_010 (IE_EA_07B020060) Extractive industry; anthropogenic pressures; moderate nutrient conditions	Construction-related sediment mobilisation, runoff and accidental contaminant releases could add to the existing pressure burden. Watercourse works and potential INNS dispersal could also affect hydromorphological and biological conditions.	Combined pressures could cause temporary changes in water quality, aquatic habitats and biological communities. Given the existing pressure environment and the uncertainty surrounding uncontrolled releases, deterioration of relevant WFD quality elements or compromise of environmental objectives cannot be excluded in the absence of mitigation.
Blackwater (Longwood)_020 (IE_EA_07B020100) Anthropogenic pressures	Excavation, watercourse crossings, drainage works, spoil handling and accidental pollutant releases could increase sediment and contaminant inputs. Ground disturbance and machinery movements could also facilitate INNS dispersal.	The combined effects could adversely affect physicochemical conditions, hydromorphology and biological quality elements. Deterioration of relevant WFD quality elements or compromise of environmental objectives cannot be excluded in the absence of mitigation.

Receptor	Potential Interaction with Existing Pressure Environment	Cumulative WFD Assessment
Blackwater (Longwood)_030 (IE_EA_07B020200) Agriculture; nutrient enrichment	Construction-related sediment, nutrient and contaminant inputs could contribute to the existing nutrient pressure environment through hydrological connectivity. Disturbance and material movements could also facilitate INNS dispersal.	Downstream dilution and attenuation may reduce sediment-related effects, but the consequences of uncontrolled pollutant releases and INNS establishment remain uncertain. Cumulative deterioration of relevant WFD quality elements or compromise of environmental objectives cannot be excluded in the absence of mitigation.
Blackwater (Longwood)_040 (IE_EA_07B020300) Agriculture; nutrient enrichment; anthropogenic pressures	Sediment, nutrient and contaminant inputs could contribute to existing pressures through downstream transport. Watercourse works and drainage pathways could also facilitate INNS dispersal.	The combined pressures could affect water quality and biological communities, although downstream attenuation may reduce their magnitude. Deterioration of relevant WFD quality elements or compromise of environmental objectives cannot be excluded in the absence of mitigation.
Blackwater (Longwood)_050 (IE_EA_07B020600) Agriculture; nutrient enrichment; hydromorphological pressures	Construction-related sediment and contaminant inputs could reach the waterbody through downstream hydrological pathways and interact with existing pressures.	Downstream dilution, dispersion and sediment deposition may reduce the magnitude of potential effects. However, the consequences of uncontrolled pollutant releases remain uncertain. Deterioration of relevant WFD quality elements or compromise of environmental objectives cannot be excluded in the absence of mitigation.
Boyne_060 (IE_EA_07B040900) No significant pressures identified	Construction-related pollutants could reach Boyne_060 through the Blackwater-Boyne drainage network.	The substantial downstream separation and opportunities for dilution and attenuation reduce the likelihood of material cumulative effects. Nevertheless, the consequences of uncontrolled contaminant releases cannot be fully established at the pre-mitigation stage. Deterioration of relevant WFD quality elements or compromise of environmental objectives cannot be excluded in the absence of mitigation.
Trim Groundwater Body (IE_EA_G_002) Agriculture; anthropogenic pressures; domestic wastewater	Accidental releases of fuels, oils, chemicals, wastewater and concrete-related substances could infiltrate soils and subsoils, adding to existing groundwater quality pressures. Excavation and temporary drainage could also cause localised changes in groundwater conditions.	The combined pressures could adversely affect groundwater chemical quality, particularly in the Johnstown Wellfield Source Protection Zones. Deterioration of chemical status or compromise of environmental objectives cannot be excluded in the absence of mitigation. Deterioration of quantitative status is not anticipated, given the absence of permanent groundwater abstraction or significant groundwater drainage.

Receptor	Potential Interaction with Existing Pressure Environment	Cumulative WFD Assessment
Operational Phase		
Blackwater (Longwood)_010 (IE_EA_07B020060) Extractive industry; anthropogenic pressures; moderate nutrient conditions	Runoff from permanent tracks and hardstandings, drainage maintenance and accidental releases of hydrocarbons or other contaminants could contribute intermittently to existing pressures. Maintenance activities could also facilitate INNS dispersal.	Routine operational contributions are expected to be limited, but uncontrolled releases and the establishment of INNS could adversely affect water quality or biological quality elements. Cumulative deterioration or compromise of environmental objectives cannot be excluded in the absence of mitigation.
Blackwater (Longwood)_020 (IE_EA_07B020100) Anthropogenic pressures	Operational runoff, drainage maintenance and accidental pollutant releases could contribute to existing anthropogenic pressures. Vegetation management and machinery movements could facilitate INNS spread.	The combined pressures could result in localised changes in water quality or ecological conditions. Deterioration of relevant WFD quality elements or compromise of environmental objectives cannot be excluded in the absence of mitigation.
Blackwater (Longwood)_030 (IE_EA_07B020200) Agriculture; nutrient enrichment	Intermittent operational runoff and accidental contaminant releases could interact with existing nutrient pressures. Maintenance activities could also facilitate INNS dispersal.	No continuous nutrient discharge is proposed, and downstream attenuation may reduce routine pollutant inputs. However, uncontrolled releases and INNS establishment remain potential pathways. Cumulative deterioration or compromise of environmental objectives cannot be excluded in the absence of mitigation.
Blackwater (Longwood)_040 (IE_EA_07B020300) Agriculture; nutrient enrichment; anthropogenic pressures	Operational runoff and accidental releases could contribute intermittently to the existing pressure environment through downstream transport.	Routine operational effects are expected to be limited and subject to downstream attenuation. Nevertheless, deterioration of relevant WFD quality elements or compromise of environmental objectives cannot be excluded in the absence of mitigation, particularly following uncontrolled pollutant releases.
Blackwater (Longwood)_050 (IE_EA_07B020600) Agriculture; nutrient enrichment; hydromorphological pressures	Operational pollutant inputs could contribute intermittently to the downstream pressure burden, although dilution and attenuation would reduce their magnitude.	A material cumulative contribution from routine operation is not anticipated. However, the consequences of uncontrolled pollutant releases remain uncertain. Cumulative deterioration or compromise of environmental objectives cannot be excluded in the absence of mitigation.
Boyne_060 (IE_EA_07B040900) No significant pressures identified	Operational pollutant inputs could reach the Boyne through downstream transport, with opportunities for dilution and attenuation before reaching the receptor.	Routine operational effects are unlikely to make a material contribution to downstream pressures. However, deterioration of relevant WFD quality elements or compromise of environmental objectives cannot be excluded in the absence of mitigation where uncontrolled pollutant releases occur.

Receptor	Potential Interaction with Existing Pressure Environment	Cumulative WFD Assessment
Trim Groundwater Body (IE_EA_G_002) Agriculture; anthropogenic pressures; domestic wastewater	Accidental releases from operational equipment, transformer oil or associated infrastructure could create contaminant infiltration pathways. Permanent tracks and drainage could also result in localised changes in recharge.	Cumulative deterioration of groundwater chemical status or compromise of environmental objectives cannot be excluded in the absence of mitigation, particularly within the Johnstown Wellfield Source Protection Zones. Deterioration of quantitative status is not anticipated.
Decommissioning Phase		
Blackwater (Longwood)_010 (IE_EA_07B020060) Extractive industry; anthropogenic pressures; moderate nutrient conditions	Dismantling, cable extraction, vehicle movements and associated ground disturbance could generate sediment-laden runoff and accidental pollutant releases. INNS could also be transferred through machinery and soil disturbance.	Although decommissioning activities would be temporary, their combined effects could adversely affect water quality and biological communities. Deterioration of relevant WFD quality elements or compromise of environmental objectives cannot be excluded in the absence of mitigation.
Blackwater (Longwood)_020 (IE_EA_07B020100) Anthropogenic pressures	Foundation reinstatement, cable extraction, turbine removal and associated traffic could generate sediment and contaminant inputs and facilitate INNS dispersal.	These pressures could interact with existing anthropogenic pressures affecting the waterbody. Cumulative deterioration of relevant WFD quality elements or compromise of environmental objectives cannot be excluded in the absence of mitigation.
Blackwater (Longwood)_030 (IE_EA_07B020200) Agriculture; nutrient enrichment	Decommissioning-related sediment and contaminant inputs could temporarily contribute to existing nutrient and water quality pressures. Machinery and material movements could also facilitate INNS dispersal.	Downstream attenuation may reduce sediment-related effects, but uncontrolled releases and INNS establishment remain uncertain. Cumulative deterioration or compromise of environmental objectives cannot be excluded in the absence of mitigation.
Blackwater (Longwood)_040 (IE_EA_07B020300) Agriculture; nutrient enrichment; anthropogenic pressures	Sediment-laden runoff and accidental contaminant releases could contribute to the existing pressure environment through downstream hydrological pathways.	The combined pressures could cause temporary changes in water quality. Deterioration of relevant WFD quality elements or compromise of environmental objectives cannot be excluded in the absence of mitigation.
Blackwater (Longwood)_050 (IE_EA_07B020600) Agriculture; nutrient enrichment; hydromorphological pressures	Decommissioning-related sediment and contaminant inputs could reach the receptor following downstream transport and attenuation.	The magnitude of sediment-related effects is expected to diminish downstream. However, uncontrolled pollutant releases remain a potential pathway. Cumulative deterioration or compromise of environmental objectives cannot be excluded in the absence of mitigation.

Receptor	Potential Interaction with Existing Pressure Environment	Cumulative WFD Assessment
Boyne_060 (IE_EA_07B040900) No significant pressures identified	Decommissioning-related pollutants could be transported downstream through the Blackwater-Boyne catchment network, with dilution, dispersion and sediment deposition reducing their magnitude.	Material cumulative effects are less likely given the downstream separation and attenuation opportunities. Nevertheless, deterioration of relevant WFD quality elements or compromise of environmental objectives cannot be excluded in the absence of mitigation following uncontrolled pollutant releases.
Trim Groundwater Body (IE_EA_G_002) Agriculture; anthropogenic pressures; domestic wastewater	Excavation, foundation reinstatement, cable extraction and accidental releases could create temporary contaminant infiltration pathways and localised changes in groundwater conditions.	Cumulative deterioration of groundwater chemical status or compromise of environmental objectives cannot be excluded in the absence of mitigation. Effects on groundwater levels and recharge are expected to be localised, and deterioration of quantitative status is not anticipated.

The cumulative assessment identifies potential interactions between project-related pressures and the existing significant pressures affecting the receiving WFD waterbodies. During construction and decommissioning, sediment mobilisation, nutrient inputs, accidental pollutant releases, hydromorphological alterations and the potential introduction or spread of Invasive Non-Native Species (INNS) could contribute to existing pressures on water quality, aquatic habitats and biological communities. During operation, potential cumulative effects are principally associated with intermittent runoff, accidental contaminant releases and maintenance activities. These combined pressures could affect the physicochemical, hydromorphological and biological quality elements supporting ecological status, as well as groundwater chemical quality.

Other existing and permitted developments within the wider catchment have also been considered, as identified in the EIAR. These include solar farm developments, the Drehid Waste Management Facility extension, residential developments in Enfield and Johnstown Bridge, and other wind farm developments. The EIAR identifies that Cushaling Wind Farm is located within the separate River Barrow catchment and therefore does not give rise to cumulative hydrological effects with the proposed development. Ballivor Wind Farm is located within the wider River Boyne catchment but drains through separate tributary systems, with substantial downstream separation between the developments. Consequently, the EIAR assesses potential cumulative water quality effects associated with the more distant wind farm developments as short-term and imperceptible.

Although the magnitude of potential cumulative effects is expected to diminish with downstream transport, dilution and attenuation, the consequences of uncontrolled pollutant releases and the potential establishment of INNS remain uncertain. Effects on groundwater levels, flow and recharge are expected to be localised, with deterioration of groundwater quantitative status not anticipated. In the absence of mitigation, cumulative deterioration of the relevant WFD quality elements, or compromise of the achievement of WFD environmental objectives, cannot be excluded for the assessed waterbodies. The effectiveness of the proposed mitigation measures in addressing these pressures will inform the subsequent determination of WFD compliance.

8. MITIGATION MEASURES

The pre-mitigation assessment identified potential pathways through which construction, operational and decommissioning activities could adversely affect the receiving surface water and groundwater environments. Although these effects would not necessarily result in deterioration of WFD status, the assessment concluded that, in the absence of mitigation, deterioration of relevant WFD quality elements or compromise of the achievement of WFD environmental objectives cannot be excluded for the assessed waterbodies.

The identified pathways principally relate to sediment mobilisation associated with excavation and earthworks; accidental releases of fuels, oils, concrete and other potentially polluting substances; works at watercourse crossings; construction-phase drainage management; temporary groundwater interception and dewatering; potential contaminant migration within the Johnstown Wellfield Public Water Supply Source Protection Zone (SPZ); operational runoff from access tracks and hardstanding areas; and emergency events involving contaminated runoff or firewater. Potential effects associated with hydromorphological alterations and the introduction or spread of Invasive Non-Native Species (INNS) have also been identified.

Accordingly, mitigation measures and embedded design controls have been incorporated into the proposed development to avoid, prevent or minimise potential adverse effects on the relevant WFD quality elements and environmental objectives.

8.1 Construction Phase

C1 - Forestry felling and vegetation clearance

- Tree felling will be undertaken in accordance with the Forest Service Forestry and Water Quality Guidelines and Forest Harvesting and Environmental Guidelines to minimise sediment and nutrient runoff.
- Trees will be felled away from aquatic zones where practicable, and branches, logs and other debris will be prevented from accumulating within watercourses.
- Additional silt fencing will be installed along stream banks where tree felling is undertaken.
- The Invasive Species Management Plan (ISMP) will be implemented, including pre-construction surveys, mapping and demarcation of infestations, species-specific treatment and subsequent monitoring.
- Identified invasive species within construction working areas will be controlled or removed before works commence, where required.
- Machinery hygiene and biosecurity controls will be implemented, and invasive plant material and contaminated soils will be appropriately contained, transported and disposed of.

C2 - Turbine foundations and hardstanding areas

- Drainage and sediment control infrastructure, including swales and settlement/stilling ponds, will be installed before foundation excavation works commence.
- Sediment-laden water accumulating within excavations will be directed through the site drainage treatment system, and direct discharge to watercourses will be prevented.
- Groundwater exclusion techniques, including sheet piling where required, will be employed to manage groundwater inflows and stabilise excavations.

- Excavated materials will be transferred to designated storage areas or retained for suitable backfilling, with appropriate stockpile protection measures implemented.
- Shallow drainage will be provided around hardstanding areas to minimise disturbance of subsoils.
- Refuelling, fuel storage, spill prevention and emergency response measures will be implemented throughout construction.
- For foundation works within the Johnstown Wellfield Source Protection Zones, the duration of open excavations will be minimised, and additional sediment and groundwater protection measures will be implemented.
- Water from relevant excavations within the Source Protection Zone will be treated to remove sediment and discharged outside the zone, where required by the proposed drainage arrangements.

C3 - Access tracks and site entrances

- Existing tracks will be utilised where practicable, and new tracks and associated drainage will be aligned to follow existing flow paths and minimise changes to the hydrological regime.
- Tracks will be constructed using clean, well-graded aggregate with minimal fines, and exposed track surfaces will be capped as soon as practicable.
- Upslope interceptor drains will be installed to separate clean overland runoff from runoff generated within construction areas.
- Cross-drains will be provided to maintain existing overland flow routes and hydrological connectivity across access tracks.
- Roadside swales, silt traps, settlement/stilling ponds and check dams will be installed where required to attenuate runoff and reduce suspended solids.
- Silt fencing will be installed where tracks approach watercourses, and sediment control infrastructure will be maintained throughout construction.
- Existing agricultural and forestry roadside drains will be maintained or cleared where obstructions impede flows, with silt traps provided to reduce sediment transport.
- A self-contained wheel-washing facility will be provided at the main site entrance, and collected waste will be removed by an appropriately permitted contractor.

C4 - Bridges, culverts and watercourse crossings

- The three proposed Fear English River crossings will be constructed as clear-span bridges, avoiding in-stream works.
- Bridge foundations will be positioned at least 2.5 m from the river bank.
- Crossings will be designed to accommodate the 1% annual exceedance probability (AEP) flood event, incorporating a 20% climate change allowance and a minimum freeboard of 300 mm.
- Existing channel width and hydraulic conveyance will be maintained, and obstruction of sediment and woody debris transport will be avoided.
- The existing restrictive 1,000 mm culvert identified for replacement will be replaced with a bridge.
- Silt fencing and other sediment controls will be installed before crossing works commence.
- Sealed silt fencing will be installed on both sides of crossing locations, extending at least 10 m upstream and downstream.

- Appropriately sized culverts will be provided for smaller drainage crossings, and continuity of existing drainage pathways will be maintained.
- Consent under Section 50 of the Arterial Drainage Act 1945 will be obtained from the Office of Public Works (OPW) for relevant crossing structures, where required.
- Baseline hydromorphological conditions at crossing locations will be established using the River Hydromorphology Assessment Technique (RHAT), and annual follow-up assessments will be undertaken to identify changes from baseline.
- Fisheries-related working restrictions, including avoidance of in-stream works during the salmonid close season where relevant, will be implemented.

C5 - Temporary construction drainage

- The Surface Water Management Plan will be implemented throughout construction.
- Clean upslope runoff will be intercepted and conveyed through cross-drains to diffuse vegetated outfalls or existing drainage pathways within the same catchment.
- Runoff from disturbed construction areas will be collected separately and treated through the proposed swale-settlement/stilling pond-diffuse outflow treatment system.
- Check dams will be installed where required to reduce flow velocities and erosion within drainage channels.
- Settlement ponds will be sized to accommodate runoff from storm events up to and including the 1-in-100-year event.
- Settlement pond outflows will be discharged diffusely over vegetated ground rather than directly into drains or watercourses.
- Erosion and sediment control infrastructure will be installed progressively before construction activities commence and maintained throughout the works.
- Arrangements will be provided to temporarily block settlement pond outfalls in the event of accidental contamination.
- Rainfall forecasts will be monitored, and contingency measures will be implemented during heavy rainfall events.
- An Environmental/Ecological Clerk of Works will be appointed with authority to require corrective action or temporarily stop works to prevent adverse hydrological effects.
- The Surface Water Quality Monitoring Programme will commence 12 months before construction and continue throughout construction and for three months after commissioning, incorporating physicochemical, biological and hydromorphological monitoring.
- Daily visual inspections of receiving watercourses will be undertaken to identify sediment plumes, hydrocarbon contamination, riparian disturbance and other visible signs of construction-related impacts.
- Monitoring exceedances will be investigated against baseline conditions and applicable environmental quality criteria, and corrective measures will be implemented where a construction-related source is identified.

C6 - Substation construction

- Additional groundwater protection measures will be implemented during construction within the Johnstown Wellfield Inner Source Protection Zone.
- The duration of open excavations will be minimised, and substation foundations will be kept shallow and above the groundwater table where practicable.
- Excavation water and potentially contaminated runoff will be managed through the drainage and sediment treatment arrangements.
- The substation drainage infrastructure, including piped surface water drainage and oil interception arrangements, will be installed.
- Designated refuelling and fuel storage facilities will be used, with appropriate bunding and spill response provisions implemented.
- Concrete washout will be restricted to designated impermeable containment facilities, and uncontrolled discharge of concrete-related wastewater will be prevented.
- Self-contained sanitary facilities will be provided, and wastewater will be removed off-site by an appropriately permitted contractor.
- The proposed substation culvert crossing of the arterial drainage network will be constructed in accordance with the relevant drainage design and OPW consent requirements.

C7 - Underground cable installation

- Underground cables will be installed alongside or within access tracks where required to minimise additional ground disturbance.
- Cable trenches will be excavated in short sections, during dry weather where practicable, and will remain open for the minimum practicable period.
- Clay bunds will be installed within trenches at intervals to prevent trenches functioning as preferential drainage pathways.
- Excavated materials will be stored and managed to prevent sediment mobilisation and runoff to nearby drains or watercourses.
- Water accumulating within excavations will be directed through appropriate sediment treatment arrangements.
- Cable trenches will be backfilled, and disturbed areas will be reinstated or revegetated as required.
- Existing drainage pathways affected by cable installation will be maintained or reinstated.
- Invasive species controls will be implemented where trenching or associated material movements could disturb identified infestations.

C8 - Temporary construction compounds

- Construction compounds will be provided with drainage systems incorporating drainage channels, settlement ponds and pollution prevention infrastructure.
- Surface water runoff from construction compounds will be directed through a Class 1 oil interception system before entering the site drainage treatment system and discharging diffusely over land.
- Designated refuelling and fuel storage facilities will be provided, including bunded storage and oil interception arrangements.

- Stored diesel and fuel oils will be bunded to at least 110% of the maximum tank capacity, with additional containment capacity provided where required for multiple tanks.
- Refuelling will be undertaken in designated areas, and spill kits, drip trays and trained personnel will be available for emergency spill response.
- On-site machinery maintenance will be restricted to emergency breakdown maintenance, with appropriate containment measures implemented.
- A designated concrete wash-down area will be provided at least 100 m from waterbodies, including streams and drainage ditches. The facility will incorporate impermeable containment and a settlement lagoon to collect concrete washout water.
- Concrete-related equipment will be washed only within designated containment facilities, and residual liquids and solids will be removed to an appropriately licensed waste facility.
- Self-contained welfare and sanitary facilities will be provided, and wastewater will be removed off-site by an appropriately permitted contractor.
- Sediment and pollution controls will be maintained until the compounds are decommissioned and disturbed areas reinstated.

C9 - Peat, spoil and excavated material management

- Excavated soils, subsoils and peat will be transferred to designated storage or deposition areas or reused for suitable backfilling and landscaping.
- Temporary material storage areas will be located at least 50 m from the true bank edge of watercourses.
- Temporary stockpiles will be covered with impermeable sheeting or other suitable protective coverings and surrounded by silt fencing.
- Stockpile sediment controls will be inspected and maintained to prevent mobilisation of suspended solids during rainfall.
- Peat deposition and containment arrangements, including engineered berms associated with the substation peat deposition area, will be implemented.
- Landscaping berms will be compacted and revegetated using native seed mixes to stabilise exposed soils.
- Silt fencing around sensitive berm locations will be maintained until vegetation is established, where required.
- Soils and vegetation containing invasive species will be segregated and managed through secure storage, controlled handling and appropriate disposal.
- Disturbed areas will be reinstated and revegetated to minimise ongoing erosion.

C10 - Construction traffic and machinery movements

- Construction traffic will use designated access routes and site entrance arrangements.
- The self-contained wheel-washing facility will be operated to minimise sediment tracking onto public roads, and collected waste will be removed by an appropriately permitted contractor.
- Plant refuelling will be undertaken at designated refuelling stations or at least 100 m from watercourses where mobile bowsers are used.

- Double-skinned mobile fuel bowsers will be used, and spill response equipment will be maintained at refuelling locations.
- Drip trays and spill kits will be provided, accidental releases will be contained, and contaminated materials will be appropriately removed.
- On-site machinery maintenance will be restricted to emergency breakdown works, with appropriate containment arrangements implemented.
- Machinery and equipment working within invasive species management areas will be subject to biosecurity measures.
- Equipment used within or near aquatic habitats will be inspected, cleaned and dried to minimise the introduction or spread of invasive species and aquatic pathogens.

C11 - Turbine delivery route accommodation works

- Existing drainage continuity will be maintained during temporary road widening and accommodation works.
- Where existing drains are covered or altered by road widening, flows will be diverted into replacement drains connected to the existing drainage network.
- Sediment and pollution prevention measures will be implemented at works locations near drains and watercourses.
- Invasive species management measures will be implemented for identified infestations along the turbine delivery route, including Cherry Laurel.
- Identified infestations will be demarcated, and exclusion buffers and treatment measures will be applied to prevent dispersal of viable plant material.
- Invasive plant material and contaminated soils will be appropriately contained and disposed of, and machinery hygiene measures will be implemented to prevent further spread.
- Temporary accommodation works and associated drainage arrangements will be reinstated following completion of delivery activities.

8.2 Operational Phase

O1 - Wind turbine operation and maintenance

- Turbine transformers will be located within the turbine structures to provide containment in the event of oil leakage.
- Fuels, lubricants and hydraulic fluids will be handled using appropriate pollution prevention measures during turbine maintenance.
- Accidental spillages will be contained immediately, and contaminated soils and other affected materials will be removed for appropriate off-site disposal.
- Waste oils and hydraulic fluids will be collected in leak-proof containers and transferred for appropriate disposal or recycling.
- Spill response equipment, including oil absorbent materials, will be maintained for use during maintenance activities.
- Invasive species biosecurity measures will be implemented during maintenance activities involving machinery, equipment or vegetation disturbance.

O2 - Substation operation and maintenance

- Concrete bunding will be maintained around the substation transformer and oil storage tanks, providing containment for at least 110% of the relevant oil storage capacity.
- Bunding arrangements for the diesel generator and associated fuel storage will be maintained, including additional containment capacity where required for multiple tanks.
- The substation surface water drainage system and full-retention petrol and oil interceptor will be maintained throughout operation.
- The effluent holding tank and associated wastewater containment arrangements will be maintained to prevent wastewater discharge to ground within the Johnstown Wellfield Source Protection Zone.
- Fuels, lubricants and hydraulic fluids will be handled using appropriate pollution prevention measures during operational maintenance.
- Accidental releases will be contained immediately, and contaminated materials will be appropriately removed.
- Waste oils and hydraulic fluids will be collected in leak-proof containers and transferred for appropriate disposal or recycling.
- Spill control equipment will be maintained, and pollution incident response procedures will be implemented in the event of an accidental release.

O3 - Permanent access tracks, hardstandings, drainage maintenance and vegetation management

- The permanent surface water drainage system will be maintained throughout operation.
- Upslope interceptor drains will continue to divert clean runoff around constructed areas and maintain existing hydrological pathways.
- Roadside swales, silt traps, check dams and settlement/stilling ponds will be inspected and maintained to provide runoff attenuation and suspended solids removal.
- Treated runoff will continue to be discharged diffusely to vegetated areas rather than directly to watercourses.
- Arrangements to temporarily block settlement pond outfalls will be maintained for use following an accidental contaminant release.
- Drains, check dams, cross-drains, culverts, swales and outfalls will be inspected for blockages and obstructions.
- Accumulated sediment and identified drainage obstructions will be removed as part of routine maintenance.
- Revegetated areas will be monitored, and maintenance measures will be implemented where necessary to prevent erosion and sediment mobilisation.
- Invasive species monitoring and biosecurity measures will be implemented during vegetation management and maintenance activities.

8.3 Decommissioning Phase

D1 - Turbine dismantling and removal

- Construction-phase sediment and pollution prevention measures will be implemented during turbine dismantling and removal, where applicable.
- Temporary silt protection controls will be reinstated before dismantling works where required.
- The existing drainage system will remain operational throughout decommissioning to collect and treat sediment-laden runoff from disturbed areas.
- Fuel handling, refuelling, spill prevention and emergency response measures will be implemented during dismantling activities.
- Accidental releases of fuels, oils and hydraulic fluids will be contained, and contaminated materials will be appropriately removed.
- Invasive species biosecurity measures will be implemented during machinery and equipment movements.

D2 - Foundation backfilling and reinstatement

- Excavation, sediment control and pollution prevention measures will be implemented during foundation reinstatement.
- The existing drainage treatment system will remain operational, and additional temporary silt controls will be installed where necessary to prevent sediment-laden runoff entering receiving waters.
- Excavated materials and exposed soils will be managed using appropriate stockpile protection and erosion control measures.
- Disturbed surfaces will be reinstated and revegetated following completion of the works.
- Revegetation will be monitored, and erosion control matting will be used where necessary to support vegetation establishment.

D3 - Underground cable extraction

- Where cable extraction involves excavation, trenching, drainage and sediment control measures will be implemented.
- Excavation disturbance will be limited to the extent necessary, and accumulated water will be managed through appropriate sediment treatment arrangements.
- Existing drainage pathways will be protected and maintained during the works, and affected drainage features will be reinstated following excavation.
- Excavated materials will be managed to prevent erosion and sediment mobilisation.
- Excavations will be backfilled, and disturbed surfaces will be reinstated or revegetated as appropriate.
- Pollution prevention and invasive species biosecurity measures will be implemented throughout cable extraction activities.

D4 - Decommissioning traffic and machinery movements

- Traffic management, refuelling, pollution prevention and spill response measures will be implemented during decommissioning.
- Sediment controls and operational drainage infrastructure will be maintained throughout vehicle movements and removal activities.
- Measures to prevent sediment tracking and contaminated runoff will be implemented during decommissioning traffic movements.
- Fuels, oils and other potentially polluting substances used during dismantling and removal activities will be stored and handled using appropriate containment measures.
- Machinery hygiene and invasive species biosecurity measures will be implemented.
- Disturbed access areas will be reinstated where required under the decommissioning arrangements.

9. WFD COMPLIANCE ASSESSMENT

The WFD compliance assessment has been undertaken to determine whether the proposed development, following implementation of the identified mitigation measures and embedded design controls, would comply with the environmental objectives of the Water Framework Directive during the construction, operational and decommissioning phases.

The assessment has considered the identified impact pathways, the sensitivity and current WFD status of the receiving water environment, the nature, magnitude, duration and spatial extent of potential effects, the existing pressures affecting the relevant waterbodies, and the mitigation measures incorporated into the proposed development.

The pre-mitigation assessment identified potential effects on the relevant surface waterbodies and groundwater body associated with construction, operational and decommissioning activities. These effects were generally expected to be localised, temporary or limited in extent. However, in the absence of mitigation, deterioration of certain biological, physicochemical and chemical quality elements, or compromise of the achievement of WFD environmental objectives, could not be excluded for the assessed surface waterbodies. Similarly, potential deterioration of the chemical status of the Trim Groundwater Body could not be excluded due to the risk of accidental contaminant releases, although deterioration of its quantitative status was not anticipated.

The mitigation measures and embedded design controls identified in Section 8 will address the principal pathways through which the proposed development could affect the receiving water environment. These include the prevention and treatment of sediment-laden runoff, management of excavation water and groundwater inflows, protection of watercourses during crossing works, containment of potentially polluting substances, maintenance of existing drainage pathways, control of invasive non-native species and implementation of environmental monitoring and incident response procedures.

Following implementation of these measures, potential residual effects on the receiving surface waterbodies are expected to be localised and of insufficient magnitude or duration to cause deterioration of their ecological or chemical status, including the status of individual biological, hydromorphological, physicochemical or chemical quality elements. Similarly, the proposed groundwater protection, pollution prevention and drainage management measures are expected to prevent deterioration of the chemical or quantitative status of the Trim Groundwater Body, including within the Johnstown Wellfield Source Protection Zones.

The cumulative effects assessment has also considered the potential interaction of the proposed development with existing significant pressures affecting the relevant waterbodies and other developments within the receiving catchment. Taking account of the identified mitigation measures and embedded design controls, the proposed development is not predicted to result in cumulative deterioration of WFD status or compromise the achievement of the applicable environmental objectives.

On the basis of the assessment undertaken, and subject to implementation of the identified mitigation measures and embedded design controls, the proposed development is not expected to:

- result in deterioration of the ecological or chemical status of Blackwater (Longwood)_010 (IE_EA_07B020060);
- result in deterioration of the ecological or chemical status of Blackwater (Longwood)_020 (IE_EA_07B020100);

- result in deterioration of the ecological or chemical status of the downstream hydrologically connected river waterbodies, namely Blackwater (Longwood)_030 (IE_EA_07B020200), Blackwater (Longwood)_040 (IE_EA_07B020300), Blackwater (Longwood)_050 (IE_EA_07B020600) and Boyne_060 (IE_EA_07B040900);
- result in deterioration of the chemical or quantitative status of the Trim Groundwater Body (IE_EA_G_002);
- cause deterioration of any individual WFD quality element;
- compromise the protection objectives of the relevant WFD Protected Areas, including the Johnstown Wellfield Drinking Water Protected Area and the Boyne_060 Drinking Water Protected Area;
- prevent or compromise the achievement of WFD environmental objectives for any of the assessed waterbodies; or
- conflict with the environmental objectives of the River Basin Management Plan 2022–2027 (Water Action Plan 2024).

Accordingly, the proposed development is considered to be compliant with the environmental objectives of the Water Framework Directive during the construction, operational and decommissioning phases.

10. DEROGATION, ARTICLE 4 (7)

Article 4(7) of the Water Framework Directive provides a mechanism whereby certain developments that may otherwise result in deterioration of water body status or prevent the achievement of WFD environmental objectives may proceed, subject to satisfaction of specific derogation tests and conditions.

Based on the findings of the WFD compliance assessment, the proposed development is not expected to result in deterioration of any surface water body or groundwater body status or prevent the achievement of WFD environmental objectives.

Accordingly, a derogation assessment under Article 4(7) of the Water Framework Directive is not required for the proposed development.

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APPENDIX 7

Site Specific Flood Risk Assessment

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DREHID WIND FARM

Site Specific Flood Risk Assessment

Prepared for:

North Kildare Wind Farm Ltd.

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Date **October 2026**

Document No:

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1. INTRODUCTION

Fehily Timoney and Company have been commissioned by the Applicant North Kildare Wind Farm Ltd., to provide consultancy services? including the preparation of this Site-Specific Flood Risk Assessment for the design of the proposed "Drehid Wind Farm Development" in Drehid, County Kildare.

The proposed Drehid Wind Farm is located in northern County Kildare, centred around the townland of Drehid. The proposed development is located approximately 3.5 km west of Carbury and approximately 2.5 km northwest of Timahoe, Co. Kildare; the site location of the project is shown in Figure 1-1 below.



Figure 1-1: Site Location

The proposed development comprises an onshore wind farm consisting of 11 no. wind turbines and associated infrastructure. The proposed wind farm will include turbine foundations and hard standing areas, internal access tracks, underground electrical and communications cabling, drainage infrastructure, temporary construction compounds and associated works. The development also includes a proposed 110 kV substation and associated loop-in connection to the existing electricity transmission network..

The proposed wind farm is located within a rural landscape comprising a combination of agricultural land, forestry and other semi-natural habitats. The proposed development extends across lands within the townlands of Ballynamullagh, Kilmurry, Killyon, Coolree, Mulgeeth, Drehid and Dunfierth, Co. Kildare. The proposed substation is located separately? within the townland of Coolree.

The proposed development has been designed to facilitate the generation of renewable electricity for export to the Irish electricity grid. The current proposal comprises 11 no. turbines with a total installed capacity of approximately 52.8 MW.

The Proposed Development was submitted to An Coimisiún Pleanála as a Strategic Infrastructure Development (SID) in accordance with Section 37E of the Planning and Development Act 2000 (as amended) following pre-application with An Coimisuin Pleanala held? Under? Section 37A of the Planning and Development Act 2000 (as amended). A separate Application for the substation and associated infrastructure was submitted under the provisions of Section 182A of the same legislation. Accordingly, all of the relevant planning applications have been made directly to An Coimisiún Pleanála.

The proposed development has been subject to detailed environmental, engineering and hydrological assessment. As part of the Site-Specific Flood Risk Assessment, the potential for flooding from relevant sources has been considered, with particular focus on fluvial and pluvial sources and the interaction between the proposed Turbines, No.3, No.4 and No.6 and the existing watercourse.

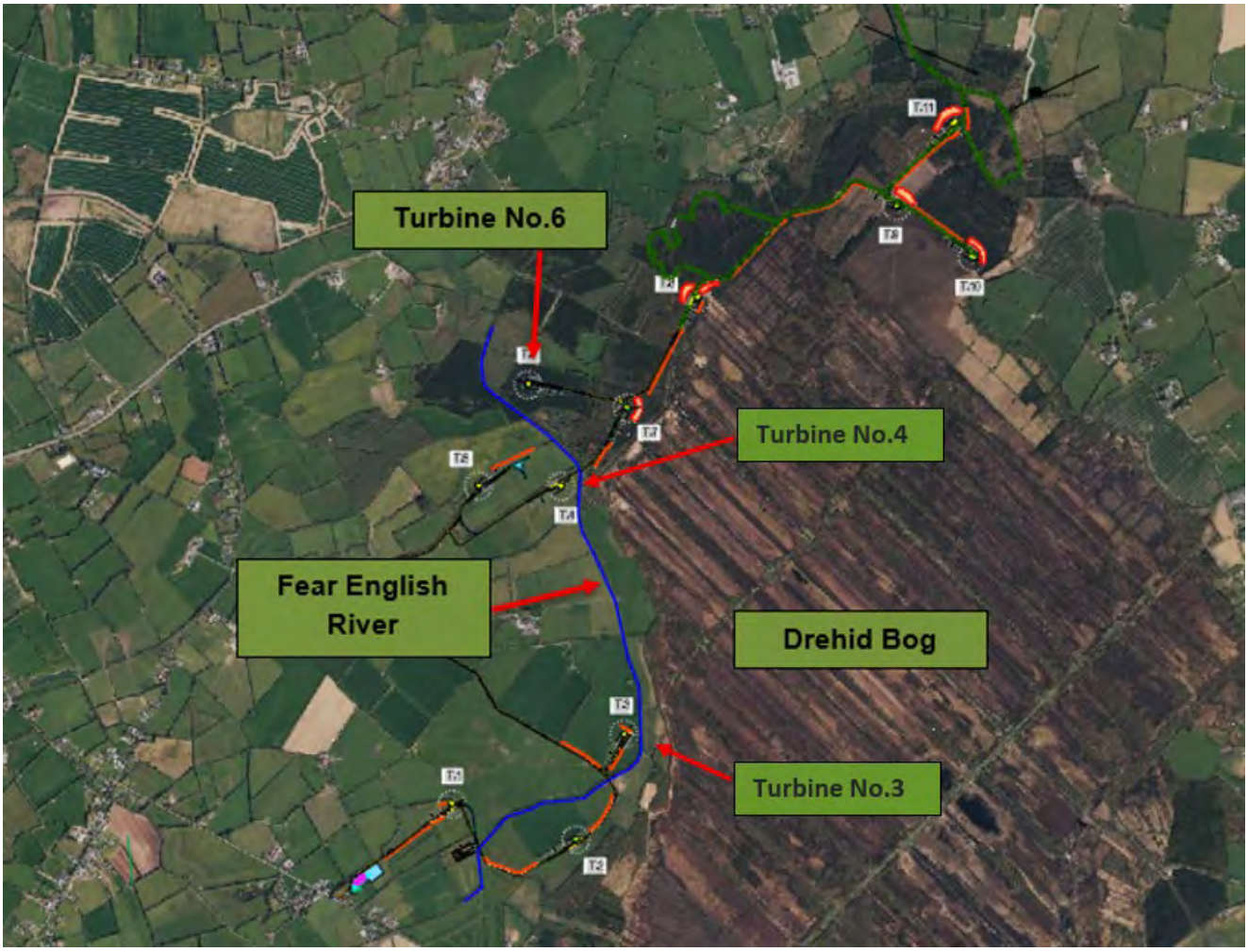


Figure 1-2: Proposed Development Drehid Wind Farm Layout

This report has been prepared as a Site-Specific Flood Risk Assessment for the Drehid Wind Farm Project. The purpose of the assessment is to identify and quantify potential flood risk associated with the proposed development and to determine whether the proposed works could result in an increase in flood risk elsewhere.

The hydraulic component of the assessment has been developed using HEC-RAS 6.6. The model represents the surveyed watercourse using a series of cross-sections and includes existing hydraulic structures and proposed structures as the design develops?.

The current hydraulic geometry comprises one modelled river reach and 48 cross-sections, with river stations extending from approximately 0 to 3,645 m.

2. FLOOD RISK ASSESSMENT METHODOLOGY

2.1 General

The Guidelines for Planning Authorities and their Technical Appendices outline the requirements for a SSFRA. The Guidelines for Planning Authorities require that works:

- Avoid development in areas at risk of flooding.
- Substitute less vulnerable uses where avoidance is not possible.
- Mitigate and manage the risk where avoidance and substitution are not possible.

The key principles of the Guidelines for Planning Authorities apply the Sequential Approach to the planning process. Figure 2-1 of this report describes the mechanism of the sequential approach for use in the planning process.

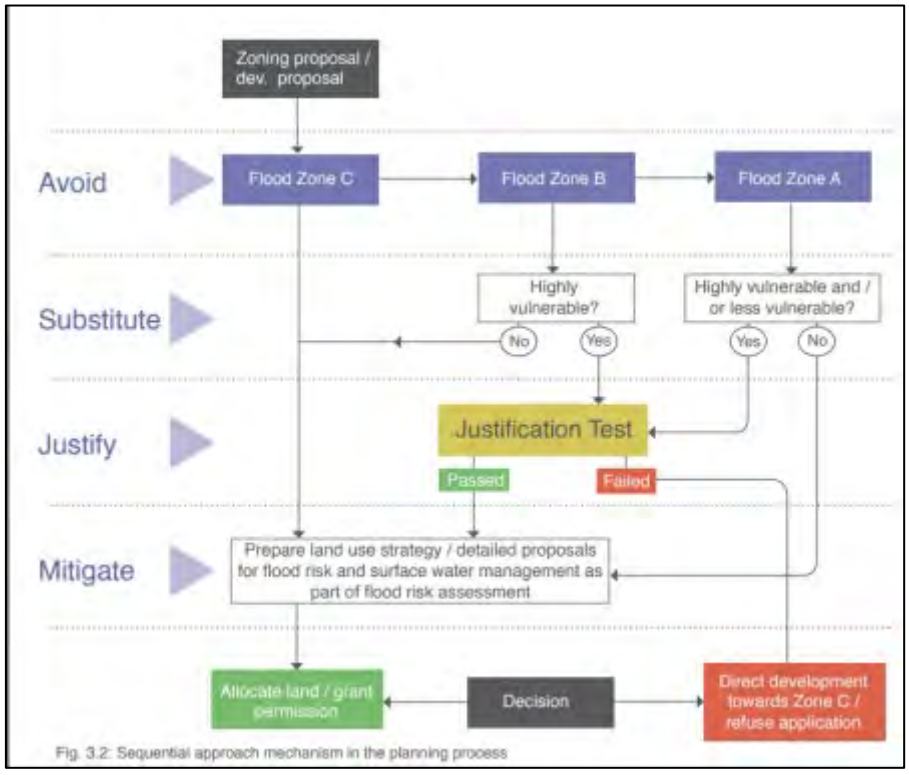


Figure 2-1: Sequential Approach Mechanism (Figure 3.2 of the Guidelines for Planning Authorities)

2.2 Source-Pathway-Receptor Model

The assessment of flood risk requires a thorough understanding of the following:

- The sources of flood water (e.g., high sea levels, intense or prolonged rainfall leading to runoff and increased flow in rivers and sewers)
- The pathways by which the flood water reaches those receptors (e.g., river channels, river and coastal floodplains, drains, sewers and overland flow).
- The people and assets affected by flooding (known as the receptors).

The Source-Pathway-Receptor (S-P-R) Model illustrated in Figure 2-2 has become widely used to assess and inform management of environmental risks.

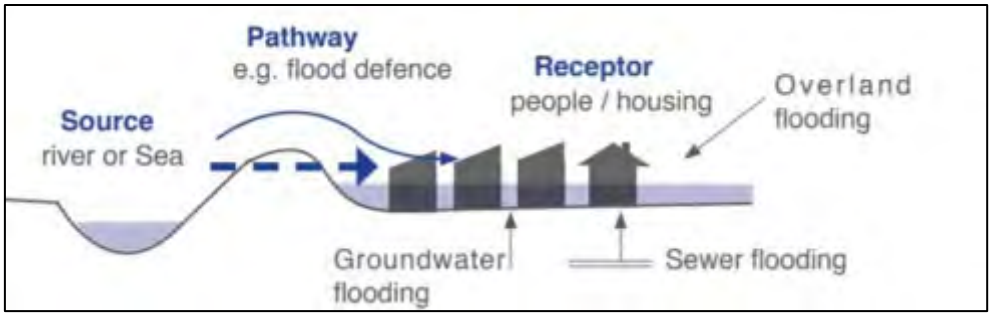


Figure 2-2: Source-Pathway- Receptor Model (Figure 2.2 of the Guidelines for Planning Authorities)

2.3 Likelihood of Flooding and Definition of Flood Zones

The Guidelines for Planning Authorities define the likelihood of flooding as the percentage probability of a flood of a given magnitude occurring or being exceeded in any given year. The likelihood of flooding is expressed as a return period or annual exceedance probability (AEP).

Flood Zones are graphical areas within which the likelihood of flooding is in a particular range. They are a key tool in flood risk management within the planning process as well as in flood warning and emergency planning. The Guidelines for Planning Authorities split these flood zones into three categories:

- Flood Zone A – where the probability of flooding from rivers and the sea is high (greater than 1% AEP for river flooding or 0.5% AEP for coastal flooding).
- Flood Zone B – where the probability of flooding from rivers and the sea is moderate (between 0.1% AEP and 1% AEP for river flooding and between 0.1% AEP and 0.5% AEP for coastal flooding).
- Flood Zone C – where the probability of flooding from rivers and the sea is low (less than 0.1% AEP for both river and coastal flooding)

2.4 Classification of the Proposed Development and Justification Test

The Guidelines for Planning Authorities categorises all types of development as either:

- Highly Vulnerable (garda, ambulances, schools, hospitals, dwelling houses, student halls…).
- Less Vulnerable (buildings used for: retail leisure, warehousing, commercial, industrial, and non-residential institutions,).
- Water Compatible (flood control infrastructure, docks, marinas, amenity open spaces...).

The Guidelines classify potential development in terms of its vulnerability to flooding. The types of development falling within each vulnerability class are described in Table 3.1? of the Guidelines.

Table 2-1: Vulnerability Class

Highly vulnerable development (Including essential infrastructure)	Garda, ambulance, fire stations and command centres are required to be operational during flooding. Hospitals. Emergency access and egress points. Schools. Dwelling houses, student halls of residence and hostels. Residential institutions such as residential care homes, children's homes and social services homes. Caravans and mobile home parks. Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility. Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding.
Less vulnerable development	Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions. Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans. Land and buildings used for agriculture and forestry. Waste treatment (except landfill and hazardous waste). Mineral working and processing. Local transport infrastructure.
Water-compatible development	Flood control infrastructure. Docks, marinas and wharves. Navigation facilities. Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. Water-based recreation and tourism (excluding sleeping accommodation). Lifeguard and coastguard stations. Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms.

	Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).?

*Uses which are not listed in the table should be considered on their own merits.

The Sequential Approach restricts development types to occur within the flood zone appropriate to their respective vulnerability classes. Table 2-2 identifies the types of development appropriate for each flood zone and those that will require a Justification Test.

Table 2-2: Matrix of Vulnerability Versus Flood Zone (Table 3.2 of the Guidelines for Planning Authorities)

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development (including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water-compatible development	Appropriate	Appropriate	Appropriate

The Justification Test has been designed to rigorously assess the appropriateness of developments that are being considered in areas of moderate or high flood risk. There are two types of Justification Tests:

- The first is the Plan-making Justification Test which is used at the plan preparation and adoption stage where it is intended to zone or otherwise designate land which is at moderate or high risk of flooding.
- The second is the Development Management Justification Test which is used at the planning application stage where it is intended to develop land at moderate or high risk of flooding for uses or development vulnerable to flooding that would generally be inappropriate for that land.

2.5 Flood Risk Assessment Stages

The Guidelines for Planning Authorities outline that a staged approach should be adopted when carrying out a SSFRA. These stages are the following:

- Stage 1 Flood Risk Identification.
- Stage 2 Initial Flood Risk Assessment.
- Stage 3 Detailed Flood Risk Assessment.

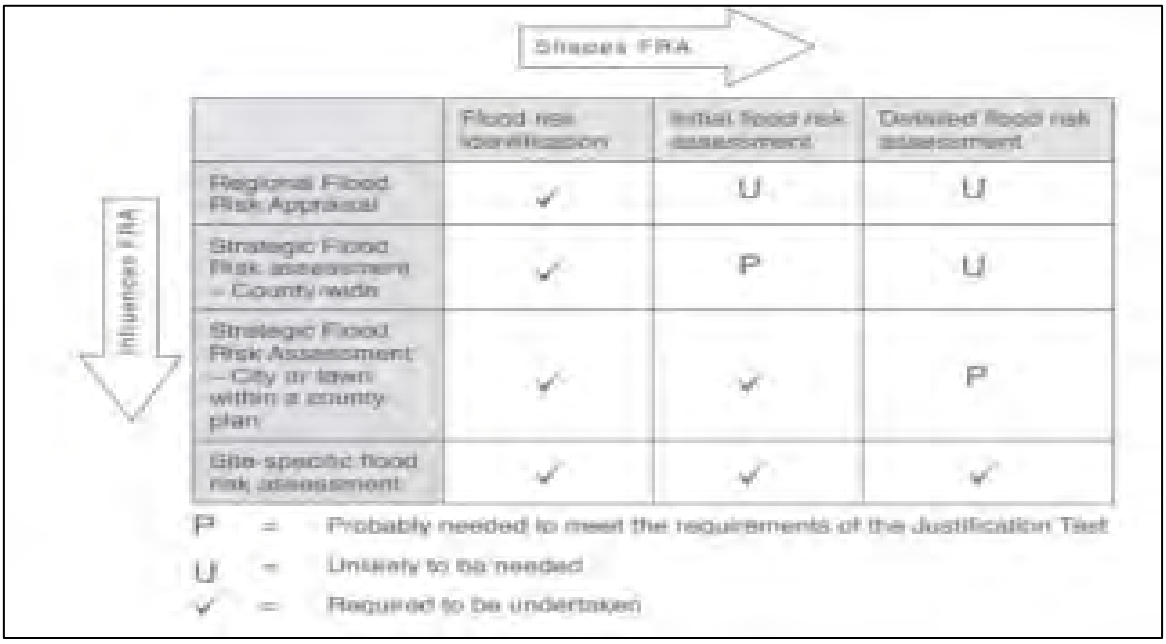


Figure 2-3: Flood risk assessment stages required per scale of study undertaken

Stage 1: Flood risk identification – to identify whether there may be any flooding or surface water management issues relating to the Proposed Development site that may warrant further investigations. The flood risk identification stage uses existing information to identify whether there may be any flooding or surface water management issues related to the site. Flood risks identified in this stage are then addressed in Stage 2.

Stage 2: Initial flood risk assessment – to confirm sources of flooding that may affect the development site, to appraise the adequacy of existing information and to determine what surveys and modelling approach is appropriate to match the spatial resolution required and complexity of the flood risk issues. This stage involves the review of data addressed in Stage 1. Data where the flood risk at the site is recognised as being low is screened out and it is not further addressed in the report, data which recognised the flood risk on the site to be medium or high is further analysed in the report.

Stage 3: Detailed flood risk assessment – to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk to a proposed or existing development, of its potential impacts on flood risk elsewhere and of the effectiveness of any proposed mitigation measures. This will typically involve the use of an existing or construction of a hydraulic model across a wide enough area to appreciate the catchment wide impacts and hydrological process involved.

3. EXISTING SITE

3.1 Description of Catchments

The Drehid Wind Farm Project is located in County Kildare, Ireland. The hydraulic assessment focuses on the watercourse and floodplain areas that could be hydraulically influenced by the proposed works.

The proposed development is located within the Boyne Catchment (Hydrometric Area 07) and within the Blackwater (Longwood)_SC_010 Sub-catchment. The site also lies within two sub-basins: Blackwater (Longwood)_020 and Blackwater (Longwood)_010. The main watercourse in the study area is the Fear English River (Balckwater? (Longwood)_020), which flows generally northwards to north-eastwards along the eastern part of the development site before joining the River Blackwater downstream. The catchment comprises a network of rivers and drainage channels, with sections of the Fear English River having been historically straightened, dredged and modified for land drainage, please refer to Figure 3-1 Below.

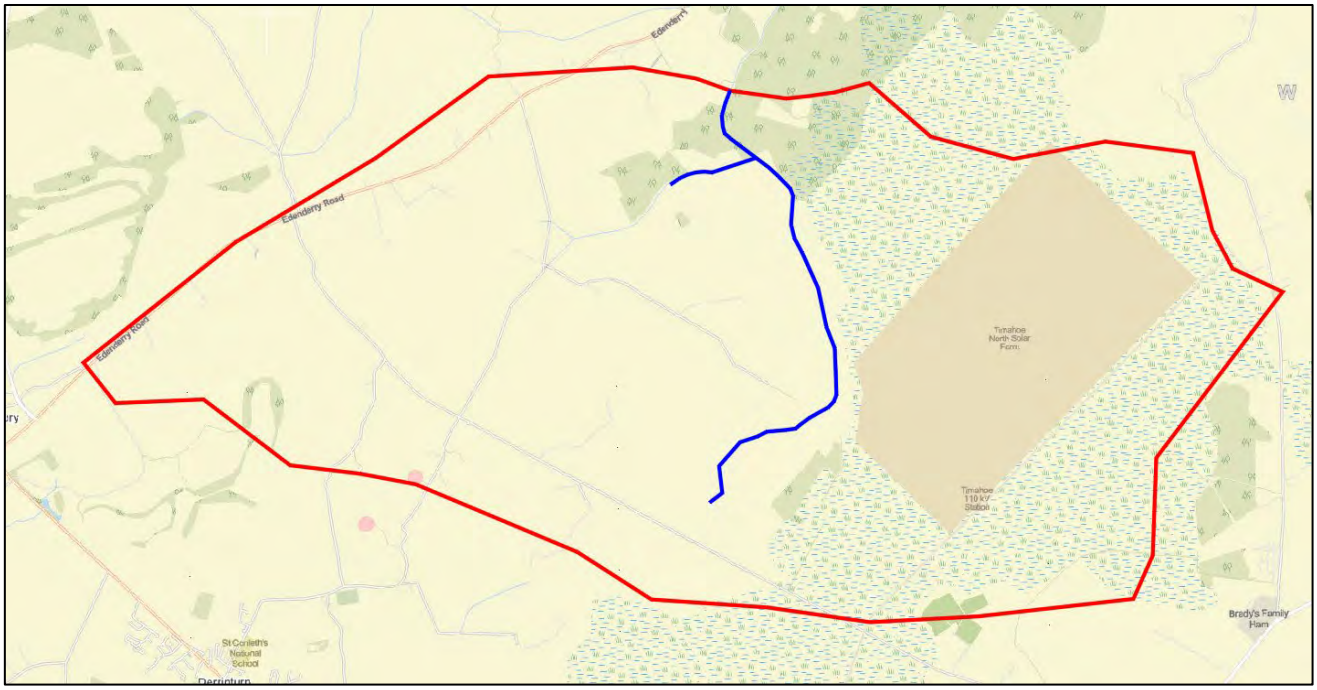


Figure 3-1: River Fear English Catchment at the Proposed Development Site

Rainfall and catchment characteristics were considered as part of the hydrological assessment, with a Standard Average Annual Rainfall (SAAR) value of 822mm adopted for the hydrological calculations.

3.2 Topography, Subsoil and Hydrogeology

The terrain across the proposed Drehid Wind Farm development in north County Kildare is generally undulating, with ground levels within the site ranging from approximately 76 m OD to 87 m OD.

The superficial geology within the study area, as per the IE Geospatial Resources (2026), consists of peat, described as 'cut over raised peat'. The surrounding area consists of 'till derived from limestones' with a section of 'gravel derived from limestones' located to the north-west.

The bedrock geology consists of 'dark limestone and shale' belonging to the 'Lucan Formation'.

The bedrock is defined as a 'productive fissured bedrock' and the aquifer classification is: 'Locally important aquifer which is generally moderately productive'. The bedrock is part of the 'Trim' Groundwater Body (GWB). The limestone which forms this GWB is described as 'extremely heterogeneous' with the degree of karstification throughout the area being highly variable. Groundwater transmissivity ranges between 50-200 m2/day. Groundwater recharge occurs via diffuse (areas where subsoil is thin or permeable) and point recharge (swallow holes) mechanisms.

Groundwater vulnerability, as defined by the GSI, is the term used to represent the intrinsic and hydrogeological characteristics that determine the ease with which groundwater could be contaminated by human activities and is a function of the subsoil type, depth and permeability. As per the GSI Public Data Viewer (2026), most of the site has a low vulnerability and a low subsoil permeability (area covered with deep peat). To the north of the site, the vulnerability and subsoil permeability are high, coinciding with the shallower peat depths. These observations are in line with the findings of the site walkover survey.

Nevertheless, FT confirms typical low permeability cover (peat) under 3.0 m and occasionally between 3.0 – 5.0m. The peat is assumed to be underlain by glacial till deposits. Data from nearby water wells indicates that bedrock is present at a depth of 6.0 mbgl (GSI Well Name: 2623SEW176) to 11 mbgl (GSI Well Name: 2623SEW136).

3.2.1 Hydrological Features

A site walkover survey was conducted when preparing the planning application to establish the drainage pattern and to record existing hydrological features; a collection of the site visit photos can be found in Appendix 5, lodged with this report.

3.2.2 Proposed Watercourse Crossings

The proposed development crosses the Fear English River at three locations. As part of this SSFRA, a detailed review and hydraulic assessment of the proposed watercourse crossings has been undertaken to assess the potential impact of the proposed access tracks and bridge structures on existing flood conditions and to ensure that the proposed crossings provide adequate conveyance of the design flows.

The Fear English River is the main watercourse associated with the proposed development site and flows through the Drehid Wind Farm lands. It forms part of the wider River Blackwater catchment, which ultimately drains to the River Boyne. The Fear English rises in the vicinity of Parsons town at approximately 88 mOD and flows generally in a northerly to north-easterly direction along the eastern part of the proposed development. Downstream of the proposed development, the Fear English receives flows from the Kilcooney River before continuing towards Johnstown Bridge, where it joins the River Blackwater. The River Blackwater subsequently flows towards the River Boyne.

Within the proposed development lands, the Fear English River and its associated drainage network have been subject to historic drainage and channel modification. Previous environmental surveys describe sections of the watercourse as having been dredged, straightened and channelised as part of the historic arterial drainage and land management activities.

The first proposed crossing of the Fear English River is associated with the proposed access track connecting Turbine T1 to Turbine T2. This crossing will provide access between the two turbine locations while maintaining the existing watercourse flow path, please refer to Figure 3-2.

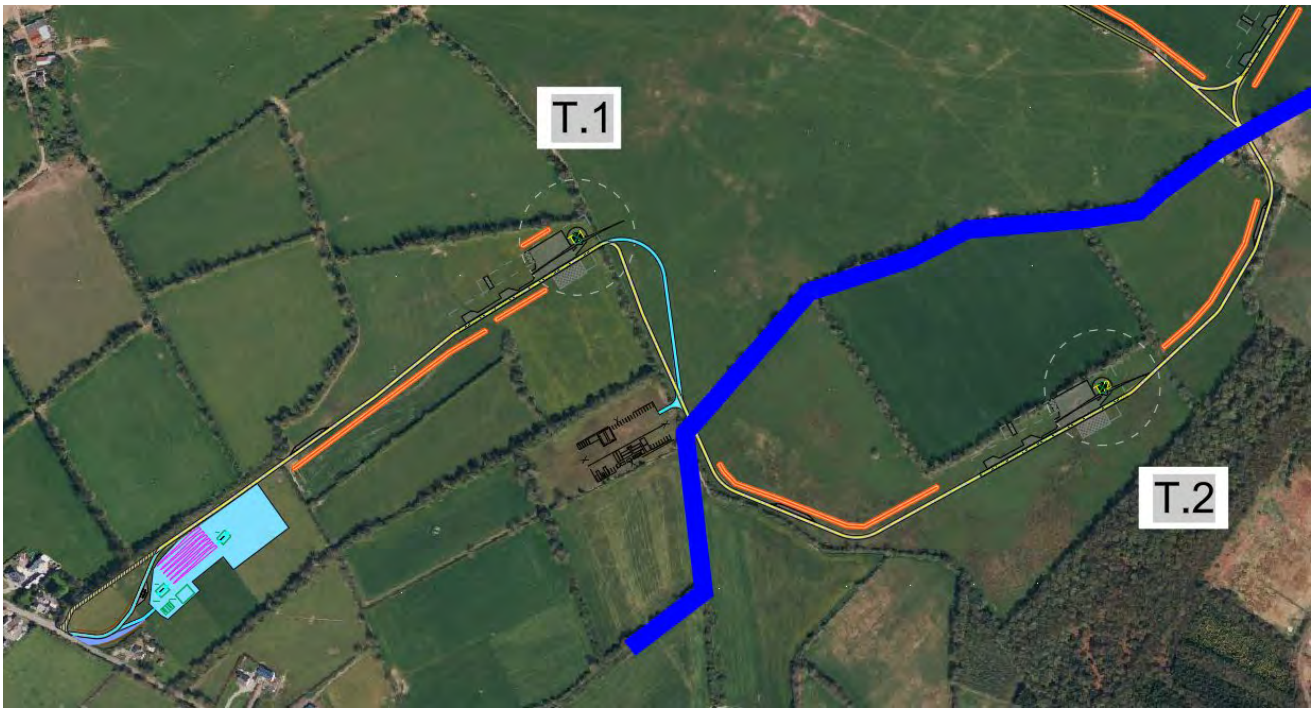


Figure 3-2: Watercourse Crossing Scheme Outline Sketch, T.1 – T.2

The second proposed crossing is located along the proposed access track connecting Turbine T2 to Turbine T3. At this location, an existing 1,000 mm diameter culvert is present beneath the access track. As part of the proposed development, the existing culvert will be removed and replaced with a bridge structure. The replacement of the existing culvert with a bridge will provide substantially greater conveyance capacity and is intended to improve hydraulic performance by reducing flow restrictions at this location. Please refer to Figure 3-3.



Figure 3-3: Watercourse Crossing Scheme Outline Sketch, T.2 – T.3

The third proposed crossing is associated with the proposed access track connecting Turbine T4 to Turbine T7. A new bridge structure is proposed at this location to facilitate the access track crossing of the Fear English River while maintaining the existing watercourse channel and flood conveyance, please refer to Figure 3-4.

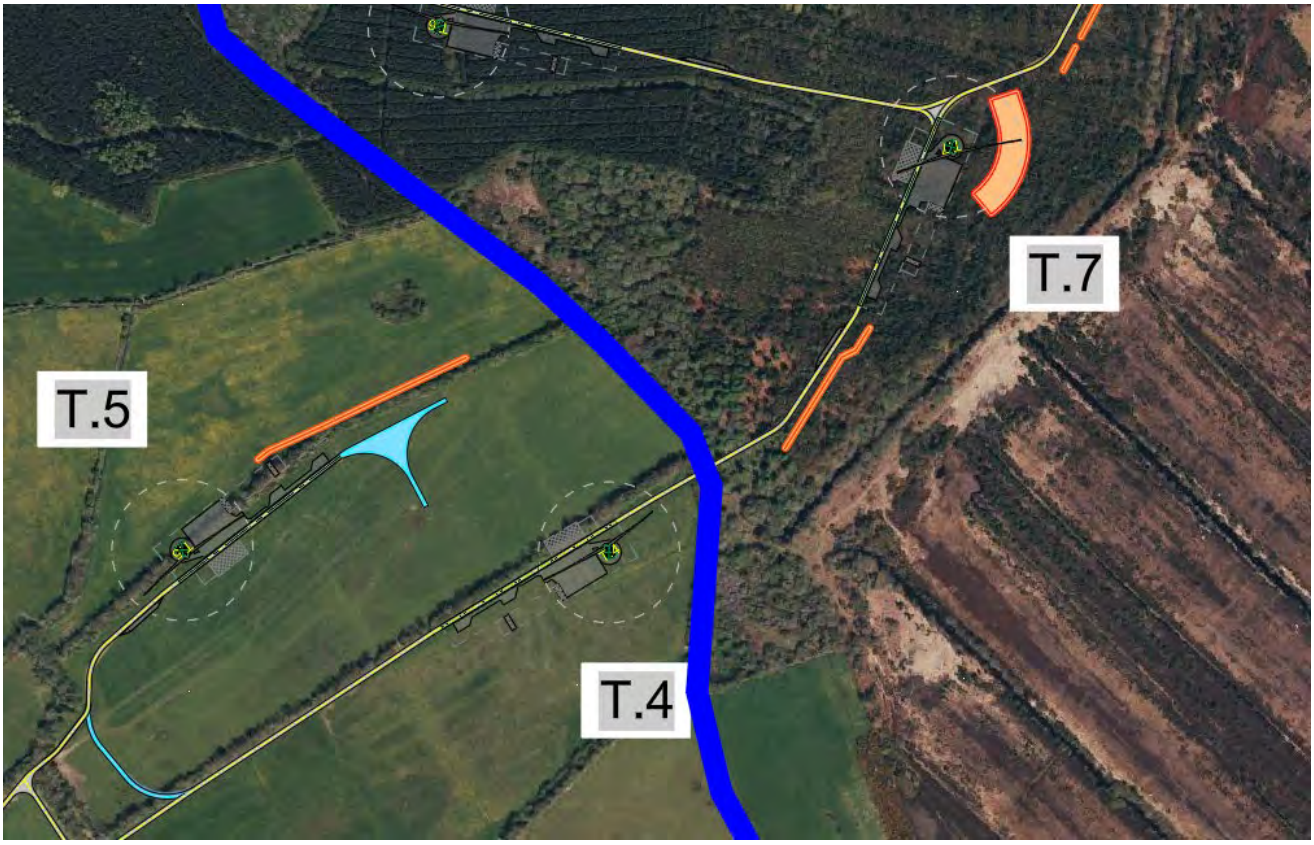


Figure 3-4: Watercourse Crossing Scheme Outline Sketch, T.4 – T.7

4. CURRENT PLANS

4.1 County Kildare Development Plan

The Kildare County Development Plan 2023–2029 provides the strategic planning framework for the sustainable development of County Kildare. The Plan establishes policies and objectives relating to renewable energy, wind energy development, infrastructure, flood risk management and climate resilience.

The proposed Drehid Wind Farm is consistent with the County Development Plan's strategic support for renewable energy development and its Wind Energy Strategy, which promotes the sustainable development of wind energy. In particular, **Objective EC O11** seeks to encourage wind energy development in suitable locations in an environmentally sustainable manner, having regard to Government policy and the County Wind Energy Strategy. The Plan also identifies the potential contribution of wind energy towards achieving renewable energy and climate-action objectives within the County.

The Wind Energy Strategy takes a stepwise approach to assigning “strategy zones” across the county of Kildare. The strategy zones are:

- Zone 1 – acceptable in principle
- Zone 2 – open to consideration
- Zone 3 – not normally permissible

The Proposed Development is located in an area considered ‘Open to Consideration’ for wind energy development.

The approach to flood risk management and Surface Water is set out in Chapter 6, Infrastructure & Environmental Services, of Volume 1 and in the Strategic Flood Risk Assessment (SFRA) of the CDP. They incorporate objectives requiring flood risk to be appropriately considered as part of the planning and development management process. Objective IN O31 requires flood risk to be managed in accordance with the sequential approach and the requirements of the Planning System and Flood Risk Management Guidelines for Planning Authorities (2009), including the preparation of site-specific Flood Risk Assessments where appropriate. Such assessments are required to address potential sources of flood risk, known flood risk, residual flood risk and any proposed site-specific flood-management measures.

The proposed development has therefore been assessed having regard to the relevant policies and objectives of the Kildare County Development Plan, with particular consideration given to the potential effects of the proposed access tracks and watercourse crossings on existing flood conditions and hydraulic conveyance.

5. STAGE 1 – FLOOD RISK IDENTIFICATION

The purpose of Stage 1 is to identify whether there may be flooding or surface water management issues associated with the proposed development that require further investigation.

5.1 Areas for Further Assessment

The review of available flood-risk information identified several matters requiring further consideration as part of this Site-Specific Flood Risk Assessment. The published project documentation indicates that the proposed development area was not identified as an Area for Further Assessment under the CFRAM programme, and detailed CFRAM flood mapping is not available for the relevant area. However, indicative mapping identifies potential fluvial flood risk (NIFM) in the vicinity of Turbine T6, while a number of turbines and the proposed substation are located within areas mapped as benefiting lands.

5.2 Coastal Flooding

Coastal flooding is not expected to be a controlling mechanism for the inland Drehid Wind Farm site, due to the ground levels within the site range from approximately 87 m OD to 76 m OD and location of the area.

5.3 Groundwater Flooding

Geological Survey Ireland (GSI) provides national groundwater flood datasets, including historic and predictive groundwater flood mapping developed through the GWFlood project. The historic mapping primarily records groundwater flooding associated with the extensive winter 2015/2016 groundwater flooding event, while the predictive mapping identifies areas susceptible to recurrent groundwater flooding.

A review of the available groundwater flood mapping was undertaken for the proposed Drehid Wind Farm site and surrounding area. No recorded groundwater flood events or mapped groundwater flood extents were identified within the proposed development area based on the available national groundwater flood datasets.

Groundwater flooding is therefore not identified as a principal source of flood risk to the proposed development based on the available mapping and records.

5.4 Fluvial Flooding

The National Indicative Flood Mapping (NIFM) Programme extends to the proposed development which shows that the Propsoed Development is vulnerable to fluvial flooding. Figure 5-1 below shows the flood extents for the 1% and 0.1 % annual exceedance event – Current Scenario.

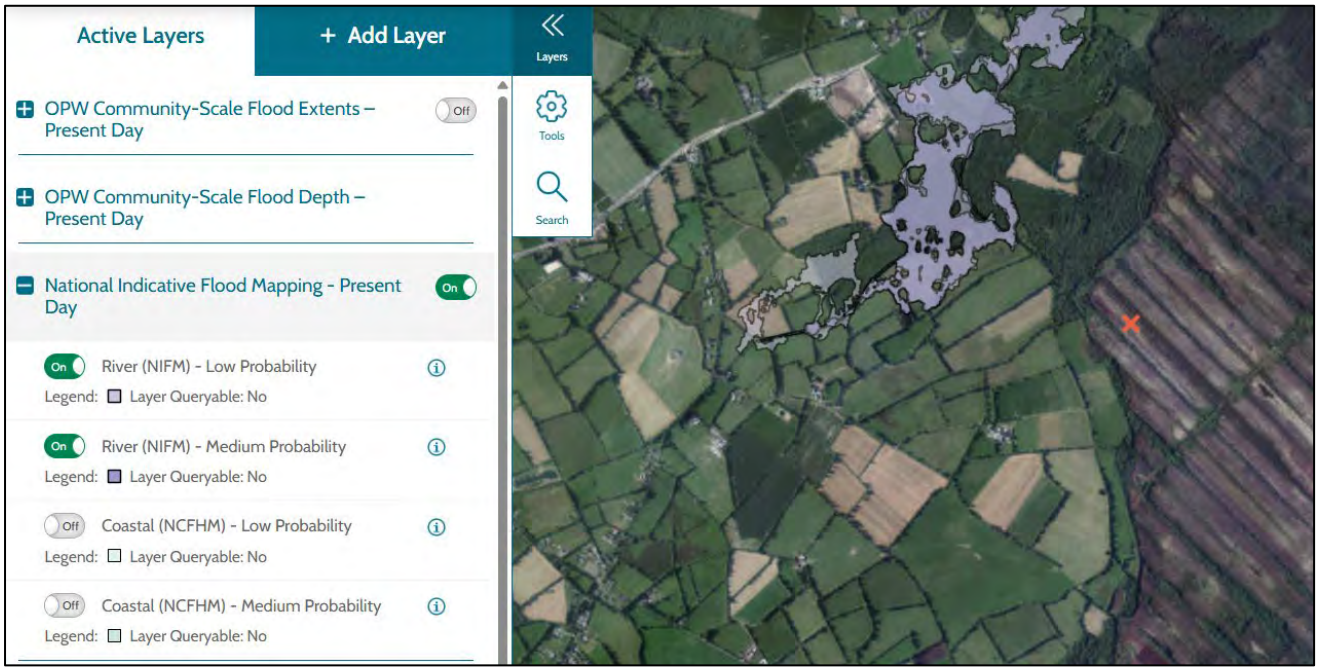


Figure 5-1: NIFM Flood Map-Medium and Low Probability-Current Scenario (Map taken from www.floodmaps.ie)

5.5 Pluvial Flooding

A review of the available flood-risk information for the proposed development site has been undertaken. No specific records or mapped data relating to pluvial (surface water) flooding have been identified for the site. Consequently, no specific pluvial flood risk has been identified based on the available information at https://www.floodinfo.ie/ .

5.6 Historical Flooding

The national flood hazard mapping (www.floodmaps.ie), indicates that there are no historical or past flooding events within the proposed site boundary. The nearest past flood event is approximately 3.2 km from the northern side of the proposed scheme, please refer to Figure 5-2 below:



Figure 5-2: Past Flood Event (Map taken from www.floodmaps.ie)

5.7 Conclusion – Stage 1

Having regard to all the information sources outlined above, it is considered that the proposed development could be subject to potential flood risk issues and therefore the assessment should proceed to Stage 2.

6. STAGE 2 – INITIAL FLOOD RISK ASSESSMENT

The purpose of this stage is to confirm sources of flooding that may affect the development site, to appraise the adequacy of existing information and to determine the complexity of the flood risk issues. This stage involves the review of data addressed in Stage 1.

Based on the information recorded in Stage 1, it has been determined that the principal source of flood risk to the proposed development is fluvial flooding associated with the Fear English River. No specific records or mapped data relating to pluvial or groundwater flooding have been identified for the site based on the available information.

The northern side of the proposed development encroaches on Flood Zones A and B (1% and 0.1% AEP) for the current scenario, as shown in Figure 6-1 below:



Figure 6-1: NIFM Extract Flood Map-Medium and Low Probability-Current Scenario (Map taken from www.floodmaps.ie)

The proposed development is located in the vicinity of the Fear English River, with three proposed watercourse crossings associated with the development access tracks. The potential for fluvial flooding at the proposed development and the potential effects of the proposed crossings on existing flood conditions are therefore considered further as part of the Stage 3 Detailed Flood Risk Assessment.

The Stage 3 assessment comprises hydraulic modelling of the Existing Scenario and Proposed Scenario for the 1% AEP and 0.1% AEP design flood events, with the results used to assess changes in flood levels, flood extents and hydraulic conveyance associated with the proposed development.

7. STAGE 3 – DETAILED FLOOD RISK ASSESSMENT

A site-specific hydraulic model was developed as part of this SSFRA to assess flood levels along the Fear English River and the hydraulic performance of the proposed watercourse crossings. Hydrological and hydraulic analysis were undertaken along the relevant reach of the river to assess the existing flood conditions and the potential impact of the proposed development.

The HEC-RAS model includes the existing channel and surrounding floodplain, together with the existing hydraulic structure and site-specific Manning's roughness values. A Proposed Scenario was then developed to include the three proposed crossings associated with the wind farm access tracks.

The first proposed crossing is located on the access track connecting Turbine T1 and Turbine T2. The second crossing is located on the access track between Turbine T2 and Turbine T3, where the existing 1,000 mm diameter culvert is proposed to be replaced with a bridge. The third crossing is located on the access track connecting Turbine T4 and Turbine T7, where a new bridge is proposed.

The hydraulic assessment was undertaken for the 1% AEP and 0.1% AEP design flood events for both the Existing and Proposed Scenarios. The model results were used to compare flood levels and flood extents and to assess the effect of the proposed crossings on flood risk upstream and downstream of the development.

7.1 Hydrology Analysis

The hydrology of a catchment is influenced by its physical characteristics, including the catchment area, rainfall, soil conditions and the characteristics of the contributing catchment. The parameters used for the hydrological calculations for the Drehid Wind Farm development are summarized in Table 7-1 below.

The hydrological assessment was undertaken to estimate the peak flows for the design flood events. The assessment considered the Institute of Hydrology Report 124 (IH124) and ADAS methods. The catchment flow calculations were undertaken using a Standard Average Annual Rainfall (SAAR) of 822 mm, a soil index of 0.47 and a 20% climate change allowance?. The design return periods adopted in the catchment flow calculations were 100 and 1000 years (1% and 0.1% AEP).

In addition, the Flood Studies Update (FSU) methodology and associated data were consulted to estimate QMED (the median annual maximum flood) for contributing catchments. Given that the catchments are relatively small, with areas of less than 25 km², QMED was estimated using alternative methods available within the FSU guidance, as applicable. The resulting FSU-derived design flows were compared with those calculated using the IH124 and ADAS methods. For the hydraulic assessment, the most conservative flow was selected from the IH124 method, to provide a precautionary basis for assessing flood levels and the potential effects of the proposed development. A 20% climate change allowance was applied to the adopted design flow. Five contributing catchments were considered in the assessment, with catchment areas divided in five different catchments ranging from approximately 2.33 km² to 20.36 km², shown in Figure 7-1 and summarized in Table 7-1 Below:



Figure 7-1: Catchment distribution

The calculated design flows were subsequently used as inputs to the hydraulic assessment of the Fear English River.

Table 7-1: Catchment Descriptors for the Hydrological Estimation Flow Locations

Variable	Description	CAT-1	CAT-2	CAT-3	CAT-4	CAT-5
SAAR (mm)	Standard Average Annual Rainfall	822	822	822	822	822
SOIL	Soil Index	0.47	0.47	0.47	0.47	0.47
AREA (km^2)	Catchment area	2.330	3.461	5.096	6.713	20.360
W (m)	Maximum catchment width	2,448	3,085	3,494	4,784	4,779
IH124 F	Growth factor 100 Years	1.96	1.96	1.96	1.96	1.96
	Growth factor 1000 Years	2.67	2.67	2.67	2.67	2.67
ADAS F1	ADAS growth factor	1.05	1.05	1.05	1.05	1.05
CC (%)	Climate change allowance	20	20	20	20	20

The Hydrology Analysis will be conducted to ascertain the flow values corresponding to the Annual Exceedance Probabilities (AEP) of 1% and 0.1%, plus 20% of Climate Change. Several methods were considered for estimating the peak flow of the watercourse:

- IoH124
- ADAS Method

The IoH124 equation was selected as it was considered the most appropriate method for the size of the catchments.

This analysis aims to simulate a flooding event and generate flood zone scenarios A and B. Below the Table 7-2 shows these flow values for the different return periods.

Table 7-2: Flood Estimations for the different return periods

Hydrological Estimation Flows	AEP (%)	
Catchment Reference	1% AEP + 20% CC (m^3/s)	0.1% AEP + 20% CC (m^3/s)
CAT-1	2.70	3.67
CAT-2	3.83	5.22
CAT-3	5.41	7.37
CAT-4	6.91	9.42
CAT-5	18.56	25.28

7.2 Hydraulic Analysis

7.2.1 Model Details

A one-dimensional flood model of the relevant watercourse was constructed using HEC-RAS Version 6.6.

The model geometry was developed from the project GIS geometric data, site survey and checked against the project terrain model, it will represent:

- Approximately 3.65 km of watercourse, from River Station 0 to River Station 3,645 m.
- The model includes 48 surveyed cross-sections along the study reach.

The primary hydraulic model inputs are summarized below:

- Geometric data: one river reach and 48 surveyed cross-sections, including channel and overbank areas. Surveyed by Murphy's? in September 2026:
  a) Including Existing infrastructures on site for Existing Scenario
  b) Including Proposed Infrastructures on site for Future Scenario

- Inflow Data - estimated using the IoH 124:
  a) 100-year Mid-Range Existing Scenario.
  b) 1000-year Mid-Range Existing Scenario.
  c) 100-year Mid-Range Future Scenario.
  d) 1000-year Mid-Range Future Scenario.

- Boundary Conditions:
  a) Normal depth for the upstream and downstream boundary conditions.

The Manning's values for the river channel and overbanks were determined by identifying the different types of materials encountered during a site visit and site survey where photos were taken; this assisted in selecting the appropriate manning's coefficient from the Hec-Ras Reference Manual. The contraction and expansion coefficients utilized were likewise drawn from the recommendations of the same manual. Please refer to Table 7-3 below:

Table 7-3: Design parameter used in the Hydraulic Analysis

Parameter	Value	Source / Basis
Manning's Value – Channel	0.065–0.080	Site-specific assessment of channel conditions and georeferenced site photographs
Manning's Value – Left Overbank	0.085–0.095	Site-specific assessment of overbank vegetation and land-cover conditions
Manning's Value – Right Overbank	0.077–0.095	Site-specific assessment of overbank vegetation and land-cover conditions
Contraction Coefficient	0.1	HEC-RAS hydraulic modelling parameter
Expansion Coefficient	0.3	HEC-RAS hydraulic modelling parameter

The proposed Bridges are designed for the 100 years return period (1% AEP) with a 20% inclusion for climate change and aim to have a minimal impact on the flood levels upstream and downstream of the proposed scheme. The bridges sizes were determined to ensure a minimum freeboard of 300 mm . All bridge geometrical parameters are listed in Table 7-4 below:

Table 7-4: Design parameter for Proposed Water crossing

Bridge	Access Track	River Station	Existing Structure	Proposed Structure	Bridge Width (m)	Opening (m)
Bridge 1	T1 – T2	3307.35 / 3299.98	Watercourse crossing	Proposed bridge	5.40	9.60
Bridge 2	T2 – T3	2555.79	1,000 mm diameter culvert	Replacement bridge	5.40	9.62
Bridge 3	T4 – T7	917.66	Watercourse crossing	Proposed bridge	5.40	9.77

7.2.2 Existing Scenario – Watercourse Cross Sections

The Existing Scenario was modelled to assess current flood conditions along the Fear English River. The HEC-RAS model includes the existing river channel, floodplain and the 1,000 mm diameter culvert beneath the access track between Turbine T2 and Turbine T3. The model was run for the 1% AEP (100-year), and 0.1% AEP (1,000-year) flood events, including a 20% allowance for climate change; the results are shown in Figure 7-2 and Figure 7-3 below.

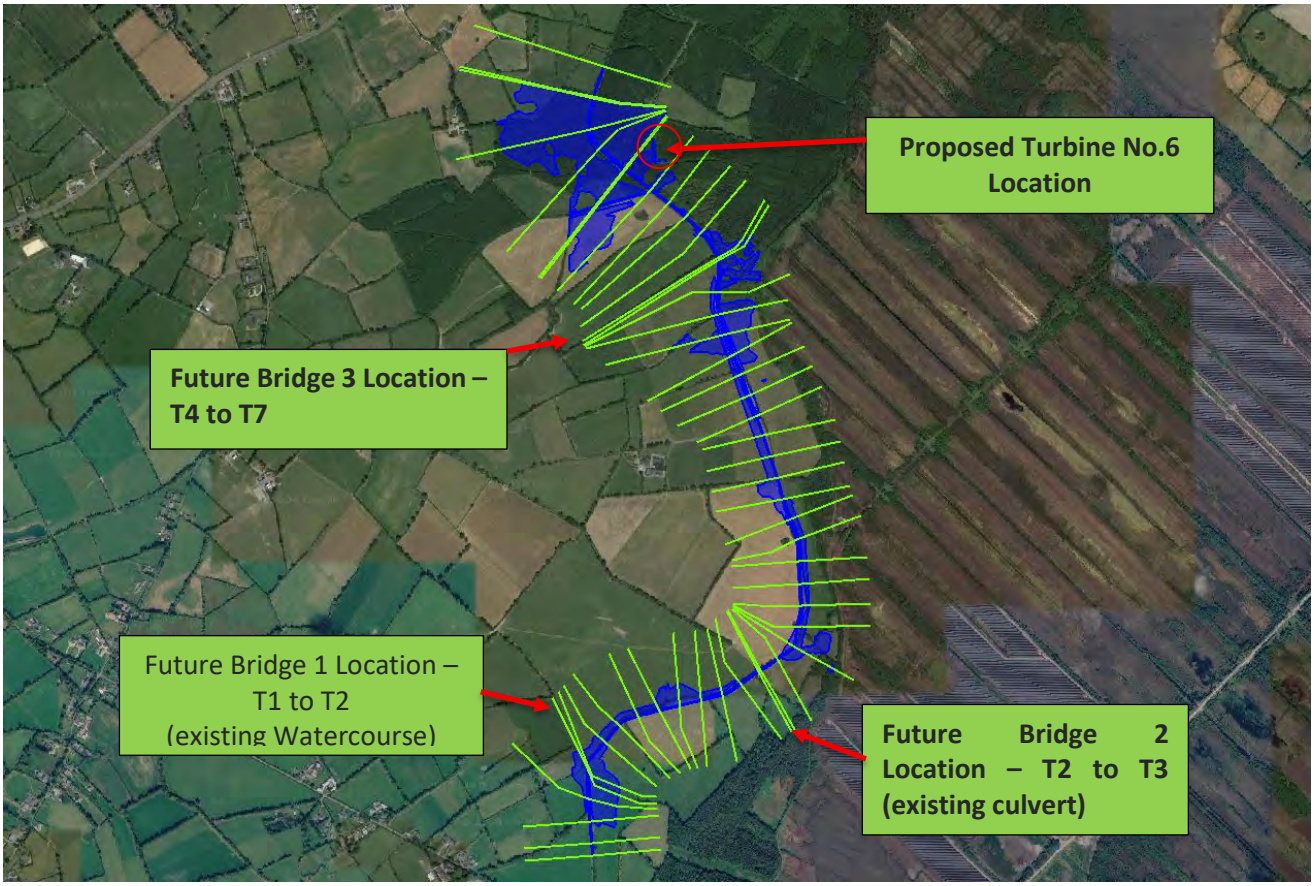


Figure 7-2: Existing Scenario - 1% AEP

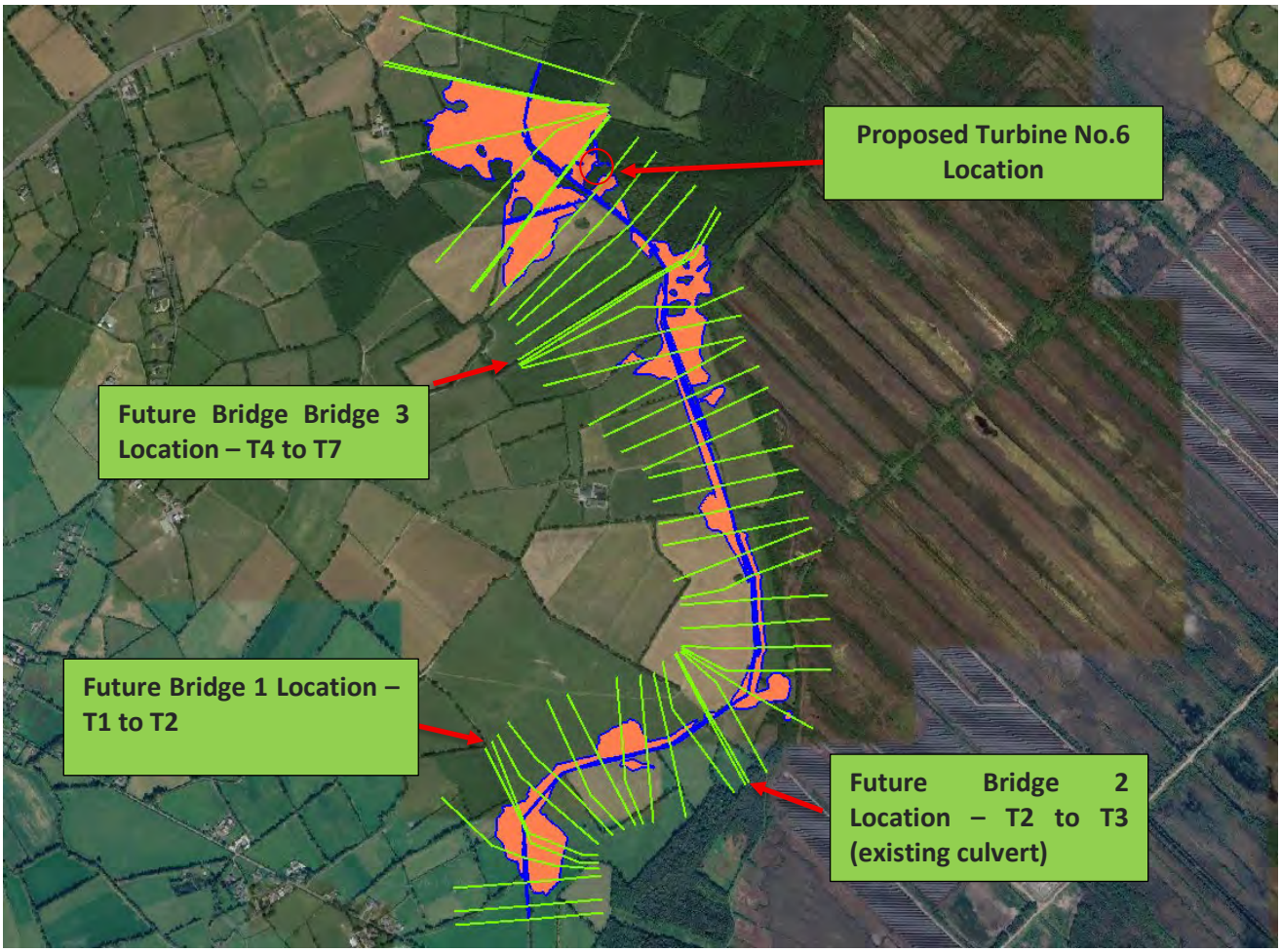


Figure 7-3: Existing Scenario – 0.1% AEP

Water levels at the three crossing locations are shown in table 7.5 below:

Table 7-5: Existing Scenario – Hydraulic Results at Watercourse Crossings

Crossing location	River station	Design event	Upstream WSE (m)	Downstream WSE (m)
Existing Water crossing future Bridge 1 – T1 to T2	3303.81	1% AEP (100-year)	84.30	84.30
		0.1% AEP (1,000-year)	84.43	84.43
Bridge 2 – T2 to T3 (existing culvert)	2555.79	1% AEP (100-year)	83.36	83.20
		0.1% AEP (1,000-year)	83.45	83.41
Existing Water crossing future Bridge 3 – T4 to T7	917.66	1% AEP (100-year)	79.86	79.86
		0.1% AEP (1,000-year)	80.02	80.02

These results are used in comparison with the Proposed Scenario, which includes the replacement of the existing culvert with a bridge and the construction of two additional bridges. The comparison will show whether the proposed works cause any changes to flood levels or flow conditions upstream and downstream of the crossings.

7.2.3 Proposed Scenario - Watercourse Cross Sections

The Proposed Scenario was modelled to assess new flood conditions along the Fear English River. The HEC-RAS model will be updated to include the three proposed watercourse crossings: a new crossing on the access track between Turbines T1 and T2, the replacement of the existing 1,000 mm diameter culvert between Turbines T2 and T3 with a bridge, and a new bridge on the access track between Turbines T4 and T7. The proposed bridge decks will be set at least 300 mm above the Proposed Scenario water level for the 1% AEP flood event. The model was simulated for the 1% AEP (100-year) and 0.1% AEP (1,000-year) flood events, including a 20% allowance for climate change. The resulting flood extents are presented in Figures 7-4 and 7-5, respectively.

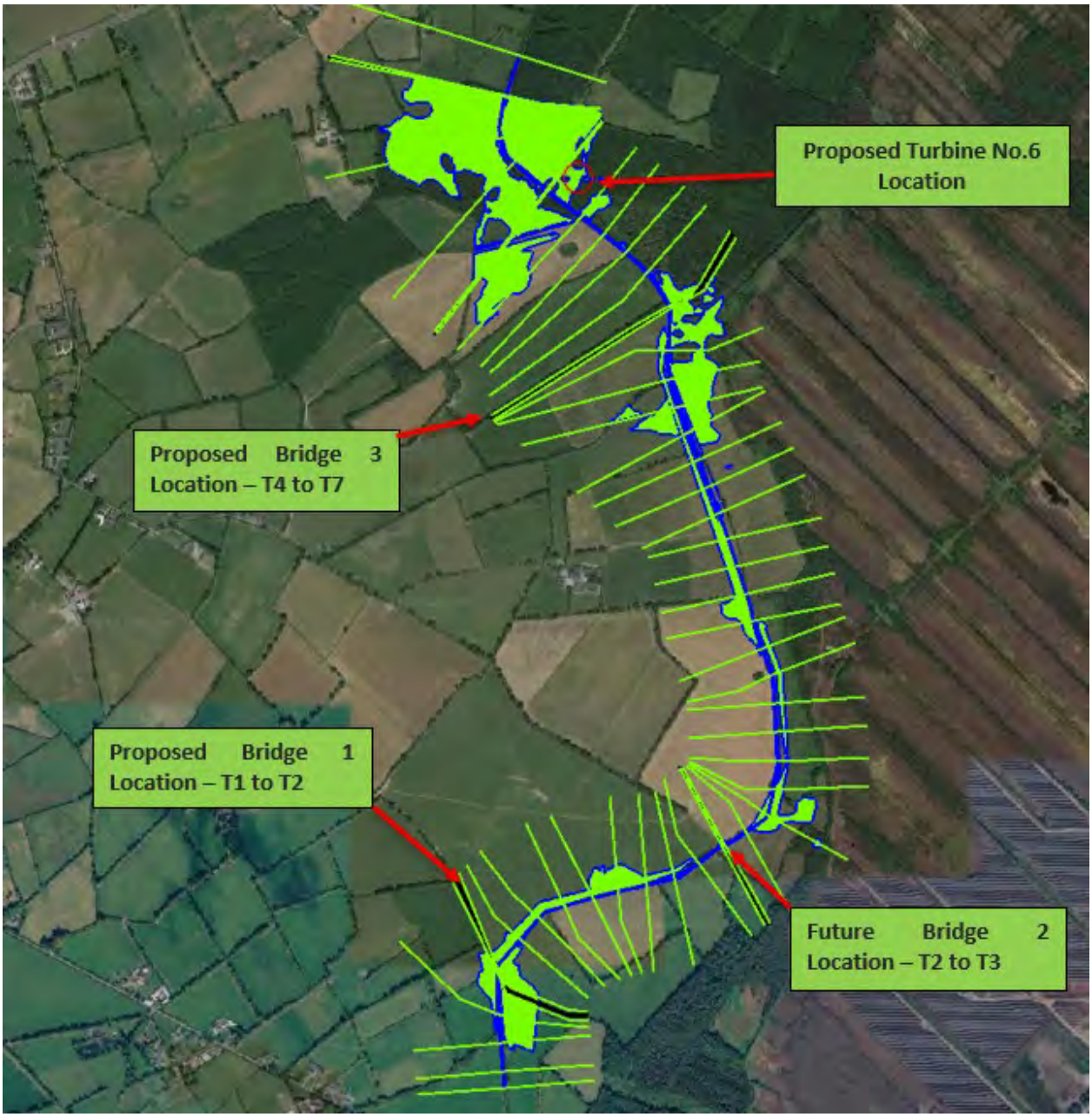


Figure 7-4 Proposed Scenario – 1% AEP

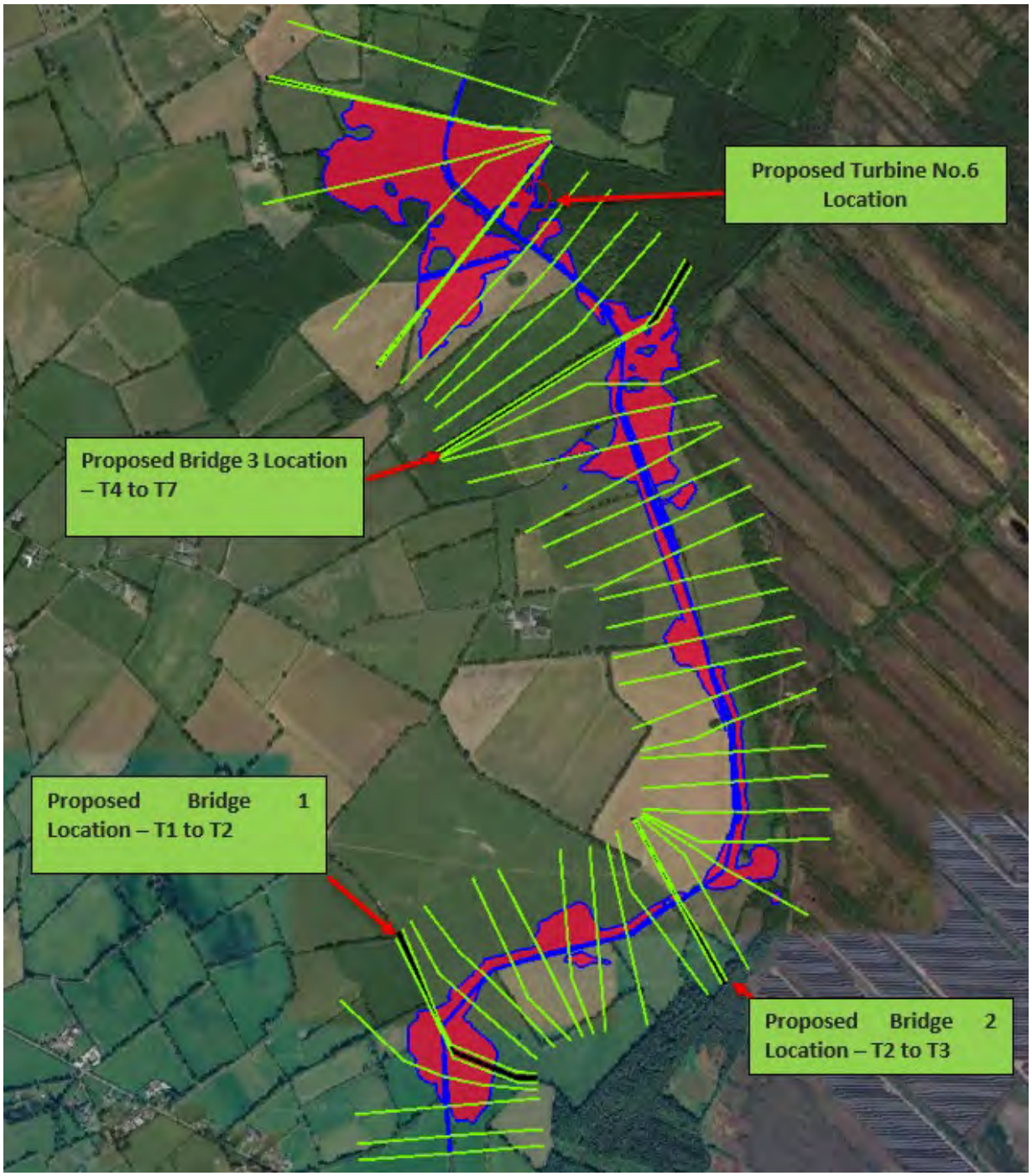


Figure 7-5: Proposed Scenario – 0.1% AEP

Water levels at the three crossing locations are shown in table 7.6 below:

Table 7-6: Proposed Scenario – Hydraulic Results at Watercourse Crossings

Crossing location	River station	Design event	Upstream WSE (m)	Downstream WSE (m)
Bridge 1 – T1 to T2	3303.81	1% AEP (100-year)	84.29	84.29
		0.1% AEP (1,000-year)	84.43	84.43
Bridge 2 – T2 to T3 (culvert replaced by bridge)	2555.79	1% AEP (100-year)	83.32	83.25
		0.1% AEP (1,000-year)	83.52	83.47
Bridge 3 – T4 to T7	917.66	1% AEP (100-year)	79.92	79.90
		0.1% AEP (1,000-year)	80.15	80.12

7.2.4 Scenarios comparison – Watercourse Cross Sections

Table 7-7 below presents a comparison of water levels between the Existing and Proposed Scenarios at the upstream and downstream cross-sections of the proposed bridges.

Table 7-7: Comparison of Existing and Proposed Scenario Water Levels at Watercourse Crossings

Crossing	Design event	Existing WSE upstream (m)	Proposed WSE upstream (m)	Difference (m)	Existing WSE downstream (m)	Proposed WSE downstream (m)	Difference (m)	Comments
Bridge 1 – T1 to T2	1% AEP (100-year)	84.30	84.29	-0.01	84.30	84.29	-0.01	No material change; slight reduction
Bridge 1 – T1 to T2	0.1% AEP (1,000-year)	84.43	84.43	0.00	84.43	84.43	0.00	No change
Bridge 2 – T2 to T3	1% AEP (100-year)	83.36	83.32	-0.04	83.20	83.25	+0.05	Slight reduction upstream and slight increase downstream
Bridge 2 – T2 to T3	0.1% AEP (1,000-year)	83.45	83.52	+0.07	83.41	83.47	+0.06	Slight increase upstream and downstream
Bridge 3 – T4 to T7	1% AEP (100-year)	79.86	79.92	+0.06	79.86	79.90	+0.04	Slight increase upstream and downstream
Bridge 3 – T4 to T7	0.1% AEP (1,000-year)	80.02	80.15	+0.13	80.02	80.12	+0.10	Increase in water levels, more noticeable upstream

The results show that the proposed bridges will have slight effect on flood levels along the Fear English River. No change is predicted at Bridge 1, while only small changes are expected at Bridges 2 and 3. The largest increase is 0.13 m at Bridge 3 during the 1,000-year flood event. Full comparison, section by section, can be found in Appendix 7, lodged with this assessment.

7.2.5 Existing Scenario – Proposed Turbine No.6

Turbine No. 6 is located on the right bank of the Fear English River, between cross-sections RS 560 and RS 441.94. The Existing Scenario hydraulic results indicate water surface elevations of approximately 79.26–79.31 mOD for the 1% AEP (Figure 7-7) event and 79.36–79.41 mOD for the 0.1% AEP (Figure 7-8) event across this reach. The model shows an increase of approximately 0.10 m in water level between the two design events. Turbine T6 aisocated outside of the flood zone.



Figure 7-6: Existing Scenario –1% AEP



Figure 7-7: Existing Scenario – 0.1% AEP

7.2.6 Proposed Scenario – Proposed Turbine No.6

Under the Proposed Scenario, the model predicts water surface elevations of 79.28–79.33 mOD for the 1% AEP event and 79.37–79.43 mOD for the 0.1% AEP event. Comparison with the Existing Scenario indicates no change in water levels for the 1% AEP (Figure 7-9) event and an increase of approximately 0.02 m for the 0.1% AEP (Figure 7-10) event at both cross-sections. The proposed works, therefore, result in **no change** to the modelled river water levels in this reach. Turbine T6 is located outside of the flood zone.

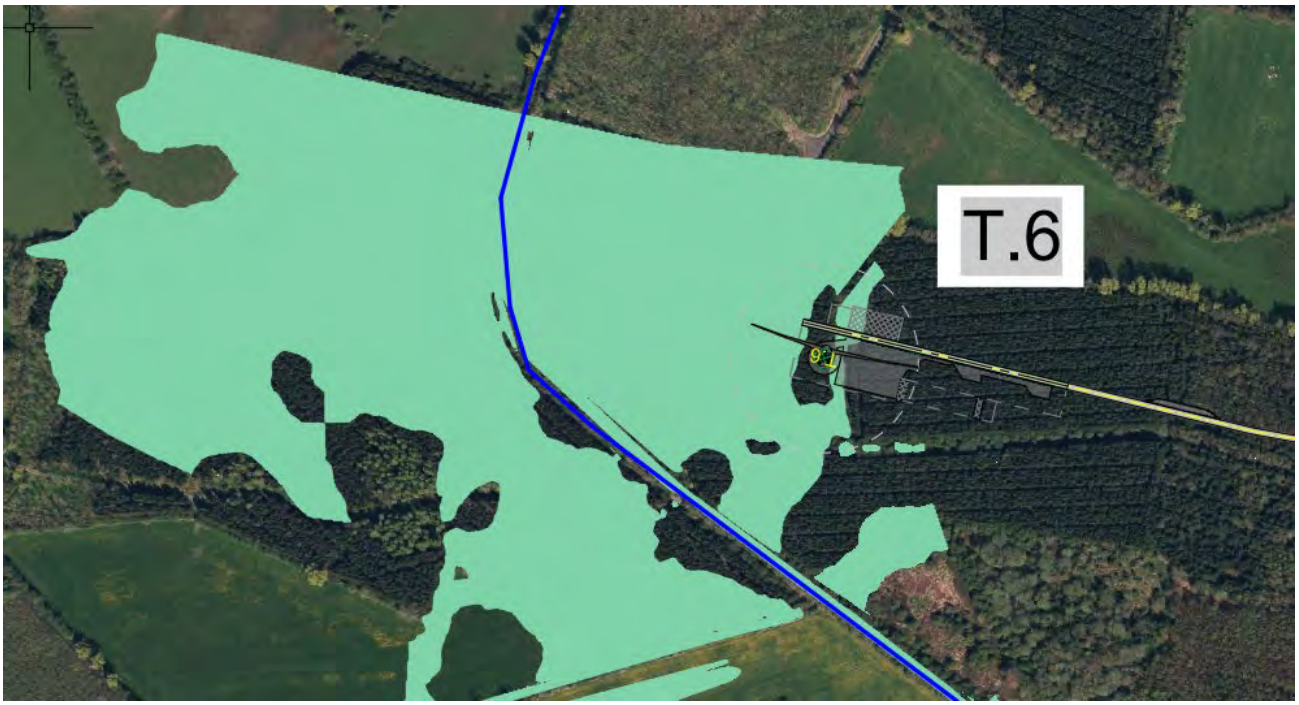


Figure 7-8: Proposed Scenario –1% AEP

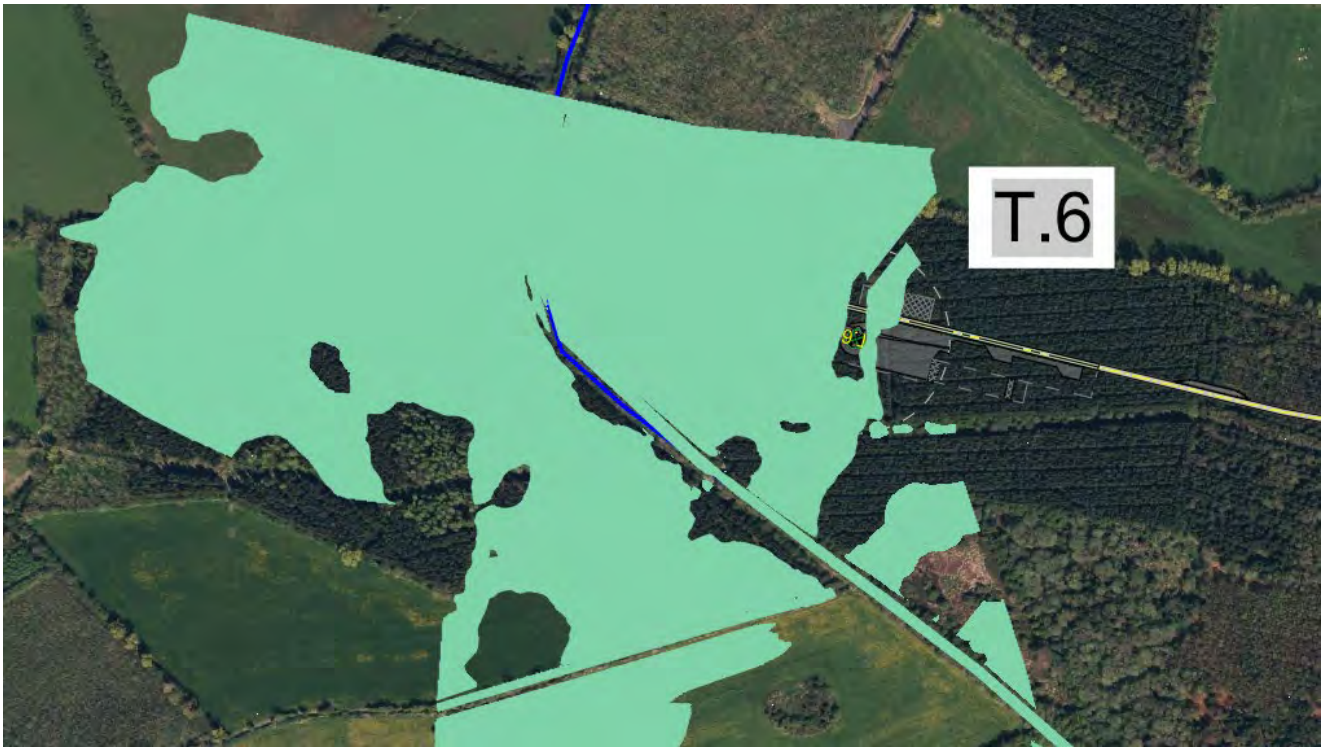


Figure 7-9: Proposed Scenario –0.1% AEP

8. MITIGATION MEASURES

The hydraulic assessment has identified potential fluvial flood risk in the vicinity of Turbine T6 and localised changes in water levels associated with the proposed watercourse crossings. Turbine T6 is located outside of the flood zone.

The EIAR for the proposed development indicated initially that it would be prudent to raise the ground levels in the vicinity of T6 to ensure that T6 is located outside of any indicative flood zone. This SSFRA has demonstrated that Turbine T6 is not located in any flood zone and therefore these mitigation measures are no longer required. Consequently, a SSFRA Justification Test is not Required.

The following measures are proposed to minimise the potential impact of the development on existing flood conditions:

- Turbine T6 is in the vicinity of the mapped fluvial flood extent associated with the Fear English River. The associated hardstanding and access track will be constructed at existing ground level to avoid raising the local ground profile and obstructing existing flood flow paths.
- The proposed drainage design for the wind farms elements will replicate the existing hydrological regime of the catchment. The proposed outfalls will discharge to the same catchments or watercourses as they would have prior to the development.
- The proposed development includes three watercourse crossings, comprising two new bridges and the replacement of the existing 1,000 mm diameter culvert between Turbines T2 and T3 with a third new bridge. The proposed bridge decks will be set at least 300 mm above the Proposed Scenario water level for the 1% AEP event. Regular inspection and maintenance of the bridges and their associated watercourse openings will be required to maintain flow conveyance and minimise residual flood risk.

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9. CONCLUSION

This Site-Specific Flood Risk Assessment (SSFRA) has assessed the flood risk associated with the proposed Drehid Wind Farm, focusing on the Fear English River, the three proposed watercourse crossings and the turbine locations. The assessment identified fluvial flooding as the main source of flood risk in the study area. Turbines T3 and T4 are not located within mapped flood zones, while Turbine T6 is located in the vicinity of the mapped fluvial flood extent.

A Stage 3 Detailed Flood Risk Assessment was carried out using HEC-RAS 6.6 to assess existing flood conditions and the potential effects of the proposed development. The model was simulated for the 1% AEP and 0.1% AEP flood events, including a 20% allowance for climate change, for both the Existing and Proposed Scenarios.

The proposed works include two new bridges and the replacement of an existing 1,000 mm diameter culvert with a third new? bridge. The results show local changes in water levels at the crossings, with a maximum predicted increase of approximately 0.13 m at Bridge 3 during the 0.1% AEP event.

At Turbine T6, the associated hardstanding and access track will be constructed at existing ground level to avoid raising the local ground profile and obstructing existing flood flow paths. The proposed drainage measures will aim to maintain the existing hydrological regime by directing runoff to the same catchments or watercourses as under existing conditions, where practicable.

Turbine T6 and its foundations???? are located outside of the flood zone.

The EIAR for the proposed development indicated initially that it would be prudent to raise the ground levels in the vicinity of T6 to ensure that T6 is located outside of any indicative flood zone. This SSFRA has demonstrated that Turbine T6 is not located in any flood zone and therefore these mitigation measures are no longer required. Consequently, a SSFRA Justification Test is not required.

Mitigation measures have been incorporated to minimize potential impacts, protect the proposed development and its surroundings, and reduce any residual flood risks. It is therefore concluded that any residual risks associated with the proposed development can be managed to an acceptable level and that the proposed works will not have a negative impact on flood extents or levels either on-site or elsewhere. The increase in flood levels resulting from the inclusion of the proposed development and associated works is within acceptable limits and not considered significant.

Accordingly, the proposed development is considered to comply with the core principles of the Planning System and Flood Risk Management Guidelines.

FEHILY TIMONEY

DESIGNING AND DELIVERING
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APPENDIX 1

Site Location and Catchment Extent



Site Location & Catchment Extent

FEHILY TIMONEY

DESIGNING AND DELIVERING
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APPENDIX 2

Hydrological Analysis

Catchment Flow Calculator

Catchment	Watercourse name
Catchment-1	Fear English River

Description	Inputs Parameters								
	Rainfall	Soil Index	Catchment Area	Max. Catchment Width	Avergae Height of Catchment Divide in metres	Design return Period	IH124 Method Growth Factor	ADAS Method Growth Factor	Climate Change Climate Change (%)
Parameters	SAAR	SOIL	AREA	W	Z	T	F	F_1	CC
Units	(mm)	-	km2	m	m	Yeas	-	-	(%)
Info Source	UKSUDS	UKSUDS	-	-	-		-	-	-
Inputs	822	0.47	2.330	2448.7011	1.3	100	1.96	1.050	20%

Description	Outputs					
	IH124 Method		ADAS Method			Design Peak Flow + CC for permeable areas
	IH124 Annual Flow	IH124 100Yr Flow	Time of Concentration	ADAS 75 Yr Flow	ADAS 100Yr Flow	
Parameter	Q_a	$Q100_{IH124}$	T	$Q_{75\ ADAS}$	$Q75_{ADAS}$	Q
Units	(m3/s)	(m3/s)	Hours	(m3/s)	(m3/s)	(m3/s)
Formula	$Q = 0.00108 * AREA^{0.89} * SAAR^{1.17} * SOIL^{2.17}$	$Q = F Q_a$	$T = 0.1677 \frac{W^{0.78}}{Z^{0.39}}$	$Q = AREA(0.0443\,SAAR - 11.19)\,SOIL^{2.9} * \left[\frac{18.79^{F-1}}{10T}\right]$	$Q=F_1*Q_{75\ ADAS}$	$Q_{75} * 1.2$
Info Source	Formula 1 of HA 106	Formula 3 of HA 106	Formula 6 of HA 106	Formula 4 of HA 106	-	Vol 3 of 5 Pt 2, 4.2.5.5 (vii)
Outputs	1.146	2.246	66.60	1.1674	1.226	**2.69563**

Catchment Flow Calculator

Catchment	Watercourse name
Catchment-1	Fear English River

Description	Inputs Parameters								
	Rainfall	Soil Index	Catchment Area	Max. Catchment Width	Avergae Height of Catchment Divide in metres	Design return Period	IH124 Method Growth Factor	ADAS Method Growth Factor	Climate Change Climate Change (%)
Parameters	SAAR	SOIL	AREA	W	Z	T	F	F_1	CC
Units	(mm)	-	km2	m	m	Yeas	-	-	(%)
Info Source	UKSUDS	UKSUDS	-	-	-		-	-	-
Inputs	822	0.47	2.330	2448.7011	1.3	100	2.67	1.050	20%

Description	Outputs					
	IH124 Method		ADAS Method			Design Peak Flow + CC for permeable areas
	IH124 Annual Flow	IH124 100Yr Flow	Time of Concentration	ADAS 75 Yr Flow	ADAS 100Yr Flow	
Parameter	Q_a	$Q100_{IH124}$	T	$Q_{75\ ADAS}$	$Q75_{ADAS}$	Q
Units	(m3/s)	(m3/s)	Hours	(m3/s)	(m3/s)	(m3/s)
Formula	$Q = 0.00108 * AREA^{0.89} * SAAR^{1.17} * SOIL^{2.17}$	$Q = F Q_a$	$T = 0.1677 \frac{W^{0.78}}{Z^{0.39}}$	$Q = AREA(0.0443\,SAAR - 11.19)\,SOIL^{2.5} \times \left[\frac{18.79T^{0.8}}{16T} - 1\right]$	$Q=F_1*Q_{75\ ADAS}$	$Q_{75} * 1.2$
Info Source	Formula 1 of HA 106	Formula 3 of HA 106	Formula 6 of HA 106	Formula 4 of HA 106	-	Vol 3 of 5 Pt 2, 4.2.5.5 (vii)
Outputs	1.146	3.060	66.60	1.1674	1.226	**3.67211**

Catchment Flow Calculator

Catchment	Watercourse name
Catchment-2	Fear English River

Description	Inputs Parameters								
	Rainfall	Soil Index	Catchment Area	Max. Catchment Width	Avergae Height of Catchment Divide in metres	Design return Period	IH124 Method Growth Factor	ADAS Method Growth Factor	Climate Change Climate Change (%)
Parameters	SAAR	SOIL	AREA	W	Z	T	F	F_1	CC
Units	(mm)	-	km2	m	m	Yeas	-	-	(%)
Info Source	UKSUDS	UKSUDS	-	-	-		-	-	-
Inputs	822	0.47	3.461	3085.71	1.6	100	2.67	1.050	20%

Description	Outputs					
	IH124 Method		ADAS Method			Design Peak Flow + CC for permeable areas
	IH124 Annual Flow	IH124 100Yr Flow	Time of Concentration	ADAS 75 Yr Flow	ADAS 100Yr Flow	
Parameter	Q_a	$Q100_{IH124}$	T	$Q_{75\ ADAS}$	$Q75_{ADAS}$	Q
Units	(m3/s)	(m3/s)	Hours	(m3/s)	(m3/s)	(m3/s)
Formula	$Q = 0.00108 * AREA^{0.89} * SAAR^{1.17} * SOIL^{2.17}$	$Q = F Q_a$	$T = 0.1677 \frac{W^{0.78}}{Z^{0.39}}$	$Q = AREA\,(0.0443\,SAAR - 11.19)\,SOIL^{2.0} * \left[\frac{18.79^{F^{0.28}} - 1}{107}\right]$	$Q=F_1*Q_{75\ ADAS}$	$Q_{75} * 1.2$
Info Source	Formula 1 of HA 106	Formula 3 of HA 106	Formula 6 of HA 106	Formula 4 of HA 106	-	Vol 3 of 5 Pt 2, 4.2.5.5 (vii)
Outputs	1.630	4.352	73.56	1.6151	1.696	**5.22225**

Catchment Flow Calculator

Catchment	Watercourse name
Catchment-3	Fear English River

Description	Inputs Parameters								
	Rainfall	Soil Index	Catchment Area	Max. Catchment Width	Avergae Height of Catchment Divide in metres	Design return Period	IH124 Method Growth Factor	ADAS Method Growth Factor	Climate Change Climate Change (%)
Parameters	SAAR	SOIL	AREA	W	Z	T	F	F_1	CC
Units	(mm)	-	km2	m	m	Yeas	-	-	(%)
Info Source	UKSUDS	UKSUDS	-	-	-		-	-	-
Inputs	822	0.47	5.096	3494.99	1.5	100	2.67	1.050	20%

Description	Outputs					
	IH124 Method		ADAS Method			Design Peak Flow + CC for permeable areas
	IH124 Annual Flow	IH124 100Yr Flow	Time of Concentration	ADAS 75 Yr Flow	ADAS 100Yr Flow	
Parameter	Q_a	$Q100_{IH124}$	T	$Q_{75\ ADAS}$	$Q75_{ADAS}$	Q
Units	(m3/s)	(m3/s)	Hours	(m3/s)	(m3/s)	(m3/s)
Formula	$Q = 0.00108 * AREA^{0.89} * SAAR^{1.17} * SOIL^{2.17}$	$Q = F Q_a$	$T = 0.1677 \frac{W^{0.78}}{Z^{0.39}}$	$Q = 0.0043 SAAR - 11.19) SOIL^{2.5} * \left[\frac{18.79^{0.9}-1}{107}\right]$	$Q=F_1*Q_{75\ ADAS}$	$Q_{75} * 1.2$
Info Source	Formula 1 of HA 106	Formula 3 of HA 106	Formula 6 of HA 106	Formula 4 of HA 106	-	Vol 3 of 5 Pt 2, 4.2.5.5 (vii)
Outputs	2.300	6.141	83.13	2.1787	2.288	**7.36890**

Catchment Flow Calculator

Catchment	Watercourse name
Catchment-4	Fear English River

Description	Inputs Parameters								
	Rainfall	Soil Index	Catchment Area	Max. Catchment Width	Avergae Height of Catchment Divide in metres	Design retum Period	IH124 Method Growth Factor	ADAS Method Growth Factor	Climate Change Climate Change (%)
Parameters	SAAR	SOIL	AREA	W	Z	T	F	F_1	CC
Units	(mm)	-	km2	m	m	Yeas	-	-	(%)
Info Source	UKSUDS	UKSUDS	-	-	-		-	-	-
Inputs	822	0.47	6.713	4784.29	4.4	100	2.67	1.050	20%

Description	Outputs					
	IH124 Method		ADAS Method			Design Peak Flow + CC for permeable areas
	IH124 Annual Flow	IH124 100Yr Flow	Time of Concentration	ADAS 75 Yr Flow	ADAS 100Yr Flow	
Parameter	Q_a	$Q100_{IH124}$	T	$Q_{75\ ADAS}$	$Q75_{ADAS}$	Q
Units	(m3/s)	(m3/s)	Hours	(m3/s)	(m3/s)	(m3/s)
Formula	$Q = 0.00108 * AREA^{0.89} * SAAR^{1.17} * SOIL^{2.17}$	$Q = F Q_a$	$T = 0.1677 \frac{W^{0.78}}{Z^{0.39}}$	$Q = AREA(0.0443\,SAAR - 11.19)\,SOIL^{2.8} * \left[\frac{18.79^{1.8}-1}{167}\right]$	$Q=F_1*Q_{75\ ADAS}$	$Q_{75} * 1.2$
Info Source	Formula 1 of HA 106	Formula 3 of HA 106	Formula 6 of HA 106	Formula 4 of HA 106	-	Vol 3 of 5 Pt 2, 4.2.5.5 (vii)
Outputs	2.939	7.848	69.80	3.2524	3.415	**9.41726**

Catchment Flow Calculator

Catchment	Watercourse name
Catchment-5	Fear English River

Description	Inputs Parameters								
	Rainfall	Soil Index	Catchment Area	Max. Catchment Width	Avergae Height of Catchment Divide in metres	Design return Period	IH124 Method Growth Factor	ADAS Method Growth Factor	Climate Change Climate Change (%)
Parameters	SAAR	SOIL	AREA	W	Z	T	F	F_1	CC
Units	(mm)	-	km2	m	m	Yeas	-	-	(%)
Info Source	UKSUDS	UKSUDS	-	-	-		-	-	-
Inputs	822	0.47	20.360	4779.43	7.2	100	2.67	1.050	20%

Description	Outputs					
	IH124 Method		ADAS Method			Design Peak Flow + CC for permeable areas
	IH124 Annual Flow	IH124 100Yr Flow	Time of Concentration	ADAS 75 Yr Flow	ADAS 100Yr Flow	
Parameter	Q_a	$Q100_{IH124}$	T	$Q_{75\ ADAS}$	$Q75_{ADAS}$	Q
Units	(m3/s)	(m3/s)	Hours	(m3/s)	(m3/s)	(m3/s)
Formula	$Q = 0.00108 * AREA^{0.89} * SAAR^{1.17} * SOIL^{2.17}$	$Q = F Q_a$	$T = 0.1677 \frac{W^{0.78}}{Z^{0.39}}$	$Q = AREA(0.0443 SAAR - 11.19) SOIL^{2.6} \left[\frac{18.79T^{1.28} - 1}{10T}\right]$	$Q=F_1*Q_{75\ ADAS}$	$Q_{75} * 1.2$
Info Source	Formula 1 of HA 106	Formula 3 of HA 106	Formula 6 of HA 106	Formula 4 of HA 106	-	Vol 3 of 5 Pt 2, 4.2.5.5 (vii)
Outputs	7.890	21.067	57.56	11.3230	11.889	**25.28000**

Catchment Flow Calculator

Catchment	Watercourse name
Catchment-2	Fear English River

Description	Inputs Parameters								
	Rainfall	Soil Index	Catchment Area	Max. Catchment Width	Avergae Height of Catchment Divide in metres	Design return Period	IH124 Method	ADAS Method	Climate Change
							Growth Factor	Growth Factor	Climate Change (%)
Parameters	SAAR	SOIL	AREA	W	Z	T	F	F_1	CC
Units	(mm)	-	km2	m	m	Yeas	-	-	(%)
Info Source	UKSUDS	UKSUDS	-	-	-		-	-	-
Inputs	822	0.47	3.461	3085.71	1.6	100	1.96	1.050	20%

Description	Outputs					
	IH124 Method		ADAS Method			Design Peak Flow + CC for permeable areas
	IH124 Annual Flow	IH124 100Yr Flow	Time of Concentration	ADAS 75 Yr Flow	ADAS 100Yr Flow	
Parameter	Q_a	$Q100_{IH124}$	T	$Q_{75\ ADAS}$	$Q75_{ADAS}$	Q
Units	(m3/s)	(m3/s)	Hours	(m3/s)	(m3/s)	(m3/s)
Formula	$Q = 0.00108 * AREA^{0.89} * SAAR^{1.17} * SOIL^{2.17}$	$Q = F Q_a$	$T = 0.1677 \frac{W^{0.78}}{Z^{0.39}}$	$Q = AREA\,(0.0443\,SAAR - 11.19)\,SOIL^{2.9} * \left[\frac{18.79^{F_1} - 1}{10F}\right]$	$Q=F_1*Q_{75\ ADAS}$	$Q_{75} * 1.2$
Info Source	Formula 1 of HA 106	Formula 3 of HA 106	Formula 6 of HA 106	Formula 4 of HA 106	-	Vol 3 of 5 Pt 2, 4.2.5.5 (vii)
Outputs	1.630	3.195	73.56	1.6151	1.696	**3.83357**

Catchment Flow Calculator

Catchment	Watercourse name
Catchment-3	Fear English River

Description	Inputs Parameters								
	Rainfall	Soil Index	Catchment Area	Max. Catchment Width	Avergae Height of Catchment Divide in metres	Design return Period	IH124 Method Growth Factor	ADAS Method Growth Factor	Climate Change Climate Change (%)
Parameters	SAAR	SOIL	AREA	W	Z	T	F	F_1	CC
Units	(mm)	-	km2	m	m	Yeas	-	-	(%)
Info Source	UKSUDS	UKSUDS	-	-	-		-	-	-
Inputs	822	0.47	5.096	3494.99	1.5	100	1.96	1.050	20%

Description	Outputs					
	IH124 Method		ADAS Method			Design Peak Flow + CC for permeable areas
	IH124 Annual Flow	IH124 100Yr Flow	Time of Concentration	ADAS 75 Yr Flow	ADAS 100Yr Flow	
Parameter	Q_a	$Q100_{IH124}$	T	$Q_{75\,ADAS}$	$Q75_{ADAS}$	Q
Units	(m3/s)	(m3/s)	Hours	(m3/s)	(m3/s)	(m3/s)
Formula	$Q = 0.00108 * AREA^{0.89} * SAAR^{1.17} * SOIL^{2.17}$	$Q = F Q_a$	$T = 0.1677 \frac{W^{0.78}}{Z^{0.39}}$	$Q = AREA(0.0443\,SAAR - 11.19)\,SOIL^{2.9} \times \left[\frac{18.79^{0.9}-1}{WT}\right]$	$Q=F_1*Q_{75\,ADAS}$	$Q_{75} * 1.2$
Info Source	Formula 1 of HA 106	Formula 3 of HA 106	Formula 6 of HA 106	Formula 4 of HA 106	-	Vol 3 of 5 Pt 2, 4.2.5.5 (vii)
Outputs	2.300	4.508	83.13	2.1787	2.288	**5.40938**

Catchment Flow Calculator

Catchment	Watercourse name
Catchment-4	Fear English River

Description	Inputs Parameters								
	Rainfall	Soil Index	Catchment Area	Max. Catchment Width	Avergae Height of Catchment Divide in metres	Design return Period	IH124 Method Growth Factor	ADAS Method Growth Factor	Climate Change Climate Change (%)
Parameters	SAAR	SOIL	AREA	W	Z	T	F	F_1	CC
Units	(mm)	-	km2	m	m	Yeas	-	-	(%)
Info Source	UKSUDS	UKSUDS	-	-	-		-	-	-
Inputs	822	0.47	6.713	4784.29	4.4	100	1.96	1.050	20%

Description	Outputs					
	IH124 Method		ADAS Method			Design Peak Flow + CC for permeable areas
	IH124 Annual Flow	IH124 100Yr Flow	Time of Concentration	ADAS 75 Yr Flow	ADAS 100Yr Flow	
Parameter	Q_a	$Q100_{IH124}$	T	$Q_{75\ ADAS}$	$Q75_{ADAS}$	Q
Units	(m3/s)	(m3/s)	Hours	(m3/s)	(m3/s)	(m3/s)
Formula	$Q = 0.00108 * AREA^{0.89} * SAAR^{1.17} * SOIL^{2.17}$	$Q = F Q_a$	$T = 0.1677 \frac{W^{0.78}}{Z^{0.39}}$	$Q = AREA(0.0443\,SAAR - 11.19)\,SOIL^{2.8} * \left[\frac{18.79^{0.28} - 1}{107}\right]$	$Q=F_1*Q_{75\ ADAS}$	$Q_{75} * 1.2$
Info Source	Formula 1 of HA 106	Formula 3 of HA 106	Formula 6 of HA 106	Formula 4 of HA 106	-	Vol 3 of 5 Pt 2, 4.2.5.5 (vii)
Outputs	2.939	5.761	69.80	3.2524	3.415	**6.91304**

Catchment Flow Calculator

Catchment	Watercourse name
Catchment-5	Fear English River

Description	Inputs Parameters								
	Rainfall	Soil Index	Catchment Area	Max. Catchment Width	Avergae Height of Catchment Divide in metres	Design retum Period	IH124 Method Growth Factor	ADAS Method Growth Factor	Climate Change Climate Change (%)
Parameters	SAAR	SOIL	AREA	W	Z	T	F	F_1	CC
Units	(mm)	-	km2	m	m	Yeas	-	-	(%)
Info Source	UKSUDS	UKSUDS	-	-	-		-	-	-
Inputs	822	0.47	20.360	4779.43	7.2	100	1.96	1.050	20%

Description	Outputs					
	IH124 Method		ADAS Method			Design Peak Flow + CC for permeable areas
	IH124 Annual Flow	IH124 100Yr Flow	Time of Concentration	ADAS 75 Yr Flow	ADAS 100Yr Flow	
Parameter	Q_a	$Q100_{IH124}$	T	$Q_{75\ ADAS}$	$Q75_{ADAS}$	Q
Units	(m3/s)	(m3/s)	Hours	(m3/s)	(m3/s)	(m3/s)
Formula	$Q = 0.00108 * AREA^{0.89} * SAAR^{1.17} * SOIL^{2.17}$	$Q = F Q_a$	$T = 0.1677 \frac{W^{0.78}}{Z^{0.39}}$	$Q = AREA(0.0443\,SAAR - 11.19)\,SOIL^{2.8} * \left[\frac{18.79^{0.8} - 1}{W}\right]$	$Q=F_1*Q_{75\ ADAS}$	$Q_{75} * 1.2$
Info Source	Formula 1 of HA 106	Formula 3 of HA 106	Formula 6 of HA 106	Formula 4 of HA 106	-	Vol 3 of 5 Pt 2, 4.2.5.5 (vii)
Outputs	7.890	15.465	57.56	11.3230	11.889	**18.55760**

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APPENDIX 3

OPW National Indicative Flood Mapping



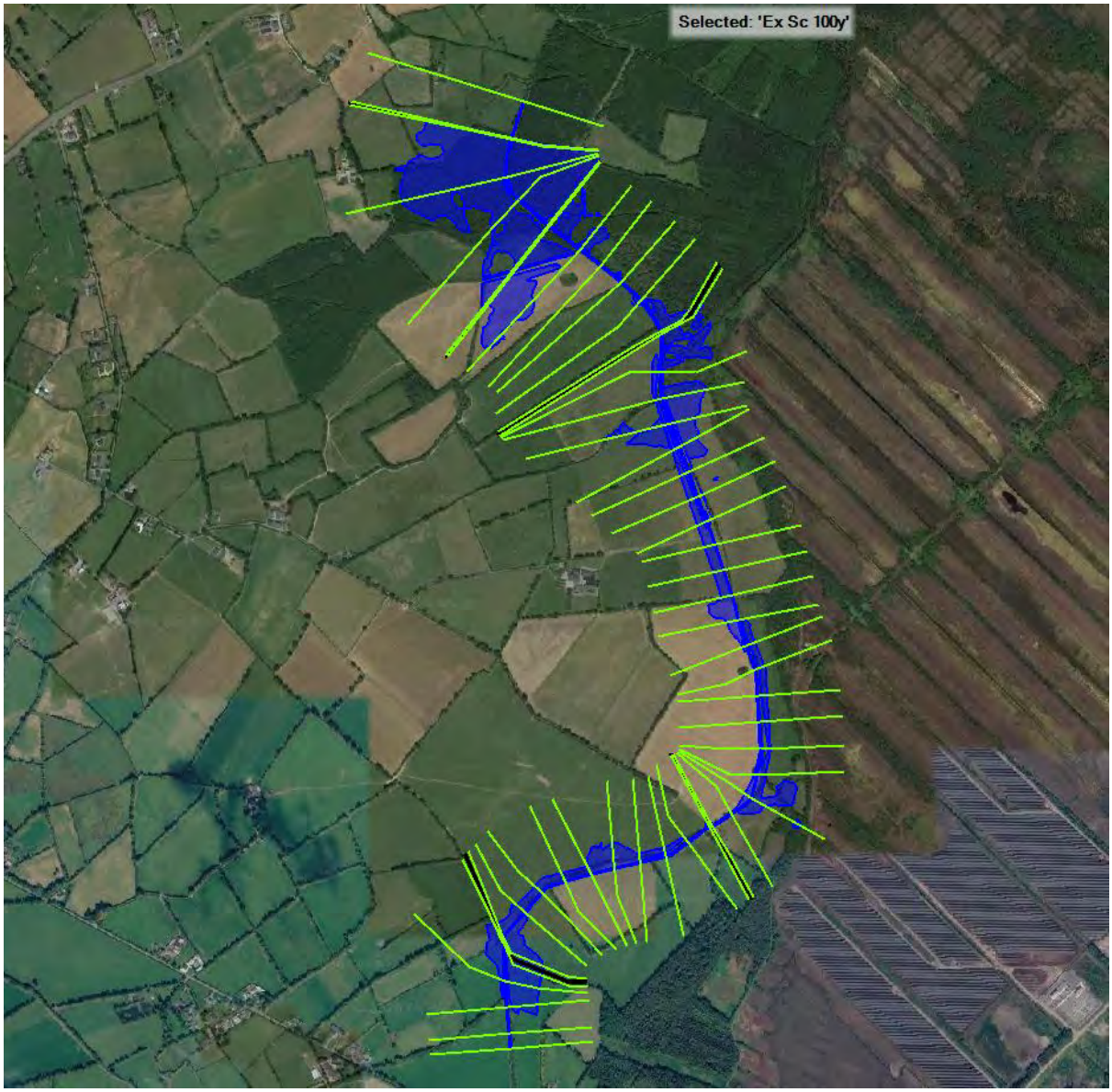
National Indicative Flood Mapping – Present Day – 0.1% AEP (Low Probability) and 1% AEP (Medium Probability) – Source: OPW, Floodinfo.ie

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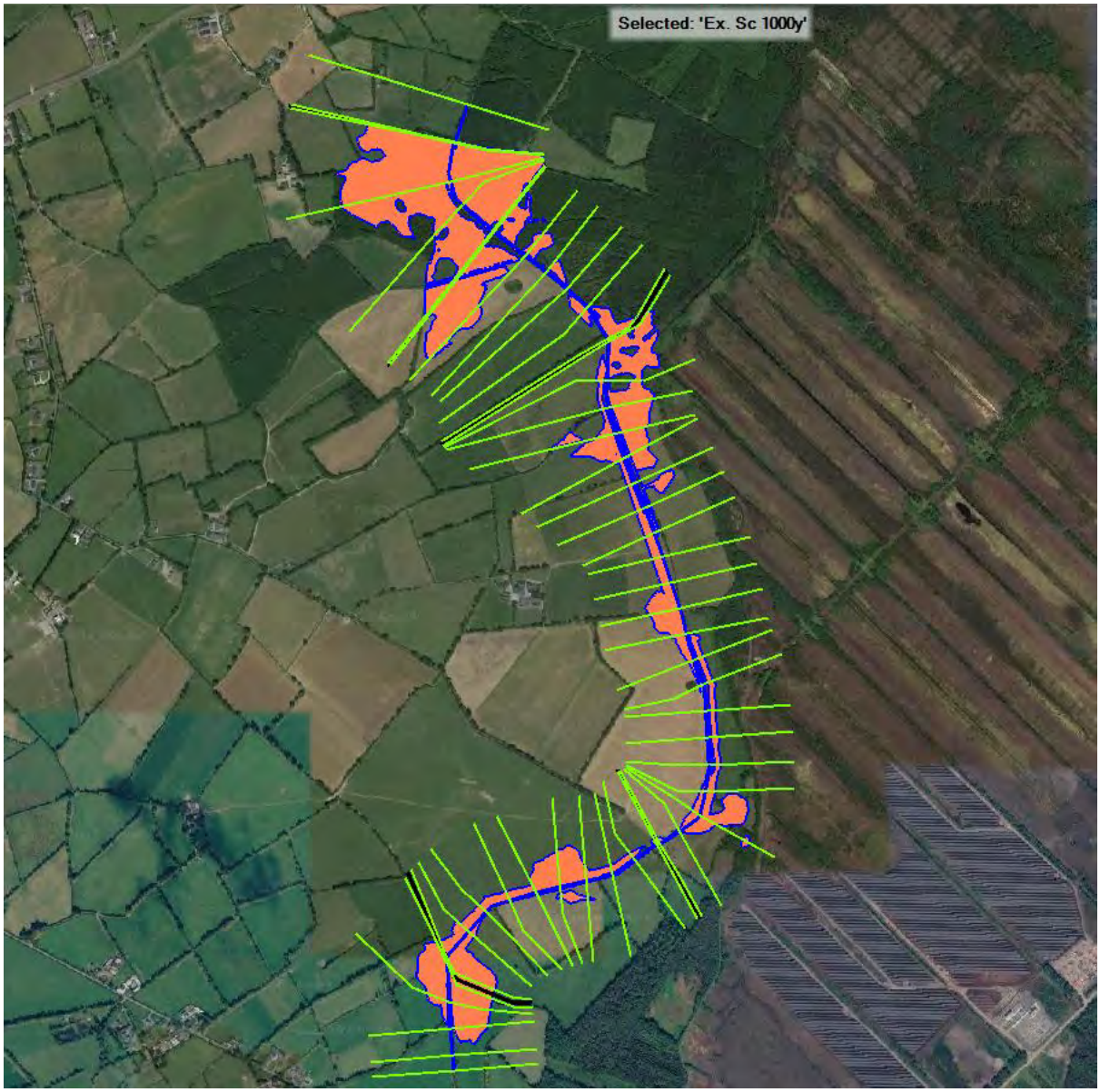
DESIGNING AND DELIVERING
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APPENDIX 4

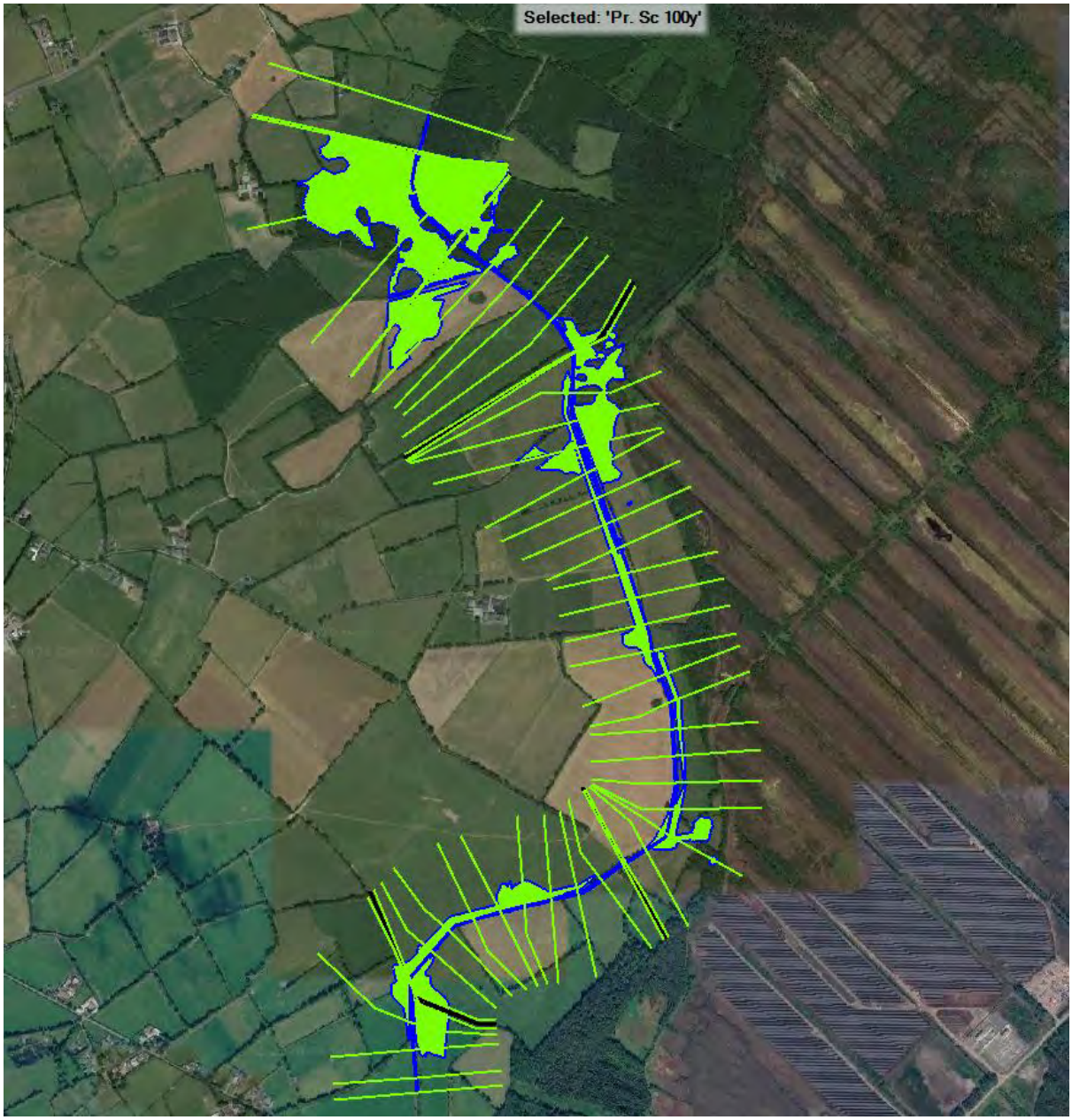
SSFRA Flood Maps - Existing and Proposed Conditions



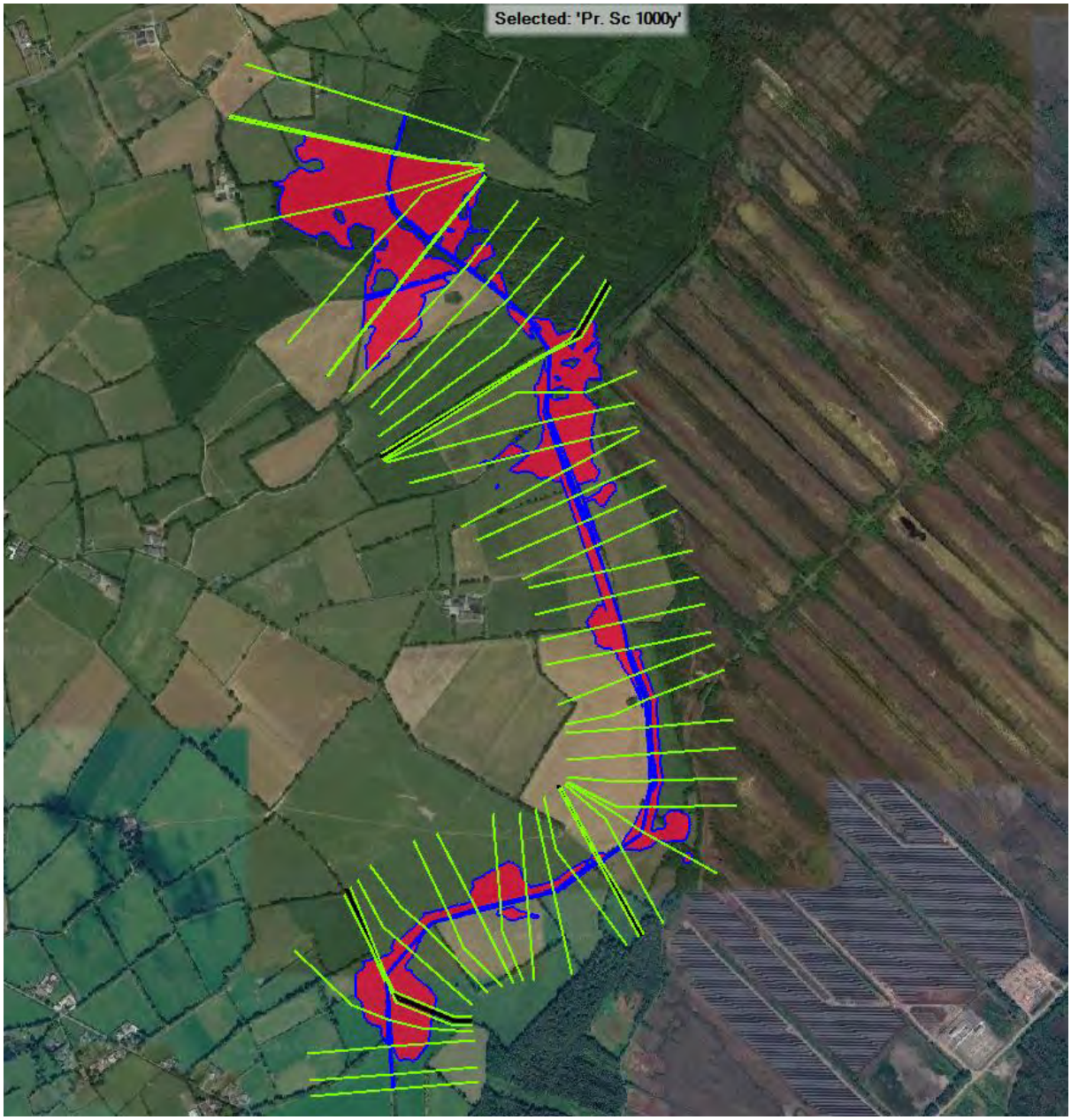
Existing Condition: 1% EAP Fluvial Flood Extent



Existing Condition: 0.1% EAP Fluvial Flood Extent



Proposed Condition: 1% EAP Fluvial Flood Extent



Proposed Condition: 0.1% EAP Fluvial Flood Extent

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APPENDIX 5

River Photos























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APPENDIX 8

Calibration Certificates

e-mail: calibration@svantek.com.pl Tel.: +48 22 51 88 322 www.svantek.com

SVANTEK

Calibration Laboratory
SVANTEK
04-872 Warsaw, ul. Strzygłowska 81
POLAND

PCA Polskie Centrum Akredytacji >O< WZORCOWANIE
AP 146

Calibration laboratory accredited by
Polish Center for Accreditation, a signatory to EA MLA and ILAC MRA
that include recognition of calibration certificates
Accreditation No AP 146

ilac-MRA

CALIBRATION CERTIFICATE

Date of issue: 15th July, 2025 **Certificate No:** 00114111/02/2025 **Page:** 1/5

OBJECT OF CALIBRATION	Noise monitoring station type SV 307, number 104985, manufacturer SVANTEK with microphone type ST 30A, number 108881, manufacturer SVANTEK.
APPLICANT	Fehily Timoney and Company Unit ¾ Northwood House Northwood Crescent Northwood Dublin D09 X899
PLACE OF CALIBRATION	Calibration Laboratory SVANTEK 04-872 Warsaw, ul. Strzygłowska 81
CALIBRATION METHOD	Method described in instruction IN-02 "Calibration of the sound level meter", issue number 15 date 23.08.2019, written on the basis of international standard EN 61672-3:2013 Electroacoustics. Part 3: Periodic tests.
ENVIRONMENTAL CONDITIONS	Temperature: (23,0 ÷ 24,1) °C Ambient pressure: (100,3 ÷ 100,4) kPa Relative humidity: (53 ÷ 55) %
DATE OF CALIBRATION	14th July, 2025
TRACEABILITY	This certificate is issued under the agreement EA MLA in the field of calibration and provides traceability of measurement results to the standards maintained in the Central Office of Measures. SVANTEK Laboratory uses guidance documents to clarify the requirements in EN ISO/IEC 17025 "General requirements for the competence of testing and calibration laboratories", where this is considered to be necessary.
CALIBRATION RESULTS	The results apply only to the calibrated object and are given on pages 2 ÷ 5 of this certificate including measurement uncertainty.

Laboratorium Wzorcujące AP 146

Technical and Quality Manager
Anna Domańska, M. Sc.

The certificate may be presented or copied as a whole document only.

UNCERTAINTY OF MEASUREMENTS

Uncertainty of measurement has been evaluated in compliance with EA-4/02 M:2022. The expanded uncertainty assigned corresponds to a coverage probability of 95 % and the coverage factor $k = 2$.

CONFORMITY WITH REQUIREMENTS

The sound level meter submitted for testing has successfully completed the periodic tests of EN 61672-3:2013, for the environmental conditions under which the tests were performed. As evidence was publicity available, from an independent testing organization responsible for approving the results of pattern-evaluation tests performed in accordance with EN 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in EN 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 specifications of EN 61672-1:2013. The pattern-evaluation tests were performed by the Capital Government Office of Budapest and reference license ID number is as follows: BP/0103-AKU/00031/2019 and also by the Spanish Metrology Centre (CEM) and reference license ID number is as follows: 181323001/M1.

CALIBRATION RESULTS

Calibration results are the following:

1. Indication at the calibration check frequency

The sound level meter was calibrated in compliance with the instruction manual. During this process, the indication of this SLM was adjusted to the sound pressure level of the sound level calibrator type SV 30A, No 7921, from SVANTEK. The sound pressure level was corrected by the free-field factor.

Deviation of the acoustic pressure measurement of the A-weighted sound level using the sound calibrator type SV 30A, No 7921, from SVANTEK, was made according to the standard reference conditions: for static pressure 101,325 kPa, for temperature 23 °C and for relative humidity 50 %, results:

(0,0 ± 0,2) dB

The deviation was determined as a difference between the measured sound level and the sound level corrected by the free-field factor appropriate to mentioned sound calibrator.

2. Self-generated noise with microphone installed

Frequency weighting	A
The highest level of self-generated noise stated in the instruction manual [dB]	23,0
Indication [dB]	18,7

3. Self-generated noise with microphone replaced by the electrical input signal device

Frequency weighting	A	C	Z
The highest expected level of self-generated noise stated in the instruction manual [dB]	18,0	23,0	33,0
Level of self-generated noise [dB]	14,0	14,0	21,2

Authorised by:

Calibration Specialist

Mateusz Krojec, Eng.

4. Acoustical signal tests of a frequency weighting C

Frequency	Relative frequency-weighted free-field response	Design-goal frequency weighting	The deviation of frequency weighting	Extended uncertainty	Acceptable limits
Hz	dB	dB	dB	dB	dB
125	-0,1	-0,2	0,1	0,3	±1,0
1000	0,0	0,0	0,0	0,3	±0,7
8000	-2,0	-3,0	1,0	0,4	-2,5; +1,5

5. Electrical signal tests of frequency weightings

Frequency	Design-goal frequency weighting			The deviation of frequency weighting			Extended uncertainty	Acceptable limits
	A	C	Z	A	C	Z		
Hz	dB	dB	dB	dB	dB	dB	dB	dB
63	-26,2	-0,8	0,0	0,3	0,3	0,2	0,3	±1,0
125	-16,1	-0,2	0,0	0,2	0,2	0,1	0,3	±1,0
250	-8,6	0,0	0,0	0,1	0,1	0,1	0,3	±1,0
500	-3,2	0,0	0,0	0,1	0,2	0,1	0,3	±1,0
1000	0,0	0,0	0,0	0,0	0,0	0,0	0,3	±0,7
2000	1,2	-0,2	0,0	0,5	0,5	0,4	0,3	±1,0
4000	1,0	-0,8	0,0	0,8	0,8	0,7	0,3	±1,0
8000	-1,1	-3,0	0,0	1,2	1,2	1,0	0,4	-2,5; +1,5
16000	-6,6	-8,5	0,0	0,6	0,6	0,8	0,6	-16,0; +2,5

6. Frequency and time weightings at 1 kHz

	Sound level				Time-averaged sound level
Frequency weighting	A	A	C	Z	A
Time weighting	Fast	Slow	Fast	Fast	-
Indication [dB]	114,0	114,0	114,0	114,0	114,0
The deviation of indication from the indication of A-weighted sound level with Fast time weighting [dB]		0,0	0,0	0,0	0,0
Extended uncertainty [dB]		0,1			
Acceptable limits [dB]		±0,1	±0,2	±0,2	±0,1

Authorised by:

Calibration Specialist

Mateusz Krojec, Eng.

7. Level linearity on the reference level range

Expected sound level	Indication	Level linearity error	Extended uncertainty	Acceptable limits
dB	dB	dB	dB	dB
124,0	124,0	0,0	0,2	±0,8
123,0	123,0	0,0		
122,0	122,0	0,0		
121,0	121,0	0,0		
120,0	120,0	0,0		
119,0	119,0	0,0		
114,0	114,0	0,0		
109,0	109,0	0,0		
104,0	104,0	0,0		
99,0	99,0	0,0		
94,0	94,0	0,0		
89,0	89,0	0,0		
84,0	84,0	0,0		
79,0	79,0	0,0		
74,0	74,0	0,0		
69,0	69,0	0,0		
64,0	64,0	0,0		
59,0	59,0	0,0		
54,0	54,0	0,0		
49,0	49,0	0,0		
44,0	44,0	0,0		
39,0	38,9	-0,1		
34,0	33,9	-0,1		
33,0	32,9	-0,1		
32,0	32,0	0,0		
31,0	30,9	-0,1		
30,0	29,9	-0,1		

8. Overload indication

Frequency weighting A

The difference between the levels of the positive and negative one-half-cycles input signals that first cause the displays of overload indication	Extended uncertainty	Maximum value of the difference
dB	dB	dB
0,1	0,3	1,5

Authorised by:

Calibration Specialist

Mateusz Krojec, Eng.

9. Toneburst response

Measurement quantity	Time weighting	Toneburst duration	The indications in response to toneburst relative to the steady sound level	Reference toneburst response relative to the steady sound level	The deviations of the measured toneburst in responses from the corresponding reference toneburst	Extended uncertainty	Acceptable limits
		ms	dB	dB	dB	dB	dB
Time-weighted sound level	Fast	200	-1,0	-1,0	0,0	0,3	±0,5
		2	-18,0	-18,0	0,0		-1,5; +1,0
		0,25	-27,1	-27,0	-0,1		-3,0; +1,0
Time-weighted sound level	Slow	200	-7,5	-7,4	-0,1		±0,5
		2	-27,1	-27,0	-0,1		-1,5; +1,0
Sound exposure level	-	200	-7,0	-7,0	0,0		±0,5
		2	-27,0	-27,0	0,0		-1,5; +1,0
		0,25	-36,1	-36,0	-0,1		-3,0; +1,0

10.Peak C sound level

Numbers of cycles in test signal	Frequency of test signal	The deviation of indication	Extended uncertainty	Acceptable limits
	Hz	dB	dB	dB
One	8000	-0,5	0,2	±2,0
Positive half-cycle	500	-0,1		±1,0
Negative half-cycle	500	-0,1		

11.High-level stability

A-weighted sound level indicated in response to a steady 1 kHz electrical signal		The difference between the initial and final indications	Extended uncertainty	Acceptable limits
at the beginning of a 5 min period of continuous exposure to the signal	at the end of a 5 min period of continuous exposure to the signal			
dB	dB	dB	dB	dB
124,0	124,0	0,0	0,1	±0,1

12.Long-term stability

A-weighted sound level indicated in response to steady 1 kHz electrical signal		The difference between the initial and final indications	Extended uncertainty	Acceptable limits
at the beginning of a period of operation	at the end of a period of operation			
dB	dB	dB	dB	dB
114,0	114,0	0,0	0,1	±0,1

Authorised by:

Calibration Specialist

Mateusz Krojec, Eng.

SVANTEK

ISO9001 certified

FACTORY CALIBRATION DATA OF THE *SV 307 No. 104990*

with microphone SVANTEK type ST30A No. 108889

IMEI: 355001097776701

1. CALIBRATION (acoustical)

LEVEL METER function; Reference frequency: 1000Hz; Sound Pressure Level: 114.03 dB.

Characteristic	Correct value [dB]	Indication [dB]	Error [dB]
Z	114.03	114.07	0.04
A	114.03	114.07	0.04
C	114.03	114.07	0.04

Calibration measured with the microphone SVANTEK type ST30A No. 108889. Calibration factor: 0.00 dB.

2. LINEARITY TEST (electrical)

LEVEL METER function; Characteristic: A; f_{nn}= 31.5 Hz

Nominal result LEQ [dB]	29.0	30.0	31.0	35.0	40.0	60.0	80.0	85.0
Error [dB]	0.0	0.0	0.0	-0.0	0.0	0.0	0.0	-0.0

LEVEL METER function; Characteristic: A; f_{nn}= 1000 Hz

Nominal result LEQ [dB]	29.0	30.0	31.0	35.0	40.0	60.0	80.0	100.0	120.0	125.0
Error [dB]	0.1	0.1	0.1	0.0	0.0	-0.0	0.0	0.0	-0.0	-0.0

LEVEL METER function; Characteristic: A; f_{nn}= 8000 Hz

Nominal result LEQ [dB]	29.0	30.0	31.0	35.0	40.0	60.0	80.0	100.0	120.0	124.0
Error [dB]	0.0	0.0	-0.0	-0.0	-0.0	-0.0	0.0	0.0	-0.0	-0.0

3. TONE BURST RESPONSE

LEVEL METER function: Characteristic: A; f_{nn}= 4000 Hz; Burst duration: 2s

Steady level nominal result = 122 dB

Result	Detector	Duration [ms]	1000	500	200	100	50	20	10	5	2	1	0.5	0.25
MAX	Fast	Indication [dB]	122.0	121.9	121.0	119.4	117.2	113.7	110.8	107.9	104.0	101.0	97.9	94.9
		Error [dB]	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.0	0.0	-0.0	-0.0	-0.1	-0.1
	Slow	Indication [dB]	119.9	117.9	114.5	111.7	108.8	104.8	101.9	98.9	94.9	-	-	-
		Error [dB]	-0.0	-0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-	-	-
SEL	-	Indication [dB]	122.0	119.0	115.0	112.0	109.0	105.0	102.0	99.0	95.0	91.9	88.9	85.9
		Error [dB]	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	-0.0	-0.0	-0.0	-0.1	-0.1

Steady level nominal result = 62 dB

Result	Detector	Duration [ms]	1000	500	200	100	50	20	10	5	2
MAX	Fast	Indication [dB]	62.0	61.9	61.0	59.4	57.2	53.7	50.9	47.9	44.0
		Error [dB]	-0.0	0.0	0.0	-0.0	-0.0	-0.0	-0.0	0.0	-0.0
	Slow	Indication [dB]	59.9	57.9	54.5	51.7	48.8	44.9	41.9	38.9	34.9
		Error [dB]	-0.1	-0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
SEL	-	Indication [dB]	62.0	59.0	55.0	52.0	49.0	45.0	42.0	39.0	35.0
		Error [dB]	0.0	-0.0	0.0	0.0	-0.0	0.0	0.0	0.0	0.0

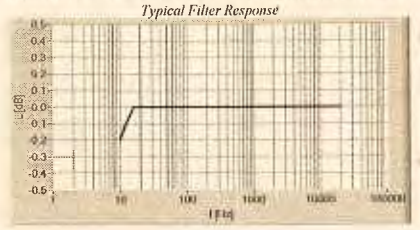
Steady level nominal result = 40 dB

Result	Detector	Duration [ms]	1000	500	200
MAX	Fast	Indication [dB]	40.0	39.9	39.0
		Error [dB]	0.0	0.0	0.1
	Slow	Indication [dB]	38.0	35.9	32.5
		Error [dB]	-0.0	0.0	-0.1
SEL	-	Indication [dB]	40.0	37.0	33.1
		Error [dB]	0.0	0.0	0.1

4. FREQUENCY RESPONSE (electrical)

LEVEL METER function; Characteristic: Z; Input signal =122 dB;

Typical Filter Response



Measured Filter Response
(f-frequency, L-level)

f [Hz]	L [dB]	f [Hz]	L [dB]	f [Hz]	L [dB]
10	-0.1	63	0.0	4000	-0.0
12.5	-0.0	125	-0.0	8000	-0.0
16	0.0	250	0.0	16000	-0.0
20	0.0	500	0.0	20000	-0.0
25	0.0	1000	-0.0		
31.5	0.0	2000	-0.0		

All frequencies are nominal center values for the 1/3 octave bands

5. FREQUENCY RESPONSE (acoustical)

LEVEL METER function; Characteristic: Z; Input: 90 dB;

Frequency [Hz]	20	31.5	63	125	250	500	800	1000	2000
Pressure Response [dB]	0.9	0.7	0.4	0.2	0.2	0.2	0.1	0.0	-0.5
Free Field Response [dB]	0.9	0.7	0.4	0.2	0.2	0.2	0.1	0.0	0.0

Frequency [Hz]	3150	4000	5000	6300	8000	10000	12500	16000
Pressure Response [dB]	-1.4	-2.1	-3.0	-4.3	-5.7	-7.1	-8.8	-11.0
Free Field Response [dB]	-0.1	0.4	0.2	0.1	-0.0	-0.4	-1.4	-3.5

6. INTERNAL NOISE LEVEL (electrical - compensated)

LEVEL METER function; Calibration factor: 0dB

Characteristic	Z	A	C
Level [dB]	≤23	≤15	≤15

7. INTERNAL NOISE LEVEL (acoustical - compensated)

LEVEL METER function; Characteristic: A;

Indication [dB]	≤23

Noise measured in special chamber, with reference microphone G.R.A.S type 40AN No. 73421

ENVIRONMENTAL CONDITIONS

Temperature	Relative humidity	Ambient pressure
22 °C	40%	989 hPa

TEST EQUIPMENT

Item	Manufacturer	Model	Serial no.	Description
1.	SVANTEK	SVAN 401	100	Signal generator
2.	SVANTEK	SVAN 917A	4369	Sound & Vibration Analyser
3.	RIGOL	DM3068	DM3015510I273	Digital multimeter
4.	SVANTEK	SV33B	93171	Acoustic calibrator
5.	G.R.A.S.	51AB	200368	Sound Intensity Calibrator
6.	G.R.A.S.	40BP	93796	½" Pressure Microphone
7.	G.R.A.S.	40AN	73421	½" Free Field Microphone
8.	SVANTEK	SL307	-	Microphone equivalent electrical impedance (18pF)

CONFORMITY & TEST DECLARATION

1. Herewith Svantek company declares that this instrument has been calibrated and tested in compliance with the internal ISO9001 procedures and meets all specification given in the Manual(s) or respectively surpass them.
2. The acoustic calibration was performed using the Sound Calibrator and is traceable to the GUM (Central Office of Measures) reference standard - sound level calibrator type 4231 No 2292773.
3. The information appearing on this sheet has been compiled specifically for this instrument. This form is produced with advanced equipment & procedures which permit comprehensive quality assurance verification of all data supplied herein.
4. This calibration sheet shall not be reproduced except in full, without written permission of the SVANTEK Ltd.

Calibration specialist: Cezary Dardziński .....

Test date: 2021-05-05

SVANTEK

ISO9001 certified

FACTORY CALIBRATION DATA OF THE *SV 307A No. 119092*

with microphone SVANTEK type ST30A No. 125153

IMEI: 352818664350609

1. CALIBRATION (acoustical)

LEVEL METER function; Reference frequency: 1000Hz; Sound Pressure Level: **113.99** dB.

Characteristic	Correct value [dB]	Indication [dB]	Error [dB]
Z	113.99	114.03	0.04
A	113.99	114.03	0.04
C	113.99	114.03	0.04

Calibration measured with the microphone SVANTEK type ST30A No. 125153. Calibration factor: 0.00 dB.

2. LINEARITY TEST (electrical)

LEVEL METER function; Characteristic: A; f_{sin}= 31.5 Hz

Nominal result LEQ [dB]	29.0	30.0	31.0	35.0	40.0	60.0	80.0	85.0
Error [dB]	-0.0	-0.0	-0.0	-0.0	0.0	0.0	-0.0	0.0

LEVEL METER function; Characteristic: A; f_{sin}= 1000 Hz

Nominal result LEQ [dB]	29.0	30.0	31.0	35.0	40.0	60.0	80.0	100.0	120.0	125.0
Error [dB]	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	0.0	0.0	-0.0	0.0

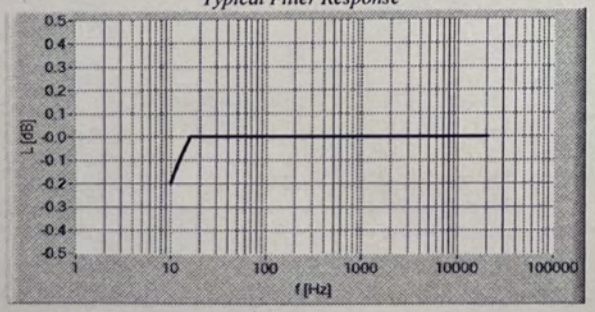
LEVEL METER function; Characteristic: A; f_{sin}= 8000 Hz

Nominal result LEQ [dB]	29.0	30.0	31.0	35.0	40.0	60.0	80.0	100.0	120.0	124.0
Error [dB]	-0.1	-0.1	-0.1	-0.1	-0.0	-0.0	-0.0	0.0	-0.0	-0.0

3. FREQUENCY RESPONSE (electrical)

LEVEL METER function; Characteristic: Z; Input signal =122 dB;

Typical Filter Response



Measured Filter Response
(f-frequency, L-level)

f [Hz]	L [dB]	f [Hz]	L [dB]	f [Hz]	L [dB]
10	-0.1	63	-0.0	4000	-0.0
12.5	-0.0	125	-0.0	8000	-0.0
16	0.0	250	0.0	16000	0.0
20	0.0	500	0.0	20000	0.0
25	0.0	1000	-0.0		
31.5	0.0	2000	-0.0		

All frequencies are nominal center values for the 1/3 octave bands

4. FREQUENCY RESPONSE (acoustical)

LEVEL METER function; Characteristic: Z; Input: 90 dB;

Frequency [Hz]	20	31.5	63	125	250	500	800	1000	2000
Pressure Response [dB]	0.6	0.5	0.3	0.2	0.2	0.2	0.1	0.0	-0.4
Free Field Response [dB]	0.6	0.5	0.3	0.2	0.1	0.0	-0.0	0.0	0.1

Frequency [Hz]	3150	4000	5000	6300	8000	10000	12500	16000
Pressure Response [dB]	-1.2	-1.8	-2.7	-3.8	-5.1	-6.4	-7.7	-9.7
Free Field Response [dB]	0.2	0.6	0.6	0.6	0.6	0.3	-0.4	-2.1

5. INTERNAL NOISE LEVEL (electrical - compensated)

LEVEL METER function; Calibration factor: 0dB

Characteristic	Z	A	C
Level [dB]	≤23	≤15	≤15

6. INTERNAL NOISE LEVEL (acoustical - compensated)

LEVEL METER function; Characteristic: A;

Indication [dB]	≤23

Noise measured in special chamber, with reference microphone G.R.A.S type 40AN No. 73421

ENVIRONMENTAL CONDITIONS

Temperature	Relative humidity	Ambient pressure
25 °C	46%	1000 hPa

TEST EQUIPMENT

Item	Manufacturer	Model	Serial no.	Description
1.	SVANTEK	SVAN 401	84	Signal generator
2.	SVANTEK	SVAN 912A	15900	Sound &Vibration Analyser
3.	RIGOL	DM3068	DM30155100773	Digital multimeter
4.	SVANTEK	SV30A	24563	Acoustic calibrator
5.	G.R.A.S.	51AB	200368	Sound Intensity Calibrator
6.	G.R.A.S.	40BP	93296	¼" Pressure Microphone
7.	G.R.A.S.	40AN	73421	½" Free Field Microphone
8.	SVANTEK	SL307	-	Microphone equivalent electrical impedance (18pF)

CONFORMITY & TEST DECLARATION

1. Herewith Svantek company declares that this instrument has been calibrated and tested in compliance with the internal ISO9001 procedures and meets all specification given in the Manual(s) or respectively surpass them.
2. The acoustic calibration was performed using the Sound Calibrator and is traceable to the GUM (Central Office of Measures) reference standard - sound level calibrator type 4231 No 2292773.
3. The information appearing on this sheet has been compiled specifically for this instrument. This form is produced with advanced equipment & procedures which permit comprehensive quality assurance verification of all data supplied herein.
4. This calibration sheet shall not be reproduced except in full, without written permission of the SVANTEK Ltd.

Calibration specialist: Krzysztof Kubeł ..... Test date: 2022-07-01

CALIBRATION CERTIFICATE

Issued By AcSoft Limited Calibration Laboratory

Date Of Issue: 08-12-2025 **Certificate No:** 1515554-1

Calibrated By: W. Jay

Approved By: W. Jay

CUSTOMER

NVM Ireland Ltd
1st Floor,
Unit 13
Boyne Business Park
Drogheda
Co Louth
A92 R625

INSTRUMENT DETAILS

Manufacturer:	SVANTEK
Model:	SV307A
Serial No.:	119173
Firmware Version:	1.26.4
Description:	Sound Level Meter
Performance Class:	1

Type Approved to IEC 61672-1:2013: Yes
(If yes, there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2013) (BP/0103-AKU/00031/2019)

SENSOR DETAILS

Manufacturer:	SVANTEK
Model:	ST30A
Serial No.:	178597
Description:	Microphone

P/O NUMBER N/A
DATE RECEIVED 05-12-2025
DATE CALIBRATED 08-12-2025

CALIBRATION RESULTS

The sound level meter submitted for testing successfully completed the periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 because (a) evidence was not publicly available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

REPORTED RESULTS

The results contained in this Certificate refer only to the measurements made at the time of test for the instrument detailed above. These results do not reflect the instrument's ability to maintain calibration.

This calibration was performed by AcSoft Ltd, 11 Abbey Court, Fraser Road,
Priory Business Park, Bedford, MK44 3WH
T: 01234 639550 W: www.acsoft.co.uk E: sales@acsoft.co.uk

CALIBRATION CERTIFICATE

Issued By AcSoft Limited Calibration Laboratory

Date Of Issue: 08-12-2025 **Certificate No:** 1515554-1

ENVIRONMENTAL CONDITIONS

	Start - End	
Temperature:	18.2 – 18.8	°C
Humidity:	52 – 55	%rh
Pressure:	100.1 – 100.2	kPa

INSTRUCTION MANUAL DETAILS

Title:	SV307 User Manual
Version No.:	Rev. 1.10
Publication Date:	04/04/2019
Date Provided or Downloaded:	07/06/2023
Uncertainties Provided:	N/A

CALIBRATOR DETAILS

Manufacturer:	SVANTEK
Model:	SV30A
Serial No.:	83782
Customer or Lab Calibrator:	Lab Calibrator
Specified or Equivalent:	Equivalent
Sound Pressure Level:	114.00 dB Calibration Reference SPL
Frequency:	999.97 Hz Calibration Check Frequency

CALIBRATION METHOD

Periodic tests were performed in accordance with procedures from IEC 61672-3: 2013.

UNCERTAINTY OF MEASUREMENTS

Uncertainty of measurement has been evaluated in compliance with EA-4/02:2013. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%.

MEASUREMENT TRACEABILITY

The instrument under test was calibrated using the following equipment:
Svantek SV401 Signal Generator, ACS022, Certificate No. 1148625
Svantek SV30A Acoustical Calibrator, ACS023, Certificate No. 6397/1
LAB-EL LB-706B Thermo-Barometer, ACS029, Certificate No. 1148624

NOTES

1. *The information appearing on this certificate has been compiled specifically for this instrument. This calibration certificate is produced with traceable and advanced equipment which permit comprehensive quality assurance verification of all data supplied herein.*
2. *The measurements in this document are traceable to GUM (Central Office of Measures), Poland*
3. *This calibration certificate shall not be reproduced except in full, without written permission from AcSoft Ltd.*

This calibration was performed by AcSoft Ltd, 11 Abbey Court, Fraser Road,
Priory Business Park, Bedford, MK44 3WH
T: 01234 639550 W: www.acsoft.co.uk E: sales@acsoft.co.uk

CALIBRATION CERTIFICATE

Issued By AcSoft Limited Calibration Laboratory

Date Of Issue: 08-12-2025 **Certificate No:** 1515554-1

CALIBRATION RESULTS ARE AS FOLLOWS:

1. Indication at the calibration check frequency

The sound level meter was calibrated in compliance with the instruction manual. During this process, the indication of this SLM was adjusted to the sound pressure level of the sound level calibrator type SV 30A, No 83782, from SVANTEK. The sound pressure level was corrected by the free-field factor.

Indicated Level On Receipt [dB]	Indicated Level Following Adjustment [dB]
113.77	114.0

2. Self-generated noise with microphone installed

Frequency weighting	A
The highest level of self-generated noise stated in the instruction manual [dB]	N/A
Indication [dB]	N/A

Self-Generated Noise is reported for information only and not used to assess conformance to a requirement.

3. Self-generated noise with microphone replaced by the electrical input signal device

Frequency weighting	A	C	Z
The highest expected level of self-generated noise stated in the instruction manual [dB]	15.0	15.0	23.0
Level of self-generated noise [dB]	8.1	13.3	17.6

Self-Generated Noise is reported for information only and not used to assess conformance to a requirement.

4. Acoustical signal tests of a frequency weighting C

Frequency	Relative frequency-weighted free-field response	Design-goal frequency weighting	The deviation of frequency weighting	Expanded uncertainty	Acceptable limits
Hz	dB	dB	dB	dB	dB
125.0	-0.16	-0.2	0.04	±0,3	±1,0
1000.0	0.04	0.0	0.04	±0,3	±0,7
8000.0	-3.16	-3.0	-0.16	±0,4	+1,5; -2,5

This calibration was performed by AcSoft Ltd, 11 Abbey Court, Fraser Road,
Priory Business Park, Bedford, MK44 3WH
T: 01234 639550 W: www.acsoft.co.uk E: sales@acsoft.co.uk

CALIBRATION CERTIFICATE

Issued By AcSoft Limited Calibration Laboratory

Date Of Issue: 08-12-2025 **Certificate No:** 1515554-1

5. Electrical signal tests of frequency weightings

Frequency	Design-goal frequency weighting			The deviation of frequency weighting			Expanded uncertainty	Acceptable limits
	A	C	Z	A	C	Z		
Hz	dB	dB	dB	dB	dB	dB	dB	dB
63	-26,2	-0,8	0,0	-0.1	-0.2	-0.2	±0,3	±1,0
125	-16,1	-0,2	0,0	-0.1	-0.1	-0.1	±0,3	±1,0
250	-8,6	0,0	0,0	-0.1	-0.1	-0.1	±0,3	±1,0
500	-3,2	0,0	0,0	-0.1	0.0	0.0	±0,3	±1,0
1000	0,0	0,0	0,0	0.0	0.0	0.0	±0,3	±0,7
2000	+1,2	-0,2	0,0	0.0	0.0	0.0	±0,3	±1,0
4000	+1,0	-0,8	0,0	0.0	0.0	0.0	±0,3	±1,0
8000	-1,1	-3,0	0,0	0.1	0.1	0.0	±0,4	+1,5; -2,5
16000	-6,6	-8,5	0,0	-0.2	-0.2	0.0	±0,6	+2,5; -16,0

6. Frequency and time weightings at 1 kHz

	Sound level				Time-averaged sound level
Frequency weighting	A	A	C	Z	A
Time weighting	Fast	Slow	Fast	Fast	-
Indication [dB]	114.0	114.0	114.0	114.0	114.0
The deviation of indication from the indication of A-weighted sound level with Fast time weighting [dB]		0.0	0.0	0.0	0.0
Expanded uncertainty [dB]		0.0			
Acceptable limits[dB]		±0,1	±0,1	±0,1	±0,1

This calibration was performed by AcSoft Ltd, 11 Abbey Court, Fraser Road,
Priory Business Park, Bedford, MK44 3WH
T: 01234 639550 W: www.acsoft.co.uk E: sales@acsoft.co.uk

CALIBRATION CERTIFICATE

Issued By AcSoft Limited Calibration Laboratory

Date Of Issue: 08-12-2025 **Certificate No:** 1515554-1

7. Level linearity

Reference level range: HIGH

Expected sound level	Indication	Level linearity error	Expanded uncertainty	Acceptable limits
dB	dB	dB	dB	dB
119.0	118.9	-0.1		
118.0	118.0	0.0		
117.0	117.0	0.0		
116.0	116.0	0.0		
115.0	115.0	0.0		
114.0	114.1	0.1		
109.0	109.1	0.1		
104.0	104.1	0.1		
99.0	99.1	0.1		
94.0	94.1	0.1		
89.0	89.1	0.1		
84.0	84.1	0.1		
79.0	79.1	0.1		
74.0	74.1	0.1		
69.0	69.1	0.1	±0,2	±0,8
64.0	64.0	0.0		
59.0	59.0	0.0		
54.0	54.0	0.0		
49.0	49.0	0.0		
44.0	44.0	0.0		
39.0	39.1	0.1		
38.0	38.1	0.1		
37.0	37.1	0.1		
36.0	36.1	0.1		
35.0	35.1	0.1		
34.0	34.2	0.2		
33.0	33.2	0.2		
32.0	32.2	0.2		
31.0	31.2	0.2		

This calibration was performed by AcSoft Ltd, 11 Abbey Court, Fraser Road,
Priory Business Park, Bedford, MK44 3WH
T: 01234 639550 W: www.acsoft.co.uk E: sales@acsoft.co.uk

CALIBRATION CERTIFICATE

Issued By AcSoft Limited Calibration Laboratory

Date Of Issue: 08-12-2025 **Certificate No:** 1515554-1

8. Toneburst response

Measurement quantity	Time weighting	Toneburst duration	The indications in response to toneburst relative to steady sound level	Reference toneburst response relative to steady sound level	Deviation of measured toneburst response from reference toneburst	Expanded uncertainty	Acceptable limits
		ms	dB	dB	dB	dB	dB
Time-weighted sound level	Fast	200	-1.0	-1,0	0.0	±0,2	±0,5
		2	-18.0	-18,0	0.0		+1,0; -1,5
		0,25	-27.2	-27,0	-0.2		+1,0; -3,0
Time-weighted sound level	Slow	200	-7.6	-7,4	-0.2		±0,5
		2	-27.2	-27,0	-0.2		+1,0; -3,0
Sound exposure level	-	200	-7.0	-7,0	0.0		±0,5
		2	-27.0	-27,0	0.0		+1,0; -1,5
		0,25	-36.2	-36,0	-0.2		+1,0; -3,0

9. Peak C sound level

Numbers of cycles in test signal	Frequency of test signal	The deviation of indication	Expanded uncertainty	Acceptable limits
	Hz	dB	dB	dB
One	8000	-0.2	±0,2	±2,0
Positive half-cycle	500	-0.2		±1,0
Negative half-cycle	500	-0.2		

10. Overload indication

Frequency weighting A

The difference between the levels of the positive and negative one-half-cycles input signals that first cause the displays of overload indication	Expanded uncertainty	Maximum value of the difference
dB	dB	dB
0.1	±0,3	1,5

This calibration was performed by AcSoft Ltd, 11 Abbey Court, Fraser Road,
Priory Business Park, Bedford, MK44 3WH
T: 01234 639550 W: www.acsoft.co.uk E: sales@acsoft.co.uk

MTS Calibration Ltd,
The Grange Business Centre,
Belasis Avenue,
Billingham TS23 1LG,
England
Telephone: 01642 876 410

CERTIFICATE OF CALIBRATION

Approved Signatory:

Tony Sherris

Issued by: MTS Calibration Ltd

Date of Issue: 11 March 2025 **Certificate Number:** 40592

Sound Level Meter

Sound Level Meter Periodic Tests to EN 61672-3: 2013 Class 1

Client: Environmental Measurements
Unit 12, Tallaght Business Centre
Whitestown Business Park
Co.Dublin 24, Ireland

Instrument Make: Larson Davis
Instrument Model: LxT1L
Serial Number: 0006026

Associated Equipment	Make	Model	Serial number
Preamplifier	PCB	PRMLxT1L	055810
Microphone	PCB	377B02	316076
Calibrator	Larson Davis	CAL200	9175
Calibrator supplied by	MTS for this calibration		

The measurements were performed at The Grange Business Centre, Belasis Avenue, TS23 1LD. The results only apply to the items tested.

Periodic tests were performed in accordance with procedures from IEC 61672-3:2013 Class 1

MTS Work procedure WP21 issue C3 test results summary, detailed results are shown on subsequent pages.

Tests performed	Section	Results of test	Page	Comments
Calibration Certificate	22		1	
Additional information			2	
Indication with Calibrator Supplied	10	No Limit	3	
Self-Generated Noise	11	No Limit	3	
Frequency and Time-weightings at 1kHz	14	Complies	3	
Long term stability	15	Complies	3	
High stability	21	Complies	3	
Acoustic Tests	12	Complies	4	
Frequency Weighting A	13	Complies	5	
Frequency Weighting C	13	Complies	6	
Frequency Weighting Z	13	Complies	7	
Level Linearity	16	Complies	8	
Level Linearity Range Control	17		n/a	SLM only has one range
Tone-burst Response	18	Complies	9	
Peak C sound level	19	Complies	10	
Overload indication	20	Complies	11	

The instrument was within the above specification as received - no modifications were made

The sound level meter submitted for testing has successfully completed the periodic tests of IEC 61672-3: 2013 for the environmental conditions under which the tests were performed. As evidence was publicly available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2: 2013, to demonstrate that the model of sound level meter fully conformed to the Class 1 specifications in IEC 61672-1: 2013, the sound level meter submitted for testing conforms to the Class 1 specifications of IEC 61672-1: 2013

Additional tests performed	Reference	
Microphone full frequency response	40594	See additional certificate
Filter calibration, third octave or octave	40595	See additional certificate

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Laboratory Location
Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030

Certificate of Calibration

Certificate number: **54460**

Test Object:	**Sound Level Meter, BS EN IEC 61672-3:2013 Class 1** **Associated Frequency Analyser to BS EN IEC 61260:1996 (Limited) Class 1**
Producer:	**Larson Davis**
Type:	**LXT1**
Serial number:	**0006872**
Customer:	**Environmental Measurements Ltd**
Address:	**Unit 11/12, Tallaght Business Centre,** **Whitestown Business Park, Dublin 24, Ireland. D24 X9TC**
Contact Person:	**Weronika Wolniak**
Order No:	**EM314**

Introduction:
Calibration has been performed as set out in CA Technical Procedures which are based on the procedures for periodic verification of sound level meters as per the **Test Object** listed above. Results and conformance statement are overleaf and detailed results, where appropriate, are provided in the attached Measurement Report.

Tested:	*Producer*	*Type*	*Serial No*	*Certificate No*
Microphone	PCB Piezotronics	377B02	333923	54459
Calibrator*	Norsonic	1251	30873	U53548
Preamplifier	PCB	PRMLxT1L	070118	Included

* The calibrator was complete with any required coupler for the microphone specified.

Additional items that have also been submitted for verification:

Wind shield	N/A
Attenuator	N/A
Extension cable	N/A

These items have been taken into account wherever appropriate.

Instruction Manual: LxT Manual I770.01 Rev M Firmware Version: v2.404 The test object is a single channel instrument.

Conditions	*Pressure kPa*	*Temperature °C*	*Humidity %RH*
Reference conditions	101.325	23	50
Measurement conditions	101.23 ±0.02	22.60 ±0.0	48.68 ±0.6

Calibration Dates:

Received date:	08-Apr-2026	Reviewed date:	20-Apr-2026
Calibration date:	17-Apr-2026	Issued date:	20-Apr-2026

Technicians: (Electronic certificate)

Calibrated by: *Palaniwel Marappan B.Eng (Hons), M.Sc*

Reviewed by: *Darren Batten*

This certificate is issued in accordance with the CA Quality Management system. It provides traceability of measurement to recognized national standards, and to the units of measurement realized at the National Physical Laboratory or other recognized national standards laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Certificate of Calibration

Continuation of Certificate number: **54460**

The statements of conformance and observation notes detailed in this certificate are made with reference to the following standards in respect of the calibration of the test object.

Manufactured:	**BS EN IEC 61672-1:2013**
Periodic Tests:	**BS EN IEC 61672-3:2013**
Pattern Evaluation:	**Not Applicable**
Filter Evaluation:	**BS EN IEC 61260:1996 (Limited) Class 1**

Conformance:

From markings on the sound level meter or by reference to the manufacturer's published literature it has been determined that the instrument submitted for verification was originally manufactured to the listed standard and similarly that the associated sound calibrator conforms to the BS EN IEC 60942 standard.

Measurement Summary:

Indication at the calibration check frequency - IEC61672-3 Ed.2 #10	Passed
Self-generated noise - IEC 61672-3 Ed.2.0 #11.2	Passed
Acoustical signal tests of a frequency weighting - IEC 61672-3 Ed.2.0 #12	Passed
Electrical signal tests of frequency weightings - IEC 61672-3 Ed.2.0 #13	Passed
Frequency weightings: A Network - IEC 61672-3 Ed.2.0 #13.3	Passed
Frequency weightings: C Network - IEC 61672-3 Ed.2.0 #13.3	Passed
Frequency weightings: Z Network - IEC 61672-3 Ed.2.0 #13.3	Passed
Frequency and time weightings at 1 kHz IEC 61672-3 Ed.2.0 #14	Passed
Level linearity on the reference level range - IEC 61672-3 Ed.2.0 #16	Passed
Toneburst response - IEC 61672-3 Ed.2.0 #18	Passed
Peak C sound level - IEC 61672-3 Ed.2.0 #19	Passed
Overload indication - IEC 61672-3 Ed.2.0 #20	Passed
High level stability test - IEC 61672-3 Ed.2.0 #21	Passed
Long term stability test - IEC 61672-3 Ed.2.0 #15	Passed
Limited 1/3octave: Relative attenuation - IEC 61260, #4.4 & #5.3	*See Note below

Comments

Correct level with associated calibrator is 113.9dB(A).

Statement of Conformance

The sound level meter submitted for testing has successfully completed the periodic tests for the environmental conditions under which the tests were performed. However, no general statement of conclusion can be made about conformance of the sound level meter to the full requirements of the manufactured standard because (a) evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in the manufacturer's standard or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests completed cover only a limited subset of the specifications in the relevant standard

Filter Calibration

The filter functions have been found to conform, by electrical testing, to the relative attenuation requirement of the standard noted over the range of frequencies shown in the attached test report.

Observations

Note:- Partial Filter calibration performed covering only 125 Hz, 1k Hz and 8k Hz 1/3 Octave bands.

No information on the uncertainty of measurement, required by the listed standard, for the correction data was made available in the instruction manual / data sheets from the equipment manufacturer / supplier for the test object. The uncertainty of measurement of the adjustment data has therefore been assumed to be numerically zero for the purpose of this periodic test. If these uncertainties are not actually zero, there is a possibility that the frequency response of the test object may not conform to the requirements of the listed standards.

Certificate of Calibration

Continuation of Certificate number: 54460

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a coverage probability of approximately 95 %. The uncertainty evaluation has been carried out in accordance with EA publication EA-4/02. Details of the uncertainty for each measurement are available from the Calibration Laboratory upon request. Details of the sources of corrections and their associated uncertainties that relate to this verification are contained within the test report accompanying this certificate.

This certificate relates only to the items tested above.

** End of Certificate **

Measurement Results:

Indication at the calibration check frequency - IEC61672-3 Ed.2 Clause 10

```
Reference level: 114.0 dB
Reference Range: 120 dB FS
Reference Frequency: 1000 Hz
Reference Calibrator: WSC15 - Nor-1256.125626003 (114dB 1kHz)
Reference calibrator level: 114.11
Before calibration:
Environmental corrections: 0.00
Other corrections: -0.15
Notional level: 113.96
Calibrator level before adjustment: 114.0
After calibration:
Environmental corrections: 0.00
Other corrections: -0.15
Notional level: 113.96
Reference calibrator level after calibration: 114.0
Associated Calibrator: Norsonic - 1251 - 30873
Associated calibrator level: 114.03
Initial level check:
Environmental corrections: 0.00
Other corrections: -0.15
Notional level: 113.88
Indicated level: 113.9
Final level statement:
Environmental corrections after calibration: 0.00
Other corrections: -0.15
Notional level: 113.88
Calibrator level after adjustment: 113.9
This value shall be used for adjusting the sound level meter in the future.
Test Passed
```

Self-generated noise - IEC 61672-3 Ed.2.0 Clause 11.2

Network	Level (dB)	Comment
A	16.2	Microphone installed
A	7.8	Equivalent capacity
C	10.7	Equivalent capacity
Z	18.0	Equivalent capacity

Test Passed

Acoustical signal tests of a frequency weighting - IEC 61672-3 Ed.2.0 Clause 12

C-Weighted results

Frequency	SLM Meas (dB)	SLM U (dB)	Microphone Corr (dB)	Microphone U (dB)	Case Refl. Corr (dB)	Case Refl. U (dB)	Wind Screen Corr (dB)	Wind Screen U (dB)	Uncert (dB)	Lim (dB)	Result (dB)	
125 Hz	0.0	0.2	0.0	0.3	0.0	0.3			0.4	+-1.0	-0.1	P
1 kHz	0.0	0.2	0.1	0.3	0.0	0.3			0.4	+-0.7	0.0	P
4 kHz	-0.3	0.3	1.0	0.3	0.0	0.3			0.4	+-1.0	0.6	P
8 kHz	-2.5	0.2	3.4	0.4	0.0	0.4			0.5	+1.5/-2.5	0.8	P

The level obtained at 1 kHz was used as reference for the calculations.
This level was: 91.80 dB.
The overall frequency response of the sound level meter, nominal case reflections and microphone response has shown to conform with the requirements in IEC 61672-3 for a class 1 sound level meter.
Frequency response test using electrostatic actuator.
Sources for correction data:
  Microphone field corrections and uncertainty: PCB Inc.
  Case reflections and uncertainty:
  Wind screen corrections and uncertainty:
Test Passed

Electrical signal tests of frequency weightings - IEC 61672-3 Ed.2.0 Clause 13

A-Weighted results:

Frequency	SLM Meas (dB)	SLM U (dB)	Microphone Corr (dB)	Microphone U (dB)	Case Refl. Corr (dB)	Case Refl. U (dB)	Wind Screen Corr (dB)	Wind Screen U (dB)	Uncert (dB)	Lim (dB)	Result (dB)	
63 Hz	0.0	0.1	0.0	0.3	0.0	0.3			0.37	+-1.0	0.0	P
125 Hz	0.0	0.1	0.0	0.3	0.0	0.3			0.37	+-1.0	0.0	P
250 Hz	0.0	0.1	0.0	0.3	0.0	0.3			0.37	+-1.0	0.0	P
500 Hz	-0.1	0.1	0.0	0.3	0.0	0.3			0.37	+-1.0	-0.1	P
1 kHz	0.0	0.1	0.1	0.3	0.0	0.3			0.37	+-0.7	0.1	P
2 kHz	-0.1	0.1	0.2	0.3	0.0	0.3			0.37	+-1.0	0.1	P
4 kHz	-0.1	0.1	0.6	0.3	0.0	0.3			0.37	+-1.0	0.5	P
8 kHz	-0.1	0.1	0.9	0.4	0.0	0.4			0.51	1.5/2.5	0.8	P
16 kHz	0.1	0.1	1.0	0.5	0.0	0.5			0.68	2.5/16	1.1	P

C-Weighted results:

Frequency	SLM Meas (dB)	SLM U (dB)	Microphone Corr (dB)	Microphone U (dB)	Case Refl. Corr (dB)	Case Refl. U (dB)	Wind Screen Corr (dB)	Wind Screen U (dB)	Uncert (dB)	Lim (dB)	Result (dB)	
63 Hz	-0.1	0.1	0.0	0.3	0.0	0.3			0.37	+-1.0	-0.1	P
125 Hz	0.0	0.1	0.0	0.3	0.0	0.3			0.37	+-1.0	0.0	P
250 Hz	-0.1	0.1	0.0	0.3	0.0	0.3			0.37	+-1.0	-0.1	P
500 Hz	0.0	0.1	0.0	0.3	0.0	0.3			0.37	+-1.0	0.0	P
1 kHz	0.0	0.1	0.1	0.3	0.0	0.3			0.37	+-0.7	0.1	P
2 kHz	0.0	0.1	0.2	0.3	0.0	0.3			0.37	+-1.0	0.2	P
4 kHz	-0.1	0.1	0.6	0.3	0.0	0.3			0.37	+-1.0	0.5	P
8 kHz	0.0	0.1	0.9	0.4	0.0	0.4			0.51	1.5/2.5	0.9	P
16 kHz	0.0	0.1	1.0	0.5	0.0	0.5			0.68	2.5/16	1.0	P

Z-Weighted results:

Frequency	SLM Meas (dB)	SLM U (dB)	Microphone Corr (dB)	Microphone U (dB)	Case Refl. Corr (dB)	Case Refl. U (dB)	Wind Screen Corr (dB)	Wind Screen U (dB)	Uncert (dB)	Lim (dB)	Result (dB)

Electrical signal tests of frequency weightings - IEC 61672-3 Ed.2.0 Clause 13

63 Hz	-0.1	0.1	0.0	0.3	0.0	0.3	0.37	+-1.0	-0.1	P
125 Hz	-0.1	0.1	0.0	0.3	0.0	0.3	0.37	+-1.0	-0.1	P
250 Hz	-0.1	0.1	0.0	0.3	0.0	0.3	0.37	+-1.0	-0.1	P
500 Hz	-0.1	0.1	0.0	0.3	0.0	0.3	0.37	+-1.0	-0.1	P
1 kHz	0.0	0.1	0.1	0.3	0.0	0.3	0.37	+-0.7	0.1	P
2 kHz	-0.1	0.1	0.2	0.3	0.0	0.3	0.37	+-1.0	0.1	P
4 kHz	-0.1	0.1	0.6	0.3	0.0	0.3	0.37	+-1.0	0.5	P
8 kHz	0.0	0.1	0.9	0.4	0.0	0.4	0.51	1.5/2.5	0.9	P
16 kHz	-0.1	0.1	1.0	0.5	0.0	0.5	0.68	2.5/16	0.9	P

The actual frequency response of PCB Piezotronics / 377B02 333923 has been used for the calculations.
The overall frequency response of the sound level meter, nominal case reflections and microphone response has shown to conform with the requirements in IEC 61672-3 for a class 1 sound level meter.
The calculated uncertainties are checked against the requirements in the standard.
Sources for correction data:
Microphone response and uncertainty: Measured response / Settings file
Test Passed

Frequency weightings: A Network - IEC 61672-3 Ed.2.0 Clause 13.3

Frequency (Hz)	Ref. (dB)	Meas. (dB)	Uncert. (dB)	Dev. (dB)
63.1	73.0	73.0	0.12	0.0
125.9	73.0	73.0	0.12	0.0
251.2	73.0	73.0	0.12	0.0
501.2	73.0	72.9	0.12	-0.1
1000.0	73.0	73.0	0.12	0.0
1995.3	73.0	72.9	0.12	-0.1
3981.1	73.0	72.9	0.12	-0.1
7943.3	73.0	72.9	0.12	-0.1
15848.9	73.0	73.1	0.12	0.1

Test Passed

Frequency weightings: C Network - IEC 61672-3 Ed.2.0 Clause 13.3

Frequency (Hz)	Ref. (dB)	Meas. (dB)	Uncert. (dB)	Dev. (dB)
63.1	73.0	72.9	0.12	-0.1
125.9	73.0	73.0	0.12	0.0
251.2	73.0	72.9	0.12	-0.1
501.2	73.0	73.0	0.12	0.0
1000.0	73.0	73.0	0.12	0.0
1995.3	73.0	73.0	0.12	0.0
3981.1	73.0	72.9	0.12	-0.1
7943.3	73.0			Not Measured
15848.9	73.0			Not Measured

Test Passed

Frequency weightings: Z Network - IEC 61672-3 Ed.2.0 Clause 13.3

Frequency (Hz)	Ref. (dB)	Meas. (dB)	Uncert. (dB)	Dev. (dB)
63.1	73.0	72.9	0.12	-0.1
125.9	73.0	72.9	0.12	-0.1
251.2	73.0	72.9	0.12	-0.1
501.2	73.0	72.9	0.12	-0.1
1000.0	73.0	73.0	0.12	0.0
1995.3	73.0	72.9	0.12	-0.1
3981.1	73.0	72.9	0.12	-0.1
7943.3	73.0	73.0	0.12	0.0
15848.9	73.0	72.9	0.12	-0.1

Test Passed

Frequency and time weightings at 1 kHz IEC 61672-3 Ed.2.0 Clause 14

Weightings Time	Netw	Ref. (dB)	Measured (dB)	Lim. (dB)	(dB)	Uncert. (dB)	Dev. (dB)	Result
Fast	A	114.0	114.0	0.2	-0.2	0.12	0.0	P
Fast	C	114.0	114.0	0.2	-0.2	0.12	0.0	P
Fast	Z	114.0	114.0	0.2	-0.2	0.12	0.0	P
Slow	A	114.0	114.0	0.1	-0.1	0.12	0.0	P
Leq	A	114.0	114.0	0.1	-0.1	0.12	0.0	P
SEL	A	134.0	134.0	0.1	-0.1	0.12	0.0	P

Test Passed

Level linearity on the reference level range - IEC 61672-3 Ed.2.0 Clause 16

Ref. (dB)	Measured (dB)	Lim. (dB)	(dB)	Uncert. (dB)	Dev. (dB)	Result
Measured at 8 kHz						
114.0	114.0	0.8	-0.8	0.12	0.0	P
115.0	115.0	0.8	-0.8	0.12	0.0	P
116.0	116.0	0.8	-0.8	0.12	0.0	P
117.0	117.0	0.8	-0.8	0.12	0.0	P
118.0	118.0	0.8	-0.8	0.12	0.0	P
114.0	114.0	0.8	-0.8	0.12	0.0	P
109.0	109.0	0.8	-0.8	0.12	0.0	P
104.0	104.0	0.8	-0.8	0.12	0.0	P
99.0	99.0	0.8	-0.8	0.12	0.0	P
94.0	94.0	0.8	-0.8	0.12	0.0	P
89.0	89.0	0.8	-0.8	0.12	0.0	P
84.0	84.0	0.8	-0.8	0.12	0.0	P
79.0	79.0	0.8	-0.8	0.12	0.0	P
74.0	73.9	0.8	-0.8	0.12	-0.1	P
69.0	68.9	0.8	-0.8	0.12	-0.1	P
64.0	64.0	0.8	-0.8	0.12	0.0	P
59.0	59.0	0.8	-0.8	0.12	0.0	P
54.0	54.0	0.8	-0.8	0.12	0.0	P
49.0	49.0	0.8	-0.8	0.12	0.0	P
44.0	44.0	0.8	-0.8	0.12	0.0	P
39.0	38.9	0.8	-0.8	0.12	-0.1	P

Level linearity on the reference level range - IEC 61672-3 Ed.2.0 Clause 16

Ref. (dB)	Measured (dB)	Lim. (dB)	Lim. (dB)	Uncert. (dB)	Dev. (dB)	Result
34.0	34.0	0.8	-0.8	0.12	0.0	P
29.0	29.0	0.8	-0.8	0.12	0.0	P
27.0	27.0	0.8	-0.8	0.12	0.0	P
26.0	26.0	0.8	-0.8	0.12	0.0	P
25.0	25.1	0.8	-0.8	0.12	0.1	P
24.0	24.1	0.8	-0.8	0.12	0.1	P
23.0	23.1	0.8	-0.8	0.12	0.1	P
22.0	22.2	0.8	-0.8	0.12	0.2	P
21.0	21.2	0.8	-0.8	0.12	0.2	P

Test Passed

Toneburst response - IEC 61672-3 Ed.2.0 Clause 18

Burst type	Ref. (dB)	Measured (dB)	Lim. (dB)	Lim. (dB)	Uncert. (dB)	Dev. (dB)	Result
Fast 200 mSec	115.0	114.9	0.5	-0.5	0.16	-0.1	P
Fast 2.0 mSec	98.0	97.8	1.0	-1.5	0.16	-0.2	P
Fast 0.25 mSec	89.0	88.7	1.0	-3.0	0.16	-0.3	P
Slow 200 mSec	108.6	108.5	0.5	-0.5	0.16	-0.1	P
Slow 2.0 mSec	89.0	88.8	1.0	-3.0	0.16	-0.2	P
SEL 200 mSec	109.0	109.0	0.5	-0.5	0.16	0.0	P
SEL 2.0 mSec	89.0	89.0	1.0	-1.5	0.16	0.0	P
SEL 0.25 mSec	80.0	79.9	1.0	-3.0	0.16	-0.1	P

Test Passed

Peak C sound level - IEC 61672-3 Ed.2.0 Clause 19

Pulse Type	Pulse Freq. (Hz)	Ref. RMS (dB)	Ref. Peak (dB)	Measured Value (dB)	Lim. (+/-dB)	Uncert. (dB)	Dev. (dB)	Result
1 cycle	8k	107.0	110.4	109.8	2.0	0.2	-0.6	P
Pos 1/2 cycle	500	110.0	112.4	112.2	1.0	0.2	-0.2	P
Neg 1/2 cycle	500	110.0	112.4	112.2	1.0	0.2	-0.2	P

Test Passed

Overload indication - IEC 61672-3 Ed.2.0 Clause 20

	Measured (dB)	Lim. (+/-dB)	Uncert. (dB)	Result
Level difference of positive and negative pulses:	0.0	1.5	0.16	P
Positive 1/2 cycle 4 kHz. Overload occurred at:	120.1			
Negative 1/2 cycle 4 kHz. Overload occurred at:	120.1			

Test Passed

High level stability test - IEC 61672-3 Ed.2.0 Clause 21

Test signal: Sine wave at 1 kHz

Initial level (dB)	Final level (dB)	Diff. (dB)	Lim. value (±dB)	Uncert. (dB)	Result
117.0	117.0	0.0	0.1	0.06	P

Test Passed

Long term stability test - IEC 61672-3 Ed.2.0 Clause 15

Test signal: Sine wave at 1 kHz

Time inteval (mm:SS)	StartLevel (dB)	StopLevel (dB)	Difference (dB)	Tolerence (±dB)	Uncert. (dB)	Result
28:59	114.0	114.0	0.0	0.1	0.06	P

Test Passed

1/3octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

Test 1/3 octave filter X=-9 fexact=125.893Hz class 1

Nominal f[Hz]	Measured L[dB]	LoLim [dB]	HiLim [dB]	Result [P/F]
23.348	15.3	0.0	47.0	P
41.227	33.6	0.0	56.0	P
66.903	56.4	0.0	75.0	P
97.261	49.3	0.0	99.5	P
112.202	114.0	112.0	115.0	P
115.768	116.6	115.7	117.3	P
119.244	117.0	116.4	117.3	P
122.622	117.0	116.6	117.3	P
125.893	117.0	116.7	117.3	P
129.251	117.0	116.6	117.3	P
132.912	117.0	116.4	117.3	P
136.903	116.8	115.7	117.3	P
141.254	114.0	112.0	115.0	P
162.952	21.0	0.0	99.5	P
236.895	18.3	0.0	75.0	P
384.432	9.9	0.0	56.0	P
678.806	10.5	0.0	47.0	P

Test 1/3 octave filter X= 0 fexact=1000.000Hz class 1

Nominal f[Hz]	Measured L[dB]	LoLim [dB]	HiLim [dB]	Result [P/F]
185.462	18.0	0.0	47.0	P
327.477	33.5	0.0	56.0	P
531.427	56.4	0.0	75.0	P
772.574	40.9	0.0	99.5	P
891.251	114.0	112.0	115.0	P
919.577	116.6	115.7	117.3	P
947.190	117.0	116.4	117.3	P
974.019	117.0	116.6	117.3	P
1000.00	117.0	116.7	117.3	P
1026.67	117.0	116.6	117.3	P
1055.75	117.0	116.4	117.3	P

1/3octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

1087.46	116.8	115.7	117.3	P
1122.02	114.1	112.0	115.0	P
1294.37	22.0	0.0	99.5	P
1881.73	17.3	0.0	75.0	P
3053.65	17.0	0.0	56.0	P
5391.95	16.1	0.0	47.0	P

Test 1/3 octave filter X= 9 fexact=7943.282Hz class 1

Nominal f[Hz]	Measured L[dB]	LoLim [dB]	HiLim [dB]	Result [P/F]
1473.18	24.2	0.0	47.0	P
2601.24	32.6	0.0	56.0	P
4221.27	54.9	0.0	75.0	P
6136.78	41.1	0.0	99.5	P
7079.46	113.4	112.0	115.0	P
7304.46	115.9	115.7	117.3	P
7523.80	117.0	116.4	117.3	P
7736.91	117.0	116.6	117.3	P
7943.28	117.0	116.7	117.3	P
8155.16	117.0	116.6	117.3	P
8386.16	117.0	116.4	117.3	P
8637.98	116.8	115.7	117.3	P
8912.51	114.0	112.0	115.0	P
10281.6	28.3	0.0	99.5	P
14947.1	30.3	0.0	75.0	P
24256.0	27.0	0.0	56.0	P
42829.8	32.8	0.0	47.0	P

Test Passed

*** End of results ***

FEHILY TIMONEY

DESIGNING AND DELIVERING A SUSTAINABLE FUTURE

APPENDIX 9

Compendium of Mitigation Measures.

FEHILY TIMONEY

DESIGNING AND DELIVERING
A SUSTAINABLE FUTURE

DREHID WIND FARM AND SUBSTATION RFI

Compendium of Mitigation Measures

Prepared for:

North Kildare Wind Farm Ltd

FEHILY TIMONEY

DESIGNING AND DELIVERING
A SUSTAINABLE FUTURE

Date: **October 2026**

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1. INTRODUCTION

Fehily Timoney and Company have compiled this Compendium of Mitigation Measures report for the Drehid Wind Farm and Substation project in response to the Request for Further Information (RFI), received in a letter from An Coimisiún Pleanála dated 2nd April 2026. The RFI item in particular states:

> *"**Mitigation Measures***
> *You are requested to submit a compendium of proposed mitigation measures."*

The Compendium of Mitigation Measures presents all proposed mitigation measures for the Proposed Development, presented with the mitigation measures for each discipline presented as its own Section.

2. CHAPTER 6 - AIR QUALITY AND CLIMATE

The mitigation measures set out in Chapter 6 are presented below:

2.1.1 Air Quality

2.1.1.1 Construction Phase

A Construction and Environmental Management Plan (CEMP) has been prepared and is included in Appendix 3.2. of the submitted EIAR. This includes for the following mitigation measures during the construction phase of the Proposed Development relevant to air quality:

- The internal access roads will be constructed prior to the commencement of other major construction activities. These roads will be finished with graded aggregate which compacts, preventing dust
- A water bowser will be available to spray work areas and haul roads, especially during periods of excavations works coinciding with dry periods of weather, in order to suppress dust migration from the site;
- All loads which could cause a dust nuisance will be covered to minimise the potential for fugitive emissions during transport;
- Earthworks and exposed areas/soil stockpiles will be re-vegetated to stabilise surfaces as soon as practicable.
- The access and egress of construction vehicles will be controlled and directed to designated locations, along defined routes, with all vehicles required to comply with onsite speed limits;
- Construction vehicles and machinery will be serviced and in good working order;
- A wheel washing facility will be provided at the main entrance of the Proposed Development as described in the CEMP accompanying this EIAR (Appendix 3.2);
- The developer in association with the contractor will be required to implement the dust control plan as part of the CEMP (a CEMP is contained in Appendix 3.2). In the event the Planning Authority decides to grant permission for the Proposed Wind Farm, the final CEMP will address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned by the Planning Authority;
- Ensure all vehicles switch off engines when stationary – no idling vehicles; and
- Exhaust emissions from vehicles operating within the site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor by ensuring that emissions from vehicles are minimised through regular servicing of machinery.

2.1.1.2 Operational Phase

As the operation of the Proposed Development will have positive impacts on air quality, mitigation measures are considered unnecessary.

2.1.1.3 Decommissioning Phase

Mitigation measures for the removal of wind turbines and all other site works from the Proposed Development site will be the same as the construction phase with respect to dust control and minimisation. The proposed access tracks across the Proposed Wind Farm site will likely be left in situ and utilised as farm tracks and forest roads following decommissioning and no mitigation measures are proposed. In terms of the Proposed Substation, this will be left in situ and taken over by EirGrid and so no mitigation measures are proposed.

2.1.2 Climate

It is considered that the Proposed Development will have an overall positive impact in terms of carbon reduction and climate change. It will assist Ireland in meeting the binding renewable energy target for the EU of 32% by 2030. Also, it will aid in increasing the onshore wind capacity, as per the Climate Action Plan 2025. In terms of renewable energy, an increase in electricity generated from renewable sources is to increase up to 80% by 2030, with 9GW of increased onshore wind capacity. This will be achieved by:

- Phasing out fossil fuels
- Harnessing renewable energy
- Micro-generation; and
- Other measures.

As no significant impacts on climate are predicted during construction, operation and decommissioning no mitigation measures are necessary or proposed. In terms of the operational phase, the operation of the Proposed Development will have a positive effect on climate due to the displacement of fossil fuels.

3. CHAPTER 7 - NOISE AND VIBRATION

The mitigation measures set out in Chapter 7 are presented below.

3.1.1 Mitigation Measures during Construction

The noise impact for construction works traffic will be mitigated by generally restricting movements along access routes to the standard working hours and exclude Sundays, unless specifically agreed otherwise. For example, during turbine erection, an extension to the working day may be required, i.e. 05:00 to 21:00, but this would be necessary only on a relatively small number of occasions. Where turbine deliveries are required at night it will be ensured that vehicles on local roads do not wait outside residential properties with their engines idling, and that the local residents will be informed of any activities likely to occur outside of normal working hours.

Consultation with the local community is important in minimising the likelihood of complaints and therefore construction will be undertaken in consultation with the local authority as well as the residents being informed of construction activities through the Community Liaison Officer.

The construction works on site would be carried out in accordance with the guidance set out in BS 5228:2009+A1:2014, and the noise control measures set out in the Construction Environmental Management Plan (CEMP). Proper maintenance of plant will be employed to minimise the noise produced by any site operations. All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the project. Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use.

The hours of construction activity will be limited to avoid unsociable hours where possible. Construction operations shall generally be restricted to between 07:00 hours and 19:00 hours Monday to Saturday. However, to ensure that optimal use is made of fair weather windows, or at critical periods within the programme, it could occasionally be necessary to work outside these hours. Any such out of hours working would be agreed in advance with the local planning authority.

As discussed in section 7.5.1 during the construction of the road for the turbine delivery route to the north of the site, there is potential for the noise limit to be exceeded at properties near the northern site entrance. Noise mitigation at this property could be provided by either phasing of works or installation of a noise barrier between the turbine delivery route and the properties which are east and west of the access track. The extent of the noise barrier for the northern site entrance is indicated on drawing P22-242-0300-0017 Rev B Site entrance to accommodate TDR. The minimum height of this barrier is 2m above ground level to achieve the required noise mitigation. Barriers should have a minimum mass per unit surface area of greater than 7kg/m2, with no gaps at the joints.

There is also a potential for the daytime noise limits to be exceeded during construction of the access track close to a family member of an involved landowner (R134), located east of the main southern site entrance. In addition, at this location, when the southern site entrance is used by HGV movements during all construction activities, there is potential for the daytime noise limit to be exceeded marginally (by up to 2dB). Note as a mitigation measure, access track layout has been moved eastwards to mitigate the construction noise impact at a property west of the site entrance.

During the access track construction, the noise limits have the potential to be exceeded by up to 10 dB at location R134. Mitigation would be required both in terms of phasing works when close to the property and installing a noise barrier. A barrier will be installed on each side of the site entrance, and should extend from the site entrance north-eastwards for approximately 80m, next to the proposed access track, in order to screen R134 and the property to the west of the site entrance (refer to drawing P22-242-0300-0015 Rev A Site access main entrance for extent of noise barrier). The height of the barrier should be 2.5m.

Barriers should have a minimum mass per unit surface area of greater than 7kg/m2, with no gaps at the joints.

The predicted noise levels at other noise sensitive properties in this area are predicted to be below the construction noise limit.

With mitigation measures, the construction and decommissioning noise levels are predicted to be below the relevant noise limit of 65 dB LAeq,1hr for operations exceeding one month, and therefore construction noise impacts are not considered to be significant. However, there is potential for temporary elevated noise levels due to the grid connection works. However, these works will be for a short duration (i.e. less than 3 days) and where the works are required over an extended period, a temporary barrier or screen will be used to reduce noise levels below the noise limit where required. The noise impact will also be minimised by limiting the number of plant items operating simultaneously where reasonably practicable.

3.1.2 Mitigation Measures during Wind Farm Operation

The results of the noise predictions presented in Section 7.5.2 and Appendices 7.4 show that operational noise levels meet the derived daytime and night-time noise limits at all residential properties (including mobile homes and planning applications) surrounding the wind farm. Therefore, no mitigation is required for windfarm operational noise. (Appendix 7.3 provides full details on octave band spectra for standardized 10m wind speeds ranging from 3 m/s to cut out).

3.1.3 Mitigation during Decommissioning

The noise impact for construction works traffic would be mitigated by generally restricting movements along access routes to the standard working hours and exclude working on Sundays, unless specifically agreed otherwise with the local authority. In addition any noise barrier mitigation identified during the construction phase would need to be considered, if noise sensitive locations are similar distances from the decommissioning works.

The decommissioning works, which will be at a lower impact than construction works, will be carried out in accordance with the policies and guidance required at the time of the works, and restricted to normal working hours, typically 07:00-19:00 hours Monday to Saturday.

4. CHAPTER 8 - BIODIVERSITY & ORNITHOLOGY

The mitigation measures set out in EIAR Chapter 8.1 Biodiversity and 8.2 Ornithology are presented below.

4.1 Mitigation Measures for Biodiversity (EIAR Chapter 8.1)

4.1.1 Mitigation Measures During Construction

4.1.1.1 Mitigation by Avoidance and Design (Proposed Wind Farm & TDR)

The following measures were undertaken to reduce effects on designated sites, flora and fauna through avoidance and design:

- The hard-standing areas of the wind farm have been kept to the minimum necessary, including all site clearance works to minimise land take of habitats and flora.
- Larger turbines have been utilised to minimise the number of turbines, reducing the total rotor envelope (less turbines) and footprint of the proposed development.
- Site design and layout deliberately avoided direct effects on designated sites and sensitive habitats such as raised bog, wet heath and mature broadleaved woodland.
- Care has been taken to ensure that sufficient buffers are in place between wind farm infrastructure and hydrological features such as rivers, lakes and streams. Access roads were the exception to the rule in that river crossings will have to take place; however, where possible, existing stream crossings have been utilised. Clear span bridges are to be used at the three stream crossing points on site to reduce the potential effect on stream beds and to avoid instream works (foundations will be located 2.5m from the river edge).
- Any works in or around watercourses will adhere to best practice as per NRA and IFI guidance for works potentially affecting watercourses.
- The use of floating road construction for access tracks in the vicinity of raised bog habitats will minimise potential for indirect drainage effects on these habitats.
- The use of piled foundations in areas near raised bog habitats will minimise foundation excavation volumes, thereby minimising potential indirect drainage effects on raised bog habitats.

4.1.1.2 Mitigation by Avoidance and Design (Proposed Substation & Grid Connection)

The following measures were undertaken to reduce effects on designated sites, flora and fauna through avoidance and design:

- The hard-standing areas of the Proposed Substation has been kept to the minimum necessary including all site clearance works to minimise land take of habitats and flora.
- Site design and layout deliberately avoided direct effects on designated sites and sensitive habitats. Specifically, the design avoided encroachment on the adjacent mature broadleaved woodland habitats to the east of the substation compound.

4.1.1.3 Project Ecologist

A Project Ecologist/Ecological Clerk of Works (ECoW) with appropriate experience and expertise will be employed for the duration of the construction phase to ensure that all the mitigation measures outlined in relation to the environment are implemented. The Project Ecologist/ECoW will be awarded authority to stop construction activity if there is potential for significant adverse ecological effects to occur.

This mitigation measure is applicable to the Proposed Wind Farm, Proposed Substation, Grid Connection and TDR.

4.1.1.4 Habitats

The area of the proposed works will be kept to the minimum necessary, including all site clearance works, to minimise disturbance to habitats and flora. In this case, the footprint of the Proposed Wind Farm and Proposed Substation have been kept to the minimum necessary, including the use of layout design methods to minimise excavation works.

No disturbance to habitats or flora outside the Proposed Wind Farm and Proposed Substation works areas will occur. All works and temporary storage of material will be restricted to the immediate footprint of Proposed Wind Farm and Proposed Substation works areas, which will be wholly within their respective site boundaries. Designated access points will be established within the site and all construction traffic will be restricted to these locations.

A Habitat and Species Management Plan (HSMP) is included in Section 8.12. This details habitat restoration measures which are designed to avoid/minimise any potential conflicts between the Proposed Wind Farm and Proposed Substation and the positive effects of increasing habitat diversity in close vicinity to operational turbines. An appropriately qualified and experienced ecologist will review, implement/supervise and, where required, amend the proposed Habitat and Species Management Plan.

4.1.1.4.1 Protection of Raised Bog (Proposed Wind Farm)

In order to protect the existing raised bog and nearby groundwater wells from the effects of dewatering, groundwater cut-off techniques (such as sheet piling) will be used in preference to lowering of the water table (dewatering) during excavation and construction works in the vicinity of raised bog areas. This will avoid the possibility of significant drainage of the adjacent peat bogs. It should also be noted that the majority of excavations close to peat bogs will not extend much deeper than the existing drainage network. Any dewatering will be temporary, during construction only and will not have time to cause drainage of the peat, which due to the low permeability of the peat would result in very slow drainage. It is also proposed, following landowner agreement that drain blocking is carried out in the remnant area of raised bog to improve its condition; this would be a slight beneficial effect.

4.1.1.4.2 Hedgerow and Treeline Reinstatement (Proposed Wind Farm)

Any re-instated habitats such as Hedgerows will utilise native species suitable for the area.

Hedgerow and treeline planting will be carried out for the Proposed Wind Farm. This will reinstate or replace linear habitat loss to ensure no net loss of these habitats occurs.

New hedgerows will be planted along the outer perimeter of turbine buffers at T1, T2, T4 and T5 (see EIAR Chapter 8, Table 8-52) within the proposed wind farm site to mitigate linear wooded habitat loss and enhance and maintain connectivity in the agricultural landscape. Ash is not currently proposed to be used due to it's vulnerability to ash dieback disease (ADB). However, if proven ADB resistant varieties of ash are available at the time of planting they can be used, in addition to other large-growing native species such as Alder and Oak. Smaller thicket-forming species such as elder, hazel and blackthorn will also be planted. Semi-mature specimens (heavy standard size) of native provenance will be included to accelerate establishment of new linear wooded habitats.

4.1.1.5 Invasive Species

The following measures are applicable to the Proposed Wind Farm and Proposed Substation.

Prior to works, an invasive species survey will be undertaken in the area to reconfirm the findings of the EIAR.

The invasive species plan and management plan (ISMP) (Appendix 8.1-8) will be adhered to for works in any areas where invasive species are present.

Halting the spread of non-native invasive species can be achieved via prevention, containment, treatment and eradication.

4.1.2 Prevention

4.1.2.1 Proposed Wind Farm

The Schedule III species Rhododendron ponticum was recorded in within the Proposed Wind Farm boundary in mixed broadleaved/conifer woodland adjacent to a section of proposed access track south of T8 (c. 15m from proposed T8 hard standing/20m from access track felling corridor), and also recorded in conifer plantation c. 170m north-east of T9 (outside Proposed Wind Farm boundary). Snowberry is present c. 15m from a section of proposed access track. Cherry laurel is present at two TDR POIs (1 & 3).

Where feasible, interaction with invasive species and surrounding areas potentially containing vector material will be prevented. If baseline conditions persist, prevention of the spread of invasive species by avoidance may be feasible. If this is not feasible then containment, treatment and eradication as detailed below will be required.

4.1.2.2 Proposed Substation

No invasive species are present within the Proposed Substation footprint. As such, if baseline conditions remain unchanged, interaction with proposed works is avoidable. Due to the possibility of spread of invasive species in the intervening period, a preconstruction invasive species survey is required as part of the invasive species management plan (ISMP) (Appendix 8.1-8). Containment and eradication measures are detailed in the ISMP which will be used as required in the event of changes to the invasive species baseline.

4.1.2.3 Containment, Treatment, Eradication

The presence sycamore and butterfly bush within the Proposed Wind Farm footprint, in addition to their tendency to spread reproductively means that containment measures will be required for these species. The following measures are also applicable to Rhododendron ponticum, cherry laurel and snowberry in the event that preconstruction surveys detect any risk of spread due to new growths becoming established within or in close proximity to the proposed works footprint.

- Cordoning off the area – this shall include a buffer of 5m surrounding the area of infestation to ensure that seeds are not transported to other sections of the site via vehicular traffic, equipment or PPE.
- No machinery or personnel shall be allowed within this restricted area. Similarly, there shall be no storage of materials within or adjacent to this restricted area.
- There shall be no vegetation clearance or trimming within the cordoned area (except where undertaken in accordance with the invasive species management plan) as this can lead to the species recolonising other areas via the wind, water if displaced into drains, or soil and vegetation attached to machinery, vehicles or personnel.
- If Schedule III species are present, no soil or vegetation shall be removed from this area unless it is securely contained and is transported under licence to a suitably licenced facility for treatment.
- For non-schedule III species, no soil or vegetation shall be removed from this area unless it is securely contained and is to be disposed of appropriately onsite or transported to a suitably licenced facility for treatment.
- Wheel washes, draining to secure waste receptacles will be implemented at the site entrance to prevent the possible spread of any invasive species via vehicular movements.
- All site machinery will be inspected for the presence of potential invasive plant vector material and where required will be washed down before entering the site to prevent inadvertent transport of invasive plant species vector material.
- Any site machinery intended for use in or near aquatic habitats will be washed down and sterilised before entering the site to prevent inadvertent transport of invasive species vector material.
- Site machinery working in areas with potential for invasive species to occur will be checked and washed down prior to exiting these areas and moving to other parts of the proposed site.
- Informing all site staff through toolbox talk as part of site inductions.
- Any new sightings of the species shall by relayed to construction staff and the developer via the project ecologist/ECoW. These areas shall follow the same protocol as described above.
- Reporting sighting(s) to the NPWS and NBDC and liaising with the NPWS.

Treatment and eradication options for each species are detailed in the ISMP. The eradication of the area of Rhododendron ponticum recorded near T8 is proposed in order to remove this reservoir which if left untreated would continue to pose an ongoing risk of site-wide infestation over the long term. Removing this source of infestation at construction stage will prevent more arduous control measures later on if this species was left unchecked and spread throughout the site. Physical removal of mature plants outside the flowering season, followed by targeted herbicide stump treatment and annual follow-up spraying of any new emergent shoots is considered to be the optimal eradication strategy.

The other area of Rhododendron ponticum (100m east of Proposed Wind Farm/c. 170m north-east of T9) will require monitoring during the operational phase.

4.1.2.4 Terrestrial Mammals

A pre-construction mammal survey will be undertaken within the potential zone of influence of the Proposed Wind Farm and Proposed Substation in order to reconfirm the existing environment as described in the EIAR. Any updates to mitigation measures as required to ensure their continued efficacy will be made based on the pre-construction survey results.

An ecologist will supervise areas where vegetation, scrub, treeline and hedgerow removal will occur prior to and during construction as appropriate (e.g., an ecologist may be required during some clearance works of areas where vegetation is too dense to check beforehand). This will ensure that any site-specific issues in relation to wildlife not currently present (e.g. badger setts) on site will be identified prior to commencement of works so as to allow appropriate mitigation measures to be put in place.

In the event that an issue arises, the NPWS will be updated, consulted with and the relevant guidelines will be implemented as appropriate (e.g. NRA guidelines), in accordance with relevant legislation (Wildlife Acts and animal welfare legislation).

Construction operations within the proposed Drehid Wind Farm will take place predominantly during the hours of daylight to minimise disturbances to faunal species at night. Some works may occur at night but the project ecologist/ECoW shall limit night-time works to areas which avoid sensitive features (e.g. mature treelines).

Where possible, tree felling in forestry areas will be limited to time periods outside which pine martens may have young in dens (March and April). If this is unavoidable than areas to be clear felled will be surveyed in advance by a suitable qualified ecologist to determine whether any occupied pine marten dens are present. If necessary, a license under the Wildlife Act will be applied for should any sites have to be disturbed.

Where possible, any required tree felling of trees in forestry areas will be limited to time periods outside which red squirrel may have young in dreys (peak period January to March). If this is unavoidable than areas to be clear felled will be surveyed in advance by a suitable qualified ecologist to determine whether any occupied dreys are present. If necessary, a license under the Wildlife Act will be sought.

4.1.2.5 Badgers

A pre-construction mammal survey including a reconfirmatory survey for any new badger setts will be undertaken within the potential zone of influence of the Proposed Wind Farm and Proposed Substation in order to reconfirm the existing environment as described in the EIAR. In the event that a new badger sett should be encountered at any point, then NPWS will be informed and Guidelines for the Treatment of Badgers Prior To the Construction of National Road Schemes (NRA, 2008c) and will be followed.

A total of 21 badger setts were observed within the study area during current surveys. Mitigation proposed for these setts is detailed in Table 17-1, below, and additional details on specific locations are included in the confidential badger mitigation report which accompanies this application. The presence of four additional badger setts in the surrounding hinterland is also noted. All of these setts are over 150m from proposed infrastructure and construction activities and as such they do not require detailed assessment or mitigation. Their presence is noted as they are relevant when assessing the local badger population at the landscape scale.

A total of two subsidiary setts (Setts 1 & 2) are located within 30m of proposed infrastructure but are separated by a deep drainage channel, screened by vegetation and face away from works. As such, it is proposed to keep these setts open during construction (with monitoring) since they are unlikely to be damaged or disturbed, and would not be used for breeding. A total of two setts (Setts 4 & 7) are overlapped by proposed works to the degree that controlled destruction following exclusion or hard blocking is required.

It is proposed to excavate within 30m of one sett (Sett 5) under ecological supervision following exclusion or hard blocking, but to retain the remainder of the sett and re-open it following construction. This course of action is proposed due to potential for the majority of the sett to remain intact, and to avoid additional tree felling which would be required to excavate the whole sett.

A total of two setts: Setts 19 (main sett) and Sett 20 (subsidiary) require hard blocking for the duration of construction, following exclusion as required. One sett (Sett 21) requires screening to provide a noise/visual barrier for the duration of construction.

The remainder of setts require monitoring or no mitigation measures. All main setts will be retained, and will be kept open in the majority of territories.

The exception to this is Sett 19. This main sett requires exclusion outside the breeding season followed by hard blocking for the duration of construction, however the presence of a nearby large Annex sett (Sett 21) located 120m from Sett 19 within the same densely vegetated field boundary provides an adequate alternative resting and breeding place while Sett 19 is hard blocked. A noise/visual barrier will be erected along the north-west and south-west edges of the site compound to screen Sett 21 from the site compound during construction.

No requirement for an artificial sett has been identified due to retention of the majority of setts, and availability of suitable alternative setts which will remain open and undisturbed near areas where setts are required to be excluded/hard blocked during construction. The option to create an artificial sett will be retained nonetheless (see confidential badger report).

Table 4-1: Proposed Badger Mitigation

Sett No.	Type	Closest Infrastructure/Activities	Mitigation
1	Subsidiary	Proposed northern access track (27m) Proposed northern access track felling buffer (20m)	Monitoring. This sett is separated from proposed works by a deep drain, vegetation cover and faces away from works.
2	Subsidiary	Proposed northern access track (21m) Proposed northern access track felling buffer (14m)	Monitoring. This sett is separated from proposed works by a deep drain, vegetation cover and faces away from works.
3	Main	Existing access track to form part of northern site access route (115m) Substation compound (250m)	Monitoring
4	Annex	T6-T7 access track (0m) Overlapped by access track and access track felling buffer.	If inactive - hard blocking/if active - exclusion during non-breeding season. Followed by controlled destruction prior to access track construction.
5	Annex	T6-T7 access track (12m) Access track felling buffer (5m)	If inactive - hard blocking/if active - exclusion during non-breeding season. Preconstruction check, ecological supervision and controlled excavation of road footprint within 30m of sett. Monitoring. Reopen following construction.

Sett No.	Type	Closest Infrastructure/Activities	Mitigation
6	Main	T6-T7 access track (158m)	Monitoring
7	Annex	T5 hard stand (overlaps sett)	If inactive - hard blocking/if active - exclusion during non-breeding season. Followed by controlled destruction prior to hard stand construction.
8	Subsidiary	T5 hard stand (83m) T5 felling buffer (20m)	Monitoring
9	Subsidiary	T4 (590m)	None Required
10	Main	T3 (623m)	None Required
11	Annex	T3 (607m)	None Required
12	Subsidiary	T3 (461m)	None Required
13	Outlier	T3 (252m)	None Required
14	Outlier (potential)	T2 felling buffer (76m) Access track (89m)	Monitoring
15	Main	Access track (89m) T2 felling buffer (147m)	Monitoring
16	Subsidiary	Access track (137m) T2 (186m)	Monitoring
17	Subsidiary	Access track (101m) T2 (126m)	Monitoring
18	Annex	Access track (127m) T2 (155m)	Monitoring
19	Main	Access track (10m) Site compound (24m)	If inactive - hard blocking/if active - exclusion during non-breeding season. Monitoring. Reopen following construction.
20	Subsidiary	Site compound (27m)	If inactive - hard blocking/if active - exclusion during non-breeding season. Monitoring. Reopen following construction.
21	Annex	Site compound (38m)	Erect noise/visual barrier during non-breeding season to screen sett from site compound. Monitoring.

The following overarching rules govern exclusion and hard blocking activities:

4.1.2.6 Disused and inactive setts

In the instance of disused setts or setts verified as inactive, and to prevent their reoccupation, the entrances shall be lightly blocked with vegetation and a light application of soil (soft blocking). The purpose of soft-blocking is to confirm that an apparently inactive sett is not occupied by badgers.

If a sett is deemed active after soft blocking a motion detection camera will be installed to confirm species and the number of individuals present.

If all entrances remain undisturbed for a minimum of five days, setts will be hard-blocked immediately using stone and wire mesh, under the supervision of an experienced and suitably qualified ecologist.

Hard-blocking is best achieved using buried fencing materials and compacted soil with further fencing materials laid across and firmly fixed to blocked entrances and surrounds. Where destruction is proposed, If all entrances remain undisturbed for a minimum of five days, setts will be immediately destructed under ecological supervision.

A report detailing evacuation procedures, sett excavation and destruction, and any other relevant issues will be submitted to the planning authority to confirm mitigation has been completed in accordance with Wildlife Acts and relevant NRA Guidance.

4.1.2.7 Active setts

Where field signs or monitoring reveal any suggestion of current or recent badger activity at any of the sett entrances, the sett will require thorough evacuation procedures.

Inactive entrances will be soft and then hard-blocked as described for inactive setts, but any active entrances will have one-way gates installed (plus proofing around sides of gates) to allow badgers to exit but not to return. The gates will be tied open for three days prior to being set to exclude. Sticks will be placed at arm's length within the gated tunnels to establish if badgers remain within the sett.

Gates will be left installed, with regular inspections, over a minimum period of 21 days (including period with gates tied open) before the sett is deemed inactive. Any activity at all will require the procedures to be repeated or additional measures taken. The sett will be monitored regularly for signs of occupancy. Once all badgers have been excluded from active setts, these will be immediately hard-blocked (using a stone and wire), and where destruction is proposed, setts will be destructed under the supervision of an experienced and suitably qualified ecologist. Hard-blocking is best achieved using buried fencing materials and compacted soil with further fencing materials laid across and firmly fixed to blocked entrances and surrounds.

A toolbox talk shall be provided to all construction workers accessing the site to raise the awareness of the species. If badgers do attempt to reoccupy the site all works shall cease within 30m of this area and the project ecologist/ECoW shall consult with NPWS. The area shall be treated as an active sett and the procedure outlined above shall apply in full.

A report detailing evacuation procedures, sett excavation and destruction, and any other relevant issues will be submitted to the planning authority to confirm mitigation has been completed in accordance with Wildlife Acts and relevant NRA Guidance.

4.1.2.8 Vegetation clearance

There is the potential for further setts to be discovered during vegetation clearance works. Care will need to be taken during this early stage of the development and a competent ecologist will be required on-site for these works. If further setts are discovered all works within 30m of the sett shall be ceased including vegetation clearance. In the event a new sett is established prior to construction, suitable mitigation measures will be implemented as required (in accordance with NRA Guidelines - 2008c) for the new sett. An activity survey shall be carried out to assess the potential for the sett to be used by badgers. And the steps followed above under the titles 'Disused and Inactive Setts' and/or 'Active Setts' will be followed.

4.1.2.9 Measures to prevent the injury of badgers during proposed mitigation measures

In the event that a badger is found injured during the implementation of proposed mitigation measures, it is important to realise that injured badgers will be frightened and can be very dangerous. They are strong animals and are not used to being handled, so no attempt will be made to touch an injured badger, as this could result in workers being bitten. NPWS shall be contacted along with ISPCA and potentially a vet specified by NPWS capable of treating the species.

4.1.2.10 Badger sett destruction

Due to overlaps with the proposed works areas, controlled destruction following exclusion or hard blocking are proposed at two badger setts (Setts 4 and 7). These measures would also to apply to any new setts which become established within or near the proposed footprint prior to construction.

The destruction of a successfully evacuated badger sett will only be conducted under the supervision of an experienced and suitably qualified ecologist, and in accordance with NRA (2006) guidelines. Destruction will be undertaken with a tracked 12-25 tonne digger, commencing at c. 25m from the outer sett entrances and working towards the centre of the sett, cutting c. 0.5m slices in a trench to a depth of 2m. Exposed tunnels will be checked for recent badger activity, with full attention paid to safety requirements in so doing.

The sett will be destroyed from several directions, in the above manner, until only the central core of the sett remains. The excavator will be operated by a competent person who has been fully briefed beforehand on the situation and procedures to be implemented whereby a badger may still be in occupation despite best practices being employed.

Once it is ensured that no badgers remain, the core will then also be destroyed and the entire area back-filled and made safe. Sett excavation will be concluded within one working day, as badgers may re-enter exposed tunnels and entrances.

A report detailing evacuation procedures, sett excavation and destruction, and any other relevant issues will be submitted to the planning authority and also circulated to NPWS. The artificial sett will be in place in advance of construction in order to provide an alternative resting and breeding place for badgers affected by unavailability of existing setts due to construction activities.

Other setts are available to compensate for the loss of Setts 4 and 7; these will remain open during construction.

4.1.2.11 Otter

A pre-construction mammal survey will be undertaken within the footprint of the development to reconfirm the existing environment as described in the EIAR. In the event that a new otter holt should be encountered at any point, then NPWS will be informed and Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (NRA, 2008d) will be followed.

Works will be restricted to the Proposed Wind Farm and Proposed Substation footprints, ensuring no activities are undertaken in areas which could potentially result in disturbance to otters.

Due to the distance separating Holt 1 from proposed infrastructure (over 150m), no mitigation other than trail camera monitoring is required.

In the case of the low-potential inactive Holt 2, due to unsuitability for breeding otter, no mitigation other than trail camera monitoring is required. Similarly, the burrow north of T6 which could potentially be used as a holt but currently lacks any signs of use by otter will require trail camera monitoring.

A report detailing the results of monitoring surveys will be submitted to the planning authority.

A toolbox talk shall be provided to all construction workers accessing the site to raise the awareness of the species. If otters do attempt to reoccupy the site all works shall cease within 30m of this area and the project ecologist/ECoW shall consult with NPWS. The area shall be treated as an active holt and the procedure outlined above shall apply in full.

4.1.2.12 Vegetation clearance

If new holts are discovered during vegetation clearance works. Care will need to be taken during this early stage of the development and a competent ecologist will be required on-site for these works.

If a new holt is discovered all works within 30m of the holt shall be ceased including vegetation clearance. NPWS shall be contacted and a derogation licence shall be sought for the new holt.

An activity survey shall be carried out to assess the potential for the holt to be used by otters and whether or not it is a breeding female. Any measures undertaken following discovery of a new holt will be in accordance with Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (NRA, 2008d) and licensing requirements.

4.1.2.13 Measures to prevent the injury of otter during proposed mitigation measures

In the event that an otter is found injured during the implementation of mitigation measures, it is important to realise that an otter is a wild animal so if injured it is highly likely to be frightened and can inflict injury. As a wild otter is not used to being handled, do no attempt to touch an injured otter, as this could result in workers being bitten. NPWS shall be contacted along with ISPCA and potentially a vet specified by NPWS capable of treating the species.

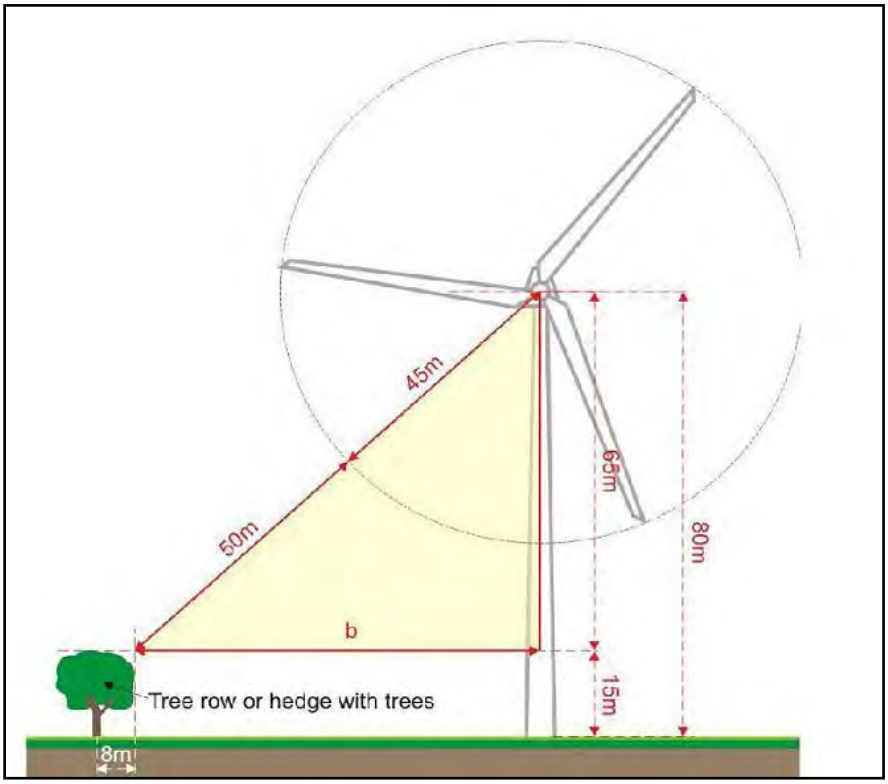
4.1.2.14 Bats

4.1.2.14.1 Vegetation Buffer

According to SNH (2021) guidance:

"The Eurobats guidance recommends a 200m buffer around woodland areas. There is, however, currently no scientific evidence to support this distance in the UK and it is recommended that a distance of 50m between turbine blade tip and nearest woodland (or other key habitat features such as wetlands etc.) is adequate mitigation in most, lower risk situations. Exceptionally, larger buffers may be appropriate, e.g. near major swarming and hibernation sites. The longevity of wind farms should also be taken into account and the maximum growth, or management, of woodland and other relevant habitat features considered in their planning. "

These distances were taken into account during the design phase of the development. The following formula was used to calculate the required felling buffer for each turbine (taking into account the height of surrounding woodland/plantations at each turbine location):



$$b = \sqrt{(50 + bl)^2 - (hh - fh)^2}$$

where:

b = the distance on the ground between the edge of the canopy and the turbine (m)

bl = blade length (m)

hh = hub height (m)

fh = tree/hedgerow height

Each of the locations of the eleven turbines was surveyed and the vegetation height informed the application of the dimensions of the blade tip buffer at turbine locations, dependant on the surrounding habitat and turbine specification. The likely growth of hedgerow/treeline/forestry was taken into account for the calculation. Surrounding habitats, height of surrounding trees and felling buffer calculated using the above equation are included in Table 17-2 below.

It should be noted that the proposed hub height for T1 is 81.4m for T1, versus 100.5 for all other turbines, resulting in a larger felling buffer for T1 compared to other turbines with the same height of surrounding vegetation.

To minimize risk to bat populations, a buffer zone is recommended around any treeline, hedgerow, woodland feature, into which no part of the turbine should intrude. The buffers recommended for each turbine are presented in Table 4-2.

Table 4-2: Assessment of potential turbine/bat conflict zones1

Turbine number	Habitats Requiring Felling	Surrounding Tree/Hedgerow Height (fh/m)	Felling Buffer Radius (m)
T1	Hedgerow/Treeline Mosaic	12	93.5
T2	Hedgerow/Treeline Mosaic	12	75.8
T3	Hedgerow/Treeline Mosaic	12	75.8
T4	Hedgerow/Treeline Mosaic	12	75.8
T5	Hedgerow/Treeline Mosaic	12	75.8
T6	Conifer Plantation	20	84.2
T7	Conifer Plantation, Mixed Broadleaved/Conifer woodland, Bog Woodland	15	79.1
T8	Mixed Conifer Woodland, Mixed Broadleaved/Conifer woodland, Bog Woodland, Scrub	12	75.8
T9	Conifer Plantation	15	79.1
T10	Conifer Plantation	6	68.1
T11	Conifer Plantation, Mixed Broadleaved/Conifer Woodland, Bog Woodland	20	84.2

[1] Based on turbine hub-height and blade length which for T1 is 81.5 and 66.5 m respectively and 100.5m and 66.5m respectively for all other turbines.

Existing trees / scrub will be cleared around ten proposed turbines, T1, T2, T4, T5, T6, T7, T8, T9, T10 and T11 to provide a vegetation-free buffer zone around each turbine. The minimum distance has been taken into consideration for felling of conifer plantation around wind turbines. All buffers will be maintained throughout the lifetime of the wind farm. Due to sufficient existing separation from treelines, T3 does not require any felling to achieve the required 75.8m buffer.

It is noted that an enlarged buffer using a 90m distance from turbine blade tips to surrounding vegetation was recommended to be implemented in the 2019 bat assessment. This was based on high Ecobat activity levels for Leisler's bat for a number of turbines. Since the current assessment indicates none of the turbine locations are above low/moderate risk for Leisler's bat, this precautionary extension of the felling buffers is not required.

The following mitigation measures for bats are recommended:

4.1.2.14.2 Supervision of vegetation clearance

An ecologist/ECoW will supervise areas where vegetation, scrub and hedgerow removal will occur prior to and during construction as appropriate (e.g., ecologist may be required during some clearance works of areas where vegetation is too dense to check beforehand).

It is recommended to complete clearance work during the autumn and spring months. Complete clearance work at least 6 months prior to installation of wind turbines. Studies have shown that bats are attracted to clear felled forestry areas due to increase insect loading. This has been shown to occur for a period of 3-6 months before the insect loading reduces to precleared felled levels.

4.1.2.14.3 Diversion from turbines via Hedgerows and Treelines

Linear features such as hedgerows and treelines serve as commuting corridors for bats (and other wildlife). Vegetation buffer clearance around turbines will alter commuting and foraging routes associated with existing hedgerows and woodland edges to avoid bats entering the rotor sweep zone of turbines. Hedgerow and treeline planting will be carried out for the Proposed Wind Farm. This will reinstate or replace linear habitat loss to ensure no net loss of these habitats occurs.

Where hedgerows and treelines are affected by turbine clearance buffers, bats will be directed away from tree-free buffers along an alternative commuting route. Where bat buffers are applied, the surrounding hedgerows and treelines should act as commuting corridors, leading bats away from the turbine location, and these hedgerows should not end abruptly at the bat buffer zones. This will be achieved by planting new pollinator-friendly hedgerows, connecting existing hedgerows onsite, around the bat buffers. Willow and Alder will be included in these hedgerows due to their rapid growth. It is proposed to create double lines of hedgerow, with Willow on one side, and pollinator-friendly hedgerow species listed below on the other. Planting of these species will be staggered to prevent excessive shading and aid establishment of the hedgerows.

All hedgerow planting is required to use plants of native provenance. The landscaping contractor is required to be informed well in advance to allow the acquisition of suitable native stock. 2–3-year-old alder and willow trees are required for hedgerows to help accelerate establishment. These will be supplemented with planting of whips.

The following fast-growing damp tolerant species are to be planted along the inner edges of these hedgerows: grey willow Salix cinerea and alder Alnus glutinosa. The following native fruiting hedgerow species are to be planted along the outer edges of these hedgerows: blackthorn (Prunus spinosa), elder (Sambucus nigra), Holly (Ilex aquifolium) and rowan (Sorbus aucuparia).

Tightly cut hedgerows with flat tops provide little benefit to wildlife; taller and bulky hedgerows are required as this provides more shelter for wildlife. When the hedgerows are maintained, stems will be cut a little above the last cut as cutting back to the exact same point depletes the energy of the hedgerow, forms a build-up of scar tissue which discourages new growth.

Light annual cutting of hedgerows is not good for wildlife as it limits the production of flowers and fruit. The sites hedgerows will be cut every three to four years in rotation if cutting is required, as this will leave areas of undisturbed hedgerows. Cutting equipment used will be sharp so as not to shatter or fray the hedge. Shattering and fraying allows for disease to enter plants and can lead to decay and weaken the vigour of the hedgerow. A finger-bar cutter is recommended as the most appropriate tool to minimise fraying and smashing of branches (Heritage Council, 2017). A flail-type hedge cutter is unsuitable for hedge trimming in situations where hedgerow health is a priority.

Hedgerow maintenance will not be carried out between the 1st of March and 31st of August as this is the nesting period for birds and any maintenance at this time will disturb breeding; this is in keeping with the Wildlife Act 1976 (as amended).

4.1.2.14.4 Lighting restrictions

In general, artificial light creates a barrier to bats so lighting should be avoided where possible. Brown Long-eared Bat and Whiskered Bat are highly averse to artificial night lighting. Artificial night lighting will be avoided throughout the site. Construction operations within the wind farm site will take place during the hours of daylight where possible to minimise disturbances to faunal species at night. Where lighting is required, directional lighting (i.e. lighting which only shines on work areas and not nearby countryside) will be used to prevent overspill.

This can be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvers and shields to direct the light to the intended area only.

It is understood that flashing red aviation lights will be provided on perimeter turbines. These will not negatively effect bats (Bennett and Hale, 2014).

4.1.2.14.5 Pre-construction Surveys

If three years lapse from between planning-stage surveys in 2023 and installation of the wind turbines, it will be necessary to repeat one season of surveys during the activity period prior to construction. Future survey work will be completed according to best practice guidelines available (SNH, 2019/ 2021; Hundt, 2012 & Collins, 2023).

A survey of trees proposed to be felled to search for potential bat roosts prior to construction.

Based on current surveys, a total of 12 trees with potential for use by individual or small numbers of bats are present within turbine felling buffers and will require felling if the wind farm is granted permission. This will result in the loss of potential or actual bat roosting (and foraging) opportunities. Best practice in tree-felling with respect to protection of potential bat roosts should be employed, including pre-felling emergence surveys and hiring a climbing specialist with bat training and licensing to check roost features with an endoscope for bats where necessary.

The eight trees with PRFs or potential for PRFs along the TDR potentially subject to effects from vegetation trimming will require similar measures (pre-trimming works emergence surveys and where required inspection at height).

If new bat roosts are present in areas affected by proposed felling, a bat derogation license will be sought from the National Parks and Wildlife Service.

4.1.2.14.6 Relocation/Retention of Bat Boxes and PRFs

Bat boxes 4 and 5 adjacent to the proposed/existing access route will be replaced with new boxes (4a and 5a) located directly north along the woodland edge bordering agricultural fields (approx. location ITM 676282 737906). This will mitigate any direct effects to these bat boxes associated with upgrade works to this section of access track, in addition to providing boxes in optimal condition for use by bats.

Following confirmation that bats are absent prior to felling, the tree PRF (knothole in trunk) of tree C will be retained and relocated to the riparian zone along the Fear English River North of T4. This will be achieved by cutting out the section of trunk containing the PRF following felling, and strapping it to a suitable mature tree along the Fear English riparian zone at similar height (3m or higher). If this is not feasible, a bat box will be provided along the Fear English riparian zone.

4.1.2.15 Other Species

Pre-construction surveys for breeding frog will be undertaken within the development footprint to reconfirm the findings of the EIAR and account for the potential time lag between EIAR surveys and the proposed construction phase. These will consist of searching suitable areas for spawn clumps during February as per NRA guidelines. In the event that frog spawn is found within the development footprint, this will be translocated under licence to suitable receptor sites outside the Proposed Wind Farm footprint. Where breeding ponds could potentially be indirectly affected, measures to prevent effects (alternative drainage routing, control of contaminants) will be implemented where feasible. Where effects cannot be avoided, construction will not take place in these areas during frog breeding season (January to June). These restrictions shall be localised to the areas were frog spawn is found. There is potential for an indirect effect on frogs and smooth newt due to water quality changes from erosion/sediment or pollutants. Weekly inspections of the erosion and sediment control measures on site will be required during the construction period, triggering remedial measures in the event of reduced efficacy. All measures to protect aquatic ecology and prevent reductions in water quality will also protect frogs and smooth newt.

For common lizard, vegetation will be felled and removed near the proposed turbine locations outside of the peak breeding season (July-August) to displace any lizards present and reduce the risk of effects and injury to individuals. This measure will be implemented in areas of suitable habitat as per the findings of the lizard report (Appendix 8.1-6) (Triturus, 2023) (i.e. proposed grid connection and turbine T11 but also T6, T8 & T9 based on previous findings). Furthermore, targeted pre-construction surveys, and where required relocation will be conducted at the proposed works locations known to support common lizard, with trapping methodologies employed to maximise lizard capture and minimise risk to overall lizard populations.

Preconstruction surveys for marsh fritillary (habitat appraisal, and if any change to the baseline suitable habitat is detected also a follow-up larval web survey) will be undertaken to reconfirm the findings of the EIAR. If optimal habitat establishes and marsh fritillary larvae are found within the Proposed Wind Farm footprint prior to construction, translocation of turves and larval webs to suitable receptor areas outside the footprint will be undertaken. This will be achieved by marking the location of pupae/larvae, and carefully excavating the surrounding sod under ecological supervision. Translocated sods will be placed in receptor sites which have been excavated to receive the sods. Receptor sites will be located nearby in similar habitat with abundant S. pratensis. If required, translocation will be carried out immediately following the survey during September to ensure pupae/larvae can be relocated.

A pre-construction reconfirmatory survey for key ecological receptor bee species requiring mitigation (Barbut's cuckoo bee, Barbut's Cuckoo Bee, gipsy cuckoo bee, large red tailed bumble bee and patchwork leafcutter bee) will be carried out within the development footprint during other pre-construction surveys (mammal, amphibian and reptile surveys). In the event that a colony is found within the footprint, the structure will be left in situ until the bee's breeding cycle is complete, and then translocated prior to construction works.

4.1.2.16 Aquatic Ecology

IFI advice arising from consultation has been taken into account in design of watercourse crossings, and mitigation measures contained in this section.

A Surface Water Management Plan is included in the CEMP, and has regard to guidelines included in 'Guidelines for the crossing of watercourses during the construction of national road schemes' (NRA, 2008b) and 'Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters' (IFI, 2016). This is considered to be the key mitigation measure for the protection of aquatic species located in downstream receiving waters. The Surface Water Management Plan will set out measures to avoid siltation, erosion, surface water run-off and accidental pollution events which all have the potential to adversely affect water quality within the site during the construction phase. It will also include preparatory works on the site, including installation of silt fences and bunds.

A CEMP has been prepared and this will be distributed to all parties involved in the construction of the wind farm site (including any sub-contractors) in order to protect aquatic interests within the study area.

All access tracks have been designed to minimise excavation on the site and reduce the risk of sediment runoff. A sealed silt fence will be placed at both sides of the crossing points and to a minimum of 10m upstream and downstream of each crossing at both sides of the road. Swales for turbine bases and hard standings will be constructed.

All infrastructure shall have a setback 50 m away from all streams within the site except for the watercourse crossings and the southern temporary compound which is within 15m of the Fear English River. Where site tracks are existing rather than a new site track, this buffer will not apply. Any access tracks crossing watercourses will be constructed as clear span bridges, where instream works are not permitted.

Where access tracks pass close to watercourses, silt fencing will be used to protect the streams. The maintenance and monitoring of such silt fences will be subject to an on-site quality management system set out in the CEMP.

Spoil heaps from the excavations for the turbine bases and trenches (where cables are to be buried) will be covered with geotextile and surrounded by silt fences to filter sediment from the surface water run-off from excavated material. Berms will be compacted and planted with native species seed mixes to promote soil stabilisation and minimise sediment runoff; the berm north-east of T5 will be surrounded by silt fencing until vegetation has been established in the following growing season to minimise potential for sediment runoff into the adjacent drainage ditch. If cables will be installed in trenches, they will be located underneath and directly adjacent to access tracks as far as possible. Trenches will be excavated during dry periods where possible in short sections and left open for minimal periods to avoid acting as a conduit for surface water flows. Clay bunds will be constructed within any cable trenches at intervals.

An Emergency Erosion and Silt Control Response Plan is included as a contingency in the CEMP, which details the required measures for the Contractor to implement in the event of an emergency on the site. Timing of the proposed works will also take account of the fisheries constraints within the study area, where no works will be undertaken in the instream environment during the salmonid close season (October–March annually), which also avoids the lamprey spawning season, as a precautionary measure.

Secure concrete washout areas have been designated on site and are detailed in the CEMP. Standing water in the excavations at the turbine bases will contain an increased concentration of suspended solids. The excavations will be pumped into temporary settlement basins as necessary which will be lined, and which will drain into existing or proposed drainage channels on site. The settlement basins will be constructed in advance of any excavations for the turbine bases.

Wheel washing facilities will be provided at the site entrance draining to silt traps. Additional silt fencing will be kept on site for the ongoing maintenance of the structures provided. Portaloos will be used to provide toilet facilities for site personnel. Sanitary waste will be removed from site via a licensed waste disposal contractor and will not be discharged on site.

Any diesel or fuel oils stored on site will be bunded to 110 % of the capacity of the storage tank. Such facilities will not be located near any drain or watercourse. Design and installation of fuel tanks will be in accordance with best practice guidelines. Refuelling of plant during construction will be carried out in designated areas within site the site compound 50m away from watercourses, draining to an oil interceptor. A 100m buffer from watercourses shall apply for any refuelling carried out using mobile bowsers. Drip trays and spill kits will be kept available on site. Appropriate containment facilities will be provided to ensure that any spills from the vehicle are contained and removed off site for disposal at an appropriately licensed facility.

Appropriate preventative measures have been detailed within the CEMP to ensure that non-native aquatic/riparian species are not introduced into the site. These measures follow the relevant manual 'The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads' by NRA (2010). While no high threat non-native aquatic invasive species were recorded at the survey sites during the current survey, the potential for the introduction of aquatic invasive species onto the site from other areas remains.

Strict biosecurity measures will be implemented if plant and machinery working in areas with invasive species along the grid route is used at the wind farm site. All machinery shall be disinfected and visually inspected before leaving works areas where invasive species are present.

To reduce the risk of invasive species and pathogen introduction (e.g. Crayfish plague), all equipment intended for use within or in the vicinity of aquatic habitats will be thoroughly checked, cleaned and dried in accordance with best practice as specified in the CIRIA C532, C648 and C741 guidelines below. Furthermore, plant machinery which has worked within riparian corridors or come in to contact with water will be steam-cleaned and dried in advance of works commencement in the Blackwater catchment.

Works will adhere to the guidelines set out in the best practice documents as listed below:

- CIRIA (2001). Control of water pollution from construction sites - Guidance for consultants and contractors (C532). Construction Industry Research and Information Association, London.
- CIRIA (2006). Control of Pollution from Linear Construction Project; Technical Guidance (C648). Construction Industry Research and Information Association, London.
- CIRIA (2015a). Manual on scour at bridges and other hydraulic structures, second edition (C742). Construction Industry Research and Information Association, London.
- CIRIA (2015b). Environmental Good Practice on Site (4th edition) (C741). Construction Industry Research and Information Association, London.
- CIRIA (2019). Culvert, screen and outfall manual (C786). Construction Industry Research and Information Association, London.
- DHPLG (2019). Draft Revised Wind Energy Development Guidelines. Department of Housing, Planning and Local Government. December 2019
- Enterprise Ireland (unknown). Best Practice Guide (BPGCS005) Oil storage guidelines.

- IFI (2016). Guidelines on Protection of Fisheries during Construction Works in and adjacent to waters. Inland Fisheries Ireland, Dublin.
- IFI (2019) Windfarm scoping document (draft). Inland Fisheries Ireland, Dublin.
- IWEA (2012). Best Practice Guidelines for the Irish Wind Energy Industry. Guidance prepared by Fehily Timoney and Company for the Irish Wind Energy Association.
- Kilfeather, P.K. (2007). Maintenance and protection of the Inland Fisheries resource during road construction and improvement works. Requirements of the Southern Regional Fisheries Board. Southern Regional Fisheries Board, Clonmel, Co. Tipperary
- Murphy, D.F. (2004). Requirements for the Protection of Fisheries Habitat During Construction and Development Works at River Sites. Eastern Regional Fisheries Board, Dublin.
- NRA (2008). Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes. National Roads Authority.
- PPG1 - General Guide to Prevention of Pollution (UK Guidance Note);
- PPG5 – Works or Maintenance in or Near Watercourses (UK Guidance Note);
- SNH (2012). Assessing the cumulative impact of onshore wind energy developments. Scottish Natural Heritage, March 2012.
- SNH (2019b). Good Practice during Wind Farm Construction (4th edition). Scottish Natural Heritage.

In addition to the above, all mitigation measures to protect water quality detailed in Chapter 10 Hydrology and Water Quality shall apply.

4.1.3 Mitigation Measures During Operation

4.1.3.1 Designated nature conservation sites

Mitigation measures outlined in section 10.9.3 and Chapter 10 - Hydrology and Water Quality of this EIAR, will be implemented, in addition to those described in the NIS to minimise and prevent the identified indirect effects on water quality as outlined previously.

4.1.3.2 Ecological walkover check - bat felling buffers

An ecological walkover survey covering the bat felling buffers will be undertaken prior to mechanical vegetation clearance to maintain these buffers as tree and scrub-free zones. This survey will ensure any potentially sensitive receptors which may establish in the buffers during the operational phase are detected prior to clearance, allowing significant effects to be avoided via avoidance/timing and other suitable mitigation as required. Species-specific surveys encompassed within the general ecological walkover survey are discussed further where applicable below (Sections 8.10.2.3 to 8.10.2.7).

4.1.3.3 Habitats, Flora & Invasive Species

Mitigation measures outlined in section 10.9.3 and Chapter 10 - Hydrology and Water Quality of this EIAR, will be implemented, in addition to those described in the NIS, to ensure that there will be no contamination of water bodies due to siltation or contaminated run-off during the operational phase.

A post-construction Annex I survey and habitat assessment will be carried out on the intact raised bog adjacent to T9 and T10 to determine the habitat condition and monitor the effectiveness of design/avoidance mitigation measures in preventing drying out of this habitat.

Invasive species will continue to be monitored, and where required, treated within the project area according to the invasive species management plan for as long as they persist within the site. Monitoring will entail site-wide checks, and will also focus specifically on the Rhododendron growth 100m east of Proposed Wind Farm/c. 170m north-east of T9, and checking for invasive species in bat felling buffers prior to periodic mechanical clearance works.

In the event that any invasive species are detected during the operational phase in areas where they could potentially interact with/be spread by operational activities, the procedures and control measures detailed in the ISMP (Appendix 8.1-8) will be followed.

4.1.3.4 Mammals

In the event that a new badger sett is discovered during maintenance of bat felling buffers (vegetation trimming), NPWS will be informed and the relevant guidance Guidelines for the Treatment of Badgers Prior To the Construction of National Road Schemes (NRA, 2008c) and will be followed.

The bat buffer pre-clearance badger survey shall extend 50m beyond the bat felling buffers.

4.1.3.5 Bats

4.1.3.5.1 Feathering of Blades

Turbines will operate in a manner which restricts the rotation of the blades as far as is practicably possible below the manufacturer's specified cut-in speed (SNH 2021). This is usually achieved by feathering the blades during low wind speeds; the angle of the blades is rotated to present the slimmest profile possible towards the wind, ensuring they do not rotate or 'idle' when not generating power.

Turbine blades spinning in low wind can kill bats, however bats cannot be killed by feathered blades which are not spinning (Horn et al., 2008). The feathering of turbine blades combined with increased cut-in speeds have been shown to reduce bat fatalities by up to 50% (SNH 2021). As such, the feathering of blades to prevent 'idling' during low wind speeds is proposed for all turbines.

4.1.3.5.2 Cut-in Speeds/Curtailment

While bat activity varied by species, no locations had activity for any species higher than low/moderate levels (based on Ecobat median percentile scores).

Therefore, increased cut-in speeds are not required from commencement of operation, but will rather be reserved for implementation where required based on operational monitoring (see Sections 7.2.3 and 7.2.4).

4.1.3.5.3 Post Construction Surveys

Monitoring of bat activity at turbine locations using static detectors will take place for at least three years after construction, providing sufficient data to detect any significant change in bat activity relative to pre-construction levels. It will assess changes in bat activity patterns and the efficacy of mitigation to inform any changes to curtailment requirements.

During years one to three of operation bat activity will be measured during monitoring periods between April and mid-October at each turbine location, in combination with carcass surveys. In addition, wind speed and temperature data will be continuously recorded at the nacelle height of each turbine.

Modern, remotely-operated wind turbines as proposed here allow cut-in speeds to be controlled centrally/automatically, facilitating an operation regime designed to minimise harmful effects to bats.

The feathering of turbine blades combined with increased cut-in speeds have been shown to reduce bat fatalities from 30% and up to 90% (Adams et al., 2021, Arnett et al., 2011, 2013; Baerwald et al., 2009). The most recent of studies showed a 63% decrease in fatalities (Adams et al., 2021).

4.1.3.5.4 Operational Curtailment

Monitoring will be carried out for the first three years of operation, and an annual review at the end of each of these years will determine whether increased cut-in speeds should be implemented.

If, following any of the initial three years of post-construction surveys, bat activity increases above the baseline and/or remains consistently high and carcass searches indicate fatalities are occurring (refer below), increased cut-in speeds will be implemented.

Alternatively, if it is found that the results of bat activity surveys and fatality searches reconfirm the level of bat activity at turbine locations remains low or low/moderate then curtailment will not be required.

Bat activity will subsequently be monitored in years 5, 10, 15, 20, 25 and 30 with further review after each monitoring period.

Where post construction acoustic surveys are undertaken, they will utilise full spectrum automatic detectors deployed, as a minimum, for one complete bat activity season.

Acoustic monitoring will be supplemented with thermal imaging cameras etc. to provide more detailed information on bat activity in the vicinity of turbines.

An assessment of static data gathered during operational surveillance will be completed using the online analysis tool Ecobat as recommended by SNH (2021) as a minimum, or other equivalent guidance as dictated by up-to date standards and practices.

If the requirement for curtailment is identified following the initial 3-year monitoring period, the following measures will be implemented:

Increasing the cut-in speed above that set by the manufacturer can reduce the potential for bat/turbine collisions. A study by Arnett et al. (2011) showed a 50% decrease in bat fatality can be achieved by increasing the cut-in speed by 1.5 m/s.

Species with elevated risk of collision (Leisler's bat, soprano and common pipistrelle) in particular could benefit from increasing the cut-in speed of turbines, as dictated on a case-by case basis depending on the activity levels recorded at each turbine.

If required based on operational monitoring results, cut-in speeds should be increased to 5.5 m/s during the bat activity season (April-October) or where temperatures are optimal for bat activity, from 30 minutes prior to sunset and to 30 minutes after sunrise at turbines where surveillance shows high bat activity levels for High and Medium-Risk species and/or if bat carcasses are recorded.

The duration required depends on the level of mitigation required for each individual turbine i.e. a full bat activity season or only spring and autumn (duration will be determined by the first year of surveillance).

Cut-in speed restrictions will be operated according to specific weather conditions:

- When the air temperature is greater than 7°C (as bat activity does not usually occur below this temperature).
- Generally, bat activity peaks at low wind speeds (<5.5m/s). As such, it has been shown that curtailing the operations of wind turbines at low wind speeds can reduce bat mortality dramatically, particularly during late summer and the early autumn months.

Due to the considerable unnecessary down time resulting from the "blanket curtailment" and the advances in smart curtailment a focused curtailment regime is further proposed as an optional means of achieving the level of curtailment indicated as required by operational monitoring.

This will focus on times and dates, corresponding with periods when the highest level of bat activity occur within the Site. This includes the use of the SCADA (Supervisory Control and Data Acquisitions) operating system (or equivalent) to only pause/feather the blades below a specified wind speed and above a specified temperature within specified time periods.

Post-construction surveys will be undertaken for the first three years of operation to confirm if curtailment is required in line with post-construction activity levels. The post construction surveys will be used to update the curtailment regime (blanket curtailment) designed around the values for the key weather parameters and other factors that are known to influence collision risk. This will include all of the following:

- Wind speed in m/s (measured at nacelle height)
- Time after sunset
- Month of the year
- Temperature (ºC)
- Precipitation (mm/hr)

4.1.3.5.5 Buffer Zones

The vegetation-free buffer zones around the identified turbines will be managed and maintained during the operational life of the development.

Due to mitigation by design, turbines will be sited at a suitable separation distance from treelines/hedgerows and trees or vegetation will be removed to ensure a woodland-free buffer zone.

The immediate surroundings of individual turbines will be managed and maintained so that they do not attract insects (i.e. the concentration of insects in the wind turbine vicinity should be reduced as much as possible, but not such that insect abundancies affected elsewhere on the site). This should be achieved through physical management of habitats without the use of toxic substances.

The radius of each buffer zone as determined by the height of surrounding vegetation is listed above.

It is noted that no trees are present within the T3 buffer, and are also absent from other turbine buffers within agricultural land (apart from existing hedgerows). Currently, no management other than removal of trees within these buffers is required, due to ongoing agricultural management limiting vegetation within these buffers to low-growing grassland or cropland. However, vegetation management encompassing the entire extent of the buffers identified will apply in the case that regular grazing or tillage of these buffers ceases, and targeted intervention is required to keep vegetation short.

4.1.3.5.6 Monitoring of Mitigation Measures

The success of the implemented mitigation measures for bats on the project will be monitored for a period of three years post construction, with further monitoring in years 5, 10, 15, 20, 25 and 30. Appropriate measures will be taken to enhance prescribed mitigation if and where required. A recommended schedule for monitoring is given in Table 17-3: Monitoring schedule recommended for bat mitigation measures, below.

4.1.3.5.7 Bat Fatality Monitoring

Whilst no significant residual effects on bats are predicted, the development could provide an opportunity to gain baseline data on bat/turbine interaction and it is recommended that the scheme be monitored for bat fatalities for the first three years of operation (post construction surveys) and subsequently in years 5, 10, 15, 20, 25 and 30 as part of the additional curtailment monitoring schedule. A comprehensive onsite fatality monitoring programme is to be undertaken following published best practice (e.g. SNH 2021 or equivalent at the time of operation).

The primary components of the mortality programme are outlined below:

- Carcass removal trials to establish levels of predator removal of possible fatalities. This should be done following best recommended practice and with due cognisance of published effects such as predator swamping, whereby excessive placement of carcasses increases predator presence and consequently skews results. No turbines which are used for carcass removal trials should be used for subsequent fatality monitoring.
- Turbine searches for fatalities should be undertaken following best practice in terms of search area (focusing on hard standing) and at intervals selected to effectively sample fatality rates as determined by carcass removal trials in (1.) above. 2
- A standardised approach with a possible control group and/or variation in search techniques such as straight line transects/ randomly selected spiral transects/ dog searches will be undertaken. This will provide a means of robustly estimating the post construction collision fatality effect (if any).
- Recorded fatalities should be calibrated against known predator removal rates to provide an estimate of overall fatality rates.

[2] Suitably trained dogs with handlers are significantly more efficient and faster than humans in locating carcasses and should preferably be used to achieve more robust results. Dog searches are, however, resource-demanding and may not always be necessary to identify if a problem exists.

4.1.3.5.8 Monitoring schedule

Table 4-3: Monitoring schedule recommended for bat mitigation measures

Mitigation measure	Monitoring required	Description	Duration
Bat boxes / PRFs	Monitor bat use	Bat boxes and PRFs to be placed at/moved to locations removed from wind turbines as determined by project ecologist/ECoW at least 1 season before construction start. These shall be examined by a licensed bat specialist according to NPWS recommendations. Records should be submitted to Bat Conservation Ireland for inclusion in its bat distribution database. Re-site if necessary. Annual cleaning required if well used by bats or if used by birds. Replacement if damaged/lost.	From mounting to 3 years post construction.
Mortality study	Fatality monitoring	Corpse searches beneath turbines to assess the effect of operation on bats.	From initial operation conducted during years 1, 2, 3, 5, 10, 15, 20, 25 and 30 post construction.
Activity monitoring	Bat activity monitoring	Static detector surveys at detector locations during the bat activity season (between April and mid-October). Assessment of activity levels using Ecobat or other currently accepted analysis methods.	From initial operation conducted during years 1, 2, 3 post construction. Additional years to be surveyed if requirement is indicated by fatality monitoring.

Table 17-4: Summary of Operational-phase mitigation measures for bats

Moderate and Moderate-High Level Bat Mitigation Applies to XX Turbines
Operate the wind turbines in a manner that reduces the movement of the blades below the cut-in speed (e.g. by feathering the blades).
Implement a monitoring programme for the first three years of operation to ensure that bat activity is at a low level in vicinity of these turbines. Review monitoring results to determine if further bat mitigation measures are required.
Continue monitoring for 3 years post operation of the wind farm to determine whether a higher cut-in speed of the blades is required. The requirement for the continuation of monitoring across subsequent monitoring years (5, 10, 15, 20, 25 & 30) will be reviewed in consultation with NPWS.
Undertake a carcass search for 3 years post operation of the wind farm to determine whether a higher cut-in speed of the blades is required. Repeat searches in years 5, 10, 15, 20, 25 & 30.
Clear and maintain buffer zone free of woodland/trees within 50m of turbine blade tips.

Moderate and Moderate-High Level Bat Mitigation Applies to XX Turbines
Maintain buffer zones around wind turbines in a manner that does not attract insects.

4.1.3.6 Other Species

Maintenance of bat felling buffers (vegetation trimming), will be undertaken outside the bird breeding season (March- August inclusive). This measure will also avoid potential disturbance to common lizard and bee species during breeding periods.

The pre-clearance bat buffer ecological survey shall include a marsh fritillary habitat appraisal, followed if necessary by a larval web survey. This will ensure that suitable mitigation and avoidance measures can be implemented in the event that marsh fritillary establish in the bat felling buffers during the operational phase.

There is potential for an indirect effect on frogs or smooth newt due to water quality changes from erosion and sediment. Periodic inspections of sediment and erosion control measures will be undertaken until the risk of erosion or siltation has declined following the successful establishment of vegetation during the operational phase.

4.1.3.7 Aquatic Ecology

The operational wind farm will have a negligible effect on aquatic ecological receptors and fisheries, as there are no further potential effects on surface water run-off or watercourses within the site. During the operation phase, oils will be required for cooling the transformers giving rise to the potential for oil spills within the site. However, the transformers will be bunded to over 110 % of the volume of oil within them.

It is not envisaged that maintenance will involve any significant effects on the hydrological regime of the area. Periodic inspections of sediment and erosion control measures will be undertaken until the risk of erosion or siltation has declined following the successful establishment of vegetation during the operational phase.

Access to the site will be controlled using a gate to prevent harmful activities such as illegal dumping, unlicensed timber or peat extraction, or recreational use of off road vehicles.

4.1.4 Mitigation Measures During Decommissioning

4.1.4.1 Designated Sites

The same mitigation measures will apply for the decommissioning phase as for the construction phase.

4.1.4.2 Habitats

Following removal of the turbines, the bat felling buffers will be allowed to succeed to woodland. Pending landowner agreement, targeted removal of non-native species (e.g. conifers) (if they are overly dominant) will be undertaken to favour the establishment of semi-natural woodland. A small proportion of conifers can be retained to maintain a food source for red squirrel.

An appropriately qualified and experienced ecologist will review and, where required, amend the proposed Habitat and Species Management Plan and consult with NPWS to seek their views on the implementation of the proposed measures.

Any re-instated habitats such as Hedgerows will utilise native species suitable for the area.

4.1.4.3 Terrestrial Mammals

Similar mitigation measures will apply for the decommissioning phase as for the construction phase.

4.1.4.4 Bats

The same mitigation measures will apply for the decommissioning phase as for the construction phase.

4.1.4.5 Other Taxa

The same mitigation measures will apply for the decommissioning phase as for the construction phase.

4.1.4.6 Aquatic Ecology

In the event of decommissioning of the proposed wind farm, activities will take place in a similar fashion to the construction phase.

Due to the proposed retention of the roads, hard standings and electrical infrastructure, potential for effects on water quality and aquatic ecology will be reduced in comparison to construction. The only potential sources of siltation will be the areas of soil used to cover the turbine foundations. The mitigation measures outlined above for the construction phase will also be implemented as relevant for the protection of aquatic ecological interests during the decommissioning phase.

4.2 Mitigation Measures for Ornithology (EIAR Chapter 8.2)

4.2.1 Mitigation Measures for Avifauna

Mitigation measures are described below which will avoid, reduce and where possible, offset potential negative effects arising in relation to avifauna from the construction, operation and decommissioning of the site. These mitigation measures shall be implemented in full.

4.2.1.1 Mitigation by Avoidance and Design

The following measures were undertaken to reduce impacts on designated sites, flora and fauna through avoidance and design:

- The hard-standing areas of the proposed development have been kept to the minimum necessary (to allow for the accommodation of turbine manufacturer specifications), including all site clearance works to minimise land take of habitats.
- Site design and layout deliberately avoided direct impacts on designated sites and sensitive habitats.

- All cabling with the exception of the locations of the high voltage line loop-in is to be placed underground; this significantly reduces collision risk to birds over the lifetime of the wind farm and is in line with best practice recommendations for mitigation measures in regard to birds and wind farms as recommended by statutory bodies such as English Nature and the Royal Society for the Protection of Birds (Drewitt and Langston, 2006).

4.2.2 Mitigation measures during the construction phase

4.2.2.1 Introduction

Construction of this project is expected to cause temporary (disturbance) adverse effects on local ecological receptors, as outlined in Section 8.16 above. The mitigation measures described below will reduce these effects significantly.

4.2.2.2 Project Ecologist/ECoW

A Project Ecologist/Ecological Clerk of Works (ECoW) with appropriate experience and expertise (in implementing ecological mitigation measures for wind farm developments) will be employed for the duration of the construction phase to ensure that all the mitigation measures outlined in relation to the environment are implemented. The Project Ecologist/ECoW will be awarded the authority to stop construction activity if there is potential for significant adverse ecological effects to occur.

4.2.2.3 Avifauna

Subject to other environmental concerns (e.g., run-off), the removal of vegetation and scrub as well as trimming of trees to facilitate the proposed development will be undertaken outside of the bird breeding season (March 1st to August 31st inclusive). This will help protect nesting birds.

Where vegetation removal is required outside this period, vegetation will be inspected for nesting birds by a suitably qualified Ecologist. In the event of birds nesting within areas required to be felled, suitable mitigation including implementation of buffer zones and/or seasonal constraints (based on known breeding cycle of species) and nest monitoring will be put in place. Similarly for swallow, the shed within the proposed northern access track footprint will be checked for evidence of re-occupation by swallows and if any are present, a seasonal restriction on demolition will be implemented. It is noted that nest buffer zones required for different bird species can vary widely. Birds which could be encountered during vegetation clearance include small passerines, woodcock and raptors. On a precautionary basis, a minimum buffer of 10m will be implemented around any active small passerine nests. A 500m buffer will be applied for nests of higher sensitivity raptor species such as kestrel, peregrine or merlin if any become established within the ZoI prior to construction. A 200m buffer will be applied in the same category for lower sensitivity species such as sparrowhawk and buzzard. (Goodship and Furness, 2022). A buffer of 250m is specified for woodcock nests.

A re-confirmatory survey (March/April) will be conducted of the proposed infrastructure to assess any evidence of target species activity or occupation of new territories (e.g. in the case of breeding Snipe or Woodcock). Should any nesting locations be recorded, works at these locations will be restricted to outside the breeding season (March 1st to August 31st inclusive) or until chicks are deemed to have fledged (following monitoring). A 500m buffer is required for breeding snipe. A buffer of 250m is specified for woodcock nests.

Grazing whooper swans using the fields near T1-T3 will be monitored prior to and during construction to detect if any disturbance/displacement occurs, and also to investigate whether habituation to construction disturbance occurs. In the event that wintering whooper swan are regularly using areas within or in close proximity to the proposed wind farm prior to construction, or if significant disturbance/displacement occurs (as determined by the ECoW/Ornithologist), a 600m exclusion zone around winter grazing areas will be implemented until wintering whooper swans have left in spring.

Based on the established absence of breeding kingfisher and poor suitability of riverbank soils along the Fear English River for kingfisher nesting, it is unlikely that breeding kingfisher will move into the ZoI prior to construction. A preconstruction kingfisher survey will be undertaken to reconfirm the baseline. In the event that breeding kingfisher did become established in the ZoI prior to construction, a 50-100m (buffer size dependent on occurrence of existing screening features) exclusion zone will be implemented around active kingfisher nests during the kingfisher breeding season (March - August inclusive), with ecological monitoring to confirm the start and end of the exclusion period.

Construction operations will take place during the hours of daylight to minimise disturbances to roosting birds, or active nocturnal bird species. This is in line with best practice recommendations for mitigation measures in regard to birds and wind farms as recommended by statutory bodies such as English Nature and the Royal Society for the Protection of Birds (Drewitt and Langston, 2006). Limited operations such as concrete pours, turbine erection and installation of the grid connection may require night-time operating hours; these works will be supervised by the project ecologist/ECoW.

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

Where removed or altered, re-instated hedgerows will be planted with native species of native provenance. This will result in habitat enhancement for local species of conservation importance such as yellowhammer. Further information relating to hedgerow planting are included in Sections 8.10.1..7.3 and 8.12.5 in Chapter 8-1 Biodiversity.

The measures to protect water quality described in EIAR Chapter 8-1 Biodiversity and EIAR Chapter 10 Hydrology and Water Quality will benefit kingfisher through protection of aquatic habitats and associated aquatic prey resources.

The use of “white lights” on the turbines will not occur as these can attract night flying birds such as migrants, and insects, which in turn can attract bats. Certain turbines will be illuminated with medium intensity fixed red obstacle lights of 2000 candelas where required by the IAA Lighting will be fitted with baffles to ensure that the light is directed skywards and will not be discernible from the ground.

The above measures are in line with best practice recommendations for mitigation measures in regard to birds and wind farms as recommended by statutory bodies such as English Nature and the Royal Society for the Protection of Birds (Drewitt, A. L. and Langston, R. H., 2006).

4.2.3 Habitat Management Plan (HMP)

A Habitat and Species Management Plan (HSMP) has been prepared for the Proposed Development, as detailed in Section 8.12 in Chapter 8-1 Biodiversity. Within this plan, the following measures are applicable to avifauna;

Revegetation of access track buffers and berms in wooded areas through natural recolonisation and targeted planting will offset the potential effect of wooded habitat loss for woodcock and other species. Within wooded areas, bog woodland bare root whips (60-90cm in height), sourced from native stock and disease free will be planted on selected berms outside bat felling buffers. Whips will be planted at 1m centres with the following mix: 20% downy birch (Betula pubescens), 10% holly (Ilex aquifolium), 15% rowan (Sorbus aucuparia), 20% scots pine (Pinus sylvestris), 10% pedunculate oak (Quercus robus), 10% sessile oak (Q. petraea) and 15% willow (Salix cinerea). Rabbit/hare protection will be put in place alongside weed suppressing leaf mulch. Any whips that die will be replaced (during the operational phase).

Berms in open agricultural habitats will be planted with native pollinator-friendly species. This will also provide benefits for foraging birds in the form of seeds and insect prey.

Bird boxes (5 No.) will be placed within the limited treelines within the site. This will help to provide further breeding habitat for birds on the site.

4.2.4 Mitigation measures during operation

A post construction monitoring programme is to be implemented at the proposed wind farm in order to confirm the efficacy of the mitigation measures; the results of this will be submitted annually to the competent authority and NPWS. Published guidance on assessing the impacts of wind farms on birds from English Nature and the Royal Society for the protection of birds recommends the implementation of an agreed post development monitoring programme as a best practice mitigation measure (Drewitt and Langston, 2006).

In addition, published recommendations on swans and wind farms (Rees, 2012) suggests that systematic post construction monitoring; adapted to quantify collision, barrier, and displacement, be conducted over a period of sufficient duration to allow for annual variation or in combination effects. The following individual components are proposed:

1. Fatality Monitoring (to be conducted during years 1, 2, 3, 5, 10 and 15 post construction)- A comprehensive fatality monitoring programme is to be undertaken following published best practice (Shawn et al., 2010; Fijn et al., 2012 and Grunkorn, 2011); the primary components are as follows:
    a) Initial carcass removal trials to establish levels of predator removal of possible fatalities.
    b) This is to be done following best recommended practice and with due cognisance to published effects such as predator swamping, whereby excessive placement of carcasses increases predator presence and consequently skews results (Shawn et al., 2010).
    c) Turbine searches for fatalities are to be undertaken following best practice (Fijn et al., 2012 and Grunkorn, 2011) in terms of search area (minimum radius hub height) and at intervals selected to effectively sample fatality rates based on carcass removal rates (e.g. 1 per month). To be conducted during years 1, 2, 3, 5, 10 and 15 post construction to allow for annual variation and cumulative effects. Dependant on results further monitoring to be agreed with NPWS.
    d) A standardised approach with a possible control group and/or variation in search techniques such as straight line transects/ randomly selected spiral transects/ dog searches will be undertaken. This will provide a means of robustly estimating the post construction collision fatality impact (if any).
    e) Recorded fatalities to be calibrated against known predator removal rates to provide an estimate of overall fatality rates.

Reports will be submitted to the competent authority and NPWS following each round of surveys.

2. Flight Activity Survey (to be conducted during years 1, 2, 3, 5, 10 and 15 post construction) - A flight activity survey is to be undertaken during the summer and winter months to include both vantage point and hinterland surveys as Per SNH (2017) guidance:
    a) Record any barrier effect i.e. the degree of avoidance exhibited by species approaching or within the wind farm (Drewitt and Langston, 2006). Target species to be all raptors and owls, all wild goose and duck species, all swan species, and all wader species.
    b) Record changes in flight heights of key receptors post construction.

Reports will be submitted to the competent authority and NPWS following each round of surveys. This survey is to be conducted during years 1, 2, 3, 5, 10 and 15 post construction to allow for annual variation and cumulative effects. Dependant on results further monitoring requirements will be agreed with NPWS.

3. Monthly Wildfowl Census (to be conducted during years 1, 2, 3, 5, 10 and 15 post construction). A monthly wildfowl census, following the methods utilised for the baseline survey, is to be repeated on a monthly basis during the winter period in the monitoring years listed above.

    This aims to:
    a) Assess displacement levels (if any) of wildfowl such as swans post construction
    b) Assess overall habitat usage changes within the vicinity of the Proposed Wind Farm post construction.

This survey is to be conducted during years 1, 2, 3, 5, 10 and 15 post construction to allow for annual variation and cumulative effects. Dependant on results further monitoring requirements will be agreed with NPWS. Reports will be submitted to the competent authority and NPWS following each round of surveys.

4. Breeding Bird Survey (to be conducted during years 1, 2, 3, 5, 10 and 15 post construction). A breeding bird survey (Common Bird Census), following methods used in the baseline survey to be repeated in each monitoring year listed above between early April to early July. This aims to:
    a) Assess any displacement effects such as those recorded on breeding birds. Overall density of breeding birds to be annually recorded.

5. Breeding Wader Survey (to be conducted during years 1, 2, 3, 5, 10 and 15 post construction). A breeding bird survey, following methods used in the baseline survey to be repeated in each monitoring year listed above during April-May-June.
6. Breeding Woodcock Survey (to be conducted during years 1, 2, 3, 5, 10 and 15 post construction). A breeding bird survey, following methods used in the baseline survey to be repeated in each monitoring year listed above during April-May-June.

The above surveys are to be conducted during years 1, 2, 3, 5, 10 and 15 post construction to allow for annual variation and cumulative effects. Dependant on results further monitoring requirements will be agreed with NPWS.

4.2.5 Mitigation Measures during the Decommissioning

The same mitigation measures will apply for the decommissioning phase as for the construction phase.

Decommissioning operations will take place during the hours of daylight to minimise disturbances to roosting birds, or active nocturnal bird species. This in line with best practice recommendations for mitigation measures in regard to birds and wind farms as recommended by statutory bodies such as English Nature and the Royal Society for the Protection of Birds (Drewitt, A. L. & Langston, R. H., 2006). Turbines components will be broken up onsite prior to removal, and as such vegetation trimming requirements to facilitate turbine removal will be minimal (reduced in comparison to construction stage) or not required.

Toolbox talks shall be held with construction staff on disturbance to key species during decommissioning. This will help minimise disturbance. This in line with best practice recommendations for mitigation measures in regard to birds and wind farms as recommended by statutory bodies such as English Nature and the Royal Society for the Protection of Birds (Drewitt, A. L. & Langston, R. H., 2006).

Any re-instated habitats will include native species where possible to enhance diversity of birds. This in line with best practice recommendations for mitigation measures in regard to birds and wind farms as recommended by statutory bodies such as English Nature and the Royal Society for the Protection of Birds (Drewitt, A. L. & Langston, R. H., 2006).

5. CHAPTER 9 - LAND SOILS AND GEOLOGY

The mitigation measures set out in Chapter 9 are presented below

The following section outlines appropriate mitigation measures by design and best practice to avoid or reduce the potential impact of the Proposed Development.

5.1 Mitigation by Design and Best Practice

In order to reduce the impacts on geology, hydrogeology and slope stability, infrastructure has been primarily located within areas of thinner, soft ground and lower slope gradients. Extensive work has already been undertaken at the preliminary design stage to apply risk avoidance by design which included:

- Peat probing and site walkover surveys to identify geotechnical constraints (e.g. peat deposits and evidence of historic landslip) likely to adversely affect the design of the Proposed Development site;
- Relocation and micro-siting of turbines, hardstandings, substation and access roads based on the site assessments and geotechnical assessments in order to reduce ground risk associated with the Proposed Development;
- The works have been designed and checked by geotechnical and civil engineers, who are suitably qualified and experienced in excavation and earthworks design and construction methodologies. A discussion about the site and the alternatives selected is included in Chapter 2 of this EIAR.

The following will also be implemented:

- Any excavation and construction related works will be subject to a design risk assessment at detailed design stage to determine risk levels for the construction, operation and maintenance and decommissioning of the works. Identified impacts will be minimised by the application of principles of avoidance, prevention and protection. Information on residual impacts will be recorded and relayed to appropriate parties;
- A detailed method statement for each element of the works will be prepared by the Contractor prior to any element of the work being carried out;
- Given that the works comprise a significant proportion of excavation and earthworks, suitably qualified and experienced geotechnical personnel will be required on site to supervise the works;
- The Contract will require programming of the works such that earthworks are not scheduled during severe weather conditions.

5.2 Construction Phase

The following sections outline appropriate mitigation measures to avoid or reduce the potential impact of the Proposed Development during the construction phase.

5.2.1 Construction Environmental Management Plan (CEMP)

A Construction Environmental Management Plan (CEMP) has been prepared for the Proposed Development and is included in Volume 3, Appendix 3.2. The CEMP defines the work practices, environmental management procedures and management responsibilities relating to the construction phase of the Proposed Development.

The CEMP sets out the key environmental management measures associated with the construction, operation and decommissioning of the site, to ensure that during these phases of the development, the environment is protected, and any potential impacts are minimised. The final CEMP will be developed further at the construction stage, on the appointment of the main contractor to the development to address the requirements of any relevant planning conditions, including any additional mitigation measures that are conditioned and shall be submitted to the planning authority.

Reference to relevant sections of the CEMP with respect to the mitigation of potential impacts to Soils, Geology and Hydrogeology from the Proposed Development are outlined below.

5.2.2 Earthworks

The Proposed Development will be constructed in a phased manner to reduce the potential impacts on the Soils, Geology and Hydrogeology. Phased construction reduces the amount of open, exposed excavations at any one time. Given that the works comprises a significant proportion of excavation and earthworks, suitably qualified and experienced geotechnical personnel will be required on site to supervise the works.

Details of the proposed methodology and mitigation measures are summarised below and are also outlined in in the CEMP in Appendix 3.2 of Volume 3.

One of the primary mitigation measures employed at the preliminary design stage was the minimisation of earthworks volumes as follows:

- All excavated overburden will be retained on-site. The surplus that cannot be used as backfill material will be stored in berms along access tracks and clear fell areas around Turbines T8, T9, T10 and T11, which are designed for that purpose. Permanent storage areas will be landscaped to minimize erosion and visual impact (see drawings P22-242-0100-0002 to P22-242-0100-0006);
- All the access tracks will be floated, excluding the entrance from public road to T1 (0.4m of average excavation depth) and the track in the agricultural land leading up to the loop-in/loop-out connection (0.3m of average excavation depth);
- Turbines T8, T9 and T10 and related hardstands will be piled;
- No borrow pits will be used and all fill and aggregate will be imported from local quarries.

Surplus overburden deposits excavated during the course of the works will be temporarily stored in a level area adjacent to the construction phase excavations prior to reuse as backfill or store in the above-mentioned berms and clear fell areas.

Some temporary stockpiles (not exceeding 2m in height) of material will be necessary adjacent to the excavation areas prior to reinstatement, however no long-term stockpiles of material will remain after construction and no surplus/waste soil or rock will be removed from the Proposed Development site. Temporary stockpiles will be shaped and sealed to prevent the ingress of water from rainfall and placed away from open excavations, sloping / soft ground as not to create an instability risk during temporary works.

To mitigate against the compaction of soil at the site, prior to the commencement of any earthworks, the work corridor will be pegged, and machinery will stay within this corridor so that soils outside the work area are not damaged. Excavations will then be carried out from access tracks as they are constructed in order to reduce the compaction of soft ground.

To mitigate against erosion of the exposed soil, all excavations will be constructed and backfilled as quickly as possible. Excavations will stop during or prior to heavy rainfall events (>10mm/hour). To mitigate against possible contamination of the exposed underlying soils, refuelling of machinery and plant will only occur at designated refuelling areas.

All temporary cuts/excavations will be carried out such that they are stable or adequately supported. Gravel fill will be used to provide additional support to drains where appropriate. Where appropriate and necessary, temporary cuts and excavations will be protected against the ingress of water or erosion by covering during adverse weather. Where necessary sheet piling or other measures will be used to provide integrity for unstable excavations, particularly within peat, alluvial, gravel or for excavations below the water table.

Support may also be required to support elevated floating roads which are being excavated for the installation of cable trenches. The stability of all excavations will be assessed in advance by an experienced geotechnical engineer. Temporary works will be such that they do not adversely interfere with existing drainage channels/regimes by the provision of silt traps and silt fencing as required (refer to Chapter 10 – Hydrology and Water Quality).

The proposed turbine locations have been carefully selected in areas of the site which is relatively close to the existing access tracks to minimise the length of new access tracks required. Drainage will be towards the existing drainage network.

Any contaminated soils will be handled, removed and disposed of in accordance with the requirements of the local authority and/or EPA and waste management legislation. In particular, the following measures will be implemented:

- Contaminated material will be left in-situ and covered, where possible until such time as the classification and assessment of waste at the site is undertaken in accordance with the appropriate technical guidance;
- Prior to removal of material from site for disposal WAC (Waste Acceptance Criteria) testing should also be undertaken in accordance with recommended standards and in-line with the acceptance criteria at a suitably licenced landfill or treatment facility;
- Where materials are removed from site for disposal, materials will be transported by a contractor with a valid waste collection permit and recovered/disposed of at an appropriately licensed facility.

Unregulated drainage will not be permitted within the Proposed Development. Any pumping of excavations will be directed into existing drainage networks via settlement ponds and will not be allowed to discharge directly to the ground except under licence.

All fuel and liquids will be stored on site in fully bunded areas as described in detail in Chapter 10 – Hydrology and Water Quality of the EIAR. In addition, an effluent holding tank along with other protection measures will be used at the substation in order to protect the Source Protection Zone at Drehid and prevent any discharges to ground. These are detailed in Chapter 10, Hydrology and Water Quality.

Other mitigation measures relating to soils and geology include the following:

- Internal Haul roads will be capped as soon as practicably possible to cover exposed subsoils and as such reduce the concentration of suspended solids in the run-off;
- A suitably qualified person will be appointed by the developer to ensure the effective operation and maintenance of drainage and other mitigation measures during the construction process;

- Due to the dispersed nature of the site, refuelling of plant during construction will be carried out at a number of dedicated refuelling station locations on site, typically at each compound or at least 100m from a watercourse using mobile bowsers;
- Each station will be fully equipped for a spill response and a specially trained and dedicated environmental and emergency spill response team will be appointed before commencement on site. Drip trays and spill kits will be kept available on site, to ensure that any spills from the vehicle are contained and removed off site. Only emergency breakdown maintenance will be carried out on site and appropriate containment facilities will be provided to ensure that any spills from breakdown maintenance vehicles are contained and removed off site;
- Portaloos and/ or containerised toilets and welfare units will be used to provide toilet facilities for site personnel during construction. Sanitary waste will be removed from site via a permitted waste contractor.

5.2.3 Control of Sediment Laden Runoff

The potential impact from silt laden surface water runoff from increased erosion of exposed overburden deposits will be addressed particularly at drainage locations and where earthworks and vegetation clearance are proposed.

Details of the proposed Surface Water Management System and mitigation measures is summarised below and are also outlined in the CEMP in Appendix 3.2 of Volume 2.

Best practices will be employed in the prevention of silt laden run-off from entering watercourses as discussed below.

To minimise the impact to surface water quality, existing forestry drainage will be maintained outside the immediate site area, and where appropriate, additional site drainage and settlement ponds will be installed as required prior to construction activities. Silt fencing will be installed in new drainage and monitoring of water quality undertaken during the construction phase.

Final drainage will be constructed following the completion of these activities with silt fencing maintained until such time as a vegetation cover has become established. Chapter 10 of this EIAR discusses surface water issues in more detail.

5.2.4 Measures for Spills

Details of oil spill protection measures adjacent to sensitive receptors and emergency spill response procedures are outlined in the CEMP which is contained in Appendix 3.2 of Volume 2.

Storage tanks, used to store fuel for the various items of machinery, will be self-contained and double-walled. Refuelling of construction vehicles will be carried out from these tanks or from delivery vehicles at designated refuelling areas. Specific mitigation measures relating to the management of hydrocarbons are as follows:

- Fuels, lubricants and hydraulic fluids for equipment used on the construction site will be carefully handled to avoid spillage.
- Any spillage of fuels, lubricants or hydraulic oils will be immediately contained, and the contaminated soil removed from the site and properly disposed of;
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the Proposed Development site for disposal or re-cycling; and

- Appropriate spill control equipment, such as oil soakage pads, will be kept within the construction area and in each item of plant to deal with any accidental spillage.

5.2.5 Slope Stability

With regard to slope stability issues, detailed design and construction phase best practice will be implemented as follows:

- The works will be supervised by a suitably qualified and experienced geotechnical engineer or engineering geologist, and hydrologist or drainage engineer;
- No amendments to the designed works will be made without the prior approval of a suitably qualified and experienced engineering geologist or geotechnical engineer familiar with wind farm construction works;
- Identified risks will be minimised by the application of the principles of avoidance, prevention and protection. Information on risks are outlined in the CEMP. This will be reviewed and updated prior to commencement of construction;
- A detailed method statement for each element of the works will be prepared prior to any element of the work being carried out. An outline of the methods are given in the CEMP. This will be reviewed and updated prior to commencement of construction;
- Details of the relevant assumptions, relating to methods and sequencing of work are provided in the CEMP. This will be reviewed and updated prior to commencement of construction;
- A CEMP has been submitted with this EIAR. Prior to construction, a site-specific environmental management plan for construction will be prepared, which will incorporate all measures set out in the CEMP, in consultation with the relevant statutory bodies, including the planning authority, Waterways Ireland and the NPWS;
- The environmental management plan for construction will provide for the checking by suitably qualified and experienced staff of equipment, materials storage and materials transfer areas, as well as drainage structures and their attenuation ability, on a regular basis;
- An emergency plan will be updated at pre-construction stage detailing the action plan which would be implemented in the unlikely event of a landslide/slope failure. Should a landslide/slope failure occur or if signs of instability/ground movement are observed, work will cease immediately;
- Drainage infrastructure will be put in place in advance of excavations. Drains will divert surface water and groundwater away from excavations into the existing and proposed surface drainage network. Uncontrolled, direct and concentrated discharges of water onto the ground surface will be avoided;
- Loading or stockpiling of materials on the surface of soft ground will be avoided. Loading or stockpiling on other deposits will not be undertaken without first establishing the adequacy of the ground to support loads by an appropriately qualified geotechnical engineer experienced in construction within upland conditions. No stockpiling of material shall take place on steep slopes;
- Excavation will be carried out from access roads or hardstanding areas to avoid tracking of construction plant across areas of soft ground;
- Excavations which could have the potential to undermine the up-slope component of an existing slope will be sufficiently supported to resist lateral slippage and careful attention will be given to the existing drainage;

- Earthworks will not be commenced when heavy or sustained rainfall (orange or red weather warnings) is forecast. A series of rainfall gauges will be installed across the Proposed Development site to provide a record of rainfall intensity. An inspection of site stability and drainage by the Geotechnical Engineer will be carried out on site when a daily rainfall of over 10mm/hr or 25mm/day is recorded on site, works will only recommence after heavy rain with the prior approval of the Geotechnical Engineer following their inspection.

Further details are given in the CEMP included in Appendix 3.2 of Volume 2 of this EIAR.

5.2.6 Groundwater

To mitigate against the increased vulnerability of the underlying aquifer to groundwater pollution, all excavations will be constructed and backfilled as quickly as possible. Excavations will stop during or prior to heavy rainfall events. To mitigate against possible contamination of the underlying groundwater, refuelling of machinery and plant will only occur at designated refuelling areas. Details of mitigation measures related to spills and fuel storage are outlined above.

Excavations dewatering are not expected to cause major interference with GSI recorded or domestic wells in the area. This is because deep rockhead is expected in the site. Besides, local quaternary bodies are expected to be peat overlying till with low permeability.

Finally, no deep excavations are planned to be performed with exception of turbine foundation excavations, which are to be no greater than 3m deep in piled solution for turbines T8, T9 and T10. A piled solution is proposed for hardstands in deep peat areas and floated roads are proposed for access tracks and temporary compounds, and as such there is no need of significant excavation for these elements. Less than one metre of average excavation expected for the Proposed Substation as it has been located in an area of shallow peat. In the case of water inflow pumping is required, it is expected to be for short-time term and with limited inflow rate. Therefore, proximal wells are expected to have quick water level recovery to normal.

The GSI database is however not complete; it is probable that there are other wells in addition to those in the GSI databases, but are generally associated with houses. It is conservatively assumed in this assessment that there is a well present in every household within 1km of the site boundary. Given the limited depth of the excavations during the construction phase and the distance to sensitive groundwater receptors the potential risk posed to groundwater supply wells is considered to be Imperceptible following the implementation of mitigation measures discussed above.

If, however, in the exceedingly unlikely event of a previously unknown domestic well being impacted by the Proposed Development, an alternative supply will be provided – either a connection to mains water or a replacement well will be drilled.

Depending on the ground conditions, presence of services, traffic management required, weather conditions, etc., the rate of installation of cable ducting would be circa 100m per day. Dewatering is therefore unlikely to be required and no impacts on wells is envisaged.

The internal cable trenches could provide preferential pathways for groundwater and contaminant movement. Trenches will be excavated during dry periods in short sections (of approximately 50m – 100m) and left open for minimal periods, to avoid acting as a conduit for surface water flows. No excavations will be carried out in heavy rainfall. To further mitigate the risk of cable trenches becoming preferential pathways, clay plugs (or other low permeability material) will be installed at regular intervals along the trench to stop / inhibit water movement.

5.2.7 Mitigation Measures during Operation

It is not envisaged that the operation of the Proposed Development will result in significant impacts on the geological and hydrogeological regimes within the study area, as there will be no further disturbance of overburden post-construction.

There is a low risk to the geology receptors from compaction of soils due to the movement of HGVs and maintenance vehicles. All site traffic will be limited to access tracks, thereby reducing the area over which compaction of the underlying natural soils can occur.

The main potential residual impact during the operation phase would be the risk to ground and groundwater from contamination from spills. Storage tanks, used to store fuel for the various items of machinery, will be self-contained and double-walled. Refuelling of maintenance vehicles will be carried out from these tanks or from delivery vehicles at designated refuelling areas. Specific mitigation measures relating to the management of hydrocarbons are as follows:

- Fuels, lubricants and hydraulic fluids for equipment used on the site will be carefully handled to avoid spillage.
- Any spillage of fuels, lubricants or hydraulic oils will be immediately contained, and the contaminated soil removed from the site and properly disposed of;
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling; and
- Appropriate spill control equipment, such as oil soakage pads, will be kept within the refuelling areas and in each item of plant to deal with any accidental spillage.

Due to the reduced magnitude of the impacts, no additional mitigation measures are required for the maintenance and operation of the Proposed Development site, over and above those incorporated into the design of the substation transformer, which will be bunded to protect soils against accidental leakages of oils and battery fluids.

5.2.8 Mitigation Measures during Decommissioning

Mitigation measures applied during decommissioning activities will be similar to those applied during construction where relevant.

Some of the impacts associated with reinstatement of the site (excavation of turbine bases, access tracks etc.) will be avoided by leaving these in place where possible. The Irish Wind Energy Association (IWEA) (2012) states that when decommissioning a wind farm “the concrete bases could be removed, but it may be better to leave them under the ground, as this causes less disturbance”. It is proposed to leave the access tracks in-situ at the decommissioning stage. IWEA also state that “it may be best” to leave site tracks in-situ depending on the size and geography of the development.

It is considered that leaving the turbine foundations, access tracks and hardstanding areas in-situ will cause less environmental damage than removing and recycling them. It is proposed to retain these elements of the construction. Turbine bases will be covered with overburden material to allow for re-vegetation of the Proposed Development site. It is proposed that the internal site access tracks and hard standings will be left in place and the land reinstated at these locations. The electrical infrastructure including substations and ancillary electrical equipment shall form part of the national grid and will be left in-situ.

Removal of this infrastructure would result in considerable disruption to the local environment in terms of increased sedimentation, erosion, dust, noise, traffic and an increased possibility of contamination of the local water table. However, if removal is deemed to be required by the respective local authority all infrastructure will be removed with mitigation measures similar to those during construction being employed.

Mitigation measures to avoid contamination by accidental fuel leakage and compaction of soil by on-site plant will be implemented as per the construction phase mitigation measures outlined above.

6. CHAPTER 10 - HYDROLOGY AND WATER QUALITY

The mitigation measures set out in EIAR Chapter 10 - Hydrology and Water Quality are presented below.

6.1 Committed Drainage Measures

6.1.1 Drainage Design

Surface water drainage features will be installed as part of the construction phase and retained where required such that they can be used during the decommissioning phase, ensuring that there would be no increase in the risk of surface water flooding to off-site areas during any phase of the Project.

6.1.2 Proposed New Site Access Tracks and Hard Surfaces

Proposed new site access tracks and turbine hard-standing areas will be drained as per the existing drainage system via roadside swales with stilling ponds at the end of the swale run. The stilling ponds will remain in place following construction. The stilling ponds will drain diffusely overland, over existing vegetated areas, within the site boundary. Stilling ponds will be sized to suit the volume and velocity of flows discharged to it.

The swales will be 0.15m in depth with a bottom width of 0.9m and side slopes of 1 in 3. The swales will be constructed in accordance with CIRIA C698 Site Handbook for the Construction of SUDS.

A minimum buffer of 50m from watercourses has been adopted, where possible for access tracks (this is not possible when an access track is approaching a bridge crossing i.e. the track has to come closer than 50 m from the watercourse in order to cross the bridge over the watercourse). Existing tracks are being widened in their existing locations, which are also more than 50 m from watercourses.

It is recommended that the SPCs will consist of a minimum of silt traps containing filter stone and filter material staked across the width of the swales and upstream of the outfall to any watercourse. This would be in addition to the measures required in the IFI guidance document, IFI (2016) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters and specific requirements provided by IFI during the consultation process.

A buffer zone will remain between silt traps and watercourses with natural vegetation left intact so as to assist silt interception.

Additional silt fencing will be kept on site and erected as required during construction to prevent the ingress of silt into the watercourses. The silt fencing will be kept in place until the natural vegetation has been re-established.

Site drainage, including silt traps and stilling ponds, will be put in place in parallel with or ahead of construction, such that excavation for new infrastructure will have a functioning drainage system in place.

The existing drainage will be maintained along the sections of the turbine delivery route where modifications will be required. It is not envisaged that any relocation of gullies etc. will be required, as the areas of oversail required for the turbine delivery route will be reinstated when the delivery period is completed.

6.1.3 Proposed Watercourse Crossings

There are 3 no. watercourse crossings required within the Proposed Development site. It is proposed to construct clear span bridges at these locations to minimise the environmental impacts and avoid any instream works. Drawings P22242-0300-0021, P22242-0300-0022 and P22242-0300-0023 illustrate the proposed bridge structures and their locations within the site.

The bridges will be of adequate length and will be designed to ensure that no in-stream works will be required and that the existing stream banks are not disturbed during construction. Sufficient free-board will be allowed for in the proposed bridge designs to allow for 1 in 100-year fluvial flood conditions.

The methods and calculations for sizing are provided in Appendix 10.1 (Preliminary Technical Report for Proposed Bridges and Culverts). The crossings are sized to convey a 1 in 100-year flood with a 20% allowance for climate change, while maintaining a minimum freeboard of 300 mm.

In accordance with the consultation responses received from the IFI it is proposed to provide clear spans in place of culverts. To minimise adverse impacts on the fisheries resource, works in rivers, streams and watercourses are generally only permitted to be carried out during the period July-September. However, the specific period for the works at each of the river crossing locations will be reviewed on a site-specific basis with the IFI at detailed design stage.

The IFI has provided detailed specifications on the design of temporary and permanent stream crossings in fisheries sensitive streams. These specifications have been considered in the preparation of the planning drawings and will be followed in the detailed design of the stream crossings.

6.2 Drain Crossings

There are four drain crossings required for the turbine delivery track in the northern portion of the site. These drains are man-made drains and two of these four are part of the OPW arterial drainage network and will be crossed with temporary crossing structures which will provide a clear-span crossing of the drains.

It is expected that all other drain crossings within the site will be crossed using piped culverts. Piped culverts will only be used over very short stretches i.e. at track crossings. Pipe culverts will be sized to take the 1 in 100-year flood flow with a 20% allowance for Climate Change. Concrete or HDPE pipes may be used depending on the size of the drain to be crossed.

For a typical drain crossing using a piped culvert, the following outline methodology will be used:

- The access track construction will finish at least 10 m from the nearside bank of the drain.
- All environmental mitigation measures will be implemented locally in advance of the works, in accordance with the measures outlined in Section 4 of the CEMP in Appendix 3.2.
- Pipe culvert installation will only take place during dry periods.
- The bed of the drain will be prepared using a mechanical digger and hand tools to the required levels in accordance with the design.
- A bedding layer will be laid in the base of the drain using Class 6 aggregate material and blinding to the desired levels in accordance with the design.
- The pipe is laid in one lift or in sections using a crane in accordance with an approved lift plan.
- Bedding material is placed and compacted around the pipe to the desired levels in accordance with the design.

- Culverts will be installed with an invert level 500 mm below the existing drain bed level. The embedded section will be allowed to fill naturally.
- The pipe is covered using compacted Class 6N fill material in accordance with the design up to the levels required by the access track sub formation.
- Rock armour headwalls will be constructed where necessary to protect pipe ends and the base of slope embankments on either side of the track.
- For small drain crossings, pipes of suitable diameter will be laid directly into the bed of the drain.

All other existing stream and drain crossings will be left in place and extended where required to match the existing structure where it is proposed to widen the road. Existing stream crossings will be protected using silt fencing.

Some drain clearing will be required at existing crossings, where they have become blocked, to maintain the continuity of flows. These existing pipes may need replacing if they are found to be in a collapsed state.

The Proposed Substation is located within a forested area and peat lands which is drained locally by forestry drainage, including a large drain on the western boundary of the substation footprint which forms part of the OPW Arterial Drainage Network. The drain will be culverted with a round culvert as designed in the Preliminary Technical Report for Proposed Bridges and Culverts (Appendix 10.1).

6.2.1 Drainage of the Proposed Substation

The substation will be drained by a network of piped stormwater drains to a full retention interceptor. A drainage layout drawing for the substation is presented as planning drawing 23727-MWP-00-00-DR-C-2100.

The access tracks approaching the substation will be drained by a network of swales and stilling ponds.

A Source Protection Zone (SPZ) (Johnstown well field) was identified at the substation location. The substation is located in the Inner Source Protection Zone.

Nevertheless, the SPZ will need to be protected from the potentially polluting elements of the Proposed Substation. Any diesel or fuel oils stored at the substation will be bunded. The bund capacity will be sufficient to contain 110% of the tank's maximum capacity. Where there is more than one tank within the bund, the capacity will be sufficient to accommodate 110% of the largest tank's maximum capacity or 25% of the total maximum capacities of all tanks, whichever is the greater. Design and installation of fuel and oil tanks will be in accordance with best practice guidelines BPGCS005 (Oil Storage Guidelines). A full retention interceptor and spillage tank will be provided as an additional measure of protection, and will capture any potential pollutants found in the stormwater drainage which drains the roofs of the substation buildings and the parking spaces.

The proposed drainage layout is shown on planning drawing 23727-MWP-00-00-DR-C-2100.

Permanent sanitary facilities will be provided at the substation, and foul water will be held in a holding tank as shown in 23727-MWP-00-00-DR-C-2100 and detailed in 23727-MWP-SS-ZZ-DR-C-2400. As the proposed substation would be infrequently manned a wastewater treatment plant or septic tank would not be deemed necessary, and a septic tank would not be appropriate due to the location of the substation within an inner SPZ. Therefore, given its location within the SPZ, a holding tank was deemed to be the most appropriate system to use. A holding tank will be provided and serviced under contract by a licensed contractor.

6.2.2 Drainage of Temporary Site Compound

There are two temporary compounds one at the south and one at the north of the site. The temporary compound in the northern portion of the site will be set back a minimum of 50m from watercourses.

The temporary construction compound in the southern portion of the site will be located approximately 15 m from the Fear English River at its closest point. This compound was previously located a minimum of 30 m from the Fear English River but has been relocated in order to mitigate potential impacts on badger using the field drain on the northern boundary of the field in which the compound is to be situated. It is understood that, on balance, the potential impacts to the Fear English River by locating the compound closer to it will be lower than the potential impacts associated with locating the compound in close proximity to the drains being used by badger. The format of the compound has been optimised so that the corner closest to the Fear English River will contain the minimal risk components, with riskier components such as fuel storage situated on the far corner of the compound, in excess of the 50 m set back distance applied as a standard on this project.

The temporary site compounds will drain to shallow grassed swales at the perimeter of the hard-standing areas, to minimize the disturbance to sub-soils. Filter drains may be used where trafficking by site staff is required to access the temporary site compounds. The filter drains/swales will drain to a stilling pond.

A trained and dedicated environmental and fuel spill emergency response team will be set up on site before commencement of construction on-site.

6.2.3 Drainage of Excavated Material

During the construction period, suitable excavated material will be used as ballast to reinstate the turbine bases.

A number of berms will also be created around turbine hardstandings and parallel to the access tracks. These berms will be created from suitable excavated material and are located on the opposite side of infrastructure to any interceptor drains. The berms will therefore not obstruct flow or risk siltation to interceptor drains.

Berms will be placed outside the roadside drains which drain the new access tracks. Silt fencing will be erected to further protect streams, where required. The stilling ponds will remain in place until the reinstated areas have attained satisfactory re-vegetation.

All excavations shall be constructed and backfilled as quickly as possible. Excavations will not be undertaken during heavy rainfall events.

Excavation will precede the turbine base construction, cable trench and access track construction. Soil will be excavated and replaced with granular fill where required. Excavation will be carried out from access roads where possible in order to reduce the compaction of topsoil.

During the construction period, spoil heaps from the excavations for the turbine bases will be stored temporarily. All stockpile material will be bunded adequately and protected from heavy rainfall to reduce silt run-off.

Surplus soil or rock excavated during the course of the works will be used on site in the form of landscaping including low berms. Material will only be stockpiled on the site where there will be immediate backfilling of the excavation with the excavated material e.g. cable laying or material will be stockpiled temporarily. These spoil heaps will be covered and surrounded by silt fences to filter sediment from the surface water run-off from excavated material. It should be noted that any stockpiling will be short-term and temporary and will occur only within the site boundary as the construction proceeds.

The site drainage system will be put in place prior to excavation, therefore the discharge routes from any temporary stockpiling will be via the site drainage system as detailed in the planning drawings.

A minimum buffer of 50m will be provided between temporary stockpiles and the nearest watercourse. There will be no permanent or long-term stockpiling of material on the site.

Reinstated areas and berms will by preference re-vegetate naturally, and further measures will be undertaken, in the form of erosion control matting for example if deemed to be required.

6.2.4 Proposed Drainage of Turbine 6

To mitigate against the potential for flood events impacting on the T6 turbine as outlined in Section 10.7 below, the ground will be raised locally at the T6 location, so that the turbine foundation and hardstanding has a finished level that is at least 300 mm above the modelled flood level. The finished level of the hardstanding will be 79.5 mOD as can be seen on P22-242-0300-0006, which exceeds the 300 mm above the modelled flood level.

Raising the ground locally to elevate the T6 foundation and hardstanding will displace a volume from the flood capacity in the area, and therefore flood "compensation" must be provided to return the flood capacity to the same as pre-development. This will be achieved by providing a "flood compensation area" immediately adjacent to the T6 hardstanding, as shown on planning drawing P22-242-0101-0033.

The flood compensation area will comprise a depression in the local ground, excavated to 1.5 m below existing ground level, to cover an area as shown in the planning drawing P22-242-0101-0033 which will provide a compensation of flood capacity to cancel the volume displaced by raising the T6 foundation and hardstanding. The result of this is that flood extents in the local area are unchanged for a given flood event, as the capacity for the land to absorb flood water remains the same post-development.

There are no other turbines located within the indicative floodplain i.e. 'Flood Zone A' of 'Flood Zone B', as shown in EIAR Chapter 10, Figure 10-8. The Proposed Substation is not located in the indicative floodplain either. This is a result of avoidance by design which aimed to locate the site infrastructure outside of flood zones. In addition, all seals on turbine towers will be designed and built to ensure no water ingress to the tower; the ducts in the foundation will be sealed to ensure no ingress of water; and the foundation will be designed and built to take account that the foundations could be exposed to water.

6.3 Flood Mitigation

To mitigate against the potential for flood events impacting on the T6 turbine as outlined in Section 10.7 below, the ground will be raised locally at the T6 location, so that the turbine foundation and hardstanding has a finished level that is at least 300 mm above the modelled flood level. The finished level of the hardstanding will be 79.5 mOD as can be seen on P22-242-0300-0006, which exceeds the 300mm above the modelled flood level.

Raising the ground locally to elevate the T6 foundation and hardstanding will displace a volume from the flood capacity in the area, and therefore flood "compensation" must be provided to return the flood capacity to the same as pre-development. This will be achieved by providing a "flood compensation area" immediately adjacent to the T6 hardstanding, as shown on planning drawing P22-242-0101-0033. The flood compensation area will comprise a depression in the local ground, excavated to 1.5 m below existing ground level, to cover an area as shown in the planning drawing P22-242-0101-0033 which will provide a compensation of flood capacity to cancel the volume displaced by raising the T6 foundation and hardstanding. The result of this is that flood extents in the local area are unchanged for a given flood event, as the capacity for the land to absorb flood water remains the same post-development.

6.4 Mitigation Measures

6.4.1 Mitigation By Avoidance and Design

A process of 'mitigation by avoidance', as informed by constraints assessment and consultation, was undertaken by the EIA team during the design of the wind farm layout and TDR (refer to Chapter 3 - Site Selection and Alternatives for further detail) with the objective of avoiding / minimising the potential for significant effects on water quality and hydrology. The Site layout and drainage infrastructure has been designed such that it is sympathetic to the existing topography and aims to maintain the existing hydrological regime of the Site such that it does not create a changed hydrological response to precipitation.

A Surface Water Management Plan for the construction, operation and decommissioning stages of the Proposed Development is contained in Section 4.3.5 of the CEMP in Volume III. The proposed drainage design will:

- Collect surface water runoff upgradient of the Proposed Development via interceptor drains and will redistribute this 'clean' collected runoff downgradient of the Proposed Development by means of cross drains which will release via diffuse outfalls to vegetated areas (within the same catchment) or will divert the runoff back into the existing network serving the catchment. This drainage design aims to maintain the hydrological regime at the Site.
- Collect surface water runoff from the footprint of the Proposed Development (during construction, operation and decommissioning) and discharge diffusely to adjacent vegetated areas via settlement ponds, such that a deterioration in water quality does not occur.

6.4.2 Attenuation and Flood Risk

The Proposed Development will increase the impermeable area within the Site and as such can potentially increase the rate and volume of surface water runoff in response to precipitation events. Mitigation measures to address surface water runoff and drainage include in line attenuation features including check dams and stilling ponds and diffuse outfalls with a view to maintaining the baseline hydrological regime and to provide attenuation at greenfield run-off rates.

All access tracks will be constructed from aggregate which will allow a portion of rainfall to infiltrate and, therefore, reduce surface water runoff. Adjacent swales will also intercept and retain surface water runoff allowing this to disperse naturally via infiltration and evapotranspiration. Where swales are installed on sloped ground, check dam structures will be used within the channels to provide attenuation, allowing a portion of the flows to disperse naturally.

Swales and drainage channels will discharge runoff from access roads and areas of hardstanding to settlement ponds. These will be suitably sized to accommodate flows from storm events up to and including the 1 in 100-year storm event.

Settlement ponds will not discharge directly to any drain or watercourse. Rather, flows from the ponds will be dispersed diffusely over land to allow natural overland flow and percolation within the catchment.

Watercourse crossings will be designed and suitably sized to accommodate peak, or storm discharge rates so as not to cause risk of impeding flows during extreme storm events and causing flooding upstream of the crossing. All drain and watercourse crossings will be designed in accordance with the requirements of Regulation 50 of the European Communities (Assessment and Management of Flood Risks) Regulations 2010 SI 122 of 2010. The channel width will be maintained and the crossings will be designed so as not to cause an impediment to the passage of woody debris or sediment transport. Appropriate freeboard will be provided to OPW requirements.

Cable trenches will be excavated in dry weather where possible and infilled and revegetated if required to prevent soil erosion or generation of silt pollution of nearby surface water. There will, therefore, be no increase in the risk of flooding.

The surface water management system at the Site will ensure that there will be no increase in the risk of fluvial or surface water flooding downstream as a result of the windfarm development.

6.4.3 Monitoring

An Environmental / Ecological Clerk of Works (EnCoW / ECoW) will be appointed by the Developer with responsibility for monitoring at the Site during the construction phase of the Development. The Clerk of Works will have the authority to temporarily stop works to prevent negative effects on hydrology or to ensure corrective action is taken to mitigate adverse effects.

A Surface Water Quality Monitoring Programme will be established which will commence 12 months prior to construction in order to establish baseline physio-chemical conditions and hydromorphological conditions of the watercourses within the Site and will continue throughout construction and for three months post-commissioning phase of the Proposed Development.

A record of monthly meteorological conditions (as a minimum precipitation and temperature) will be maintained.

Biological water quality assessment using the EPA Q-value methodology will be carried out once prior to the commencement of construction and on a six month basis during the monitoring period.

The hydromorphological baseline at the proposed watercourse crossings within the Site will be established using the River Hydromorphology Assessment Technique (RHAT). Annual RHAT assessments will be carried out which will be compares against the baseline. The Design and Construction of the bridge crossing and culverts will minimise upstream afflux, avoid turbulence and minimise loss of the natural channel bed due to the culvert or structure in order to ensure that hydromorphology is not affected. The Design will ensure that the baseline river Hydromorphological Condition Score derived from the initial RHAT assessment is not altered such that it would impact the derived WFD hydromorphology classification.

The Contractor will ensure that the daily visual monitoring of the surface water network for visible signs of construction impact is carried out on a daily basis for example, riparian vegetation loss, evidence of oil/fuel slick, sediment plumes, fish kill.

During the construction and commissioning phase, water quality monitoring results will be recorded and compared against baseline data and where there is a deviation beyond the 95%ile, the Contractor will investigate and as necessary sample further upstream and determine if elevated concentrations are coming from the Site, in which case the Contractor will ensure that emergency control measures are put in place to return the levels to the baseline.

Similarly, the Contractor will compare results of water quality monitoring with the 95%ile High Status Environmental Quality Standards arising from the European Union Environmental Objectives (Surface Waters) Regulations 2009 as amended. Any deviation beyond these standards will be investigated and the findings will be report to the Community Water Officer.

During the construction and commissioning phase, daily inspection of environmental protection measures e.g. silt traps, check dams, ponds and outfalls and drainage channels will be carried out and any improvement works carried out within a timely manner.

6.5 Proposed Mitigation Measures for the Construction Phase

Proposed drainage measures to reduce and protect the receiving waters from the potential impacts during the construction of the Proposed Development are as outlined above in Section 10.6. These include measures to prevent runoff erosion from vulnerable areas and consequent sediment release into the nearby watercourses to which the Proposed Development site discharges. The mitigation measures proposed to reduce potential direct, indirect and turbine delivery route and cable route impacts are outlined below.

- A suitably qualified person will be appointed by the developer to ensure the effective operation and maintenance of drainage and other mitigation measures during the construction process. The operations management of the Proposed Development will include regular monitoring of the drainage system and maintenance as required. The increase in the rate of run-off along the route of the site access roads and hard-standing areas will be mitigated by the proposed drainage system which includes the provision of stilling ponds to reduce the concentration of suspended solids in the run-off from these areas, and the addition of silt fencing where deemed necessary.
- Stilling ponds will be put in place in advance as construction progresses across the site. The stilling ponds with a diffuse outflow detail will mitigate any increase in run-off. Erosion control and retention facilities, including stilling ponds will be regularly maintained during the construction phase. The three-stage treatment train (swale - stilling pond - diffuse outflow) proposed to retain and treat the discharges from hard surface areas as a result of the development will reduce any risk of flooding downstream.
- Standing water, which could arise in excavations, has the potential to contain an increased concentration of suspended solids as a result of the disturbance to soils. The excavations for turbines will be pumped into the site drainage system (including stilling ponds), which will be constructed at site clearance stage, in advance of excavations for the turbine bases. As the majority of turbine excavations will be within low permeability peat or glacial till, groundwater inflow is expected to be small. In areas of higher permeability soils, flows may be higher and exclusion techniques such as sheet piles may be required to control groundwater flow and stabilize excavations, particularly close to the river where a higher water table is expected.
- The excavated subsoil material will be removed, either to the designated material storage areas or stockpiled close to the excavation and used as backfill material if suitable.
- Temporary material storage areas will be covered with impermeable sheeting and surrounded with silt fencing, which will be monitored to manage any potential loss of suspended solids to surface waters. Temporary material storage areas will be a minimum of 50 m from the true bank edge of any watercourse.
- Drains around hard-standing areas will be shallow to minimise the disturbance to sub-soils.
- Cross-drains of a suitable diameter (as sized within the Preliminary Technical Report for Proposed Bridges and Culverts – Appendix 10.1) will be provided to prevent a risk of clogging for crossings conveying flows from bog drains, agricultural drains and forestry drains across the access roads.

- All tracks will be surfaced with clean well graded stone with the minimum of fines which will be imported, to mitigate the conveyance of silt-laden run-off in the track drainage.
- Silt fencing will be used as an additional protection to watercourses where deemed necessary, where floating roads are to be constructed.
- Interceptor cut-off drains will be provided on the upslope side of the site access roads to prevent the mixing of overland flows with the drainage for the proposed development. These interceptor drains will discharge diffusely over land.
- Cables will be installed in trenches adjacent to the site access roads, or laid within the access road line, where required. Trenches will be excavated during dry periods where possible in short sections and left open for minimal periods, to avoid acting as a conduit for surface water flows. Clay bunds will be constructed within the cable trench at regular intervals.
- The routes for the proposed access tracks are laid out to follow the existing tracks where practicable. Site access roads have been laid out to reduce the longitudinal slope of roadside drains and to follow natural flow paths where possible. Where roadside drains are laid at slopes greater than 2%, check dams will be provided. This is unlikely to occur as the slopes on the site are flat, however the check dams, if required, will reduce the effective slope and run-off velocities and any consequent potential for erosion.
- Where agricultural tracks, and forestry tracks will be used to access the development, the roadside drains alongside these roads will be cleared of obstructions, should it be found that debris and vegetation are impeding flows. Silt traps will be provided at regular intervals to reduce the concentration of suspended solids in the surface water run-off being conveyed in the existing drains, which may result from vehicles trafficking these roads from the construction areas.
- All open water bodies adjacent to proposed construction areas will be protected by fencing, including the proposed stilling ponds.
- The site drainage has been designed to complement existing overland flow and existing bog, agricultural and forestry drainage. The drainage design will be developed in full at the detailed design stage.
- Additional protection will be provided in the form of silt fencing downslope where required and at existing stream crossings during construction, to further ensure that there is no impact from the development to streams and rivers crossing the site.
- All personnel working on site will be trained in pollution incident control response. Emergency Silt Control and Spillage Response Procedures contained within the Site Drainage Management Plan of the Construction Environmental Management Plan (CEMP) will ensure that appropriate information will be available on site outlining the spillage response procedure and a contingency plan to contain silt. A regular review of weather forecasts of heavy rainfall is required, and a contingency plan will be prepared for before and after such events. A record will be kept of daily visual examinations of watercourses which receive flows from the proposed development, during and for an agreed period after the construction phase. Water samples will be taken, and water quality will be monitored in accordance with a water monitoring programme, which will be agreed with Kildare County Council.
- The developer will ensure that erosion control, namely silt-traps, silt fencing and swales are regularly maintained during the construction phase.
- Existing overland flow channels will be maintained, and cross-drains provided in the access roads to allow continuity of flow. Interceptor drains will be constructed upslope where there are no existing channels, with cross-drains provided at regular intervals. The roadside drains will therefore only carry the site access road run-off and so avoid carrying large volumes of water and concentrating flows.

- During the construction period, an emergency facility will be provided to control the discharge from the stilling ponds. This will mitigate the risk of any accidental spillage on site affecting watercourses.
- Roads will be capped as soon as practicably possible to cover exposed subsoils and as such reduce the concentration of suspended solids being conveyed in the run-off into the drainage system.
- Where access tracks pass close to watercourses, silt fencing will be used to protect the streams by reducing the concentration of suspended solids being conveyed in the surface water run-off into watercourses. Silt traps will also be provided at outfalls from roadside swales to existing drains. Silt traps will be kept upstream of outfalls to allow a buffer zone to the outfall.
- Wheel wash facilities will be located at the main site entrance to reduce construction traffic fouling public roads. The wheel wash will come with an additional water tank which will be filled regularly. These units will be self-contained and will filter the waste for ease of disposal. Waste will be removed from each unit and from site by a permitted contractor. Additional silt fencing will be kept on site in case of an emergency break out of silt laden run-off.
- Silt traps and silt fencing for the proposed wind farm development are proposed as described above in Section 10.6 and will be put in place in advance as construction progresses across the site.
- Tree felling will be undertaken in accordance with the specifications set out in the Forest Service Forestry and Water Quality Guidelines (2000) (2) and Forest Harvesting and Environmental Guidelines (2000) (3), to ensure a tree clearance method that reduces the potential for sediment and nutrient runoff.
- Trees will be felled away from aquatic zones where possible. Branches, logs or debris will not be allowed to accumulate in aquatic zones and will be removed as soon as possible. Additional silt fencing will be erected along the banks of any streams at the location of the proposed tree felling to provide additional protection to the watercourses.
- Where new cross-drains are proposed on this site to convey surface water from roadside swales to outfalls, these will be sized in accordance with the calculations contained in Appendix 10.1.
- Roadside swales will serve to attenuate any increase in surface water run-off due to new hardcore tracks or existing track widening.
- Refuelling of plant during construction will only be carried out at dedicated refuelling station locations on site, typically at each compound or at least 100m from a watercourse using mobile bowsers. This will reduce any risk of pollutants being conveyed in the surface water run-off, into the drainage system and subsequently into watercourses. Each station will be fully equipped for a spill response and a specially trained and dedicated environmental and emergency spill response team will be appointed before commencement on site. Only emergency breakdown maintenance will be carried out on site. Drip trays and spill kits will be kept available on site, to ensure that any spills from the vehicle are contained and removed off site.
- To avoid any risk of groundwater contamination resulting from the foul drainage for the site, portaloos and/ or containerised toilets and welfare units will be used to provide toilet facilities for site personnel. Sanitary waste will be removed from site via a licenced waste disposal contractor.
- Where existing drains will be covered with hardcore as part of modifications for road widening to facilitate the turbine delivery route, the surface water will be diverted into new drains which will connect to the existing drainage system.
- The Proposed Substation is located in an Inner Source Protection Zone. There is the potential risk of pollution of the aquifer that feeds this SPZ through the infiltration of potentially contaminated surface water during the construction of the substation. Any impact on the SPZ will be avoided by design. Specialized construction techniques will be used for development in the SPZ. These include limiting the time any excavation is open, keeping foundations for the substation shallow and above the groundwater table if possible.

- Turbine T11 is in the outer zone of this SPZ. T11 is c. 60m from the Inner Source Protection Zone. There is the potential risk of pollution of the aquifer that feeds this SPZ through the infiltration of potentially contaminated surface water during works for the excavation and construction of turbine T11. Specialized construction techniques will be used for development in the SPZ, limiting the time that the excavation for the foundation is open. Silt management techniques should be applied to ensure that silt is not generated and kept in excavations, water from excavations to be pumped out of the area and put through silt management before being discharged outside the zone.

6.5.1 Proposed Mitigation Measures for the Operation and Maintenance Stage of the Proposed Development

The Surface Water Management Plan, included in Appendix 2.1 – CEMP (Appendix D thereof – SWMP), in Volume III, will ensure that there is no effect on water quality as a result of the Proposed Development. The proposed drainage system will provide several stages of treatment to surface water runoff from constructed areas, which follows the concept of a multi-stage SuDS 'treatment train'.

Interceptor drains installed upslope of access tracks and areas of hardstanding will divert surface water runoff from undeveloped land around the constructed areas to disperse naturally within open ground without mixing with the construction drainage.

The proposed swales will intercept surface water runoff from access tracks and areas of hardstanding. The grass within the swales will provide some filtration to remove a portion of silt and suspended solids. Silt traps will be provided upstream of outfalls from roadside swales.

The settlement ponds will be designed to provide sufficient retention time and a low velocity environment to allow suspended solids of a very small particle size to fall out of suspension prior to discharge. Additional treatment will be provided upstream of the settlement pond with the use of drainage stone at the inlet to provide filtration. In an emergency, the outfall from a settlement pond will be blocked to provide a temporary holding area for accidental spillages on site.

As stated in the SWMP, to adhere to CIRIA C753, part of the maintenance routine that will mitigate issues relating to surface water will be the inspection of the following: drains, check-dams, cross-drains and culverts for blockages; outfalls to existing field drains and watercourses, existing roadside swales for obstructions; progress of re-vegetation.

6.5.2 Proposed Mitigation Measures for Decommissioning of the Wind Farm

As in the construction phase silt protection controls would again be put in place. The drainage system will remain operational during the decommissioning phase and will serve to treat any sediment laden surface water run-off due to a renewed disturbance of soils. Re-vegetation will be monitored. If it is deemed necessary, erosion control matting will be used to assist in the re-establishment of vegetation.

The mitigation measures set out in EIAR Chapter 11- Population, Human Health & Material Assets are presented below.

7.1 Population and Human Health - Mitigation Measures

Where potential significant effects have been identified, mitigation measures have been proposed. Residual impact is then considered which details potential impacts following implementation of mitigation measures, as described within EIAR Chapter 11- Population, Human Health & Material Assets.

7.2 Population

7.2.1 Mitigation Measures - Population

As there are no significant impacts predicted on population trends and population density, no mitigation measures are required.

7.3 Socio-Economics, Employment and Economic Activity

7.3.1 Mitigation Measures Socio-Economics, Employment and Economic Activity

Given that potential effects of the Proposed Development at construction, operation and decommissioning phases are predominantly positive in respect of socio-economics, employment and economic activity, no mitigation measures are considered necessary.

7.4 Land Use

7.4.1 Mitigation Measures Land Use

Mitigation measures for land use are primarily related to preliminary design stage, which has allowed for the prevention of unnecessary or inappropriate ground works or land use alterations to occur. The construction and operational footprint of the proposed development has been kept to the minimum necessary to avoid impact on existing land uses as far as possible.

Existing tracks have been incorporated into the design to minimise the construction of new tracks and roads. Where new access tracks are required, these have been sensitively designed in order to minimise impact. Electricity cables will be installed underground in or alongside access tracks to avoid impact on forestry practices.

Furthermore, it should be noted that the clear felling of trees in the State requires a felling license. The associated afforestation of alternative lands equivalent in area to those lands being permanently clear felled is also subject to licensing (afforestation licensing'). The Forest Service of the Department of Agriculture, Food & the Marine is Ireland's national forest authority and is responsible for all forest licensing. In light of the foregoing and for the purposes of this project, the developer commits that the location of any replanting (alternative afforestation) associated with the project will be outside any potential hydrological pathways of connectivity i.e., outside the catchment within which the proposed project is located.

On this basis, it is reasonable to conclude that there will be no more than imperceptible indirect, or in-combination effects associated with this replanting. In addition, the developer commits to not commencing the project until both felling and afforestation licenses are in place, and this ensures the afforested lands are identified, assessed and licensed appropriately by the relevant consenting authority. Forestry activity at the site will cease during the construction phase resulting in a short-term slight, negative impact to existing land use at the wind farm site, however, activity in adjacent areas of forestry can continue during the construction phase.

The construction and decommissioning works of both the Wind farms will be planned and controlled by a Construction and Environmental Management Plan (CEMP). The CEMP for the construction phase is included in Appendix 3.2 of Volume 3 of this EIAR. This provides details on day-to-day works and methodologies. As part of these works, the public and other stakeholders will be provided with updates on construction activities which will affect access to lands. This will be communicated to members of the public through a community liaison officer employed for the duration of the construction period.

All proposed works and deliveries along the TDR route will also be controlled by a Construction and Environmental Management Plan to avoid undue impact to adjacent land uses.

7.5 Recreation, Amenity and Tourism

7.5.1 Mitigation Measures - Recreation, Amenity and Tourism

Mitigation measures for recreation, amenity and tourism are primarily related to the preliminary design stage of the Drehid Wind Farm, which has allowed for the prevention of unnecessary or inappropriate development to occur that would significantly affect any recreational or tourist amenity. In designing the Drehid Wind Farm, careful consideration was given to the potential impact on landscape amenity.

7.6 Human Health & Safety

7.6.1 Mitigation Measures Human Health & Safety

7.6.1.1 Construction Health and Safety Mitigation Measures

A site-specific Safety and Health Management Plan has been prepared on a preliminary basis for the project in accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013 and is included in the CEMP contained in Appendix 3.2 of Volume 3 EIAR Appendices.

The Safety and Health Management Plan shall be finalised in accordance with this outline plan following the appointment of the contractor for the main construction works.

All hazards will be identified, and risks assessed. Where elimination of the risk is not feasible, appropriate mitigation and/or control measures will be established. The contractor will be obliged under the construction contract and current health and safety legislation to adequately provide for all hazards and risks associated with the construction phase of the project.

Solas (formerly FÁS) Safe Pass registration cards are required for all construction, delivery and security staff. Construction operatives will hold a valid Construction Skills Certificate Scheme card where required.

The developer is required to ensure a competent contractor is appointed to carry out the construction works. The contractor will be responsible for the implementation of procedures outlined in the Safety & Health Plan.

Public safety will be addressed by restricting site access during construction. Appropriate warning signs will be posted, directing all visitors to the site manager.

7.6.2 Operational Health and Safety - Mitigation Measures

No mitigation measures are required in relation to people and animals during operational stages of the development.

For security purposes, access to the towers and the substation compound will not be obtained without the corresponding keys. The substation will be enclosed by palisade fencing and equipped with intruder and fire alarms in line with ESB and EirGrid standards.

A harness will be provided to allow access to the nacelle and will be connected to a central line running behind the ladder. This will prevent personnel from freefalling more than a few centimetres, hence reducing the potential for injury.

Adequate clearance of structures from overhead lines will be provided. In this case, all on-site electrical connections are carried by underground cable.

There will be lightning conductors on each turbine as all structures standing tall in the sky require protection and turbines in particular to allow surge protection to electrical components.

As no impacts from ELF-EMF have been identified, mitigation measures are not included.

7.6.3 Operational Health and Safety Mitigation Measures for the Proposed Recreation Amenity Trail

Signage will be located along the trail at regular locations to clearly define the route of the trail. Safety signage will also be located at regular locations regarding fire prevention and public health & safety awareness.

Regular maintenance and upkeep of the trail will be provided with litter bins located along the trail.

7.6.4 Human Health for Operational Stage - Mitigation Measures

No mitigation measures are required in relation to human health during the operational stage of the proposed development.

7.7 Material Assets

7.7.1 Mitigation Measures

Non-renewable resources of general construction fill will be sourced locally and will be excavated from on-site borrow pits insofar as possible to minimise transportation distances, reducing CO2 emissions.

Where services and street furniture are required to be removed temporarily to accommodate turbine delivery, residents and business in proximity to the works will be informed in advance.

The comprehensive turbine delivery procedure which will be implemented between Dublin Port and the wind farm site will include safety procedures and Garda escort in accordance with the Traffic Management Plan contained within the CEMP in Appendix 3.2.

The Waste Management Plan will be finalised in accordance with the CEMP following the appointment of the contractor for the main construction works and will take cognisance of any newly published waste management policy.

8. CHAPTER 12 - SHADOW FLICKER

The mitigation measures set out in Chapter 12 are presented below.

8.1 Mitigation Measures for Shadow Flicker

Shadow flicker control modules, consisting of light sensors and specialised software, will be installed on the turbines to ensure that mitigation is implemented. The calculated shadow flicker periods can be input into the turbine control software and when the correct conditions are met (i.e. the light intensity is sufficient) during a potential period of shadow flicker, individual turbines will cease operation as required until the conditions for shadow flicker are no longer present.

North Kildare Wind Farm Ltd. are willing to provide protection from shadow flicker by committing to shutting down turbines for all instances where shadow flicker effects may occur in practice at residential dwellings within 10 rotor diameters of the turbines. This procedure is defined as "zero shadow flicker" mitigation.

The "*zero shadow flicker*" mitigation strategy will minimise any shadow flicker that could potentially occur at the residential dwellings. However, when the conditions for shut down due to shadow flicker are met, there will be a short period of time before complete shutdown occurs as the turbines gradually come to a stop. This will depend on the reaction time of the shadow flicker control modules and the particular turbine type, as well as a gradual reduction in rpm, i.e. the blades will not come to a sudden stop.

Appendix 12-2 contains a list of times when each turbine could theoretically cause shadow flicker, which may be used to programme a "*zero shadow flicker*" mitigation system.

9. CHAPTER 13 - TRAFFIC AND TRANSPORTATION

The mitigation measures set out in Chapter 13 - Traffic and Transportation are presented below.

9.1 Mitigation Measures for Traffic and Transportation

This section outlines the various mitigation measures that will minimise or eliminate the potential impacts of the scheme in terms of traffic and transportation. Certain aspects of the development of the scheme to date have already included mitigation in terms of scheme design and route selection, for example. It is considered that no further mitigation measures are required for the operational stage of this development.

9.1.1 Turbine Delivery Route

As outlined above, the Turbine Delivery Route has been evaluated and identified following a detailed appraisal of potential route options and the identification of the most appropriate route and the necessary accommodation works along the route to mitigate the impact of turbine delivery. These works are summarised in Section 13.4.3 above, and the report is presented in Appendix 13.1.

9.1.2 Haul Routes

The proposed haul routes have been selected in order to maximise use of regional and national roads, and to minimise HGV traffic on narrow local roads. All HGV traffic will approach the site entrance from the west, with HGV traffic travelling to and from sites routed along the R403 and R402 via Carbury roundabout in order to avoid the local road network to the east and the junction at Timahoe in particular.

9.1.3 Cable Routes

The need for lengthy cable routes has been minimised due to the location of the site and layout of the proposed development. There is a section of cable installation which will be routed through circa 1.38km of the L50242, for the purposes of connecting the southern and northern sections of the Proposed Development site.

9.1.4 Site Entrance

The site will be accessed by the main site entrance on the L5025 Derrymahon Road and secondary access on central public road L50242 for T4-11. There will also be a temporary use site entrance constructed off the L5012, immediately west of the existing Coillte entrance, for the purposes of turbine delivery for northern section of the site T4-T11. As this entrance will only be used temporarily, it is considered inappropriate to carry out significant accommodation works to achieve sight lines. Rather, use of this entrance will be controlled by banksmen, and only right-in, left-out turns will be permitted.

Local accommodation works are proposed at the Main site entrance and the secondary site entrance to provide sufficient exit visibility, as shown in the site entrance drawings and reproduced in Appendix 13.3.

The Kildare County Development Plan states that sightline and visibility requirements are determined on a case by case basis (Section 17.7.1) but that guidance for stopping distances and visibility splays at junctions and accesses are set out in the TII c (DMRB). DN-GEO-03031 (NRA TD9) sets out a desirable minimum stopping sight distance of 160 m for roads of design speed of 85km/h, which is generally the design speed of roads posted at 80km/h. One step below the desirable minimum is 120m, and two steps below is 90m.

As the speed limit in the vicinity of the main site entrance is 80km/h, the recommended visibility would be 160 m to either side of the site entrance/exit. Sightlines of 160m are achievable to the north of the proposed entrance. However, the presence of a mature tree approximately 155m from the proposed entrance prevents the full sightline from being achieved to the south. The sightline available to the south far exceeds the one step below desirable minimum visibility of 120m required by TII. It is considered that the sightline of 155m to the south will provide adequate visibility to oncoming traffic for traffic exiting the site, and vice versa. Advance signage will be provided on the L5025 in both directions to alert road users to the presence of HGVs and the proximity of the construction site.

In the vicinity of the secondary access on the central road L50242, while there are no posted speed limits, the narrow carriageway width and low traffic volumes lead to low speeds on the road. Visibility splays of 90m are achievable to both the east and the west of the proposed junction, which are considered to provide adequate visibility to oncoming traffic for traffic exiting the site, and vice versa.

As mentioned previously, an additional access point is currently present on the northern boundary of the site via Coillte lands, to the L1004. This entrance will only be used for pedestrians and cyclists to access the proposed amenity trail and it is not proposed to use this access point for construction or operational traffic.

9.1.5 Construction Mitigation Measures

The following mitigation measures are proposed for the construction phase of the scheme:

9.1.5.1 Construction Environmental Management Plan and Construction Traffic Management Plan

A Construction Environmental Management Plan (CEMP), including a Construction Traffic Management Plan, has been prepared and is presented in Appendix 3.2 of this EIAR. This will be updated by the appointed contractor in advance of the works. This will be agreed with Kildare County Council and An Garda Síochána.

The TMP will clearly identify the routes to be used to access the site for different types of traffic as appropriate, i.e. haul routes and construction staff access routes, as well as those sections of road which are not to be used. This will be planned and executed in accordance with best practice, including Chapter 8 of the Traffic Signs Manual.

9.1.5.2 Traffic Management Co-ordinator

The appointed contractor will provide a competent person with responsibility for traffic management coordination for the duration of the project. This person will be the main point of contact for all matters relating to traffic management on the project.

9.1.5.3 Road Pre-Condition Surveys

A pre-condition survey will be carried out in advance of any construction works on the public roads that will be agreed to be used as haul routes in connection with the works to record the condition of the road. The specification and timing of the pre-construction survey will be agreed with Kildare County Council and TII as appropriate. A joint survey shall be undertaken if required by the relevant roads authority.

9.1.5.4 Site Induction

All workers will receive a comprehensive site induction which shall include, as appropriate, a section on traffic management and clear guidance on the routes which should and should not be used.

9.1.5.5 Emergency Procedures

A 24-hour emergency phone number will be maintained for the duration of the construction works. This number will be noted on temporary signage at each works area for cable works, and at the site entrance, at a minimum.

9.1.5.6 Public Consultation

Subject to agreement with the planning authority, a letter drop will be carried out to notify members of the public living near the proposed site/route/roadworks, to advise them of any particularly significant upcoming traffic related matters e.g. temporary lane/road closures, delivery of turbine components at night.

9.1.5.7 Signage

A system of clear signage relating to the project, both temporary and permanent, will be agreed with the planning authority. These signs will also identify those roads to be used (and not to be used) for accessing the site in line with the objectives of the Construction TMP.

9.1.5.8 On-Site Vehicle Cleaning

Temporary wheel washing facilities will be located at the main site entrance, subject to agreement with the planning authority, to prevent soil/dirt from being transported onto the public road network.

9.1.5.9 Road Cleaning and Maintenance

Road sweepers will be utilised to maintain the public roads in a clear condition. This will apply especially during the earthworks stages of the project.

9.1.5.10 Road Opening Licensing

Road works associated with the cabling on the public road will be undertaken in line with the requirements of the road opening licence, the terms of which will be set out by Kildare County Council.

9.1.5.11 Adjacent Dwellings

A number of mitigation measure shall be put in place so as to reduce the impact on the residential dwelling adjacent to the site entrance during construction. These include the following:

- All construction traffic shall follow the identified haul route, as such, any temporary noise from construction will be moving away from the dwelling on entering the site.
- A noise attenuation barrier will also be put in place along the boundary of the site to reduce any further temporary noise impacts on the dwelling. This can be done in consultation/agreement with the neighbouring residents if permitted.
- A commitment is given that no construction traffic vehicles will loiter outside the dwelling.
- The residents will be kept informed of the traffic movements during construction by way of leaflet drops so they are aware of different stages of development/construction.
- Dust monitoring will take place at the site entrance and there will be done daily visual checks for dust deposition. Dust screens or other suitable measures will be put in place , as required.

9.1.5.12 Local Access

Reasonable access to local dwellings, farms, and businesses is to be maintained at all times during any road closure associated with the cable works. The details of this will be agreed with the roads authority in advance of the works, in consultation with the local residents in so far as is practicable. The section of local road impacted during cable works is a cul de sac and therefore diversions are not suitable. Reasonable access will be retained and the works will be short term in duration for the impact owing to the cabling works.

9.1.5.13 Road Safety Assessment Stage 1/2

A Road Safety Assessment has been carried out by an independent consultancy JB Barry & Partners Ltd. in March 2019 for the proposed development, specifically, to consider the suitability of the haul routes indicated in the previous 2018 EIAR for use. The findings of this RSA resulted in a number of local roads in the site vicinity being removed as potential haul routes (the L5024, L5017, L5011). The RSA also advised that, where possible, bypass routes of urban centres should also be used (for example, the urban centres of Prosperous, Clane, Enfield, Naas, etc. should be avoided by haul traffic where possible).

The Road Safety Assessment has been carried out to confirm the suitability of the existing road network, from a safety point of view, to accommodate the proposed construction traffic. The following paragraphs identify the links on the road network surrounding the proposed development. The findings and recommendations of the RSA have been incorporated into current the approach.

9.1.5.14 M4

The M4 is a dual carriageway motorway, designed and constructed in compliance with NRA/TII guidelines. Road Safety Audits are carried out on all motorways as part of the various stages of the design and construction process. The M4 will be used for transporting materials as well as turbine components to the site. This road carries large volumes of traffic and functions as a strategic national route. It is therefore suitable for use by HGV traffic for material deliveries to the site. The Turbine Delivery Report (TDR), which is included in Appendix 13.1, assesses the suitability of a route for abnormal load delivery, such as turbine blades or tower sections for the turbines. This TDR report also outlines accommodation works required to facilitate these deliveries on the preferred route. The M4 was selected as the preferred route as alternatives would require vehicles to pass through areas of soft ground or towns such as Edenderry. Accommodation works are not required on the M4 itself. The Enfield Interchange (Junction 9 on the M4) requires minor accommodation works but these do not raise any safety concerns. Any signs to be removed to facilitate deliveries will be reinstalled immediately following the delivery, and deliveries will be coordinated in conjunction with An Garda Síochána.

9.1.5.15 R402

The R402 is a regional road which will be used for HGVs and general traffic to and from the proposed development, as well as forming part of the turbine delivery route. It forms the main road between Edenderry and the M4. This is generally a wide and flat road with one lane in each direction, approx. 7m wide, with good visibility. There are a number of bends on the road, but it is reasonably heavily trafficked, and no safety concerns are anticipated for use by general traffic, including HGVs. This section of the R402 was upgraded in recent years and the junction of the R402/L5025 was widened and upgraded to include left-turn and right-turn pockets. This junction is considered to provide sufficient visibility and geometry to allow HGV movements in all directions. Minor accommodation works are required to facilitate turbine delivery; however, these are generally limited to temporary removal of signage and a street light, which will be reinstated immediately following the deliveries. As with the M4, turbine deliveries will be coordinated in conjunction with An Garda Síochána.

9.1.5.16 R403

The R403 is a regional road connecting Carbury and Allenwood. It is proposed to use this for HGV traffic approaching the site from the south. Similar to the R402, it is a single carriageway road with generally good visibility. It is not proposed to route turbine deliveries via the R403.

9.1.5.17 L5025

The L5025 is a local road which provides the access route to the site itself from the R402. It will therefore be used by all traffic entering and exiting the site.

Turbine deliveries via this route will require accommodation works including paving an area of verge on the southern side of the road, and potential trimming of hedgerows. Turbine deliveries will be coordinated in conjunction with An Garda Síochána to ensure safe navigation of this stretch of road.

The L5025 is narrower than the regional roads and carries lower volumes of traffic. Visibility is good and there are locally widened areas. It should be noted that this road passes through a rural area and therefore is regularly used by agricultural vehicles, with approx. 60 HGVs currently passing along it in both directions each day. HGVs and site traffic will therefore use this road in both directions and it is not anticipated that there will be any particular safety concerns on this section of road for delivery vehicles. Prior to construction, the appointed contractor will liaise with Kildare County Council with regard to the Construction-stage Traffic Management Plan, including any construction stage speed limits that may be required on the L5025.

9.1.5.18 L50242

The L50242 local road is a cul de sac located in a central location of the proposed development site. The L50242 will be utilised for cable installation so as to connect the northern and southern section of the site. The road will also be utilised as a connection between the southern and northern sections of the site throughout construction with a secondary construction entrance on the L50242.

9.1.5.19 L5012

Prior to construction, the appointed contractor will liaise with Kildare County Council with regard to the Construction-stage Traffic Management Plan, including any construction stage speed limits that may be required on the L50242 and the L5012.

10. CHAPTER 14 - CULTURAL HERITAGE

The mitigation measures set out in Chapter 14 - Cultural Heritage are presented below.

10.1 Mitigation Measures - Wind Farm Site

10.1.1 Construction Activities

The following mitigation measures will be carried out at the earliest stages of construction/ during the site preparation phase. All archaeological works will take place under licence to the National Monuments Service of the Department of Housing, Local Government and Heritage (DHLGH).

Archaeological monitoring of all earth-moving works will be undertaken at all earthmoving/excavation works associated with the development of:

- Turbine foundations
- Access tracks
- Hardstands
- Internal cables
- Temporary construction compounds
- Earthen berms and landscaping along the access tracks and around the turbines

The purpose of monitoring is to determine if any archaeological material or features are uncovered during ground disturbance works. In the event of the discovery of archaeological finds or remains, the DHLGH and the NMI will be notified immediately. Provision will be made to allow for, and fund any, archaeological work that may be needed if any remains are noted. If features are revealed, the immediate area will be investigated, allowing no further development to take place until the site is fully identified, recorded and excavated or alternatively avoided to the satisfaction of the statutory authorities. In accordance with best practice and legislative requirements this provision would include the production of written reports on the findings, with post-excavation analyses and publications of the results of the works, where appropriate.

10.1.1.1 Turbine Delivery Routes

As a best practice measure a baseline condition survey will be carried out at Johnstown Bridge (RPS B04-25). This will be undertaken to record baseline data which will be monitored during construction phase.

10.1.1.2 Indirect effects on setting mitigation

There is no mitigation possible for this potential impact; instead, mitigation by design was actively carried out during the EIAR process. Using a GIS spatial data, the archaeological, architectural and cultural heritage features identified during the baseline study and field survey work were used as a tool by all consultants. Arriving at the final proposed layout was through a series of iterative phases and interaction with all of the technical consultants.

10.1.1.3 General

Attention is drawn to National Monuments Acts (as amended) which still active, and the Historic and Archaeological Heritage and Miscellaneous Provisions Act (2023) (Appendix 14, Section 14.1), which states that in the event of the discovery of archaeological finds or remains, the Department of Housing, Local Government and Heritage and the National Museum of Ireland should be notified immediately. In such a scenario, the archaeological finds or remains will need to be investigated, and no further development will take place in that area until the finds or remains are resolved in agreement with the relevant authorities.

During the construction phase all mitigation measures will be undertaken in compliance with national policy guidelines and statutory provisions for the protection of the archaeological, architectural and cultural heritage.

10.1.1.4 Operational Effects

All physical archaeological, architectural and cultural heritage impact issues will be resolved at the pre-construction stage of the development and therefore there will be no potential impacts at the operation stage of the development. There are no appropriate mitigation measures to remedy the indirect impacts on the setting of features within the wider landscape.

10.1.1.5 Decommissioning

No mitigation measures will be required during the decommissioning phase. The same level of baseline recording and monitoring of the bridge structures along the access routes will be required.

10.2 Mitigation Measures - Substation Site

10.2.1 Construction Activities

Archaeological monitoring will be conducted during all earthmoving and excavation works associated with the development of the substation and its connection. The monitoring aims to identify any archaeological material uncovered during ground disturbance. In the event of discoveries, the DHLGH and NMI will be notified immediately.

10.2.2 Operational Effects

All physical archaeological, architectural and cultural heritage impact issues will be resolved at the pre-construction stage of the substation site therefore there will be no potential impacts at the operation stage.

11. CHAPTER 16 - TELECOMMUNICATIONS AND AVIATION

The mitigation measures set out in Chapter 16 - Telecommunications and Aviation are presented below.

11.1 Mitigation Measures for Telecommunication

Sections 5.10 of the Department of Environment Heritage and Local Government (DoEHLG) Planning Guidelines on Wind Energy Developments (2006) acknowledge that "electromagnetic interference can be overcome". The preliminary telecommunication impact assessment identified during the consultation the operators with the highest likelihood for impact. It was agreed with these operators that there are a number of mitigation options that can be explored to overcome any residual impacts. The following link mitigation measures will be implemented as necessary to overcome electromagnetic interference:

- Technology Upgrade: Replacement of the existing telecommunications service equipment with another less affected type;
- Diverting telecommunications links - The possibility of diverting telecommunication links to another telecommunications tower in the vicinity can be investigated;
- Special Purpose Mitigation Tower - the possibility of diverting the existing links and consolidating the existing towers to one tower can be explored;
- Relocation of telecommunications equipment - The possibility of moving telecommunication equipment to another telecommunications tower in the vicinity can be investigated;
- Fiber-optic communication systems – The possibility of installing fibre cables underground in conjunction with Wind Farm electricity transmission cables could be explored. The use of underground fibre optic cable in lieu of telecommunication links would avoid the wind farm interference effects;
- Wind Turbine Tower – To mitigate interference the turbine tower could be utilised as a transmitter/receiver (hop point);
- Combination - The possibility of providing a mix of the above could be explored.

Mitigation options may be different for each service affected, depending on the type of service and the level of any interference expected.

Based on the consultation carried out with 'Netshare' and in order to mitigate any impact to Vodafone Transmission Network, the following assurances should be complied with:

1. All listed co-ordinates are accurate.
2. Construction and erection of these turbines using cranes, etc, is done in a manner that does not interfere with the Line of site of this microwave during the construction phase.

In order to mitigate potential impacts to 'Eir' infrastructure, prior to commencement of construction, 'Eir' will carry out a detailed review of their infrastructure and the applicant will consult with 'Eir' to agree measures that ensure no impact to T9 (T10 when this was discussed with Eir previously). ESB Telecom have agreed to carry out a detailed analysis using the JRC method for diffraction to determine a more precise clearance zone that will confirm if the current clearance is sufficient to ensure no impact to T11 (T12 when this was discussed with Eir previously).

If the detailed analysis which will be carried out prior to construction based on best available updated information on the link concludes that the current distance does not meet the required exclusion zone, the applicant will agree one of the 7 no. mitigation measures outlined above. The mitigation measures will be imposed at the developer's expense.

The Developer has given an undertaking to cover the cost of implementing the necessary mitigation measures to prevent any degradation of service that is currently provided. This approach is consistent with the guidelines and satisfactory to the relevant operators that may be affected.

11.2 Mitigation Measures for Aviation

Following consultation with the IAA in 2018 and further consultation with the DoD in 2024 lighting requirements for turbines should be conditioned as follows:

1. Single turbines or turbines delineating corners of a wind farm should be illuminated by high intensity obstacle strobe lights.
2. Obstruction lighting elsewhere in a wind farm will be of a pattern that will allow the hazard to be identified and avoided by aircraft in flight.
3. Obstruction lights used should be incandescent or of a type visible to Night Vision Equipment. Obstruction lighting fitted to obstacles must emit light at the near Infra-Red (IR) range of the electromagnetic spectrum specifically at or near 850 nanometres (NM) of wavelength. Light intensity to be of similar value to that emitted in the visible spectrum of light. Obstruction lights used should be incandescent or of a type visible to Night Vision Equipment.
4. Provide as-constructed co-ordinates in WGS84 format together with ground and tip height elevations at each wind turbine location.
5. Notify the Authority of intention to commence crane operations with a minimum of 30 days prior notification of their erection.

As with any tall structure development, the potential impact to aviation is that of an obstacle. Aviation 'Rules of the Air' provide guidance to pilots on how to remain clear of obstacles and the distances required to remain clear.

The Proposed Development, whilst present within MOA4, does not present as an impact to Air Corps operations given the freedom of aircraft to access the airspace below 4500ft without permission. Access without notification presents a higher degree of risk to Air Corps operations than that of the proposed development, which is a fixed location which is notified (formally published) and lit.

The mitigation is addressed through promulgation of the obstacle environment through the Irish Integrated Aeronautical Information Publication. In addition, the obstacles will be lit to conform to aviation standards and the additional night vision requirement from the DOD. It must be noted that night vision requirements are a common requirement and therefore the solution is readily available.

12. CONCLUSION

This Compendium of Mitigation Measures report has brought together all proposed mitigation measures for the proposed Drehid Wind Farm and Substation, in response to the RFI letter from An Coimisiún Pleanála, dated 2nd April 2026.

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