

6.6.1.2 Habitats Along the Haul Route

The proposed haul road is shown in Figure 4-1, Chapter 4 of the EIAR. Starting in Drumkeeran, the route passes through a farm yard, mapped as Buildings and artificial surfaces (BL3). It then crosses wet grassland dominated by soft rush before joining the local road network (L4282). The proposed route then utilises a large section of existing forestry (WD4) and associated access tracks (Plate 6-12), categorised as Buildings and artificial surfaces (BL3), before moving west through Conifer plantation (WD4) forestry of varying ages (Plate 6-13). Where forestry rides occur within the development footprint, these are dominated by species-poor Wet grassland (GS4) see Plate 6-14, dominated by soft rush and Yorkshire fog and areas Scrub (WS1) (Plate 6-15). Scrub (WS1) consisted of willow (*Salix* sp.), gorse (*Ulex europaeus*) and bramble (*Rubus fruticosus* agg.).

The river channels occurring along the proposed haul road were categorised as Eroding/upland rivers (FW1) (Plate 6-11). Wet willow-alder-ash woodland (WN6) was recorded both upstream and downstream of the proposed haul road (Plate 6-15). This immature woodland was dominated by willow (*Salix* sp.) and bramble and also contained some naturally regenerating Sitka spruce.



Plate 6-12 Example of existing forestry track (ED2) within the proposed haul road



Plate 6-13 Example of second rotation forestry (WD4) occurring within the proposed haul road, with mature forestry in the background.



Plate 6-14 Example of fragmented wet grassland (GS4) occurring within forestry rides along the site haul road



Plate 6-15 Example of willow dominated scrub (WS1) occurring along the proposed haul road between plantation forestry blocks.

The proposed haul route will continue to follow the existing road (BL3) south until it enters the wind farm site through Conifer plantation (WD4) and on to existing forestry tracks (ED2). The existing road is bordered by Conifer plantation (WD4), soft rush dominated Wet grassland (GS4) and Upland blanket bog (PB2) along its length to the windfarm site.

6.6.1.3 Habitats on the Grid Connection Route

The proposed grid connection route will leave the on-site substation south through the proposed windfarm site, following existing forestry tracks categorised as Spoil and bare ground (ED2). On exiting the windfarm site the grid connection will follow the existing local road, categorised as Buildings and artificial surfaces north for approximately 1.8km and will then follow the existing unbound access road (ED2) for approximately 300m into the Garvagh substation.

6.6.1.4 Habitats at the site of the Met Mast, Amenity Car Park, Amenity Paths and Site Access Road

The proposed met mast is located within Conifer plantation forestry (WD4) within the site boundary, located southwest of T5. The area is dominated by sitka spruce and is generally of low ecological significance (Plate 6-16). Similarly, the proposed amenity car park, amenity trail and the majority of the site access track new roads are located within Conifer plantation forestry (WD4) of low ecological value. This is a highly modified habitat and subject to ongoing forestry activity.



Plate 6-16 Existing access track classified as Recolonising bare ground (ED3) leading north to Conifer plantation (WD4) where the met mast will be located

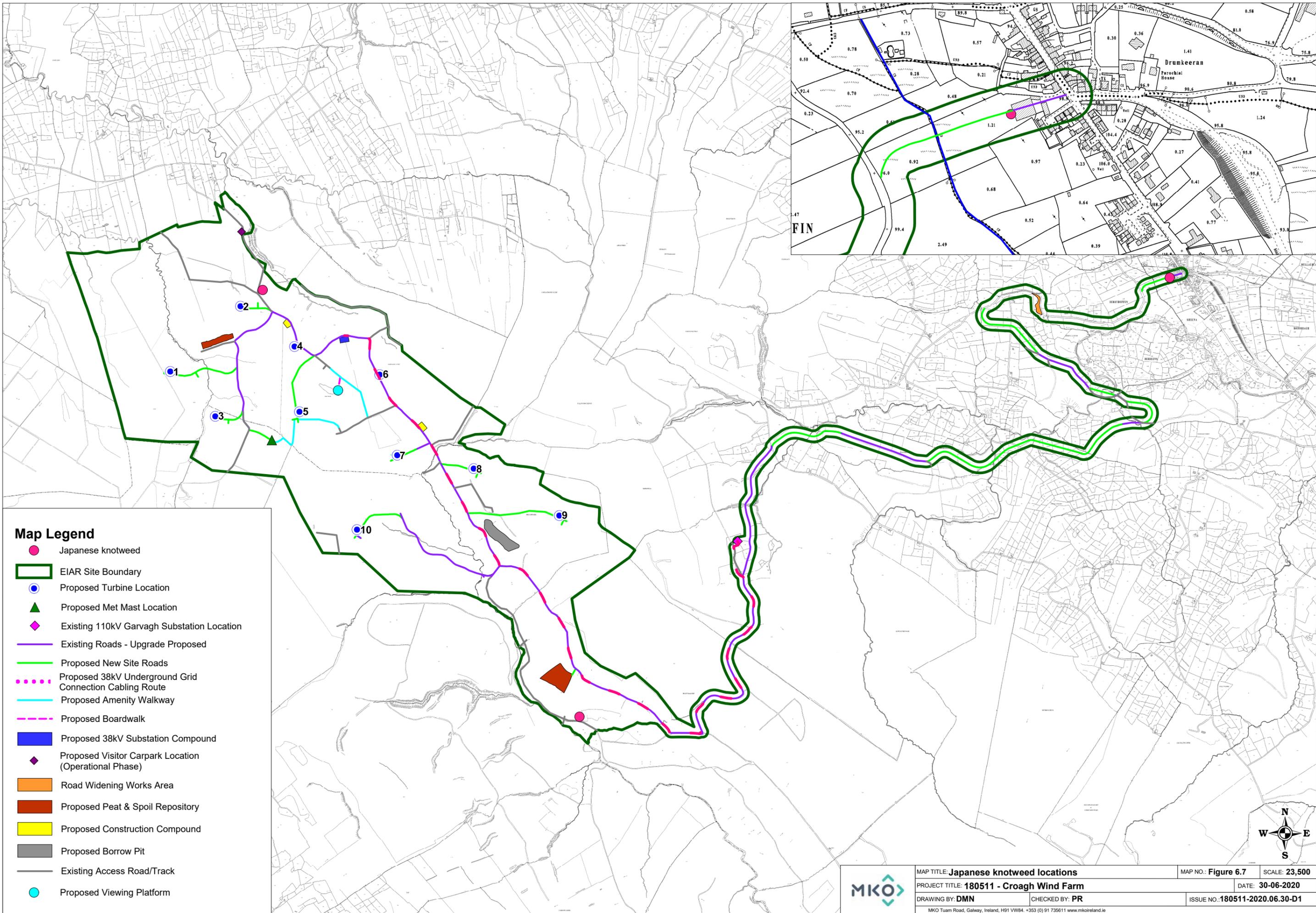
6.6.2 Protected Flora

No botanical species listed under the Flora (protection) Order (1999, as amended 2015), listed in the EU Habitats Directive (92/43/EEC), or listed in the Irish Red Data Books were recorded on the site. All species recorded are common in the Irish landscape. No rare and protected plant species recorded in the desk study, including those obtained from NPWS data request (see Table 6-6), were recorded within the study area.

6.6.3 Invasive species

During field surveys, a search for Invasive Alien Species (IAS) listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015) was conducted. A number of Japanese knotweed (*Fallopia japonica*) plants were recorded adjacent to an existing forestry road, approximately 200m east of Turbine 2 (Grid Ref: E184107 N324067) and in close proximity to the proposed access road, by existing farm buildings to the east of the site (Grid Ref: E 190620 N 324296). The location of the Japanese knotweed stands are shown in Figure 6-7.

No additional species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 were recorded during the survey.



Map Legend

- Japanese knotweed
- EIAR Site Boundary
- Proposed Turbine Location
- ▲ Proposed Met Mast Location
- ◆ Existing 110kV Garvagh Substation Location
- Existing Roads - Upgrade Proposed
- Proposed New Site Roads
- ⋯ Proposed 38kV Underground Grid Connection Cabling Route
- Proposed Amenity Walkway
- - - Proposed Boardwalk
- ▭ Proposed 38kV Substation Compound
- ◆ Proposed Visitor Carpark Location (Operational Phase)
- ▭ Road Widening Works Area
- ▭ Proposed Peat & Spoil Repository
- ▭ Proposed Construction Compound
- ▭ Proposed Borrow Pit
- Existing Access Road/Track
- Proposed Viewing Platform



MAP TITLE: Japanese knotweed locations	MAP NO.: Figure 6.7	SCALE: 23,500
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6.6.4 Fauna in the Existing Environment

Dedicated faunal walkover surveys were undertaken at the site on the following dates:

- > 14th June 2017
- > 25th September 2017
- > 24th April 2019
- > 26th April 2019
- > 24th June 2019
- > 5th July 2019
- > 14th August 2019
- > 19th August 2019
- > 21st August 2019
- > 30th August 2019
- > 13th September 2019
- > 31st January 2020

In addition to the above targeted surveys, additional faunal signs/sightings were also recorded during other surveys including habitat assessments, bat surveys and bird surveys. The site was also visited on numerous additional occasions during the undertaking of bat surveys throughout 2017, 2018 and 2019.

The walkover survey was designed to detect the presence, or likely presence, of a range of protected species, including birds, bats, otter and badger. Potential suitable habitats were investigated for signs of animal presence. The following subsections provide a breakdown of the species recorded within the proposed development boundary during the site visit and assessment.

6.6.4.1 Badger

Dedicated surveys for this species were undertaken on the above dates between 2017, 2019 and 2020, in addition to incidental records recorded during other species-specific surveys. During dedicated badger surveys of the site, signs of badger i.e. badger foraging signs, latrines etc. were searched for. A single main sett (comprising numerous entrances) and one outlier sett was recorded within and adjacent to the study area. The location of all badger setts are shown on Figure 6-8, Confidential Appendix 6-4¹² of this EIAR. In addition, badger foraging signs and latrines were also recorded within the study area. An example of the main sett (showing two of the entrances) recorded within the study area is provided in Plate 6-17.

¹² Following standard best practice, the location of breeding or resting places of protected species should be provided as a confidential appendix for review by the competent authority and not made available to the public in order to avoid potential for persecution.



Plate 6-17 Example of main badger sett recorded within the study area.

6.6.4.2 Otter

No otter signs were recorded during the dedicated otter surveys of the watercourses within the site. Three otter spraints were recorded on the Killanummary Stream and Rathgeean River outside the north and northwest of the site during the dedicated fisheries assessment or kick sampling of the watercourses surrounding the study area, see Appendix 6-3 of the EIAR (Triturus Environmental Ltd, 2019). The main watercourses were assessed as providing suitable commuting and foraging habitat for the species and otter may occur within the EIAR Site boundary, at least on occasion. Following assessment, the fisheries potential of the upper reaches of watercourses within the site is poor (Triturus Environmental Ltd, 2019) and therefore otter are more likely to utilise the lower reaches of the watercourses, downstream of the proposed development site.

6.6.4.3 Red Squirrel

Dedicated red squirrel (*Sciurus vulgaris*) surveys were undertaken, including walked transects through coniferous plantation forestry (WD4). Feeding signs were present throughout the forestry, however no dreys were recorded within the proposed development footprint during the surveys.

6.6.4.4 Bats

Bat surveys undertaken in 2019, in accordance with Scottish Natural Heritage Guidance (SNH 2019), form the core dataset for the assessment of effects on bats at the proposed development site. Bat surveys included roost survey, manual transect surveys and ground-level static surveys.

Roost surveys

One structure located within the south of the site at grid reference E186351 N321105 was surveyed for evidence of roosting bats. The building was assessed as providing suitable roosting features and was subject detailed inspections of the exterior to assess for evidence of bat use. No evidence of bat use was recorded during the roost assessments (Collins, 2016). In addition, no bats were recorded during a dedicated roost survey undertaken by two surveyors on the 7th May 2019. Following this emergence survey it was concluded that the building was not suitable for roosting bats and no further surveys were deemed necessary. No other structures within the site were identified as being, within 200m of a turbine location, or as providing roosting bat features and thus further surveys were not deemed necessary.

The surrounding habitats were assessed as low suitability for roosting bats. No potential tree roosts were identified during the roost surveys and no evidence of bat use was recorded elsewhere during the roost assessment.

Manual transects 2019

Manual transects were undertaken in spring, summer and autumn 2019. Bat activity was recorded on all surveys. Bat activity was low with 68 bat passes in total recorded across all survey nights. Activity was particularly low during the summer transect where only 2 bat passes were recorded in total. In general, Leisler's bat was recorded most frequently. This activity was largely concentrated in the spring season. Common and soprano pipistrelle were also frequently recorded, particularly in autumn. *Myotis* sp. and brown long-eared bat were less frequently encountered. Species composition and activity levels varied significantly between surveys. Figure 4-4, Section 4.5 'Manual Transects' of the standalone 'bat report', provided in Appendix 6-2 of the EIAR, presents results for individual species per survey period.

Ground-level Static Surveys 2019

SNH Guidance (2019) requires static detector surveys at turbine bases and the results of those surveys are provided below. The location of all static detectors is provided in Table 3.2 of the Bat report Appendix 6-2 of this EIAR. In total, 21,214 bat passes were recorded across all deployments. In general, Leisler's bat (n= 7,699), common pipistrelle (n=6,384) and soprano pipistrelle (n=6,628) occurred most frequently, while instances of *Myotis* sp. (n=456) and brown long-eared bat (n=47) were significantly less.

Leisler's bat activity was significantly higher than all other species (see Figure 4-7, Appendix 6-2 of the EIAR). During the summer and autumn seasons, Leisler's bat activity reduced while common and soprano pipistrelles were more prevalent during the summer and autumn seasons. Activity was variable between survey nights. Therefore, the median Nightly Pass Rate, including absences, was used as the most appropriate measure of bat activity (Lintott & Mathews, 2018). Results for each species can be found in Section 4.6 of the detailed bat report, provided in Appendix 6-2 of the EIAR.

6.6.4.5 Reptiles and Amphibians

Common frog (*Rana temporaria*) was recorded in the area of peatland within the site. The species is likely to breed in wet habitats within the study area. Common lizard (*Zootoca vivipara*) and smooth newt (*Lissotriton vulgaris*), while not recorded during the site visits, are likely to occur within the study area.

The proposed development will not result in a significant loss of suitable habitat for reptiles and amphibians. It is considered that suitable habitat is extremely widespread in the study area and beyond.

6.6.4.6 Fisheries and Aquatic Fauna

In order to collate baseline fisheries information, Triturus Environmental Ltd. were contracted by MKO to undertake both a catchment-wide electro-fishing, white-clawed crayfish and Q-sampling survey of watercourses within the footprint of the proposed wind farm development study area. A detailed *Aquatic and fisheries assessment* has been prepared for the project and is provided in Appendix 6-3 of the EIAR. A total number of 12 ($n=21$) sites were electro-fished across the Killanummery, Argina, Tullynascreena and Owengar rivers as well as numerous unnamed tributaries over the course of Monday 19th – Wednesday 21st August 2019. Biological water quality was analysed (via Q-sampling) at $n=13$ sites. The location of all survey sites referred to in the below subsections is provided in Figure 1.1 of the *Aquatic and fisheries assessment*, Appendix 6-3 of the EIAR.

A total of $n=112$ fish across five species were recorded via electro-fishing. Brown trout were the dominant species overall accounting for 92% of the total catch, followed by small numbers of Atlantic salmon, stone loach and minnow. Only one site (A7, Killanummery Stream, see location in Figure 1.1 of the *Aquatic and fisheries assessment*, Appendix 6-3 of the EIAR) produced species other than brown trout and this was the only site to support Atlantic salmon at the time of survey. European eel was not recorded from any site.

Lamprey (*Lampetra* spp.) were not recorded during the survey, with all but one site (A7) considered generally unsuitable for the species in terms of both nursery and spawning habitat. Typically, survey sites were too high-energy to support lamprey larvae or adult spawning.

A total of $n=12$ (57%) electro-fishing sites did not support resident fish (any species) at the time of survey. These sites were located in more upland areas and invariably featured high-energy flows exposed to regular spate conditions, often flowing over moderate to steep gradients. Upstream fish access for salmonids was difficult or blocked entirely due to such physical characteristics in several cases e.g. sites A1, A2, A3, C1, C2 etc. Some did offer some low suitability for European eel, however, despite their absence at the time of survey.

No white-clawed crayfish were recorded via trapping or sweep netting surveys across a total of $n=24$ sites in the footprint of Croagh wind farm. However, crayfish remains were recorded in otter spraint under bridges at sites A7 on the Killanummery Stream and site D3 on the Rathgeean River. The majority of sites were considered unsuitable for the species.

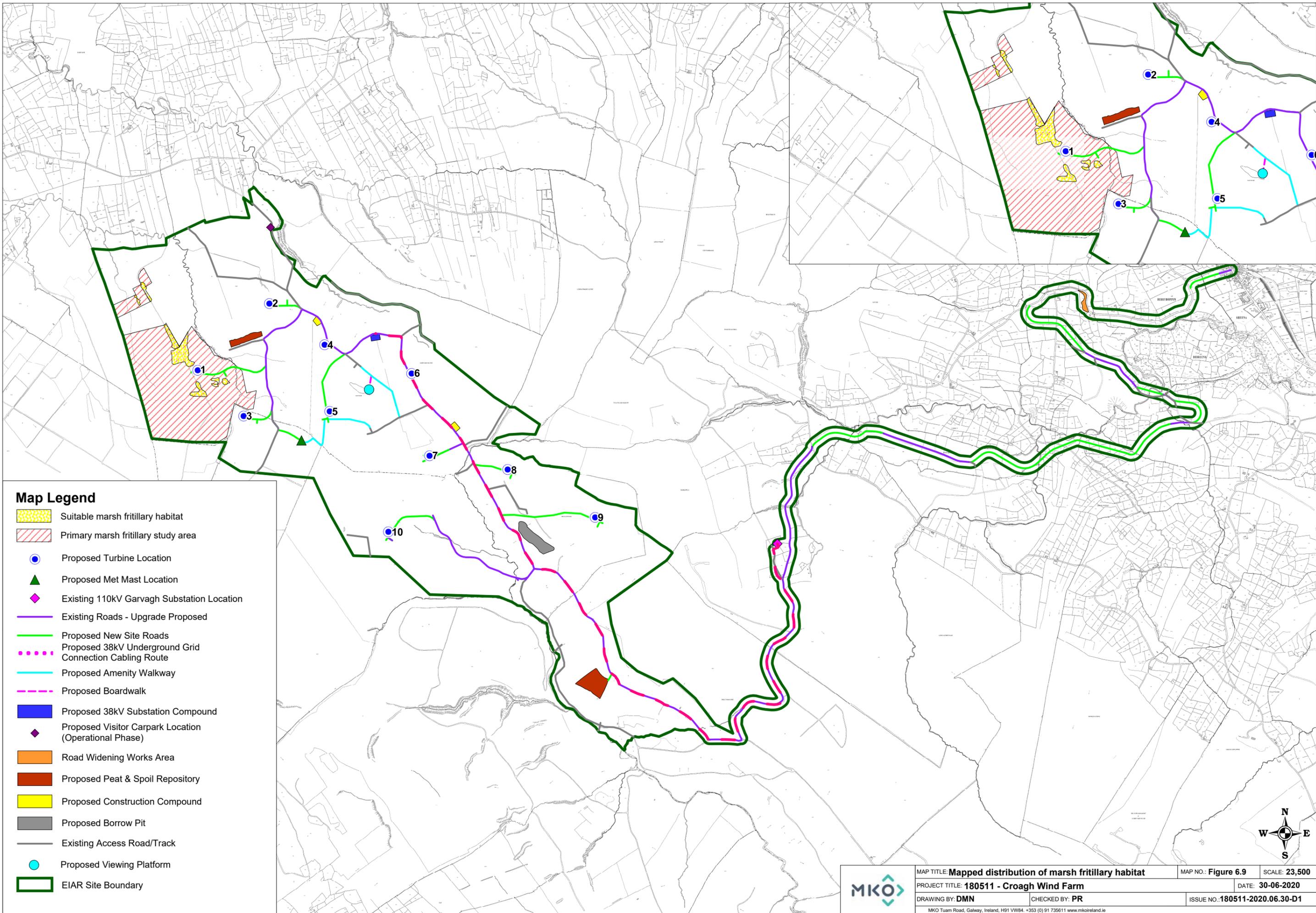
Overall, the watercourses with the highest value for fish species were the lower survey reaches of the Killanummery, Argina, Tullynascreena and Owengar rivers. Over half of the survey sites were on upland, eroding watercourses and featured higher gradients and higher flows not conducive to supporting resident salmonids, European eel, lamprey or white-clawed crayfish.

6.6.4.7 Marsh Fritillary

The desk study identified that marsh fritillary is known to occur in the wider area surrounding the proposed development.

Dedicated surveys were undertaken within the study area to identify areas of suitable marsh fritillary habitat. Suitable habitat was recorded in small areas within the northwest of the study area as shown in Figure 6-9. The suitable habitat was mainly associated with areas where stone material has been brought into the site for the construction of site access tracks, where peat had been cutaway or within areas of degraded blanket bog.

During dedicated larval web surveys of the study area in 2017 and 2018, no marsh fritillary larval webs were recorded. None of the potentially suitable marsh fritillary habitat recorded within the proposed development site occur within the proposed infrastructure footprint. In addition, best practice suggests that two consecutive years of surveys be undertaken within suitable habitat, and if not found then no

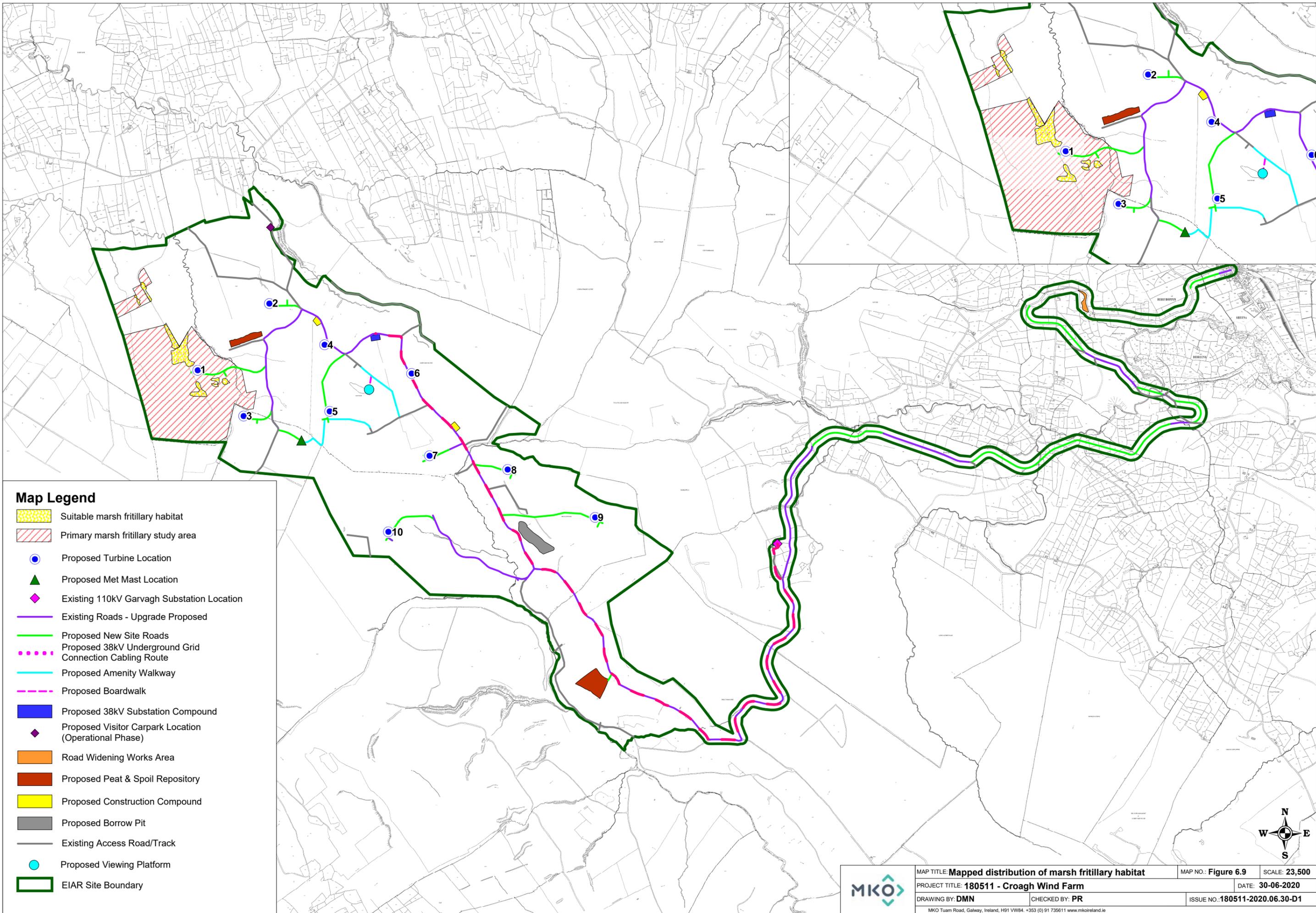


Map Legend

-  Suitable marsh fritillary habitat
-  Primary marsh fritillary study area
-  Proposed Turbine Location
-  Proposed Met Mast Location
-  Existing 110kV Garvagh Substation Location
-  Existing Roads - Upgrade Proposed
-  Proposed New Site Roads
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-  Proposed Amenity Walkway
-  Proposed Boardwalk
-  Proposed 38kV Substation Compound
-  Proposed Visitor Carpark Location (Operational Phase)
-  Road Widening Works Area
-  Proposed Peat & Spoil Repository
-  Proposed Construction Compound
-  Proposed Borrow Pit
-  Existing Access Road/Track
-  Proposed Viewing Platform
-  EIAR Site Boundary



MAP TITLE: Mapped distribution of marsh fritillary habitat	MAP NO.: Figure 6.9	SCALE: 23,500
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further surveys required. In addition, TII (2009) guidelines also state generally that ‘In the vast majority of situations, surveys over successive years will not be required’. For this reason, no additional dedicated surveys were undertaken. As described above, an example of the fragmented areas of suitable marsh fritillary habitat recorded at the site is shown in Plate 6-18.



Plate 6-18 Example of linear strip of wet grassland occurring between forestry and cutover raised bog providing suitable habitat (containing devils-bit scabious) for marsh fritillary.

In addition to the larval web searches, habitat suitability assessments were undertaken during larval web searches within areas of suitable habitat for the species. This followed methods set out in National Biodiversity Data Centre (NBDC¹³) best practice guidance. The results of the condition assessment were focused on assessing the quality of the marsh fritillary habitat identified on site during the initial walkover surveys. Only areas identified as providing suitable marsh fritillary supporting habitat i.e. containing sufficient abundance of devils-bit scabious, were subject to the condition assessment.

6.6.4.8 Other species

Irish hare (*Lepus timidus ssp. hibernicus*) was observed on occasion within the site boundary. Mustelid scats were recorded within the forestry and are presumed to be pine marten (*Martes martes*). The scats of fox (*Vulpes vulpes*) were also recorded in a number of areas within the site. Red deer (*Cervus elaphus*) was observed during the site walkover surveys and numerous deer droppings and wallows were found throughout the site.

¹³ NBDC, 2019, *Habitat Condition Assessment for Marsh Fritillary*, Online, Available at: <http://www.biodiversityireland.ie/wordpress/wp-content/uploads/Marsh-Fritillary-Habitat-Condition-Form.pdf>, Accessed, 20 March 2020

No significant areas of suitable habitat for other taxa including invertebrates or amphibians, species listed in Annex II or IV of the EU Habitats Directive, or other species of conservation concern was identified within the boundaries of the proposed development site.

6.6.5 Importance of Ecological Receptors

Table 6-12 lists all identified receptors and assigns them an ecological importance in accordance with the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009). This table also provides the rationale for this determination and identifies the habitats that are Key Ecological Receptors. These ecological receptors are considered in Section 6.7 of this report and mitigation/ measures will be incorporated into the proposed development where required, to avoid potential significant impacts on the features.

Table 6-12 Key Ecological Receptors identified during the assessment

Ecological feature or species	Reason for inclusion as a KER	KER
Designated sites	<p>Nationally Designated Sites</p> <p>The following Nationally designated site is located downstream of the proposed development and has been identified as being within the likely Zone of Impact:</p> <ul style="list-style-type: none"> ➤ Corry Mountain Bog NHA (002321) ➤ Owengar Wood pNHA (001419) ➤ Kilgarriff Marsh pNHA (000426) 	Yes
	<p>European Designated Sites</p> <p>The following Special Areas of Conservation are identified in the AA Screening as being within the Likely Zone of Impact and are assessed fully in the NIS that accompanies this application:</p> <ul style="list-style-type: none"> ➤ Lough Gill SAC [001976] ➤ Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC (000627) <p>These sites are assigned International importance and included as a KER as there is potential for indirect effects on them via water pollution.</p> <p>Note: SPAs within the Likely Zone of Impact are considered in Chapter 7, Ornithology and in the NIS.</p>	Yes
Aquatic Habitats and related species	<p>Eroding/upland rivers (FW1)</p> <p>A number of natural watercourses and large rivers were located within the site boundary. These watercourses include:</p> <ul style="list-style-type: none"> ➤ River Bonet via the Killanummery Stream, Argina, Tullynascreen and Owengar Rivers as well as several unnamed channels. <p>These Rivers and Streams have been assigned Local importance (Higher Value) as they are of high biodiversity value and connect to downstream waterbodies in the local area. They also provide a conduit to downstream SACs of international importance.</p>	Yes

Ecological feature or species	Reason for inclusion as a KER	KER
	<p>Dystrophic lakes (FL1)</p> <p>The site of the proposed development includes a Dystrophic lake (FL1), Lough Nacroagh. There is a small area of Rich Fen and Flush, which is included as a wetland for the purposes of this assessment. These areas have been assigned County Importance in that they conform to EU Habitats Directive habitats that are of high biodiversity, although small in scale.</p>	Yes
	<p>Aquatic and Fisheries Species</p> <p>The aquatic species that are associated with the rivers that are located within and surrounding the site assigned Local Importance (Higher Value) in that they have a high biodiversity value in the local context. The downstream watercourses and fauna within them have been assigned as of Local Importance (Higher Value) due to the known populations of salmon, trout and lamprey species along with otter. There is potential for indirect effect on these features as a result of impacts on water quality. These species include salmonid, trout, lamprey species, white clawed crayfish, European eel, aquatic invertebrates and other aquatic species. Fish and other aquatic species are therefore included as a KER for further assessment along with Upland eroding rivers.</p>	Yes
Conifer plantation (WD4)	<p>The majority of the proposed windfarm infrastructure is located within Conifer Plantation (WD4). This is a highly modified habitat with a low biodiversity value. This is classified as Local Importance (Lower Value). For these reasons, this habitat has not been identified as a KER.</p>	No
Peatlands and associated habitats	<p>Upland Blanket Bog (PB2)</p> <p>This habitat is assigned County Importance as, although the habitat occurring within the site has been degraded as a result of forestry and turbary activities, the areas of upland blanket bog conform to EU Habitats Directive Annex I habitat Blanket Bog [7130] and is of high biodiversity. The footprint of the proposed development has the potential to result in direct and indirect effects on the receptors and they are included as a KER for further assessment.</p>	Yes
	<p>Transition mire and quaking bog (PF3)</p> <p>This habitat is assigned County Importance as it conforms to the EU Habitats Directive habitat Transition mires [7140] as well as occurring in close association with upland blanket bog (PB2) habitat and Dystrophic lakes (FL1). The footprint of the proposed development has the potential to result in direct and indirect effects on the receptors and they are included as a KER for further assessment.</p>	Yes
	<p>Poor fen and flush (PF2)</p> <p>The Poor fen and flush (PF2) habitat has no affinity with habitats listed under Annex I of the EU Habitats Directive, however, this habitat does form part of the wider Upland blanket bog (PB2) habitat that does conform to EU Habitats Directive Annex I Blanket bogs [7130]. Therefore, this habitat has been assessed as of local importance (higher value). Impacts on this habitat are therefore assessed under potential impacts on upland</p>	Yes

Ecological feature or species	Reason for inclusion as a KER	KER
	blanket bog habitat. From a precautionary point of view this habitat has been included as a KER.	
Spoil and bare ground (ED2)	The habitat is common and widespread in the wider area. The habitat has been assessed as of Local Importance (lower value) as it is largely associated with artificial site access tracks and is of low biodiversity value. For this reason, it has not been identified for further assessment and is not a KER.	No
Wet grassland (GS4)	Wet grassland (GS4) has been assessed as of local importance (lower value) as where this habitat occurs within the proposed development footprint, it is generally of low biodiversity value primarily due to fragmentation, abandonment and scrub encroachment associated with the surrounding afforestation of the landscape. However, the habitat is of some local importance to local wildlife (NRA, 2009). As such, the habitat has been assessed as of Local Importance (lower value).	No
Scrub (WD1)	The habitat that is of some local importance to local wildlife (NRA, 2009). However, the habitat is common and widespread in the wider area. As such, the habitat has been assessed as of Local Importance (lower value).	No
Wet willow-alder-ash woodland (WN6)	This habitat occurs as linear strips of woodland along the larger watercourses that occur on site. This habitat occurs as narrow strips of treelined along the narrow upland watercourses. It is located between stands of plantation woodland and has been assessed as of local importance (higher value) as they are of high local biodiversity value. The proposed development footprint will not result in the loss of Wet willow-alder-ash woodland (WN6) recorded on site and has therefore been excluded as a KER.	No
Oak-ash-hazel woodland (WN2)	Wet willow-alder-ash woodland (WN6) has been assigned Local Importance (higher value) as it is of high local biodiversity value. This habitat occurs outside of the proposed development footprint and upstream of any of the proposed infrastructure. As such, it will not be affected.	No
Badger	Badger as an ecological receptor has been assigned Local Importance (Higher value) on the basis that the habitats within and adjacent to the study area are likely to be utilised by a locally occurring badger population of Local Importance. Direct impacts on badger are not anticipated. There will be no loss of resting or breeding places associated with the development. The proposed development has the potential to result in indirect effects on the receptor and it is therefore included as a KER for further assessment.	Yes
Otter	No evidence of otter was recorded within the red line boundary; however, three spraints were recorded on the Killanummery Stream and Rathgeean River outside the north and northwest of the site during detailed fisheries assessments. Based on the absence of otter records within the site, the low number of otter records in the wider study area and the low suitability of the aquatic habitats to support fish species, otter has been assessed as of Local Importance (Higher value). No evidence of a more ecologically important population was recorded during any of the site surveys undertaken. The proposed development has the potential to result in indirect effects on the receptor (as a result of deterioration in habitat or disturbance during construction/ decommissioning) and it is therefore included as a KER and requires further assessment.	Yes

Ecological feature or species	Reason for inclusion as a KER	KER
Red squirrel	<p>Although evidence of red squirrel was recorded within the study area, no evidence of populations of squirrel being significant at more than a local level was recorded. Based on the low number of squirrel records for the site, squirrel has been assessed as of Local Importance (Higher value).</p> <p>The proposed development footprint has the potential to result in direct and indirect effects on this receptor. However, given the extent of suitable habitat in the area for the species, the small footprint of the proposed infrastructure and the fact that the proposal will not result in any fragmentation of red squirrel habitat, red squirrel has not been included as a KER.</p>	No
Marsh fritillary	<p>Based on the desk study, marsh fritillary has been recorded outside the site, as recently as 2019. However, although small areas of suitable habitat for the species does occur within the site boundary, no evidence of the species was recorded during dedicated surveys for the species undertaken in 2017 and 2018. In addition, the proposed development footprint avoids areas identified as potentially suitable for the species and as such, no potential for impact on the species is predicted. For this reason, the species has not been considered for further assessment in this report.</p>	No
Bats	<p>The habitats within and surrounding the proposed development site are likely to be utilised by a bat population of Local Importance (higher value). All bat species in Ireland are protected under both national legislation – (Wildlife Act, 1976, as amended in 2017) and European legislation – (Habitats Directive (92/43/EEC)). Bats are likely to forage and commute within the vicinity of the proposed development. No potential bat roosting features were identified within or adjacent to the development footprint. The proposed development has the potential to result in direct and indirect effects on the receptor. Therefore, bats are included as a KER for further assessment.</p>	Yes
Reptiles and Amphibians	<p>It is considered that the proposed development will not result in a significant loss of suitable habitat for reptiles and amphibians. No evidence of populations of amphibians being significant at more than a local level was recorded. No likely significant effects on these species are anticipated and therefore further survey/ assessment was not deemed necessary. Based on the low number of amphibian records for the site and the highly afforested nature of the study area, amphibians have been assessed as of Local Importance (lower value).</p>	No
Invasive species	<p>Japanese knotweed was recorded along the site access route to the east of the site.</p>	Yes
Additional protected fauna (e.g. Irish hare, pine marten, fox etc).	<p>The recorded evidence suggests that the study area is not utilised by populations of higher than local significance and no potential for significantly effects have been identified at the population level. Due to the small footprint and nature of the proposed development, they are unlikely to be significantly affected by the proposed development. For this reason, other faunal species are not considered further in this EIAR. Significant effects are not anticipated.</p>	No

6.7 Ecological Impact Assessment

6.7.1 Do-Nothing Effect

If the proposed development were not to proceed, the majority of the lands within the site would continue to be managed as commercial forestry. This would continue to involve the harvesting of timber as it matures, followed by the coniferous forestry replanting. The other habitats identified within the EIAR study area, including peatlands and associated habitats, would likely remain in a similar condition. In some drier areas of the peatland habitat, scrub is likely to develop and in time, this may undergo succession to small areas of woodland. The general biodiversity on the site, as described in this chapter, would likely remain similar to its current state as activity levels and land use would not change significantly.

6.7.2 Effects on Designated Sites

None of the elements of the proposed development are located within the boundaries of any Nationally or European designated sites. There will be no direct effects on any designated site as a result of the construction, operation and decommissioning the wind farm project including the haul route, substation and grid connection.

Three nationally designated sites were identified as being within the zone of influence and as KERs. These are listed below:

- Corry Mountain Bog NHA (002321)
- Owengar Wood pNHA (001419)
- Kilgarraff Marsh (000426)

NHAs or pNHAs that are also designated as European Sites have been assessed as those designations within the Appropriate Assessment Screening Report and NIS, with the relevant conclusions are recorded and referenced in this chapter.

In relation to European sites, an Appropriate Assessment Screening Report and Natura Impact Statement (NIS) have been prepared to provide the competent authorities with the information necessary to complete an Appropriate Assessment for the Proposed development in compliance with Article 6(3) of the Habitats Directive.

As per the aforementioned EPA draft Guidance (2017), “a biodiversity section of an EIAR, should not repeat the detailed assessment of potential effects on European sites contained in a Natura Impact Statement” but should “incorporate their key findings as available and appropriate”. This section provides a summary of the key assessment findings with regard to Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

The Screening for Appropriate Assessment concluded as follows:

‘it cannot be excluded beyond reasonable scientific doubt, in view of best scientific knowledge, on the basis of objective information and in light of the conservation objectives of the relevant European sites, that the proposed development, individually or in combination with other plans and projects, would be likely to have a significant effect on the following sites:

- Lough Gill SAC [001976]
- Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC (000627)
- Cummeen Strand SPA (004035)

As a result, an Appropriate Assessment is required, and a Natura Impact Statement has been prepared in respect of the proposed development in order to assess whether the proposed development will adversely impact the integrity of these European Sites’.

The findings presented in the NIS are that, ‘*in the light of the best scientific knowledge in the field, all aspects of the proposed development which, by itself, or in combination with other plans or projects, which may affect the relevant European Sites have been considered. The NIS contains information which the competent authority, may consider in making its own complete, precise and definitive findings and conclusions and upon which it is capable of determining that all reasonable scientific doubt has been removed as to the effects of the proposed development on the integrity of the relevant Natura 2000 sites.*

6.7.3 Likely Significant Effects During Construction Phase

6.7.3.1 Effects on Habitats During Construction

Table 6-13 below provides details of the extent of the recorded habitats on the site, the extent of the habitat that will be lost to facilitate the proposed development and the percentage of the total area of that habitat in the EIAR study area that it represents.

Table 6-13 Extent of habitat lost to the proposed development and the percentage of the total area of that habitat on site

Habitat	Total area on the site	Area to be lost to development footprint	Percentage of total to be lost
Conifer plantation (WD4)	580.9	30.46	5.24
Upland Blanket Bog (PB2)	61.97	0.91	1.47
Poor fen and flush (PF2)	1.22	0.19	15.57
Transition mire and quaking bog (PF3)	0.68	0.02	2.94
Wet grassland (GS4)	20.5	0.47	2.29
Scrub (WS1)	0.33	0.01	3.03
Buildings and artificial surfaces (BL3)	7.0	2.26	32.29
Total	672.6	34.32	5.10%

The proposed development will result in the loss of areas of habitat that are of Local Importance (Lower Value) and are not identified as KERs. This mainly involves the loss of coniferous plantation forestry (WD4) and has been assessed as of low ecological value. Other habitats assessed as of local importance (lower value) include; Wet grassland (GS4), Buildings and artificial surfaces (BL3), Recolonising bare ground (ED3) and Spoil and bare ground (ED2). Any direct or indirect impacts on these habitats are not significant.

The effects on habitats that are identified as KERs are described in the below tables.

6.7.3.1.1 Assessment of Potential Effects on Rivers and Streams, Open Waterbodies and Sensitive Aquatic Faunal Species

Table 6-14 Potential for impact on rivers, streams, Open Waterbodies and Sensitive Aquatic Species

<p>Description of Effect</p>	<p>The footprint of the proposed development has been specifically designed to avoid the large waterbodies and watercourses within the study area, see Sections 4.2 & 4.7 of the EIAR. The location of new watercourse crossings has been specifically chosen to facilitate the use of clear-span bridges, see Section 4.9.3 of the EIAR, thereby minimising potential for impact on the receiving environment. However, the proposed internal road network and proposed haul route cross a number of watercourses. In some locations, site access tracks will utilise existing bridges with no instream works proposed. As no instream works are proposed, there will be no direct effects on these habitats or the species that are associated with them. There is no potential for the proposed development to result in any barrier to the movement of aquatic species.</p> <p>There is potential for the construction activity to result in the run off of silt, nutrients and other pollutants such as hydrocarbons and cementitious material into these watercourses. This could result from the removal of scrub and woodland, culverting of drainage ditches, minor movement of peat (associated with T1) or the use of concrete and other construction materials. The proposed development will cross a number of small drainage ditches, which are not themselves ecologically sensitive but do provide connectivity to the larger watercourses that surround the site.</p> <p>The construction phase of the proposed watercourse crossings represents a potential indirect effect on the identified aquatic receptors in the form of habitat degradation through water pollution.</p> <p>These effects on water quality are fully described in Chapter 9 ‘Water’ of this EIAR and are described here in relation specifically to ecology.</p> <p>The proposed amenity boardwalk has also been specifically designed to be set back from Lough Nacroagh as well as being constructed in the form of a raised boardwalk, further reducing potential for any deterioration in water quality.</p> <p>Note: Whilst this impact assessment is in the habitats section, it also assesses the impact on the proposed development on aquatic species including salmonids, lamprey, white-clawed crayfish, European eel, aquatic invertebrates and other aquatic species. The proposed development will have no direct impact on the aquatic habitat of these species and there is no potential for disturbance. The only pathway for effect to occur is as a result of water pollution and this is discussed in this section in relation to habitats and species.</p>
<p>Characterisation of unmitigated effect</p>	<p>In the absence of mitigation, the indirect effect of water pollution on aquatic receptors during construction has the potential be a short-term reversible impact on watercourses which act as a conduit to downstream habitats. The magnitude of any such impact is likely to be at worst moderate, given that the all major infrastructure such as turbine bases, site compound etc. are located over 50 metres from any significant watercourse.</p>
<p>Assessment of Significance prior to mitigation</p>	<p>In the absence of mitigation and following the precautionary principle, there is potential for the proposed development to result in significant indirect effects on the identified aquatic habitats and species at a local geographic scale in the form of pollution during the construction phase of the proposed development.</p>
<p>Mitigation</p>	<p>A detailed drainage maintenance plan for the proposed development is provided in Section 4.7.11 of this EIAR. This plan provides details of how water quality will be protected during the construction of the proposed development. In addition to this, specific mitigation is provided in relation to water quality in Chapter 9: ‘Water’ of this EIAR. In addition, the Construction Environmental Management Plan (CEMP) that is provided as Appendix 4-3 of the EIAR, provides the details of exactly how the measures will be implemented during construction.</p>

	In relation to watercourse crossings, Inland Fisheries Ireland (IFI) will be consulted a minimum of four weeks in advance of the installation of clear-span bridges.
Residual Effect following Mitigation	Following the implementation of mitigation, there will be no significant residual effect on aquatic habitats or species as a result of the proposed development.

6.7.3.1.2 Assessment of Potential Effects on Peatlands and Associated Habitats

Table 6-15 Loss of peatlands and associated habitats

Description of Effect	<p>The construction of the proposed windfarm and associated infrastructure will result in the direct loss of approximately 0.91 hectares (1.47%) of the total study area, of Upland blanket bog (PB2) as a result of the proposed Turbine 1 and associated site access track. This area of blanket bog also forms an intimate mosaic with small areas of Transition mire and quaking bog (PF3) and Poor fen and flush (PF2). As described in Section 4.6.1.2 of the EIAR ‘a wooden boardwalk will extend for approximately 90m from the amenity walkway north of Lough Nacroagh and will terminate at a viewing platform on the shores of the lake’. As the proposed boardwalk has been designed to utilise existing forestry rides and will be constructed as a raised boardwalk, there will be no associated loss of peatland habitats. The remaining area of peatland habitats (61.06 ha) have been entirely avoided in the design of the project with no potential for any effect thereon.</p> <p>There is the potential to result in indirect effects on the habitat immediately adjoining the footprint through drainage.</p>
Characterisation of unmitigated effect	This is a permanent and irreversible impact on habitats of County Importance. The magnitude of this impact is Slight as it only affects a small percentage of the overall habitat type, which is widespread in the surrounding landscape.
Assessment of Significance prior to mitigation	The loss or degradation of Upland blanket bog (PB2) habitats has been assessed as a permanent significant negative effect on a very small area of a receptor of County importance, in the absence of mitigation. The impact is restricted to a small percentage of the overall habitat within the site. In addition, the proposed infrastructure layout has been designed to deliberately avoid the other areas of Upland blanket bog (PB2) within the site boundary.
Mitigation	The proposed development has been deliberately designed to minimise loss of Upland blanket bog (PB2). Where the development footprint does occur on this habitat, at Turbine 1, the proposed development provides for the replacement of peatland habitat through the restoration of forestry (WD4) back to peatland, located adjacent to Turbine no. 7. This is fully described in the site-specific Biodiversity Management Plan (BMP), provided in Appendix 6-5 of the EIAR. The BMP aims to ensure that there will be no net loss of peatland habitat associated with the proposed development. This has been further developed by the inclusion of an additional peatland enhancement area comprising of degraded Upland blanket bog (PB2) located to the north of Turbine no. 7. It is proposed to undertake enhancement of this area of peatland, covering an area of 3.74 hectares, through drain blocking and the removal of encroaching conifers (establishing as a result of natural seed dispersal). The location and extent of the habitat replacement and enhancement areas located adjacent to T7 are mapped in the Biodiversity Management Plan, Appendix 6-5 of the EIAR.
Residual Effect following Mitigation	Following the implementation of mitigation and the arising effect of the mitigation measures, there will be no significant residual effect on these Upland blanket bog (PB2). There may be a short-term slight negative effect in the early stages of implementation of the Biodiversity Management Plan in the form of habitat loss.

6.7.3.2 Effects on Protected Fauna During Construction

The proposed development has the potential to result in habitat loss and disturbance impacts on faunal species that were recorded on the site but were not included as KERs, see Table 6-13. Given the extensive area of habitat that will remain undisturbed throughout the site and the avoidance of the most significant areas of faunal habitat (wetlands, natural woodlands and watercourses), no significant effects on non-KER faunal biodiversity is anticipated as a result of the proposed development. Therefore, these species were excluded from further assessment.

The potential for significant effects on aquatic species is restricted to indirect effects on their habitat resulting from water pollution. This has been assessed in Section 6.7.3.1.1 above and is not repeated below.

6.7.3.2.1 Assessment of Potential Effects on Badger

Table 6-16 Assessment of Potential Impacts on Badger

<p>Description of Effect</p>	<p>Whilst badger setts and foraging activity were recorded within the study area, the proposed development has been specifically designed to avoid all identified setts. There is some potential for small scale loss of foraging habitat to facilitate the construction footprint.</p> <p>In addition, the proposed haul roads will pass close (over 35 metres) to an identified badger sett located within the north-eastern section of the study area (see Figure 6-8, confidential Appendix 6-4). In the absence of mitigation/best practice, this has the potential to result in disturbance/displacement, and potentially mortality, during the construction phase of the proposed development. In addition, construction works in close proximity to the sett could prevent badgers from occupying the sett.</p>
<p>Characterisation of unmitigated effect</p>	<p>Given the small scale of the development footprint in comparison to the size of the study area, the loss of foraging habitat to the footprint of the proposed development constitutes a Permanent Slight Negative Effect. This would not be reversible as it is within the construction footprint. The proposed development will not result in any fragmentation of badger habitat, as there will be no barriers to movement throughout the site as a result of the proposed works.</p> <p>Although the works that are proposed close to the badger sett involve only the construction of an access track, following the precautionary approach, there is potential for short term slight negative effects on the local badger population in terms of disturbance, displacement and potentially mortality.</p>
<p>Assessment of Significance prior to mitigation</p>	<p>There is no potential for significant loss of badger habitat as a result of the proposed development at any geographic scale.</p> <p>In the absence of mitigation, there is potential for significant disturbance/displacement and/or mortality on the local badger population as a result of the proposed development.</p> <p>There is no potential for significant effects at a county, national or international scale.</p>

Mitigation	<p>The following measures will be undertaken for the avoidance of disturbance/displacement and direct mortality and will be implemented during the construction phase of the proposed development:</p> <ul style="list-style-type: none"> ➤ From a precautionary basis, a pre-commencement badger survey will be undertaken in accordance with standard best practice guidance (TII, 2005) prior to the commencement of site works to confirm the conditions predicted in this EIAR. If a badger sett is identified within or immediately adjacent to the proposed development footprint, a badger sett disturbance licence will be sought from the National Parks and Wildlife Service. ➤ An exclusion zone will be put in place along the section of haul road during the construction phase to ensure works are not undertaken within 30 metres of a known badger sett on site (known to be approx. 40 metres from the proposed footprint). ➤ All of the above works will be undertaken or supervised by an appropriately qualified ecologist. <p>To protect individual badgers during the construction phase of the proposed development, all open excavations on site will be covered when not in use and backfilled as soon as possible. Excavations will also be covered at night and any deep excavations left open will have appropriate egress ramps in place to allow mammals to safely exit excavations should they fall in.</p>
Residual Effect following Mitigation	<p>Following the implementation of the mitigation as described above, there is no potential for any significant negative effect on badger at any geographic scale.</p>

6.7.3.2.2 Assessment of Potential Effects on Otter

Table 6-17 Assessment of Potential Impacts on Otter

Description of Effect	<p>As described above in relation to aquatic habitats and species, the proposed development has been deliberately designed such that all major infrastructure, i.e. turbine bases and hardstands, avoid significant watercourses and wetland habitats. No instream works are proposed within watercourses that occur. There is therefore no potential for direct effect on habitat that is significant for otter.</p> <p>The dystrophic lake recorded on site has been entirely avoided by the proposed site infrastructure.</p> <p>Infrastructure such as the haul roads and site access tracks will require a number of watercourse crossings. The construction of these watercourse crossings has the potential for indirect effects in the form of disturbance to otter.</p> <p>The proposed development also has the potential to result in indirect effects on otter habitat in the form of water pollution resulting from construction activity as described above.</p>
Characterisation of unmitigated effect	<p>There is no potential for direct loss or fragmentation of significant otter habitat.</p> <p>Given that the site is at present in active afforestation of different ages and all major proposed infrastructure is located over 50 metres from any significant watercourse, any potential disturbance to otter will be a short-term, slight negative effect associated with the installation of the proposed watercourse crossings.</p> <p>In the absence of mitigation, the indirect effect of water pollution on otter during construction has the potential to be a short-term reversible impact. The magnitude of any such impact is likely to be at worst moderate, given that the all major infrastructure such</p>

	as turbine bases and construction compounds are located over 50 metres from any significant watercourse.
Assessment of Significance prior to mitigation	<p>There is no potential for the construction phase of the proposed development to result in significant disturbance, displacement or habitat fragmentation for otter.</p> <p>In the absence of mitigation and following the precautionary principle, there is potential for the proposed development to result in significant indirect effects on otter at a local geographic scale in the form of habitat deterioration resulting from pollution.</p>
Mitigation	<p>A detailed drainage maintenance plan for the proposed development is provided in Section 4.7 of this EIAR. This plan provides details of how water quality will be protected during the construction of the proposed development. In addition to this, specific mitigation is provided in relation to water quality in Chapter 9: 'Water' of this EIAR. In addition, the Construction Environmental Management Plan (CEMP) that is provided as Appendix 4-4 of the EIAR provides the details of exactly how the measures will be implemented during construction.</p> <p>Prior to the commencement of construction works associated with the installation of watercourse crossings, the following measures will be undertaken for the avoidance of disturbance/displacement and direct mortality and to ensure that no otter holts/breeding sites have been established since the original surveys undertaken (TII, 2007):</p> <ul style="list-style-type: none"> ➤ From a precautionary basis, a pre-commencement otter survey will be undertaken in accordance with standard best practice guidance prior to the commencement of site works. In the unlikely event that an otter holt is identified within or immediately adjacent to the proposed development footprint, consultation will be undertaken with the National Parks and Wildlife Service and a derogation licence applied for. ➤ All conditions of a derogation licence will be implemented in full. ➤ No works should be undertaken within 150m of any holts at which breeding females or cubs are present. ➤ No wheeled or tracked vehicles (of any kind) should be used within 20m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance should also not take place within 15m of such holts, except under licence (TII, 2006¹⁴). ➤ All of the above works will be undertaken or supervised by an appropriately qualified ecologist.
Residual Effect following Mitigation	Following the implementation of mitigation, there will be no significant residual effect on otter as a result of the proposed development.

¹⁴ NRA, 2006. *Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes*. Dublin: Transport Infrastructure Ireland. Available at: www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-Treatment-of-Otters-prior-to-the-Construction-of-National-Road-Schemes.pdf

6.7.3.2.3 Assessment of Potential Effects on Bats

Table 6-18 Assessment of Potential Impacts on Bats

<p>Description of Effect</p>	<p>Whilst the study area was utilised by foraging and commuting bats, the proposed development will not result in any significant reduction or loss of the available habitat on the site given the size of the site and nature and small scale of the habitats that will be lost.</p> <p>No bat roosts were identified in close proximity to the construction footprint of the proposed development and there is no potential for significant bat roosts to be disturbed by increased human presence and increased noise during construction. No built structures within the site were identified as being, within 200m of a turbine location, or as providing roosting bat features and thus further surveys were not deemed necessary.</p> <p>The potential for bats to be killed during removal of trees or structures was considered in this assessment. However, no buildings or other structures with the potential to support bat roosts will be demolished to facilitate the proposed development. In addition, the trees occurring within the development footprint were assessed as not providing suitable cavities to support any significant bat roosts. The coniferous woodland does not provide suitable cavities due to the nature and age of the species recorded, while the scrub habitat occurring within the infrastructure footprint comprises largely of immature downy birch and willows.</p>
<p>Characterisation of unmitigated effect</p>	<p>The construction of the proposed development has the potential to result in Short-Term Imperceptible Negative effects on the local bat populations in the form of habitat loss, disturbance or direct mortality.</p>
<p>Assessment of Significance prior to mitigation</p>	<p>There is no potential for the construction of the proposed development to result in Significant effects on the local bat population at any geographic scale as no roosts were recorded close to the infrastructure, habitat loss and disturbance are only likely to result in imperceptible effects on the local population. The bat survey report, which is included in Appendix 6-2 provides further detail and analysis with regard to the effects on bat species.</p>
<p>Mitigation</p>	<p>Whilst no significant effects on bat species have been identified, the following potential positive effects are noted. The felling of plantation forestry (WD4) within the site, to facilitate site access roads and turbine locations, will result in the creation of more woodland edge habitat and as such benefit feeding and commuting bat species locally.</p> <p>In addition, the following construction best practice will be employed to minimise general noise and disturbance potential. Plant machinery will be turned off when not in use and all plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996).</p>
<p>Residual Effect following Mitigation</p>	<p>There is no potential for the construction of the proposed development to result in Significant effects on the local bat population at any geographic scale. There will be no significant effect on the conservation status of any bat species as defined in ‘<i>The Status of Protected Habitats and Species in Ireland</i>’ (NPWS, 2019)</p>

6.7.3.3 Potential Introduction or Spread of Invasive Alien Plant Species

6.7.3.3.1 Pre-Mitigation Impacts

The Third Schedule invasive species Japanese knotweed was recorded along the proposed site access route. From a precautionary perspective, a pre-construction invasive species survey will be undertaken a part of the proposed project. This will provide updated data in advance of any construction given the

intervention time period between the original survey work and any future grant of permission/construction. Measures will be in place to prevent the spread of these species during the proposed works. In addition, all necessary precautions will be taken to prevent the introduction of invasive species to the site from elsewhere.

6.7.3.3.2 Proposed Mitigation Measures

Best practice measures in relation to invasive species are described below:

- All earthworks machinery will be thoroughly pressure-washed prior to arrival on site and prior to their further use elsewhere.
- Care will be taken not to disturb or cause the movement of invasive species fragments, either intentionally or accidentally.
- Stands of Knotweed will be clearly demarcated by temporary fencing and tracking within them will be strictly avoided. A minimum buffer of seven metres will be applied to avoid disturbance of lateral Knotweed rhizomes.
- Where works occur within 7m of a Knotweed stand these will be carried out under the supervision of a suitably qualified ecologist.
- Should removal of Knotweed off site be required this will be done so under the supervision of an ecologist in line with NPWS licencing.
- The machinery must be thoroughly cleaned down under supervision of an ecologist prior to moving away from the Knotweed contaminated area.
- All contractors and staff will be briefed about the presence, identification and significance of Knotweed before commencement of works.
- Good construction site hygiene will be employed to prevent the spread of these species with vehicles thoroughly cleaned down prior to leaving any site with the potential to have supported invasive species. All plant and equipment employed on the construction site (e.g. excavator, footwear, etc.) will be thoroughly cleaned down on site to prevent the spread of invasive plant species such as Knotweed. All clean down must be undertaken in areas with no potential to result in the spread of invasive species.
- When working at locations in proximity to natural watercourses, a suitable barrier will be erected between the watercourse and the stand of invasive species. This will assist in preventing the spread of any invasive species into the watercourse during their removal.
- Any material that is imported onto any site will be verified by a suitably qualified ecologist to be free from any invasive species listed on the ‘Third Schedule’ of Regulations 49 & 50 of Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011). This will be carried out by searching for rhizomes and plant material.
- Any soils or subsoils contaminated with invasive species will sent for disposal to an authorized waste facility under licence from NPWS.

The treatment and control of invasive alien species will follow guidelines issued by the National Roads Authority - *The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads* (NRA 2010) and Irish Water (2016) *Information and Guidance Document on Japanese Knotweed*.

6.7.3.3.3 Residual Impact

No impact.

6.7.3.3.4 Significance of Effects

With the above mitigation in place there will be no significant effect with regard to Third Schedule invasive species as a result of the proposed works.

6.7.4 Likely Significant Effects During Operational Phase

6.7.4.1 Effects on Habitats during Operation

The operation of the proposed development will not result in any additional land take or loss of revegetated peatland habitats and as such there is no potential for any significant effects in this regard. These habitats are not considered to be a KER in the context of the operation of the proposed development. However, the proposed development has the potential to result in enhancement of the surrounding areas through habitat rehabilitation management (as described in the Biodiversity Management Plan) that will be implemented during the construction phase of the proposed development and maintained during the operational phase. Details of the management that will be undertaken are provided in the Biodiversity Management Plan in Appendix 6-5.

Potential for effects on rivers, streams, open waterbodies and sensitive aquatic species remains a KER during operation and is assessed in detail in the following subsection.

6.7.4.1.1 Effects on Rivers and Streams, open waterbodies and sensitive aquatic faunal species.

Table 6-19 Assessment of Potential Impacts on Rivers, Streams, Open Waterbodies and Sensitive Aquatic Faunal Species

Description of Effect	<p>The increased amount of hard standing associated with the windfarm infrastructure has the potential to result in faster run off of water from the site to the surrounding watercourses. This may have the indirect effect of causing erosion, which could lead to deterioration of surface water and supporting habitat quality. Additionally, there is the potential for the faster run off of any pollutants that may be associated with vehicular usage on the site.</p> <p>These impacts on water quality are fully described in Chapter 9: ‘Water’ of this EIAR and are described here in relation specifically to biodiversity.</p> <p>Note: Whilst this impact assessment is in the habitats section, it also assesses the impact on the proposed development on aquatic species including salmonids, lamprey, white-clawed crayfish, European eel, aquatic invertebrates and other aquatic species. The proposed development will have no direct impact on the aquatic habitat of these species and there is no potential for disturbance. The only pathway for effect to occur is as a result of water pollution and this is discussed in this section in relation to habitats and species.</p>
Characterisation of unmitigated effect	<p>Impact on water quality during the operational phase of the proposed development has been assessed as a permanent negative effect in the absence of mitigation. The magnitude of this impact is slight because all major infrastructure will be located over 50 metres from any significant watercourse (those mapped by the EPA¹⁵ and downloaded to GIS) and the footprint of the proposed development will be minimal when compared to the overall size of the site. The closest turbine to an EPA mapped watercourse is Turbine no. 3, located approx. 90 metres to the east of the watercourse.</p>
Assessment of Significance prior to mitigation	<p>Significant effects on water quality are not anticipated at any geographic scale during the operation of the proposed development.</p>
Mitigation	<p>Whilst no significant effects on water quality are anticipated, potential for effects on water quality associated with the operational phase drainage of the site has been fully mitigated through appropriate design and mitigation as fully described in Section 9.4.4 of Chapter 9: ‘Water’ and Section 3.2 of the CEMP.</p>

¹⁵ EPA, 2020, Online Map viewer. Available at: <https://gis.epa.ie/EPAMaps/>

Residual Effect following Mitigation	Following the implementation of the mitigation measures outlined above, no potential for significant effect has been identified at any geographic scale as a result of the proposed development.
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6.7.4.2 Effects on Fauna during Operation

The operation of the proposed development will not result in any additional habitat loss or deterioration, nor will it result in a significant increase in anthropogenic activity due to its location and scale.

The implementation of the Biodiversity Management Plan will ensure that any Upland blanket bog habitat that is lost to facilitate the proposed infrastructure will be replaced within the site. The Biodiversity Management Plan will also incorporate drain blocking and the removal of encroaching conifers from an existing area of Upland blanket bog, as fully described in Appendix 6-5, and will result in the establishment of habitats of higher value for local faunal species. As such the operation of the proposed development will not result in a significant impact at any geographic scale. Such measures will have positive effects on the non-volant terrestrial fauna at the site of the proposed development. There is no potential for significant negative effects on non-volant terrestrial fauna including badger and otter that were identified as KERs during the construction phase of the development.

It should be noted that no significant habitat for salmonids, lamprey, white-clawed crayfish, European eel, aquatic invertebrates or other aquatic species was recorded within the footprint of the proposed development and all major infrastructure such as turbine bases are located over 50 metres from the watercourses and wetlands within the site. The potential for significant effects on the above aquatic species is restricted to indirect effects on their habitat resulting from water pollution. This has been assessed in Section 6.7.4.1.1 and is not repeated below.

Potential for significant effects on bat species resulting from the operation of the proposed development were identified and therefore, these are identified as KERs during the operational phase.

6.7.4.2.1 Assessment of Potential Effects on Bats during operation

Table 6-20 Assessment of Potential Impacts on Bats

Description of Effect	<p>There is no potential for loss or fragmentation of foraging or roosting habitat for bat species during the operational phase of the proposed windfarm as there will be no additional loss of any habitats following construction.</p> <p>The bat survey report that is provided in Appendix 6-2, found bat species composition and abundance to be typical of the geographic location and largely afforested upland nature of the site.</p>
Characterisation of unmitigated effect	<p>The operation of the proposed wind farm has the potential to result in a long-term effect on Pipistrelle and Leisler’s bat species as a result of mortality due to collision. The magnitude of this effect in the absence of mitigation is moderate on the basis that no significant roosts were identified in the immediate vicinity of the turbines and the median level of activity is considered moderate (on a precautionary basis).</p> <p>It is noted in the SNH (2019) guidelines that bat activity on windfarm sites is highly liable to change following construction of a wind farm due to the changes in habitat that occur to facilitate construction. Therefore, continued monitoring of operational wind farms for three years’ post construction is recommended in the guidelines and will be undertaken at this site, to determine the actual, post construction effects on the local bat populations.</p>

Assessment of Significance prior to mitigation	Following the precautionary principle, there is potential for the operation of the proposed development to result in Significant effects on the local bat population.
Mitigation	<p>In order to reduce the value of the habitat for bat species in the areas surrounding the turbines, a buffer of at least 50m between the tip of the blade and any trees or other tall vegetation that could provide high quality foraging habitat for bat species will be implemented. Details of this mitigation and how it is calculated is provided in Appendix 6-2.</p> <p>In addition to this, ongoing monitoring of bat activity will be undertaken for at least 3 years’ post construction of the wind farm. This will provide data and information on the actual recorded impact of the wind turbines on the local bat populations. Full details of the proposed monitoring programme are provided in Appendix 6-2 and include measurement of bat activity, weather conditions and any correlation between the two. The monitoring will also include corpse searching in the areas surrounding the turbines to gather data on any actual collisions.</p> <p>If, following monitoring, there are significant effects recorded, a range of measures are proposed to ensure that any such effects are fully mitigated. These measures include blade feathering, curtailment of turbines during certain conditions and increase of buffers surrounding the turbines. Any or all of the above measures may be employed following actual monitoring of the impact of the operating turbines on bats to ensure that no potential for significant effects on bat species remains.</p>
Residual Effect following Mitigation	Following the implementation of the monitoring and mitigation described above, there is no potential for significant residual effects on bat species.

6.7.5 Likely Significant Effects During Decommissioning phase

There will be no additional habitat loss associated with the decommissioning of the proposed development and therefore there will be no significant effects in this regard. In addition, the removal of the infrastructure will involve similar operations to those involved in construction but without the large-scale earth moving or excavations as the turbine bases and roads etc. will be left in place. These works would therefore be of a smaller scale but would have similar impacts on ecology to those experienced during construction. There would be no additional or ancillary impacts associated with the decommissioning phase.

The same mitigation to prevent significant impacts on water quality and associated aquatic fauna and other terrestrial fauna during construction will be applicable to the decommissioning phase. An outline decommissioning plan is contained in the CEMP, Appendix 4-4 of the EIAR. The CEMP for the project provides the details of the mitigation and best practice that will be employed to avoid any potential for significant residual effects on biodiversity during decommissioning of the proposed wind farm. In addition, the measures incorporated into the construction phase, in Section 4.7.11 of this EIAR, including specific mitigation provided in relation to water quality in Chapter 9: ‘Water’, will be implemented during decommissioning.

6.8 Cumulative impact

The proposed development was considered in combination with other plans and projects in the area that could result in cumulative impacts on the Key Ecological Receptors (KERs) identified in Section 6.6.5 of this report, including European Sites, Nationally designated sites. This included a review of

online Planning Registers and served to identify past, present and future plans and projects, their activities and their predicted environmental effects. The projects considered are listed in Chapter 2: Background of the Proposed Development.

6.8.1 Assessment of Plans

The following development plans have been reviewed and taken into consideration as part of this assessment:

- > Leitrim County Development Plan 2015-2021
- > Sligo County Development Plan 2017–2023
- > Roscommon County Development Plan 2014-2020
- > National Biodiversity Action Plan 2017-2021

The review focused on policies and objectives that relate to designated sites for nature conservation, biodiversity and protected species. Policies and objectives relating to the conservation of peatlands and sustainable land use were also reviewed, particularly where the policies relate to the preservation of surface water quality. An overview of the search results with regard to plans is provided in Table 6-21.

European sites are considered in the Natura Impact Statement that accompanies this application.

Table 6-21 Assessment of Plans

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
<p>Leitrim County Development Plan 2015-2021</p>	<p><u>Peatlands</u></p> <p><u>Objective 74</u></p> <p>It is an objective of the Council to conserve peatlands and protect peatland landscapes within the County.</p> <p><u>Objective 75</u></p> <p>It is an objective of the Council to seek hydrological reports for significant developments within and close to peatlands, in order to assess potential impacts on the integrity of the peatland ecosystems.</p> <p><u>Trees, woodlands & Hedgerows</u></p> <p><u>Policy 83</u></p> <p>It is the Council's policy to ensure the preservation of sound deciduous trees, woodlands and native hedgerows, without excessively inhibiting development.</p> <p><u>NHA/pNHA</u></p> <p><u>Policy 79</u></p> <p>It is the policy of the Council to protect NHA sites. The Council acknowledges that not all sites of ecological importance have been identified and will protect any such site of significance, proposed as an NHA.</p> <p><u>Objective 66</u></p>	<p>The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the biodiversity, protected species and designated sites.</p> <p>The proposed development has been designed in order to avoid peatland habitats where possible and where some loss has been identified; appropriate mitigation and compensation measures have been incorporated into the proposed project through a Biodiversity Management Plan.</p> <p>The proposed development is located outside of any Nationally designated sites, as described in Section 6.5.1.</p> <p>No potential for negative cumulative impacts when considered in conjunction with the current proposal were identified.</p> <p>No developments or projects identified within the Development Plan were found to occur in the wider area surrounding the proposed development.</p>

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	<p>It is an objective of the Council to protect all Natural Heritage Areas and those proposed for designation either before or during the lifetime of this plan so as to recognise that the process of designation of such sites is ongoing, with new sites being added and boundaries of existing sites being adjusted, as better information becomes available.</p> <p><u>Objective 67</u></p> <p>It is an objective of the Council to protect the following proposed Natural Heritage Areas and all others as they become proposed during the lifetime of this plan.</p>	
<p>Sligo County Development Plan 2017–2023</p>	<p><u>Natural heritage –Policies</u></p> <p>It is the policy of Sligo County Council to:</p> <p>P-NH-1 Protect, sustainably manage and enhance the natural heritage, biodiversity, geological heritage, landscape and environment of County Sligo in recognition of its importance for nature conservation and biodiversity, and as a non-renewable resource, in association with all stakeholders.</p> <p>P-NH-2 Promote increased understanding and awareness of the natural heritage and biodiversity of the county.</p> <p>P-NH-3 Protect and, where possible, enhance the plant and animal species and their habitats that have been identified under the EU Habitats Directive, EU Birds Directive, the Wildlife Act and the Flora Protection Order.</p> <p>P-NH-4 Take full account of the precautionary principle where uncertainty exists regarding the potential impact of a proposed development on the natural heritage resource.</p> <p><u>Designated sites for nature conservation – Policies and objective</u></p>	<p>The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the biodiversity, protected species and designated sites.</p> <p>The proposed development has been designed in order to avoid peatland habitats where possible and where some loss has been identified; appropriate mitigation and compensation measures have been incorporated into the proposed project through a Biodiversity Management Plan.</p> <p>The proposed development is located outside of any Nationally designated sites, as described in Section 6.5.1.</p> <p>No potential for negative cumulative impacts when considered in conjunction with the current proposal were identified.</p>

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	<p>P-DSNC-1 Protect and maintain the favourable conservation status and conservation value of all-natural heritage sites designated or proposed for designation in accordance with European and national legislation and agreements. These include Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Natural Heritage Areas (NHAs), Ramsar Sites, Statutory Nature Reserves. In addition, the Council will identify, maintain and develop non-designated areas of high nature conservation value which serve as linkages or ‘stepping stones’ between protected sites in accordance with Article 10 of the Habitats Directive.</p> <p>P-DSNC-4 Consider development within, or with the potential to affect, Natural Heritage Areas or proposed Natural Heritage Areas, where it is shown that such development, activities or works will not have significant negative impacts on such sites or features, or in circumstances where impacts can be appropriately mitigated.</p> <p><u>Protected plant and animal species - Policies and objective</u></p> <p>P-PPAS-1 Ensure that development does not have a significant adverse impact, incapable of satisfactory mitigation on plant, animal or bird species protected by law.</p> <p><u>Nature conservation outside designated sites – policies</u></p> <p>P-NCODS-1 Minimise the impact of new development on habitats of natural value that are key features of the County’s ecological network. Developments likely to have an adverse effect on recognised sites of local nature conservation importance will be required to demonstrate the impacts on the ecological value of the site and will not be approved unless it can be clearly demonstrated that there are reasons for the development that outweigh the need to safeguard the nature conservation value of the site.</p>	<p>No developments or projects identified within the Development Plan were found to occur in the wider area surrounding the proposed development.</p>

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	<p>P-NCODS-3 Ensure that proposals for development protect and enhance biodiversity, wherever possible, by minimising adverse impacts on existing habitats and by including mitigation and/or compensation measures, as appropriate, which ensure that biodiversity is enhanced.</p> <p>P-NCODS-4 Apply the precautionary principle in relation to development proposals with potential to impact on County Biodiversity Sites or on local nature conservation interest by requiring an ecological impact assessment (EcIA) to ensure that any proposed development will not affect the integrity and conservation value of the site.</p> <p><u>Inland waters</u> - policies & Objectives</p> <p>P-INW-1 Protect rivers, streams and other water courses and their associated Core Riparian Zones (CRZs) from inappropriate development and maintain them in an open state, capable of providing suitable habitats for fauna and flora. Structures (e.g. bridges) crossing fisheries waters shall be clear-span and shall be designed and built in consultation with Inland Fisheries Ireland.</p> <p>O- INW-1 Consult with prescribed bodies prior to undertaking, approving or authorising any works or development that may impact on rivers, streams and watercourses.</p> <p>O- INW-2 Require that runoff from a developed area does not result in deterioration of downstream watercourses or habitats, and that pollution generated by a development is treated within the development area prior to discharge to local watercourses.</p>	
Roscommon County Development Plan 2014 - 2020 -	<p>Core Policy 2.10: To identify and recognise the potential, in economic and social terms, of the county's natural resources such as its arable agricultural land, clean environment, lands with forestry potential, aggregate reserves and tourism opportunities. To support the utilisation of alternative energy provision in a sustainable and harmonious way in terms of impacts on landscapes and habitats over the broad spectrum of its potential sources, including wind, solar and alternative fuel sources. Any such development will be cognisant of the need to protect, conserve and enhance the county's</p>	<p>The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the biodiversity, protected species and designated sites. The proposed development has been designed in order to avoid peatland habitats where possible and where some loss has been identified; appropriate mitigation and</p>

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
Core Strategy and Settlement Policy	biodiversity and the requirement for screening to determine if a full Appropriate Assessment of the likely impact on integrity on Natura 2000 sites is required.	<p>compensation measures have been incorporated into the proposed project through a Biodiversity Management Plan.</p> <p>No potential for negative cumulative impacts when considered in conjunction with the current proposal were identified.</p> <p>No developments or projects identified within the Development Plan were found to occur in the wider area surrounding the proposed development.</p>
National Biodiversity Action Plan 2017-2021	<p>Objective 1 Mainstream biodiversity into decision-making across all sectors</p> <p>Developments in the area of Green Infrastructure are being initiated at the local and regional level. Green Infrastructure is a strategically planned network of natural and semi natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services such as water purification, air quality, space for recreation and climate mitigation and adaptation.</p> <p>Objective 4 - Conserve and restore biodiversity and ecosystem services in the wider countryside</p> <p>Target 6.2 - Sufficiency, coherence, connectivity, and resilience of the protected areas network substantially enhanced by 2020.</p>	<p>The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the biodiversity, protected species and designated sites. The proposed development has been designed in order to avoid any potential fragmentation of habitats or commuting corridors.</p> <p>No potential for negative cumulative impacts when considered in conjunction with the current proposal were identified.</p>
The Regional Planning Guidelines for the West 2010-2022	EAP13: To support the protection of Natural Heritage Areas, Special Protection Areas, Special Areas of Conservation, Nature Reserves, Ramsar Sites (Wetlands), Wildfowl Sanctuaries, National Parks, Nature Reserves and the biodiversity designated under the Habitats Directive, Birds Directive, Wildlife Act, Flora Protection Order and other designated or future designated sites.	<p>The proposed development will not result in significant effects on habitat and features of ecological importance.</p> <p>The proposed development has been designed in order to avoid and minimise impacts on sensitive habitats and species.</p>

Plans	Key Policies and Objectives directly related to European Sites and Biodiversity in the Zone of Influence	Assessment of Potential Impact on European Sites
	<p>EAO18: Support the achievement of favourable conservation status of Annex I habitats, Annex II species, Annex I bird species and other regularly occurring migratory bird species and their habitats in the region.</p>	<p>No potential for negative cumulative impacts when considered in conjunction with the current proposal were identified</p>

6.8.2 Assessment of Projects

As described in Section 2.2 of the EIAR, relevant projects have been assessed in-combination with the proposed wind farm development and include planning applications in the vicinity of the site, within the zone of influence of all habitats and species considered in this report, and include other wind energy applications within the wider area. These have not been repeated here to reduce the duplication of information within this EIAR. However, they have been fully considered in the assessment with further detail provided below. In addition, Section 6.8.4 concludes on their potential for impact on biodiversity.

For the purposes of this cumulative assessment wind farms within a 10-kilometre radius of the proposed development area were considered in further detail below. Windfarms occurring at greater distances were considered, however, given the nature of the KERs identified within the EIAR study area and that no significant residual effects were identified, further detailed analysis is not provided below.

Black Banks, Co. Leitrim (Ref. 97/13602)

The potential for the proposed development to result in significant cumulative or in combination effects when assessed alongside Black Banks wind farm, which is located to south-east of the proposed project, was considered. The planning file was reviewed on the Leitrim County Council Planning Register and no information regarding potential effects on biodiversity was available. However, given the location of the Black Banks wind farm, the nature of the habitats on that site (as reviewed on publicly available aerial photography) and the lack of significant residual impacts on biodiversity associated with the proposed Croagh Wind Farm when considered on its own, significant cumulative or in-combination effects are not anticipated.

Taking into consideration the absence of any significant residual effect identified for the proposed Croagh Wind Farm, significant cumulative effects on the KERs identified with regard to direct habitat loss, disturbance/displacement or mortality are not anticipated.

Garvagh Glebe, Co. Leitrim (Ref. 03/257, 08/602)

The potential for the proposed development to result in significant cumulative or in combination effects when assessed alongside Garvagh Glebe wind farm, which is located to the east of the site, was considered. The planning file was reviewed on the Leitrim County Council Planning Register and no information regarding potential effects on biodiversity was available. However, given the location of the Garvagh Glebe wind farm, the nature of the habitats on that site (as reviewed on publicly available aerial photography) and the lack of significant residual impacts on biodiversity associated with the proposed Croagh Wind Farm when considered on its own, significant cumulative or in-combination effects are not anticipated.

Taking into consideration the absence of any significant residual effect identified for the proposed Croagh Wind Farm, significant cumulative effects on the KERs identified with regard to direct habitat loss, disturbance/displacement or mortality are not anticipated.

Carrane Hill, Co. Sligo (Ref. 98/533)

The potential for the proposed development to result in significant cumulative or in combination effects when assessed alongside Carrane Hill wind farm, which is located 600m from the wind farm site, was considered. The planning file was reviewed on the Sligo County Council Planning Register and no information regarding potential effects on biodiversity was available. However, given the location of the Carrane Hill wind farm, the nature of the habitats on that site (as reviewed on publicly available aerial photography) and the lack of significant residual impacts on biodiversity associated with the proposed Croagh Wind Farm when considered on its own, significant cumulative or in-combination effects are not anticipated.

Taking into consideration the absence of any significant residual effect identified for the proposed Croagh Wind Farm, significant cumulative effects on the KERs identified with regard to direct habitat loss, disturbance/displacement or mortality are not anticipated.

Geevagh, Co. Sligo (Ref. 98/861)

The potential for the proposed development to result in significant cumulative or in combination effects when assessed alongside Geevagh wind farm, which is located 1km from the wind farm site, was considered. The planning file was reviewed on the Sligo County Council Planning Register and no information regarding potential effects on biodiversity was available. However, given the location of the Geevagh wind farm, the nature of the habitats on that site (as reviewed on publicly available aerial photography) and the lack of significant residual impacts on biodiversity associated with the proposed Croagh Wind Farm when considered on its own, significant cumulative or in-combination effects are not anticipated.

Taking into consideration the absence of any significant residual effect identified for the proposed Croagh Wind Farm, significant cumulative effects on the KERs identified with regard to direct habitat loss, disturbance/displacement or mortality are not anticipated.

Moneenatieve, Co. Leitrim (Ref. 00/7)

The potential for the proposed development to result in significant cumulative or in combination effects when assessed alongside Moneenatieve wind farm, which is located 1.8km from the wind farm site, was considered. The planning file was reviewed on the Leitrim County Council Planning Register and no information regarding potential effects on biodiversity was available. However, given the location of the Moneenatieve wind farm, the nature of the habitats on that site (as reviewed on publicly available aerial photography) and the lack of significant residual impacts biodiversity associated with the proposed Croagh Wind Farm when considered on its own, significant cumulative or in-combination effects are not anticipated.

Taking into consideration the absence of any significant residual effect identified for the proposed Croagh Wind Farm, significant cumulative effects on the KERs identified with regard to direct habitat loss, disturbance/displacement or mortality are not anticipated.

Corrie Mountain, Co. Leitrim (Ref. 96/12794)

The potential for the proposed development to result in significant cumulative or in combination effects when assessed alongside Corrie Mountain wind farm, which is located 2.3km from the wind farm site, was considered. The planning file was reviewed on the Leitrim County Council Planning Register and no information regarding potential effects on biodiversity was available. However, given the location of the Corrie Mountain wind farm, the nature of the habitats on that site (as reviewed on publicly available aerial photography) and the lack of significant residual impacts on biodiversity associated with the proposed Croagh Wind Farm when considered on its own, significant cumulative or in-combination effects are not anticipated.

Taking into consideration the absence of any significant residual effect identified for the proposed Croagh Wind Farm, significant cumulative effects on the KERs identified with regard to direct habitat loss, disturbance/displacement or mortality are not anticipated.

Spion Kop, Co. Leitrim (Ref. 95/12501)

The potential for the proposed development to result in significant cumulative or in combination effects when assessed alongside Spion Kop wind farm, which is located 3.2km from the wind farm site, was considered. The planning file was reviewed on the Leitrim County Council Planning Register and no information regarding potential effects on biodiversity was available. However, given the location of the Spion Kop wind farm, the nature of the habitats on that site (as reviewed on publicly available aerial

photography) and the lack of significant residual impacts on biodiversity associated with the proposed Croagh Wind Farm when considered on its own, significant cumulative or in-combination effects are not anticipated.

Taking into consideration the absence of any significant residual effect identified for the proposed Croagh Wind Farm, significant cumulative effects on the KERs identified with regard to direct habitat loss, disturbance/displacement or mortality are not anticipated.

Altagowlan, Co. Roscommon (Ref. 00/1979)

The potential for the proposed development to result in significant cumulative or in combination effects when assessed alongside Altagowlan wind farm, which is located 3.2km from the wind farm site, was considered. The planning file was reviewed on the **Roscommon** County Council Planning Register and no information regarding potential effects on biodiversity was available. However, given the location of the Altagowlan wind farm, the nature of the habitats on that site (as reviewed on publicly available aerial photography) and the lack of significant residual impacts on biodiversity associated with the proposed Croagh Wind Farm when considered on its own, significant cumulative or in-combination effects are not anticipated.

Taking into consideration the absence of any significant residual effect identified for the proposed Croagh Wind Farm, significant cumulative effects on the KERs identified with regard to direct habitat loss, disturbance/displacement or mortality are not anticipated.

Derrysallagh, Co. Sligo (Ref. 12/133)

Derrysallagh is the next closest wind farm to the proposed development, located approximately 3.7km to the south. The development was not located within any designated sites for nature conservation. Not all of the EIAR submitted for the application was available online during the search. Therefore, it was not possible to review the entire Ecological Impact Assessment. However, given the location of the wind farm, the nature of the habitats on that site (as reviewed on publicly available aerial photography) and the lack of significant residual impacts on biodiversity associated with the proposed Croagh Wind Farm when considered on its own, significant cumulative or in-combination effects are not anticipated.

Taking into consideration the absence of any significant residual effect identified for the proposed Croagh Wind Farm, significant cumulative effects on the KERs identified with regard to direct habitat loss, disturbance/displacement or mortality are not anticipated.

Garvagh Tullyhaw, Co. Roscommon (Ref. 03/1486)

Garvagh Tullyhaw is the next closest wind farm to the proposed development, located approximately 4.3km to the south-east. The EIS was consulted to determine whether cumulative impacts are likely to result. The EIS concluded that the windfarm will not have a significant effect on the receiving flora and fauna. No significant residual effects on biodiversity receptors were identified.

Based on the information available in the Garvagh Tullyhaw EIS, significant cumulative impacts are not anticipated.

Seltannaveeny, Co. Sligo (Ref. 02/1094)

Seltannaveeny is the next closest wind farm to the proposed development, located approximately 5.7km to the south-east. A compilation of a formal EIS was not mandatory as the proposed development was below the statutory threshold (5 turbines or 5MW). The scope of the EIA to be carried out did not include any ecology section. However, given the location of the Seltannaveeny wind farm, the nature of the habitats on that site (as reviewed on publicly available aerial photography) and the lack of significant residual impacts on biodiversity associated with the proposed Croagh Wind Farm when considered on its own, significant cumulative or in-combination effects are not anticipated.

Taking into consideration the absence of any significant residual effect identified for the proposed Croagh Wind Farm, significant cumulative effects on the KERs identified with regard to direct habitat loss, disturbance/displacement or mortality are not anticipated.

Tullynamoyle, Co. Leitrim (Ref. 03/331)

The potential for the proposed development to result in significant cumulative or in combination effects when assessed alongside Tullynamoyle wind farm, which is located 7.5km from the wind farm site, was considered. The planning file was reviewed on the Leitrim County Council Planning Register and no information regarding potential effects on biodiversity was available. However, given the location of the Tullynamoyle wind farm, the nature of the habitats on that site (as reviewed on publicly available aerial photography) and the lack of significant residual impacts on biodiversity associated with the proposed Croagh Wind Farm when considered on its own, significant cumulative or in-combination effects are not anticipated.

Taking into consideration the absence of any significant residual effect identified for the proposed Croagh Wind Farm, significant cumulative effects on the KERs identified with regard to direct habitat loss, disturbance/displacement or mortality are not anticipated.

Tullynamoyle Extension, Co Leitrim (Ref. 15/164)

The planning file was reviewed on the Leitrim County Council Planning Register and no information regarding potential effects on biodiversity was available. However, given the location of the wind farm, the nature of the habitats on that site (as reviewed on publicly available aerial photography) and the lack of significant residual impacts biodiversity associated with the proposed Croagh Wind Farm when considered on its own, significant cumulative or in-combination effects are not anticipated.

Taking into consideration the absence of any significant residual effect identified for the proposed Croagh Wind Farm, significant cumulative effects on the KERs identified with regard to direct habitat loss, disturbance/displacement or mortality are not anticipated.

6.8.3 Existing Habitats and Land Uses

The potential for the proposed development to result in a cumulative loss or deterioration of habitats, or impact on the KER species identified, was considered in relation to the existing land uses in the area.

The wind farm is primarily located in forestry habitats, which generally provide low value habitats for faunal species. In addition, due to the nature of the plantation forestry, this habitat is of low biodiversity value locally. The proposed development will not result in any significant loss of valuable habitats e.g. upland peatland or grassland. The minor loss of peatland habitat that will be affected, will be fully mitigated through habitat enhancement and restoration proposed as part of this development. The wind farm will not contribute to any overall loss of high value habitat, it has been deliberately designed to be located on habitats of low value for faunal species.

6.8.4 Assessment of Cumulative Effects

The residual construction, operational and decommissioning impacts of the proposed development are considered cumulatively with other plans and projects as described in Sections 6.8.1 & 6.8.2. Particular focus has been placed on those plans and projects that are in closest proximity to the proposed development and those that could be potentially affected via downstream surface water.

Following the detailed surveys undertaken and impact assessment provided in Section 6.7, it is concluded that there will be no significant residual habitat loss, disturbance, deterioration of water quality etc., associated with the wind farm project and therefore it cannot contribute to any cumulative effect when considered in combination with other plans and projects. The other wind farms in the area

were considered (among other projects) but the proposed development has been deliberately designed to minimise the effects on biodiversity through the siting of the wind farm on habitats of low ecological value (conifer plantation). The project also includes a biodiversity management plan, which further minimises / offsets any potential for individual or cumulative negative effects on biodiversity.

No significant effects as a result of the proposed development in relation to disturbance, displacement or mortality of faunal species has been identified. Therefore, there is no potential for the proposed development to contribute to any cumulative effect in this regard.

The proposed development will not result in any significant residual effects on biodiversity and will not contribute to any cumulative effect when considered in combination with other plans and projects.

In the review of the projects and plans that was undertaken, no connection that could potentially result in additional or cumulative impacts was identified. Neither was any potential for different (new) impacts resulting from the combination of the various projects and plans in association with the proposed development.

6.9 Conclusion

The site is located primarily within a large plantation coniferous forestry (WD4) of varying ages that has been assessed as of low ecological value. Consequently, any potentially significant effects on the Key Ecological Receptors identified in this report have been avoided through their avoidance during the project design or by the implementation of mitigation measures as detailed in Section 6.7 of this chapter; including all references made to mitigation specified in other Chapters and appendices of the EIAR.

A small area of fragmented Upland blanket bog (PB2) also occurs within the northwest of the site. This area of peatland and associated habitats have been assessed as corresponding to those listed in Annex I of the EU Habitats Directive and were therefore identified as of County importance. The proposed development has been designed in order to avoid peatland habitats where possible and where some loss has been identified; appropriate mitigation and compensation measures have been incorporated into the proposed project through a Biodiversity Management Plan.

Faunal species records within the EIAR study area, during detailed ecological surveys undertaken between 2017 and 2020, were found to be common and widespread in the wider area, and in a National context. Protected species such as badger were identified within the site boundary. The badger setts recorded have been fully avoided by the proposed development footprint. In addition, a number of standard best practice measures have been incorporated into the project for the avoidance of impact on badger as a result of disturbance/displacement. The implementation of these measures in full will ensure compliance with the Wildlife Act.

Taking the above information into consideration and having regard to the precautionary principle, the proposed development will not result in a residual loss of peatland habitat of high ecological significance and will not have any significant impacts on the ecology of the wider area. Provided that the proposed development is constructed and operated in accordance with the design, best practice and mitigation that is described within this application, significant impacts on ecology are not anticipated at any geographic scale.

7. ORNITHOLOGY

7.1 Introduction

This chapter assesses the likely significant effects that the Croagh Wind Farm development (the ‘Proposed Development’) may have on avian receptors. Particular attention has been paid to species of ornithological importance. These include species with national and international protection under the Wildlife Acts 1979-2012 as amended and the EU Birds Directive 2009/147/EC among other relevant legislation. Where potential effects are identified, mitigation is described and residual impacts on avian receptors are assessed.

This chapter is supported by Technical Appendices 7-1 to 7-7 which contain data from the surveys undertaken including full details of the survey times, weather conditions, and other relevant information together with the bird records themselves. Appendix 7-6 contains the CRA document which illustrates how the Collision Risk Modelling was undertaken for this site. Appendix 7-7 contains the Birds Monitoring Programme. The proposed development area and survey radii are provided in Figures 7-1-7-6.

The chapter is structured as follows:

- The Introduction provides a description of the Proposed Development and the relevant legislation, guidance and policy context regarding ornithology.
- This is followed by a comprehensive description of the ornithological surveys and impact assessment methodologies that were followed to inform the robust assessment of likely significant effects on avian receptors.
- A description of the Baseline Ornithological Conditions and Receptor Evaluation is then provided. This is followed by an Assessment of Effects, which as per SNH Guidance (2017), includes direct habitat loss, displacement and death from collision. Effects are described with regard to each phase of the Proposed Development: construction, operational and decommissioning. Potential cumulative effects in combination with other projects are fully assessed.
- Proposed mitigation and best practice measures to ameliorate the identified effects are described and discussed. This is followed by an assessment of residual effects taking into consideration the effect of the proposed mitigation and best practice measures.
- The conclusion provides a summary statement on the overall significance of predicted effects on ornithology.

The following list defines the meaning of the technical terms used in this chapter:

- “Key Ornithological Receptor” (KOR) is defined as a species occurring within the zone of influence of the development upon which likely significant effects are anticipated and assessed.
- “Zones of Influence” (ZOI) for individual ornithological receptors refers to the zone within which potential effects are anticipated ZOIs were assigned following best available guidance (SNH 2016 and McGuinness et.al 2015).

7.1.1 Description of the Proposed Development

The full development description is provided in Chapter 4 of the EIAR. The proposed development comprises 10 no. turbines with an overall blade tip height of up to 170 metres, a substation that will connect by underground cable to the existing Garvagh substation, a borrow pit, 2 no. peat repository

areas, new access road from the regional road, replacement lands and all ancillary infrastructure. A detailed description of the Proposed Development is included in Chapter 4 of this ELAR.

The Proposed Development will have an operational life of 30 years from the date of commissioning of the wind farm.

7.1.2 Legislation, Guidance and Policy Context

This ELAR is prepared in accordance with the requirements of the 2011 EIA Directive as amended by EIA Directive 2014/52/EU.

The following are the key legislative provisions applicable to habitats and fauna in Ireland:

- Irish Wildlife Acts 1976 to 2012 as amended.
- The European Communities (Birds and Natural Habitats) Regulations 2011 (transposes EU Birds Directive 2009/147/EC and EU Habitats Directive 92/43/EC).
- The International Convention on Wetlands of International Importance 1971.

In the absence of specific National Irish Ornithological Survey Guidance, the guidance documents published by Scottish Natural Heritage (SNH) have been followed to inform this assessment:

- SNH (2017). *Recommended bird survey methods to inform impact assessment of onshore wind farms*. Scottish Natural Heritage.
- SNH (2018) *Avoidance rate information & guidance note: Use of avoidance rates in the SNH wind farm collision risk model*. Scottish Natural Heritage, Edinburgh, UK. <http://www.snh.gov.uk/docs/B721137.pdf>.
- SNH (2016). *Assessing Connectivity with Special Protection Areas (SPAs)*. Scottish Natural Heritage.
- SNH (2012). *Assessing the Cumulative Impact of Onshore Wind Energy Developments*. Scottish Natural Heritage.
- SNH (2006). *Assessing Significance of Impacts from Onshore Windfarms on Birds with Designated Sites*. Scottish Natural Heritage.
- SNH (2009). *Monitoring the impact of onshore wind farms on birds*. Scottish Natural Heritage.
- SNH (2000). *Wind farms and birds: calculating a theoretical collision risk assuming no avoidance action*. SNH Guidance Note.

The following Irish Guidance documents were also consulted:

- Percival, S.M. (2003). *Birds and wind farms in Ireland: A review of potential issues and impact assessment*. Ecological Consulting.
- McGuinness, D., Muldoon, C., Tierney, N., Cummins, S., Murray, A., Egan, S. & Crowe, O. (2015). *Bird Sensitivity Mapping for Wind Energy Developments and Associated Infrastructure in the Republic of Ireland*. Guidance Document. Birdwatch Ireland.
- Birds of Conservation Concern in Ireland 2014-2019 (Colhoun, K. and Cummins, S. 2013).

This assessment has been prepared with respect to the various planning policies and strategy guidance documents listed below:

- Planning and Development Acts 2000 – 2018.
- Leitrim County Council (2015). Leitrim County Development Plan 2015-2021.
- Sligo County Council (2017). Sligo County Development Plan 2017-2023.

- EPA (2017) Guidelines on the Information to be contained in Environmental Impact Assessment Reports – Draft August 2017’.
- EPA (2015) ‘Revised Guidelines on the Information to be contained in Environmental Impact Statements – Draft September 2015’
- EPA (2015) ‘Advice Notes for Preparing Environmental Impact Statements – Draft September 2015’.
- EPA (2003) ‘Advice Notes on Current Practice in the Preparation of Environmental Impact Statements’
- EPA (2002) ‘Guidelines on the Information to be contained in Environmental Impact Statements’
- DoEHLG (2013). *Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment*. Department of the Environment, Community and Local Government (where relevant).
- The European Commission also published a number of guidance documents in December 2017 in relation to Environmental Impact Assessment of Projects (Directive 2011/92/EU as amended by 2014/52/EU) including ‘*Guidance on Screening*’, ‘*Guidance on Scoping*’ and ‘*Guidance on the preparation of the Environmental Impact Assessment Report*’.
- NRA (2009). *Guidelines for Assessment of Ecological Impacts of National Road Schemes (Revision 2)*. National Roads Authority.
- European Commission (2002). *Assessment of plans and projects significantly affecting Natura 2000 sites*.

7.1.3

Statement of Authority and Competence

This ornithology chapter has been prepared by Senior Ornithologist, Mr. Pdraig Cregg (BSc., MSc.) with the assistance of Ecologist, Mr David Naughton (BSc.), of McCarthy Keville O’Sullivan Ltd. (MKO). Both are suitably qualified, competent, professional ecologists with extensive experience of completing avifaunal assessments and are competent experts for the purposes of the preparation of this EIAR. The scope of works and survey methodology was devised by Senior Ornithologist, Mr. Alex Ash (BSc.) and is fully compliant with recent SNH guidance. The chapter has been reviewed by Pat Roberts (B.Sc. Environmental Science) who has over 14 years’ experience in management and ecological assessment.

Field surveys were undertaken by Lee Dark (BSc., MSc.), Rob Wheeldon (BSc., MSc.), Shay Fennelly (BSc.), Jack Kennedy (BSc.), Eric Dempsey (www.birdsireland.com), John Curtin (BSc.), Andrew O’Donoghue (BSc.), Chris Peppiatt (PhD), Declan Manley (BTO C license, BTO Trainer license & Irish Ringing License from NPWS) Pdraig Webb (3rd Year BSc.) and Athena Michaelides (BSc.) All of the above surveyors are competent experts for the purposes of the preparation of this EIAR and suitably qualified.

7.2

Assessment Approach and Methodology

7.2.1

Desk Study

A comprehensive desk study was undertaken to search for any relevant information on species of conservation concern which may potentially make use of the study area. The assessment included a thorough review of the available ornithological data including:

- Review of online web-mappers: National Parks and Wildlife Service (NPWS), National Biodiversity Data Centre (NBDC), Irish Wetland Bird Survey I-WeBS.
- Review of Bird Atlases: (Sharrock, 1976; Lack, 1986; Gibbons et al., 1993; Balmer et al., 2013).

- Review of Birds of Conservation Concern (BoCCI) in Ireland 2014-2019 (Colhoun & Cummins, 2013).
- Review of specially requested records from the NPWS Rare and Protected Species Database.
- Review of impact assessments associated with nearby developments including wind farms.

7.2.2 Consultation

7.2.2.1 Scoping and Consultation

Consultation was undertaken with the relevant statutory and non-statutory organisations as part of the EIAR scoping to inform the current assessment. Full details can be found in Section 2.5 of Chapter 2.

Table 7-1 provides a list of the organisations consulted with regard to Ornithology during the scoping process and notes where scoping responses were received.

Copies of all scoping responses are included in Appendix 2.1 of this EIAR. The recommendations of the consultees have informed the EIAR preparation process and the contents of this chapter. Table 2.3 in Chapter 2 of this EIAR describes where the comments raised in the scoping responses received have been addressed in this assessment.

Table 7-1 Consultation Responses

	Consultee	Response
01	An Taisce	Response received on 05 th April 2019. Comment: Address cumulative effects, impacts on birds since construction of other wind farms in the area
02	BirdWatch Ireland	Response received on 14 th December 2018. Comment: Acknowledgement email - has forwarded to Policy & Advocacy officer for comment. No further comment received to date.
03	Department of Agriculture, Food and the Marine	Response received on 22 nd January 2019. Comment: Felling licence requirements, felling impacts to be assessed
04	Department of Culture, Heritage, and the Gaeltacht	Response received on 30 th January 2019. Comment: Requirements re ecological surveys on biodiversity, flora, fauna (incl birds, bats), habitats (incl aquatic), Construction Management Plan, cumulative impacts, post-construction monitoring
05	Irish Peatland Conservation Council	Response received on 21 st January 2019. Comment: Concerns re loss of blanket bog, impacts on designated sites, birds (Curlew), water quality, peat stability, visual amenity/views

	Consultee	Response
06	Irish Red Grouse Association	No response to date
07	Irish Raptor Study Group	No response to date
08	Irish Wildlife Trust	No response to date
09	Leitrim County Council - Env.	No response to date. However, a meeting was held with Leitrim County Council on the 10 th June 2019 and 15 th of May 2020.
10	Leitrim County Council – Heritage	No response to date. However, a meeting was held with Leitrim County Council on the 10 th June 2019
11	Roscommon County Council - Env.	Response received on 28 th February 2019. Comment: Env section has no comments to make
12	Roscommon County Council - Heritage	No response to date
13	Sligo County Council - Env.	No response to date. However, a meeting was held with Sligo County Council on the 21 st June 2019 and 21 st of May 2020.
14	Sligo County Council – Heritage	No response to date. However, a meeting was held with Sligo County Council on the 21 st June 2019

7.2.3

Identification of Target Species and Key Ornithological Receptors

This section of the report describes the criteria used for the selection of target species. The methodology for assessment followed a precautionary screening approach with regard to the identification of Key Ornithological Receptors. Following a comprehensive desk study, initial site visits and consultation, a list of “Target species” likely to occur in the zone of influence of the Proposed Development was derived. The observation/survey work carried out on the site was specifically designed to survey for these identified target species in accordance with SNH guidance (2017). The target species list (see Appendix 6-1) was drawn from:

- Annex I of the EU Birds Directive.
- Special Conservation Interests (SCI) of Special Protection Areas (SPA) within the zone of likely significant effects.
- Species protected under the fourth schedule of the Wildlife Acts 1976-2012 as amended.
- Red and Amber listed birds of Conservation Concern.

Following analysis of the collated bird survey data, it was possible to refine the list of Target species to identify “Key Ornithological Receptors” and exclude species which were not recorded during the extensive surveys and those for which pathways for significant effect could not be identified.

7.2.4 Field Surveys

Field surveys were undertaken during the survey period September 2017 - September 2019. The data provided in this report is robust and allows clear, precise and definitive conclusions to be made on the avian receptors identified within the subject site. Field survey methodologies have been devised to survey for the bird species composition and assemblages that occur within the study area. The study area/ area surveyed for each type of survey is discussed in the methodology section below. The survey radii mentioned below are discussed in relation to the proposed development area, that is the area within the development boundary where all onsite infrastructure is sited, with the exception of the access road. The survey of the access road is discussed in Section 7.2.4.2.8 below.

7.2.4.1 Initial Site Assessment

Based on the results of the desk study, consultation and reconnaissance site visits, the likely importance of the study area for bird species was ascertained. Based on the collated information available from the above preliminary assessment and adopting a precautionary approach, a site-specific scope for the ornithological survey was developed.

7.2.4.2 Survey Methodologies

The survey work undertaken between September 2017 and September 2019 forms the core dataset for the assessment of effects on ornithology.

In the absence of specific national bird survey guidelines, the ornithological surveys were designed and undertaken in full accordance with ‘*Recommended bird survey methods to inform impact assessment of onshore wind farms*’ (SNH, 2017).

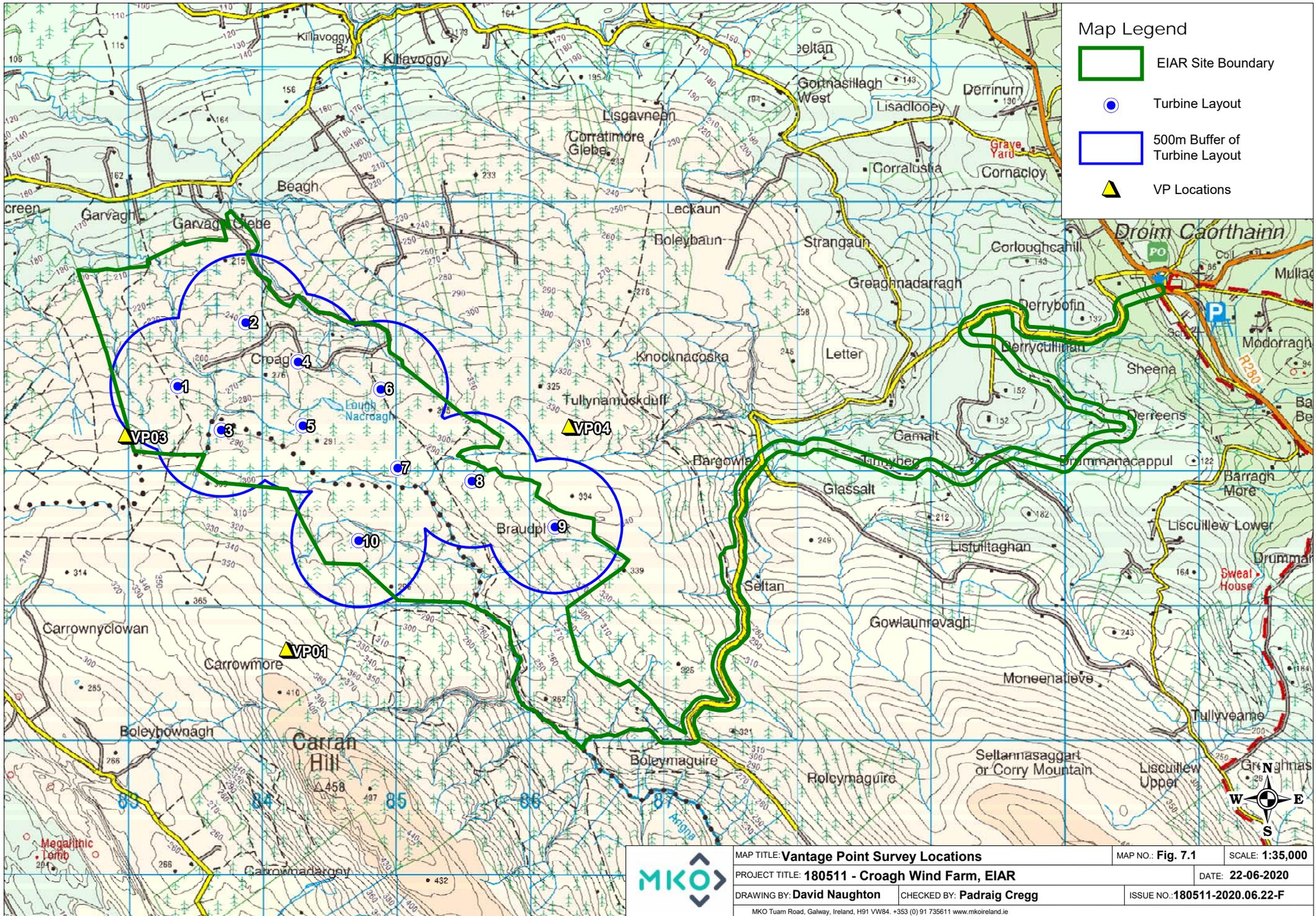
The various survey types undertaken are described below.

7.2.4.2.1 Vantage Point Surveys

Vantage point surveys were undertaken in accordance with SNH guidance from September 2017 to September 2019. Surveys were conducted monthly throughout this survey period from four fixed point vantage points (VP1, VP2, VP3 and VP4) to allow comprehensive coverage of the 500m study area surrounding the proposed turbines. The vantage point locations were selected by undertaking a viewshed analysis, as described below, and confirmed by a recce visit and initial field surveys in September 2017. Data collected from VP02 has been excluded from the core dataset and CRM as it is no longer proposed to site any turbines within its view shed. The proposed turbine layout is entirely covered from three fixed VPs (VP1, VP3 & VP4). In the interests of transparency, data gathered from VP2 is provided in Appendix 7-5 but is not discussed in detail in this report. Figure 7-1 shows the locations of all vantage points relative to the development site.

Viewshed Analysis

Viewshed analysis was carried out to inform coverage of the study area from fixed vantage point locations (i.e. VPs 1, 3 and 4). Viewsheds were calculated using Resoft Wind Farm ZTV (Zone of Theoretical Visibility) software in combination with Mapinfo Professional (Version 10.0) using a notional layer suspended at 30m, which is representative of the minimum height considered for the Potential Collision Risk Area based on a worst-case scenario turbine model. While the relevance of being able to view as much of the site to ground level is acknowledged, the SNH guidance emphasizes the importance of visibility of the ‘collision risk volume’ when the data is to be used to estimate the risk of collision with turbines by birds.



The viewshed analysis involved testing each VP location for its visibility coverage by creating a viewshed point 1.5 meters in height (to represent the height of observer) on a map using 10 metre contours terrain data. The relative height of forestry and its effects on visibility is also accounted for. Using the ZTV software, a viewshed of 360 degrees was produced calculating an area 30 metres from ground level up to a 2km radius. The resulting viewshed image was then cropped to 180 degrees to give the viewshed from each VP location in line with SNH (2017). A 500m buffer was applied to the outer most turbines of the proposed wind farm development in line with SNH (2017). The aim of the viewshed analysis is to identify the visible airspace of the turbine rotor swept area, using the fewest VPs. The visible view sheds at 30m are presented on Figure 7-2.

Data Recording and Digitisation

Data on bird observations and flight activity was collected from a scanning arc of 180° and a 2km radius by an observer at each fixed location for six hours per month. Due to weather constraints, some surveys ended early but were continued at a later date in the month to ensure that six hours of surveys were conducted per month in accordance with SNH guidance (2017). Surveys were scheduled to provide a spread over the full daylight period including dawn and dusk watches to coincide with the highest periods of bird activity. Target species were as per listed in Table 1-1 of Appendix 7-1.

Survey effort for vantage point watches is presented in Appendix 7-2, Table 1-1. This includes full details of dates, times, survey locations, survey duration and weather conditions for each survey. Table 7-2 below shows a summary of the VP survey work undertaken.

Table 7-2 Vantage Point Survey Effort

Survey Season	Months	Minimum Effort per VP
2017/2018 Non-Breeding Season (4VPs)	Sep - Mar	42 hours/VP
2018 Breeding Season (4VPs)	Apr - Sep	36 hours/VP
2018/2019 Non-Breeding Season (4VPs)	Oct - Mar	36 hours/VP
2019 Breeding Season (4VPs)	Apr - Sep	36 hours/VP

Observed flight activity was recorded as per defined flight bands which were chosen in relation to the dimensions of potential turbine models for the site. Bands were split into 0-10m, 10-25m, 25m-175m and 175m+. All flight activity within the height band 25-175m is considered to be within the Potential Collision Height (PCH) with regard to the turbine swept area.

Each flight observation was assigned a unique identifier when mapped in the field and subsequently digitised using GIS software.

7.2.4.2.2 Breeding Bird Surveys (Adapted Brown & Shepherd Survey)

Breeding walkover surveys were undertaken to determine the presence of bird species of high conservation concern and identify areas of possible, probable or confirmed breeding territories for bird species observed within the study area. The survey methodology followed the Adapted Brown and Shepherd method for upland sites as outlined in Gilbert et al. (1998) and SNH (2017) ('adapted Brown and Shepherd surveys'). Heavily forested areas and non-Coillte land holdings around the margins of the proposed development area, were surveyed from areas where public access was permitted i.e. public roads, or from areas within Coillte property.

Transect routes were devised to ensure coverage of different habitat complexes between vantage point locations within the study area. Transects were selected in order to survey every area of suitable breeding/ foraging habitat, in areas where access was not an issue. Target species were waders, raptors,

