Natura Impact Statement

Croagh Wind Farm, Co. Leitrim & Co. Sligo

Further Information Response – March 2021

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Planning and Environmental Consultants

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1. INTRODUCTION

1.1 Background

McCarthy Keville O'Sullivan Ltd. (MKO) has been appointed to prepare a Natura Impact Statement to allow the competent authority to conduct an Appropriate Assessment under Part XAB of the Planning and Development Acts 2000-2019 of a proposed wind energy development and all associated infrastructure located at Croagh, Co. Leitrim and Co. Sligo.

An Appropriate Assessment Screening Report has been prepared and is provided in Appendix 1. This Appropriate Assessment Screening Report identified the European Sites upon which the proposed development has the potential to result in significant effects and the pathways by which those effects may occur. It has also identified those qualifying interests/special conservation interests that have the potential to be affected by the proposed development. The Screening Report identifies the European Sites upon which significant effects could not be excluded. Those sites will be assessed in this Natura Impact Statement.

This report has been prepared in compliance with Part XAB of the Planning and Development Acts 2000-2019, the Planning and Development Regulations 2001-2020 and relevant jurisprudence of the European and Irish courts. It has also been prepared in accordance with the European Commission guidance document Assessment of Plans and Projects Significantly affecting Natura 2000 Sites: Methodological Guidance on the provisions of Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC (EC, 2001), European Communities (2018) Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg European Commission and the Department of the Environment's Guidance on the Appropriate Assessment of Plans and Projects in Ireland (December 2009, amended 11 February 2010).

In addition to the guidelines referenced above, the following relevant guidance was considered in preparation of this report:

1. *Council of the European Commission (1992) Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. Official Journal of the European Communities. Series L 20, pp. 7-49.*
2. *European Communities (2000) Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission,*
3. *EC (2007) Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission. European Commission.*
4. *EC (2013) Interpretation Manual of European Union Habitats. Version EUR 28. European Commission.*
5. *CIEEM (2018) Institute of Ecology and Environmental Management Guidelines for Ecological Impact Assessment.*

1.2 Statement of Authority

This report has been prepared by David McNicholas (BSc., MSc., MCIEEM) and Pat Roberts (B.Sc., MCIEEM). David McNicholas has over 9 years' professional ecological consultancy experience and is a full member of the Chartered Institute of Ecology and Environmental Management. Pat has over 14 years' experience in ecological management and assessment. The baseline ecological surveys were undertaken by David McNicholas and James Owens (BSc., MSc). James has over 4 years' consultancy experience and is a competent expert in undertaking ecological surveys.

2. CONCLUSIONS OF ARTICLE 6(3) APPROPRIATE ASSESSMENT SCREENING REPORT

The Article 6(3) Appropriate Assessment Screening report identified the potential for the proposed development to result in significant effects on the following European Sites:

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

Each of these sites is discussed individually below in terms of the Qualifying Interests and Special Conservation Interests with the potential to be affected and the pathways by which any such effects may occur.

2.1 Lough Gill SAC

As described in the Screening for Appropriate Assessment report, (see Appendix 1), and Section 9.3.4, Chapter 9 'Water' of the EIAR (Appendix 3), hydrological connectivity with the SAC has been identified via the Tullynascreen Stream and the Killanummery River that drain the upper reaches of the northern part of the site, located within the Garvogue catchment. These watercourses drain to the River Bonet, which forms part of the SAC at its closest. The River Bonet then enters into Lough Gill. The SAC is located 4.4km (over 7km surface water distance) downstream of the proposed development site at its closest.

2.1.1 Surface water deterioration

Taking a precautionary approach, a potential pathway for indirect effects on the following aquatic QI's, in the form of deterioration of surface water as a result of pollution during construction activities, was identified:

- Alluvial forests with *Alnus glutinosa* and Fraxinus excelsior (*Alno-Padion, Alnion incanae, Salicion albae)* [91E0]
- Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation [3150]
- *Austropotamobius pallipes* (White-clawed Crayfish) [1092]
- *Petromyzon marinus* (Sea Lamprey) [*1095]*
- *Lampetra planeri* (Brook Lamprey) [1096]
- *Lampetra fluviatilis* (River Lamprey) [1099]
- *Salmo salar (*Salmon) [1106]
- *Lutra lutra* (Otter) [1355]

The potential effect requires further assessment and will be considered below under the conservation objectives for the above listed QIs.

2.2 Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC (000627)

As described in the Screening for Appropriate Assessment report, (see Appendix 1), and Section 9.3.4, Chapter 9 'Water' of the EIAR (Appendix 3), hydrological connectivity with the SAC has been identified via the Tullynascreen Stream and the Killanummery River that drain the upper reaches of the

northern part of the site, located within the Garvogue catchment. These watercourses drain to the River Bonet. The River Bonet then enters into Lough Gill before entering the SAC at Drumcliff Bay, via the Garavogue River, located approx. 17.7 km (over 28.6km surface water distance) downstream of the proposed development.

2.2.1 Surface water deterioration

Taking a precautionary approach, a potential pathway for indirect effects on the following aquatic QI's, in the form of deterioration of surface water as a result of pollution during construction activities, was identified:

- Mudflats and sandflats not covered by seawater at low tide [1140]
- Estuaries [1130]
- *Phoca vitulina* (Harbour Seal) [1365]
- *Petromyzon marinus* (Sea Lamprey) [1095]
- *Lampetra fluviatilis* (River Lamprey) [1099]

The potential effect requires further assessment and will be considered below under the conservation objectives for the above listed QIs.

2.3 Cummeen Strand SPA (004035)

The proposed development site does not offer suitable supporting habitat for the SCI species for which the SPA is designated. As fully described in Chapter 7 'Ornithology' of the accompanying EIAR for the proposed development, none of the SCI bird species for which the SPA has been designated were recorded during the bird surveys of the site over the survey period September 2017 - September 2019. Therefore, it is not considered that there is any movement of these SCI species for Cummeen Strand SPA into, out of and between European sites occurring within the likely zone of impact (i.e. Lough Arrow SPA, Cummeen Strand SPA or Ballykenny-Fisherstown Bog SPA) of the proposed development site. Therefore, disturbance/displacement or collision risk related effects on SCI species have been excluded.

However, as described in the Screening for Appropriate Assessment report, see Appendix 1, hydrological connectivity with the SPA has been identified via the Killanummery River that joins the River Bonet further downstream. The River Bonet enters into Lough Gill before entering the SPA at Drumcliff Bay, via the Garavogue River, located over 29 km hydrological distance downstream of the proposed development. Potential for impact on the designated site is therefore restricted to water quality deterioration. Surface water deterioration

Taking a precautionary approach, a potential pathway for indirect effects on the following aquatic SCIs, in the form of deterioration of surface water as a result of pollution during construction activities, was identified:

- Wetland and Waterbirds [A999]

As the Wetland and Waterbird [A999] conservation objective is the supporting habitat for the following SCI listed bird species, these species have been screened in for further assessment:

- Light-bellied Brent Goose (*Branta bernicla hrota*) [A046]
- Oystercatcher (*Haematopus ostralegus*) [A130]
- Redshank (*Tringa totanus)* [A162]

The potential effect requires further assessment and will be considered below under the conservation objectives for the above listed SCIs.

3. DESCRIPTION OF PROPOSED DEVELOPMENT

3.1 Site Location

The proposed development site is located in an upland area on the north-eastern slopes of Carrane Hill on the boundary of Counties Leitrim and Sligo. The site is located approximately 3.8 kilometres west of Drumkeeran and approximately 7.5 kilometres southeast of Dromahair, see Figure 3.1. The Grid Reference coordinates for the approximate centre of the site are E 584840 N 823450. The site location in relation to all European sites is shown in Figure 3.2.

The Proposed Development layout makes maximum use of the existing access road and tracks within the site. The site will be accessed via a number of local roads and Coillte forestry roads, including a local road adjoining the R280 Regional Road, which travels through Drumkeeran, east of the site. The Study Area is approximately 800 hectares.

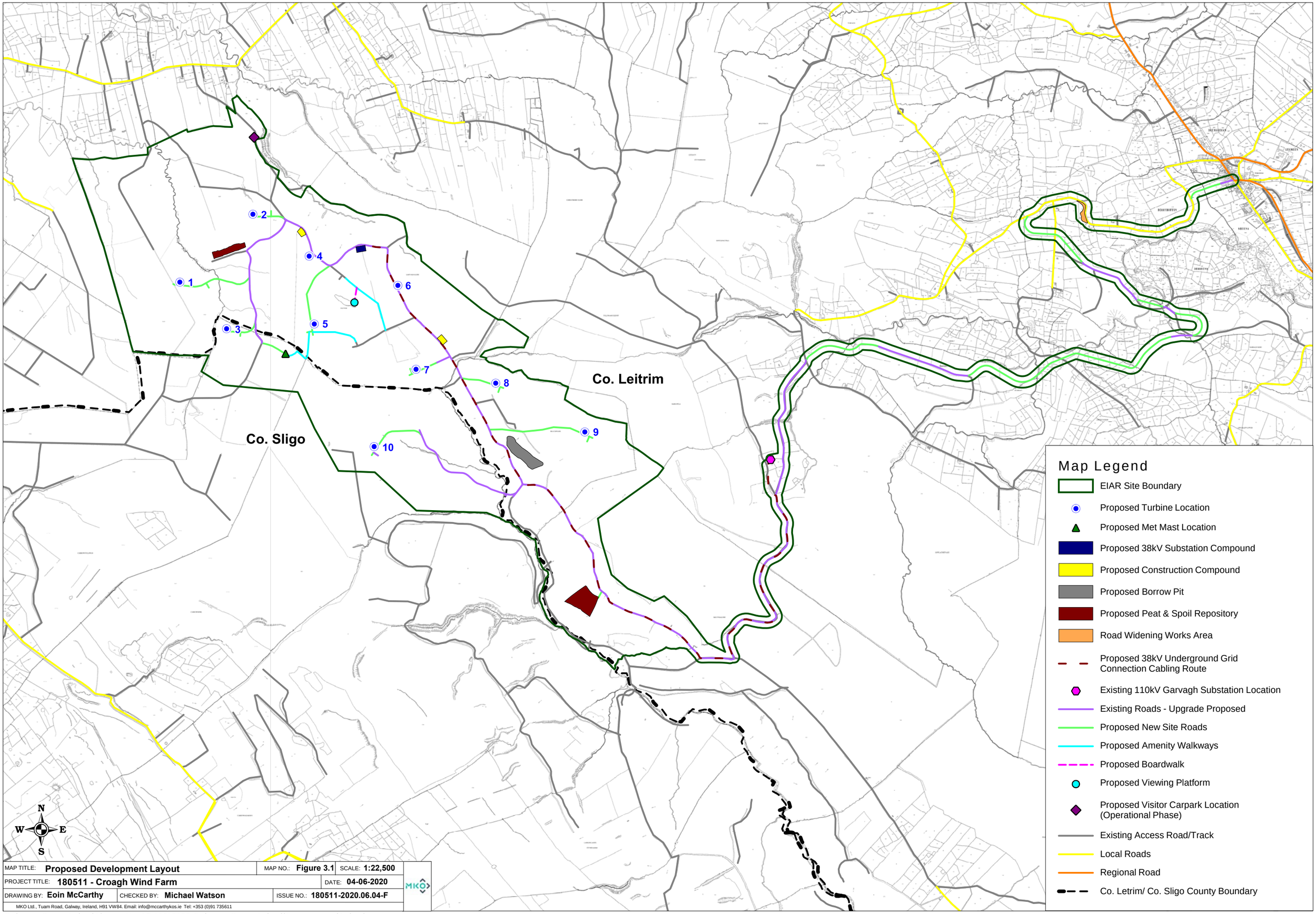
3.2 Characteristics of the Proposed Development

3.2.1 Description of the project

The Proposed Development comprises:

1. *Construction of 10 No. wind turbines with a maximum overall blade tip height of up to 170 metres, and associated hardstand areas;*
2. *1 no. 38kV permanent electrical substation including a control building with welfare facilities, all associated electrical plant and equipment, security fencing, all associated underground cabling, waste water holding tank and all ancillary works;*
3. *1 no. permanent Meteorological Mast with a maximum height of up to 100 metres;*
4. *All associated underground electrical and communications cabling connecting the turbines to the proposed wind farm substation;*
5. *All works associated with the connection of the proposed wind farm to the national electricity grid, via underground cabling to the existing Garvagh substation;*
6. *Upgrade of existing tracks and roads, provision of new site access roads and hardstand areas;*
7. *The partial demolition and alteration of two agricultural buildings in the townlands of Sheena and associated junction access and road works to the existing yard, agricultural buildings and agricultural lands in the townlands of Sheena and Derrybofin to provide a link road primarily for construction traffic off the R280. This link road will be used for the delivery of abnormal loads to the site during the construction period and may be used during the operational period if necessary or to facilitate the decommissioning of the wind farm. Following construction, access to the link road will be closed off and the yard/agricultural building will revert to its use for agricultural purposes except if and when required for delivery of abnormal loads during the operational period of the windfarm or to facilitate the decommissioning of the wind farm;*
8. *1 no. borrow pit;*
9. *2 no. peat and spoil repository areas*
10. *2 no. temporary construction compounds;*
11. *Recreation and amenity works, including marked trails, boardwalk and viewing area provision of a permanent amenity car park, and associated recreation and amenity signage*
12. *Site Drainage;*
13. *Permanent Signage;*
14. *Ancillary Forestry Felling to facilitate construction and operation of the proposed development; and*
15. *All associated site development works*

This application seeks a ten-year planning permission and 30-year operational life from the date of commissioning of the entire wind farm.



Map Legend

- EIAR Site Boundary
- Proposed Turbine Location
- Proposed Met Mast Location
- Proposed 38kV Substation Compound
- Proposed Construction Compound
- Proposed Borrow Pit
- Proposed Peat & Spoil Repository
- Road Widening Works Area
- Proposed 38kV Underground Grid Connection Cabling Route
- Existing 110kV Garvagh Substation Location
- Existing Roads - Upgrade Proposed
- Proposed New Site Roads
- Proposed Amenity Walkways
- Proposed Boardwalk
- Proposed Viewing Platform
- Proposed Visitor Carpark Location (Operational Phase)
- Existing Access Road/Track
- Local Roads
- Regional Road
- Co. Letrim/ Co. Sligo County Boundary

MAP TITLE: **Proposed Development Layout**		MAP NO.: **Figure 3.1**	SCALE: **1:22,500**
PROJECT TITLE: **180511 - Croagh Wind Farm**			DATE: **04-06-2020**
DRAWING BY: **Eoin McCarthy**	CHECKED BY: **Michael Watson**	ISSUE NO.: **180511-2020.06.04-F**	

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Drumcliff Bay SPA
Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC
Cummeen Strand SPA
Coastal04
Lough Gill SAC
Ballysadare Bay SPA
Ballysadare Bay SAC
Union Wood SAC
Corratirrim SAC
Boleybrack Mountain SAC
Garvogue
Cuilcagh - Anierin Uplands SAC
Ballysadare
Shannon
Unshin River SAC
And Cloonacleigha Loughs SAC
igo) SAC
Lough Arrow SAC
Bricklieve Mountains and Keishcorran SAC
Lough Arrow SPA

Map Legend

- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- EPA mapped watercourses
- River Catchments
- 15km buffer from proposed development
- Proposed turbine location
- EIAR Study Area

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MAP TITLE: **Site in relation to EU designated sites**		MAP NO.: **Figure 3.2**	SCALE: **1:140.000**
PROJECT TITLE: **180511 - Croagh Wind Farm**			DATE: **16-06-2020**
DRAWING BY: **DMN**	CHECKED BY: **PR**		ISSUE NO.: **180511-2020.04.16-D1**

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The planning application for the proposed wind farm includes a connection to the national electricity grid. All elements of the proposed development, including grid connection and any works required on public roads to accommodate turbine delivery, have been considered.

3.2.2 Development layout

The overall layout of the Proposed Development is shown on Figure 3.1. This drawing shows the proposed locations of the wind turbines, electricity substation, construction compounds, internal roads layout and the site entrances. A detailed description of all elements of the development, including construction methodology and site layout drawings of the proposed development are included in Chapter 4 and Appendix 4-1 of the EIAR accompanying this application. A summary description is provided below.

3.2.3 Site setup

A suite of best practice environmental control and measures have been incorporated into the design of the proposed project for the construction, operation and decommissioning phase of the proposed project. Measures for the protection of water quality have been incorporated into the initial site setup phase, including the installation and management of site compounds, fuel storage areas, material storage areas are set out in this NIS along with additional mitigation measures prescribed in Section 5. These are fully described in the Construction Environmental Management Plan (CEMP), provided in Appendix 2, Section 9.5.3 Chapter 9 '*Water*' of the EIAR (Appendix 3) and additional measures also provided in Section 3.5 of this NIS. Such measures will ensure that there is no potential for water quality deterioration associated with site setup and construction.

3.2.4 Construction details

3.2.4.1 Turbine Foundations

Each wind turbine is secured to a reinforced concrete foundation that is installed below the finished ground level. The size of the foundation will be dictated by the turbine manufacturer, and the final turbine selection will be the subject of a competitive tender process. Different turbine manufacturers use different shaped turbines foundations, ranging from circular to hexagonal and square, depending on the requirements of the final turbine supplier. For this reason, all potential variations in the required infrastructure have been considered in this assessment.

After the foundation level of each turbine has been formed using piling methods or on competent strata, the bottom section of the turbine tower "Anchor Cage" is levelled and reinforcing steel is then built up around and through the anchor cage. The outside of the foundation is shuttered with demountable formwork to allow the pouring of concrete and is backfilled accordingly with appropriate granular fill to finished surface level (**Error! Reference source not found.**Plates 3-1 and 3-2 below). Detailed construction methodology for the turbine foundations is provided in Section 4.9, Chapter 4 of the EIAR accompanying this application.

Plate 3.1 Turbine Base 'Anchor Cage'

Plate 3.2 Finished Turbine Base

3.2.4.2 Hard Standing Areas

Hard standing areas consisting of levelled and compacted hardcore are required around each turbine base to facilitate access, turbine assembly and turbine erection. The hard-standing areas are typically used to accommodate cranes used in the assembly and erection of the turbine, offloading and storage of turbine components, and generally provide a safe, level working area around each turbine position. The hard-standing areas are extended to cover the turbine foundations once the turbine foundation is in place. The sizes, arrangement and positioning of hard standing areas are dictated by turbine suppliers. However, this NIS has assessed the potential impacts of the hard-standing design. The proposed hard standing areas are shown on the detailed layout drawings included in Appendix 4-1 of the EIAR accompanying this application.

3.2.4.3 Site Roads

To provide access within the site of the Proposed Development and to connect the wind turbines and associated infrastructure approximately 10.9 kilometres of existing roads and tracks will need to be upgraded and approximately 6.9 kilometres of new access roads will need to be constructed. The road construction design has taken into account the following key factors as stated in the Fehily Timoney & Company's (FTC) Peat & Spoil Management Plan in Appendix 4-2, of the accompanying EIAR:

1. *Buildability considerations*
2. *Serviceability requirements for construction and wind turbine delivery and maintenance vehicles*
3. *Minimise excavation arisings*
4. *Requirement to minimise disruption to peat hydrology*

Whilst the above key factors are used to determine the road design the actual construction technique employed for a particular length of road is determined on the prevailing ground conditions encountered along that length of road. The construction methodology proposed to be used for new and existing roads across the site are included in Section 4.9.2, Chapter 4 of the EIAR accompanying this application.

3.2.4.3.1 *Construction of New Excavated Roads*

The general construction methodology for the construction of excavated roads, as presented in Appendix 4.2, of the accompanying EIAR, is summarised below. This methodology includes procedures that are to be included in construction to minimise any adverse impact on the receiving environment. The location, extent and layout of all new roads are provided in Figure 3.1.

1. *Interceptor drains will be installed upslope of the access road alignment to divert any surface water away from the construction area.*

2. *Road construction will be carried out in sections of approximately 50m lengths i.e. no more than 50m of access road will be excavated without re-placement with stone fill.*
3. *The surface of the excavated access road will be overlaid with up to 500mm of selected granular fill. Granular fill to be placed in layers in accordance with the designers' specification.*
4. *A layer of geogrid/geotextile may be required at the surface of the competent stratum (to be confirmed by the designer, but won't impact on any potential effects of the proposed development).*
5. *A final surface layer shall be placed over the excavated road, as per design requirements, to provide a road profile and graded to accommodate wind turbine construction and delivery traffic.*

3.2.4.3.2 Construction of New Floating Roads

The general construction methodology for the construction of floating roads, is outlined in section 4.9, Chapter 4 of the EIAR accompanying this application and in Peat and Spoil Management Plan (Appendix 5 of this NIS) and is summarised below. This methodology includes procedures that are to be included in the construction to minimise any adverse impact on peat stability.

As described in the *Peat and Spoil Management Plan* (P&SMP) (FehilyTemoney, 2020), it will be necessary to construct floating roads over peat. The location and extent of such construction measures required is fully illustrated in Figure 2.1 '*Plan Drawing Of Wind Farm With Road Construction Type*' and Section 5 of the P&SMP, Appendix 5, of the EIAR. Localised sections of floating road will be utilised as described above, but these have a lesser impact. Floating roads minimise impact on the peat, particularly peat hydrology. In floating road construction, there is no excavation of peat required, and thus no peat arisings are generated (FehilyTemoney, 2020). Excavated roads have a greater potential impact and thus have been considered as the worst case. All road construction/alteration methodologies have been fully considered in this NIS.

The general construction methodology for the construction of floating roads, as presented in AGEC's Peat and Spoil Management Plan in Appendix 4.2 of the EIAR, is summarised below. This methodology includes procedures that are to be included in the construction to minimise any adverse impact on peat stability.

1. *Prior to commencing floating road construction movement monitoring posts will be installed in areas where the peat depth is greater than 3m.*
2. *Base geogrid to be laid directly onto the existing peat surface along the line of the road in accordance with geogrid provider's requirements.*
3. *Construction of road to be in accordance with appropriate design from the designer.*
4. *The typical make-up of the new floated access road is 500 to 750mm of selected granular fill with 2 no. layers of geogrid with possibly the inclusion of a basal layer of tree trunks/brash*
5. *Granular fill to be placed in layers in accordance with best practice*
6. *Pressure berms will be incorporated either side of the access road in some of the deeper peat areas. The inclusion of a 2 to 5m wide pressure berm (typically 0.5m in height) either side of the access road will reduce the likelihood of potential bearing failures beneath the access road.*
7. *The finished running width of the road will be approximately 5m with localised widening for turning and passing.*
8. *Stone delivered to the floating road construction shall be end-tipped onto the constructed floating road. Direct tipping of stone onto the peat shall not be carried out.*
9. *To avoid excessive impact loading on the peat due to concentrated end-tipping all stone delivered to the floating road shall be tipped over at least a 10m length of constructed floating road.*
10. *Where it is not possible to end-tip over a 10m length of constructed floating road then dumpers delivering stone to the floating road shall carry a reduced stone load (not*

greater than half full) until such time as end-tipping can be carried out over a 10m length of constructed floating road.

11. *Following end-tipping a suitable bulldozer shall be employed to spread and place the tipped stone over the base geogrid along the line of the road.*
12. *A final surface capping layer shall be placed over the full width of the floating road, as per design requirements, to provide a road profile and graded to accommodate wind turbine construction and delivery traffic.*

3.2.4.4 Amenity Pathways and Carpark

The proposed recreation and amenity facilities consist of a series of marked walkways, picnic areas, viewing points, complimented by waypoint signage, and a visitor car park.

The scale of the site, extent of infrastructure already in place and proposed as part of the wind farm development, and the accessibility of the area from the public road network, provides a recreation and amenity opportunity of great potential. The recreational and amenity proposals for the site follow an emerging international trend to make wind farm sites accessible to the general public by providing recreation opportunities that complement the wind farm development. Although the site consists of a rural working landscape under commercial forestry plantation with many wind farm developments already permitted in the immediate vicinity and surrounding area, the site has a secluded and isolated feel, which adds to the attractiveness and potential of the area as a recreation location.

The recreation and amenity facilities proposed for the Croagh Wind Farm development are intended to appeal to walkers, cyclists, trail runners, amongst others, and are outlined in the below.

3.2.5 Recreation and Amenity Facilities

The proposed recreation and amenity facilities consist of a series of marked walkways and a viewing point, complimented by waypoint signage and a visitor car park, each of which are detailed in the below. The following proposals should be read in conjunction with Figure 4-30, Appendix 6 which maps the proposed recreation and amenity proposals for the site of the Proposed Development.

3.2.5.1 Visitor Entrance and Car Park

Access to the site, for visitors during the operational phase, will be via the local road in the townland of Garvagh Glebe, north of the proposed visitor car park. It is proposed to use an existing site entrance, as shown on Figure 3.1, for public access to the site and associated amenity facilities during the operational phase. This existing entrance has adequate visibility splays for safe access and egress for passenger vehicles or cyclists. This detail is shown in Figure 4-31, Appendix 6. This entrance will not be used to provide access or egress for construction plant or vehicles during the construction or operational phase of the Proposed Development.

A visitor car park will be constructed on the western side of the amenity access track, the detail of which is shown in Figure 4-31, Appendix 6. The surface dressing of this car park will be level and compacted Clause 804 stone and will accommodate up to 24 vehicles.

The car park will act as a landing point or trailhead for recreation and amenity users arriving at the site. The car park will provide a safe and easily accessible landing point, allowing visitors to orientate themselves on the site.

3.2.5.2 Car Park, Amenity Walkways, Seating Areas and Waypoint Signage

It is proposed to open sections of the wind farm site roads, in combination with proposed new gravel walkways, as marked trails for walkers, cyclists, trail runners and general outdoor recreation. Three separate sections of proposed new gravel walkways are proposed, forming a number of looped trails within the site of the proposed wind farm development. In total, there will be approximately 3.75 kilometres of amenity walkways constructed and linking into wind farm site roads. The proposed walkways are shown on Figure 4-30, Appendix 6 of this NIS. All proposed walkways will have a 2.5 metre-running width, constructed in the same manner as the proposed new floating road sections, as described in Section 3.4.3.2 of this NIS, and will correspond to National Trails Office Class 3 Walking Trails standard, or better.

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. Figure 4-33, Appendix 6 of this NIS shows typical cross section of the proposed boardwalk and viewing platform.

Seating areas will be provided at different locations along the amenity walkways, including the viewing platform, to allow visitors to rest and take advantage of the scenic views of the wider area from the site and to enjoy the area around Lough Nacroagh. A typical seating area is shown in Figure 4-29, Appendix 6 of this NIS.

Three different forms of information and waypoint signage will be provided across the proposed recreation and amenity area. The proposed locations of the signage are indicated on Figure 4-34, Appendix 6 of this NIS.

3.2.5.3 Onsite Electricity Substation and Control Building

The onsite substation will be constructed by the following methodology:

- The area of the onsite substation will be marked out using ranging rods or wooden posts and the soil and overburden stripped and removed for use in landscaping. Any excess material will be sent to one of the on-site peat repositories or the proposed borrow pit, for reinstatement purposes.
- The dimensions of the onsite substation area will be set to meet the requirements of the ESB or Eirgrid, and the necessary equipment to safely and efficiently operate the wind farm. Sections and elevations of the proposed substation are shown in Figures 4-12, Appendix 6 of this NIS. This NIS fully assesses the potential impacts of the onsite substation design. Two control buildings will also be built within the onsite substation compound;
- The foundations will be excavated down to a suitable foundation stratum and appropriately shuttered reinforced concrete will be laid over it. An anti-bleeding admixture will be included in the concrete mix; The construction and components of the substation will be to ESB or Eirgrid specifications. A foundation area large enough to accommodate proposed infrastructure as been assessed as part of this report.
- The block work walls will be built up from the footings to DPC level and the floor slab constructed, having first located any ducts or trenches required by the follow on mechanical and electrical contractors;
- The block work will then be raised to wall plate level and the gables & internal partition walls formed. Scaffold will be erected around the outside of the building for this operation;
- The concrete roof slabs will be lifted into position using an adequately sized mobile crane;

- The timber roof trusses will then be lifted into position using a telescopic load all or mobile crane depending on site conditions. The roof trusses will then be felted, battened, tiled and sealed against the weather.
- The electrical equipment will be installed and commissioned.
- Perimeter fencing will be erected.
- Temporary Construction Compounds

The temporary construction compounds, see Figure 3.1, will be constructed as follows:

- The area to be used as the compound will be marked out at the corners using ranging rods or timber posts. Drainage runs and associated settlement ponds will be installed around the perimeter;
- The compound area will be established using a similar technique as the construction of the substation compound discussed above;
- A layer of geo-grid will be installed, and compacted layers of well graded granular material will be spread and lightly compacted to provide a hard area for site offices and storage containers;
- Areas within the compound will be constructed as site roads and used as vehicle hardstandings during deliveries and for parking;
- The compound will be fenced and secured with locked gates if necessary; and,
- Upon completion of the Proposed Development the temporary construction compound will be decommissioned by backfilling the area with the material arising during excavation, landscaping with topsoil as required.

3.2.5.4 Site cabling

Each turbine will be connected to the on-site electricity substation via an underground 20 or 33kV (kilovolt) electricity cable. The ducting requirements are the same for both voltages. Fibre-optic cables will also connect each wind turbine to the wind farm control building at the onsite substation compound. The electricity and fibre-optic cables running from the turbines to the onsite substation compound will be run in cable ducts installed in trenches 0.6m wide and approximately 1.3 metres below the ground surface, along the sides of roadways. The route of the cable ducts will follow the access track to each turbine location and are shown on the site layout drawings, Figure 3.1. Figures 4-15 and 4-16, Appendix 6, shows two variations of a typical cable trench, one for off-road trenches (to be installed on areas of soft ground that will not be trafficked) and one for on-road trenches (to be used where trenches run along or under a roadway).

Clay plugs will be installed at regular intervals of not greater than 50 metres along the length of the trenches to prevent the trenches becoming conduits for runoff water. While the majority of the cable trenches will be backfilled with native material, clay subsoils of low permeability will be used to prevent conduit flow in the backfilled trenches. This material will be imported onto the site should sufficient volumes not be encountered during the excavation phase of roadway and turbine foundation construction.

3.2.6 Grid Connection Cabling

A connection between the Proposed Development and the national electricity grid will be necessary to export electricity from the proposed wind farm. This connection will originate at the proposed onsite substation and will run east along the existing site roads and local access roads, within Coillte property, to the existing Garvagh 110kV Electricity Substation, located within the site in the townland of Seltan, see Figure 3.1. The grid connection cabling route is approximately 6.2 kilometres in length. All works required to connect the proposed wind farm to the national grid can be undertaken within the site boundary. The grid connection cable trench is shown in Figure 4-14, Appendix 6 of this NIS.

3.2.7 Site Drainage

The drainage design for the Proposed Development has been prepared by Hydro Environmental Services Ltd. (HES), and by the firm's principal, Mr. Michael Gill. The protection of the watercourses within and surrounding the site, and downstream catchments that they feed is of utmost importance in considering the most appropriate drainage proposals for the site of the Proposed Development. The Proposed Development's drainage design has therefore been proposed specifically with the intention of having no negative impact on the water quality of the site and its associated rivers and lakes, and consequently no impact on downstream catchments and ecological ecosystems. No routes of any

natural drainage features will be altered as part of the Proposed Development. Turbine locations and associated new roadways were selected to avoid natural watercourses, and existing roads are to be used wherever possible. There will be no direct discharges to any natural watercourses, with all drainage waters being dispersed as overland flows. All discharges from the proposed works areas will be made over vegetation filters at an appropriate distance from natural watercourses. Buffer zones around the existing natural drainage features have been used to inform the layout of the Proposed Development.

Turbine locations have been selected to avoid natural watercourses. 9 no. new watercourse crossings and 16 no. potential crossing upgrades will be required as part of the Proposed Development. One new crossing will be required along the construction access road. The location and design of the proposed watercourse crossings are provide in the detailed planning application drawings Figures 4-38 & 4-39, Appendix 6 of this NIS. There will be no direct discharges to natural watercourses. All discharges from the proposed works areas or from interceptor drains will be made over vegetated ground at an appropriate distance from natural watercourse and lakes. Buffer zones around the existing natural drainage features have informed the layout of the Proposed Development and are indicated on the drainage design drawing Figure 3-2a, Appendix 6 of this NIS.

Where artificial drains are currently in place in the vicinity of proposed works areas, these drains may have to be diverted around the proposed works areas to minimise the amount of water in the vicinity of works areas. Where it may not be possible to divert artificial drains around proposed work areas, the drains will be blocked to ensure sediment laden water from the works areas has no direct route to other watercourses. Where drains have to be blocked, the blocking will only take place after an alternative drainage system to handle the same water has been put in place.

Existing artificial drains in the vicinity of existing site roads will be maintained in their present location where possible. If it is expected that these artificial drains will receive drainage water from works areas, check dams will be added (as specified below) to control flows and sediment loads in these existing artificial drains. If road widening or improvement works are necessary along the existing roads, where possible, the works will take place on the opposite side of the road to the drain.

Details of all proposed drainage measures incorporated into the proposed development are fully described in Section 4.7, Chapter 4 of the EIAR, Section 9.4.2, Chapter 9 'Water' (Appendix 3) and Section 3.2 of the CEMP, Appendix 2 of this NIS.

3.2.8 Peat Management

The management of excavated peat and overburden and the methods of placement and/or reinstatement are described in detail in FTC's *Peat and Spoil Management Plan* in Appendix 4-2 of the EIAR for this application. This management plan is also provided in Appendix 5 of this NIS.

3.2.9 Proposed Clear-span Watercourse Crossing

It is proposed to construct clear-span watercourse crossings along the access roads to Turbine No. 1 and Turbine No. 10 using corrugate metal arches. The locations of these crossings are shown as *Proposed*

New Watercourse Crossing No. 1 and *No. 2* on the layout drawings included as Figures 4-38 & 4-39 Appendix 6 of this NIS.

The clear-span bridge will be constructed to the specifications of the OPW bridge design guidelines '*Construction, Replacement or Alteration of Bridges and Culverts - A Guide to Applying for Consent under Section 50 of the Arterial Drainage Act, 1945*', and in consultation with Inland Fisheries Ireland. Abutments will be constructed from precast units combined with in-situ foundations, placed within an acceptable backfill material.

Four new water course crossings will be required as part of the proposed development. The locations of these crossings are shown as *Proposed New Watercourse Crossing No. 3* to *No. 6* on the layout drawings 4-38 & 4-39, Appendix 6 of this NIS. It is proposed that these crossings will be constructed using bottomless, pre-cast concrete structures. The typical construction methodology for the installation of a pre-cast concrete clear-span bridge as well as corrugated metal or plastic and stone clear-span bridge is presented in Section 5 of this NIS.

The design drawings for the proposed clear-span watercourse crossings are shown in Figure 4-40, Appendix 6 of this NIS .

3.3 Operation

The Proposed Development is expected to have a lifespan of approximately 30 years. Planning permission is being sought for a 30-year operation period commencing from the date of full operational commissioning of the wind farm. During the operational period, on a day-to-day basis the wind turbines will operate automatically, responding by means of anemometry equipment and control systems to changes in wind speed and direction.

The wind turbines will be connected together, and data relayed from the wind turbines to an off-site control centre. Each turbine will also be monitored off-site by the wind turbine supplier. The monitoring of turbine output, performance, wind speeds, and responses to any key alarms will be monitored at an off-site control centre 24-hours per day.

Each turbine will be subject to a routine maintenance programme involving a number of checks and changing of consumables, including oil changes. In addition, there will be a requirement for unscheduled maintenance, which could vary between resetting alarms to major component changes requiring a crane. Typically, maintenance traffic will consist of four-wheel drive vehicles or vans. The electricity substation and site tracks will also require periodic maintenance.

3.4 Decommissioning

The wind turbines proposed as part of the Proposed Development will have, in line with planning permission, a lifespan of approximately 30 years. Following the end of their useful life, the wind turbines may be replaced with a new set of turbines, subject to planning permission being obtained, or the Proposed Development may be decommissioned fully. The onsite substation and will remain in place as it will be under the ownership of the ESB/EirGrid.

Upon decommissioning of the Proposed Development, the wind turbines will be disassembled in reverse order to how they were erected. All above ground turbine components will be separated and removed off-site for recycling. Turbine foundations will remain in place underground and will be covered with earth and reseeded as appropriate. Leaving the turbine foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in significant environment nuisances such as noise, dust and/or vibration. Site roadways will be left in situ to facilitate ongoing timber management and harvesting. Underground cables, including grid connection, will be removed and the ducting left in place. A decommissioning

plan will be agreed with the local authorities three months prior to decommissioning the Proposed Development. An outline decommissioning plan is contained in the CEMP in Appendix 2 of this NIS.

4. CHARACTERISTICS OF THE RECEIVING ENVIRONMENT

The ecological surveys that were undertaken to inform this NIS are fully described in this section. A general description of the ecology of the site of the proposed development is provided in the AA Screening Report in Appendix 1. The specific surveys, including otter, lamprey, freshwater crayfish and salmon surveys, that were undertaken to assess the potential effects on the identified European Sites are described below.

4.1 Ecological Survey Methodologies

4.1.1 Desk Study methodology

The desk study undertaken for this assessment included a thorough review of available ecological data including the following:

- Review of online web-mappers: National Parks and Wildlife Service (NPWS), EPA (Envision), Water Framework Directive (WFD), Geological Survey of Ireland (GSI) & Inland Fisheries Ireland (IFI).
- Review of Bird Atlases: (Sharrock, 1976; Lack, 1986; Gibbons *et al.,* 1993; Balmer *et al.*, 2013).
- Review of the Bat Conservation Ireland (BCI) Private Database.
- Review of the publicly available National Biodiversity Data Centre (NBDC) web-mapper.
- Data on potential occurrence of protected bryophytes – as per NPWS online map viewer; Flora Protection Order Map Viewer – Bryophytes[1].
- Inland Fisheries Ireland (IFI) Reports.
- Records from the National Parks and Wildlife Services ('NPWS') WS web-mapper and review of specially requested records from the NPWS Rare and Protected Species Database for the hectad in which the Proposed Development is located.
- Review of NPWS Article 17 Metadata and GIS Database Files

4.1.2 Scoping and Consultation

MKO undertook a scoping exercise during preparation of this NIS and associated planning application documentation, as fully described in Chapter 2, Section 2.6 of the accompanying EIAR.

Copies of all scoping responses are included in Appendix 2.1 of the accompanying EIAR. The recommendations of the consultees have informed the EIAR preparation process and the contents of this NIS. The comments raised in the scoping responses received have been addressed in this NIS.

Table 4.1 provides a list of the organisations consulted with regard to potential for impact on EU designated sites during the scoping process.

[1] *NPWS, 2020, Online map viewer; Flora Protection Order Map Viewer – Bryophytes. Online, Available at: http://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=71f8df33693f48edbb70369d7fb26b7e, Accessed: 24/03/2020.*

Table 4.1 Organisations consulted with regard to biodiversity

Consultee	Response	Section of NIS addressed
Department of Culture, Heritage and the Gaeltacht	The scoping response provides a number of recommendations and a summary of the main points is provided below: 'Any watercourse or wetland impacted on should be surveyed for the presence of protected species and species listed on Annexes II and IV of the Habitats Directive. These species could include otters (*Lutra lutra*). which are protected under the Wildlife Acts and listed on Annexes II and IV of the Habitats Directive, salmon (*Salmo salar*) and Lamprey species listed on Annex II of the Habitats Directive'.	Section 6.1 of this NIS assesses the residual effect of the proposed development on both otter and salmon. Mitigation measures for the protection of water quality is described in Section 5.2.1.
Sligo County Council	A '*Natura Impact Statement will also be prepared*'	This NIS fully considers the potential for adverse effect on EU Designated sites.

In addition, a data request was sent to the National Parks and Wildlife Service, scientific data unit, and a response was received on the 9th of April 2019. The only species recorded, that was also a QI of any downstream SAC was freshwater crayfish (*Austropotamobius pallipes*).

4.1.3 Ecological Survey Methodologies

4.1.3.1 Ecological Multi-disciplinary walkover surveys

Multidisciplinary walkover surveys were undertaken within the site of the proposed development 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

All surveys of vegetation were completed within the optimum period for vegetation surveys/habitat mapping, i.e. April to September (Smith *et al.*, 2011). A comprehensive walkover of the entire site was completed. Surveys undertaken outside of this period were not used to evaluate habitats.

The walkover surveys were also designed to detect the presence, or likely presence, of a range of protected species. The survey included a search for habitats and species listed as QIs/SCIs of EU designated sites in the wider area.

The multi-disciplinary walkover surveys comprehensively covered the entire study area and based on the survey findings, further detailed targeted surveys were carried out for features and locations of ecological significance. These surveys were carried out in accordance with NRA *Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna* on National Road Schemes (NRA, 2009).

During the multidisciplinary 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. Invasive species were searched for to ensure that there is no potential for the spread within and outside of the site of the proposed development and thus potential spread to surrounding EU designated sites.

Targeted survey methodologies undertaken at the site are described in the following subsections.

4.1.3.2 Dedicated Habitat and Vegetation Composition Surveys

Habitats within the site were classified according to the guidelines set out in '*A Guide to Habitats in Ireland*' (Fossitt, 2000), which classifies habitats based on the vegetation present and management history. Vegetation was sampled by taking botanical quadrats/Relevés within representative habitat areas of the site. This allowed for accurate habitat classification. The location of each of the quadrats and the quadrat data is provided in Appendix 6-1, of the EIAR. The extent of each habitat on site was mapped on site using aerial photographs, hand held GPS and smartphone technology. A representative photograph was also taken for each of the habitats recorded on site, including all relevés.

Habitats, such as peatlands recorded within the site, likely to correspond to EU Habitats Directive Annex I habitat types have been described and assessed in accordance with NPWS guidance from the relevant national Annex I habitat surveys/ Irish Wildlife Manuals. Where applicable, vegetation communities were also classified for habitats, in particular Annex I habitats, according to the Irish Vegetation Classification (IVC) system (Perrin, 2015[2]).

The habitat assessment surveys described in this report, including EU Habitats Directive Annex I classification and condition assessment, have been undertaken with reference to the following guidelines and interpretation documents:

- Perrin, P.M, Martin, J.R., Barron, J.R., Roche & O'Hanrahan, B. (2014) *Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland.* Version 2.0. Irish Wildlife Manuals, No. 79. National Parks and Wildlife Service.
- O'Neill, F.H., Martin, J.R., Devaney, F.M. & Perrin, P.M. (2013) The Irish semi-natural grasslands survey 2007-2012. Irish Wildlife Manuals, No. 78. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Ireland.
- Martin, J.R., O'Neill, F.H. & Daly, O.H. (2018) The monitoring and assessment of three EU Habitats Directive Annex I grassland habitats. Irish Wildlife Manuals, No. 102. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

[2] *Perrin, P.M., (2015) The Irish Vegetation Classification – Technical Progress Report No. 1, Online, Available at: http://www.biodiversityireland.ie/wordpress/wp-content/uploads/Irish-Vegetation-Classification_Technical-Progress-Report-No.1-1.pdf Accessed 20.03.2020.*

- NPWS (2019), The Status of EU Protected Habitats and Species in Ireland. Volume 2: *Habitat Assessments*. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill
- NPWS (2013), The Status of EU Protected Habitats and Species in Ireland. Habitat Assessments Volume 2. Version 1.1. Unpublished Report, National Parks & Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- Commission of the European Communities (2007) Interpretation manual of European Union habitats. Eur 27. European Commission DG Environment.

Habitats considered to be of ecological significance and in particular having the potential to correspond to those listed in Annex I of the EU Habitats Directive 92/43/EEC were identified and their potential for association with those habitats occurring within nearby EU designated sites assessed.

Plant nomenclature for vascular plants follows 'New Flora of the British Isles' (Stace, 2010), while mosses and liverworts nomenclature follows 'Mosses and Liverworts of Britain and Ireland - a field guide' (British Bryological Society, 2010).

4.1.3.3 Otter Survey

Following a review of the desk study findings and the results of the multi-disciplinary walkover survey; areas identified as providing potential habitat for otter were subject to specialist targeted survey. The otter survey of watercourses was conducted on the 14th June and 25th September 2017, 5th July and 14th August 2019 and 31st January 2020. Additional otter surveys were undertaken during a fisheries assessment of the watercourses both within and downstream of the study area over the course of Monday 19th – Wednesday 21st August 2019 Triturus (2019)[3].

The otter surveys were conducted as per NRA (2009) guidelines (Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes). This involved a search for all otter signs e.g. spraints, scat, prints, slides, trails, couches and holts. In addition to the width of the rivers/watercourses, a 10m riparian buffer (both banks) was considered to comprise part of the otter habitat (NPWS 2009). The dedicated otter surveys also followed the guidance as set out in NRA (2008) 'Guidelines for the Treatment of Otters Prior to the Construction of National Roads Schemes' and following CIEEM best practice competencies for species surveys (CIEEM, 2013).

4.1.3.4 Fish Surveys

Habitat suitability for protected aquatic species of conservation interest which are known or suspected to occur within the study area (e.g. fish species, otter etc.) were conducted. Aquatic habitats and species were assessed during the multi-disciplinary walkover surveys and where appropriate dedicated aquatic habitat and fisheries surveys were undertaken. A dedicated fisheries assessment was undertaken at the site for targeted species groups including salmon, trout and lamprey over the course of Monday 19th – Wednesday 21st August 2019 Triturus (2019). A full description of the survey methodologies is provided in the standalone report available in Appendix 4. Aquatic plant species protected under Flora (Protection) Order, 2015 (S.I. No. 356 of 2015) were searched for during all aquatic surveys.

4.1.3.5 Invasive Species Survey

During the multi-disciplinary walkover surveys, a search for non-native invasive species was undertaken. The survey focused on the identification of invasive species listed under the Third Schedule of the

[3] *Triturus (2019). Aquatic and fisheries assessment of Croagh wind farm, Drumkeeran, Co. Leitrim. Unpublished report prepared by Triturus Environmental Ltd. for McCarthy Keville O'Sullivan. October 2019.*

European Communities (Birds and Natural Habitats) Regulations 2011 (As Amended) (S.I. 477 of 2015).

4.2 Desk Study Results

4.2.1 Lough Gill SAC

4.2.1.1 Review of Conservation Objectives

The relevant QIs and the associated conservation objectives of the site are presented in Table 4.1. The Targets and Attributes for the relevant habitats and species, as described in the Lough Gill SAC Conservation Objectives supporting documents, were reviewed and considered in this assessment.

Table 4.2 Qualifying Interests and Conservation Objective (Version 1, 2018)

Qualifying Interest	Conservation Objective
Alluvial forests with Alnus glutinosa and Fraxinus excelsior (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0]	This site has the generic conservation objective: '*To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected.*'
Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation [3150]	
Austropotamobius pallipes (White-clawed Crayfish) [1092]	
Petromyzon marinus (Sea Lamprey) [1095]	
Lampetra planeri (Brook Lamprey) [1096]	
Lampetra fluviatilis (River Lamprey) [1099]	
Salmo salar (Salmon) [1106]	
Lutra lutra (Otter) [1355]	

4.2.1.2 Site Specific Pressures and Threats

As per the Natura 2000 Data Form, the site-specific threats, pressures and activities with potential to effect on the SAC were reviewed and considered in relation to the proposed development. These are provided in Table 4.3. None of the pressures and threats listed are associated with the proposed development.

Table 4.3 Site-specific threats, pressures and activities with potential to effect on the SAC

Negative Impacts			
Rank	**Threats and pressures [code]**		**Inside/outside/both [i] o [b]**
M	B06	grazing in forests/ woodland	I
L	J02.05.02	modifying structures of inland water courses	I
M	A10.01	removal of hedges and copses or scrub	I
M	E01.03	dispersed habitation	I
M	D01.01	paths, tracks, cycling tracks	I
L	B	Sylviculture, forestry	I

H	E01.01	continuous urbanisation	B
L	J02.10	management of aquatic and bank vegetation for drainage purposes	I
L	G01.01.01	motorized nautical sports	I
L	E03.03	disposal of inert materials	I
M	I01	invasive non-native species	I

Rank: H = high, M = medium, L = low
i = inside, o = outside, b = both

4.2.1.3 Annex II species of Lough Gill SAC

The Qualifying Interests with the potential to be affected via the identified pathway include:

- *Austropotamobius pallipes* (White-clawed Crayfish) [1092]
- *Petromyzon marinus* (Sea Lamprey) [1095]
- *Lampetra planeri* (Brook Lamprey) [1096]
- *Lampetra fluviatilis* (River Lamprey) [1099]
- *Salmo salar* (Salmon) [1106]
- *Lutra lutra* (Otter) [1355]

No detailed Conservation Objectives are available for Lough Gill SAC. Species and habitat information for the conservation of this species are available in detailed Conservation Objectives for other SACs (000688, 002165 and 001818) and the Article 17 (2019)[4] reports.

4.2.1.3.1 *Austropotamobius pallipes (White-clawed Crayfish) [1092]*

The overall conservation status of the white clawed crayfish in Ireland is bad with a deteriorating trend, due to the reduction of range and the continuing pressures that it faces. Non-indigenous crayfish species (NICS) are identified as a major direct threat to the whiteclawed crayfish (*Austropotamobius pallipes)* and as a disease vector, in particular crayfish plague (*Aphanomyces astaci),* which is fatal to white clawed crayfish. There have been outbreaks of crayfish plague (*Aphanomyces astaci)* in Ireland since 2015 and it is thought that human activity, especially the transport of disease vectors on contaminated equipment, has introduced and spread the disease. Strict biosecurity is required and there should be no decline in lake water quality to help support suitable habitat for the White-clawed Crayfish species.

4.2.1.3.2 *Lamprey species*

Lough Gill SAC is designated for three species of lamprey; *Petromyzon marinus* (Sea Lamprey), *Lampetra planeri* (Brook Lamprey) and *Lampetra fluviatilis* (River Lamprey).

The overall status for sea lamprey is bad with a stable trend, unchanged since 2013. In Ireland there are extensive areas of suitable habitat for brook lamprey and no significant pressures impacting this species; the overall status is therefore assessed as Favourable. The overall status for river lamprey is Unknown due to the inability to distinguish between river lamprey and brook lamprey larvae and the challenges with sampling for adult river lamprey.

[4] *Status of Habitats and Species - Article 17 Reports, Online, Available at: https://www.npws.ie/publications/article-17-reports Accessed 31.01.2021*

Artificial barriers can block or cause difficulties to lampreys' migration, both up- and downstream, thereby possibly limiting the species to specific stretches and creating genetically isolated populations (Espanhol et al., 2007). Juveniles burrow in areas of fine sediment in still water. Many sites with suitable larval attributes i.e. fine sediment in low velocity habitat, are found not to contain larval lamprey. This may be a function of chance or probability or may be a consequence of insufficient recruitment to fill all spatial niches. Occupancy in excess of 50% of sites is 'reasonable' for the Irish catchments examined to date (King et al., unpublished data).

4.2.1.3.3 *Salmo salar (Salmon) [1106]*

Lough Gill SAC is designated for Atlantic Salmon. Artificial barriers block salmons' upstream migration, thereby limiting the species to lower stretches and restricting access to spawning areas. Smolt abundance can be negatively affected by a number of impacts such as estuarine pollution, predation and sea lice (*Lepeophtheirus salmonis).* The Overall Status is assessed as Inadequate.

4.2.1.3.4 *Lutra lutra (Otter) [1355]*

Lough Gill SAC is designated for Otter. Otters need lying up areas throughout their territory where they are secure from disturbance (Kruuk, 2006; Kruuk and Moorhouse, 1991). There should be no significant decline in the broad diet available to otter. Otters will regularly commute across stretches of open water up to 500m. e.g. between the mainland and an island; between two islands; across an estuary (De Jongh and O'Neill, 2010). It is important that such commuting routes are not obstructed. The Overall Status of otter in Ireland considered to be Favourable, unchanged since the previous reporting period.

4.2.1.4 *Annex I habitats of Lough Gill SAC*

The Qualifying Interests with the potential to be affected via the identified pathway include:

- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0]
- Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation [3150]

4.2.1.4.1 *Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0]*

Lough Gill is designated for Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*). Alder and oak regenerate poorly. Ash often regenerates in large numbers although few seedlings reach pole size. Periodic flooding is essential to maintain alluvial woodlands along river floodplains. Mature and veteran trees are important habitats for bryophytes, lichens, saproxylic organisms and some bird species. Their retention is important to ensure continuity of habitats/niches and propagule sources. The following are the most common invasive species in this woodland type: Himalayan balsam (*Impatiens glandulifera*), giant hogweed *(Heracleum mantegazzianum*), sycamore *(Acer pseudoplatanus).* A number of pressures affect this habitat in Ireland, the most serious being invasive species, particularly sycamore *(Acer pseudoplatanus),* beech *(Fagus sylvatica),* Indian balsam *(Impatiens glandulifera)* and currant species *(Ribes nigrum and R. rubrum).* Some native species such as brambles *(Rubus fruticosus agg.)* and common nettle can also become over-vigorous. Small area losses due to clear-felling have also occurred and the over status is Bad.

4.2.1.4.2 *Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation [3150]*

Little is known about the characteristics or ecology of this habitat in Ireland. It is associated with base rich lakes, with circumneutral or higher pH, in low-lying, large, naturally more productive catchments and is characterised by high abundance and diversity of pondweeds *(Potamogeton* spp.) and mesotrophic values for total phosphorus and chlorophyll. Two measures of extent should be used: 1. the area of the lake itself and; 2. the extent of the vegetation communities/zones that typify the habitat. The Overall Status is assessed as Inadequate with a stable trend, as in the 2013 assessment. This lake habitat is considered likely to occur in lowland, base-rich lakes in the midlands and north-east of Ireland, where it is characterised by high abundance and diversity of pondweeds (*Potamogeton* spp.), such as *Potamogeton lucens, P. praelongus, P. perfoliatus, P. obtusifolius, P. berchtoldii* and *P. pectinatus.* Other rooted, predominantly submerged higher plants frequently co-occur, including *Myriophyllum spicatum*, *Hippuris vulgaris*, *Callitriche* spp., *Sagittaria sagittifolia* and *Ceratophyllum demersum*, while free-floating species such *Lemna trisulca* are also common. The habitat has been under pressure from eutrophication since the 1970s or before.

4.2.2 Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC (000627)

4.2.2.1 Review of Conservation Objectives

Table 4.4 Qualifying Interests and Conservation Objective (Version 1, 2013)

Qualifying Interest	Conservation Objective
Mudflats and sandflats not covered by seawater at low tide [1140]	To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC
Estuaries [1130]	To maintain the favourable conservation condition of Estuaries in Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC
Phoca vitulina (Harbour Seal) [1365]	To maintain the favourable conservation condition of Harbour Seal in Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC
Petromyzon marinus (Sea Lamprey) [1095]	To restore the favourable conservation condition of Sea Lamprey in Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC
Lampetra fluviatilis (River Lamprey) [1099]	To maintain the favourable conservation condition of River Lamprey in Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC

4.2.2.2 Site Specific Pressures and Threats

As per the Natura 2000 Data Form, the site-specific threats, pressures and activities with potential to effect on the SAC were reviewed and considered in relation to the proposed development. These are provided in Table 4.5. None of the pressures and threats listed are associated with the proposed development.

Table 4.5 Site-specific threats, pressures and activities with potential to effect on the SAC

Negative Impacts			
Rank	**Threats and pressures [code]**		**Inside/outside/both [i] o [b]**
M	G02.01	golf course	i
M	G01.02	walking, horseriding and non-motorised vehicles	i
M	A02.01	agricultural intensification	i
L	J02.11.01	Dumping, depositing of dredged deposits	i
M	I01	invasive non-native species	i
M	D03.01	port areas	i
L	G05.01	Trampling, overuse,	i
M	E01.03	dispersed habitation	i
L	E03.03	disposal of inert materials	i
L	J01.01	burning down	i
M	G01.03.02	off-road motorized driving	i
L	J02.12.01	sea defense or coast protection works, tidal barrages	i
L	G02.08	camping and caravans	i
H	F01.01	intensive fish farming, intensification	i
M	D03	shipping lanes, ports, marine constructions	i

Rank: H = high, M = medium, L = low
i = inside, o = outside, b = both

4.2.2.3 Annex II Species of Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC

The Qualifying Interests with the potential to be affected via the identified pathway include:

- *Phoca vitulina* (Harbour Seal) [1365]
- *Petromyzon marinus* (Sea Lamprey) [1095]
- *Lampetra fluviatilis* (River Lamprey) [1099]

4.2.2.3.1 *Phoca vitulina (Harbour Seal) [1365]*

According to the marine habitats and species Conservation objectives supporting document, Version 1, 2013, records of harbour seal in the site have been compiled from historical Wildlife Service site visits and regional surveys (Summers et al., 1980; Warner, 1983; Harrington, 1990; Lyons, 2004). The potential extent of this habitat, resting and breeding sites within the SAC is illustrated on Map 8 of the SSCOs (NPWS 2013). The breeding sites, moult haul out and resting haul out sites should be conserved in a natural condition and human activities should occur at levels that do not adversely affect the harbour seal population at the site.

4.2.2.3.2 *Petromyzon marinus* (Sea Lamprey) [1095]

According to the SSCOs (NPWS 2013), this SAC only covers marine/estuarine habitat and it is not anticipated that it contains suitable spawning or nursery habitat for sea lamprey. Migrating adult lamprey pass through the site en route to/from the Garavogue River, which flows out of Lough Gill. Lough Gill SAC (site code: 1976), which is adjacent to this SAC, encompasses the freshwater elements of sea lamprey habitat. Potential barriers for migrating lamprey include anthropogenic physical barriers and chemical barriers e.g. oxygen depletion or discharge of noxious pollutants

4.2.2.3.3 *Lampetra fluviatilis* (River Lamprey) [1099]

According to the SSCOs (NPWS 2013), this SAC only covers marine/estuarine habitat and it is not anticipated that it contains suitable spawning or nursery habitat for river lamprey. Migrating adult lamprey pass through the site en route to/from the Garavogue River, which flows out of Lough Gill. Lough Gill SAC (site code: 1976), which is adjacent to this SAC, encompasses the freshwater elements of sea lamprey habitat. Potential barriers for migrating lamprey include anthropogenic physical barriers and chemical barriers e.g. oxygen depletion or discharge of noxious pollutants

4.2.2.4 Annex I Habitats of Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC

The Qualifying Interests with the potential to be affected via the identified pathway include:

- Mudflats and sandflats not covered by seawater at low tide [1140]
- Estuaries [1130]

4.2.2.4.1 *Mudflats and sandflats not covered by seawater at low tide [1140]*

The potential extent of this habitat within the SAC is illustrated on Map 4 of the SSCOs (NPWS 2013), estimated using OSi data as 2,288ha and the habitat area should remain stable or increase subject to natural processes. The extent of *Zostera*-dominated community and the *Mytilidae*-dominated community complex, should be maintained subject to natural processes, as mapped on Map 5, based on intertidal surveys undertaken in 2007 and 2010 (ASU, 2007, 2012) and subtidal survey in 2010 (Aquafact, 2011).

4.2.2.4.2 *Estuaries [1130]*

The habitat area within the SAC is illustrated on Map 3 of the SSCOs (NPWS 2013), was estimated as 1258ha using OSi data and the defined Transitional Water Body area under the Water Framework Directive. The extent of *Zostera*-dominated community and the *Mytilidae*-dominated community complex, should be maintained subject to natural processes, as mapped on Map 5, based on intertidal surveys undertaken in 2007 and 2010 (ASU, 2007, 2012) and subtidal survey in 2010 (Aquafact, 2011).

4.2.3 Cummeen Strand SPA (004035)

4.2.3.1 Review of Conservation Objectives

Table 4.6 Qualifying Interests and Conservation Objective (Version 1, 2013)

Qualifying Interest	Conservation Objective
Wetlands and Waterbirds [A999]	*To maintain the favourable conservation condition of wetland habitat in Cummeen Strand SPA as a resource for the regularly occurring migratory waterbirds that utilise it.*
Light-bellied Brent Goose (*Branta bernicla hrota*) [A046]	*To maintain the favourable conservation condition of Light-bellied Brent Goose in Cummeen Strand SPA.*
Oystercatcher (*Haematopus ostralegus*) [A130]	*To maintain the favourable conservation condition of Oystercatcher in Cummeen Strand SPA.*
Redshank (*Tringa totanus)* [A162]	*To maintain the favourable conservation condition of Redshank in Cummeen Strand SPA.*

4.2.3.2 Site Specific Pressures and Threats

As per the Natura 2000 Data Form, the site-specific threats, pressures and activities with potential to effect on the SPA were reviewed and considered in relation to the proposed development. These are provided in Table 4.7. None of the pressures and threats listed are associated with the proposed development.

Table 4.7Site-specific threats, pressures and activities with potential to effect on the SPA

Negative Impacts			
Rank	**Threats and pressures [code]**		**Inside/outside/both [i] o [b]**
H	E02	Industrial or commercial areas	i
M	D01.02	roads, motorways	o
M	H	Pollution	i
H	F01	Marine and Freshwater Aquaculture	i
M	A08	Fertilisation	o
H	E02	Industrial or commercial areas	o
M	E01	Urbanised areas, human habitation	o
H	D03.02	Shipping lanes	i
H	J02.01.02	reclamation of land from sea, estuary or marsh	i
L	F02.03	Leisure fishing	i

Rank: H = high, M = medium, L = low
i = inside, o = outside, b = both

4.2.3.3 Wetlands and Waterbirds [A999]

According to the Site Special conservation objective (Version 1, 2013) the wetland habitat area was estimated as 1732ha using OSi data and relevant orthophotographs. According to part three –

Conservation Objectives for Cummeen Strand SPA - Waterbird populations are deemed to be unfavourable when they have declined by 25% or more, as assessed by the most recent population trend analysis. To be favourable, the permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 1,732 ha, other than that occurring from natural patterns of variation. The following relevant extracts have been taken from the NPWS site synopsis and Natura 2000 Data Form for the SPA.

> *"Cummeen Strand SPA comprises the greater part of Sligo Harbour, the middle one of the three 'arms'forming Sligo Bay. The site extends for up to 7 km from east to west and has an average width of c.2.5 km. The site is the estuary of the Garavoge River, a short slow-flowing river which flows from Lough Gill. The harbour is very enclosed, with the mouth of the harbour being sheltered by two islands (Coney Island and Oyster Island). A large proportion of the estuary is intertidal (> 80%). Sediments are predominantly sands or coarser materials, though muddy sands or muds also occur. Zostera beds are present. The intertidal sand and mud flats are fringed by salt marshes in places but mostly stony shoreline. Sligo Harbour is a regional port for the town of Sligo. Cummeen Strand is of importance for the diversity of wintering waterfowl and is an integral part of the larger unit of Sligo Bay. The site has an internationally important population of Branta bernicla hrota and supports nationally important numbers of Haematopus ostralegus and Tringa totanus. Both Pluvialis apricaria and Limosa lapponica utilise the site though in relatively low numbers. The intertidal flats, which have well-developed macro-invertebrate communities and Zostera beds, provide good feeding grounds for the wintering birds. Birds roost on the salt marshes and upper shoreline though on high tides some may leave the site to roost elsewhere."*

4.2.3.4 Light-bellied Brent Goose (*Branta bernicla hrota*)

As per the NPWS (2013), the baseline data upon which the SPA populations is based are derived from the 5-year mean peak counts for the period 1995/96 – 1999/00 (I-WeBS). The baseline population for light-bellied brent goose (*Branta bernicla hrota*) is 223 individuals. Recent Site Data (for the period 2006/07 – 2010/11 [I-WeBS]) puts the population at 481 individuals (mean peak).

As described in the NPWS (2013[5]) document '*Terrestrial foraging was recorded in areas adjacent to the SPA and this is likely to occur regularly. 52 Brent foraged in grassland adjacent 0C463 (Killaspug Pt - Dorrins Strand West) on 02/02/11. Areas adjacent (east) of 0C446 (Cartron to Standalone Pt.) held good numbers foraging terrestrially during both high tide surveys (maximum number 111). The highest intertidal foraging density within a single subsite was recorded for 0C485 (Rosses Point Harbour) (2 Brent Geese ha^{-1}). The average whole site foraging density was 0.2 individuals ha^{-1}*.

4.2.3.5 Oystercatcher (*Haematopus ostralegus*)

As per the NPWS (2013), the baseline data upon which the SPA populations is based are derived from the 5-year mean peak counts for the period 1995/96 – 1999/00 (I-WeBS). The baseline population for Oystercatcher is 680 individuals. Recent Site Data (for the period 2006/07 – 2010/11 [I-WeBS]) puts the population at 481 individuals (mean peak). Recent Site Data (for the period 2006/07 – 2010/11 [I-WeBS]) puts the population at 792 individuals (mean peak).

As described in the NPWS (2013) document 'Oystercatchers foraged across all ten subsites. '*The highest average intertidal foraging density within a single subsite was recorded for 0C445 (Ballincar -*

[5] *National Parks & Wildlife Service September (2013), Cummeen Strand Special Protection Area, Conservation Objectives Supporting Document - Version 1, Online, Available at: https://www.npws.ie/sites/default/files/publications/pdf/004035_Cummeen%20Strand%20SPA%20Supporting%20Doc_V1.pdf, Accessed 03.02.2021*

Ballyweelin) (1.9 Oystercatcher ha^{-1}). The second highest foraging density was 1.5 Oystercatchers ha^{-1} recorded for 0C447 (inner Port). The average whole site foraging density was 0.3 individuals ha^{-1}'.

4.2.3.6 Redshank (*Tringa totanus*)

As per the NPWS (2013), the baseline data upon which the SPA populations is based are derived from the 5-year mean peak counts for the period 1995/96 – 1999/00 (I-WeBS). The baseline population for Redshank is 408 individuals. Recent Site Data (for the period 2006/07 – 2010/11 [I-WeBS]) puts the population at 280 individuals (mean peak).

As described in the NPWS (2013) document 'The peak intertidal foraging density was 1.8 Redshanks ha-1 recorded for 0C446 (Cartron to Standalone Pt.); this subsite recording an average foraging density of 1.0 Redshank ha^{-1} throughout the survey programme. 0C445 (Ballincar – Ballyweelin) recorded a density of 1.6 Redshanks ha^{-1} on one occasion. The whole site average intertidal foraging density was 0.2 Redshanks ha^{-1}'.

4.2.4 Baseline Hydrology

The baseline hydrology of the site and surrounding area has been fully assessed and this assessment is provided in full in Appendix 3 to this NIS. The relevant Sections of the hydrological assessment, which describe the baseline hydrological environment, are provided below:

> *'With respect regional hydrology, the Proposed Development is located in 2 no. river basins and 3 no. regional surface water catchments. The southern half of the wind farm site is located in the Shannon River surface water catchment within the Shannon International River Basin District (SHIRBD). The northern half of the wind farm site is located in the Garvogue River surface water catchment. Both the Garvogue River and the Ballysadare River are located within the North Western International River Basin District (NWIRBD).*
>
> *In terms of turbine distribution, 4 no. are located in the Shannon River surface water catchment and 6 no. are located in the Garvogue River surface water catchment.*
>
> *The Garvagh grid connection route, which runs to the southeast of the site, passes through the Shannon River surface water catchment (for 6.4km) and the Garvogue River surface water catchment (for 0.7km).*
>
> *In terms of local hydrology, the southern half of the windfarm site is located in the Arigna River surface water catchment. The Arigna River flows into Lough Allen approximately 16km downstream of the site. The north half of the windfarm site is located in the Bonet River surface water catchment. The Bonet River flows into Lough Gill approximately 15km downstream of the site. Approximately 6km of the site access road drains directly to Lough Allen via the Owengar River'.*

A regional hydrology map is attached as **Figure 9.1**, Chapter 9 of the EIAR, provided in Appendix 3 of this NIS.

> *There are four main rivers which drain the Proposed Development site, namely the upper reaches of the Killanummery River (IE_WE_35K030600) which drains the north-western section of the site. The Killanummery River continues to flow northwest, before meeting the River Bonet just south of Dromahair, approximately 7.5 km north of the site. The smaller Tullynascreen Stream (IE_WE_35K030600) runs parallel to this river, and flows northwest, meeting the Killanummery River approximately 2 km north of the site. The Tullynascreen Stream emanates from Lough Nacroagh, a small lake with an area of ~0.01 km^2.*

The Cashel Stream drains the north-eastern section of the proposed site. The Cashel Stream is fed from several smaller streams which converge near Kilavoggy Bridge ~1.5km north of the site. The stream then flows north/northeast, meeting the River Bonet approximately 1 km southeast of Dromahair.

Chapter 9 (Section 9.5.3.9) of the EIAR (Appendix 3 of this NIS) concludes that, in the absence of mitigation, there is no potential for the proposed development to result in significant effects on any downstream European Site within the River Shannon catchment. This further confirms the findings of this NIS and accompanying Screening report (see Appendix 1). The conclusion, as provided in Chapter 9 of the EIAR is provided below:

'Due to the large downstream distance to Lough Forbes Complex SAC 43.1 km (approximately 61.0km surface water distance) and the fact that there are several lakes between the Proposed Development and the SAC (Lough Allen, Lough Corry, Lough Nanoge, Lough Tap, Lough Boderg and Lough Bofin), no effects on Lough Forbes are anticipated (even in the absence of mitigation) due to the large natural attenuation capacity of the watercourses and lakes'..

Section 3, Chapter 9 of the EIAR (see Appendix 3) provides details of the local and regional hydrology in relation to all elements of the proposed development, grid connection, amenity area and car park

4.3 Ecological Survey Results

4.3.1 Habitat survey

A habitat map of the site is provided in Figure 4.1. A habitat map is also provided with the proposed infrastructure footprint overlain in Figure 4.2.

The majority of the study area (580 hectares/86.3%) is dominated by plantation forestry, comprising mainly of Sitka spruce (*Picea sitchenis*) and Lodgepole pine (*Pinus contorta*). The site is accessible via a network of existing forestry access tracks and forestry rides. The remainder of the wind farm infrastructure site is dominated by degraded Upland Blanket Bog (PB2). The haulage route to the east of the site primarily traverses areas of Wet grassland (GS4), Scrub (WS1), Conifer plantation (WD4) and existing roads.

Detailed habitat and botanical survey details are provided in Chapter 6 (Biodiversity) of the EIAR accompanying this application.

Waterbodies within the proposed development site including drainage ditches, open waterbodies and streams/watercourses classified as upland eroding rivers provide hydrological connectivity with downstream designated sites and are further described in this section. Watercourses within the NIS primary study area are mapped on Figure 3.1 of the Screening for Appropriate Assessment, indicating hydrological connectivity with downstream EU Sites.

Conifer plantation (WD4)

In total, approximately 580 hectares/86.3% of the study area comprises of coniferous plantation forestry (Plate 4.1 and Plate 4.2). This includes forestry (WD4) of various ages (including clear-felled areas, semi-mature and mature stands, along with immature pre-thicket areas of both first and second rotation. Sitka spruce and Lodgepole pine are the dominant species, typically 8-10m tall. Mature conifer plantation is interspersed with immature stands. The understorey is typically species-poor in forestry plantations and vegetation normally restricted to a few bryophytes and ferns which include, hard fern (*Blechnum spicant*) and *Thuidium tamariscum*.

As the forestry was originally planted on peatland habitats, forestry rides or areas where forestry failed to achieve closed canopy can be dominated by ling heather (*Calluna vulgaris*), heath rush (*Juncus*

squarrosus), purple moor-grass (*Molinia caerulea*) and *Sphagnum palustre*. These areas make up a very small area of the overall forestry plantation.

Most of the proposed wind farm infrastructure is located within Conifer plantation (WD4) habitat (88.75%) which includes Turbines 2-10, temporary construction compounds, borrow pits, substation, met mast, part of the access road to T1, new site roads to other turbines and part of the turbine haulage route.

Plate 4.1: Example of Conifer plantation (WD4) within the study area

Plate 4.2 Example of recently felled and replanted Conifer plantation (WD4) within the study area.

Upland Blanket Bog (PB2)

Upland blanket bog (PB2) habitat occurs to the west of the site and a small pocket in the centre of the site. This habitat is typically degraded where it occurs on the site. Turbine 1 and part of its access road is located within Upland blanket bog (PB2) in the north-west corner of the site. This represents 0.55% of the habitat loss to the development footprint. This area includes and is surrounded by bog which has been cutover in the past for turbary and shows evidence of drying-out.

T1 is located immediately adjacent to a relatively recent cutover area which has revegetated and was dominated by a short sward of ling heather and hare's-tail cottongrass (*Eriophorum vaginatum*). The peatland habitat within the infrastructure footprint was dominated by dense leggy ling heather which was relatively dry underfoot (Plate 4.3). In addition, some of the area around proposed TI location had been recently disturbed (Plate 4.4). Although the vegetation was characteristic of a grade between wet and dry heath, the peat depths in this area were well in excess of 50cm so the habitat was categorised as Upland blanket bog (PB2), some of which was inactive where *Sphagnums* were absent. The peatland habitat formed a mosaic with Poor fen and flush (PF2) and Transition mire and quaking bog (PF3) which are described in the sections below.

Plate 4.3: Degraded Upland blanket bog (PB2) along proposed access road to T1

Plate 4.4: Degraded Upland blanket bog (PB2) withinT1 footprint

Poor fen and flush (PF2)

This habitat was recorded within the Upland blanket bog (PB2) in the north-west corner of the site, within and adjacent to Turbine no. 1, where there was movement of ground and surface water through the peatland (Plate 4.3). It was sometimes recorded in an intimate mosaic with Transition mire and quaking bog (PF3). Poor fen and flush (PF2) generally formed linear features and was characterised by species which were indicative of higher nutrients than the surrounding bog such as soft rush (*Juncus effusus*), Yorkshire fog (*Holcus lanatus*), wavy hair-grass (*Deschampsia flexuosa*), sweet vernal grass (*Anthoxanthum odoratum*), sharp-flowered rush/jointed rush (*Juncus acutiflorus/Juncus articulates*), sorrel (*Rumex acetosa*) *Polytrichum commune* and *Spagnum palustre*.

Plate 4.5: Poor fen and flush (PF2) at T1 location

Transition mire and quaking bog (PF3)

Transition mire and quaking bog (PF3) was recorded in an intimate mosaic with Poor fen and flush (PF2) in the north-west corner of the site and it was also recorded along the southern shore of Lough Nacroagh in the centre of the site. Where it occurred in association with Poor fen and flush (PF2) within the peatland complex in the north-west of the site, it was found as relatively small linear features where there was movement of ground and surface water (Plate 4.6). A much larger area of the habitat (0.46ha) was recorded in association with Lough Nacroagh, along its southern shore (Plate 4.7). The access road to Turbine 1 will cross a small area of Transition mire (PF3) in the north-west of the site. There is no wind farm infrastructure proposed within or adjacent to the habitat where it exists adjacent to Lough Nacroagh.

Plate 4.6: Transition mire and quaking bog (PF3) along proposed access road to T1

Plate 4.7: Transition mire and quaking bog (PF3) adjacent to Lough Nacroagh

Dystrophic lakes (FL1)

Lough Nacroagh in the centre of the proposed windfarm site was categorised as a Dystrophic lake (FL1) (Plate 4.8). The lake is relatively small and is being encroached by Transition mire and quaking bog (PF3) habitat to the south. The lake is surrounded by forestry along its northern shore and where there is a small gap in tree cover, purple moor-grass and ling heather occur right up to the water edge. The lake does not contain any emergent vegetation.

Plate 4.8: Lough Nacroagh categorised as a Dystrophic lake (FL1)

Spoil and bare ground (ED2)

Unbound forestry tracks throughout the site were categorised as Spoil and bare ground (ED2). The access track verges across much of the site contained of wet grassland or surrounding peatland habitats (Plate 4.9). Species recorded comprised mainly of sweet vernal grass (*Anthoxanthum odoratum*), daisy (*Bellis perennis*), dandelion (*Taraxacum officinale* agg.), colt's-foot (*Tussilago farfara*), soft rush (*Juncus effusus*), purple moor-grass, *Carex* ssp, crested dogs-tail (*Cynosurus cristatus*) and heather (*Calluna vulgaris*). Upgrading of existing forestry tracks is proposed across the site, as shown in Figure 3.1.

Plate 4.9: Example of existing unbound forestry tracks categorised as Spoil and bare ground (ED2)

Eroding/upland rivers (FW1)

A number of watercourses drain the site windfarm site with the watercourses draining the northern part of the site forming the Killanummery River, which flows into the River Bonet further north, and those draining the southern part of the site forming the Arigna River. The streams within the windfarm site were generally small, up to a metre wide, fast flowing and with a rocky substrate. Most of the streams were surrounded by forestry and did not contain submerged vegetation or where forestry cover was absent, were bordered by heath or wet grassland vegetation such as ling, soft rush and Yorkshire fog (*Holcus lanatus*) (Plate 4.10).

The Gowlaunrevagh and Tinnybeg Rivers will be crossed as part of the proposed haul road located to the east of the site of the proposed development. There are three crossings on the access road as shown in Figures 4-38 and 4-39. This river enter the Owengar River located within a steep valley to the north of the haul road. An example of the Gowlaunrevagh River crossing location is provided in Plate 4.11.

Plate 4.10: Killanummery River (FW1) flowing through the north-west of the windfarm site

Plate 4.11: The Owengar River (FL1) flowing along the proposed haulage route east of the proposed windfarm

The proposed haul road is shown in Figure 3.1 of this NIS. The access road travels through farmland before entering plantation forestry (WD4). The proposed route utilises a section of existing forestry access track (Plate 4.12), categorised as Buildings and artificial surfaces (BL3), before moving west through Conifer plantation (WD4) forestry of varying ages (Plate 4.14). Where forestry rides occur within the development footprint, these are dominated by species-poor Wet grassland (GS4) see Plate 4.13, dominated by soft rush and Yorkshire fog and areas Scrub (WS1) (Plate 4.15). 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 4.16). Wet willow-alder-ash woodland (WN6) was recorded both upstream and downstream of the proposed haul road (Plate 4.15). This immature woodland was dominated by willow (*Salix* sp.) and bramble and also contained some naturally regenerating Sitka spruce.

Plate 4.12: Example of existing forestry track (ED2) within the proposed haul road

Plate 4.13: Example of second rotation forestry (WD4) occurring withing within the proposed haul road, with mature forestry in the background.

Plate 4.14 Example of fragmented wet grassland (GS4) occurring within forestry rides along the site haul road

Plate 4.15 Example of willow dominated scrub (WS1) occurring along the proposed haul road between plantation forestry blocks.

The proposed haulage 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.

4.3.1.1 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 (L4282), categorised as Buildings and artificial surfaces north for approximately 1.8km and will then follow the existing unbound forestry access road (ED2) for approximately 300m into the Garvagh substation.

4.3.1.2 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. 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.

4.3.2 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). A map showing the recorded distribution of invasive species is provided in Figure 6-7, Appendix 6. Given the location of recorded invasive species in relation to the proposed infrastructure, best practice invasive species management measures have been incorporated into the proposed development, see Section 6.7.3.3, Chapter 6 of the EIAR. The implementation of these measures and the location of the recorded stands, away from any mapped watercourses, will ensure that there is no potential for impact on downstream EU designated sites.

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

4.3.3 Faunal Surveys

4.3.3.1 Otter

A single otter spraint was recorded beneath a bridge on the Arigna River, located over 420 metres outside the southwest of the site during the dedicated otter surveys of the watercourses in the study area on the 14th June 2017. Three otter spraints were recorded on the Killanummery 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 4 of this NIS (Triturus Environmental Ltd, 2019). No other otter signs were recorded within the study area despite dedicated surveys. The main watercourses were assessed as providing suitable commuting and foraging habitat for the species and otter may occur within the study area, at least on occasion. Due to the forested nature of the site and turbary activities, 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.

4.3.3.2 Fisheries and Aquatic Fauna

In order to collate baseline fisheries information, Triturus Environmental Ltd. were contracted by MKO to undertake electro-fishing, white-clawed crayfish and biological water quality surveys 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 4 of the NIS. A total of 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 4 of this NIS.

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) 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 bar 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.

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 unstainable 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, lamprey or white-clawed crayfish.

4.3.3.3 Bird surveys

Extensive bird surveys were undertaken to inform the EIAR and have been reviewed in the preparation of this NIS. As fully described in the Ornithology chapter (Chapter 7) of the accompanying EIAR for the proposed development, dedicated bird surveys were undertaken to industry standard best practice i.e. Scottish Natural Heritage (2017) '*Recommended bird survey methods to inform impact assessment of onshore wind farms. Scottish Natural Heritage*'. None of the SCI bird species for which SPAs occurring within the likely zone of impact (Lough Arrow SPA, Cummeen Strand SPA or Ballykenny-Fisherstown Bog SPA) have been designated were recorded during these bird surveys of the site over the survey period September 2017 - September 2019. Therefore, it is not considered that there is any significant movement of the SCI species for the SPAs (Lough Arrow SPA, Cummeen Strand SPA or Ballykenny-Fisherstown Bog SPA) into, out of and between European sites in the vicinity of the proposed development site. Therefore, disturbance/displacement or collision risk related effects on the SCI bird species (listed in Table 3.1 of the accompanying Screening report, Appendix I of this NIS) have been excluded. The EIAR and NIS reviewed the 2019, 2013 and 2007 EU Birds Directive (Article 12[6]) Reports, however, none of the SCI bird species for which the surrounding SPAs have been designated were identified as breeding or at risk of collision, disturbance/displacement as a result of the proposed development.

The Cummeen Strand SPA (004035) is the only SPA that has been Screened In. This SPA is located over 18km away from the proposed development and no potential for habitat loss, disturbance, displacement or collision with the SCI species for this SPA was identified. Therefore, dedicated bird surveys and their results are irrelevant to this assessment. The SPA was screened in on a precautionary basis, due to the hydrological connectivity between the proposed development and the SPA (29.1km) and the only identified pathway for effect is via water. The assessment is therefore based on the assessment of this pathway and the measures that are in place to block it and do not rely on bird surveys.

[6] *NPWS, 2020, The status and trends of Ireland's bird species – Article 12 Reports, Online, Available at: https://www.npws.ie/status-and-trends-ireland%E2%80%99s-bird-species-%E2%80%93-article-12-reporting Accessed 31.01.2021*

5. ASSESSMENT OF POTENTIAL EFFECTS & ASSOCIATED MITIGATION

5.1 Potential for Direct Effects on the European Sites

There will be no direct effects on the Qualifying Interests of Lough Gill SAC or Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC and there will be no direct effects on the Special Conservation Interests of Cummeen Strand SPA. The proposed development is located 4.4 km from the nearest European Site. The site consists of forestry habitats and a small area of peatland. There are no Annex I habitats on site for which any of the surrounding SACs have been desigated. The site is also located outside of the core foraging range of the SCI bird for which SPAs have been designated (SNH, 2016). No potential for direct effects on any European Site exists.

5.2 Potential for Indirect Effects on the European Sites

5.2.1 Deterioration of Water Quality

There is hydrological connectivity between the proposed development and downstream European Sites via watercourses within the site boundary which discharge to Lough Gill via the River Bonet, and ultimately to Drumcliff Bay.

The proposed development has the potential to cause deterioration in surface water quality during the construction, operational and decommissioning phase of the development due to the release of pollutants including suspended solids and hydrocarbons, potentially affecting the following QIs/SCIs, in the absence of mitigation:

Lough Gill SAC [001976]

A potential indirect pathway for effect in the form of surface water pollution/degradation was identified in relation to the following aquatic dependent QIs associated with Lough Gill SAC:

- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0]
- Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition* - type vegetation [3150]
- *Austropotamobius pallipes* (White-clawed Crayfish) [1092]
- *Petromyzon marinus* (Sea Lamprey) [1095]
- *Lampetra planeri* (Brook Lamprey) [1096]
- *Lampetra fluviatilis* (River Lamprey) [1099]
- *Salmo salar* (Salmon) [1106]
- *Lutra lutra* (Otter) [1355]

Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC (000627)

An indirect potential pathway for effect in the form of surface water pollution was identified in relation to the following aquatic dependent QIs associated with Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC:

- Mudflats and sandflats not covered by seawater at low tide [1140]

- Estuaries [1130]
- *Phoca vitulina* (Harbour Seal) [1365]
- *Petromyzon marinus* (Sea Lamprey) [1095]
- *Lampetra fluviatilis* (River Lamprey) [1099]

Cummeen Strand SPA (004035)

The potential for deterioration of surface water quality affecting the supporting habitat of SCI species associated with Cummeen Strand SPA has been identified:

- Wetland and Waterbirds [A999]

This conservation objective [A999] is also key to maintaining the other SCI species, light-bellied brent goose, oystercatcher and redshank for which the SPA has been designated. Therefore, indirect effects on these species as a result of supporting habitat deterioration is fully assessed here, and in Section 6.3 of this NIS, as part of the Wetland and Waterbirds [A999] conservation objective.

5.2.1.1 Mitigation employed to prevent Impacts on Water Quality

The prevention of impacts on water quality was considered in the design of all elements of the project and at all stages of the proposed development from pre-construction and site set up through to eventual decommissioning. The deterioration of water quality is the only identified pathway for effects on European Sites. The environmental management framework to be adhered to during the construction phase of the development including comprehensive detail regarding site set up, pollution prevention and hydrocarbon management and incorporates the mitigating principles to ensure no adverse impact on the integrity of European Sites as described in Appendix 2 to this NIS. All measures for the protection of water quality during the project design as well as construction, operational and decommissioning phases of the proposed development are set out in the following subsections.

5.2.1.2 Mitigation by Design

The design of the Proposed Development, as described in Chapter 4 of the EIAR accompanying this application, sets out very clearly how the wind farm including the grid connection has been designed and will be operated in accordance with best industry practice to avoid any significant effects outside the site including the prevention of impacts on watercourses. This design includes suitable precautionary mitigation to make certain that the proposed development will not adversely affect the integrity of European sites.

The development has been designed to avoid effects on the watercourses that provide connectivity to relevant European Sites. This section demonstrates how this has been achieved:

- The proposed development has been designed so that all infrastructure, except for access roads, is located over 50 metres from watercourses significant watercourses i.e. those mapped by the EPA[7].
- The upgrade of existing access tracks and construction of new tracks will involve some works within 50m of watercourses and new watercourse crossings. However, no instream works are proposed, and a suite of measures are in place to avoid any adverse effects on watercourses. These measures are described in full in the Chapter 9 '*Water*' of the EIAR that is included in full as Appendix 3 of this NIS. They are also described in Section 5.2.1.3 of this NIS.
- No vehicle or plant movement or stock-piling of construction materials or construction waste will take place within a 50-metre buffer zone around watercourses during the windfarm construction and no vegetation will be removed from within this zone.

[7] *EPA, 2020, Online map viewer, https://gis.epa.ie/EPAMaps/*

- New site access roads have been designed to minimise excavation arisings, see Section 4.3.2.1 of the EIAR.
- The use of floating roads will result in no excavation and thus no peat arisings are generated. This will further minimise potential for suspended solids generation.
- The development has been designed to maintain a drainage neutral situation to avoid drainage related impacts (See Chapter 9: Water).
  Hard standing areas have been designed to the minimum size necessary to accommodate the turbine model that is selected.
- *'The deeper peat areas were avoided when optimising the wind farm layout and main infrastructure elements for the site'* (FehilyTimoney, 2020[8]).

In addition to the above, FehilyTimoney (2020) undertook the peat stability assessment following the principles in *Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments* (Scottish Executive, 2nd Edition, 2017)[9]. The Peat Hazard and Risk Assessment Guide (PHRAG) is used in this report as it provides best practice methods to identify, mitigate and manage peat slide hazards and associated risks in respect of consent applications for electricity generation projects.

Slope angle is one part of the stability assessment, which also takes into account peat depth and strength, in addition FehilyTimoney do not solely rely on the factor of safety (FoS) measurement; a risk assessment using qualitative factors is also used to determine the relative risk of peat instability on a site. The qualitative factors used in the risk assessment have been compiled based on FehilyTimoney's experience of assessments and construction in peat land sites and peat failures throughout Ireland and the UK. The risk assessment includes a number of factors (detailed in Appendix G of the Geotechnical and Peat Stability Assessment (PSA) Report[10]), as follows:

- 'Combination of factors (shear strength, slope angle, peat depth with 10kPa applied load)
- Evidence of sub peat water flow
- Surface water flow
- Evidence of previous slips
- Evidence of bog pools
- Evidence of mechanically cut peat
- Evidence of quaking/buoyant peat
- Type of vegetation
- Slope characteristics'.

This is fully outlined in Appendix 7 of this NIS.

In total 10 factors, including the FoS results, are used to assess peat stability. In the risk assessment (FehilyTimoney's PSA report Section 8 and Appendix E) the likelihood of a hazard (peat failure) occurring is determined based on the results of the stability calculation FoS and the qualitative factors given above.

The following summary of the PSA is provided in Section 1 of the same report:

> "The findings of the peat assessment, which involved analysis of 324 no. locations, showed that the proposed development areas have an acceptable margin of safety and that the site is

[8] *FehilyTimoney, 2020, Geotechnical & peat stability assessment report for Croagh Wind Farm, Co. Leitrim/Sligo*
[9] *Scottish Executive, 2nd Edition, 2017, Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments. Online, Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2017/04/peat-landslide-hazard-risk-assessments-best-practice-guide-proposed-electricity/documents/00517176-pdf/00517176-pdf/govscot%3Adocument/00517176.pdf. Accessed 01.03.2021*
[10] *FehilyTimoney, 2020, Geotechnical & peat stability assessment report for Croagh Wind Farm, Co. Leitrim/Sligo*

suitable for the proposed wind farm development. Notwithstanding the above, there is an elevated risk of developing such a site in an area with a high density of historical landslides. The management of peat stability and appropriate construction practices will be inherent in the construction phase of the wind farm to ensure peat failures do not occur on site. Overall, the peat characteristics and ground conditions on the Croagh site are similar to that encountered on successfully developed wind farm sites in the area. In summary, the findings of the geotechnical and peat stability assessment showed that the proposed Croagh wind farm site has an acceptable margin of safety and is suitable for wind farm development."

5.2.1.3 Construction Phase Mitigation

Mitigation measures have been incorporated into the proposed development for the prevention of water pollution. The proposed development includes a detailed drainage plan that is included in full as Appendix 3 to this NIS. This plan and all the associated measures have been taken into account in this assessment. The drainage philosophy overall is to minimise waters arising on site, to adequately treat any water that may arise and to ensure that the hydrological function of the watercourses on the site and in the wider catchment are not affected by the proposed works. This philosophy including all associated mitigation measures to protect local surface water quality are fully described in the Construction and Environmental Management Plan (CEMP) and Chapter 9 ('Water' Chapter) of the EIAR, included as Appendix 2 and Appendix 3 respectively.

The Inland Fisheries Ireland (2016): *Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters*; and the Scottish Natural Heritage (SNH) *Good Practice During Wind Farm Construction* (SNH, 2019, 4th Edition) will also be adhered to.

All detailed mitigation measures for the protection of water quality are fully described below and in Section 4.7 of the accompanying EIAR, the CEMP (included as an Appendix 2) and Sections 9.5.3 – 9.5.4 Chapter 9 of the EIAR (provided here in Appendix 3). The following subsections describe the mitigation measures proposed for the construction phase of the proposed development.

5.2.1.3.1 *Clear-span watercourse crossing construction methodology and associated mitigation*

As described in Section 3.2.9 of this NIS, it is proposed to construct clear-span watercourse crossings along the access roads to Turbine No. 1 and Turbine No. 10. In addition, as described in Section 3.2.6.1, up to 9 no. new watercourse crossings will be required as part of the Proposed Development. The locations of these crossings are shown on the layout drawings included in Appendix 6 of this NIS.

The clear-span bridge and corrugated metal or plastic and stone clear-span bridge will be constructed to the specifications of the OPW bridge design guidelines '*Construction, Replacement or Alteration of Bridges and Culverts - A Guide to Applying for Consent under Section 50 of the Arterial Drainage Act, 1945*', and in consultation with Inland Fisheries Ireland. Abutments will be constructed from precast units combined with in-situ foundations, placed within an acceptable backfill material.

Four new water course crossings will be required as part of the proposed development. The locations of these crossings are shown as *Proposed New Watercourse Crossing No. 3* to *No. 6* on the layout drawings in Appendix 6 of this NIS. It is proposed that these crossings will be constructed using bottomless, pre-cast concrete structures.

The typical construction methodology for the installation of a pre-cast concrete clear-span bridge is presented below:

- The access road on the approach to the watercourse will be completed to a formation level which is suitable for the passing of plant and equipment required for the installation of the watercourse crossing.

- All drainage measures along the proposed road will be installed in advance of the works.
- The abutment will consist of concrete panels which will be installed on a concrete lean mix foundation to provide a suitable base. The base will be excavated to rock or competent ground with a mechanical excavator with the foundation formed in-situ using a semi-dry concrete lean mix. The base will be excavated along the stream bank with no instream works required.
- Access to the opposite side of the river for excavation and foundation installation will require the installation of pre-cast concrete slab across the river to provide temporary access for the excavator.
- All pre-cast concrete panels and slabs/beams will be installed using a crane which will be set up on the bank of the watercourse and will be lifted into place from the bank with no contact with the watercourse.
- A concrete deck will be poured over the beams/slabs which span across the river. This will be shuttered, sealed and water tested before concrete pouring can commence.
- A typical design drawing of a pre-cast concrete, clear span crossing is shown in Figure 4-40, Appendix 6 of this NIS.

The proposed construction methodology for the installation of a corrugated metal or plastic and stone clear-span bridge is presented below:

- The access road on the approach to the watercourse will be completed to a formation level which is suitable for the passing of plant and equipment required for the installation of the watercourse crossing.
- The foundation will consist of concrete panels which will be installed on a concrete lean mix foundation to provide a suitable base. The base will be excavated to rock or competent ground with a mechanical excavator with the foundation formed in-situ using a semi-dry concrete lean mix. The base will be excavated away from the stream bank with no instream works required.
- The bottom plate of the culvert will be bolted to the foundation on both sides of the stream. The top section of the culvert will be bolted together and lifted into position and bolted to the two bottom sections. This sequence will continue until the full length of culvert is in position.
- Once the culvert is in position stone backfill will be placed and compacted against the culvert up to the required level above the foundations. A concrete beam will then be shuttered, fixed and poured along the two shoulders of the steel culvert.
- When the concrete beams are cured the filling and compaction of the road will be completed. The road finish level will be as per the drawings provided in Appendix 4.1 of the EIAR.

The design drawings for the proposed clear-span watercourse crossings are shown in Figure 4-38 and Figure 4-39, Appendix 6 of this NIS. All of the above works will be supervised by the Environmental Clerk of Works and the project hydrologist.

5.2.1.3.2 *Construction phase drainage management*

The following best practice drainage measures have been incorporated into the proposed development for the protection of surface water quality:

- If required, pumping of excavation inflows will prevent build-up of groundwater in excavations.
- Swales will be used to intercept and collect run off from construction areas of the site during the construction phase, and channel it to settlement ponds for sediment attenuation as per the drainage design.
- Interceptor drains will be installed up-gradient of any works areas to collect surface flow runoff and prevent it reaching excavations and construction areas of the site. It will then be directed

to areas where it can be re-distributed over the ground as sheet flow as per the drainage design.

- A level spreader will be constructed at the end of each interceptor drain to convert concentrated flows in the drain into diffuse sheet flow on areas of vegetated ground. The levels spreaders will be located downgradient of any proposed works areas in locations where they are not likely to contribute further to water ingress to construction areas of the site.
- Areas of existing vegetation (vegetation filters) accepting drainage water issuing from level spreaders as sheet flow, will remove any suspended sediment from water channelled via interceptor drains or any remaining sediment in waters channelled via swales and settlement ponds.
- On steep sections of access road transverse drains ('grips') will be constructed where appropriate in the surface layer of the road to divert any runoff off the road into swales/road side drains;
- Check dams will not be used in any natural watercourses, only artificial drainage channels and interceptor drains. The check dams will be installed at regular intervals along interceptor drains to restrict flow velocity, minimise channel erosion and promote sedimentation behind the dam as per the drainage design.
- Settlement ponds, placed either singly or a pair in series, will buffer volumes of run-off discharging from the drainage system during periods of high rainfall, by retaining water until the storm hydrograph has receded, thus reducing the hydraulic loading to water courses as per the drainage design.
- If the discharge water from construction areas fails to be of a high quality, then a filtration treatment system (such as a 'siltbuster' or similar equivalent treatment train (sequence of water treatment processes)) will be used to filter and treat all surface discharge water collected in the dirty water drainage system. This will apply for all of the construction phase.
- Silt fences will be emplaced down-gradient of all construction areas. Silt fences are effective at removing heavy settleable solids. This will act to prevent entry to the existing drainage network of sand and gravel-sized sediment, released from excavation of mineral sub-soils of glacial and glacio-fluvial origin and entrained in surface water runoff. Inspection and maintenance of these structures during construction phase is critical to their functioning to stated purpose. They will remain in place throughout the entire construction phase.
- Silt bags will be used where small to medium volumes of water need to be pumped from excavations (e.g. the proposed underpass locations). As water is pumped through the bag, most of the sediment is retained by the geotextile fabric allowing filtered water to pass through.

5.2.1.3.3 *Culvert Upgrades*

The following mitigation is proposed for completion of windfarm culvert upgrades:

- Where possible all proposed new natural stream crossings will be bottomless culverts and the existing banks will remain undisturbed as much as possible;
- Where the proposed grid connection cabling route follows an existing forestry road or road proposed for upgrade, the cable will pass over or below the culvert within the access road;
- As a further precaution near stream construction work will only be carried out during the period permitted by Inland Fisheries Ireland for in-stream works according to the Eastern Regional Fisheries Board (2004) guidance document "*Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites*", that is, May to September inclusive. This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses;
- During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed on-site.

5.2.1.3.4 *Hydrocarbons and Waste Material*

The use of hydrocarbons during the construction process leads to the potential for pollution to enter the wider environment, including drainage ditches and watercourses. Leaks in poorly maintained plant and machinery could lead to hydrocarbon dispersal over works areas. Leaks in fuel storage tanks and spillages during refuelling operations could lead to larger releases of hydrocarbons into the environment.

The Construction and Environmental Management Plan (CEMP) (Appendix 2) provides measures to avoid impacts on the wider environment as a result of pollution and are summarised below.

Refuelling, Fuel and Hazardous Materials Storage

The following mitigation measures are proposed to avoid release of hydrocarbons at the site:

- Minimal refuelling or maintenance of construction vehicles or plant will take place on site. Off-site refuelling will occur at a controlled fuelling station;
- On-site refuelling will take place using a mobile double skinned fuel bowser. Staff in charge of refilling will have the necessary training and permits necessary to undertake such work. The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled off site and will be towed around the site by a 4x4 jeep to where machinery is located. It is not practical for all vehicles to travel back to a single refuelling point, given the size of the cranes, excavators, etc. that will be used during the construction of the wind farm. The 4x4 jeep will also carry fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use. Only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations.
- Fuels volumes stored on site will be minimised. Any fuel storage areas will be bunded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm drainage system and an appropriate oil interceptor;
- The electrical substation compound will be bunded appropriately to the volume of oils likely to be stored, and to prevent leakage to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor;
- The plant used will be regularly inspected for leaks and fitness for purpose; and,
- Spill kits will be available to deal with any accidental spillage in and outside the refuelling area.

5.2.1.3.5 Cement Based Products Control Measures

The following mitigation measures are proposed to avoid release of cement leachate from the site:

- No batching of wet-cement products will occur on site;
- Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place. Where possible pre-cast elements for culverts and concrete works will be used;
- No washing out of any plant used in concrete transport or concreting operations will be allowed on-site;
- No concrete will be transported around the site in open trailers or dumpers so as to avoid spillage while in transport.
- Where concrete is delivered on site, only chute cleaning will be permitted, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed.
- Use weather forecasting to plan dry days for pouring concrete;

- Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event;

The small volume of water that will be generated from washing of the concrete lorry's chute will be directed into a concrete washout area, typically built using straw bales and lined with an impermeable membrane. The areas are generally covered when not in use to prevent rainwater collecting. In periods of dry weather, the areas can be uncovered to allow much of the water to be lost to evaporation. At the end of the concrete pours, any of the remaining liquid contents is tankered off-site. Any solid contents that will have been cleaned down from the chute will have solidified and can be broken up and disposed of along with other construction waste.

5.2.1.3.6 Avoidance of peat slippage and associated water quality impacts

Section 3.2.11 '*Peat Stability Management',* Appendix 2 of this NIS has identified that peat slippage could result in effects on downstream aquatic receptors. This states that '*Peat instability or failure refers to a significant mass movement of a body of peat that would have an adverse impact on wind farm development and the surrounding environment. Peat failure excludes localised movement of peat that could occur below an access road, creep movement or erosion type events.* Section 3.2.12 '*General Recommendations for Good Construction Practice*', Appendix 2 of this NIS identifies measures that have been put in place to prevent any potential for impact as a result of peat slippage. In addition, Appendix 5 of the NIS includes the site specific "*Peat and Spoil Management Plan*".

As described in Section 3.2.12 "*General Recommendations for Good Construction Practice*" of the CEMP (see Appendix 2 of this NIS), based on the recommendations and control measures given in the FehilyTimoney Peat Stability Assessment (Appendix 8-1 of the EIAR) report being strictly adhered to during construction and the detailed stability assessment carried out for the peat slopes, which showed that the site has an acceptable margin of safety, potential for effect as a result of peat slippages can be excluded.
The CEMP, Appendix 2 of this NIS, describes the measures which will be implemented during the construction phase of the project to ensure the management of the risks for this site.

In addition to the above measures, Section 5.2 "*Environmental Emergency Response Procedure*" of the CEMP, see Appendix 2 of the NIS, provides both monitoring measures for the identification of Peat Movement as well as the necessary actions to be put in place. These include, as fully described in the CEMP, measures for the management of 'Excessive Peat Movement', 'Onset of Peat Slide' and 'Spill Control Measures'.

5.2.1.3.7 *Monitoring*

As described in the CEMP, see Appendix 2 of the NIS, daily monitoring of excavations by a suitably qualified person will occur during the construction phase. If high levels of seepage inflow occur, excavation work should immediately be stopped, and a geotechnical assessment undertaken.

Turbidity monitors, or sondes, will be installed at locations surrounding the wind farm site. The sondes will provide continuous readings for turbidity levels in the watercourse. This equipment will be supplemented by daily visual monitoring at their locations. This will be supplemented by field chemistry measurements. The likely suite of determinants will include:

- pH (field measured)
- Electrical Conductivity (field measured)
- Temperature (field measured)
- Dissolved Oxygen (field measured)
- Total Phosphorus
- Chloride
- Nitrate
- Nitrite

- Total Nitrogen
- Ortho-Phosphate
- Ammonia N
- Biochemical Oxygen Demand
- Total Suspended Solids

The above measures will both determine that the proposed mitigation measure are working as planned as well as informing the need for any alterations to the onsite mitigation and drainage design. All such measures will be overseen and implemented by a dedicated project Environmental Clerk of Works.

5.2.1.4 Operation Phase Mitigation

The operational phase drainage measures incorporated into the proposed development design will remain in place for the duration of the project to avoid any potential operational phase run-off from hard stands. Details of all proposed drainage measures incorporated into the proposed development are fully described in Section 4.7, Chapter 4 of the EIAR, Section 9.5.4, Chapter 9 '*Water*' (Appendix 3) and Section 3.2.4 of the CEMP, Appendix 2 of this NIS. The below measures are a summary of the main water protection measures incorporated into the design of the proposed development. They will be installed and constructed in conjunction with the road and hardstanding construction work as described below:

- Interceptor drains will be installed up-gradient of all proposed infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. It will then be directed to areas where it can be re-distributed over the ground by means of a level spreader;
- Swales/road-side drains will be used to collect runoff from access roads and turbine hardstanding areas of the site, likely to have entrained suspended sediment, and channel it to settlement ponds for sediment settling;
- On steep sections of access road transverse drains ('grips') will be constructed in the surface layer of the road to divert any runoff off the road into swales/road side drains;
- Check dams will be used along sections of access road drains to intercept silts at source. Check dams will be constructed from a 4/40mm non-friable crushed rock;
- Settlement ponds, emplaced downstream of road swale sections and at turbine locations, will buffer volumes of runoff discharging from the drainage system during periods of high rainfall, by retaining water until the storm hydrograph has receded, thus reducing the hydraulic loading to watercourses; and,
- Settlement ponds will be designed in consideration of the greenfield runoff rate.

With the implementation of the proposed wind farm drainage measures as outlined above, there will be no potential for impact on downstream watercourses and thus no potential for adverse effect on downstream EU designated sites.

5.2.1.5 Decommissioning Phase Mitigation

The wind turbines proposed as part of the Proposed Development are expected to have a lifespan of approximately 30 years. Following the end of their useful life, the wind turbines may be replaced with a new set of turbines, subject to planning permission being obtained, or the Proposed Development may be decommissioned fully. The onsite substation will remain in place as it will be under the ownership of the ESB/EirGrid.

Upon decommissioning of the Proposed Development, the wind turbines would be disassembled in reverse order to how they were erected. All above ground turbine components would be separated and removed off-site for recycling. Turbine foundations would remain in place underground and would be covered with earth and reseeded as appropriate. Leaving the turbine foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the

ground could result in significant environment nuisances such as noise, dust and/or vibration. Site roadways will be left in situ, as appropriate. If it were to be confirmed that the roads were not required in the future for any other useful purpose, they could be removed where required. Underground cables, including grid connection, will be removed and the ducting left in place. A decommissioning plan will be agreed with the local authorities three months prior to decommissioning the Proposed Development.

6. ASSESSMENT OF RESIDUAL ADVERSE EFFECTS

The potential for adverse effects on each of the individual Qualifying Interests that were identified as being at risk of potential effects in the AA Screening Report is assessed in this section in view of the Conservation Objectives of those habitats and species.

6.1 Lough Gill SAC

No detailed Conservation Objectives are available for Lough Gill SAC. Targets and attributes for the conservation of the Qualifying Interests of this site are available in detailed Conservation Objectives for other SACs, including Cummeen Strand/Drumcliff Bay SAC and others (000688, 002165 and 001818). The listed targets and attributes are representative of factors considered in the conservation of these species at other SAC sites. The extrapolated targets and attributes for this species have been reviewed and considered in relation to the current development and are described in Table 6.1Table 6.1 to Table 6.8.

6.1.1 *Austropotamobius pallipes* (White-clawed Crayfish) [1092]

Table 6.1 Extrapolated Targets and Attributes associated with site specific conservation objectives forAustropotamobius pallipes (White-clawed Crayfish) [1092]

Attribute	Target	Assessment
Distribution	No reduction from baseline.	There will be no reduction in the distribution or population structure that could limit habitat accessibility as there are no proposed alterations to the natural watercourses occurring on site.
Population structure: recruitment	Juveniles and/or females with eggs should be present in all occupied 1km squares, subject to natural processes and availability of suitable habitat	
Negative indicator species	No non-indigenous crayfish species	No in-stream works are proposed as part of the proposed development. No crayfish were recorded within the site during the surveys undertaken and no potential for the introduction of non-native crayfish species or diseases exists. Section 3.5 of this NIS describes the measures incorporated into the proposed development for the protection of water quality both within and downstream of the site during all phases of the proposed development. Following the application of mitigation, there is no potential for any deterioration in water quality in the SAC.
Disease	No instances of disease	
Water quality	Maintain appropriate water quality, particularly pH and nutrient levels, to support the natural structure and functioning of lake habitat 3140	
Habitat quality: heterogeneity	No decline in heterogeneity or habitat quality	

6.1.1.1 Determination on potential for adverse effects

There is no scientific doubt about the effectiveness of the mitigation measures incorporated into the proposed development and there is no lacunae or gaps in the available data. Based on the above, it is concluded in view of best scientific knowledge, beyond reasonable scientific doubt on the basis of objective information that the proposed development, will have no adverse effect on the population of *Austropotamobius pallipes* (White-clawed Crayfish) associated with Lough Gill SAC.

6.1.2 *Petromyzon marinus (Sea Lamprey) [1095]*

Table 6.2 Extrapolated Targets and attributes associated with nominated site-specific conservation objectives for Petromyzon marinus (Sea Lamprey) [1095]

Attribute	Target	Assessment
Distribution: extent of anadromy	Greater than 75% of main stem length of rivers accessible from estuary	There will be no reduction in the distribution or extent of anadromy given that there will be no instream works or alterations to river morphology and structures which could limit habitat accessibility are not proposed.
Population structure of juveniles	At least three age/size groups present	There will be no reduction in the population structure of juveniles associated with the proposed development. The only identified pathway for effect is via indirect surface water deterioration. This was considered in the design of the proposed development and a range of measures, outlined in Section 3 of this report, are in place to avoid all water pollution during construction, operation and decommissioning.
Juvenile density in fine sediment	Juvenile density at least 1/m^2	
Extent and distribution of spawning habitat	No decline in extent and distribution of spawning beds	There will be no reduction in the habitat or spawning extent associated with the proposed development. The only identified pathway for effect is via indirect surface water deterioration. This was considered in the design of the proposed development and a range of measures, outlined in Section 3 of this report, are in place to avoid all water pollution during construction, operation and decommissioning.
Availability of juvenile habitat	More than 50% of sample sites positive	

6.1.2.1 Determination on potential for adverse effects

There is no scientific doubt about the effectiveness of the mitigation measures incorporated into the proposed development and there is no lacunae or gaps in the available data. Based on the above, it can be concluded, in view of best scientific knowledge, beyond reasonable scientific doubt and based on objective information, that the Proposed development will not adversely affect Sea Lamprey within the Lough Gill SAC.

6.1.3 *Lampetra planeri (Brook Lamprey) [1096]*

Table 6.3 Extrapolated Targets and attributes associated with nominated site-specific conservation objectives for Lampetra planeri (Brook Lamprey) [1096]

Attribute	Target	Assessment
Distribution	Access to all water courses down to first order streams	There will be no reduction in the distribution given that there will be no instream works or alterations to stream or watercourse morphology and structures which could limit habitat accessibility are not proposed.
Population structure of juveniles	At least three age/size groups of brook/river lamprey present	There will be no reduction in the population structure of juveniles associated with the proposed development. The only identified pathway for effect is via indirect surface water deterioration. This was considered in the design of the proposed development and a range of measures, outlined in Section 3 of this report, are in place to avoid all water pollution during construction, operation and decommissioning.
Juvenile density in fine sediment	Mean catchment juvenile density of brook/river lamprey at least 2/m²	
Extent and distribution of spawning habitat	No decline in extent and distribution of spawning beds	There will be no reduction in the habitat or spawning extent associated with the proposed development. The only identified pathway for effect is via indirect surface water deterioration. This was considered in the design of the proposed development and a range of measures, outlined in Section 3 of this report, are in place to avoid all water pollution during construction, operation and decommissioning.
Availability of juvenile habitat	More than 50% of sample sites positive	

6.1.3.1 Determination on potential for adverse effects

Based on the above, it can be concluded, in view of best scientific knowledge, beyond reasonable scientific doubt and based on objective information, that the Proposed development will not adversely affect Brook Lamprey within the Lough Gill SAC.

6.1.4 *Lampetra fluviatilis (River Lamprey) [1099]*

Table 6.4 Extrapolated Targets and attributes associated with nominated site-specific conservation objectives for Lampetra fluviatilis (River Lamprey) [1099]

Attribute	Target	Assessment
Distribution	Access to all water courses down to first order streams	There will be no reduction in the distribution given that there will be no instream works or alterations to stream or watercourse morphology and structures which could limit habitat accessibility are not proposed.
Population structure of juveniles	At least three age/size groups of river/brook lamprey present	There will be no reduction in the population structure of juveniles associated with the proposed development. The only identified

Juvenile density in fine sediment	Mean catchment juvenile density of brook/river lamprey at least 2/m²	pathway for effect is via indirect surface water deterioration. This was considered in the design of the proposed development and a range of measures, outlined in Section 3 of this report, are in place to avoid all water pollution during construction, operation and decommissioning.
Extent and distribution of spawning habitat	No decline in extent and distribution of spawning beds	There will be no reduction in the habitat or spawning extent associated with the proposed development. The only identified pathway for effect is via indirect surface water deterioration. This was considered in the design of the proposed development and a range of measures, outlined in Section 3 of this report, are in place to avoid all water pollution during construction, operation and decommissioning.
Availability of juvenile habitat	More than 50% of sample sites positive	

6.1.4.1 Determination on potential for adverse effects

There is no scientific doubt about the effectiveness of the mitigation measures incorporated into the proposed development and there is no lacunae or gaps in the available data. Based on the above, it can be concluded, in view of best scientific knowledge, beyond reasonable scientific doubt and based on objective information, that the Proposed development will not adversely affect River Lamprey within the Lough Gill SAC.

6.1.5 *Salmo salar (Salmon) [1106]*

Table 6.5 Extrapolated Targets and attributes associated with nominated site-specific conservation objectives for Salmo salar (Salmon) [1106]

Attribute	Target	Assessment
Distribution: extent of anadromy	100% of river channels down to second order accessible from estuary	There will be no reduction in the distribution of extent of anadromy given that there will be no instream works or alterations to river morphology and structures which could limit habitat accessibility are not proposed.
Adult spawning fish	Conservation Limit (CL) for each system consistently exceeded	There will be no reduction in the number of adult spawning fish associated with the proposed development. The only identified pathway for effect is via indirect surface water deterioration. This was considered in the design of the proposed development and a range of measures, outlined in Section 3 of this report, are in place to avoid all water pollution during construction, operation and decommissioning.
Salmon fry abundance	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 min sampling	There will be no reduction in salmon fry abundance associated with the proposed development. The only identified pathway for effect is via indirect surface water quality deterioration. This was considered in the design of the proposed development and a range of measures, outlined in Section 3 of this report, are in place to avoid all water pollution during

		construction, operation and decommissioning.
Out-migrating smolt abundance	No significant decline	There will be no decline in out migrating smolt abundance associated with the proposed development. The only identified pathway for effect is via indirect surface water deterioration. This was considered in the design of the proposed development and a range of measures, outlined in Section 3 of this report, are in place to avoid all water pollution during construction, operation and decommissioning.
Number and distribution of redds	No decline in number and distribution of spawning redds due to anthropogenic causes	There will be no decline in number and distribution of spawning redds associated with the proposed development. The only identified pathway for effect is via indirect surface water deterioration. This was considered in the design of the proposed development and a range of measures, outlined in Section 3 of this report, are in place to avoid all water pollution during construction, operation and decommissioning.
Water quality	At least Q4 at all sites sampled by EPA	The only identified pathway for effect is via indirect surface water deterioration. This was considered in the design of the proposed development and a range of measures, outlined in Section 3.5 of this report, are in place to avoid all water pollution during construction, operation and decommissioning.

6.1.5.1 Determination on potential for adverse effects

There is no scientific doubt about the effectiveness of the mitigation measures incorporated into the proposed development and there is no lacunae or gaps in the available data. Based on the above, it can be concluded, in view of best scientific knowledge, beyond reasonable scientific doubt and based on objective information, that the proposed development will not adversely affect Atlantic salmon within the Lough Gill SAC.

6.1.6 *Lutra lutra (Otter) [1355]*

Table 6.6 Extrapolated Targets and attributes associated with nominated site-specific conservation objectives for Lutra lutra (Otter) [1355]

Attribute	Target	Assessment
Distribution	No significant decline	There will be no decline in the distribution of the otter population for which the SAC has been designated as a result of the proposed development. The proposed development site is located in excess of 7km (surface water distance) upstream of the SAC. The proposed development has been specifically designed to avoid impacts on watercourses within and surrounding the site. As described in Section 3.5 of this NIS, Section 4.9.4 of the EIAR and

Attribute	Target	Assessment
		the detailed CEMP, a suite of best practice environmental control and mitigation measures have been incorporated into the proposed development for the protection of water quality. No instream works are proposed and measures are in place to avoid any deterioration of water quality during construction, operation and decommissioning.
Extent of terrestrial habitat	No significant decline. Area mapped and calculated as 596.8ha above high water mark (HWM); 958.9ha along river banks/ around ponds	The proposed development will not result in the loss of any habitat anywhere within the SAC as it is located over 7km (surface water distance) upstream of the designated site. There will be no instream works and there is no major infrastructure within 50m of any natural watercourse.
Extent of marine habitat	No significant decline. Area mapped and calculated as 4,461.6ha	
Extent of freshwater (river) habitat	No significant decline. Length mapped and calculated as 500.1km	
Extent of freshwater (lake/lagoon) habitat	No significant decline. Area mapped and calculated as 125.6ha	
Couching sites and holts	No significant decline	There will be no loss of holting or couching sites within the SAC as the proposed development is located over 7km (surface water distance). In addition, no holting or couch sites were recorded on the site of the proposed development during either the dedicated otter surveys of the site and fisheries surveys.
Fish biomass available	No significant decline	There will be no decline in availability of fish biomass associated with the proposed development. The only identified pathway for effect is via indirect surface water quality deterioration. This was considered in the design of the proposed development and a range of measures, outlined in Section 3.5 of this report, are in place to avoid all water pollution during construction, operation and decommissioning. Such measures will ensure that there is no disturbance to fish or potential for water pollution.
Barriers to connectivity	No significant increase.	There will be no barriers created as a result of this development as there will be no instream works and there is no major infrastructure

Attribute	Target	Assessment
		within 50m of any natural watercourse. No potential for disturbance or commuting potential to the species is expected as result of the proposed development. Section 3 of this NIS describes the measures incorporated into the proposed development for the protection of water quality both within and downstream of the site during all phases of the proposed development. This includes for the installation of bottomless culverts where watercourse crossings are required.

6.1.6.1 Determination on potential for adverse effects

There is no scientific doubt about the effectiveness of the mitigation measures incorporated into the proposed development and there is no lacunae or gaps in the available data. Based on the above, it can be concluded, in view of best scientific knowledge, beyond reasonable scientific doubt and based on objective information, that the Proposed development will not adversely affect otter with the Lough Gill SAC.

6.1.7 *Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0]*

Table 6.7 Extrapolated Targets and attributes associated with nominated site-specific conservation objectives for Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0]

Attribute	Target	Assessment
Habitat area	Area stable or increasing, subject to natural processes	There will be no decline in habitat area associated with the proposed development. The proposed development is located 7km (surface water distance) upstream of the SAC and thus will not directly affect alluvial woodland within the SAC. Following dedicated habitat surveys of the study area, the habitat was not found to occur on site. The only identified pathway for effect is via indirect surface water deterioration. This was considered in the design of the proposed development and a range of measures, outlined in Section 3.5 of this report, are in place to avoid all water pollution during construction, operation and decommissioning.
Habitat distribution	No decline.	
Woodland size	Area stable or increasing. Where topographically possible, "large" woods at least 25ha in size and “small” woods at least 3ha in size	
Woodland structure: cover and height	Maintain diversity and extent of community types	There will be no alteration to the woodland structure associated with the proposed development. The proposed development is located 7km (surface water distance) upstream of the SAC and thus will not directly or indirectly affect alluvial woodland within the SAC. The habitat does not occur onsite.
Woodland structure: community diversity and extent	No significant decline. Area mapped and calculated as 125.6ha	
Woodland structure: natural regeneration	Seedlings, saplings and pole age-classes occur in	

Attribute	Target	Assessment
	adequate proportions to ensure survival of woodland canopy	
Hydrological regime: flooding depth/height of water table	Appropriate hydrological regime necessary for maintenance of alluvial vegetation	There will be no instream works or alteration to the natural hydrological regime necessary to support the natural structure and function of the woodland within the SAC, located in excess of 7km (surface water distance) downstream of the proposed development. As described in Section 3 of this NIS and Chapter 9 'Water' of the EIAR, there will be no alteration to the water table and hydrological regime and thus no alteration to the downstream alluvial woodland habitat given.
Woodland structure: dead wood	At least 30m³/ha of fallen timber greater than 10cm diameter; 30 snags/ha; both categories should include stems greater than 40cm diameter (greater than 20cm diameter in the case of alder)	As the proposed development is located in excess of 7km (surface water distance) downstream of the proposed development there will be no effect on the amount of dead wood within the woodland structure.
Woodland structure: veteran trees	No decline	There will be no instream works or alteration to the natural hydrological regime necessary to support the woodland structure. As the SAC is located in excess of 7km (surface water distance) downstream of the proposed development, there will be no changes to the water table or flooding regime.
Woodland structure: indicators of local distinctiveness	No decline	
Vegetation composition: native tree cover	No decline. Native tree cover not less than 95%	
Vegetation composition: typical species	A variety of typical native species present, depending on woodland type, including alder (*Alnus glutinosa),* willows (*Salix spp)* and, locally, oak (*Quercus robur)* and ash *(Fraxinus excelsior)*	
Vegetation composition: negative indicator species	Negative indicator species, particularly non-native invasive species, absent or under control	

6.1.7.1 Determination on potential for adverse effects

There is no scientific doubt about the effectiveness of the mitigation measures incorporated into the proposed development and there is no lacunae or gaps in the available data. Based on the above, it can be concluded, in view of best scientific knowledge, beyond reasonable scientific doubt and based on objective information, that the Proposed development will not adversely affect Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae*) [91E0] associated within the Lough Gill SAC.

6.1.8 *Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation [3150]*

Table 6.8 Extrapolated Targets and Attributes associated with nominated site-specific conservation objectives for Natural eutrophic lakes with Magnopotamion or Hydrocharition – type vegetation [3150]

Attribute	Target	Assessment
Habitat area	Area stable or increasing, subject to natural processes	There will be no reduction in habitat area or distribution. The proposed development is located >7km (surface water distance) from the SAC. The only identified pathway for effect is via indirect surface water deterioration. This was considered in the design of the proposed development and a range of measures, outlined in Section 3 of this report, are in place to avoid all water pollution during construction, operation and decommissioning.
Habitat distribution	No decline, subject to natural processes	
Typical species	Typical species present, in good condition, and demonstrating typical abundances and distribution	The proposed development is located >7km (surface water distance) from the SAC. There will be no alteration to the vegetation composition its distribution or species present within the eutrophic lake habitat, as a result of the proposed development. The only identified pathway for effect is via indirect surface water deterioration. This was considered in the design of the proposed development and a range of measures, outlined in Section 3 of this report, are in place to avoid all water pollution during construction, operation and decommissioning.
Vegetation composition: characteristic zonation	All characteristic zones should be present, correctly distributed and in good condition	
Vegetation distribution: maximum depth	Restore maximum depth of vegetation, subject to natural processes	
Hydrological regime: water level	Maintain appropriate natural hydrological regime necessary to	There will be no instream works or alteration to the natural

Attribute	Target	Assessment
fluctuations	support the habitat	hydrological regime necessary to support the natural structure and function of the lake; nutrient content, biomass, phytoplankton composition, algal biomass, macrophyte status within the SAC, located in excess of 7km (surface water distance) downstream of the proposed development. There will be no instream works associated with the proposed development and therefore no potential for impact on water quality or the hydrological regime as a result of the proposed development. In addition, the proposed development is located in excess of 7km (surface water distance) downstream of the SAC.
Lake substratum quality	Maintain appropriate substratum type, extent and chemistry to support the vegetation	
Water quality: transparency	Maintain/restore appropriate Secchi transparency. There should be no decline in Secchi depth/transparency	
Water quality: nutrients	Restore the concentration of nutrients in the water column to sufficiently low levels to support the habitat and its typical species	
Water quality: phytoplankton biomass	Maintain appropriate water quality to support the habitat, including good chlorophyll a status	
Water quality: phytoplankton composition	Maintain appropriate water quality to support the habitat, including good phytoplankton composition status	
Water quality: attached algal biomass	Maintain trace/ absent attached algal biomass (<5% cover) and good phytobenthos status	
Water quality: macrophyte status	Restore good macrophyte status	
Acidification status	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes	
Water colour	Restore appropriate water colour to support the habitat	There will be no instream works or alteration to the water colour, clarity or an alteration to the organic carbon levels of the lake within the SAC, located in excess of 7km (surface water distance) downstream of the proposed development. As described in Section 3 of this NIS and Chapter 9 'Water' of the EIAR, there will be no there will be no instream works or alteration to the water table and hydrological regime of natural eutrophic lakes habitat. In addition, the site of the proposed development is located over 7km (surface water distance)
Dissolved organic carbon (DOC)	Maintain appropriate organic carbon levels to support the habitat	
Turbidity	Maintain appropriate turbidity to support the habitat	

Attribute	Target	Assessment
		downstream of the SAC.
Fringing habitat: area	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of the lake habitat	There will be no alteration to the fringe habitats supporting the lake within the SAC as the works are located in excess of 7km (surface water distance) downstream of the proposed development. As described in Section 3 of this NIS and Chapter 9 'Water' of the EIAR, there will be no instream works or alteration to the water table, the supporting habitats and hydrological regime of natural eutrophic lakes habitat. In addition, the site of the proposed development is located over 7km (surface water distance) downstream of the SAC.

6.1.8.1 Determination on potential for adverse effects

There is no scientific doubt about the effectiveness of the mitigation measures incorporated into the proposed development and there is no lacunae or gaps in the available data. Based on the above, it can be concluded, in view of best scientific knowledge, beyond reasonable scientific doubt and based on objective information, that the Proposed development will not adversely affect Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae*) [91E0] associated within the Lough Gill SAC.

6.2 Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC (000627)

A site-specific conservation objective supporting document is available for Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC (000627). As such, the site-specific targets and attributes provided in this document have been assessed below in the following sub-sections (NPWS, 2013).

6.2.1 Mudflats and sandflats not covered by seawater at low tide [1140]

Table 6.9 Targets and Attributes associated with nominated site-specific conservation objectives for Mudflats and sandflats not covered by seawater at low tide [1140] (NPWS, 2013)

Attribute	Target	Assessment
Habitat area	The permanent habitat area is stable or increasing, subject to natural processes.	There will be no reduction in habitat area. The proposed development is located 17.7 km (approximately 28.6km surface water distance upstream) of the SAC. The only identified pathway for effect is via indirect surface water deterioration. This was considered in the design of the

Attribute	Target	Assessment
		proposed development and a range of measures, outlined in Section 3 of this report, are in place to avoid all water pollution during construction, operation and decommissioning.
Community extent	Maintain the extent of the *Zostera*-dominated community and the *Mytilidae*-dominated community complex, subject to natural processes.	There will be no reduction in habitat area. The proposed development is located 17.7 km (approximately 28.6km surface water distance upstream) of the SAC. The only identified pathway for effect is via indirect surface water deterioration. This was considered in the design of the proposed development and a range of measures, outlined in Section 3 of this report, are in place to avoid all water pollution during construction, operation and decommissioning.
Community structure: *Zostera* density	Conserve the high quality of the *Zostera*-dominated community, subject to natural processes	
Community structure: *Mytilus edulis* density	Conserve the high quality of the *Mytilidae*-dominated community complex, subject to natural processes	
Community distribution	Conserve the following community types in a natural condition: Intertidal fine sand with *Peringia ulvae* and *Pygospio elegans* community complex; Estuarine mixed sediment to sandy mud with *Hediste diversicolor* and oligochaetes community complex; Fine sand with crustaceans and *Scololepis* (*Scololepis*) *squamata* community complex; Fine sand with *Angulus* spp. and *Nephtys* spp. community complex	There will be no reduction in habitat area. The proposed development is located 17.7 km (approximately 28.6km surface water distance upstream) of the SAC. The only identified pathway for effect is via indirect surface water deterioration. This was considered in the design of the proposed development and a range of measures, outlined in Section 3 of this report, are in place to avoid all water pollution during construction, operation and decommissioning.

6.2.1.1 Determination on potential for adverse effects

There is no scientific doubt about the effectiveness of the mitigation measures incorporated into the proposed development and there is no lacunae or gaps in the available data. Based on the above, it can be concluded, in view of best scientific knowledge, beyond reasonable scientific doubt and based on objective information, that the Proposed development will not adversely Mudflats and sandflats not covered by seawater at low tide associated within the Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC

6.2.2 Estuaries [1130]

Table 6.10 Targets and attributes associated with nominated site-specific conservation objectives for Estuaries [1130]

Attribute	Target	Assessment
Habitat area	The permanent habitat area is stable or	There will be no reduction in

Attribute	Target	Assessment
	increasing, subject to natural processes.	habitat area. The proposed development is located 17.7 km (approximately 28.6km surface water distance upstream) of the SAC. The only identified pathway for effect is via indirect surface water deterioration. This was considered in the design of the proposed development and a range of measures, outlined in Section 3 and associated appendices of this report, are in place to avoid all water pollution during construction, operation and decommissioning.
Community extent	Maintain the extent of the *Zostera*-dominated community and the *Mytilidae*-dominated community complex, subject to natural processes.	There will be no reduction in community extent. There will be no reduction in habitat area. The proposed development is located 17.7 km (approximately 28.6km surface water distance upstream) of the SAC. The only identified pathway for effect is via indirect surface water deterioration. This was considered in the design of the proposed development and a range of measures, outlined in Section 3 and associated appendices of this report, are in place to avoid all water pollution during construction, operation and decommissioning.
Community structure: *Zostera* density	Conserve the high quality of the *Zostera*-dominated community, subject to natural processes	
Community structure: *Mytilus edulis* density	Conserve the high quality of the Mytilidae-dominated community complex, subject to natural processes	
Community distribution	Conserve the following community types in a natural condition: Intertidal fine sand with *Peringia ulvae* and *Pygospio elegans* community complex; Estuarine mixed sediment to sandy mud with *Hediste diversicolor* and oligochaetes community complex; Fine sand with *Angulus* spp. and *Nephtys spp.* community complex; Sand to mixed sediment with amphipods community; Intertidal reef community.	There will be no reduction in community extent. There will be no reduction in habitat area. The proposed development is located 17.7 km (approximately 28.6km surface water distance upstream) of the SAC. The only identified pathway for effect is via indirect surface water deterioration. This was considered in the design of the proposed development and a range of measures, outlined in Section 3 and associated appendices of this report, are in place to avoid all water pollution during construction, operation and decommissioning.

6.2.2.1 Determination on potential for adverse effects

There is no scientific doubt about the effectiveness of the mitigation measures incorporated into the proposed development and there is no lacunae or gaps in the available data. Based on the above, it can be concluded, in view of best scientific knowledge, beyond reasonable scientific doubt and based on objective information, that the Proposed development will not adversely affect Estuaries associated within the Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC.

6.2.3 *Phoca vitulina* (Harbour Seal) [1365]

Table 6.11 Targets and attributes associated with nominated site-specific conservation objectives for Phoca vitulina (Harbour Seal) [1365]

Attribute	Target	Assessment
Access to suitable habitat	Species range within the site should not be restricted by artificial barriers to site use.	There will be no reduction in habitat area. The proposed development is located 17.7 km (approximately 28.6km surface water distance upstream) of the SAC. There will be no reduction in the access to suitable habitat by artificial barriers to site use for harbour seal.
Breeding behaviour	Conserve the breeding sites in a natural condition.	There will be no reduction in habitat area. The proposed development is located 17.7 km (approximately 28.6km surface water distance upstream) of the SAC. There will therefore be no reduction in the breeding, moulting or resting behaviour of harbour seals. Their sites will be not be disturbed and retained in a natural condition given the separation in distance between the SAC and the proposed development.
Moulting behaviour	Conserve the moult haulout sites in a natural condition	
Resting behaviour	Conserve the resting haulout sites in a natural Condition	
Disturbance	Human activities should occur at levels that do not adversely affect the harbour seal population at the site	There will be no reduction in habitat area. The proposed development is located 17.7 km (approximately 28.6km surface water distance upstream) of the SAC. There will therefore be no disturbance related effects from the proposed development.

6.2.3.1 Determination on potential for adverse effects

There is no scientific doubt about the effectiveness of the mitigation measures incorporated into the proposed development and there is no lacunae or gaps in the available data. Based on the above, it can be concluded, in view of best scientific knowledge, beyond reasonable scientific doubt and based on

objective information, that the Proposed development will not adversely affect Harbour Seal associated within the Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC.

6.2.4 *Petromyzon marinus* (Sea Lamprey) [1095]

Table 6.12 Targets and attributes associated with nominated site-specific conservation objectives for Petromyzon marinus (Sea Lamprey) [1095]

Attribute	Target	Assessment
Distribution: extent of anadromy	Greater than 75% of main stem length of rivers accessible from estuary	There will be no reduction in the distribution of extent of anadromy given that there will be no instream works or alterations to river morphology and structures which could limit habitat accessibility are not proposed.
Population structure of juveniles	At least three age/size groups present	There will be no reduction in the population structure of juveniles associated with the proposed development. The SAC is located over 28km, hydrological distance, downstream of the proposed development. The only identified pathway for effect is via indirect surface water deterioration. This was considered in the design of the proposed development and a range of measures, outlined in Section 3.5 and associated appendices of this report, are in place to avoid all water pollution during construction, operation and decommissioning.
Juvenile density in fine sediment	Juvenile density at least 1/m²	
Extent and distribution of spawning habitat	No decline in extent and distribution of spawning beds	There will be no reduction in the habitat or spawning extent associated with the proposed development. The SAC is located over 28km, hydrological distance, downstream of the proposed development. The only identified pathway for effect is via indirect surface water deterioration. This was considered in the design of the proposed development and a range of measures, outlined in Section 3 and associated appendices of this report, are in place to avoid all water pollution during construction, operation and decommissioning.
Availability of juvenile habitat	More than 50% of sample sites positive	

6.2.4.1 Determination on potential for adverse effects

There is no scientific doubt about the effectiveness of the mitigation measures incorporated into the proposed development and there is no lacunae or gaps in the available data. Based on the above, it can be concluded, in view of best scientific knowledge, beyond reasonable scientific doubt and based on objective information, that the Proposed development will not adversely affect Sea Lasmprey within the Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC

6.2.5 *Lampetra fluviatilis (River Lamprey) [1099]*

Table 6.13 Targets and attributes associated with nominated site-specific conservation objectives for Lampetra fluviatilis (River Lamprey) [1099]

Attribute	Target	Assessment
Distribution	Access to all water courses down to first order streams	There will be no reduction in the distribution given that there will be no instream works or alterations to stream or watercourse morphology and structures which could limit habitat accessibility are not proposed.
Population structure of juveniles	At least three age/size groups of river/brook lamprey present	There will be no reduction in the population structure of juveniles associated with the proposed development. The SAC is located over 28km, hydrological distance, downstream of the proposed development. The only identified pathway for effect is via indirect surface water deterioration. This was considered in the design of the proposed development and a range of measures, outlined in Section 3 and associated appendices of this report, are in place to avoid all water pollution during construction, operation and decommissioning.
Juvenile density in fine sediment	Mean catchment juvenile density of brook/river lamprey at least 2/m²	
Extent and distribution of spawning habitat	No decline in extent and distribution of spawning beds	There will be no reduction in the habitat or spawning extent associated with the proposed development. The SAC is located over 28km, hydrological distance, downstream of the proposed development. The only identified pathway for effect is via indirect surface water deterioration. This was considered in the design of the proposed development and a range of measures, outlined in Section 3 and associated appendices of this report, are in
Availability of juvenile habitat	More than 50% of sample sites positive	

		place to avoid all water pollution during construction, operation and decommissioning.

6.2.5.1 Determination on potential for adverse effects

There is no scientific doubt about the effectiveness of the mitigation measures incorporated into the proposed development and there is no lacunae or gaps in the available data. Based on the above, it can be concluded, in view of best scientific knowledge beyond reasonable scientific doubt and based on objective information, that the Proposed development will not adversely affect River Lamprey with the Cummeen Strand/Drumcliff Bay (Sligo Bay) SAC.

6.3 Cummeen Strand SPA [004035]

The detailed conservation objective supporting document (NPWS, 2013) for the site was reviewed in the undertaking of this assessment. The detailed Targets and Attributes for the relevant SCI 'Wetlands' are provided and assessed below.

6.3.1 Wetlands and Waterbirds [A999]

Table 6.14Targets and attributes associated with site specific conservation objectives for Wetlands and waterbirds [A999]

Attribute	Target	Assessment
Habitat area	The permanent area occupied by the wetland habitat should be stable and not significantly less than 1732 hectares, other than that occurring from natural patterns of variation	There will be no reduction in habitat area. The proposed development is located 18.1km (approximately 29.1km surface water distance downstream) from the SPA and will not directly impact upon the wetland habitat for which the SPA has been designated. Therefore, the only identified pathway for effect is via indirect surface water deterioration. This was considered in the design of the proposed development and a range of measures, outlined in Section 3 and associated appendices of this report, are in place to avoid all water pollution during construction, operation and decommissioning. The measures incorporated for the protection of the Wetlands [A999] conservation objective, upon which the other SCI species light-bellied brent goose, oystercatcher and redshank depend, will ensure that there is no potential for indirect effect on the qualifying interests as a result of the proposed development. These measures have been fully described in Section 5.2.1 of this NIS and associated appendices. In summary these include: › The setting back of significant infrastructure over 50 metres from EPA mapped watercourses. › The development has been designed to maintain a drainage neutral situation to avoid drainage related impacts, › The use of clear-span watercourse crossing to avoid any in-river works. The above measures, along with a comprehensive suite of additional site-specific measures are set out in full in Chapter 9 'Water' of the accompanying EIAR, Appendix 3 of this NIS.

6.3.1.1 Determination on potential for adverse effects

There is no scientific doubt about the effectiveness of the mitigation measures incorporated into the proposed development and there is no lacuna or gaps in the available data. Based on the above, it can be concluded, in view of best scientific knowledge beyond reasonable scientific doubt and based on objective information, that the Proposed Development will not adversely affect wetlands and water birds associated within the Cummeen Strand SPA, including light-bellied brent goose, oystercatcher and redshank.

6.4 Conclusion of Residual Impact Assessment

In view of best scientific knowledge, on the basis of objective information, and taking into account all necessary mitigation incorporated into the proposed development, there is no potential for adverse effect on the identified QIs/SCIs and their associated targets and attributes, or on any European Site. All pathways for effect have been robustly blocked through measures to avoid impacts and the incorporation of best practice/mitigation measures into the project design.

It will not prevent the QIs/SCIs of any European Sites from achieving favourable conservation status in the future as defined in Article 1 of the EU Habitats Directive. A definition of Favourable Conservation Status is provided below:

> *'conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within the territory referred to in Article 2;*

The conservation status will be taken as 'favourable' when:

- *Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and*
- *The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and*
- *There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.'*

Based on the above, it can be concluded in view of best scientific knowledge, on the basis of objective information that the Proposed Development will not adversely affect the Qualifying Interests/Special Conservation Interests associated with any European Designated Sites including in particular the following:

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

7. IN-COMBINATION EFFECTS

A search and review in relation to plans and projects that may have the potential to result in cumulative and/or in-combination impacts on European Sites was conducted. This included a review of online Planning Registers, development plans and other available information and served to identify past and future plans and projects, their activities and their predicted environmental effects.

7.1 Development context – Ecological Plans and Policies

The following development plans 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

The review focused on policies and objectives that relate to Natura 2000 sites and natural heritage. Policies and objectives relating to sustainable land use were also reviewed.

7.2 Plans

Table 7.1Review of plans

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
Leitrim County Development Plan 2015-2021	**PROTECTION OF THE NATURAL ENVIRONMENT / NATURAL HERITAGE: Policies & Objective** **Climate Change** **EUROPEAN, NATIONAL AND OTHER ENVIRONMENTALLY SENSITIVE SITES: Policies & Objectives** It is considered that certain developments within areas adjoining and in the vicinity of environmentally sensitive areas may impact on the integrity of such sensitive areas. Accordingly, areas adjoining environmentally sensitive sites, including; Natura 2000 sites, proposed Natural Heritage sites, Natural Heritage Sites, Areas of Outstanding Natural Beauty, High Visual Amenity Areas, and other features such as; lakes, rivers, waterways, wetlands, peatlands and deciduous woodlands, shall be protected from inappropriate development through the Development Management process. **Natura Sites** **Policy 76** It is the policy of the Council to protect and conserve Special Areas of Conservation and Special Protection Areas including 'Candidate' and 'Proposed' areas. **Policy 77** It is the Policy of the Council to ensure that all Plans and Projects that have the potential to negatively impact on the integrity of the Natura 2000 network, will be subject to a Habitats Directive Assessment (HDA), in accordance with Article 6 of the Habitats Directive and in accordance with best practice and guidance. **Policy 78** No projects or programme giving rise to significant adverse; direct, indirect, secondary or	The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the Natura 2000 network. Where the potential for any adverse effect on any European Site has been identified, the pathway by which any such effect may occur has been robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within this report and its appendices. The measures ensure that the construction and operation of the proposed development does not adversely affect the integrity of European sites. Therefore, it can be objectively concluded that the Proposed Development, individually or in combination with other plans or projects, will

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
	cumulative impacts upon the integrity of any Natura 2000 sites, having regard to their qualifying interests and conservation objectives, arising from their size, scale, area or land take, shall be permitted on the basis of this Plan (either alone or in combination with other plans or projects). **Candidate Special Areas of Conservation (cSACs)** **Objective 62** It is an objective of the Council to protect those sites identified as candidate Special Areas of Conservation as well as any other sites that may be so identified during the lifetime of this plan **Special Protection Areas (SPAs)** **Objective 65** It is an objective of the Council to protect the following proposed Special Protection Areas and all others as they become proposed and designated during the lifetime of this plan. **Natura Impact Statement** **Policy 128:** It is the policy of the Council that all wind farm applications will be assessed on the full range of criteria including those mentioned herein and those identified in the Wind Farm Development Guidelines, 2006 (or any subsequent update) published by the Department of Environment, Heritage and Local Government.	not adversely affect the integrity of any European Site.
Sligo County Development Plan 2017–2023	**Natural heritage –Policies** It is the policy of Sligo County Council to: **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. **Designated sites for nature conservation – Policies and objective**	The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the Natura 2000 network. Where the potential for any adverse effect on any European Site has been identified, the

Plans	Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
	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-DSNC-3** Carry out an appropriate level of assessment for all development plans, land-use plans and projects that the Council authorizes or proposes to undertake or adopt, to determine the potential for these plans or projects to impact on designated sites, proposed designated sites or associated ecological corridors and linkages in accordance with the Habitats Directive, All appropriate assessments shall be in compliance with the provisions of Part XAB of the Planning and Development Act 2000. **Strategic energy policies & Objectives** **SP-EN-2** Facilitate the sustainable production of energy from renewable sources, energy conversion and capture in forms such as wind power, hydro-power, wave generated energy, bioenergy, solar technology and the development of Waste to Energy/Combined Heat and Power schemes at appropriate locations and subject to compliance with the Habitats Directive. All such development proposals will be assessed for their potential impact on urban and rural communities, Natura 2000 sites, designated Sensitive Rural Landscapes, Visually Vulnerable Areas, Scenic Routes and scenic views, as well as in accordance with strict location, siting and design criteria. **SP-EN-4** Support existing and new enterprises that wish to use renewable energy to serve their own needs by on-site energy production subject to normal planning criteria and subject to compliance with the Habitats Directive.	pathway by which any such effect may occur has been robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within this report and its appendices. The measures ensure that the construction and operation of the proposed development does not adversely affect the integrity of European sites. Therefore, it can be objectively concluded that the Proposed Development, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site.

7.3 Other Projects

Assessment material for this in-combination impact assessment was compiled on the relevant developments within the vicinity of the proposed development and was verified on the 07/07/2020. The material was gathered through a search of relevant online Planning Registers, reviews of relevant documents, planning application details and planning drawings, and served to identify past and future projects, their activities and their environmental impacts. All relevant projects were considered in relation to the potential for in-combination effects. All relevant data was reviewed (e.g. individual EISs/EIARs, layouts, drawings etc.) for all relevant projects. These are listed below.

Other Developments
The review of planning registers for both Leitrim and Sligo County Councils documented relevant general development planning applications in the vicinity of proposed development site and the grid connection route, most of which relate to the provision and/or alteration of one-off rural housing and agriculture-related structures.

Consideration of Forestry Replacement Lands
As the proposed development will result in the felling of existing forestry lands within the proposed development footprint, additional lands have been identified for forestry replacement of this area. This afforestation has been subject to its own separate consenting process and all necessary Appropriate Assessment and Screening requirements associated.

Forestry Practices
The majority of the lands within the site and the surrounding area are planted with commercial forestry. The management and felling of this surrounding commercial forestry was also considered in this assessment.

Other Wind Turbines
There are a number of permitted and operation windfarm developments permitted within a 20-kilometre radius of the proposed development site, which are detailed in Table 7.4.

7.3.1 Projects considered in the Cumulative Impact Assessment

A review of the Planning Registers for Leitrim (LCC), Roscommon (RCC) and Sligo (SCC) County Council's shows that there has been a number of renewable energy and energy infrastructure planning applications within the vicinity of the application site.

Table 7.2 sets out the planning applications identified in relation to wind energy (and associated works) within approximately 5 kilometres of the proposed development site:

Table 7.2 Applications Within 5km of the Proposed Wind Farm

Planning Ref:	Name/Location	Description	Status
LCC 95/12501	Spion Kop, Co. Leitrim	2 x 600 kW wind turbines 40 meters in height with blade diameter of 40 meters, and all associated works	Grant, 13/06/1996
LCC 96/12794	Corry Mountain, Co. Leitrim	Erect 8 wind turbines 42 metres high to the Nacelle with rotor blades of 42 metres making a total height of 63 metres at Seltannasaggart	Grant 25/10/1996

Planning Ref:	Name/Location	Description	Status
		Townland and Liscuillew Upper Townland, Co Leitrim	
LCC 97/13602	Boleymaguire and Seltan Tds, Co. Leitrim	Erect 12 Wind Turbines with towers of a height not exceeding 50 metres and rotor diameter not exceeding 48 metres with control building and ancillary equipment at Boleymaguire and Seltan Townlands, Co. Leitrim	Grant 27/01/1999
SCC 98/533	Carrane Hill, Co. Sligo	Extension of Duration application - erection of 4 no. wind turbines with towers not exceeding 46 metres in height and rotor diameter not exceeding 54.25 metres with control building and ancillary equipment for generation of electricity.	Refused LCC 11/02/1999; Granted by ABP Ref: 21.110572 07/10/1999
SCC 98/861	Geevagh, Co. Sligo	Extension of Duration application – erection of 6 no. wind turbines, 45-50m in height with rotor diameter not exceeding 55m and a wind measuring mast, height not exceeding 50m, site roads, notice boards, control building, ancillary equipment etc	Grant 24/02/2000
LCC 98/14248	Seltannasaggart, (Corry Mountain), Co Leitrim	Erection of 2 No. Monitoring Wind Masts close to an existing turbine each to a maximum height of 54.75 metres.	Grant 28/07/1999
LCC 00/7	Moneenatieve, Co. Leitrim	Extend existing windfarm by installing 6 wind turbines, 1 substation, 1 - 40 metre monitoring mast and associated equipment on Moneenatieve Td, Co Leitrim .	Grant by LCC which was upheld by An Bord Pleanála on the 28/11/2000
RCC 00/1979	Altagowlan, Arigna, Carrick-On-Shannon, Co. Roscommon	To extend an existing windfarm by installing 9 wind turbines, 1 sub-station, 1 - 45 metre monitoring mast and associated equipment	Grant 21/09/2001
RCC 02/1374	S.H.H., Convent, Co. Roscommon.	The development of one wind turbine, a site entrance and a site access road	Grant 23/04/2003
RCC 03/1486	Tullynahaw Arigna, Co. Roscommon	For a wind energy project comprising 11 wind turbines and all associated works.	Grant, 14/06/2004
LCC 03/257	Garvagh Glebe, Co. Leitrim	The development of a Wind Energy Project comprising thirteen wind turbines, and all associated works.	Grant 11/08/2003

Planning Ref:	Name/Location	Description	Status
RCC 03/1486	Tullynahaw Arigna, Co. Roscommon	For a wind energy project comprising 11 wind turbines and all associated works.	Grant, 14/06/2004
LCC 07/498	Seltan, Co Leitrim	Erect a 70m anemometer mast for the measurement of wind speed and directions for the lifetime of the wind farm already permitted	Grant 27/07/2007
RCC 08/430	Seltannaveeney, Co. Roscommon	To erect 1 no. wind turbine generator; with onsite underground electrical cabling and ancillary works	Grant 19/01/2009
RCC 08/466	Seltannaveeny, Co. Roscommon	To construct 1 no. electricity sub-station; with onsite underground electrical cabling and ancillary works.	Grant 26/11/2008
LCC 08/602	Garvagh Glebe, Co. Leitrim	Extension of Duration (for Pl.Ref.03/257) application - wind energy project of 13no. wind turbines.	Granted 25/07/2008
LCC 09/76	Seltan, Arigna, Co. Leitrim	Alter Garvagh Gleve 110kV/MV Substation (Planning Ref. PL12.VA0001) to include a sewage treatment system and raised percolation area	Grant 19/05/2009
LCC 09/378	Boleymaguire, Arigna, Co. Leitrim	Alter Garvagh Glebe Wind Farm (Planning Ref. No. 03/257) to install a 67 metre high guyed lattice anemometer mast in substitution for a previously approved 50 metre high guyed pole anemometer mast	Grant 03/12/2009
RCC 09/451	Tullynahaw, Arigna, Carrick-On-Shan, Co. Roscommon	The development will consist of alteration to Tullynahaw Wind Farm (Planning Ref . PD/03/1486) to install a 67 metre high guyed lattice anemometer mast in substitution for a previously approved 50 metre high guyed pole anemometer mast	Grant 23/10/2009
LCC 15/35	Garvagh Glebe, Garvagh, Co. Leitrim	Construction of an extension to the existing Garvagh Glebe 110kV substation, comprising of the construction of a 110kV grid connection substation compound with switchgear housing, equipment plinths, bunds and fencing, oil interceptor and associated site development works	Grant 14/01/2016
LCC 18/45	Seltan and Boleymaguire, Co. Leitrm	The installation of approximately 0.46km of underground cable ducting, 1 no. joint bay and ancillary development laid primarily within the public road corridor, with a section of circa. 0.07km within private lands at Seltan.	Refused 05/08/2018; Granted by ABP (Ref: 301812-18) 18/06/2018

Planning Ref:	Name/Location	Description	Status
ABP PL21 .300811	Counties Leitrim, Roscommon and Sligo	Substitute Consent Application for installed portion of grid connection from consented Derrysallagh Windfarm Substation to Garvagh Glebe Substation, through townlands of Seltan, Boleymaguire, Leitrim, Gubbaruddda (Roscommon), Carrowcashel, Tulllynure, Straduff, Glen, and Ballynashee, Co. Sligo.	ABP Granted Permission 05/02/2019

Table 7.3 lists planning applications relating to wind energy developments which are located outside of the approximate 5km distance surrounding the proposed site. The below table captures applications between a 5-20km distance of the proposed development:

Table 7.3 Applications Within a 5-20km radius of the Proposed Wind Farm

Planning Ref:	Name/Location	Description	Status
RCC 02/1094	Seltenaveeny, Co. Roscommon	Development to consist of two wind turbines, electrical sub-station, site entrance and access roads	Grant, 28/01/2003
LCC 03/301	Lackagh, Killarga, Leitrim	Construct a windfarm consisting of 25 wind turbines of 60m hub height with associated transformers and associated works. This application is accompanied by an Environmental Impact Statement (EIS).	Grant by LCC, Refused by ABP 02/06/2004.
LCC 03/331	Tullynamoyle, Killarga, Co Leitrim	Develop an electricity generating windfarm consisting of twelve (12) wind turbines	Granted by LCC, Refused by ABP on the 02/06/2004
RCC 04/1315	Carrownadargny, Co. Roscommon.	Retention and completion of all works (670 metres of road) under Pl.Ref.98/533 and permission for the erection of 4 wind turbines and ancillary equipment for the generation of electricity	Grant 23/06/2005
LCC 05/691	Tullynamoyle, Co. Leitrim	Erect an electricity generating windfarm consisting of six (6) wind and site works	Grant by LCC, upheld by ABP on the 14/05/2008
SCC 06/136	Carrownadargney, Co. Sligo	Erection of 2 wind turbines with towers 44 metres in height and rotor diameter of 52 metres and ancillary equipment for the generation of electricity (being an extension to the wind farm referred to in planning ref no. 04/1315.	Grant 22/05/2006
LCC	Carrickheeney,	Windfarm comprising 4 wind turbines,	Refused LCC;

Planning Ref:	Name/Location	Description	Status
10/152	Co. Leitrim	20Kv substation building.	24/10/2011; ABP Grant (PL12.239133) 24/10/2011
SCC 12/133	Derrysallagh, Co. Sligo.	A 10 year permission for construction of a wind farm consisting of 12 wind turbines, a sub-station including a control building and associated equipment, new internal access roads, and the upgrading of an existing road.	Grant 26/04/2013
LCC 13/52	Tullynamovle Extension 1, Co. Leitrim	Ten year planning permission for an extension to an existing wind farm development permitted under planning reference 05/691. The development will consist of six (6) electricity generating wind turbines and all site works.	Grant 12/08/2013
LCC 15/93	Tullynamoyle Td, Killaraga, Co. Leitrim	Development at existing wind farm for the erection of 2 turbines previously granted permission under Leitrim County Council Planning Ref. 05/691 and An Bord Pleanála Ref: PL 12.218384, as part of a 6 turbine wind farm (4 turbines already commissioned) and upgrade of an existing forest track.	Grant 31/08/2015
LCC 15/164	Tullynamovle Extension 2, Co. Leitrim	Development consisting of twelve (12) electricity generating wind turbines (4 operational, 6 under construction and two permitted). The overall development will consist of 15 turbines	Grant 01/02/2016
SCC 17/93	Tawnaghmore, Co. Sligo	A ten year permission for erection of four wind turbines and associated works.	Grant 03/06/2017
LCC 19/26	Tullynamoyle, Killarga, Co. Leitrim	A thirty year planning permission for an additional four (4) wind turbines to an existing fifteen (15) turbine windfarm.	Grant 18/05/2020
LCC 20/20	Corderry, Co. Leitrim	Installation of battery arrays located within container units (16 no.), control building, transformer and new site entrance.	Ongoing

A range of other (non-renewable energy related) planning applications exist within 2km of the proposed wind farm development site. Many of the noted applications relate to agricultural developments and/or single residential developments. Table 7.4 below lists the planning applications identified within the vicinity of the development site.

Table 7.4 Other Applications in the Vicinity of the Proposed Wind Farm

Planning Ref:	Description	Status
LCC 01/760	Provide septic tank and percolation area.	Grant 07/01/2002
02/976	Erect a bungalow type dwelling, septic tank, percolation area, provide new site entrance, connection to existing group water scheme and associated site works.	Grant 15/10/2002
LCC 04/207	Erect 1 one and a half storey dwelling house, domestic garage, mechanical effluent treatment unit and percolation area to E.P.A Guidelines 2000, provide new site and access road.	Grant 27/05/2004
LCC 04/431	Erect dwelling house, domestic garage, proprietary effluent treatment system and constructed wetland	Grant 06/10/2004
LCC 05/175	Convert part of existing bedroom to bathroom and install treatment unit and polishing filter	Grant 06/07/2005
LCC 05/765	Erect one number single storey dwelling, proprietary effluent treatment system, entrance piers, gates, new site access and all associated ancillary works	Grant 21/08/2006
LCC 06/787	Erect one no. single storey type dwelling, garage, proprietary sewerage treatment system, entrance piers, new site access and all associated ancillary works	Grant 19/09/2006
LCC 06/798	Construct a dwelling house with sewage treatment system and percolation area and all associated site works	Grant 19/09/2006
LCC 06/827	Construct a proprietary sewerage treatment system and all associated ancillary works	Grant 11/08/2006
LCC 06/1205	Erect one number single storey type dwelling, proprietary sewerage treatment system, entrance piers, new site access and all associated ancillary works	Grant 27/03/2007
LCC 06/1231	Erect one number dormer type dwelling, proprietary sewerage treatment system, entrance piers, new site access and all associated ancillary works	Grant 28/03/2007
LCC 07/265	Erect one number single storey type dwelling, proprietary sewerage treatment system, entrance piers, new site access and all associated ancillary works	Grant 25/07/2007
LCC 07/282	Retain disabled bathroom extension with effluent treatment unit and percolation on site	Grant 10/09/2007

Planning Ref:	Description	Status
LCC 07/498	Erect a 70m anemometer mast for the measurement of wind speed and directions for the lifetime of the wind farm already permitted	Grant 27/07/2007
SCC 07/502	Continued operation of existing quarry within an overall site of 287 hectares.	Grant 12/05/2009
LCC 07/601	Restore and extend the existing School House	Grant 08/01/2008
LCC 07/773	Erect one number slatted agricultural livestock storage shed, concrete yard and all associated ancillary works	Grant 07/05/2008
LCC 07/776	Erect one number dry bedded agricultural livestock storage shed, sheep dipping unit, new site entrance, concrete yard and all associated ancillary works	Grant 15/04/2008
LCC 08/475	Erect one number dormer type dwelling, one domestic garage, proprietary sewerage treatment system, entrance piers, new site access and all associated ancillary works	Grant 14/08/2008
LCC 09/323	Retain modifications to existing house and garage previously granted under P.04/1048	Grant 06/11/2009
LCC 11/140	Erect an extension to side of existing dwelling and all associated works	Grant 08/09/2011
LCC 18/45	The installation of approximately 0.46km of underground cable ducting, 1 no. joint bay and ancillary development laid primarily within the public road corridor, with a section of circa. 0.07km within private lands at Seltan.	Refused LCC 05/08/2018; Granted by ABP (Ref: 301812-18) 18/06/2018
LCC 20/2	Retention of extension to the rear of existing house,	Granted 09/03/2020

Where the potential for the proposed development to result in adverse effects on European Sites on its own was identified, there was potential for it to contribute to in combination effects when considered in combination with other plans and projects. In the absence of mitigation, the potential for the proposed development to contribute to in combination effects on water quality within downstream the following SACs and SPAs:

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

Following the implementation of the best practice measures outlined in Sections 3 and 5 of this report, in the 'Water' Chapter of the EIAR accompanying this application (Appendix 3) and in the CEMP (Appendix 2), all potential impact pathways have been blocked. There is therefore no potential for the proposed development to contribute to any in-combination impact on EU Designated Sites when considered in combination with other plans and projects.

7.3.2 Conclusion of Cumulative Assessment

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

8. CONCLUDING STATEMENT

For the reasons set out in detail in this NIS, 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.

In conclusion, in the light of the conclusions of the assessment which it shall conduct on the implications for the European sites concerned, the competent authority is enabled to ascertain that the proposed development will not adversely affect the integrity of any of the European sites concerned.

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