Natural Forces Renewable Energy 2 Ltd.

Proposed Cloonanny Wind Farm
Co. Longford

VOLUME I
NON-TECHNICAL SUMMARY

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1 Introduction

Article 5(1)(e) of the EIA Directive requires the project proponent to include a Non-Technical Summary (NTS) of the Environmental Impact Assessment Report (EIAR) and it is transposed into Irish law under article 94(c) of the Planning and Development Regulations 2001, as amended. The term 'non-technical' indicates that this summary should not include technical terms, detailed data and scientific discussion, that detail is presented in Volume II, the EIAR.

This Non-Technical Summary provides a concise, but comprehensive description of the Project, its existing environment, the effects of the project on the environment, the proposed mitigation measures, and the proposed monitoring arrangements, where relevant. The NTS highlights any significant uncertainties about the project. It explains the development consent process for the Project and the role of the EIA in that process.

It is important to highlight that the assessments that form part of the EIAR were undertaken as an iterative process rather than a one-off, post-design environmental appraisal. Findings from the individual assessments have been fed into the design process, resulting in a project which achieves a 'best fit' within the environment.

The summary of the proposed development is set out in Section 2. of this NTS and a detailed description of the project is provided in Chapter 2.

In Summary a 10-year permission is being sought by Natural Forces Renewable Energy 2 Limited for the development of a 14MW wind farm comprising 2 no wind turbines, 20kV on site substation and battery storage, met mast and all associated site and development works in the townlands of Cloonanny Glebe, Corragarrow, Derryharrow and Gorteenorna, Co. Longford.

1.1 Screening for Environmental Impact Assessment

Environmental Impact Assessment (EIA) requirements derive from EU Directives. Council Directive 2014/52/EU amended Directive 2011/92/EU and is transposed into Irish Law by the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018.

Any proposed development which falls within one of the categories of development specified in Schedule 5 of the Planning and Development Regulations 2001, as amended, which equals or exceeds, a limit, quantity, or threshold prescribed for that class of development must be accompanied by an EIAR.

The Proposed Development falls under the category '*Energy Industry*' as set out in Class 3 (i) within Part 2 of Schedule 5, which provides that a mandatory EIA must be carried out for;

(i) *Installations for the harnessing of wind power for energy production (wind farms) with more than 5 turbines or having a total output greater than 5 megawatts.*

The Proposed Development will have a total output of 14MW, therefore an EIA is mandatory.

1.2 Competency

It is a requirement that the EIAR must be prepared by competent experts. For the preparation of this EIAR, the Applicant engaged McCutcheon Halley Chartered Planning Consultants to direct and coordinate the preparation of the EIAR and a team of qualified specialists were engaged to prepare individual chapters. The consultant firms and lead authors are listed in **Table 1**. Details of competency, qualifications, and experience of the lead author of each discipline is outlined in the individual chapters.

Table 1 EIAR Chapters & Contributors

Chapter	Aspect	Consultant	Lead Author
1	Introduction	McCutcheon Halley Planning Consultants	Anika Haget
2	Development Description	McCutcheon Halley Planning Consultants	Anika Haget
3	Alternatives	McCutcheon Halley Planning Consultants	Anika Haget
4	Population & Human Health	McCutcheon Halley Planning Consultants	Anika Haget
5	Landscape & Visual Impact Assessment	Macro Works Ltd	Jorden Derecourt
6	Material Assets -Transportation	Stephen Reid Consulting	Stephen Reid
7	Material Assets - Built Services	Mable Consulting Engineers Ltd	Barry McGinn
8	Land and Soils	Whiteford Geoservices Ltd	John Whiteford
9	Water and Hydrology	IE Consulting Engineers	Joanna Mackey
10	Biodiversity	ID Environmental Consultants	Ian Douglas
11	Ornithology	ID Environmental Consultants	Ian Douglas
12	Noise & Vibration	AWN Consulting Ltd	Mike Simms
13	Air Quality	AWN Consulting Ltd	Aisling Cashell
14	Climate	AWN Consulting Ltd	Aisling Cashell
15	Cultural Heritage	Icon Archaeology Ltd	John Kavanagh
16	Interactions of the Foregoing	McCutcheon Halley Planning	Anika Haget
17	Summary of Mitigation Measures	McCutcheon Halley Planning	Anika Haget

1.3 Methodology

In preparing the EIAR the following regulations and guidelines were considered:

- The requirements of applicable EU Directives and implementing Irish Regulations regarding Environmental Impact Assessment, as cited in section 1.5 above;
- Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Reports (European Commission, 2017)
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Environmental Protection Agency, May 2022).

- Guidelines on Information to be Contained in Environmental Impact Statements (EIS) (Environmental Protection Agency, 2002)
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government, 2018).

In addition, contributors have had regard to other relevant discipline-specific guidelines, these are noted in individual chapters of the EIAR.

Each chapter of this EIAR assesses the direct, indirect, cumulative, and residual impact of the proposed development for both the construction and operational stage of the proposed development.

The identified quality, significance, and duration of effects for each aspect is primarily based on the terminology set out in the EPAs Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022) as summarised in the following table:

Table 2 Impact Rating Terminology

Quality of Effects	
Positive	A change which improves the quality of the environment (for example, by increasing species diversity; or improving the reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
Neutral	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Negative/Adverse Effects	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem, or damaging health or property or by causing nuisance).
Significance of Effects	
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound Effects	An effect which obliterates sensitive characteristics.
Duration & Frequency of Effects	
Momentary Effects	Seconds to minutes
Brief Effects	Less than 1 day
Temporary Effects	Less than 1 year
Short-term Effects	1-7 years
Medium-term Effects	7-15 years

Long-term Effects	15-60 years
Permanent Effects	Over 60 years
Reversible Effects	Effects that can be undone, for example through remediation or restoration.
Frequency of Effects	Describe how often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).
Extent & Context of Effects	
Extent	Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.
Context	Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)
Probability of Effects	
Likely	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Type of Effects	
Indirect Effects	Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
Cumulative Effects	The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
Do Nothing Effects	The environment as it would be in the future should the subject project not be carried out.
Worst-case Effects	The effects arising from a project in the case where mitigation measures substantially fail.
Indeterminable Effects	When the full consequences of a change in the environment cannot be described.
Irreversible Effects	When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
Residual Effects	The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
Synergistic Effects	Where the resultant effect is of greater significance than the sum of its constituents, (e.g. combination of SOx and NOx to produce smog).

2 Project Description

A summary description of the development is outlined below. A detailed description of the proposed development is contained within Chapter 2 of this EIAR.

A 10-year permission is being sought by Natural Forces Renewable Energy 2 Limited for the development of a 14MW wind farm on lands measuring 17.28ha located at the L5046 and L50462 in the townlands of Cloonanny Glebe, Corragarrow, Derryharrow and Gorteenorna, Co. Longford.

The proposed development will consist of the following:

(i) Demolition of a single-storey derelict shed structure (c. 93 sqm GFA) to facilitate the turbine haul route

(ii) Construction of two E175 EP5 wind energy converters, each with an electrical rating of 7MW, an overall ground-to-blade tip height of 199.9 metres, a rotor blade diameter of 175 metres, hub height of 112.4 metres, associated foundations and hard-standing areas;

(iii) Construction of an 800m permanent internal site access road which will run from the L50462 to the wind energy converter hardstanding areas including a 9.1m clear span bridge crossing a local stream;

(iv) Construction of 1 No. meteorological mast with a height of 32 metres, associated foundation and hardstanding area;

(v) Construction of 1 No. 20kV substation compound comprising 2 No. Modular Buildings each measuring 13.5 sqm in area and 3.5m in height, a Battery Energy Storage System (BESS) comprising 3 storage modules with a height of 2.8 metres and associated electrical works, foundation and hardstanding area;

(vi) Temporary alterations to the L5046 and L50462 public roads and temporary access roads to facilitate the turbine component haul route, including temporary widening of sections of the L5046 and L50462.

(vii) Installation of underground collector circuit and communications cabling in underground cable trenches, from the proposed wind energy converter to the proposed on-site substation;

(viii) All associated and ancillary site development, excavation, construction, and reinstatement works, including the provision of a temporary construction compound, site drainage, spoil management, fencing, lighting, hedge and operational maintenance and tree trimming and cutting.

(ix) This application is seeking a 35- year operational life from the date of commissioning of the entire wind farm.

The grid connection from the proposed on-site substation to the national electricity grid does not form part of the subject planning application. However, as part of the planning application process, this EIAR addresses three potential grid connection options currently considered to ensure a comprehensive environmental assessment of all aspects of the Proposed Development. The grid connection will be via 1 of the 3 potential options outlined below:

- Option 1 Connect the proposed development via (8.03km) to Richmond 110kV Substation
- Option 2 Connect the proposed development via (3.96km) to Longford 38kV Substation
- Option 3 Connect the proposed development via (5.85km) to Glebe 38kV Substation

It is anticipated that the grid connection from the Proposed Development will be by means of an underground cable connecting to one of the Substations identified above via the public road network.

For bridge crossings, the cable will be located within the bridge deck, where there is insufficient depth and width available horizontal directional drilling (HDD) will be employed as an alternative.

Once the preferred route emerges it will be determined whether the grid connection falls within the category of exempted development under Class 26 of Schedule 2 in the Planning and Development Regulations 2001, as amended or requires planning permission, in which case an application will be made to the planning authority.

All elements of the proposed development as outlined above together with the turbine delivery route and grid connection options have been assessed as part of this EIAR.

3 Alternatives Considered

The Planning and Development Regulations, 2001, as amended, require;

> *"A description of the reasonable alternatives studied by the person or persons who prepared the EIAR, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the proposed development on the environment".*

Reasonable alternatives may include project design proposals, location, size and scale, which are relevant to the proposed development and its specific characteristics.

The Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports states:

> *"The objective is for the developer to present a representative range of the practicable alternatives considered. The alternatives should be described with 'an indication of the main reasons for selecting the chosen option'. It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account in deciding on the selected option. A detailed assessment (or 'mini-EIA') of each alternative is not required."*

The Guidelines also state that the range of alternatives considered may include the 'do-nothing' alternative.

Accordingly, this chapter of the EIAR provides an outline of the main alternatives examined during the design phase. It sets out the main reasons for choosing the development as proposed, taking into account and providing a comparison on the environmental effects. The assessment of alternatives is considered under the following headings;

i. Do Nothing Alternative
ii. Alternative Uses
iii. Alternative Locations
iv. Alternative Design
v. Alternative Technical Solutions

3.1 'Do Nothing' Alternative

Under this scenario, the Proposed Development would remain unchanged in its current condition, and the land would continue to be managed according to existing farming practices.

The implementation of the 'do nothing' alternative would mean losing the opportunity to contribute to the Government's objectives of producing electricity from renewable energy, as well as other benefits such as increased local employment and diversification of investment sources.

It should be noted that in either case, the current agricultural use of the land would be maintained in both the 'do nothing' and proposed development scenarios.

The predicted effects of the 'Do-nothing' scenario are likely and would last at least short-term (1-7 years), reflecting a reasonable timescale for a further development application to come forward on the site in the absence of this application.

3.2 Alternative Uses

The principal determinant of the suitability of uses at this location is governed by the land use policies outlined in the Longford County Development Plan (LCDP) 2021-2027. No specific land use zoning applies to this location at the subject site, so a reasonable alternative would be to maintain its current use as low intensity agricultural land. However, this would not support the objectives of increasing renewable energy production or reducing greenhouse gas emissions.

Notwithstanding the above, the LCDP recognises that rural areas have the potential to be harnessed for renewable energy projects, especially wind energy (section 5.8.1), and contribute to the achievement of national energy sustainability targets. Indeed, the LCDP also identifies the capacity of rural land to have a variety of uses, such as rural enterprise, forestry, horticulture, equine industry and rural tourism.

However, the predicted environmental effects of an alternative land use strategy for this site would be similar, as the construction phase would be comparable. Thus, as determined in this EIAR, with the correct application of standard construction management measures, significant effects during the construction phase, including noise, dust and traffic, would be of short duration and would range in significance from non-significant to at worst moderate.

3.3 Alternative Locations

It is essential that wind farms are sited in highly suitable locations, i.e. in areas with grid capacity, wind resources, access, away from constraints such as housing and environmental areas, etc.; and avoid those areas with more inherent problems.

The Applicant has therefore carried out extensive site search exercises throughout Longford County and the surrounding area to identify the most suitable sites for wind energy development with the capacity to be successfully planned and developed.

During a detailed screening process, four potential development locations were evaluated. Based on the findings, the number of viable sites was narrowed down based on the main factors as follows:

- Setback to residential properties
- Environmental Designations
- Archaeology and Cultural Heritage
- Landscape Sensitivity
- Transport
- Wind Speeds
- Electricity Grid Capacity & Connection Options
- Consultation with local communities and the Local Authority

The subject site was selected as the most favourable location for the Proposed Development.

Details of the alternative sites and the reasons they were not selected are provided in the table below.

Table 3 Alternative Locations

Option	Location	Main reason not Chosen
1	Kilmore Upper	Complex, peat-rich soil
2	Mount Jessop	Too distant from the grid
3	Carrickglass Demesne	Access issues and proximity to pNHA

3.4 Alternative Design

The project design has evolved to account for contributions from various experts, such as engineers, ecologists, hydrological, geotechnical, archaeological specialists, telecommunication specialists, and traffic consultants and landowners. The project design has also been revised throughout the design stage based on site investigations and feedback from consultations with the local community, and Longford County Council.

3.4.1 Turbine Layout

A preliminary turbine layout option created focussing on positioning maximum turbine quantity on site. A minimum separation distance of two times the rotor diameter (350m) between the turbines was established which allowed for 4 turbines to be positioned on the subject site.

An alternative layout option was prepared in which the turbine quantity was reduced to allow for a greater spacing of 2.5 times the rotor diameter (437m) between the turbines. This allows for reduced turbulences and an increased electricity generation potential per turbine.

Based on the initial site layouts, a Telecoms Impact Assessment was conducted. The assessment revealed several telecom links interacting with the proposed site. Therefore, the layout was further revised to a 2-turbine layout to ensure the Proposed Development did not pose an impact on the telecommunication links.

A 2-turbine layout was the ultimate solution to ensuring no disruption to telecommunications surrounding the site.

Additional benefits associated with the 2-turbine layout compared to the former layouts include:

- Decreased Built Footprint: With two turbines instead of four, there is a notable reduction in the built footprint required for project infrastructure, including access tracks, turbine foundations, substations, and hardstand areas. A smaller footprint lessens the amount of land disturbance and reduces the need for extensive earthworks and excavation.
- Reduced Impact on Water Quality: A smaller footprint and reduced need for excavation decrease the likelihood of soil erosion and sedimentation, which could otherwise impact nearby water bodies.
- Lower Turbine Noise Emissions: The greater spacing between the turbines and the reduced total number of turbines lowers the cumulative noise output from the wind farm. This reduction benefits both biodiversity in the area and nearby residents.
- Reduced Visual Impact: A two-turbine layout decreases the landscape and visual impact of the project.

3.4.2 Grid Connection

Two types of grid connection were initially considered for the proposed development: Overhead Line (OHL) and Underground Cable (UGC). While OHL is more cost-effective, UGC offers greater durability, resilience, and is less susceptible to damage, while also having no visual impact. Additionally, current ESB and Eirgrid policies favour utilising public road infrastructure for grid connections. Given these factors, UGC is considered the preferred option for connecting the Proposed Development to the grid. Furthermore, adopting UGC would reduce impacts on historic bridges along the route, including Balkenny Bridge and the Railway Bridge, both of which are listed in the National Inventory of Architectural Heritage (NIAH). This approach not only minimises visual and environmental disturbance but also helps preserve the cultural heritage of these significant structures.

Five potential grid connection points surrounding the site were identified:

- Glebe 38kV Substation (approx. 6km),
- Longford 38kV Substation (approx. 4km),
- Richmond 110/38kV Substation (approx. 8km),
- Edgeworthstown 38kV Substation (approx. 12.5km),
- Roosky 38kV Substation (approx. 13km).

Of the list above this was reduced to the three nearest substations due to proximity and available capacity to the Proposed Development. As per the 1927 Electricity (Supply) Act, the Electricity Supply Board (ESB) are the only approved statutory body allowed connect, operate and own electrical distribution infrastructure. For the Proposed Development to ascertain a grid connection offer from ESB, the development must first be in receipt of a full grant of planning permission and have applied via the ESB's Enduring Connection Process (ECP). As a result, the exact grid connection route/methodology will only become apparent at the time when ESB are undertaking their detailed design review of the Proposed Development grid connection works.

Given the process and timelines for agreeing a grid connection with ESB, the proposed grid connection is excluded from the subject application for permission. Once the preferred route emerges it will be determined whether the grid connection falls within the category of exempted development under

Class 26 of Schedule 2 in the Planning and Development Regulations 2001, as amended or requires planning permission, in which case an application will be made to the planning authority. To ensure the effects of the whole project are considered as part of this application, the EIAR assesses the 3 potential options.

3.5 Alternative Technical Solution

3.5.1.1 Alternative Energy Technologies

Utilising renewable resources like wind energy is crucial to achieving climate action targets. Therefore, only alternative renewable energy sources are considered.

Wind energy and solar energy are considered the only viable options for the Cloonanny site. The decision to choose wind over solar for this site was driven by three primary factors: land use efficiency, the ability to maintain existing agricultural practices and capacity factors. Given the increased land footprint and lower capacity factor associated with solar energy, and the ability to maintain agricultural practices with a turbine layout, wind energy is a more appropriate option for this site. It allows for more efficient land use while providing a higher yielding energy output, ensuring minimal disruption to current land use and supporting both renewable energy goals and local farming activities.

3.5.1.2 Alternative Turbine Model

The decision to select the Enercon E175 over alternative turbine models, such as the Enercon E138, was guided by several key factors. Firstly, the E175 offers a higher rated power capacity than the E138. Given that the E138 and E175 have similar footprints, choosing the E175 allows for maximised energy generation without requiring additional space for foundation bases, thereby achieving greater energy yield per turbine. This higher yield means that fewer turbines are needed to meet energy targets, resulting in a reduced overall environmental impact. Additionally, the E175's larger rotor diameter enhances its performance in low wind conditions, capturing more wind energy effectively. Moreover, the E175 incorporates advanced technology and design enhancements that contribute to enhanced reliability and reduced maintenance requirements, which are crucial for optimising operational efficiency and minimising downtime.

3.5.1.3 Turbine Features

Standard Wind Turbines can be fitted with several additional technical features if required by the developer. To further reduce effects on the environment, the proposed Turbines will be fitted with a Shadow shut-off system and trailing edge serration (TES).

4 Assessment of Environmental Impacts

4.1 Population & Human Heath

The assessment of Population and Human Health is contained within Chapter 4 of Volume II.

4.1.1 Existing Environment

The subject site is located within the functional area of Longford County Council and is governed by the Longford County Development Plan 2021-2027 (LCDP). The application site is categorised as 'Rural' (Open Countryside) in the LCDP. Under the Plan, there are no land use zoning objectives in place for the lands.

The area surrounding the subject site is mainly used for agriculture, with some residential and commercial areas. The closest settlements to the proposed development are the rural settlement clusters of Melview, located c. 700m northwest of the site and Carriglass, c. 900m southeast of the site. Furthermore, the site is located c. 2.8km north-east of Longford Town and c.3.5km south-east of Newtown Forbes.

Regarding the age profile of the population, there were 5,563 people aged 50 years or older (32.1%) in the Study Area at the 2022 census, which is the same as the rate in Longford County (33.4%). Seniors in the Study Area (aged 65 years or older) totalled 2,615 people (15.1%), which is consistent with Longford County (15.6%). The median age of residents in the Study Area was 38.35 years, slightly lower than Longford County and the state, with a median age of 38.8 years each in 2022.

The State average household size in 2022 was 2.74. The average household size in County Longford is slightly lower (2.71) while the study area is consistent with the State (2.74). 63% of the study area's population is in the 15-64 working age cohort. Overall, 50% of the study area's population is working, which is 6% below the national average and 3% below the county average.

The 2022 census also reveals that the top occupations in the study area were professional occupations (13.5%), followed by skilled trades occupations (11.9%) and elementary occupations (10.4%). The largest proportion of people working in the study area are employed in "professional services" (22.1%), followed by "manufacturing industries" (19%) and "trade and commerce" (18.5%). The largest proportion in the county is "professional services" (21.5%), followed by "trade and commerce" (17.2%) and "manufacturing industries" (16.4%).

It is noted that despite the rural setting of the subject site and the Study Area with predominantly agriculture-related vegetation cover, only 2.5% of the workforce in the Study Area is employed in the agriculture, forestry and fisheries industry, which is below the county share of 5.4%.

Regarding the level of educational attainment, 14.2% had completed lower secondary school, 19.5% had completed upper secondary school, and 28.5% have obtained a tertiary level qualification, which is equivalent to the county level (28.7%).

According to the Pobal Deprivation Index, the overall score for County Longford in 2022 was calculated as -5.33, which is described as slightly below average and has improved slightly from -6.01 in 2016.

The 2022 deprivation index in the study area ranges from 2.04 for Clonee ED to -19.36 for Longford No 1 Urban.

4.1.2 Do Nothing Scenario

If the Proposed Development was not constructed, the Site and the current land-use of agriculture and public roads will remain unchanged to the current baseline conditions

If the Proposed Development were not to proceed, the potential benefits of local employment, community benefit and economic investment from the Proposed Development and its construction would be lost.

Furthermore, it would be a missed opportunity to contribute to County Longford's valuable renewable energy transition, as would the opportunity to further contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions. Therefore, also health advantages of transitioning from fossil fuels to renewable wind energy will be lost.

4.1.3 Impact Assessment

4.1.3.1 Construction Phase

It is estimated that during peak construction, there is expected to be a peak on-site workforce of c. 25 workers. It is not anticipated that this will generate an increase in **population** locally as employees will travel to the Proposed Development site from their existing place of residence. Therefore, the construction phase will have no impact on the population in the study area in terms of changes to population trends or density, household size or age structure and the impact on the population is thus neutral and not significant.

A vital feature of the Proposed Development in terms of its potential **economic impact** relates to its capital value, a significant portion of which will be spent on the purchase of Irish-sourced goods and services. The construction phase (approximately 24 months) will provide a boost to the local construction sector in terms of employment, capital expenditure on materials and construction labour costs, and will generate additional expenditure in the local economy, for example, local shops and other local retail services and as a consequence of the presence of construction staff during the construction phase.

The staff will be comprised of administrative, technical, skilled and unskilled workers and, to the extent practicable, local labour will be employed. In addition to direct employment, there will be considerable and wide-ranging off-site employment and economic activity associated with the construction of the Proposed Development.

The anticipated overall impacts associated with the construction phase on the local workforce and economy are likely to have a moderate, temporary and short-term positive effect.

The anticipated likely significant effects in the absence of mitigation on **residential amenities** relate to disruption due to increased construction traffic movements on the local road network, noise, dust and visual impact arising from plants (e.g. cranes) necessary to deliver the Proposed Development.

In the absence of mitigation, the anticipated impact on residential amenity would be local and of temporary to short-term duration with a moderate negative significance.

Construction sites pose potential risks to the **health and safety** of the public. However, access by the public would be considered trespassing. In the absence of mitigation, the effect would likely be negative, with an effect that might range from slight to profound depending on the magnitude of the incident.

In the absence of standard construction mitigation measures, likely significant impacts would arise from construction traffic, noise, dust, and visual effects. It is noted that the potential for effects on population and human health during the construction phase are dealt with in this EIAR under the more specific topics of the environmental media by which they might be caused including landscape and visual, air quality, traffic and noise.

The construction period is anticipated to last for 24 months and is likely to benefit the local economy through expenditure on purchases of accommodation, food, fuel etc. which will be required to sustain the construction workforce. It is considered that beneficial effects would be experienced by businesses operating within the tourism sector or service providers closely related to **tourism**. The effects would likely be slightly positive with a temporary to short term duration.

Given that there are currently no tourism attractions specifically pertaining to the site and given the distance of the Proposed Development to tourism attractions in the wider area, there are no effects on tourism attractions associated with the construction phase of the development.

A **shadow flicker** assessment has been prepared to assess its potential effects on properties close to the proposed turbines. This effect occurs when the blades are in operation and repeatedly cut through the sun's rays. The intensity of this effect depends on the position of the sun and the intensity of the sun's rays, the direction of the wind (i.e. the position of the nacelle) and the position of the turbine. The shadow flicker assessment has been carried out in accordance with the applicable Wind Energy Development Guidelines (2006) which state that the likelihood of shadow flicker being experienced at distances greater than 10 times the rotor diameter of a turbine is low. Apart from the turbines, no other element of the proposed development generates shadow flicker effects. Therefore, the study area has been determined to be 1.75 km from the proposed turbines and all dwellings within this area have been assessed for shadow flicker effects. The 2006 WEG established that the acceptable limit for shadow flicker is 30 hours per year with a maximum of 30 minutes per day for homes and offices within 500 m of the proposed turbines.

4.1.3.2 Operational Phase

Given the nature of the Proposed Development there will be no impact on the **population** in the study area during the operational phase and the impact is thus neutral and not significant.

During the operational phase the Proposed Development will require maintenance. There is an opportunity for mechanical-electrical contractors and craftspeople to become involved with the maintenance of the Proposed Development on **employment and economic activity** and the impact is thus slight positive on the long term**.**

The developer will implement a community benefit fund for the Proposed Development which can be used by the local community to invest in and support the wider economic, recreational, environmental, social and cultural amenities and initiatives in the locality of the Proposed Development, the impact is considered moderate, positive on a long term.

Given that there are currently no **tourism** attractions specifically pertaining to the site and given the distance of the Proposed Development to tourism attractions in the wider area, it is not considered that the proposed development would have an adverse impact on tourism infrastructure in the vicinity.

The "worst case" results of the **shadow flicker** assessment showed that 26 shadow flicker receivers exceeded the standard of 30 minutes per day or 30 hours per year, as set out in the 2006 Wind Energy Development Guidelines for Planning Authorities. However, these sensitive receivers are located 800 metres from the nearest dwelling.

Compared to the "worst case" results, the "actual case" results are a more realistic prediction of likely shadow flicker, considering the probability of sunlight and the prevailing wind direction based on historical meteorological data. None of the 403 receivers surveyed are likely to experience shadow flicker more than 30 hours per year. Receiver JD was found to have the longest estimated duration of shadow flicker in actual cases, predicted to be less than 8 minutes. Based on the results of the shadow flicker assessment, the effect is **imperceptible, negative** and **long term.**

4.1.3.3 Decommissioning Phase

The decommissioning phase will be similar the construction phase but on a smaller scale. No additional effects will occur.

4.1.3.4 Cumulative Impact

A review of recent, relevant and large-scale planning applications was undertaken to identify sites with potential for cumulative impacts. While there are a number of developments in the vicinity of the study area, none of these projects are likely to result in cumulative impacts on population and human health. Subject to compliance with the measures contained in the individual plans, the cumulative effect is likely, short-term and not significant.

The nearest operational wind farm development to the Proposed Development is the Sliabh Bawn Wind Farm in County Roscommon, approximately 20 km west of the subject site, comprising 20 turbines. In addition, permission has been granted for a single turbine at Lissanore, approximately 14 km south-east of the subject site. Given the distance to the Proposed Development site and subject to compliance with the mitigation measures contained in the respective environmental plans, cumulative impacts are not likely to occur. Regarding the impact of shadow flicker, given the distances to the nearest wind farm developments, cumulative impacts from this phenomenon are not likely to occur.

4.1.4 Mitigation

4.1.4.1 Incorporated Design

The layout of the Proposed Development has been designed to maximise the distance of any sensitive receptors from the proposed turbines and no dwelling is located within 800m of the proposed turbines. Based on initial feedback from local residents, the layout has also been reduced form initially 4 proposed turbines, to now 2 proposed turbines.

To ensure the risk to maintenance staff, landowners and site visitors remains negligible throughout the operational life of the Wind Farm, access to the turbines is restricted through a door at the base of the structure, which will be locked at all times outside maintenance visits. Furthermore, fencing will be erected in areas of the site where uncontrolled access is not permitted, and appropriate health and safety signage will also be erected at relevant locations around the site.

As a precaution the turbines will also be fitted with a shadow shutoff system to allow controlling of the turbines and prevent the occurrence of shadow flicker at sensitive receptors surrounding the Wind Farm. This is a function that is integrated into the control system of the wind energy converter. The shutdown times and parameters are determined and programmed into the wind energy converter control system. Shadow shutdown is activated as soon as the shutdown intensity falls below the set values. A technical description of the Shadow shut-off system is included in Appendix 4.1.

The developer will implement a community benefit fund for the Proposed Development which can be used by the local community to invest in and support the wider economic, recreational, environmental, social and cultural amenities and initiatives in the locality of the proposed development.

4.1.4.2 Construction Phase

To minimise the potential impacts from the construction phase, the following mitigation measures are recommended:

- **Construction and Environmental Management Plan (CEMP)**: The appointed contractor(s) will update the Outline CEMP submitted with the application and submit to Longford County Council prior to the commencement of development.
  - The CEMP will comply with all appropriate legal and best practice guidance for construction sites.
  - The purpose of a CEMP is to provide a mechanism for the implementation of the various mitigation measures which are described in this EIAR and to incorporate relevant conditions attached to a grant of permission. The CEMP requires that these measures will be checked, maintained to ensure adequate environmental protection. The CEMP also requires that records will be kept and reviewed as required to by the project team and that the records will be available on site for review by the planning authority.
  - All construction personnel will be required to understand and implement the requirements of the Contractor's CEMP and shall be required to comply with all legal requirements and best practice guidance for construction sites.

- All mitigation and monitoring measures included in the Summary of Mitigation and Monitoring Measures in Chapter 17 of this EIAR will be included in the CEMP and adhered to.

- **Community Liaison Officer**: The contractor will appoint a community liaison officer to ensure that any issues from the local community are dealt with promptly and efficiently during construction. These details will be included in the contractor's CEMP.
- **Construction Working Hours** will generally be limited to the hours 0700 – 1900 Monday to Friday and 0700 – 1400 hours on Saturday. To ensure that optimal use is made of good weather periods or at critical periods within the programme it may be necessary on occasion to work outside of these hours. Any such out of hours working will be agreed in advance with Longford County Council.
- Project supervisors for the construction phase (**PSCS**) will be appointed in accordance with the Health, Safety and Welfare at Work (Construction Regulations) 2013, and a Health and Safety Plan will be formulated during the detailed design stage which will address health and safety issues from the design stages, through to the completion of the construction phase.
- The **Waste Management Plan** (WMP) will be updated, implemented and maintained by the Contractor.

4.1.4.3 Operational Phase

The Proposed Development is designed to modern standards that incorporate measures that reduce risks to population and human health. The impact assessment section did not identify likely significant environmental impacts on population and human health arising from the operational phase of the Proposed Development. Accordingly, other than mitigation incorporated in the design and mitigation measures outlined in other chapters of this EIAR relating to human health, no further mitigation measures are proposed with respect to population and human health.

4.1.4.4 Decommissioning Phase

Any impact that occurs during the decommissioning phase will be similar the construction phase but on a smaller scale. Thus, the mitigation measures outlined for the construction phase will also be implemented during the decommissioning phase. A decommissioning plan will be agreed with the local authorities prior to decommissioning of the Proposed Development.

4.1.5 Residual Impact Assessment

It is anticipated that the Proposed Development will overall generate slight positive economic benefits for the local community and the wider local area.

Strict adherence to the mitigation measures recommended in this EIAR will ensure that there will be no negative residual impacts or effects on Population and Human Health from the construction, operation and decommissioning of the Proposed Development.

4.1.6 Monitoring

Measures to avoid negative impacts on Population and Human Health are largely integrated into the design and layout of the Proposed Development. Compliance with the design and layout will be a condition of any permitted development.

No specific monitoring is proposed in relation to this section. Monitoring of standard construction mitigation measures as outlined in this EIAR will be undertaken by the appointed contractor.

4.2 Landscape & Visual Character

The assessment of Landscape & Visual Character is contained within Chapter 5 of Volume II.

Landscape Impact Assessment (LIA) relates to changes in the physical landscape brought about by the Development, which may alter its character, and how this is experienced.

Visual Impact Assessment (VIA) relates to assessing effects on specific views and on the general visual amenity experienced by people.

Cumulative landscape and visual impact assessment is concerned with additional changes to the landscape or visual amenity caused by the proposed Development in conjunction with other developments (associated or separate to it), or actions that occurred in the past, present or are likely to occur in the foreseeable future.

Production of this Landscape and Visual Impact Assessment (LVIA) involved baseline work in the form of desktop studies and fieldwork comprising professional evaluation by qualified and experienced Landscape Architects. This entailed a Desktop Study, Fieldwork and Appraisal – including:

- Consideration of the receiving landscape with regard to overall landscape character as well as the salient features of the study area including landform, drainage, vegetation, land use and landscape designations.
- Consideration of the visual environment including receptor locations such as centres of population and houses; transport routes; public amenities and facilities and; designated and recognised views of scenic value.
- Consideration of design guidance and planning policies.
- Consideration of potentially significant effects and the mitigation measures that could be employed to reduce such effects.
- Estimation of the significance of residual landscape effects.
- Estimation of the significance of residual visual effects aided by photomontages prepared at all of the selected VRP locations.
- Estimation of cumulative landscape and visual effects in combination with other surrounding developments that are either existing, permitted or in the planning system and pending a decision from a planning authority. A more conservative approach has been adopted and projects that are at the pre-planning stage where information is available to the public are also included in the cumulative impact assessment.

The assessment was undertaken within a 20km radius study area, with the 'central study area' defined as 5km radius from the site.

4.2.1 Existing Environment

The proposed project is located across flat to rolling farmland to the northeast of Longford town. The site terrain is generally flat, ranging in elevation from 40m AOD to c.50m AOD, with T1 located slightly higher than T2. The site gently slopes southwards to the Camlin River, the nearest watercourse, at a distance of c.200m south. The immediate surrounds of the site and central study area are relatively uniform, with the primary features being the Shannon River 7.3km to the west and the rolling landform of Corn Hill 7km to the northeast. Between the two, across the central study area, is a relatively even landscape of rolling drumlins with extensive boglands to the south.

Field sizes are varied across the site, with smaller, irregular field sizes tracing the landform and drainage features identified above, getting larger where more cohesive areas of farmland. Peatland areas occur frequently throughout the study area as well on both sides of the River Shannon, particularly to the south and west of the site. The transitional bog margins tend to be contained in peatland scrub or occasional commercial conifer plantations.

The nearest and most notable centre of population in relation to the proposed development is the settlement of Longford, which is situated some c. 3km southeast of the site. The settlement pattern within the remaining 3-5km of the central study area is principally composed of isolated rural dwellings and farmsteads, small linear clusters of development and small cross-road settlements. There is a higher degree of built form to the south of the site than the north. There are a number of substantial settlements throughout the study area that serve as rural service centres, including Newtown Forbes, Roosky, Termonbarry, and Lanesborough along the Shannon to the west, Edgeworthstown to the southeast and Granard to the northeast.

The nearest and most notable major transport route in relation to the proposed development is the N4 regional road. There are a number of national routes in Longford, while regional routes connect these across the wider study area. Other modes of transport include the Royal Canal and the Irish railway network, served by Sligo-Dublin intercity services. The Royal Canal is confined to the western and southern study area, while the rail line generally follows the path of the N4 between the north and east of the study area – via Longford Town

The River Shannon is popular for fishing and boating, and there are local walks around parts of the shoreline. There are a number of harbours and walkways along the Shannon and Royal Canal across the study area. These typically intersect or occur at population centres, such as Termonbarry, Cloondara, and Mosstown. The Royal Canal Way follows the towpath across the south of the study area. Smaller recreation features include Cairn Hill Walking Trail, 8km to the north, Leebeen Park and Aughnacliffe Waterfall Trails, 14km to the north. In the south of the wider study area is the Corlea Trackway Visitor Centre.

4.2.2 Landscape Policy Context and Designations

The majority of the study area overlays Co. Longford, while Co. Roscommon occupies the western periphery of the study area, located 7km to the west of the site. Co. Leitrim overlays the north of the

wider study area, the boundary for which is some 7km north of the site at its nearest point of the study area. Finally, Co. Westmeath is located 14km to the north and Co. Cavan 16km to the north.

Both landscape and visual designations are assessed for Co. Longford, Roscommon and Leitrim. However, within Co. Westmeath and Co. Cavan, policy is not included within this appraisal beyond the scenic designations.

4.2.2.1 Longford County Development Plan (2021 – 2027)

Within Co. Longford, the Proposed Development is contained within 'LCT Unit 4 – Central Corridor'. Unit 4 – Central Corridor has been identified as *"generally LOW. Potential areas of MEDIUM to HIGH sensitivity exist in the vicinity of protected woodlands, riverbanks and in the vicinity of the Aquifer.*

This landscape character unit is surrounded by three other LCT Units, namely; 'LCT 6 – Peatlands' to the south, LCT Unit 7 – Open Agriculture', which lies to the southeast and 'LCT 2 – Northern Upland' to the north. Smaller areas of the study area are overlaid by the remaining Landscape Character Units, these being 'LCT Unit 3 – Shannon Basin/Lough Ree', which lies to the west, 'LCT Unit 1 – Northern Drumlin Lakeland', which lies to the north, and 'LCT 5 – Inny Basin' to the eastern periphery of the county and study area.

4.2.2.2 Roscommon County Development Plan (2022 – 2028)

A landscape character assessment is included within the current Roscommon County Development Plan and this divides the County in to 7 no. Landscape Character Types (LCTs). The 'River Corridor' LCT is the most relevant to the Proposed Development as it encompasses the western banks of the River Shannon and Lough Ree, which occur immediately across the Longford – Roscommon border. The generic Landscape Character Types are then further divided into 36 no. geographically distinct Landscape Character Areas (LCAs). A number of these are contained within the 'River Corridor' LCT within the western half of the study area. The most relevant LCA is 'LCA 5 – Slieve Bawn and Feorish Bogland Basin. This LCA has been designated as landscapes of 'Very High Value' (second highest of 4 classifications).

4.2.2.3 Leitrim County Development Plan 2023-2029

The current Landscape Character Assessment review identifies 17 contrasting Landscape Character Types (LCTs) within County Leitrim and a further 14 Landscape Character Areas (LCAs). The nearest of these to the site is LCA 13 – South Leitrim Drumlins and Shannon Basin, which overlays much of the area of Leitrim within the study area, and a land portion of southern Leitrim. At the northern border of the study area there us a small section of LCA 14 – Corriga Uplands. No designated landscapes, views and prospects occur within the Corriga Uplands LCA.

4.2.2.4 Views of Recognised Scenic Value

Views of recognised scenic value are primarily indicated within County Development Plans in the context of scenic views/routes designations, but they might also be indicated on touring maps, guide books, road side rest stops or on post cards that represent the area.

All of the scenic routes and views in Longford, Leitrim, and Roscommon that are oriented towards the site and fall inside the ZTV pattern are included and represented by a viewpoint where relevant. The

majority (c. 25) of these are those within Co. Longford, with a notable cluster to the north of the proposed development. There are three Co. Roscommon scenic designations within the study area, all of which are directed away from the site. The only scenic designation within the section of Co. Leitrim within the study area is also oriented away from the site. Co. Cavan and Co. Westmeath do not have any designated views within the study area.

4.2.2.5 The Department of Environment, Heritage and Local Government Wind Energy Development Guidelines 2006 and draft revised 2019 Wind Energy Development Guidelines

The Wind Energy Development Guidelines (2006) provide guidance on wind farm siting and design criteria for a number of different landscapes types. The setting of the proposed project is most consistent with the 'Hilly and Flat Farmland' type described in the 2006 Guidelines. However, proximity to Longford introduces a second landscape type to the central study area, this being 'Urban and Industrial', located 1.5-2km to the southwest. The wider context also encompass characteristics of 'Flat Peatland' landscape types to the west.

It is considered that the proposed wind farm developments' siting and design respond well and are generally consistent with the guidance note above for the 'Hilly and Flat Farmland' and 'Urban and Industrial' landscape types. The location is most in keeping with the 'Urban and Industrial' description, is in keeping with both descriptions regarding spatial extent (limited) and spacing (regular). Early-stage analysis resulted in the reduction of a three-turbine layout to a two-turbine layout. While the proposed height of the turbines is taller than those typically suggested above, the offset from surrounding large or cluttered structures and isolation from cumulative developments are in keeping with the above guidelines.

4.2.3 Cumulative Baseline

The SNH Guidelines relating to the Cumulative Effects of Wind Farms (2005) and GLVIA - 2013 identify that cumulative impacts on visual amenity consist of combined visibility and sequential effects. The cumulative baseline in this case included one existing development (Sliabh Bawn – 19 turbines), one permitted development (Lissanore – 1 turbine), and one pre-planning development (Derryadd – 22 turbines).

4.2.4 Landscape Character, Value and Sensitivity

The central study area is typical of the Longford Landscape Character Assessment, listing agricultural pasture, urban fabric and mixed pockets of tree cover as the main land uses across "*relatively flat and low lying"* landform. Within the Longford CDP, the sensitivity of the landscapes in the central study area is *"generally LOW"* although there is *"Potential areas of MEDIUM to HIGH sensitivity exist in the vicinity of protected woodlands and riverbanks",* each of which occurs within the central study area. It is considered that the central study area is not particularly rare or distinctive in character and therefore deemed Medium-Low sensitivity, as while the north of the central study area is more cohesive, the dominant rural land use is not overly sensitive, with the exception of localised features such as the Camlin River and Carrickglass Demesne. In the southern central study area, the landscape character is fragmented with areas of higher sensitivity (e.g., Royal Canal, Castle Forbes Demesne)

interspersed with utilitarian rural landscapes, which are highly influenced by Longford. The combination of these features results in the overall **Medium-Low** sensitivity.

Although the wider study area contains some notable landscape features, it is not considered to have a particularly rare or distinctive 'landscape image' or iconic associations. Like the central portion of the study area, the principal landscape values appear to relate to rural subsistence and productivity, and these values are not particularly susceptible to new forms of rural development. Overall, the landscape sensitivity of the wider study area is considered Medium. There are areas across the broad lowlands that are **Medium-low**, while other singular features are of High landscape sensitivity, such as along the Shannon Corridor and surrounding lakeshores.

4.2.5 Sensitivity of Visual Receptors

Visual sensitivity is a two-sided analysis of receptor susceptibility (people or groups of people) versus the value of the view on offer at a particular location. To assess the susceptibility of viewers and the amenity value of views, the assessor uses a range of criteria to analyse how strongly the viewer/view is associated with each of the criterion.

4.2.5.1 Sensitivity of Designated Scenic Routes and Views (SR/SV);

Due to the varied and complex nature of the landscape within the study area, which comprises numerous notable landscape features, there are many scenic routes and scenic views within the 20km study extent. As identified in the visual baseline, those relevant to the project are represented by VP1, VP2, VP5, VP7, VP8, VP10, VP21, VP25, VP26 and VP27. VP1 and VP10 feature High sensitivity. At VP25, set within Ardagh Village, the sensitivity is deemed High-medium.

The majority of the scenic designations within Co. Longford are routes located along public roadways; where the primary significance of this assessment is the designation applied to them. As such, VP2, VP5, VP7, VP8, VP21, VP26 and VP27 are deemed to be of Medium sensitivity.

4.2.5.2 Sensitivity of Local Community views (LCV);

Local Community views are considered to be those experienced by those people who live, work and move around the area within approximately 5km of the site. These include VP11, VP12, VP13, VP14, VP19 and VP29.

Viewpoints 11, 12, and 13 are located in the surroundings of Melview, to the northwest of the proposed turbines. Viewpoint 14 is located along a small lane of residences to the northeast of the proposed development, while VP19 is slightly separated to the south of the proposed development at the periphery of Longford. Finally, VP29 is located within Clonbalt Wood, which is a medium sized area of housing, separated from the main built area of Longford by the N4. The sensitivity of VP11, VP12, VP13, VP14, VP19 and VP29 is deemed Medium-Low.

4.2.5.3 Sensitivity of Centres of Population (CP);

Five viewpoints were chosen to represent centres of population within the central and wider study area (VP4, VP9, VP18, VP20, and VP24). Two views are located within Longford (VP18, VP20), both of which were requested during pre-planning meetings to address heritage features within the town.

The other three views (VP4, VP9 and VP24) are located at smaller towns in the western study area, at Drumlish, Newtown Forbes and Ballyleage, respectively.

On balance of the busy, built setting of these views with the various heritage and amenity features, the sensitivity is deemed to be Medium. The exception is Viewpoint 4 is located along the R198 at the rural border of Drumlish, with a relatively enclosed view of a populated rural setting. As such, VP4 is deemed Medium-low.

4.2.5.4 Sensitivity of Major Routes (MR)

The densest concentration of major routes across the study area surrounds Longford; however, these diverge across the study area. The five viewpoints selected primarily to represent major routes are VP3, VP6, VP16, VP17, and VP22.

VP3 is located with wide views over Lough Bofin; VP16 was included to represent the heritage values of Carrickglass. Therefore, these two views are deemed Medium sensitivity. VP6 is located near the River Shannon and the population centre of Roosky. VP17 is located between the proposed development and Longford, where the N4 crossed the Camlin River. Finally, VP22 is located at a slightly elevated section of the N4, west of Edgeworthstown. Overall, the remaining three viewpoints feature a sensitivity of Medium-Low.

4.2.5.5 Sensitivity of Amenity and heritage features (AH).

A number of heritage and amenity features are included in the views addressed above, in particular within the scenic designations and Centres of Population. The remaining views are focused along waterways. These include VP15 at Termonbarry Lock, VP23 where the N63 crosses the Royal Canal, and VP28 at Mosstown Harbour. The viewpoint sensitivity for VP15 is deemed High-Medium, while VP23 and VP28 are of Medium sensitivity.

4.2.6 Impact Assessment

4.2.6.1 Do Nothing Scenario

In this instance the do-nothing scenario would be that the receiving landscape stays in the same or similar condition as it currently is, managed for a combination pastoral farmland and under continued development pressure from Longford.

4.2.6.2 Demolition Phase

4.2.6.2.1 Landscape

Overall, the magnitude of demolition stage landscape effects within the site and its immediately surrounding context is deemed to be **Medium** and of a **Negative** quality, but of a **Temporary** duration. Beyond 5km from the site, the magnitude of landscape impact is deemed to reduce to **Low** and **Negligible** at increasing distances as the decommissioning related activities become a proportionately smaller component of the overall landscape fabric.

4.2.6.2.2 Visual Impact

For these reasons, the magnitude of visual impact at the demolition stage is deemed to be no greater than **Medium** at the nearest surrounding receptors, however, this reduces swiftly at greater distances from the site, especially within the wider study area, where the magnitude of visual impact is considered to be no greater than **Low-negligible**. Combined with a **Medium-low** sensitivity for receptors within the central study area, the significance of visual effect will be **Moderate-slight** for those within approximately 1km of the site. Thereafter, the significance of effect will reduce to **Slight** throughout the central study area and **Slight** and **Imperceptible** at increasing distances within the wider study area as the development becomes a progressively smaller component in the afforded view. Thus, it is not considered that the proposed project will generate significant visual effects at the demolition stage.

4.2.6.3 Construction Phase

4.2.6.3.1 Landscape

With regards to construction impacts based on a **Medium-low** sensitivity judgement of the central study area and a **High-medium** magnitude of construction stage landscape impact, the significance of impact is considered to be **Substantial-moderate / Negative / Short-term** within and immediately around the site during construction, but reducing quickly with distance and broader context. Across the wider study area, the significance will reduce from **Moderate-slight** to **Slight-imperceptible** between 5km and 20km distance to the site.

4.2.6.3.2 Visual Impact

For these reasons, the magnitude of visual impact at the construction stage is deemed to be no greater than **High/High-medium** at the nearest surrounding receptors, however, this reduces swiftly at greater distances from the site, especially within the wider study area, where the magnitude of visual impact is considered to be no greater than **Low/Low-negligible**. Combined with a **Medium-low** sensitivity for receptors within the central study area, the significance of visual effect will be **Substantial-moderate** for those within approximately 1km of the site. Thereafter, the significance of effect will reduce to **Moderate/Moderate-Slight** throughout the central study area and **Slight** and **Imperceptible** at increasing distances within the wider study area as the development becomes a progressively smaller component in the afforded view. Thus, it is not considered that the proposed project will generate significant visual effects at the construction stage.

4.2.6.4 Operational Phase

4.2.6.4.1 Landscape

Based on a **Medium-low** sensitivity judgement and a **Medium** magnitude of operational stage landscape impact, the localised significance of impact is considered to be **Moderate / Negative / Long-term** within and immediately around the site. Thereafter, significance will reduce to **Moderate-Slight** and **Slight-imperceptible** at increasing distances as the development becomes a progressively smaller component of the wider landscape fabric even in the context of higher sensitivity landscape units / features such as the Shannon to the west, and scenic designations to the north.

4.2.6.4.2 Visual Impact

The residual visual impacts range between Moderate and Imperceptible, and in the majority of cases, the significance of visual impact was deemed Moderate-slight or below. Only five views were deemed to have a visual impact significance of Moderate. All five of these are the nearest potential views of the proposed development, all within 1.5km of the proposed turbines, while VP16 is also representing a more sensitive heritage receptor. Three (VP11, VP14, VP17) experience High-medium impacts, while VP16 features Medium impacts – combined with the Medium viewpoint sensitivity to result in Moderate significance. VP12 also experiences Medium impacts and Moderate significance. Overall, the proposed wind farm is considered a modest two-turbine development that does not appear out of place in terms of its scale or function in this diverse landscape context. As discussed in the landscape impacts section, where viewed from longer distance locations, the proposed development is clustered with the higher intensity land uses associated with a population centre.

4.2.6.5 Decommissioning Phase

4.2.6.5.1 Landscape

Overall, the magnitude of decommissioning stage landscape effects within the site and its immediately surrounding context is deemed to be **Medium** and of a **Negative** quality, but of a **Temporary** duration. Beyond 5km from the site, the magnitude of landscape impact is deemed to reduce to **Low** and **Negligible** at increasing distances as the decommissioning related activities become a proportionately smaller component of the overall landscape fabric.

4.2.6.5.2 Visual Impact

For these reasons, the magnitude of visual impact at the decommissioning stage is deemed to be no greater than **High/High-medium** at the nearest surrounding receptors, however, this reduces swiftly at greater distances from the site, especially within the wider study area, where the magnitude of visual impact is considered to be no greater than **Low/Low-negligible**. Combined with a within a **Medium-low** sensitivity for receptors within the central study area, the significance of visual effect will be **Substantial-moderate** for those within approximately 1km of the site. Thereafter, the significance of effect will reduce to **Moderate/Moderate-Slight** throughout the central study area and **Slight** and **Imperceptible** at increasing distances the wider study area as the development becomes a progressively smaller component in the afforded view. Thus, it is not considered that the proposed project will generate significant visual effects at the decommissioning stage.

4.2.6.6 Cumulative

The proposed development has the potential to contribute cumulative impacts to the permitted Lissanore Turbine. This is a single turbine located in the east of the study area, at 13km distance from the proposed Cloonanny Turbines. There is potential combined visibility from views in the north and northeast of the study area, in particular at VP3, VP7, VP8, and VP10. At all of these locations, the proposed developments will be well separated and of a similar scale, almost exclusively at viewpoints with broad views encompassing large areas of mixed land uses, where seeing higher intensity land uses such as wind energy is not out of place. Therefore, the magnitude of cumulative impact is deemed **Low.**

4.2.6.6.1 Cumulative – potential baseline

whilst the proposed development will generate some increase in the intensity of wind farm development within the study area, most notably in the local landscape in the immediate surrounds of the proposed development, it represents a relatively minor increase in the overall number of turbines within the study area. Therefore, the cumulative impacts resulting from the Cloonanny development are deemed **Low.**

4.2.6.7 Mitigation

Incorporated Design Given the highly visible nature of commercial wind energy developments it is not generally feasible to screen them from view using on-site measures as would be the primary form of mitigation for many other types of development. Instead, landscape and visual mitigation for wind farms must be incorporated into the early stage site selection and design phases.

In this instance the main form of landscape and visual mitigation employed is the reduction of the 3-4 turbines previously considered to a two-turbine layout.

4.2.6.8 Demolition & Construction Phases

Aside from demolition and construction stage mitigation measures to minimise land and vegetation disturbance and dust emissions (which may reduce visual amenity), there are no specific mitigation measures to be implemented. The appropriate management and reinstatement of excavations, in a timely manner, will ensure that any adverse effects caused, for example at site entrances or road upgrade locations, are minimised insofar as possible. Similarly, the progressive reinstatement and landscaping of the site will remediate any short term adverse effects on the local landscape.

4.2.6.9 Operational Phase

There are no operational phase mitigation measures additional to the incorporated design and 'appropriate management and reinstatement of excavations' in the construction phase described above.

4.2.7 Residual Impact Assessment

As described above, landscape and visual mitigation measures that formed part of the iterative design process of this Proposed Development over a number of years, and which are embedded in the assessed project. Therefore, other specific landscape and visual mitigation measures are not considered necessary / likely to be effective. Thus, the impacts assessed in Section 4.2.6 are the equivalent of residual impacts in this instance.

4.2.8 Monitoring

There are no monitoring measures proposed for landscape and visual.

4.3 Material Assets: Traffic & Transport

The assessment of Traffic and Transport is contained within Chapter 6 of Volume II. The traffic and transport assessment has focussed on:

- identifying likely significant effects resulting from :
  - the construction phase
  - the operational phase and
  - the possible future decommissioning phase.
- including potential cumulative impacts in conjunction with other planned developments or infrastructure projects.
- recommendations are also made for mitigation measures to avoid or reduce identified impacts.

4.3.1 Existing Environment

The existing environment in terms of traffic and transport provides a baseline for the assessment. Traffic counter data was collected on key road links which had been identified by the project team and in consultation with Longford County Council (LCC) as suitable for construction traffic and turbine delivery routes during initial scoping assessments, carried out from driven route assessments and a review of mapping, aerial photography and land ownerships and constraints, including existing built and natural features (buildings, roads, infrastructure, landscape, roadside boundaries and watercourses).

4.3.2 Impact Assessment

4.3.2.1 Do Nothing Scenario

In the Do-Nothing Scenario, the existing site for the proposed wind farm at Cloonanny Glebe will remain in agricultural use and there is no expected change in traffic generated on the road network and no direct traffic effects as a result.

4.3.2.2 Demolition and Construction Phase

Demolition and Construction Traffic Contribution

The demolition and construction Phase of the proposed windfarm development will have significant effects in terms of traffic and transport impacts due to temporary revisions/interventions on the road network and associated civil engineering works to accommodate the delivery haul route for the wind turbine components, works related to Grid connection underground cable routes on or adjacent to the road network, and traffic impacts associated with construction staff travel and materials deliveries to the windfarm site.

These effects will be temporary in nature, with some relating a short duration activities associated with temporary roadworks, and turbine component deliveries, while other general construction activities and related deliveries of materials such as stone and concrete will occur over a longer period of the proposed 24-month development programme of the project.

It is estimated that there will be in the order of 5 full time staff employed directly in the early and latter stages of the development, rising to a peak of 25 full-time staff employed directly during the peak period of construction activities at the main wind farm site.

The percentage impact on the road network from construction related activities is most pronounced during the peak of activity during delivery of stone for the temporary access road at the wind farm site, although it is below the thresholds for detailed road link and junction capacity assessment as set out in the TII Traffic and Transport Assessment Guidelines 2014 'PE-PDV-02045'.

The impacts on traffic are deemed **direct**, **temporary**, **negative** and **moderate**, which are considered significant with regard to the demolition and construction phase of the project.

4.3.2.3 Operational Traffic Contribution

The operational traffic generated by the proposed wind farm development relates to occasional and infrequent access for maintenance, monitoring or repairs by van or a small flatbed truck. The effects on traffic are neutral and are tending towards imperceptible.

4.3.2.4 Decommissioning Traffic Contribution

The proposed wind farm has a design life of 35 years and the possible Decommissioning Phase of the proposed windfarm development will have significant effects in terms of traffic and transport impacts due to temporary revisions/interventions on the road network and associated civil engineering works to accommodate the haul route away from the site for the decommissioned wind turbine components, and traffic impacts associated with construction staff travel and materials removed from the windfarm site as part of the restoration of the lands. As some of the foundation works will not be removed during decommissioning (being covered by landscape reprofiling, the volume of HGV traffic and construction workers will be lower than during the initial construction period.

These effects will be temporary in nature, with some relating a short duration activities associated with temporary roadworks, and turbine component haulage from the site, while other general construction activities and related haulage of materials such as stone may occur over a longer period, although the decommissioning will be expected to occur over a shorter period than the construction Phase.

It is estimated that there will be in the order of 5 full time staff employed directly in the decommissioning at the main wind farm site.

The percentage impact on the road network from decommissioning related activities is below the thresholds for detailed road link and junction capacity assessment as set out in the TII Traffic and Transport Assessment Guidelines 2014 'PE-PDV-02045'.

The impacts on traffic are deemed **direct**, **temporary**, **negative** and **moderate**, which are considered significant with regard to the decommissioning phase of the project.

4.3.2.5 Cumulative Impact

As the traffic impacts of the Cloonanny windfarm development are all related to the construction phase or decommissioning phase with neutral levels of operational traffic predicted, impacts are

temporary, while permanent traffic impacts will be tending towards imperceptible for this project and therefore cumulative traffic impacts are not relevant after the completion of the construction activities.

It is noted from a review of the LCC online planning files that there are no current permitted projects which are likely to have a material impact on the traffic volumes on the proposed delivery haul route via the R194, L1011 and L5046.

There is a grant of permission for continuance of a quarry at Killoe (LCC ref: 2017), 4.5km to the northwest of the Cloonanny site, but it is considered that this would maintain the existing operations at that location and would therefore be no change to the 2024 baseline traffic flows in the receiving road network.

Westmeath County Council, working in partnership with Longford County Council and in association with Transport Infrastructure Ireland, are in the process of developing a new N4 road scheme along a section of the N4 between Mullingar and Longford (Roosky). The scheme is currently at the emerging preferred route corridor stage.

The proposed wind farm development within the red line boundary does not interfere with the route corridor. The three Route Options for the proposed underground gird connection all pass through the emerging preferred route corridor, which runs between the existing N4 Longford Bypass and the wind farm site. The final route and construction methodology for the grid connection will be designed to take this into account.

Prior to the commencement of the grid connection works, the developer will liaise with TII and the overseeing agencies for the N4 Upgrade project to ensure that the grid connection route does not create issues regarding the construction of the new road. An application will be made for appropriate Road Opening Licence(s) and a detailed Traffic Management Plan will be prepared for agreement with the Road Authority (LCC), ensuring potential effects are mitigated.

4.3.3 Mitigation

4.3.3.1 Incorporated Design

A number of design related measures are proposed to ensure road infrastructure is adequate to cater for the projected traffic during the Construction Phase.

A section of access road to the west of the existing L5046/L50462 junction will be constructed to accommodate both daily construction traffic to and from the wind farm site with improved exit sightlines and a fully constructed road specification with drainage measures, adequate to accommodate the expected loads and traffic volumes expected across the construction period,

The existing alignment of the L54062 from the L5046 junction will be retained as a non-trafficked route to accommodate pedestrian and cyclist activity using the L50462 as an access/leisure route.

It is intended that the topsoil and subsoil excavated at the windfarm and temporary accommodation works sites will be stored for reuse in reinstatement and landscaping works, to reduce the volume of waste and other materials transported off-site by road. Where materials such as construction related

waste materials cannot be recycled and reused on site, these will be removed from site by backloading of delivery haulage vehicles where practical to avoid additional HGV trips.

The delivery haul route (via the N4 to the wind farm site) was selected with regard to the largest wind turbine components that will be delivered as abnormal load transport, route assessment carried out visually by Mable to identify existing constraints, and swept path assessments to determine the most appropriate measures requiring minimal interventions and temporary works along the selected route (via the R194, L1011 and L5046.

Where temporary construction and haul delivery junction exit sightlines for the design speed/posted speed limit of the existing road cannot be incorporated, it is proposed to implement temporary traffic management (TTM) measures as set out in the PTMP, which will be subject to detailed agreement with LCC as part of the Road Opening Licences that will have to be in place before works can commence.

Road surfaces on the public road will be reinstated as temporary works are completed, and temporary 'stone' areas for abnormal load delivery swept paths will be barriered off to prevent access by non-construction road users. At interfaces between temporary works and public road areas, the Contractor will monitor and clean the road to ensure construction materials, spoil or stone from the temporary areas is not deposited onto the public road.

Construction staff parking will be accommodated within the compound at the wind farm site, and staff will not park their personal vehicles on the public road or at temporary works sites Staff working at temporary works sites will be transported to the work sites from the wind farm compound using a contractor van/flatbed truck (which will be accommodated within the controlled temporary works area so it is not parked on the public road.

These measures are proposed to ensure safety of road users and minimise traffic disruption during the construction Phase.

4.3.3.2 Construction Phase

A Preliminary Traffic Management Plan (PTMP) has been prepared as part of the Construction and Environmental Management Plan (CEMP) and incorporates traffic management measures for the construction stage and will be further developed and agreed with the planning authority in advance of any works being undertaken.

The hours of construction activity will be limited to standard working week construction hours, where possible. However, to ensure that optimal use is made of good weather periods or at critical periods within the programme (i.e., concrete pours or to accommodate delivery of large turbine components along public routes), it may be necessary on occasion to work outside of these hours. Any such out of hours working will be agreed in advance with Longford Co. Co.

While 'out of hours' operational traffic activity for specialised or infrequent deliveries such as can result in temporary impacts such as increased construction traffic noise to receptors along the haul delivery road network, there is a key offset by reducing the impact on the overall road network, and particularly on the wider network where daytime temporary closures or diversions on the key National

and Regional Roads forming most of the turbine delivery route would have a more significant impact on the existing network traffic at times when volumes are higher.

Adequate advance public information including advertising and promotion of any temporary works closures or diversions though social media, print media and websites (TII, AA Roadwatch, and Local Authorities) and adequate VMS (variable message signage) on approach routes to the site area and temporary accommodation works areas, and also for the turbine delivery activity will be key to minimising disruption to travel which can lead to queuing and increased vehicle km driven due to temporary detours.

The day-to-day construction staff traffic generated by the main windfarm site during the two-year build period will peak at 25 persons, which not be a significant traffic generator. Where practical, construction staff will be encouraged to vehicle share car pool travelling to and from the work site.

A detailed CTMP for the construction phase will be agreed with LCC in advance of construction commencing. As set out in the PTMP prepared or the planning application, this will include:

- Appointment of a Traffic Management Coordinator
- Engagement/Liaison with locals
- Pre-condition survey
- Road opening licence for any temporary or permanent works on or adjacent to the public roads (and for Grid connection works)

Adherence to the CTMP and any Temporary Traffic Management (TTM) measures in place at worksites (including management of construction related vehicles to ensure there is no inappropriate parking or loading/unloading on public roads), and strictly following agreed haulage delivery routes, which will be monitored by the Project Management Team throughout the construction period.

Reinstatement of the temporary accommodation works areas (where widening or bend overswing areas are required to assist the turbine delivery areas) after these delivery activities are complete will return the road network to the 'Do Nothing' current condition.

4.3.3.3 Operational Phase

There will be minimal post-development traffic generated by the wind farm site when it is operational, which will be related to routine maintenance and repairs. This level of traffic would be infrequent and only result in one or two van or small truck movements in a particular day, occurring only occasionally over the proposed 35-year operating design life.

Where practical, operational maintenance staff will be encouraged to vehicle share car pool travelling to and from the site.

Sightlines will have to be maintained at the access from the L50462 to the substation and wind turbine sites. Where vegetation and foliage regrowth occurs within the public road area, this can be undertaken by the local authority as part of routine road maintenance activities, while any maintenance within the operator's lands/private lands would be undertaken by the operator/landowner.

4.3.3.4 Decommissioning Phase

The wind farm has a design life of 35 years. Therefore, if the project is to be decommissioned in the future, a decommissioning plan will be prepared for agreement with LCC. including a traffic management plan and mitigation measures similar to those implemented during the construction phase will be put in place. By leaving foundation areas and subsurface elements in place, the traffic impact of decommissioning can be reduced and less material will having be excavated and hauled away from the site for disposal remotely.

4.3.4 Residual Impact Assessment

As with all construction projects where there is traffic activity and works adjacent to live roads, there will be residual traffic impacts due to delivery traffic and construction worker commuting traffic on the public road network, and also due to temporary wind farm/substation work sites which are on or adjacent to, the public road network.

These can be managed adequately and the significance of the **temporary, direct** impacts reduced from moderate effects to **slight** effects if the correct mitigation measures including procedures and practices which follow the agreed CMTP are maintained during the construction phase.

No significant residual traffic impacts are expected during the operational phase following the implementation of the mitigation measures, The **long-term permanent** effects during the operational life are expected to be **neutral** and will tend towards **imperceptible**.

As with all decommissioning projects where there is resultant traffic activity and works adjacent to live roads, there will be residual traffic impacts due to haul traffic and worker commuting traffic on the public road network, and also due to temporary and wind farm decommissioning work sites which are on or adjacent to, the public road network.

These can be managed adequately and the significance of impacts reduced from moderate effects to **slight effects,** which are **temporary** and **direct** if the correct mitigation measures including procedures and practices which will follow the agreed decommissioning CTMP are maintained and followed during the decommissioning phase

4.3.5 Monitoring

Monitoring is essential for reducing the risks associated with mitigation measures in a wind farm development project because it ensures that these measures are functioning as intended and can be adjusted if needed.

Regular monitoring of construction activity and temporary work areas allows for the early identification of issues such as road pavement surface deterioration, control failure, structural damage to roadside features or bridges, vegetation growth impacting on access and junction sightlines, or warning signage being damaged or dirty, which could compromise mitigation efforts.

By detecting problems early, corrective actions can be taken before they escalate into major incidents or environmental impacts

4.4 Material Assets: Built Services

The assessment of Built Services is contained within Chapter 7 of Volume II.

Based on a review of the proposed development and the suggested topic areas set out in the EPA guidelines (2022), the consideration of the projects impact on Material Assets is discussed in the context of built services. This includes electricity supply and infrastructure, telecommunications, aviation, water and wastewater infrastructure and waste management. The assessment of Built Services is contained within Chapter 7 of Volume II.

4.4.1 Electrical Infrastructure and Supply

4.4.1.1 Existing Receiving Environment

Underground and overhead electrical cables near the grid route options and proposed site. No underground or overground electrical infrastructure exists on the proposed development site. Three substations within 8 km of the site are potential connection points:

- Richmond 110 kV Substation
- Longford 38 kV Substation
- Glebe 38 kV Substation

4.4.1.2 'Do Nothing' Scenario

If the proposed development is not constructed, there will be no impact on local electrical infrastructure. However, the opportunity to generate renewable energy and supply electricity to the national grid will be lost, along with the associated benefits of offsetting fossil fuel-based electricity generation.

4.4.1.3 Potential Significant Effects

4.4.1.3.1 Construction Phase

Development Site:

- There is no underground or overground electrical infrastructure on the proposed site, resulting in a Neutral Effect.

Turbine Delivery Route:

- The relocation or alteration of electrical poles for turbine delivery may cause temporary power outages, resulting in a Negative, Not Significant, and Temporary Effect.

Grid Route:

- Underground electrical infrastructure along the grid routes may require alterations, leading to temporary outages and Negative, Slight, and Temporary Effects. Accidental strikes on unknown underground services may cause similar disruptions. During grid connection or substation upgrades, minor supply disruptions could also occur, resulting in Negative, Slight, and Temporary Effects.

4.4.1.3.2 Operational Phase

Development Site:

- The development will positively contribute to the national grid by generating renewable energy, likely resulting in a Positive, Slight, and Long-Term Effect.

Turbine Delivery Route:

- No further disruptions are expected, leading to a Neutral Effect.

Grid Route:

- The installed cable route will not disrupt existing electrical infrastructure, resulting in a Neutral Effect.

4.4.1.3.3 Decommissioning Phase

Development Site

- No impact on underground or overground services is expected, leading to a Neutral Effect.

Turbine Delivery Route:

- Relocation or alteration of electrical poles for turbine removal may cause temporary power outages, resulting in a Negative, Not Significant, and Temporary Effect.

Grid Route

- Leaving underground cable ducts in situ minimizes disruption, resulting in a Neutral Effect.

4.4.1.3.4 Cumulative Effects

No cumulative impacts are expected in the local context. Nationally, the project will contribute positively to renewable energy supply, reducing reliance on fossil fuels and supporting carbon emission reductions.

4.4.1.4 Mitigation Measures

Mitigation by Design

- Turbine Delivery Route: Designed to avoid overground electrical infrastructure where possible.
- Grid Route: Designed to avoid existing underground cables.
- Design Standards: Compliance with relevant codes and standards.

Mitigation by Appropriate Construction Methodology

- Utility Provider Coordination: Liaise with providers to identify services and use safe excavation practices.
- Guidelines Compliance: Adhere to utility provider safety procedures near electrical infrastructure.
- Confirmatory Survey: Verify the location of services before construction.
- Hand Digging: Minimize accidental damage with hand excavation near services.

- Backup Services: Use temporary solutions for disrupted services.
- Post-Construction Testing: Confirm no service disruptions before operations.

4.4.1.5 Residual Impact Assessment

Mitigation measures reduce risks during construction, operation, and decommissioning phases, ensuring effects are brief and minor.

4.4.2 Telecommunications

4.4.2.1 Existing Environment

An electromagnetic interference (EMI) impact assessment identified six key telecom operators with networks in the area:

- 2RN: Includes UHF DTT off-air and PTP microwave radio links.
- Enet: Three PTP microwave radio links.
- Imagine Broadband: One PTP microwave radio link.
- Three Ireland: One PTP microwave radio link.
- Vodafone: Four PTP microwave radio links.
- Eir: One PTP microwave radio link.

Existing underground and overhead telecommunications cables are present along grid route options and the turbine delivery route but do not cross the proposed development site.

4.4.2.2 Do-Nothing Scenario

If the proposed development is not constructed, there will be no potential impact on telecommunications infrastructure.

4.4.2.3 Potential Effects

4.4.2.3.1 Construction Phase:

Development Site:

- Point-to-Point Radio Links: Likely, Negative, Not Significant, and Brief effects due to potential signal interference from construction structures.
- Underground/Overground Services: Neutral Effect as no telecom services are present within the site.

Turbine Delivery Route:

- Point-to-Point Radio Links: Neutral Effect.
- Underground/Overground Services: Likely, Negative, Not Significant, and Temporary effects due to the potential relocation or alteration of telecom poles.

Grid Route:

- Point-to-Point Radio Links: Neutral Effect as the grid route is underground.

- Underground/Overground Services: Likely, Negative, Slight, and Temporary effects due to localized service relocations.

4.4.2.3.2 Operational Phase:

Development Site:

- Point-to-Point Radio Links: Neutral Effect as turbines do not interfere with link paths.
- Underground/Overground Services: Neutral Effect.

Turbine Delivery Route:

- Point-to-Point Radio Links: Neutral Effect.
- Underground/Overground Services: Neutral Effect.

Grid Route:

- Point-to-Point Radio Links: Neutral Effect.
- Underground/Overground Services: Neutral Effect.

4.4.2.3.3 Decommissioning Phase:

Development Site:

- Point-to-Point Radio Links: Likely, Negative, Not Significant, and Brief effects due to signal interference from decommissioning equipment.
- Underground/Overground Services: Neutral Effect.

Turbine Delivery Route:

- Point-to-Point Radio Links: Neutral Effect.
- Underground/Overground Services: Likely, Negative, Not Significant, and Temporary effects due to pole relocations for turbine removal.

Grid Route:

- Point-to-Point Radio Links: Neutral Effect.
- Underground/Overground Services: Neutral Effect, as cables will remain in place.

4.4.2.4 Cumulative Effects

The proposed development is not expected to cause cumulative effects on telecommunications infrastructure when combined with other projects.

4.4.2.5 Mitigation Measures

Mitigation by Design:

- Wind turbine layout and grid routes are designed to avoid interference with telecommunications infrastructure.
- Turbine delivery routes are planned to minimize conflicts with overground services.

Mitigation by Construction Methodology:

- Coordination with telecom providers to identify and protect infrastructure.
- Surveys to confirm service locations and excavation near sensitive areas conducted by hand if necessary.
- Real-time monitoring of signal interference with corrective actions if required.
- Backup services for temporarily relocated telecom poles.
- Post-construction testing to confirm no disruptions to services.

4.4.2.6 Residual Impacts

Mitigation measures will reduce potential effects to the extent possible, but some impacts, particularly during construction and decommissioning, will remain Likely, Negative, Not Significant, and Brief or Temporary.

4.4.3 Aviation

4.4.3.1 Existing Environment

A desk-based review indicates that there are numerous aerodromes and airfields in the surrounding region. However, Ireland West Airport was noted as the closest airport to the proposed development.

4.4.3.2 Do-Nothing Scenario

If the proposed development is not constructed, there will be no potential impact on aviation services.

4.4.3.3 Potential Effects

4.4.3.3.1 Construction Phase:

Based on the aviation review statement by AI Bridges, there will be a Neutral Effect on aviation services during the construction phase.

4.4.3.3.2 Operational Phase:

The aviation review indicates that there will be a Neutral Effect on aviation services during the operational phase.

4.4.3.3.3 Decommissioning Phase:

The aviation review suggests that there will be a Neutral Effect on aviation services during the decommissioning phase.

4.4.3.4 Cumulative Effects

The proposed development is not expected to cause cumulative effects on aviation services when considered alongside other existing, permitted, or proposed developments.

4.4.3.5 Mitigation Measures

Although no significant impacts were identified, the following mitigation measures required by the Irish Aviation Authority (IAA) will be implemented:

Mitigation by Design:

- An aeronautical lighting scheme will be installed on the turbines, as agreed with the IAA.
- Mitigation by Construction Methodology:
- As-constructed coordinates (WGS84 format) along with ground and tip height elevations for each wind turbine location will be submitted to the IAA.
- The IAA will receive at least 30 days' notice prior to commencing crane operations for turbine erection.

4.4.3.6 Residual Impacts

Based on the aviation review statement conducted by AI Bridges, the proposed development is expected to have a Neutral Effect on aviation services throughout all phases of the project, with mitigation measures ensuring compliance with safety standards.

4.4.4 Gas

4.4.4.1 Existing Environment

A review of the Gas Network Ireland "Dial Before You Dig" (DBYD) maps confirms there are no gas pipelines or related infrastructure within the study area.

4.4.4.2 Do-Nothing Scenario

If the proposed development is not constructed, there will be no impact on gas infrastructure.

4.4.4.3 Potential Effects

4.4.4.3.1 Construction Phase:

Given the absence of gas infrastructure in the area, the construction phase will have a Neutral Effect on gas services.

4.4.4.3.2 Operational Phase:

Similarly, the operational phase will have a Neutral Effect on gas services.

4.4.4.3.3 Decommissioning Phase:

The decommissioning phase will also have a Neutral Effect on gas services.

4.4.4.4 Cumulative Effects

Since there is no gas infrastructure within the development area or nearby projects that involve gas services, the proposed development will not contribute to cumulative effects on gas infrastructure.

4.4.4.5 Mitigation Measures

Although no gas infrastructure is present, the following precautionary measures will be implemented to ensure safety:

- Review and Confirmation of Gas Infrastructure: Before construction, the Gas Network Ireland DBYD maps will be revisited to confirm that no new pipelines or services have been installed since the initial review.
- Liaison with Gas Networks Ireland (GNI): GNI will be consulted to ensure no unforeseen services are present or planned and that all safety requirements are met.

- Compliance with Safety Guidelines: All construction activities will follow standard safety protocols for working in areas where utilities might be present, mirroring approaches taken for electrical and telecommunications infrastructure.

4.4.4.6 Residual Impacts

Given the absence of gas infrastructure and the implementation of these precautionary measures, the residual impact of the proposed development on gas services is expected to remain Neutral during all phases of the project.

4.4.5 Water and Wastewater Infrastructure

4.4.5.1 Existing Environment

Water and wastewater infrastructure exists along the grid route options, turbine delivery route, and in the vicinity of the proposed site. However, no water or wastewater infrastructure is present on the proposed development site.

4.4.5.2 Do-Nothing Scenario

If the proposed development is not constructed, there will be no impact on water or wastewater infrastructure.

4.4.5.3 Potential Effects

4.4.5.3.1 Construction Phase:

Development Site:

- Water: The project will not require connection to water infrastructure. Construction needs (e.g., dust suppression, concrete chute washing, and sanitary uses) will be met through on-site rainwater collection, settlement ponds, and bottled water for drinking. Neutral Effect is expected.
- Wastewater: Temporary toilet units with holding tanks will be used. Wastewater will be transported to nearby wastewater treatment plants with capacity (e.g., Longford or Ennybegs WWTPs). Neutral Effect is anticipated.

Turbine Delivery Route:

- Water/Wastewater: No impacts are expected. Neutral Effect is anticipated for both services.

Grid Route:

- Water/Wastewater: Alteration or relocation of existing infrastructure may result in Negative, Slight, Temporary Effects due to potential disruptions during construction.

4.4.5.3.2 Operational Phase:

Development Site:

- Water: Minimal potable water use for maintenance will be met through bottled water. No connection to water infrastructure is required. Neutral Effect is anticipated.

- Wastewater: Temporary facilities will be used for maintenance activities. Wastewater will be transported to licensed treatment plants. Neutral Effect is expected.

Turbine Delivery Route and Grid Route:

- Water/Wastewater: No impacts are expected during operation. Neutral Effect is anticipated.

4.4.5.3.3 Decommissioning Phase:

Development Site:

- Water: Similar to construction, water needs will be met through on-site collection and bottled water. Neutral Effect is anticipated.
- Wastewater: Temporary sanitary facilities will be used, and wastewater will be transported to treatment plants. Neutral Effect is expected.

Turbine Delivery Route and Grid Route:

- Water/Wastewater: Infrastructure will remain in place to minimize environmental disruption. Neutral, Long-Term Effects are expected.

4.4.5.3.4 Cumulative Effects

The proposed development is not expected to cause cumulative effects on water and wastewater infrastructure when combined with other projects.

4.4.5.4 Mitigation Measures

To minimize impacts, the following measures will be implemented:

Mitigation by Design:

- The grid route will be designed to avoid existing water and wastewater infrastructure wherever practicable.

Mitigation by Construction Methodology:

- Utility Provider Coordination: Liaise with providers to ensure services are identified and safe excavation practices are followed.
- Service Surveys: Confirm the location of all underground services before construction.
- Hand Digging: Use manual excavation near identified services to prevent accidental damage.
- Post-Construction Testing: Verify service functionality after construction.
- On-Site Contingency Plans: Keep materials on-site for temporary repairs in case of accidental damage.
- Compliance: Follow utility provider guidelines and safety standards.

4.4.5.5 Residual Impact Assessment

Implementing these mitigation measures will significantly reduce the duration and severity of potential effects. Any temporary impacts will be minimized to brief disturbances, maintaining the effects' overall significance as outlined.

4.4.6 Waste Management

4.4.6.1 Existing Receiving Environment

No waste infrastructure is currently present within the study area.

4.4.6.2 'Do Nothing' Scenario

If the proposed development is not constructed, no waste will be generated, and there will be no impact on waste management.

4.4.6.3 Potential Significant Effects

4.4.6.3.1 Construction Phase

Solid waste generated during construction includes soil, spoil, timber, metals, concrete, municipal waste, sundry material waste, glass, packaging/plastics, waste electrical and electronic items, and other miscellaneous materials.

Potential Significant Effects:

- Improper Segregation of Waste: Failure to segregate waste streams could result in recyclable materials being sent to landfill, causing a Negative, Moderate, Long-Term Effect.
- Exceeding Waste Storage Capacity: Overfilled waste containers could lead to spillage and litter, resulting in a Negative, Slight, Short-Term Effect.
- Illegal Waste Disposal: Using unlicensed contractors or improper documentation could lead to fly-tipping, resulting in a Negative, Significant, Long-Term Effect.
- Hazardous Waste Mismanagement: Mishandling hazardous materials could contaminate soil and water, causing a Negative, Moderate, Long-Term Effect.
- Leachate from Waste Storage: Rainfall could create leachate from waste, leading to a Negative, Moderate, Long-Term Effect.
- Odour Issues: Prolonged waste storage could create unpleasant odours, causing a Negative, Slight, Short-Term Effect.
- Pest Infestation: Poorly managed waste could attract vermin, causing a Negative, Moderate, Long-Term Effect.

4.4.6.3.2 Operational Phase

Minimal solid waste generated during operation includes municipal waste, sundry material waste, glass, packaging/plastics, waste electrical and electronic items, and waste oils.

Potential Significant Effects:

- Similar risks apply as during construction, including improper segregation, exceeding storage capacity, illegal disposal, hazardous waste mismanagement, leachate formation, odour issues, and pest infestation, with impacts ranging from Negative, Slight to Negative, Significant Effects.

4.4.6.3.3 Decommissioning Phase

Solid waste generated during decommissioning includes fibreglass, soil, spoil, timber, metals, concrete, municipal waste, mixed recyclable waste, glass, packaging/plastics, waste electrical and electronic items, and other miscellaneous materials.

Potential Significant Effects:

- Non-Recyclable Materials: Fibreglass turbine blades may need disposal in landfills, causing a Moderate, Negative Effect.
- Other risks align with the construction and operational phases.

4.4.6.4 Cumulative Effects

The proposed development is not expected to result in cumulative waste effects when considered alongside other developments.

4.4.6.5 Mitigation Measures

4.4.6.5.1 Responsibilities

Competent personnel will oversee waste management:

- Construction Phase: Construction Manager.
- Operational Phase: Turbine manufacturer or maintenance company.
- Decommissioning Phase: Construction Manager.

4.4.6.5.2 Waste Prevention

Measures include:

- Efficient Ordering: Minimize overordering with precise quantities.
- Handling Protocols: Prevent material damage through proper handling.
- Supply Coordination: Reduce redundant deliveries.

4.4.6.5.3 Documentation and Compliance

Adhering to waste hierarchy and legislation (e.g., EU Directive 2008/98/EC).

4.4.6.5.4 Waste Storage and Containment

- Designated Areas: For temporary waste storage.
- Containment Procedures: Secure containers to prevent spillage.
- Regular Inspections: Ensure compliance with management policies.

4.4.6.5.5 Movement of Waste

All waste transport will comply with applicable laws and regulations.

4.4.6.5.6 Turbine Re-use

Refurbish or maintain turbines for resale in secondary markets.

4.4.6.6 Residual Impact Assessment

- Construction Phase: Effects reduced to Neutral.
- Operational Phase: Effects reduced to Neutral.
- Decommissioning Phase: Effects reduced to Neutral with mitigation measures.

4.5 Land & Soils

The assessment of Land & Soils is contained within Chapter 8 of Volume II. The Land and Soils assessment has focused on the potential significant effects on land, soils and underlying geology during construction, operation and decommissioning components of the Project, including:

- The Proposed Development versus current land use.
- Excavation activities and their interaction with the existing soils and geology baseline.
- Vehicular movement, both along Turbine Delivery / Haul Route and new Site Tracks and their significance for compaction and subsidence.
- Slope Stability, in particular where this relates to peat landslide hazard, excavations in soils and spoil management.
- Potential for Soil and Groundwater contamination.
- Consideration of both sites of geological significance and protected sites and their potential to be impacted by interactions with the Soils and geology environment during the lifetime of The Project.
- Operation and Maintenance Phase activities.
- Decommissioning activities.

4.5.1 Existing Environment

The land usage varies across the land holdings which make up the Cloonanny Wind Farm development with the predominant usage mainly as pastureland for livestock. There are no residential dwellings within the site, however one uninhabited derelict agricultural building is located within the red-line boundary. The closest habited buildings are more than 800m from the proposed turbines.

The Proposed Development is immediately underlain by the Visean Limestones Formation which consists of undifferentiated dark grey limestone rock. To the south of the Proposed Development, the Argillaceous Limestone Formation is present which consists of dark limestone and shale. Karst specific landforms have not been identified at the Applicant Site.

Superficial soils present within the Applicant Site consist of thick superficial soils overlying limestone rock. The natural superficial soils consist of Topsoil / Boulder Clay (Till/Mineral Soils) and Alluvium. There is an absence of significant Peat soils within the Development footprint and preliminary screening has determined landslide hazard to be negligible.

4.5.2 Impact Assessment

4.5.2.1 Do Nothing Scenario

The “Do Nothing Effect” is the effect that would result should the Proposed Development not be constructed. In this case, it is envisaged that the current land use would remain as it is now, with continued intensive grazing for cattle and other livestock.

Given the nature of the land, being generally pastureland, minor forestry and rough grazing, it is unlikely that any substantial changes in this use would occur in the near future.

4.5.2.2 Demolition Phase

No potential significant effects relating to Soils and Geology arise out of demolition of a single storey derelict shed structure to facilitate the turbine haul route.

4.5.2.3 Construction Phase

Construction Phase activities will impact soils and will have the following potential effects:

Land and Land use - 32,141m^3 of topsoil, subsoil and bedrock removal during construction excavations will result in an adverse effect to land capability for agriculture, causing a loss of moderately productive agricultural lands and a small area of forestry. This is considered to be of **slight significance, negative, and a permanent effect**

Earthwork Activities - Subsoil and bedrock removal during construction excavations is unavoidable. The operation of removing soils and bedrock increases the potential for siltation to occur. Effects in the absence of mitigation of all earthwork excavation activities will be at most **moderate significance, negative, and permanent effect.**

Vehicular Movement - Compaction, erosion and degradation of soils will occur during the construction phase from vehicular movement of cranes, excavators, dumper trucks, concrete trucks, and private cars. Vehicle movement during construction will have a **significant, negative and permanent effect** on the geology and soils.

Peat Landslide Hazards, Ground Stability and Failure – Peat Landslide Hazard has been deemed negligible as significant quantities of peat were not recorded within the footprint of the windfarm infrastructure and the topography of the land. The flat or very low slopes across the site mean that the risk of soil instability is considered to be low. Effects in the absence of mitigation of all earthwork excavation activities will be at most **significant, negative, and long-term effect**.

Soil and Ground Water Contamination - Accidental spillage of fuels and other chemicals during construction works is the main pollution risk. The production of waste materials during construction will be minimised by good site practices and adherence to the waste management section of the CEMP. Refer to the Construction Environmental Management Plan (CEMP), EMP4 – Fuel, Oil and Chemical Management & EMP15 – Waste Management Plan. Effects in the absence of mitigation, from the release of hydrocarbons, will be **significant, long-term, negative.**

Sites of Geological Heritage mapped in proximity to the proposed development have been screened out for potential impacts on soils and geology. They are located too distant for any direct or indirect impact on soils and geology to occur.

Protected Sites and Sites of Designated Importance – With the exception of the Carrickglass NHA all sites proximal to the site have been screened out for potential impacts on soils and geology. There is potential for Carrickglass NHA to be impacted by pollution, originating from the Site, in the form of accidental contamination of soil indirectly transported by watercourses. In the absence of mitigation this would have a **significant, long-term, negative** effect.

Waste Materials - All construction materials and waste will be stored in secure areas. Any hazardous materials will be correctly stored within properly bunded areas in accordance with good practice as

described in the IWEA and Scottish Best Practice Guidelines and in accordance with the CEMP. The effects associated with the use of construction materials are considered to be **moderate, permanent** and **negative**.

Health Effects- Potential health effects arise mainly through the potential for soil, rock and groundwater contamination. The Proposed Development is not a recognised source of pollution and so the potential for effects during the operational phase are negligible.

4.5.2.4 Operational Phase

Operational phase from the Proposed Development will have the no further enhancement of potential effects from those stated for the construction phase.

4.5.2.5 Cumulative Impact

Rhine Quarry and Sliabh Bawn Wind Farm have been assessed to be potential cumulative effects to the Proposed Development with respect to Vehicle Movement on Soils.

During the construction of the Proposed Development there will be the requirement for the importation of engineered fill from source quarries. Should these coincide with demand for imported aggregate for maintenance works at the existing Sliabh Bawn Wind Farm or construction of any of the projects currently in planning, there would a cumulative impact in terms of demands placed on local quarries for aggregate.

As such, there will be a **moderate, negative and temporary** cumulative effect, caused mainly by increased vehicle traffic, during the construction and decommissioning phases of the project. During the Operational phase there will be a **slight, negative and long-term** cumulative effect**.**

4.5.2.6 Incorporated Design

In order to reduce the impacts on soils and geology, infrastructure has also been positioned within areas where organic soils are absent, and slope gradients are low. Infrastructure has also been moved away from designated watercourses and other sensitive features. Windfarm infrastructure has also been located on agricultural lands and minor forestry where soils are extensively worked and drained, so as to be remote from residential and sensitive commercial properties.

4.5.2.7 Demolition & Construction Phases

No potential significant effects relating to Soils and Geology arise out of demolition of a single storey derelict shed structure to facilitate the turbine haul route.

Detailed Mitigation measures are outlined within the Construction Environmental Management Plan (CEMP) to ensure there is a reduction in the significance of effects as a result of the proposed development on soils and geology. This CEMP defines the work practices, environmental management procedures and management responsibilities relating to the construction phase to protect the environment and minimised any potential impacts. Once these best practice mitigation measures are implemented the impact on soils and geology during construction are considered at the most, **slightly significant, negative and permanent.**

4.5.2.8 Operational Phase

It is not envisaged that the operation of the proposed development will result in a significant impact on the Soils and Geology regime. Due to the reduced magnitude of the effects, no new additional mitigation measures are required for the maintenance and operation of the wind farm, over and above those incorporated into the design of the substation transformers and batteries, which will be bunded to protect soils against accidental leakages of oils and battery fluids.

The potential effects on the soil and geological environment during the operational phase of the work will be mitigated through good practice as described in the IWEA and Scottish Best Practice Guidelines; vehicular movements, hydrocarbon controls, sustainable use of natural resources, human health

4.5.3 Residual Impact Assessment

There will be no significant residual impact on Soils and Geology as a result of the Demolition Phase of the Proposed Development.

The residual effects after implementation of all mitigation measures for the Construction and Decommissioning Phases of the Proposed Development will be reduced to, at most, **slightly significant, negative and permanent.**

The residual effects after implementation of all mitigation measures for the Operational Phase of the Proposed Development will be **not significant, permanent, negative**

Overall following the application of all mitigation measures there will be not **likely, not significant, negative and permanent** residual effects in relation to Soils and Geology of the Proposed Development.

4.5.4 Monitoring

Monitoring set out in Section 8.15 of Chapter 8 and CEMP will be required. In general, it will require:

- All drainage systems to be properly maintained at regular intervals.
- Excavations, slopes, disposal sites and roads to be inspected and audited regularly for signs of soil or spoil movement and where possible, early warning systems will be established.
- Regular analysis of watercourses to be undertaken. Refer to Chapter 9, Water and Hydrology for further details.
- All activity on site, and at site boundaries, including plant and visitors, to be monitored and a register kept.
- Only authorised and suitably qualified personnel allowed to access or undertake works for the Project – access will be strictly controlled and documented at all times.

4.6 Water & Hydrology

The assessment of Water & Hydrology is contained within Chapter 9 of Volume II.

4.6.1 Existing Environment

4.6.1.1 Hydrology

Regionally, the landscape features the gently meandering Camlin River, part of a flat, lowland area. The river originates near Granard, about 17.6 km east of the Proposed Development, and flows into the River Shannon, 7.3 km west of the site. The riverbanks have gradual slopes, reflecting the gentle topography. The site lies within the Upper Shannon WFD Catchment area, specifically the Shannon[Upper]_SC_060 Sub-Catchment, which covers parts of Longford, Roscommon, and nearby regions. This sub-catchment includes the Camlin River and several smaller watercourses feeding into the Upper Shannon.

The EPA River Basin Management Plan (RBMP) 2018-2021 hydrological mapping within a 2 km radius of the Proposed Development was reviewed. The water quality status of nearby surface water bodies from 2016-2021 was categorised as follows: the Shannon[Upper]_SC_060 achieved a 'Good' status and is 'Not at Risk'; while the Moneylagan watercourse has a 'Moderate' status and is 'At Risk' due to pressures like urban runoff, wastewater, hydromorphology, and agriculture.

The biological Q-rating system assesses ecological health based on the presence of sensitive aquatic macroinvertebrates. Two monitoring points along the Camlin 26 stream revealed that the upstream point achieved a Q-rating of 3-4 ('Moderate' status), while the downstream point achieved a Q-rating of 4 ('Good' status) in 2020.

The Proposed Development will mainly impact two surface water features: the unnamed stream (EPA Code: IE_SH_26C010800) and the Derryharrow stream, both of which drain into the Camlin 26 stream located to the south of the site. The unnamed stream flows along the eastern boundary of the site, south of the road L5046, and extends to the southeastern area near the proposed turbine T2.

Surface water samples were collected from three locations (SW1, SW2, SW3) in August 2024 to establish baseline conditions prior to construction. Two surface water samples were collected from the unnamed stream (SW1 and SW2), which is a small tributary feeding into the Camlin 26. The third sample (SW3) was taken from the Camlin 26. Results were screened against Environmental Quality Standards (EQS) values. Overall, the results showed consistency across the sample locations; however, ammoniacal nitrogen, orthophosphate, and total phosphorus levels indicated poorer water quality compared to the "Good" status assigned to the Shannon[Upper]_SC_060 sub-catchment in the WFD.

In addition, there are also numerous drainage ditches located within the Proposed Development Site and its surrounds. These channels facilitate the flow of surface water runoff into the streams within or downgradient of the Site boundary. The drainage network is largely influenced by the gradient of the land and topography in the area.

The entire site is underlain by Visean limestones, characterized by undifferentiated dark grey limestone rock. Variations in water recharge are influenced by the EPA mapped cut-over raised bog located southeast of the site, specifically near turbine T2. Most of the site has a recharge coefficient

of 22%, while the area over the cut-over bog has a significantly lower recharge value of 4%. Both values are utilized in the site's simple water balance calculations, where the remaining effective rainfall contributes either to surface water runoff or to groundwater in the subsoil above the bedrock. The groundwater recharge rates were calculated to range from 12.8 mm/yr to 70.5 mm/yr across the site.

There are no recurring flood incidents within the Proposed Development boundary according to the OPW's flood mapping. However, the potential flood risk from an extreme fluvial flood event of the River Camlin is considered HIGH for the Proposed Development. The Site Specific Flood Risk Assessment (SSFRA) concludes that, although part of the wind farm, specifically turbine no. 2, is situated within Flood Zones A and B, the development is not anticipated to negatively affect the local hydrological regime or increase flood risk in surrounding areas and would not materially contravene the county development plan. Longford County Council (LCC) confirmed no issues with Turbine T2, as the Justification Test demonstrated compliance with flood management guidelines and the development plan.

The Camlin River downstream of the site is categorized as having High Importance due to its "Moderate (3-4)" Q-rating values and its essential role in local drainage and flood management; however, the main risk of surface water contamination stems from elevated suspended solids from increased runoff and sediment transport, along with potential hydrocarbon leaks and spills from equipment and machinery entering nearby watercourses.

4.6.1.2 Hydrogeology

The site features several mapped soil types, including Acid Deep Poorly Drained Mineral (AminPD) in the north-west, Mineral Alluvium (AlluvMIN) along the north-east boundary, and predominantly Acid Poorly Drained Mineral Soils with Peaty Topsoil (AminPDPT) throughout most of the site, except for the south-east corner, which is classified as Cutaway/Cutover peat (Cut); during a site survey, the soils were found to be well-drained.

The majority of the site is characterised as underlain by Sandstone and shale till (Lower Paleozoic) (TLPSsS) subsoils with minor strips of Alluvium (EPA, 2024). The south-east corner is mapped as cutover peat (Cut).

The site is underlain by Visean Undifferentiated Limestone (CDVIS), characterized by interbedded limestone, sandstone, and argillaceous beds, which can exhibit soluble limestone and associated "karst" features at other outcrop locations, though none are mapped on the site; south of the Camlin River, outside the site boundary, the bedrock is classified as Argillaceous Limestones (CDUBAL), comprising dark limestone, shale, and chert, with the boundary between the two rock types defined by a southwest to northeast trending fault.

The area mapped as Visean Undifferentiated Limestone, corresponds to a Regionally Important Aquifer–Karstified (conduit) (Rkc); while south of the Camlin River, outside the site boundary, the bedrock mapped as Argillaceous Limestones, is classified as a Locally Important Aquifer–Bedrock which is Moderately Productive in Local Zones (LI); the boundary between these rock types and aquifer types defined by the southwest to northeast trending fault, has potential implications for connectivity between the aquifers.

6 No. Trial Hole engineering logs from the Site Investigation (SI) Report indicate that the thickest peat layer, measuring up to 0.80 m, was found at T2, while T1 had 0.20 m and the Substation location had 0.30 m. Peat depth screening at the main infrastructure for the Proposed Development, indicated an absence of peat soils within the development footprint, and the subsoils were primarily composed of boulder clay tills and mineral soils, with no bedrock encountered in any of the trial holes.

The site is underlain by the Newtown Forbes Groundwater Body (GWB), covering an area of 80 km² and characterised by a conduit flow regime. According to the Draft 3 Newtown Forbes GWB Description, this area primarily features Visean Carboniferous Limestone, which is covered by thick deposits of glacial drift and peat, with minimal rock outcrop. The limestone is classified as a Regionally Important Aquifer – Karstified (conduit) (Rkc), indicating high permeability and productivity due to karst features like caves and conduits. Key characteristics of the GWB include:

- Structural geological features such as faults and folds influence groundwater flow and connectivity between aquifer units.
- Diffuse recharge primarily occurs from rainfall, which infiltrates through the limestone, though percolation is limited in the western area due to peat and underlying clay.
- The aquifer has high transmissivity and storage capacity, making it a valuable water resource.
- Groundwater flow is concentrated in an upper weathered and epikarstic zone, extending to about 30 m, moving towards rivers and the River Shannon, with some areas potentially partially confined due to extensive peat and low permeability subsoils.

Overall, groundwater quality in the Newtown Forbes GWB is generally good, but the karst nature increases vulnerability to contamination if surface pollutants are not managed effectively.

The GSI's online web viewer indicates that the groundwater vulnerability beneath the site is predominantly Moderate (M), with a small area of High (H) vulnerability in the southeast, corresponding to the infrastructure for turbine T2. Site investigation data confirm that the subsoils have low permeability at T1 and the Substation, and moderate permeability at T2. Geophysical surveys reveal soil/subsoil thicknesses of 10 m to 20 m around T1 and the Substation, and 5 m to 10 m around T2. All exploratory trial holes reached depths of 3.50 m to 3.70 m within predominantly stiff silt/clay. Based on the GSI's classification, the area around T1 and the Substation is classified as Low (L) vulnerability, while T2 is classified as Moderate (M). The infrastructure proposed for T2 is more vulnerable due to thinner subsoils, suggesting that greater protection for the aquifer is provided in areas where T1 and the Substation are located.

The majority of the site has a groundwater recharge coefficient of 22%, but the area with cut-over bog, where topsoil thickness can reach 0.80 m, has a lower recharge value of 4%. Groundwater recharge is greater (22%) in areas where the topsoil is 0.20 m to 0.30 m, such as around T1 and the Substation.

During site investigations, six trial pits were excavated, revealing weak groundwater flow at 2.80 m and 3.30 m below ground level near T2, indicating low to moderate permeability in the subsoils; no groundwater strikes were found in the other trial pits. The groundwater table is likely dynamic,

influenced by seasonal rainfall fluctuations. The topographic gradient in the southeast area of T2 directs water towards the Camlin River, but lower permeability at T2 leads to greater water retention and a higher water table compared to T1 and the Substation.

No groundwater sampling has been completed, and there are no available EPA groundwater monitoring data for the Newtown Forbes GWB. However, hydrochemical analyses from nearby trial wells in 1999 indicated high hardness, alkalinity, and electrical conductivity, with iron and manganese levels exceeding EU potable water limits.

The site does not exhibit any mapped karst features within 2 km, and none were observed during a site visit; however, the underlying soluble limestone bedrock has the potential to develop karst features. Nearby karst features are located approximately 2.5 km to the northwest of the site.

The Newtown Forbes GWB, which underlies the site, has achieved 'Good' status in three WFD cycles and is classified as 'Not at Risk,' with no significant pressures identified affecting these groundwater bodies.

No Group Water Schemes or Public Water Supplies are mapped within 2 km of the site; although some private wells were identified. Several designated sites are located within 5 km, with notable hydrological connectivity to the Ballykenny-Fisherstown Bog SPA and Lough Forbes Complex pNHA.

The hydrogeological environment is classified as Very High Importance due to the karst aquifer; with the main risks include hydrocarbon spills during construction and operation.

4.6.2 Impact Assessment

4.6.2.1 Do Nothing

If the Proposed Development were not to proceed, the proposed site would remain as a greenfield site, continuing to be used for agriculture.

4.6.2.2 Demolition Phase

A derelict shed at the junction of L1011 and L5046 will be demolished to facilitate the Haul Route; the remainder of the site is a greenfield area.

4.6.2.3 Construction Phase

The site is a greenfield site, therefore the construction phase will involve construction of site access roads (temporary and permanent), removal of vegetation and soil/subsoil to accommodate foundations for infrastructure including for the Substation, T1 and T2 turbines and temporary construction compound etc. The following potential effects highlight concerns about changes to natural hydrological and hydrogeological processes and water quality during construction.

4.6.2.3.1 Possible Impacts on Groundwater Vulnerability

The site's geophysical survey indicates a soil/subsoil thickness of 10 to 20 m around T1 and the Substation, and 5 m to 10 m around T2, where low to moderate permeability is observed. The T2 area, with cut-over bog soil, has a lower thickness and higher vulnerability, increasing the risk of groundwater recharge to the underlying Regionally Important Karstified Aquifer. Excavation may

disrupt perched water in T2, causing it to drain into deeper layers, which poses a negative, significant, likely, temporary, and indirect effect on the aquifer.

4.6.2.3.2 Surface and Groundwater Contamination from Oil/Fuel Spills and Leaks

The use of heavy machinery may lead to oil and fuel spills, which can contaminate nearby water bodies and adversely impact aquatic ecosystems. Additionally, wastewater generated from the temporary construction compound may contain harmful contaminants, posing a risk of groundwater contamination, particularly to the Regionally Important Aquifer. This impact is assessed as negative, slight, likely, long-term, and direct.

4.6.2.3.3 Earthworks Leading to the Mobilization of Suspended Solids into Surface Waterbodies

Construction activities, including excavation and road building, may mobilize suspended solids into surface water bodies, particularly the Camlin River. This could increase sediment loads and turbidity, negatively affecting water quality. Sources of sediment include drainage from excavation areas, stockpiled materials, and erosion from newly constructed drainage channels. The pre-mitigation potential effect is negative, significant, likely, temporary, and direct.

4.6.2.3.4 Potential Effects on Surface and Groundwater WFD Status

The Shannon[Upper] _SC_060 has achieved 'Good' status, and nearby monitoring points show moderate to good Q-ratings. However, increased sediment from construction activities may lower the Q-rating of downstream water bodies, particularly the Camlin River, potentially impacting its current 'Good' status. This change is linked to erosion of exposed soils and is expected to have a negative, imperceptible, likely, temporary, and indirect effect.

4.6.2.3.5 Potential Effects on Natural Infiltration and Groundwater Recharge

The construction of foundations and hard-standing areas for the wind turbines will involve substantial excavation, potentially disrupting local surface and subsurface drainage. The creation of impermeable surfaces may reduce natural infiltration, increase surface runoff, and impact groundwater recharge. The primary pathway for this impact is surface runoff, affecting the unnamed stream near T2 and ultimately the Camlin River. Without mitigation, the potential effect is assessed as negative, significant, likely, temporary, and direct.

4.6.2.4 Operational Phase

4.6.2.4.1 Increased Storm Water Run-off

The construction of impermeable surfaces from wind turbines, the substation, and associated infrastructure will alter natural infiltration rates, potentially increasing surface runoff and affecting groundwater recharge. However, the impact on surface water drainage patterns in the southeast area where T2 is located may be limited due to the lower permeability of the till soil/subsoil. The pre-mitigation potential effect on the Camlin River is negative, significant, likely, long-term, and indirect.

4.6.2.4.2 Potential Impacts on Surface Water Quality

Routine maintenance of turbines and equipment may involve the use of lubricants, chemicals, and small quantities of oil, which could spill and contaminate water sources if not managed properly. Additionally, the use of herbicides or mechanical clearing to maintain clear areas around the site may also affect nearby waterways. Waste generated during operations, including hazardous materials,

must be carefully managed to prevent leachate or runoff that could contaminate surface water. The potential effect on the Camlin River is negative, significant, likely, medium-term, and indirect.

4.6.2.4.3 Potential Impacts on Groundwater Quality

Accidental spillage of hydrocarbons used for cooling turbines or machinery could infiltrate the soil/subsoil, potentially contaminating the aquifer. However, the absence of wastewater facilities on-site means significant impacts on groundwater quality from this source are not anticipated. The pre-mitigation potential effect on the Camlin River, Ballykenny-Fisherstown Bog SPA, and Regionally Important Karstified Aquifer is negative, slight, likely, long-term, and indirect.

4.6.2.4.4 Potential Impacts on Designated Sites

The Ballykenny-Fisherstown Bog SPA is hydrologically connected to the site via the Camlin River, and hydrogeologically connected through the underlying Regionally Important Aquifer. The Proposed Development could adversely affect the water environment in the area, potentially impacting this Special Area of Conservation (SAC). The pre-mitigation potential effect is negative, slight, likely, long-term, and indirect.

4.6.2.4.5 Potential Impacts on WFD Status

During the operational phase, there is a slight potential for increased suspended sediment in surface water runoff, particularly during heavy rainfall or flooding events. An increase in sediment could lower the Q-rating of downstream water bodies, potentially affecting the Camlin River's current "Good" status (Q4) and pushing it into moderate or worse conditions. The pre-mitigation potential effect is negative, slight, likely, temporary, and indirect.

4.6.2.5 Decommissioning Phase

The potential effects during decommissioning are similar to those identified for the construction phase, including disruption of subsurface hydrological pathways, altered groundwater recharge, increased surface runoff, and risks of ponding or localized flooding. There is also a risk of contamination from accidental spills of oil, fuel, or other hazardous substances. No additional impacts beyond those expected during the construction phase are anticipated

4.6.2.6 Cumulative Impact

Per Appendix 1.2 *Cumulative Assessment - Projects and Plans* , several minor residential developments in the area, are not expected to significantly contribute to cumulative water impacts. Larger projects, such as nearby quarries, solar farms, and other wind farms up to 20 km away, were also assessed. The Zone of Influence (ZoI) for water impacts is limited to the WFD Catchment area of the Upper Shannon and specifically the WFD Sub-Catchment of Shannon[Upper]_SC_060, which includes a regionally important karstified aquifer underlying the site. Other large developments are either too distant or unlikely to interact with the water systems in a way that would lead to significant cumulative effects.

Additionally, the site is within the Longford County Council's jurisdiction and governed by the Longford County Development Plan 2021–2027. As the proposed site lies outside the boundary of the Draft Local Area Plan (LAP) for Longford Town, it was not included in the cumulative effects assessment.

4.6.3 Mitigation

4.6.3.1.1 Possible Impacts on Groundwater Vulnerability

There is a slight increase in groundwater vulnerability in the southeast area of the site, where soil is thinner (5 m to 10 m) and mapped as Moderate, while the rest of the site has low vulnerability with soil thickness over 10 m. To mitigate groundwater contamination, best practices for oil use and machinery refuelling will be implemented, governed by a detailed Environmental Management Plan (EMP) that will manage all on-site activities, ensuring compliance with environmental regulations and guidelines.

4.6.3.1.2 Surface and Groundwater Contamination from Oil/Fuel Spills and Leaks

Mitigation measures include:

- Servicing all machinery before site access.
- Designating specific impervious areas for refuelling and maintenance to prevent spills.
- Only trained personnel handling refuelling to minimize accidents.
- Establishing a comprehensive spill response plan.
- Prohibiting refuelling near watercourses to reduce contamination risks.
- Installing silt fencing to prevent contaminated runoff from reaching surface water.
- Maintaining 20 m buffer zones around watercourses where feasible.
- Ensuring wastewater from the construction compound is disposed of properly by licensed facilities.

4.6.3.1.3 Earthworks Leading to the Mobilisation of Suspended Solids into Surface Waterbodies

Silt fencing will be installed around the work site and along watercourse boundaries to capture sediment before it enters surface waters. Daily monitoring of runoff and surface water will be conducted to detect and address any increases in suspended solids. Earthmoving will be halted during heavy rainfall to minimize erosion and runoff, and disturbed areas will be quickly revegetated to promote soil stabilization.

4.6.3.1.4 Potential Effects on Surface and Groundwater WFD Status

Mitigation measures regarding hydrocarbon use and the management of suspended solids will protect the Surface and Groundwater Water Framework Directive (WFD) status, ensuring no changes to the volume or chemical status of surface and groundwater. The Proposed Development will comply with WFD requirements, with no direct discharges to streams or rivers during construction; all runoff will pass through a water treatment system before being released to vegetated surfaces.

4.6.3.1.5 Mitigation Measures for Construction Activities in Flood-Prone Areas

To mitigate flood-related risks during the construction of Turbine T2, which is located in Flood Zones A and B due to potential extreme fluvial flooding from the Camlin River, several measures will be implemented: excavated topsoil and subsoil will be stored outside the flood zone, a protective berm will be built around the excavation area, materials will be stored within protected areas, temporary drainage systems will manage stormwater, reinforcements will be securely anchored, and critical activities will be scheduled for drier months. Additionally, the Environmental Management Plan (EMP) protocols and Met Éireann weather warnings will be followed at all times.

4.6.3.2 Operational Phase

4.6.3.2.1 Increased Storm Water Run-off

The infrastructure will manage storm water by gradually controlling discharge volumes during storm events, preventing downstream flood risk. Drainage discharge points will be regularly inspected and managed.

4.6.3.2.2 Potential Impacts on Surface Water Quality

A comprehensive water management system will prevent surface water contamination from suspended solids, hydrocarbons, and pollutants. This system includes sediment control, oil-water separators, and filtration mechanisms to protect water quality and aquatic ecosystems, in line with the Environmental Management Plan (EMP).

4.6.3.3 Potential Impacts on Groundwater Quality

Mitigation measures include:

- Regular servicing of machinery before site access.
- Controlled refuelling and maintenance areas with impervious surfaces to prevent spills.
- A comprehensive spill response plan and procedures.
- Silt fencing, 20 m buffer zones around watercourses, and limited herbicide use.
- Baseline groundwater quality testing and ongoing monitoring to detect contamination early. All activities will follow the EMP guidelines.

4.6.3.4 Potential Impacts on Designated Sites

Mitigation for surface and groundwater protection will ensure that the Ballykenny-Fisherstown Bog SPA remains unaffected by the development.

4.6.3.5 Potential Impacts on WFD Status

Strict controls on hydrocarbon use and sediment prevention during operations will protect the Water Framework Directive (WFD) status, ensuring no changes in surface or groundwater quality. Runoff will be treated before being released to natural surfaces, complying with WFD requirements.

4.6.3.6 Decommissioning Phase

Any impact that occurs during the decommissioning phase will be similar the construction phase. Thus, the mitigation measures outlined for the construction phase will also be implemented during the decommissioning phase

4.6.4 Residual Impact Assessment

4.6.4.1 Construction Phase

4.6.4.1.1 Possible Impacts on Groundwater Vulnerability

The construction of foundations for turbines and access roads will cause localised changes to the natural groundwater flow patterns. Impacts will typically be minimal and localised, but there will be minor residual changes to the recharge rates to the groundwater aquifers beneath the site.

The residual effect is considered to be Negative, Not Significant, Likely, Temporary and Indirect.

4.6.4.1.2 Surface and Groundwater Contamination from Oil/Fuel Spills and Leaks

Despite implementing spill containment and response measures, there is always a slight residual risk of accidental spills of oil, fuel, or chemicals during construction activities. Small leaks or spills may still occur and, if not immediately contained, could infiltrate the ground and impact groundwater.

The residual effect will be Negative, Imperceptible, Unlikely, Short-term and Indirect.

4.6.4.1.3 Earthworks Leading to the Mobilization of Suspended Solids into Surface Waterbodies

Earthworks have the potential to result in elevated concentrations of suspended solids in surface water runoff. The measures outlined in Section4.6.3.1.3 will mitigate the risk of suspended solids entering the watercourses.

The residual effect will be Neutral, Imperceptible, Unlikely, Short-term and Indirect.

4.6.4.1.4 Potential Effects on Surface and Groundwater WFD Status

Strict mitigation measures as outlined in Section 4.6.3, regarding hydrocarbon use and the prevention of increased suspended solids during the construction phase will ensure the protection of the Surface and Groundwater Water Framework Directive (WFD) status. The Proposed Development will not result in any changes to the volume or chemical status of surface and groundwater, ensuring no alteration to their WFD status. Consequently, the Proposed Development complies with the requirements of the WFD (2000/60/EC).

At construction stage, there will be no direct discharge to streams or rivers. All runoff from work areas will pass through an in-line water treatment system before being released via buffered outfalls to vegetated natural surfaces.

The residual effect will be Neutral, Imperceptible, Unlikely, Short-term and Indirect.

4.6.4.2 Operational Phase

4.6.4.2.1 Increased Storm Water Run-off

With the implementation of mitigation measures outlined in Section 4.6.3, the residual impact is Negative, Imperceptible, Unlikely, Medium-term and Indirect.

4.6.4.2.2 Potential Impacts on Surface Water Quality

With the implementation of mitigation measures outlined in Section 4.6.3, the residual impact is Negative, Imperceptible, Unlikely, Medium-term and Indirect.

4.6.4.2.3 Potential Impacts on Groundwater Quality

With the implementation of mitigation measures outlined in Section 4.6.3, the residual impact is Negative, Imperceptible, Unlikely, Medium-term and Indirect.

4.6.4.2.4 Potential Impacts on Designated Sites

With the implementation of mitigation measures outlined in Section 4.6.3, the residual impact is Negative, Imperceptible, Unlikely, Medium-term and Indirect.

4.6.4.2.5 Potential Impacts on WFD Status

With the implementation of mitigation measures outlined in Section 4.6.3, the residual impact is Negative, Imperceptible, Unlikely, Medium-term and Indirect.

4.6.4.3 Decommissioning Phase

Any residual impacts that occur during the decommissioning phase will be similar to the construction phase. Thus, the residual impacts outlined for the construction phase will also be applicable.

4.6.5 Monitoring

4.6.5.1 Construction Phase

Surface water quality monitoring should be completed during the construction phase of the Proposed Development. Surface water quality monitoring will be completed at the discharge point (downstream of the buffered outfalls of the drainage system) plus in the unnamed stream which will run through the T2 infrastructure and the Camlin River. The monitoring will include the following:

- Visual inspection (colour, turbidity, odour, sheen)
- In-situ physio-chemical parameters including: Temperature, pH and Conductivity

4.6.5.2 Operational Phase

Surface water quality monitoring should be completed during the operational phase of the Proposed Development. Surface water quality monitoring will be completed at the discharge point (downstream of the buffered outfalls of the drainage system) plus in the unnamed stream which will run through the T2 infrastructure and the Camlin River. The monitoring will include the following:

- Visual inspection (colour, turbidity, odour, sheen)
- In-situ physio-chemical parameters including: Temperature, pH and Conductivity

4.6.5.3 Decommissioning Phase

Surface water quality monitoring should be completed during the construction phase of the Proposed Development. Surface water quality monitoring will be completed at the discharge point (downstream of the buffered outfalls of the drainage system) plus in the unnamed stream which will run through the T2 infrastructure and the Camlin River. The monitoring will include the following:

- Visual inspection (colour, turbidity, odour, sheen)
- In-situ physio-chemical parameters including: Temperature, pH and Conductivity

4.7 Biodiversity

The assessment of Biodiversity is contained within Chapter 10 of Volume II. The Biodiversity Chapter assesses the likely significant effects (both alone and cumulatively with other projects) that the Proposed Development may have on Biodiversity and sets out the mitigation measures proposed to avoid, reduce or offset any potential significant effects that are identified.

Ecological surveys were carried out to provide sufficient data to support a robust assessment of all ecological constraints related to this project. A Preliminary Ecological Appraisal of the overall study area was initially conducted in November 2020. A range of multidisciplinary walkover surveys dedicated botanical and faunal surveys were undertaken during all appropriate seasons between November 2020 and September 2024. The habitats within the Proposed Development site were the subject of a detailed survey and assessment. All habitats were classified in accordance with Fossitt (2000).

4.7.1 Existing Environment

The Proposed Development will be located approximately 5km northeast of Longford town. The site is primarily improved agricultural grasslands and wet grassland separated by hedgerows. This is also the predominant land use types in the local area. The Camlin River is approximately 200m south of the proposed site. A tributary of the Camlin, the Derryharrow Stream, is found 190m north of the nearest turbine location. Drains and modified streams within and surrounding the Proposed Development site all eventually discharge into the Camlin. The Proposed Development is neither located within nor directly adjacent to any European or Nationally Designated Sites. The Camlin flows along the eastern boundary of Lough Forbes Complex SAC and Ballykenny-Fisherstown Bog SPA approximately 10km downstream from the site, eventually discharging into the Shannon 14km downstream. The Shannon then flows into Lough Ree, which forms part of both the Lough Ree SPA and SAC, located approximately 26km downstream from the Proposed Development area. The closest nationally designated area is Carrickglass Demesne pNHA which is less than 1km from the site. No connectivity exists with this pNHA.

Watercourses within and surrounding the Development site were highly modified and not found to provide optimal fisheries or otter habitat. No otter resting or breeding sites were identified within the Proposed Development Site. No protected aquatic species were identified. In addition, detailed bat assessments have been undertaken as part of the detailed baseline assessment, detailed results of which are provided in technical appendices to this EIAR. One badger sett was recorded over 400m from works at the closest point which is outside of the development footprint. A population of the protected butterfly species marsh fritillary was recorded within the field corresponding to the Annex I habitat type *Molinia* meadow. Which is over 200m from the existing access road and over 500m from the nearest turbine.

4.7.2 Impact Assessment

The construction phase will result in habitat loss/disturbance of approximately 2.9 ha of habitat in total to facilitate the construction of infrastructure and site access. By area, the largest habitat type lost as a result of the Proposed Development is improved agricultural grassland (GS1), which is

approximately 1ha. Wet grassland (GS4) and improved /wet grassland (GS1/GS4) comprise the second largest habitat type impacted, accounting for 1.5ha combined. The removal of hedgerows will be required to allow access to the Proposed Development. The total length of the hedgerow, which will be removed, is approximately 1,393m. An assessment of hedgerow habitat quality was carried out based on the hedgerow appraisal methodology (Foulkes *et al*., 2012). This concluded that 72% or 1015m of this hedgerow was poor (low, box cut, discontinuous, low diversity), 11% or 124m was moderate (top heavy, mostly continuous, moderate species richness) and 17% or 254m was good quality (dense, continuous, species-rich). None of the habitat due for removal were noted as being of higher than Local Importance (Higher Value). No significant effects on any habitats at any geographical scale are anticipated. Furthermore, the implementation of the Habitat Management and Enhancement Plan has the potential to result in a positive impact habitat with the site of works by increasing species diversity and working to conserve areas of high-quality habitat.

No potential for significant negative effects on faunal species was identified as a result of the Proposed Development. The Proposed Development has been carefully designed to avoid sensitive mammal habitats, such as woodlands and badger setts. Indirect effects, such as the temporary loss of foraging or commuting areas, are also unlikely to be significant due to the availability of similar habitats in the surrounding area. Once operational, the development poses no risk to terrestrial mammals, either through habitat loss or disturbance.

Evidence of marsh fritillary butterflies was recorded over 500m from the nearest turbine, within the area of Molinia meadows noted above. No evidence of marsh fritillary of breeding was found outside this habitat area, and no adverse effects on this species or its habitat will occur during construction or operation.

Although no bat roosts were recorded within the development footprint, clearance for access in infrastructure will result in the loss of hedgerows, some of which provides foraging habitat. This habitat loss represents a slight, localised impact on bats. Disturbance from construction noise, lighting, and activity is unlikely to cause significant effects, as works will be limited to daylight hours. During the operational phase, wind turbines may pose a risk to foraging bats. While these risks could result in a slight, long-term negative impact on local bat populations, mitigation measures have been put in place to avoid any potential effects.

Aquatic ecology is not expected to be significantly affected by the Proposed Development. All major infrastructure, such as turbines, has been located over 200m from primary watercourses. Construction activities present a minor risk of water pollution due to runoff or accidental spills, robust mitigation measures have been designed to prevent these impacts. During the operational phase, no instream activities or materials with potential to harm water quality will be present on-site, ensuring no significant effects on aquatic species or habitats.

4.7.2.1 Do Nothing

The Proposed Development Site currently comprises agricultural lands managed through a mix of high- and low-intensity practices. If the development does not proceed, the area will likely remain in agricultural use, resulting in continued agricultural runoff into nearby watercourses and ongoing

pressure on riverbanks from livestock activity. The grid connection area will remain as a road, and the proposed substation and battery energy storage system (BESS) site will continue as agricultural fields.

Faunal assemblages would likely remain similar to those currently using the site, including passerine bird species typical of agricultural and riverine habitats, as well as mammals such as badgers which forage in fields, hedgerows, and ditches. Otters would continue to commute and forage in Camlin and connected water courses, while bats would rely on the scrub, hedgerow, and woodland habitats for foraging and commuting.

4.7.2.2 Cumulative Impact

The cumulative impacts of the Proposed Development on Key Ecological Receptors (KERs), including European and nationally designated sites, were assessed alongside other local projects, plans, and other wind developments. This evaluation involved reviewing planning records and resources to identify ongoing, past, and future activities in the area and their potential environmental impacts.

The analysis focused on wind farm projects within a 25 km radius, with major assessments conducted for Derryadd Wind Farm and Sliabh Bawn Wind Farm. Avian receptors were identified as the only potential pathway for impacts between the Proposed Development and these wind farms. Shared bird species, including peregrine falcon, golden plover, and whooper swan, were considered. Given the low potential impact significance for all avian KERs concluded as a result of this development, combined with the distance between the sites, the risk of cumulative impacts was deemed negligible.

A review of other developments, including quarries, solar farms, and housing projects, concluded that no significant source-pathway-receptor linkages exist between these projects and the Proposed Development. The assessment confirmed no hydrological connections or significant residual effects on possible ecological receptors. The Longford County Development Plan and Biodiversity Action Plan were also reviewed to ensure alignment with relevant policies and objectives, with no contraventions identified.

The Proposed Development will disturb approximately 2.9 hectares of habitat during construction, primarily affecting improved agricultural grassland, wet grassland, and hedgerows. Restoration efforts post-works, supported by mitigation measures and a Biodiversity Management and Enhancement Plan, will ensure no significant cumulative habitat loss.

No significant impacts on Special Areas of Conservation (SACs) or Special Protection Areas (SPAs) were identified, as confirmed in the Appropriate Assessment Screening Report.

Overall, no residual or cumulative effects on biodiversity or designated sites are anticipated from the Proposed Development, whether assessed independently or in combination with other plans and projects.

4.7.3 Mitigation

4.7.3.1 Incorporated Design

The Proposed Development has been meticulously designed to avoid, reduce, and minimise effects on avian Key Ecological Receptors through a mitigation-by-design approach guided by established literature, such as the Pearce-Higgins (2009). The design approach prioritised situating the development footprint in the least ecologically sensitive areas. This iterative design process was employed, involving ongoing consultation with the developer and the design team—comprising the Project Manager, Project Engineers, Project Ecologists, and Project Ornithologists—to optimise the layout of the wind farm. This collaborative effort ensured that construction activities and the eventual operational wind farm avoided sensitive locations and habitat loss for KERs.

4.7.3.2 Construction Phase

4.7.3.2.1 Watercourses and Aquatic Ecology

During the construction phase, particular attention was paid to the potential impacts on water quality and aquatic habitats. To mitigate these risks, a detailed Surface Water Management Plan (SWMP) was developed as part of the broader Construction Environmental Management Plan (CEMP). The SWMP outlines specific measures for managing water runoff, ensuring that sediment and contaminants from the construction activities do not reach nearby watercourses causing adverse effects. A series of drainage systems, such as clean water cut-off drains and dirty water cut-off drains, have been designed to divert clean water away from disturbed construction zones and capture sediment-laden runoff for treatment. These measures include the use of silt fencing, silt bags, and check dams to control sediment flow, as well as settlement ponds to allow for sediment deposition before water is discharged. These drainage measures are not only aimed at protecting water quality during construction but will also remain in place during the operational phase to ensure continued water management.

4.7.3.2.2 Habitats and Flora

Efforts to protect local flora and habitats were integral to the construction design. The project was specifically designed to avoid areas of high ecological value, with careful consideration given to the preservation of hedgerows, trees, and high-quality wet grassland. Where habitat loss was unavoidable within temporary works and access areas, hedgerows will be replanted using suitable native species from native tree stock. Access to sensitive areas will be strictly controlled, ensuring that construction activities did not encroach on habitats outside of the designated works areas. Measures like root protection zones were implemented to prevent damage to tree roots, and an ecologist will be employed to oversee all construction activities.

4.7.3.2.3 Terrestrial Mammals

To minimise the impact on terrestrial mammals, the design of the wind farm avoided important habitats for species such as badgers, otters, and pine martens. Prior to construction, a pre-construction walkover survey was conducted to identify any mammal resting or breeding sites which may have been created since surveys were carried out. In the event that any such sites were found, appropriate exclusion zones will be implemented, and construction activities will be timed to avoid sensitive periods like breeding seasons or hibernation. Additionally, construction activities will be

restricted to daylight hours, and any excavations designed with escape routes to prevent mammals from becoming trapped. A suitably qualified ecologist would also be on-site during construction to monitor for any potential impacts on mammal populations.

4.7.3.2.4 Bats

The Proposed Development includes measures to protect bats during the construction phase, primarily through noise and lighting controls. Construction machinery would be required to meet permissible noise levels, and where lighting was necessary, it would be directed in a way that minimised its impact on surrounding habitats.

4.7.3.3 Operational Phase

4.7.3.3.1 Habitats and Flora

Once operational, the Proposed Development is not expected to lead to further habitat loss. In fact, the implementation of the Biodiversity Management and Enhancement Plan (BMEP) is expected to have a positive impact on local habitats, such as grasslands and hedgerows, which will be restored and managed to enhance biodiversity. The BMEP also includes specific measures to support pollinators and other species, including the restoration of fields for marsh fritillary.

4.7.3.3.2 Terrestrial Mammals and Bats

The operation phase is not anticipated to cause significant impacts on terrestrial mammals, especially given the ongoing implementation of the Biodiversity Management and Enhancement Plan. For bats, specific mitigation measures will be implemented as part of the Bat Monitoring and Mitigation Plan (BMMP). This plan is designed to reduce the risk of bat fatalities due to turbine collisions. A key mitigation measure involves feathering the turbine blades, which adjusts their position to reduce rotational speed during low wind conditions. Additionally, curtailment strategies will be employed, which involve adjusting turbine operation based on real-time data to avoid conditions when bats are most active. To further protect bats, an automated bat detection system as proposed, which would shut down turbines if bat activity is detected in real time. These measures, combined with careful monitoring, will help to reduce bat fatalities mitigating adverse effects on local bat populations.

4.7.3.4 Decommissioning Phase

The mitigation measures for the decommissioning phase of the project will be similar to those implemented during construction. This will include updated ecological surveys of the site to assess the flora and fauna present at that time. The decommissioning activities will be designed to minimise impacts on the environment, focusing on protecting habitats and species. While the scale of mitigation measures will be smaller compared to construction, they will be tailored to the ecological conditions on site at the time, ensuring that any necessary protections are put in place to protect the local ecology.

4.7.4 Residual Impact Assessment

This Chapter of the Environmental Impact Assessment Report (EIAR) concludes that, with the implementation of the proposed mitigation measures, no residual impacts on any of the Key Ecological Receptors will occur following the construction, operational or decommissioning phases of the

Proposed Development. In summary, through the proactive and comprehensive mitigation strategies in place, the development is designed to ensure that any potential impacts on the environment are fully addressed. As a result, no significant residual impacts will occur.

4.7.5 Monitoring

The monitoring plan for the Proposed Development includes several key elements designed to ensure minimal environmental impact during and after construction. Prior to construction, an ecological walkover survey will be conducted to assess for any changes in mammal activity or nesting places, and trees will be re-assessed for bat roosting potential. Additionally, nesting bird checks will be required if construction takes place during the breeding season, with exclusion zones and monitoring implemented as needed.

Water quality will be actively monitored through a Surface Water Monitoring Plan (SWMP), which includes daily visual inspections of site drains and outfalls, water quality measurements at designated locations, and monthly laboratory tests to track construction impacts on water quality. Weekly field assessments will complement lab results to provide real-time data on water quality. These monitoring efforts will be reported regularly, and post-construction monitoring will continue until water quality returns to baseline conditions.

Post-construction bat monitoring will be carried out as part of a Bat Monitoring and Mitigation Plan (BMMP), which includes strategies such as feathering, curtailment of turbine operation, and casualty searches. If significant bat collisions are detected, additional measures will be implemented. This comprehensive monitoring approach ensures that potential environmental impacts are effectively managed throughout and beyond the construction phases into the operational phase of the Proposed Development.

4.8 Ornithology

The assessment of Ornithology is contained within Chapter 11 of Volume II.

This chapter assesses the likely significant effects that the Proposed Development may have on avian receptors. Firstly, a brief description of the Proposed Development is provided. This is followed by a comprehensive description of the methodologies that were followed in order to obtain the information necessary to complete a thorough assessment of the potential effects of the Proposed Development on avian receptors. An analysis of the results determines how birds might be affected (directly or indirectly) by the construction, operation and decommissioning of the Proposed Development, and an assessment is made regarding the significance of these effects. Where potential impacts are identified, mitigation measures have been developed to avoid or reduce residual significant effects. This assessment is supported by Appendices which contain data from the surveys undertaken and the results and a Collision Risk Assessment (CRA) model for the Proposed Development.

4.8.1 Existing Environment

The Proposed Development will be located approximately 5km northeast of Longford town. The site is primarily improved agricultural grasslands and wet grassland separated by hedgerows. This is also the predominant land use types in the local area. The Camlin River is approximately 200m south of the proposed site. A tributary of the Camlin, the Derryharrow Stream, is found 190m north of the nearest turbine location. Drains and modified streams within and surrounding the Proposed Development site all eventually discharge into the Camlin. Key habitats that could be utilised by birds include grasslands, particularly those close to the watercourse and prone to flooding and hedgerows.

The Proposed Development is neither located within nor directly adjacent to any European or Nationally site designated for the conservation of bird species. The Camlin flows along the eastern boundary of Lough Forbes Complex SAC and Ballykenny-Fisherstown Bog SPA approximately 10km downstream from the site, eventually discharging into the Shannon 14km downstream. The Shannon then flows into Lough Ree, which forms part of both the Lough Ree SPA and SAC, located approximately 26km downstream from the Proposed Development area.

4.8.2 Impact Assessment

An accurate prediction of the effects is derived following a thorough understanding of the nature of the Proposed Development along with a comprehensive knowledge of bird activity within the study area. The identification of avian Key Ecological Receptors (KERs) and the assessment of effects followed the precautionary principle. Effects associated with habitat loss, disturbance displacement, collision risk and cumulative effects have been assessed based on the relevant best practise guidance (EPA, 2022; Percival, 2003).

Several species recorded on-site were classified as having high or moderate sensitivity due to their conservation status, regional importance, or national population declines. These include species such as Whooper Swan (high sensitivity) and Peregrine, Herring Gull, Mute Swan, and Mallard (medium sensitivity). The assessment of avian Key Ecological Receptors (KERs) within the study area concludes that no significant effects are anticipated as a result of the Proposed Development. Based on

established evaluation criteria, no avian KERs are predicted to experience effects greater than long-term slight negative effects (EPA, 2022) and low effect significance (Percival, 2003) during the construction or operation phase of the Proposed Development.

The potential for effects on avian Key Ecological Receptors (KERs) to result in likely significant effects on European designated sites was assessed in the Appropriate Assessment Screening Report, as summarised in the section above. The AA process determined that the Proposed Development will not result in any likely significant effects, either alone or in combination with other plans or projects, on European-designated sites or their conservation objectives.

Hydrological connectivity exists between the Proposed Development and Special Areas of Conservation (SPAs); Ballykenny-Fisherstown Bog SPA and Lough Ree SPA via the River Camlin. However, natural processes like pollutant dissipation, dilution, and sedimentation, combined with significant separation distances of 10km and 26km, respectively, ensure that any potential impacts on water quality will not compromise conservation objectives at either site.

The development maintains appropriate buffer zones for sensitive species like Whooper Swan, Mute Swan and Mallard. Minimal habitat disturbance is expected given the limited size of the development footprint, and ample alternative foraging areas exist nearby. No evidence suggesting the site is on key migratory or commuting routes for Special Conservation Interest (SCI) species was found. Therefore, disturbance or displacement impacts are not anticipated to cause significant effects on any SCI bird species that could cause any European-designated site to not meet its conservation objectives or adversely affect bird populations at any geographical scale

A Collision Risk Assessment (CRA) predicts negligible collision risks for species such as Peregrine Falcon, Whooper Swan, and Teal. For Golden Plover, the highest risk species identified, an estimated four collisions over the 35-year operational lifespan of the wind farm are predicted, equating to one bird every nine years. This low risk will not compromise the conservation objectives of any European site or adversely effecting bird population at any geographical scale

4.8.2.1 Do Nothing

The Proposed Development is located on agricultural land currently managed with both high and low-intensity practices. If the project does not proceed, the land will likely remain in agricultural use, with continued agricultural runoff impacting nearby watercourses and livestock affecting riverbank conditions. The Grid Connection will remain as a road, and the Substation and BESS sites will continue to be used for farming. Faunal assemblages would likely remain similar to those currently present, including bird species typical of agricultural and riverine habitats in the midlands, particularly passerines species.

4.8.2.2 Cumulative Impact

The wind farm projects within a 25-kilometre radius of the Proposed Development (Derryadd Wind Farm, Sliabh Bawn Wind Farm, Lissanore), are presented in terms of their proximity to the Proposed Development and whether the project is permitted/operational or pending/under appeal.

The analysis focused on wind farm projects within a 25km radius, with major assessments conducted for Derryadd Wind Farm and Sliabh Bawn Wind Farm. Avian receptors were identified as the only potential pathway for impacts between the Proposed Development and these wind farms. Shared bird species, including peregrine falcon, golden plover, and whooper swan, were considered.

Lissanore shared the following avian KERs with the Proposed Development: peregrine falcon, buzzard, kestrel, sparrowhawk and snipe. None of these were noted as having residual impacts due to either the Proposed Development or the proposed Lissanore development.

Given the low potential impact significance for all avian KERs, combined with the distance between the sites, the risk of cumulative impacts was deemed negligible.

4.8.3 Mitigation

4.8.3.1 Incorporated Design

The Proposed Development has been designed to avoid, reduce, and minimise effects on avian Key Ecological Receptors (KERs) through a mitigation-by-design approach, guided by established literature (Pearce-Higgins, 2009). An iterative design process was employed, involving ongoing consultation among the developer and the design team—comprising the Project Manager, Project Engineers, Project Ecologists, and Project Ornithologists—to optimise the layout of the wind farm. This collaborative effort ensured that construction activities were avoided at sensitive locations and habitat loss for avian KERs was minimised at the source. The design prioritised situating the development footprint in the least ecologically sensitive areas, thereby adopting an avoidance-by-design strategy to reduce potential adverse effects on bird species.

4.8.3.2 Construction Phase

To protect avian receptors during the construction phases of the Proposed Development, a range of mitigation and best-practice measures will be implemented. Habitat protection will be prioritised by controlling vehicle movement to prevent encroachment beyond the development footprint, thereby minimising habitat disturbance and the potential disturbance to foraging bird species. Vegetation clearance, including hedgerows and scrub, will be restricted to periods outside the bird breeding season (March to August) where possible. To further reduce disturbance to breeding birds, construction activities will be scheduled outside the breeding season wherever possible. In cases where such scheduling is not feasible, pre-construction checks will be conducted by a qualified Ecological Clerk of Works (ECoW) or ornithologist. Noise will be managed by ensuring that all machinery complies with noise regulations, and unnecessary noise, such as equipment idling or excessive revving, will be avoided.

A Construction and Environmental Management Plan (CEMP) will be in place before construction begins, ensuring compliance with all relevant planning and environmental requirements. As part of the CEMP, an Ecological Clerk of Works (ECoW) will be appointed to oversee ecological protection measures. The ECoW will deliver on-site training (Toolbox Talks) to inform workers of ecological and ornithological sensitivities, liaise with project ornithologists and relevant authorities such as NPWS and Longford County Council.

4.8.3.3 Operational Phase

Once operational, the availability of suitable habitats in the area will not significantly decrease. Given the buffer distance from the Camlin and adjacent grasslands and the final turbine layout, no significant disturbance or displacement of avian species is anticipated. Collision Risk Assessment modelling indicated no greater than low impacts for any avian receptors, and no evidence of a barrier effect caused by the Proposed Development was identified. Therefore, no mitigation measures are required for the operational phase. However, monitoring in accordance with best practices is proposed.

4.8.3.4 Decommissioning Phase

During the decommissioning phase, disturbance limitation measures will follow the construction mitigation. In addition, if winter roosting or breeding activity of birds of high conservation concern is identified within monitoring activities no works shall be undertaken within a species-specific buffer (as per Goodship, N.M. and Furness, R.W. 2022), in line with industry best practice.

4.8.4 Residual Impact Assessment

Significant residual impacts are impacts that remain once mitigation has been implemented or impacts that cannot be mitigated. As per Percival's 2003 criteria, an effect significance of greater than Low was not identified for any avian KER. As per EPA 2022 criteria, an effect significance of greater than Slight was not identified for any avian KERs.

With the avoidance measures (design phase) and full implementation of mitigation measures throughout the other phase of the project, significant residual effects on avian KERs are not expected.

4.8.5 Monitoring

A comprehensive Operational Bird Monitoring Programme, including breeding and winter bird surveys as well as collision monitoring, has been established and can be seen in the technical appendices to this report.

Pre-construction bird surveys will be carried out by a qualified ornithologist to identify sensitive sites within 500 meters of the work area. If works continue into breeding or winter seasons, additional surveys will be conducted, and restricted areas will be clearly marked to protect sensitive bird habitats.

During the operational phase, bird monitoring will continue at pre-construction survey locations to detect changes in bird behaviours. If significant impacts are observed, mitigation measures, such as limiting turbine operation times, may be implemented. For the decommissioning phase, work will also avoid the breeding season where possible, and pre-decommissioning bird surveys will be conducted to identify and protect sensitive sites. Reports summarising monitoring results and recommendations will be submitted to the Planning Authority and the National Parks and Wildlife Service during all phases of the project.

4.9 Noise & Vibration

The assessment of Noise & Vibration is contained within Chapter 12 of Volume II.

4.9.1 Existing Environment

The background noise environment has been established through noise monitoring surveys undertaken at seven noise sensitive locations (NSLs) surrounding the Proposed Wind Farm Site. Prevailing background noise levels for day and night periods at various wind speeds have been measured in accordance with best practice guidance contained in the Institute of Acoustics document 'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise' (IOA GPG).

4.9.2 Impact Assessment

4.9.2.1 Do Nothing Scenario

In the absence of the proposed development being constructed, the noise environment at the nearest noise sensitive locations and within the development site will remain largely unchanged resulting in a neutral and local impact in the long-term.

4.9.2.2 Construction Phase

During the construction phase of the Proposed Project development there will be some short-term effect on nearby noise sensitive locations due to noise emissions from site traffic and other construction activities. However, given the distances between the main construction works and nearby noise sensitive locations, and the fact that the construction of the various infrastructure elements are temporary to short term in nature, the combination of the various noise sources will not be excessively intrusive at any single noise-sensitive location. Furthermore, the application of binding noise limits and hours of operation, along with implementation of appropriate noise and vibration control measures, will ensure that noise and vibration effects are kept within the guidance limits.

The likely effects at the nearest sensitive locations. associated with construction noise and vibration are negative, not significant and short term

4.9.2.3 Operational Phase

4.9.2.3.1 Wind Turbines

The results of the background noise survey have been used to derived appropriate noise criteria for the development in line with the guidance contained in 'Wind Energy Development Guidelines for Planning Authorities 2006.

Based on detailed information on the site layout, the turbine noise emissions and turbine hub height for the proposed development, a series of turbine noise prediction models were prepared. The predicted turbine noise levels have been calculated in accordance with the IOA GPG recommendations. The assessment has confirmed that the residual turbine noise levels associated with the Proposed Project will be within the best practice noise criteria curves recommended in Irish

guidance document 'Wind Energy Development Guidelines for Planning Authorities 2006. Therefore, it is not considered that a significant effect is associated with the Proposed Project.

4.9.2.3.2 Substation and BESS operation

Similarly, a noise prediction models was prepared for the substation and BESS compound. The predicted noise levels have been calculated in accordance with International Organization for Standardization (ISO) *ISO 9613-2:2024 Acoustics – Attenuation of sound during propagation outdoors - Part 2: General method of calculation* (ISO, 2024). The predicted noise levels are below the adopted criterion in all cases, as such the substation and BESS are unlikely to result in any adverse impacts at nearby NSLs.

4.9.2.3.3 Operational Phase Traffic Movements

There is no significant traffic volume expected during the operational phase, therefore, there are no significant noise effects from vehicle movements to and from the site in the operational phase.

No significant vibration effects are associated with the operation of the Proposed Project.

In summary, the noise and vibration impact of the proposed development is not significant considering best practice guidance for wind turbine developments.

4.9.2.4 Decommissioning Phase

In relation to the decommissioning phase, similar overall noise levels as those calculated for the construction phase would be expected, as similar plant, machinery and equipment will be used.

In all instances, the total predicted decommissioning noise levels are anticipated to be below the appropriate Category A value (i.e. 65 dB $L_{Aeq,1hr}$) and therefore a significant effect is not predicted in relation to the nearest NSLs in terms of decommissioning noise.

4.9.3 Cumulative Impact

The nearest wind farms existing or proposed wind farms are more than 10 km from the proposed development. Based on this distance, there is no potential for a cumulative noise or vibration impact at the NSLs at the proposed Cloonanny wind farm.

4.9.4 Mitigation

4.9.4.1 Construction Phase

The construction phase noise assessment finds that there is no significant noise or vibration effect expected during the construction phase. While no specific noise or vibration mitigation measure are required, management of construction noise will make reference to BS5228 (BSI 2014), which offers detailed guidance on the control of noise and vibration from construction activities.

4.9.4.2 Operational Phase

The operational phase finds that there is no significant impact at any NSL expected from the operation of the proposed development. No mitigation measures are required.

4.9.4.3 Decommissioning Phase

The decommissioning will entail similar activities to the construction phase. The mitigation measures described for the construction phase will also be applied to the decommissioning phase in order to ensure noise levels remain within criteria.

4.9.5 Residual Impact Assessment

With respect to the EPA's criteria for description of effects, in terms of construction activities, the potential associated effects at the nearest NSLs associated with the various elements of the construction phase are described as negative, not significant and short term.

4.9.6 Monitoring

Commissioning noise surveys will be undertaken to ensure compliance with any noise conditions applied to the development. In the unlikely instance that an exceedance of these noise criteria is identified, the assessment guidance outlined in the IOA GPG and Supplementary Guidance Note 5: Post Completion Measurements (July 2014) should be followed, and relevant corrective actions will be taken.

4.10 Air Quality

The assessment of Air Quality is contained within Chapter 13 of Volume II. The air quality assessment has focussed on:

- Potential construction dust emissions and impacts to nearby sensitive receptors such as residential properties, schools, hospitals, etc.
- Potential vehicle emissions from traffic accessing the site for construction works and for operational phase maintenance activities.
- Potential beneficial, indirect air quality impacts from the generation of renewable electricity and the displacement of fossil fuel electricity and its associated air emissions.

4.10.1 Existing Environment

Baseline data and data available from similar environments indicates that levels of nitrogen dioxide (NO_2), particulate matter less than 10 microns (PM_{10}) and particulate matter less than 2.5 microns ($PM_{2.5}$) and are generally well below the National and European Union (EU) ambient air quality standards.

The assessment of baseline air quality in the region of the proposed development has shown that current levels of key pollutants are significantly lower than their limit values. Due to the size, nature and location of the proposed development, increased road traffic emissions resulting from construction and maintenance of the proposed development are expected to have a negligible impact on air quality.

4.10.2 Impact Assessment

4.10.2.1 Do Nothing Scenario

In the Do Nothing Scenario, the proposed development will not be constructed. No construction works associated with the proposed development will take place and emissions of fugitive dust and particulate matter and emissions from equipment and machinery will not occur. The Do Nothing Scenario associated with the operational phase of the proposed development is assessed within Section 12.7.2 of Chapter 12. In terms of the traffic assessment, the scenario was found to be ***long-term, localised, direct, imperceptible*** and ***negative***. In terms of the indirect impact to air quality as a result of renewable electricity generation and the potential offsetting of fossil fuel derived electricity, in the Do Nothing scenario this renewable electricity will not be generated and there is therefore, no indirect benefit to air quality as fossil fuel derived emissions will not be offset.

4.10.2.2 Demolition & Construction Phases

An assessment of the potential dust impacts as a result of the construction phase of the proposed development was carried out based on the UK Institute for Air Quality Management 2024 guidance document *'Guidance on the assessment of Dust from Demolition and Construction'*. This established the sensitivity of the area to impacts from construction dust in terms of dust soiling of property, human health and ecological effects. The surrounding area was assessed as being of medium sensitivity to dust soiling and of low sensitivity to dust-related human health effects.

The sensitivity of the area was combined with the dust emission magnitude for the site under four distinct categories: demolition, earthworks, construction and trackout (movement of vehicles) to determine the mitigation measures necessary to avoid significant dust impacts. It was determined that there is at most a medium risk of dust related impacts associated with the proposed development. In the absence of mitigation there is the potential for ***direct, short-term, negative,*** and ***slight*** impacts to air quality.

In addition, construction phase traffic emissions have the potential to impact air quality, particularly due to the increase in the number of HGVs accessing the site. Construction stage traffic did not meet the scoping criteria for a detailed modelling assessment outlined in Transport Infrastructure Ireland's 2022 guidance document *'Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106'* As a result a detailed air assessment of construction stage traffic emissions has been scoped out from any further assessment and the construction stage traffic emissions will have a ***direct, short-term, negative*** and ***imperceptible*** impact on air quality.

4.10.2.3 Operational Phase

Operational phase traffic has the potential to impact air quality due to vehicle exhaust emissions as a result of the increased number of vehicles accessing the site. The change in traffic associated with the operational phase of the proposed development met the PE-ENV-01106 criteria requiring a detailed air dispersion modelling assessment. Therefore, it can be determined that during the operational phase, the proposed development will have a ***direct, long-term, localised, imperceptible, negative*** and ***not significant*** impact on air quality.

4.10.2.4 Decommissioning Phase

The decommissioning phase will involve the removal of the turbines and associated infrastructure from the site. Vehicles and generators associated with the removal of the turbines have the potential to cause a temporary negative impact on local air quality in the short term. However, due to the short-term nature of any associated works and low background pollutant concentrations in the vicinity of the site it is predicted to have a ***short-term, direct, negative*** and ***imperceptible*** effect on local air quality once mitigation measures as per the construction phase mitigation are applied.

4.10.2.5 Cumulative Impact

There is the potential for cumulative impacts to air quality should the construction phase of the proposed development coincide with that of other developments within 500m of the site. A review of proposed/permitted developments in the vicinity of the site was undertaken and relevant developments with the potential for cumulative impacts were identified.

There is at most a medium risk of dust impacts associated with the proposed development. The dust mitigation measures outlined in Section 12.8 of Chapter 12 will be applied during the construction phase which will avoid significant cumulative impacts on air quality. With appropriate mitigation measures in place, the predicted cumulative impacts on air quality associated with the construction phase of the proposed development and the permitted cumulative developments are deemed ***direct, short-term, localised, negative*** and ***not significant.***

The direct impacts of the operational phase on air quality associated with the proposed development are predicted to be imperceptible. Cumulative impacts are considered ***direct, long-term, negative*** and ***not significant.***

Overall, no significant impacts to air quality are predicted during the construction or operational phases of the proposed development.

4.10.3 Mitigation

4.10.3.1 Incorporated Design

There is no incorporated design mitigation required for the development

4.10.3.2 Demolition & Construction Phases

Detailed dust mitigation measures are outlined within Section 12.8 of Chapter 12 and also included in the Construction Environmental Management Plan to ensure that no significant nuisance as a result of construction dust emissions from demolition, earthworks, construction and trackout (movement of vehicles) occurs at nearby sensitive receptors. Once these best practice mitigation measures, derived from the Institute for Air Quality Management 2024 guidance '*Guidance on the Assessment of Dust from Demolition and Construction*' as well as other relevant dust management guidance, are implemented the impacts to air quality during the construction of the proposed development are considered ***direct, short-term, localised, negative*** and ***not significant***, posing no nuisance at nearby sensitive receptors (such as local residences).

4.10.3.3 Operational Phase

As the predicted concentrations of pollutants will be imperceptible no mitigation is required. The impact to air quality has been assessed as ***direct, long-term, localised, negative*** and ***not significant.***

4.10.3.4 Decommissioning Phase

Mitigation measures as per the construction phase mitigation will be applied.

4.10.4 Residual Impact Assessment

When the dust mitigation measures detailed in the mitigation section (Section 12.8) are implemented, the residual effect of fugitive emissions of dust and particulate matter from the site will be ***short-term, direct, localised, negative*** and ***not significant*** in nature and will pose no nuisance at nearby receptors.

There are no predicted direct impacts to air quality during the operational phase of the proposed development. Emissions from infrequent maintenance vehicles have been assessed as having a ***long-term, direct, localised, negative*** and ***imperceptible*** effect on air quality.

There will be indirect beneficial impacts to air quality from the generation of renewable electricity from the proposed development. There will be NO_X emission savings which may otherwise have been generated from fossil fuels. The generation of 35 GWh of renewable electricity will result in a decrease in annual NO_X emission levels by 0.03% of the 2030 National Air Emissions Target of 40.6kt. This is an ***indirect, long-term, slight*** and ***positive*** effect on air quality.

4.10.5 Monitoring

Monitoring of the dust mitigation measures will be required as set out in Section 12.13 of Chapter 12 and the Construction Environmental Management Plan. The monitoring requirements will ensure that the dust mitigation measures are working satisfactorily.

4.11 Climate

The assessment of Climate is contained within Chapter 14 of Volume II. The climate assessment has focussed on:

- The potential greenhouse gas emissions during the construction and operational phases of the development.
- The offsetting of GHG emissions through renewable electricity generation, which will contribute to reducing Ireland's reliance on fossil fuels.
- The vulnerability of the project to climate change, including considerations for increased rainfall and other projected climate impacts.
- The design measures to enhance the project's resilience to future climate risks, such as incorporating drainage systems for increased rainfall.
- The long-term benefits of the development in helping Ireland achieve its Climate Action Plan targets and the National Climate Objective of Net Zero by 2050.

4.11.1 Existing Environment

The existing climate baseline can be determined by reference to data from the EPA on Ireland's total greenhouse gas (GHG) emissions and compliance with European Union's Effort Sharing Decision *"EU 2020 Strategy"* (Decision 406/2009/EC). The EPA state that Ireland had total GHG emissions of 60.6 Mt CO_2e (Mega tonnes carbon dioxide equivalent) in 2023. This is 2.27 Mt CO_2e higher than Ireland's annual target for emissions in 2023. EPA projections indicate that Ireland has used 63.9% of the 295 Mt CO_2e Carbon Budget for the five-year period 2021-2025. Further reduction measures are required in order to stay within the budget requirements.

4.11.2 Impact Assessment

The potential impacts on climate have been assessed in two distinct ways; a greenhouse gas assessment (GHGA) and a climate change risk assessment (CCRA). The GHGA quantifies the GHG emissions from a project over its lifetime and compares these emissions to relevant carbon budgets, targets and policy to contextualise magnitude. The CCRA considers a projects vulnerability to climate change and identifies adaptation measures to increase project resilience.

The impact of the construction, operation and decommissioning of the proposed development on Ireland's total national greenhouse gas emission is compared to Ireland's 2023 total greenhouse gas emissions, the relevant sectoral emissions ceilings and 2030 carbon budgets. Any adverse impacts are predicted to occur during the construction phase, with the dominant sources of greenhouse gas emissions as a result of the development due to the construction traffic and embodied energy associated with the turbine construction.

The generation of renewable electricity for export to the national grid during the operational phase will lead to a net saving for the development in terms of greenhouse gas emissions. The production of wind power for export to the national grid means that the proposed impacts from the proposed development in terms of GHGs have a net positive annual impact and will contribute to Ireland achieving the Climate Action Plan (CAP24) commitments and the 2030 carbon budgets as well as the long term National commitment of achieving Net Zero by 2050.

4.11.2.1 Do Nothing Scenario

The Do Nothing assessment assumes that the proposed project is not built. In this scenario the climate emissions will remain as per the current baseline in the short-term.

In this scenario, the additional renewable energy capacity associated with the proposed project is not generated during the operational phase. Such renewable energy is required to ensure targets set out in CAP24 are met. Such targets include up to 80% of the national grid being generated from renewable sources including 9 GW onshore wind by 2030. In addition, CAP24 aims to phase out and end the use of coal and peat in electricity generation by 2030. The Do Nothing Scenario is not in line with such plans. Reducing the use of coal and peat in energy generation and a reliance on renewable energy will also have a beneficial effect on air quality. Therefore, the Do Nothing Scenario is a lost opportunity for a beneficial effect on climate in the long term.

4.11.2.2 Construction Phase

The GHG emissions associated with the construction of the proposed development were calculated using the online Transport Infrastructure Ireland Carbon Assessment Tool and by reviewing the wind turbine life cycle assessments. GHG emissions associated with the proposed development are predicted to be a small fraction of Ireland's Industry and Transport sector 2030 emissions ceilings of 4 Mt CO_2e and 6 Mt CO_2e, respectively. The proposed development will incorporate some mitigation measures which will aim to reduce climate impacts during construction and once the development is operational.

4.11.2.3 Operational Phase

GHG emissions during the operational phase due to increases in road traffic as a result of maintenance vehicles accessing the site were assessed. The changes in traffic volumes associated with the operational phase of the development were not substantial enough the meet the assessment criteria requiring a detailed climate modelling assessment, as per Transport Infrastructure Ireland (TII) 2022 guidance "*PE-ENV-01104: Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document".* Increases in traffic derived levels of CO_2e have been scoped out of a detailed assessment and are predicted to be imperceptible.

Once operational, the proposed development will generate 35 GWh of renewable electricity for export to the national grid. This renewable electricity generation will offset the greenhouse gas (GHG) emissions from the construction phase, making the development a net positive contributor in terms of GHG emissions. Additionally, it will support Ireland in meeting its Climate Action Plan 2024 (CAP24) targets. The proposed wind farm will also contribute to achieving the National Climate Objective of Net Zero by 2050, while aiding the phased elimination of coal and peat in electricity generation by 2030.

Impacts to climate are deemed ***direct, long-term, positive*** and ***slight,*** which is considered ***not significant*** with regard to the construction and operational phase.

4.11.2.4 Decommissioning Phase

Vehicles related to the decommissioning phase will give rise to CO_2 emissions. It is not predicted that this development will involve the use of a significant number of vehicles during the decommissioning

phase. Therefore, emissions from vehicular traffic are predicted to be imperceptible during the decommissioning phase.

The effect on climate due to decommissioning will be ***direct, temporary, negative*** and ***imperceptible*** if recycling of components is carried out where possible.

4.11.2.5 Climate Change Risk Assessment

A CCRA was conducted to consider the vulnerability of the proposed development to climate change, as per the TII 2022 PE-ENV-01104 guidance. This involves an analysis of the sensitivity and exposure of the development to future climate hazards which together provide a measure of vulnerability. The hazards assessed included flooding (coastal, pluvial, fluvial); extreme heat; extreme cold; drought; extreme wind; lightning, hail, fog, wildfire and landslides. The proposed development is predicted to have at most low vulnerabilities to the various climate hazards and therefore climate change risk is considered ***direct, long-term, negative*** and ***imperceptible***, which is considered overall ***not significant*** with regard to the construction and operational phase.

Overall, no significant impacts to climate are predicted during the construction or operational phases of the proposed development.

4.11.2.6 Cumulative Impact

With respect to the requirement for a cumulative assessment PE-ENV-01104 states that *"for GHG Assessment is the global climate and impacts on the receptor from a project are not geographically constrained, the normal approach for cumulative assessment in EIA is not considered applicable".*

However, by presenting the GHG impact of a project in the context of its alignment to Ireland's trajectory of net zero and any sectoral carbon budgets, this assessment will demonstrate the potential for the project to affect Ireland's ability to meet its national carbon reduction target. Therefore, the assessment approach is considered to be inherently cumulative.

The cumulative impact of all wind farms across Ireland will significantly contribute to meeting the CAP24 targets. The proposed wind farm development will also play a key role in helping Ireland achieve the National Climate Objective of Net Zero by 2050, and assist in phasing out the use of coal and peat in electricity generation by 2030.

The cumulative impact of the proposed development in relation to GHG emissions is considered ***direct, long-term, beneficial*** and ***slight*****,** which is overall ***not significant*** in EIA terms.

4.11.3 Mitigation

4.11.3.1 Incorporated Design

A number of mitigation measures have been incorporated into the design of the proposed development. This includes installing a Battery Management System and Thermal management systems. In addition, there will be two heating, ventilation and air conditioning units servicing each BESS container within the energy storage compound. Further fire mitigation measures are detailed in the Fire Risk Assessment.

The BESS and substation will be elevated by 30cm from ground level and the turbine foundation and platform will be raised above the predicted flood levels. The battery energy storage system and substation compound can be elevated on platforms or berms designed to withstand extreme weather events, with additional protective bunding to prevent water ingress.

4.11.3.2 Construction Phase

A number of best practice mitigation measures are proposed for the construction phase of the proposed development to ensure that impacts to climate are minimised. These mitigation measures include a demolition and construction program, determine material reuse and waste recycling opportunities (in compliance with the EU Taxonomy Regulation 2020/852) and identifying and implementing lower carbon material choices and quantities during detailed design.

4.11.3.3 Operational Phase

During the operational phase, emissions will be minimal. The primary focus will be on renewable electricity generation, which will contribute significantly to reducing Ireland's reliance on fossil fuels. To address future climate change risks, the design includes mitigation measures such as adequate drainage systems to manage a 20% increase in rainfall, consistent with the 'Medium Risk' RCP4.5 scenario (2021-2050).

4.11.3.4 Decommissioning Phase

Mitigation measures as per the construction phase mitigation will be applied.

4.11.4 Residual Impact Assessment

The impact to climate as a result of a proposed development must be assessed as a whole for all phases. The proposed development will result in some impacts to climate through the release of GHGs. TII state that the crux of assessing significance is *"not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050"*. The proposed development has been designed to maximize its contribution to renewable electricity generation, significantly reducing climate impacts during operation. By producing clean energy, the development will directly support Ireland's transition to a low-carbon economy and help mitigate climate change. The proposed development has incorporated some minimal measures to reduce climate change impacts. Once mitigation measures are put in place, the effect of the proposed development in relation to GHG emissions is considered ***direct, long-term, negative*** and ***slight,*** which is overall ***not significant*** in EIA terms.

In relation to climate change vulnerability, it has been assessed that there are no significant risks to the proposed development as a result of climate change. The residual effect of climate change on the proposed development is considered ***direct, long-term, negative*** and ***imperceptible***, which is overall ***not significant*** in EIA terms.

4.11.5 Monitoring

The construction phase will include the monitoring of waste management and material use to ensure they are minimized and handled responsibly. Efforts will be made to source materials locally where possible, reducing the carbon footprint and supporting local suppliers. Regular audits and tracking will help ensure compliance with best practices in sustainability and resource efficiency throughout the project.

During the operational phase each turbine will 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. Weather conditions will also be continuously monitored during the construction phase to anticipate potential adverse events, allowing the team to take precautionary measures, such as pausing work during extreme weather to ensure safety and protect equipment.

4.12 Cultural Heritage – Archaeology & Built Heritage

The assessment of Cultural Heritage – Archaeology & Built Heritage is contained within Chapter 15 of Volume II.

4.12.1 Existing Environment

The evaluation of impacts upon the archaeological, architectural, and cultural heritage resources is based on a desktop study of published and unpublished documentary and cartographic sources, followed by a field survey and test excavation. This assessment has been produced in accordance with national and local legislation and policy, as well as best practice guidance.

In order to capture sufficient baseline data to robustly assess direct and indirect impacts to cultural heritage assets, the spatial scope of the assessment comprises all the land within the site, together with a 2.5km zone around the Proposed Development site and a 10km zone for UNESCO world heritage sites. Longford Town is 3.3km to the south of the Proposed Development and has been included due to its historic importance. This extent of this zone is considered to be appropriate, given the nature of the Proposed Development.

The Cultural Heritage Assessment also reviewed the potential direct impacts of the Turbine Delivery Route on cultural assets as part of the Preliminary Traffic Management Plan (PTMP). This route extends from the Port of Waterford, County Kilkenny to the subject site along the motorway, national, regional and local road network with temporary widening of the L50462 and L5046 public roads required and a crossing at Carriglass bridge (NIAH 13400912).

The Cultural Heritage Assessment also reviewed the potential direct impacts of the potential Grid Connection routes (GCR) on cultural assets. Three options have been considered as part of the grid connection works.

The desk-based assessment was conducted to ascertain all historical and archaeological information relevant to the Subject Site and the local area. All types of heritage assets were identified within the Area of Study around the Proposed Development, while additional baseline information was also obtained through a comprehensive program of archaeological testing.

4.12.2 Impact Assessment and Mitigation

The proposed turbine development will not directly impact any known cultural assets within the footprint of the main development area. Archaeological testing found no evidence of previously unknown sub-surface archaeological remains. Archaeological monitoring of associated groundworks will ensure that no potential sub-surface archaeological remains are directly impacted by the proposed works. Should archaeological material be identified, the Project Archaeologist will liaise with the National Monuments Service to agree suitable mitigation measures.

The proposed Turbine Delivery Route will involve the demolition of one vernacular outbuilding of limited local historical interest only. A photographic survey and associated monitoring of groundworks will ensure that this structure is preserved by record. It is further proposed that the historic bridge (NIAH13400912) is subject to a structural survey to ensure its suitability in relation to heavy loads.

Three options have been considered in relation to the Grid Connection Route. The mitigation measures include archaeological monitoring in relation to directional drilling at the location of two bridges (NIAH 13400816 & 13303020), the site of the ford (RMP LF008-043) and along the Ballinalee Road to the sub-station. The bridges will not be directly impacted by the proposed works and the site of the ford is not currently known.

Archaeological monitoring may identify the location of this fording point. Should archaeological material be found associated with the fording site, the Project Archaeologist will liaise with the National Monuments Service to agree suitable mitigation measures.

The Indirect impacts of the proposed development are primarily concerned with the Operational Phase. The visual impact on RMP sites is considered Negligible-Low as the partial remains of a ringfort is located 610m from the turbines and the partial remains of an enclosure is located at 730m. The remaining RMP sites are over 1.25km from the turbines.

The indirect visual impact on Longford Historic Town and the ACA is also considered Negligible-Low based on the associated distances at 3.3km and 2.35km respectively and partial visibility due to the urban setting and multiple intervening mature hedgerows. The indirect visual impact on Carrickglass Demesne concluded that both turbines and met mast will be visible over the hub between and above the established trees and historic (in disrepair) walled garden of Carrickglass Demesne. The principal country house is located at a distance of 1.4km from the turbines with open pasture and a layered foreground separating the development from the more sensitive surroundings resulting in a moderate impact.

4.12.3 Residual Impact Assessment

4.12.3.1.1 Demolition Phase

No direct or indirect residual impacts on cultural heritage assets are expected.

4.12.3.1.2 Construction Phase

Following the completion of archaeological monitoring of groundworks and any associated mitigation measures should previously unknown archaeological remains be uncovered, no further direct or indirect residual impacts are expected.

4.12.3.1.3 Operational Phase

The negligible to moderate indirect visual impact on cultural assets identified in this study will remain as a residual impact during the Operational Phase.

4.12.3.1.4 Decommissioning Phase

The updated Archaeological Impact Assessment prepared prior to the decommissioning phase will outline any potential changes to the legislative environment and associated baseline data. The future potential direct or indirect residual impacts on cultural heritage assets cannot be determined at this stage.

4.12.4 Monitoring

Archaeological monitoring is carried out under licence from the National Monuments Service. Archaeological monitoring is the recommended mitigation strategy for the following:

1 Turbine Delivery Route: Monitoring of the demolition of vernacular outbuilding located at the junction of L1011 and L5046.
2 Main Turbine Development Area: Monitoring of all groundworks within the footprint of the main development area.
3 Grid Connection Route Option 1: Monitoring of all groundworks at RMP LF008-043 (Site of Ford) of which no visible trace survives, and the exact location is not known.
4 Grid Connection Route Option 3: Monitoring of all groundworks from Ballinalee Road to Sub-station. Proposed route is adjacent to the Zone of Notification associated with RMP LF013-016001 (Medieval Church) and RMP LF013-016002 (Graveyard).

4.13 Description of Significant Interactions

Likely significant interactions are set out in Chapter 16 of the EIAR. In practice many impacts have slight or subtle interactions with other disciplines. During the preparation of this EIAR each of the specialist consultants engaged with each other with respect to the likely interactions between effects predicted as a result of the proposed development. Mitigation measures to alleviate identified likely significant effects address identified interactions. This approach meets with the requirements of Part X of the Planning and Development Act 2000, as amended, and Part 10, and schedules 5, 6 and 7 of the Planning and Development Regulations 2001, as amended.

5 Summary of Mitigation & Monitoring Measures

A key objective of the Environmental Impact Assessment process is to identify likely significant environmental impacts at the pre-consent stage and where necessary to propose measures to mitigate or ameliorate such impacts. Monitoring Measures must be incorporated in the Development Consent for a Project if the Project is likely to have significant adverse effects Article 8a of the EIA Directive, requires that monitoring measures proposed (if appropriate) should be included in the EIA Report.

This section summarises the proposed mitigation and monitoring measures set out in Chapters 4 to 15 of Volume II of this EIAR.

It is proposed that the appointed contractor will develop a site-specific Construction and Environmental Management Plan (CEMP) prior to works commencing on-site. All the mitigation and monitoring measures proposed within the individual specialists' assessments will be incorporated into the plan.

Table 4 Incorporated Design Mitigation

Aspect	Table 4 - Incorporated Design Mitigation
Population & Human Health (Ch. 4)	▪ The layout of the Proposed Development has been designed to maximise the distance of any sensitive receptors from the proposed turbines and no dwelling is located within 800m of the proposed turbines. Based on initial feedback from local residents, the layout has also been reduced form initially 4 proposed turbines, to now 2 proposed turbines. ▪ To ensure the risk to maintenance staff, landowners and site visitors remains negligible throughout the operational life of the Wind Farm, access to the turbines is restricted through a door at the base of the structure, which will be locked at all times outside maintenance visits. Furthermore, fencing will be erected in areas of the site where uncontrolled access is not permitted, and appropriate health and safety signage will also be erected at relevant locations around the site. ▪ As a precaution the turbines will also be fitted with a shadow shutoff system to allow controlling of the turbines and prevent the occurrence of shadow flicker at sensitive receptors surrounding the Wind Farm. This is a function that is integrated into the control system of the wind energy converter. The shutdown times and parameters are determined and programmed into the wind energy converter control system. Shadow shutdown is activated as soon as the shutdown intensity falls below the set values. ▪ The developer will implement a community benefit fund for the Proposed Development which can be used by the local community to invest in and support the wider economic, recreational, environmental, social and cultural amenities and initiatives in the locality of the proposed development.
Landscape & Visual (Ch. 5)	▪ Reduction of layout to two turbines
Material Assets: Traffic & Transport (Ch. 6)	▪ A section of access road to the west of the existing L5046/L50462 junction will be constructed to accommodate both daily construction traffic to and from the wind farm site with improved exit sightlines and a fully constructed road specification with drainage measures, adequate to accommodate the expected loads and traffic volumes expected across the construction period.

Aspect	Table 4 - Incorporated Design Mitigation
	▪ The existing alignment of the L54062 from the L5046 junction will be retained as a non-trafficked route to accommodate pedestrian and cyclist activity using the L50462 as an access/leisure route. ▪ The delivery haul route (via the N4 to the wind farm site) was selected with regard to the largest wind turbine components that will be delivered as abnormal load transport, and swept path assessments to determine the most appropriate measures requiring minimal interventions and temporary works along the selected route (via the R194, L1011 and L5046. ▪ Where temporary construction and haul delivery junction exit sightlines for the design speed/posted speed limit of the existing road cannot be incorporated, it is proposed to implement temporary traffic management (TTM) measures as set out in the PTMP, which will be subject to detailed agreement with LCC as part of the Road Opening Licences that will have to be in place before works can commence. ▪ Road surfaces on the public road will be reinstated as temporary works are completed, and temporary 'stone' areas for abnormal load delivery swept paths will be barriered off to prevent access by non-construction road users. At interfaces between temporary works and public road areas, the Contractor will monitor and clean the road to ensure construction materials, spoil or stone from the temporary areas is not deposited onto the public road. ▪ Construction staff parking will be accommodated within the compound at the wind farm site, and staff will not park their personal vehicles on the public road or at temporary works sites Staff working at temporary works sites will be transported to the work sites from the wind farm compound using a contractor van/flatbed truck (which will be accommodated within the controlled temporary works area so it is not parked on the public road).
Material Assets: Built Services (Ch. 7)	**Electrical Infrastructure & Supply** ▪ Turbine Delivery Route: As far as practicable the turbine delivery route has been designed to avoid existing overground electrical infrastructure cables, reducing the potential for conflict. ▪ Grid Route Design: As far as practicable the underground Grid Connection route will be designed to avoid existing underground electrical infrastructure cables, reducing the potential for conflict. ▪ Design Standards: The development will be designed to relevant codes of practice and standards for each part of infrastructure which is to be installed/ constructed. **Telecommunications** ▪ Wind Turbine Layout: The turbine locations have been selected to avoid impacting on telecommunication infrastructure, however, prior to construction, the location of the wind turbines will be further reviewed to ensure they do not interfere with point-to-point transmission services. ▪ Turbine Delivery Route: As far as practicable the turbine delivery route has been designed to avoid existing overground Telecommunication infrastructure cables, reducing the potential for conflict. ▪ Grid Route Design: As far as practicable the underground Grid Connection route will be designed to avoid existing underground Telecommunication infrastructure cables, reducing the potential for conflict.

Aspect	Table 4 - Incorporated Design Mitigation
	Aviation ▪ An aeronautical lighting scheme for the Development will be agreed with the IAA and will be installed on the turbines; **Gas** ▪ Review and confirmation of absence of gas infrastructure: Prior to construction, the Gas Networks Ireland DBYD maps will be revisited to verify that no new gas pipelines or services have been installed since the initial assessment. **Water and Wastewater Infrastructure** ▪ Grid Route Design: As far as practicable the underground Grid Connection route will be designed to avoid existing underground water and wastewater infrastructure, reducing the potential for conflict. **Waste Management** ▪ See Construction Stage Mitigation Measures
Land & Soils (Ch. 8)	▪ Iterative layout design to ensure that positioning of turbines, access roads, material storage areas and other site infrastructure on agricultural lands and minor forestry, where the soils are extensively worked and drained, so as to be remote from residential and sensitive commercial properties. ▪ Infrastructure has been positioned within areas where organic soils are absent and slope gradients are low and has been moved away from designated watercourses and other sensitive features. ▪ Extensive preliminary peat assessment has been employed to screen for the presence of peat or other organic soil deposits across the Proposed Development. ▪ Undertaking of preliminary site investigations, including excavation of trial pits and undertaking of geophysical surveys, to establish overburden and bedrock characteristics at the main structures and optimise Project design. ▪ Relocation and micro-siting of turbines, hardstandings, access roads and other infrastructure based on the site assessments and geotechnical assessments in order to reduce ground risk associated with the proposed project. ▪ All construction works will be designed and checked by geotechnical engineers, who are suitably qualified and experienced in wind farm construction, earthworks design and construction methodologies.
Water & Hydrology (Ch. 9)	▪ Surface Water Management to include erosion control measures such as interceptor drains and temporary settlement tanks. ▪ Groundwater Management to include buffer zones, with Vegetative cover within these zones to help absorb runoff, filter sediments, and reduce the flow of potentially polluted water. ▪ Flood protection measures to include berm around Turbin base of T2 to divert stormwater away and prevent water from inundating the worksite. Also, temporary drainage systems to effectively manage stormwater runoff, especially in flood-prone areas.
Biodiversity (Ch. 10) **Ornithology** (Ch 11)	▪ **Mitigation-by-Design Approach:** The Proposed Development was designed to avoid, reduce, and minimise effects on Key Ecological Receptors (KERs) following established guidance. ▪ **Iterative Design Process:** Ongoing consultations among the developer, Project Manager, Engineers, Ecologists, and Ornithologists optimised the wind farm layout.

Aspect	Table 4 - Incorporated Design Mitigation
	▪ **Avoidance of Sensitive Areas:** Construction activities and infrastructure placement have been planned to avoid ecologically sensitive locations, priorities the use of low sensitivity areas and minimise habitat loss for all ecological receptors.
Noise & Vibration (Ch. 12)	▪ N/A
Air Quality (Ch. 13)	▪ There is no incorporated design mitigation required for the development.
Climate (Ch. 14)	▪ A Battery Management System (BMS) will be installed which will detect problems using cell and module voltage measurements and select temperature measurements within the batteries. Automatic disconnect of the batteries will occur if any unusual parameters are measured. Thermal management systems will be installed to ensure all electrical installations are operating at their optimal temperature and will automatically reduce power input if safe temperature ranges are exceeded. In addition, there will be two heating, ventilation and air conditioning units servicing each BESS container within the energy storage compound. Further fire mitigation measures are detailed in the Fire Risk Assessment. ▪ The BESS and substation will be elevated by 30cm from ground level. For the turbine, raising the foundation and platform to ensure it is well above the predicted flood levels, as already planned for turbine no. 2, will prevent floodwaters from reaching critical components. The battery energy storage system and substation compound can be elevated on platforms or berms designed to withstand extreme weather events, with additional protective bunding to prevent water ingress. Both foundations will be raised and generally all technical equipment will be at elevated hights inside the turbine tower.
Cultural Heritage: (Ch. 15)	A structural survey should be carried out at the location of the bridge (NIAH 13400912) along the proposed Turbine Delivery Route to ensure that the structure will not be directly and adversely impacted by the heavy loads associated with the delivery of turbine components. ▪ The vernacular outbuilding scheduled for demolition as part the demolition phase is of local historic interest. The mitigation measures include a photographic survey of the structure and archaeological monitoring of the demolition and associated groundworks to ensure preservation by record.

Table 5 Construction Phase Mitigation Measures

Aspect	Table 5 - Construction Phase Mitigation Measures
Population & Human Health (Ch. 4)	▪ Construction and Environmental Management Plan (CEMP): The appointed contractor(s) will update the Outline CEMP submitted with the application and submit to Longford County Council prior to the commencement of development. ▪ The CEMP will comply with all appropriate legal and best practice guidance for construction sites. ▪ The purpose of a CEMP is to provide a mechanism for the implementation of the various mitigation measures which are described in this EIAR and to incorporate relevant conditions attached to a grant of permission. The CEMP requires that these measures will be checked, maintained to ensure adequate environmental protection. The CEMP also requires that records will be kept and

Aspect	Table 5 - Construction Phase Mitigation Measures
	reviewed as required to by the project team and that the records will be available on site for review by the planning authority. ▪ All construction personnel will be required to understand and implement the requirements of the Contractor's CEMP and shall be required to comply with all legal requirements and best practice guidance for construction sites. ▪ All mitigation and monitoring measures included in the Summary of Mitigation and Monitoring Measures in Chapter 17 of this EIAR will be included in the CEMP and adhered to. ▪ Community Liaison Officer: The contractor will appoint a community liaison officer to ensure that any issues from the local community are dealt with promptly and efficiently during construction. These details will be included in the contractor's CEMP. ▪ Construction Working Hours will generally be limited to the hours 0700 – 1900 Monday to Friday and 0700 – 1400 hours on Saturday. To ensure that optimal use is made of good weather periods or at critical periods within the programme it may be necessary on occasion to work outside of these hours. Any such out of hours working will be agreed in advance with Longford County Council. ▪ Project supervisors for the construction phase (PSCS) will be appointed in accordance with the Health, Safety and Welfare at Work (Construction Regulations) 2013, and a Health and Safety Plan will be formulated during the detailed design stage which will address health and safety issues from the design stages, through to the completion of the construction phase. ▪ The Waste Management Plan (WMP) will be updated, implemented and maintained by the Contractor.
Landscape & Visual (Ch. 5)	▪ There are no specific landscape and visual construction stage mitigation measures
Material Assets: **Traffic & Transport** (Ch. 6)	▪ The Preliminary Traffic Management Plan incorporates traffic management measures for the construction stage which will be applied for the construction phase and will be further developed and agreed with the planning authority in advance of any works being undertaken. ▪ The hours of construction activity will be limited to avoid unsociable hours, where possible. Construction operations shall generally be restricted to between 07:00hrs and 19:00hrs on weekdays and between 07:00hrs and 14:00hrs on Saturdays. However, to ensure that optimal use is made of good weather periods or at critical periods within the programme (i.e., concrete pours or to accommodate delivery of large turbine components along public routes), it may be necessary on occasion to work outside of these hours. Any such out of hours working will be agreed in advance with Longford Co. Co. ▪ Adequate advance public information including advertising and promotion of any temporary works closures or diversions though social media, print media and websites (TII, AA Roadwatch, and Local Authorities) and adequate VMS (variable message signage) on approach routes to the site area and temporary accommodation works areas, and also for the turbine delivery activity will be key to minimising disruption to travel which can lead to queuing and increased vehicle emissions. ▪ Where practical, construction staff will be encouraged to vehicle share car pool travelling to and from work sites. ▪ It is intended that the topsoil and subsoil excavated at the windfarm and temporary accommodation works sites will be stored for reuse in reinstatement

Aspect	Table 5 - Construction Phase Mitigation Measures
	and landscaping works, to reduce the volume of waste and other materials transported off-site by road. Where materials such as construction related waste materials cannot be recycled and reused on site, these will be removed from site by backloading of delivery haulage vehicles where practical to avoid additional HGV trips. ▪ A detailed CTMP for the construction phase will be agreed with LCC in advance of construction commencing. As set out in the PTMP prepared or the planning application, this will include: ▪ Appointment of a Traffic Management Coordinator ▪ Engagement/Liaison with locals ▪ Pre-condition survey ▪ Road opening licence for any temporary or permanent works on or adjacent to the public roads (and for Grid connection works) ▪ Adherence to the CTMP and any Temporary Traffic Management (TTM) measures in place at worksites (including management of construction related vehicles to ensure there is no inappropriate parking or loading/unloading on public roads), and strictly following agreed haulage delivery routes, which will be monitored by the Project Management Team throughout the construction period. ▪ Reinstatement of the temporary accommodation works areas (where widening or bend overswing areas are required to assist the turbine delivery areas) after these delivery activities are complete will return the road network to the 'Do Nothing' current condition.
Material Assets: Built Services (Ch. 7)	**Electrical Infrastructure & Supply** ▪ Utility Provider Coordination: The developer will liaise with utility providers to ensure all services are identified, and safe practices are employed during excavation near underground services; ▪ Utility Provider Guidelines: Compliance with all relevant service provider guidelines, including safe working procedures near live electrical infrastructure, will be enforced; ▪ Confirmatory Survey: Prior to construction, a confirmatory survey of all existing services will be conducted to verify and identify the precise location of underground and overhead services; ▪ Hand Digging: Excavation around identified services will be carried out by hand where necessary to minimize the risk of accidental damage; ▪ **Backup Services for Relocated Poles**: Backup services, such as mobile units, may be arranged if telecommunications poles are temporarily relocated, minimizing disruption to the local network; ▪ **Post-construction Testing and Validation**: After construction, a full survey will confirm that no services have been disrupted. If disruptions are found, the developer will work with utility providers to restore functionality before operations begin. **Telecommunications** ▪ Telecommunications Provider Coordination: The developer will liaise with utility providers to ensure all services are identified, and safe practices are employed during excavation near underground services; ▪ Telecommunications Provider Guidelines: Compliance with all relevant service provider guidelines, including safe working procedures near live telecommunications infrastructure, will be enforced;

Aspect	Table 5 - Construction Phase Mitigation Measures
	▪ Confirmatory Survey: Prior to construction, a confirmatory survey of all existing services will be conducted to verify assumptions and identify the precise location of underground and overhead services; ▪ Hand Digging: Excavation around identified services will be carried out by hand where necessary to minimize the risk of accidental damage; ▪ Real-time Monitoring of Signal Interference: During the construction and decommissioning phases, real-time monitoring equipment will detect any signal interference, enabling immediate corrective action if required; ▪ Backup Services for Relocated Poles: Backup services, such as mobile units, will be arranged, if required, if telecommunications poles are temporarily relocated, minimizing disruption to the local network; ▪ Post-construction Testing and Validation: After construction, a full survey will confirm that no services have been disrupted. If disruptions are found, the developer will work with utility providers to restore functionality before operations begin. **Aviation** ▪ As-constructed coordinates in WGS84 format together with ground and tip height elevations at each wind turbine location will be provided to the IAA; ▪ The IAA will be notified of intention to commence crane operations with at least 30 days prior notification of their erection. **Gas** ▪ Liaison with Gas Networks Ireland (GNI): Although no gas infrastructure is currently identified, GNI will be consulted to ensure that no unforeseen services are present or planned, ensuring full compliance with any additional safety or procedural requirements. ▪ Compliance with safety guidelines: As a precaution, all construction activities will follow standard industry safety protocols for working in areas where there could be undetected services or utilities, similar to the approach taken for electrical and telecommunications infrastructure. **Water and Wastewater Infrastructure** ▪ Utility Provider Coordination: The developer will liaise with utility providers to ensure all services are identified, and safe practices are employed during excavation near underground services; ▪ Utility Provider Guidelines: Compliance with all relevant service provider guidelines, including safe working procedures near water and wastewater infrastructure, will be enforced; ▪ Confirmatory Survey: Prior to construction, a confirmatory survey of all existing services will be conducted to verify assumptions and identify the precise location of underground; ▪ Hand Digging: Excavation around identified services will be carried out by hand where necessary to minimize the risk of accidental damage; ▪ Post-construction Testing and Validation: After construction, a full survey will confirm that no services have been disrupted. If disruptions are found, the developer will work with utility providers to restore functionality before operations begin. ▪ Compliance with guidelines: All works will be in compliance with the relevant service provider's requirements or guidelines, including safety practices for working near underground services;

Aspect	Table 5 - Construction Phase Mitigation Measures
	▪ Availability of materials: Additional materials will be kept on-site to make any necessary temporary repairs in case of accidental damage to water or wastewater services. On-site contingency plans will ensure that in the event of accidental service damage, immediate temporary repairs can be made until permanent solutions are implemented by the service provider. **Waste Management** Waste Prevention During the detailed design, the appointed contractor will have responsibility for the development and management of waste handling procedures in accordance with waste legislation and the waste management hierarchy. Measures implemented to achieve these aims will include, but are not limited to, the following: ▪ Efficient Ordering: Materials will be ordered in precise quantities using a "just in time" approach. ▪ Handling Protocols: Special handling measures will be in place to prevent damage to materials. ▪ Supply Coordination: Coordinated delivery schedules will minimize excess and redundant deliveries. Waste Management Documentation and Compliance: The construction project will adhere to comprehensive documentation and compliance requirements to ensure all waste management activities are traceable and compliant with regulations: ▪ Compliance: Where waste is created, it will be managed in accordance with the waste hierarchy in Council Directive 2008/98/EC on waste and section 21A of the Waste Management Act 1996, as amended, as follows: (a)Prevention; (b)re-use; (c)Recycling; (d)Other recovery (including energy recovery); and (e) Disposal. ▪ Permit and License Verification: The contractor will keep a detailed file of Waste Collection Permits, Waste Facility Permits, Certificates of Registration, and Waste Licenses for all materials leaving the site. ▪ On-Site Record-Keeping: Receipts from waste disposal facilities will be maintained to verify that waste has been transferred to licensed facilities. Waste Storage and Containment: Temporary storage and containment of waste on-site will follow strict safety and environmental guidelines: ▪ Designated Storage Areas: Clearly marked and appropriately contained areas will be set up for temporary waste storage to prevent contamination and ensure safety. ▪ Containment Procedures: All waste containers will be sealed and regularly inspected to prevent spills, leaks, or exposure to weather elements. ▪ Inventory and Inspection: Regular inspections will be carried out to ensure that stored waste complies with site management policies and does not pose environmental or safety risks. Management of the Movement of Waste All movement of waste and the use of waste contractors will be undertaken in accordance with waste legislation including the following:

Aspect	Table 5 - Construction Phase Mitigation Measures
	▪ Waste Management Acts 1996 (as amended); ▪ Waste Management (Collection Permit) Regulations 2007 as amended; and ▪ Waste Management (Facility Permit and Registration) Regulations 2007 as amended. <u>Turbine Re-use:</u> ▪ At the end of their operational lifespan, turbines will be inspected and evaluated for functionality and safety standards. Where deemed suitable, turbines will be refurbished or maintained as necessary to meet second-hand market requirements.
Land & Soils (Ch. 8)	▪ A robust Construction Environmental Management Plan (CEMP) to be implemented ▪ The Proposed Development will be constructed in a phased manner in order to reduce the potential effects on the Soils and Geology. Phased construction reduces the amount of open, exposed excavations at any one time. ▪ Any excavation, piling and construction related works will be subject to a design risk assessment. Identified impacts will be minimised by the application of principles of avoidance, prevention and protection. ▪ Detailed method statements for each element of the works will be prepared by the Contractor ▪ Suitably qualified and experienced geotechnical personnel will be required on site to supervise the works. ▪ The Contractor will programme the works such that earthworks are not scheduled during severe weather conditions ▪ Spoil loaded onto sensitive topsoil, organic soils or sensitive mineral soils will be at a gradient of no more than an average of 5 degrees to the horizontal. Topsoils and organic soils will always be removed prior to such actions and retained for re-use as landscaping a material. ▪ Battering back the sides of an excavation to approx. 60 degrees in clay soils and 30 degrees in granular soils will be employed to reduce the potential for slippage. ▪ Action to be taken to ensure surface water flows does not compromise soils. ▪ Excavated spoil will not be deposited on the down slope or up slope edges of any excavation. This spoil will instead be deposited on the two flanks either side of the excavation (where gradient is least) and spread in such a way as to limit the surcharge pressure on sensitive soils. ▪ The hardstanding areas surrounding the turbine bases will be designed in a manner such that crane loadings can be transferred directly onto the competent strata underlying any sensitive mineral soils. To ensure effective sidewall support during these operations the contractor will adopt an approved engineering solution (such as sheet piling or other bracing method) to maintain sidewall stability at all times. ▪ Movement can often occur during or following severe rainstorm events, particularly when following a prolonged dry spell. Extra vigilance will be maintained at such times, during construction to ward against this potential effect. ▪ All slopes are to be regularly checked for development of tension cracks indicative of slope movement.

Aspect	Table 5 - Construction Phase Mitigation Measures
	▪ Method statements will be followed at all times. Where modification is required this will be agreed by the supervising engineer. ▪ Slopes will not be undercut, nor excavations left unsupported for periods in excess of 24 hours. Excavations are to be backfilled as soon as practicable. Excavation and filling operations shall be coordinated to minimise the time an excavation remains opened. ▪ Pore water pressure within excavations should be kept low at all times by draining or by installing sumps at regular intervals. This will prevent ponding of water within excavations which could increase hydraulic heads locally and potentially lead to instability. ▪ Soil Movement will be monitored regularly during the construction works, by means of regular site visits and assessments, by a suitably qualified and experienced professional. ▪ Only experienced and competent contractors will be appointed to carry out the construction works. ▪ Low ground bearing pressure machinery will be used for transport of construction materials in sensitive areas, where ground conditions dictate its requirement. ▪ Construction at less sensitive areas will be completed first to allow suitable construction practices to be established before works commence in the more difficult areas. ▪ Site staff will also undergo induction training to learn about the risks associated with working on "upland environments" and procedures aimed at reducing soil movement. ▪ Sufficient time should be allowed to carry out the works in a safe and timely manner. ▪ Mineral soil spoil disposal will take place at various locations within the wind farm land holding where low surface gradients combine with minimal peat depth and sufficient distance from sensitive receptors. Refer to CEMP. ▪ Spoil movements will be minimised by disposing of the material within or immediately adjacent to the construction footprint of the structure from whence it was excavated. ▪ Preparation of Spoil Disposal sites will involve the removal of the topsoil which will be transferred to a specific location to be stockpiled and maintained for re-use during restoration operations. ▪ Spoil will be deposited, in layers of 0.50m and will not exceed a total thickness of 2.00m, unless contained by suitably designed berms. ▪ Spoil will only be deposited on slopes of < 5 degrees to the horizontal and greater than 10m from the top of a cutting. The exact location of such areas will be determined in consultation with the construction phase geotechnical specialist. ▪ Spoil Disposal Sites used will have a regular weekly assessment, made by the construction manager or other suitably qualified individual, to ensure that stability and good condition is maintained ▪ Once disposal is complete the disposal sites will be re-vegetated with the "Top Mat" removed at the commencement of disposal operations. Upon commencement of the restoration phase guidance from a suitably qualified ecologist will be sought to provide a suitable methodology and programme of maintenance for the restored areas.

Aspect	Table 5 - Construction Phase Mitigation Measures
	▪ Drainage infrastructure will be put in place in advance of excavations. Drains will divert surface water and groundwater away from excavations into the existing and proposed surface drainage network. Uncontrolled, direct and concentrated discharges of water onto the ground surface will be avoided. ▪ Earthworks will not be commenced when heavy or sustained rainfall is forecast. A rainfall gauge will be installed on site to provide a record of rainfall intensity. An inspection of site stability and drainage by the Geotechnical Engineer will be carried out on site when a daily rainfall of over 25mm is recorded on site, works will only recommence after heavy rain with the prior approval of the Geotechnical Engineer following inspection. ▪ Vehicular movements will be restricted to the footprint of the Proposed Development and demarcated on-site visually. ▪ Vehicular traffic will be minimised through the re-use of excavated material reducing the need to source material from external quarries ▪ Best practice as described in the IWEA and Scottish Best Practice Guidelines will be applied during construction which will minimise double handling, again reducing the traffic. ▪ Fuel management procedures to be followed as per CEMP ▪ All materials used and wastes generated will be reduced by good practice and attention to the CEMP (EMP15 – Waste Management Plan). A policy of reduce, re-use and recycle will apply. ▪ All waste will be segregated and re-used where possible or removed for recycling. Any waste which is not recyclable or compostable will be properly disposed to landfill. ▪ Excavated spoil materials will be re-used close to the area of excavation.
Water & Hydrology (Ch. 9)	**Possible Impacts on Groundwater Vulnerability:** ▪ Implementing best practices for oil use and machinery refuelling to prevent any contamination of groundwater. ▪ All construction phase activities on-site will be carried out in strict accordance with a detailed Environmental Management Plan. ▪ EMP Monitoring to ensure adherence to best practices. **Surface and Groundwater Contamination from Oil/Fuel Spills and Leaks:** ▪ Mitigation will include the following: ▪ All plant and machinery will be serviced before being granted access to the site; ▪ Designate specific areas for refuelling and maintenance in a controlled manned, located on impervious surfaces/bunded trays to prevent spills from spilling / seeping into the ground; ▪ Only trained personnel will handle refuelling and maintenance to reduce the likelihood of accidental spills; ▪ A comprehensive spill response plan and procedures will be in place, that can be actioned in the event of an accident or emergency; ▪ Refuelling and equipment maintenance will be prohibited near watercourses or drainage areas to minimise contamination risks; ▪ All drilling operations will be closely controlled, with continuous monitoring of fluid returns to ensure minimal impact and prompt response to any issues; ▪ All drilling fluid and lubricants shall be biodegradable and non-toxic; ▪ Silt fencing should be in place to prevent contaminated runoff from reaching. surface water;

Aspect	Table 5 - Construction Phase Mitigation Measures
	▪ 20 m buffer zones should be in place around all watercourses where possible; ▪ All activities will be completed in line with the EMP. ▪ Wastewater/greywater from the temporary construction compound will be transferred offsite by a suitably licensed wastewater facility for treatment and disposal. **Earthworks Leading to the Mobilization of Suspended Solids into Surface Waterbodies** ▪ Silt fencing will be installed prior to commencement of works, around the perimeter of the work site and along watercourses boundaries (including field drains where there is connectivity to the streams adjacent to the site which drain into the Camlin River) to capture and retain sediment before it enters surface waters. These silt fences will be embedded into the local soil to ensure water is adequately captured and filtered reducing the likelihood of suspended sediment in surface water being transferred into the local watercourses and field drains. ▪ Earthmoving activities will be ceased during heavy rainfall to reduce the likelihood of erosion and runoff. Construction activities will be planned where possible during dry periods of low rainfall to minimise the risk of erosion and sediment mobilisation caused by heavy rain. ▪ Disturbed areas will be revegetated as quickly as possible once earthworks are completed to promote natural soil stabilisation and reduce sediment runoff. ▪ All groundworks should be completed in line with the CEMP. ▪ Daily monitoring and inspections of runoff, plus surface water near construction sites will be completed to detect any increases in suspended solids and take immediate corrective actions. **Potential Effects on Surface and Groundwater WFD Status:** ▪ No direct discharge to streams or rivers. All runoff from work areas will pass through an in-line water treatment system before being released via buffered outfalls to vegetated natural surfaces. **Mitigation Measures for Construction Activities in Flood-Prone Areas:** ▪ All topsoil and subsoil excavated during construction will be stored outside of the flood zone area to prevent loss or contamination during flooding events. ▪ A flood protection berm will be constructed around the excavation area for T2 to shield it from potential floodwaters. ▪ Construction materials will either be stored within the protection berm or in areas outside the flood zone to ensure they remain dry and uncontaminated during flood events. ▪ Temporary drainage infrastructure will be installed to effectively manage stormwater runoff, preventing water accumulation and mitigating localized flooding during periods of heavy rainfall. ▪ Measures will be taken to secure all reinforcements, ensuring they are properly anchored and remain stable during potential flooding scenarios. ▪ Concrete pouring and other critical construction activities will be scheduled for the drier summer months to minimize the risk of flooding-related disruptions and to improve construction efficiency. ▪ All procedures outlined in Environmental Management Plan (EMP) 11 will be strictly followed when Met Éireann issues a weather warning, ensuring proactive response to extreme weather conditions. **Surface water quality monitoring:**

Aspect	Table 5 - Construction Phase Mitigation Measures
	Surface water quality monitoring will be completed at the discharge point (downstream of the buffered outfalls of the drainage system) plus in the unnamed stream which will run through the T2 infrastructure and the Camlin River. The monitoring will include the following: ▪ Visual inspection (colour, turbidity, odour, sheen) ▪ In-situ physio-chemical parameters including Temperature, pH and Conductivity
Biodiversity (Ch. 10)	**Watercourses and Aquatic Ecology** ▪ **Surface Water Management Plan (SWMP)** has been prepared as part of the Construction Environmental Management Plan (CEMP), ensuring compliance with guidance, legislation, and drainage design. This includes the following elements: ▪ Clean Water Cut-off Drains to divert water from disturbed zones and minimize contamination. ▪ Dirty Water Cut-off Drains to capture sediment-laden water and direct it to treatment facilities. ▪ Silt Fencing to capture sediment along watercourses and drainage paths, with regular inspections. ▪ Silt Busters to filter suspended solids from pumped water on-site. ▪ Silt Bags for passive filtration to reduce suspended solids before water discharge. ▪ Swales to capture and transport sediment-laden runoff to treatment areas. ▪ Check Dams in swales and drains to slow water flow and promote sediment deposition. ▪ Buffered Outfalls to release treated water gently onto vegetated ground, minimizing erosion risks. ▪ Settlement Ponds to capture sediment-laden runoff with rock aprons for flow regulation. ▪ Sedimats and Vegetation Filters for additional filtration after silt bags. ▪ Allow Revegetation. ▪ Hydrologist Oversight: The Project Hydrologist ensures drainage controls are implemented according to the planning documents. ▪ Pre-emptive Strategies: Construction schedule will adapt to weather forecasts, minimizing runoff during heavy rainfall. ▪ Reactive Management: Monitoring by the Environmental Manager, halting work if siltation occurs and additional measures are needed. ▪ Field Monitoring: Regular monitoring of water parameters (pH, conductivity, temperature) and field chemistry, particularly after heavy rain. **Habitats and Flora** ▪ Habitat Preservation: The development avoids or minimises loss of habitats with high local or higher ecological value. ▪ Biodiversity Management and Enhancement Plan (BMEP): Includes restoration of grasslands, hedgerows, and pollinator habitats, with monitoring by an experienced ecologist. ▪ Root Protection Zones: Used to protect hedgerows and tree lines during construction, with measures to prevent unnecessary disturbance. ▪ Conduct Invasive Species Monitoring

Aspect	Table 5 - Construction Phase Mitigation Measures
	Mitigation for Terrestrial Mammals (Excluding Bats): ▪ Avoidance of Mammal Habitats: Setts and sensitive areas for mammals like badgers and otters are avoided. ▪ Pre-construction Walkover Survey: Identifies mammal resting/breeding places for exclusion zones and timing of construction activities. ▪ Construction Measures: ▪ Limiting construction to daylight hours. ▪ Providing escape points in excavations. ▪ Employing an Ecological Clerk of Works (ECoW) for monitoring mammal sensitivities. ▪ Exclusion Zones: For species like red squirrel, pine marten, otter, and badger, with NPWS licensing as required. **Bats** ▪ Noise Restrictions: Plant machinery will be turned off when not in use. All equipment will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations ▪ Lighting Restrictions: Directional lighting will be used to avoid overspill onto adjacent hedgerows. Lighting, both will be designed to minimise light spillage to reduce impacts on surrounding habitats.
Ornithology (Ch 11)	▪ Displacement and/or disturbance impacts, and habitat degradation will be limited by controlling the movement of vehicles; vehicles will not encroach onto habitats beyond the Proposed Development footprint. ▪ Any vegetation clearance required, including the cutback and any clearance of hedgerows and scrub, will take place outside the breeding season (March to August, inclusive) unless permission is obtained from NPWS outside of these times. ▪ Where possible, construction will take place outside the breeding season to minimise disturbance and or displacement to breeding birds, but where works are necessary, there will be a commitment to undertake relevant pre-work surveys by the project ECoW or ornithologist; ▪ All plant and equipment will conform with the Construction Plant and Equipment Permissible Noise Levels Regulations. ▪ Plant and equipment will be turned off when not in use, with no unnecessary revving.
Noise & Vibration (Ch. 12)	Regarding construction activities, reference shall be made to BS5228-1 (BSI 2014a), which offers detailed guidance on the control of noise and vibration from construction activities. It is proposed that various practices be adopted during construction as required, including the following: ▪ limiting the hours during which site activities likely to create high levels of noise or vibration are permitted. ▪ establishing channels of communication between the contractor/developer, Local Authority, and residents. ▪ appointing a site representative responsible for matters relating to noise and vibration. ▪ monitoring typical levels of noise and vibration during critical periods and at sensitive properties; and

Aspect	Table 5 - Construction Phase Mitigation Measures
	▪ keeping the surface of the site access tracks even to mitigate the potential for vibration from lorries. Furthermore, a variety of practicable noise control measures will be employed. These include: ▪ regular maintenance and servicing of machinery. ▪ selection of plant with low inherent potential for generation of noise and/or vibration. ▪ placing of noisy / vibratory plant as far away from sensitive properties as permitted by site constraints **Noise** The contract documents shall specify that the Contractor undertaking the construction of the works will be obliged to take specific noise abatement measures when deemed necessary to comply with the recommendations of BS5228-1 (BSI 2014a). The following list of measures will be considered, where necessary, to ensure compliance with the relevant construction noise criteria: ▪ No plant used on site will be permitted to cause an on-going public nuisance due to noise. ▪ The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations. ▪ All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract. ▪ Compressors will be attenuated models, fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers. ▪ Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use. ▪ Any plant, such as generators or pumps, which is required to operate before 07:00hrs or after 19:00hrs will be surrounded by an acoustic enclosure or portable screen. ▪ During the construction programme, supervision of the works will include ensuring compliance that significant noise effects are avoided. ▪ The hours of construction activity will be limited to avoid unsociable hours where possible. Construction operations shall generally be restricted to between 7:00hrs and 19:00hrs Mondays to Fridays and to between 7:00hrs and 14:00hrs on Saturdays. However, to ensure that optimal use is made of good weather period or at critical periods within the programme (i.e., concrete pours) or to accommodate delivery of large turbine component along public routes it could be necessary on occasion to work outside of these hours. **Vibration** It is recommended that vibration from construction activities be limited to the values set out in Table 12.4. of chapter 12.
Air Quality (Ch. 13)	▪ Develop and implement a stakeholder communications plan that includes community engagement before works commence on site. Community engagement includes explaining the nature and duration of the works to local residents and businesses.

Aspect	Table 5 - Construction Phase Mitigation Measures
	▪ The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board should also include head/regional office contact details. ▪ During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions. Dry and windy conditions are favourable to dust suspension. Therefore, mitigations must be implemented if undertaking dust generating activities during these weather conditions. ▪ A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out. ▪ Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book. ▪ Hold regular liaison meetings with other high risk construction sites within 250 m of the site boundary where feasible, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes. ▪ Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. ▪ Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site. ▪ Avoid site runoff of water or mud. ▪ Keep site fencing, barriers and scaffolding clean using wet methods. ▪ Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below. ▪ Cover, seed or fence stockpiles to prevent wind whipping. ▪ Ensure all vehicles switch off engines when stationary - no idling vehicles. ▪ Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable. ▪ Impose and signpost a maximum-speed-limit of 15 kph haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate). ▪ Produce a Construction State Traffic Management Plan to manage the sustainable delivery of goods and materials. ▪ Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing). ▪ Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g., suitable local exhaust ventilation systems. ▪ Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate. ▪ Use enclosed chutes and conveyors and covered skips. ▪ Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.

Aspect	Table 5 - Construction Phase Mitigation Measures
	▪ Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods. ▪ No bonfires or burning of waste materials. ▪ Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. ▪ Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable. ▪ Only remove the cover in small areas during work and not all at once. ▪ During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil and thus suppress dust. ▪ Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place. ▪ Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery. ▪ For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust. ▪ A speed restriction of 15 kph will be applied as an effective control measure for dust for on-site vehicles. ▪ Avoid dry sweeping of large areas. ▪ Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport. ▪ Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable. ▪ Record all inspections of haul routes and any subsequent action in a site log book. ▪ Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned. ▪ Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable). ▪ Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits. ▪ Access gates to be located at least 10 m from receptors where possible. ▪ Undertake daily on-site and off-site inspections, where receptors (including roads) are nearby, to monitor dust, record inspection results in the site inspection log. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary. ▪ Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions. ▪ Monitoring of construction dust deposition along the site boundary near to nearby sensitive receptors during the construction phase of the proposed development is recommended to ensure mitigation measures are working satisfactorily. This can be carried out using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting

Aspect	Table 5 - Construction Phase Mitigation Measures
	gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2m above ground level. The TA Luft limit value is 350 mg/m2/day during the monitoring period of 30 days (+/- 2 days).
Climate (Ch. 14)	▪ Appointing a suitably competent contractor who will undertake waste audits detailing resource recovery best practice and identify materials can be reused/recycled; ▪ Use of low carbon concrete during construction; ▪ Consideration of the use of locally sourced lower carbon options where feasible; ▪ Alignment with the local and national climate action plans; ▪ Materials will be reused on site where possible; ▪ Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods; ▪ Ensure all plant and machinery are well maintained and inspected regularly; ▪ Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site; and ▪ Sourcing materials locally where possible to reduce transport related CO2 emissions.
Cultural Heritage: (Ch. 15)	As part of the Construction Phase mitigation measures, all groundworks within the main development area (Turbines, Met Mast & Associated Infrastructure Works) should be archaeologically monitored to ensure that previously unknown no sub-surface archaeological remains are not directly impacted by the proposed development. The proposed directional drilling in proximity to historic bridges should also be archaeologically monitored to ensure that previously unknown archaeological remains are not directly impacted by the proposed works. In addition, it is also recommended that ground works in proximity to known archaeological monuments should also be archaeologically monitored. Should previously unknown archaeological remains be uncovered during the course of archaeological monitoring, further mitigation measures may be required subject to consultation and agreement with the National Monuments Service.

Table 6 Operational Phase Mitigation Measures

Aspect	Table 6 - Operational Phase Mitigation Measures
Population & Human Health (Ch. 4)	▪ Other than mitigation incorporated in the design and mitigation measures outlined in other chapters of this EIAR relating to human health, no further mitigation measures are proposed with respect to population and human health.
Landscape & Visual (Ch. 5)	▪ There are no specific landscape and visual operational stage mitigation measures
Material Assets: **Traffic & Transport** (Ch. 6)	▪ Where practical, operational maintenance staff will be encouraged to vehicle share car pool travelling to and from the site. ▪ Sightlines will have to be maintained at the access from the L50462 to the substation and wind turbine sites. Where vegetation and foliage regrowth occurs within the public road area, this can be undertaken by the local authority as part

Aspect	Table 6 - Operational Phase Mitigation Measures
	of routine road maintenance activities, while any maintenance within the operator's lands/private lands would be undertaken by the operator/landowner.
Material Assets: Built Services (Ch. 7)	▪ See Construction Stage Mitigation Measures
Land & Soils (Ch. 8)	▪ All wastes from the substation, battery storage and ancillary facilities will be removed by the appropriate contractor. The operational team will carry out maintenance works (to Site Access Tracks, Substation, Battery Energy Storage and Turbines) and will put in place control measures to mitigate the risk of hydrocarbon or oil spills during the operational phase of the windfarm ▪ Any vehicles utilised during the operational phase will be maintained on a weekly basis and checked daily to ensure any damage or leakages are corrected. ▪ Fuels, lubricants and hydraulic fluids for equipment used will be carefully handled to avoid spillage. ▪ Any spillage of fuels, lubricants or hydraulic oils will be immediately contained, and the contaminated soil removed from the site and properly disposed of ▪ Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for recycling ▪ Appropriate spill control equipment, such as oil soakage pads, will be kept within the refuelling areas and in each item of plant to deal with any accidental spillage.
Water & Hydrology (Ch. 9)	**Increased Storm Water Run-off:** ▪ Storm water attenuation so that any increase in discharge volume during storm events are gradual and controlled, preventing an increase in the flood risk downstream. ▪ Drainage discharge points will be inspected and managed throughout the Operational stage of the project. **Potential Impacts on Surface Water Quality:** ▪ Water management system specifically designed to prevent surface water contamination from suspended solids, hydrocarbons, and other pollutants. This system will include features such as sediment control measures, oil-water separators, and filtration mechanisms to ensure that runoff from operational activities is properly managed. ▪ All maintenance activities on site will be completed in accordance with the EMP. **Potential Impacts on Groundwater Quality:** ▪ All plant and machinery will be serviced before being granted access to the site; ▪ Designate specific areas for refuelling and maintenance in a controlled manned, located on impervious surfaces/bunded trays to prevent spills from spilling / seeping into the ground; ▪ Only trained personnel will handle refuelling and maintenance to reduce the likelihood of accidental spills; ▪ A comprehensive spill response plan and procedures will be in place, that can be actioned in the event of an accident or emergency; ▪ Refuelling and equipment maintenance will be prohibited near watercourses or drainage areas to minimise contamination risks; ▪ Silt fencing should be in place to prevent contaminated runoff from reaching surface water; ▪ 20 m buffer zones should be in place around all watercourses where possible;

Aspect	Table 6 - Operational Phase Mitigation Measures
	▪ Avoid use of herbicides for vegetation control around turbines and access roads. Where herbicides are necessary, use environmentally friendly alternatives and apply them following strict guidelines to prevent infiltration into groundwater; ▪ All activities will be completed in line with the EMP. ▪ Conduct baseline groundwater quality testing before the wind farm becomes operational to establish existing conditions; ▪ Implement a regular groundwater monitoring program to detect any potential contamination early and take immediate corrective action; **Potential Impacts on Designated Sites:** ▪ Implementation of the mitigation measures for protection of surface and groundwater as outlined in above will also ensure that Ballykenny-Fisherstown Bog SPA will not be affected by the Proposed Development. **Potential Impacts on WFD Status:** ▪ Strict mitigation measures regarding hydrocarbon use and the prevention of increased suspended solids during the operation phase will ensure the protection of the Surface and Groundwater Water Framework Directive (WFD) status. ▪ All runoff from work areas will pass through an in-line water treatment system before being released via buffered outfalls to vegetated natural surfaces.
Biodiversity (Ch. 10)	▪ Maintain Settlement Ponds and Check Dams within the drainage system ▪ Allow Revegetation of Drainage Channels and Roadsides. ▪ Implement Surface Water Management Plan (SWMP), including clean and dirty water cut-off drains. ▪ Monitoring by Project Hydrologist and Environmental Manager ▪ Follow a Biodiversity Management and Enhancement Plan ▪ Enforce Root Protection Zones ▪ Execute Bat Monitoring and Mitigation Plan (BMMP) ▪ Support habitat recovery through Biodiversity Management and Enhancement Plan
Ornithology (Ch 11)	Once operational, the availability of suitable habitats in the area will not significantly decrease. Given the buffer distance from the Camlin and adjacent grasslands and the final turbine layout, no significant disturbance or displacement of avian species is anticipated. Collision Risk Assessment modelling indicated no greater than low impacts for any avian receptors, and no evidence of a barrier effect caused by the Proposed Development was identified. Therefore, no mitigation measures are required for the operational phase.
Noise & Vibration (Ch 12)	The findings of the assessment confirmed that the predicted operational noise levels from the Proposed Development will be within the relevant best practice noise criteria. Therefore, no specific mitigation measures are required.
Air Quality (Ch. 13)	▪ There is no mitigation required for the operational phase of the development
Climate (Ch. 14)	▪ All on-site employees and contractors will ensure that machinery used is properly maintained and is switched off when not in use to avoid unnecessary exhaust emissions from maintenance traffic. ▪ Incorporating sustainable drainage systems (SuDS) to manage excess surface water runoff, such as swales and attenuation ponds will reduce flood risk across

Aspect	Table 6 - Operational Phase Mitigation Measures
	the entire site. These measures, combined with regular maintenance and flood monitoring, will help ensure the resilience of the site to future flooding scenarios.
Cultural Heritage: (Ch. 15)	▪ There are no additional mitigation measures available to completely negate the current indirect visual impact on the Cultural Assets identified during the operational phase.

Table 7 Decommissioning Phase Mitigation Measures

Aspect	Table 7 - Decommissioning Phase Mitigation Measures
Population & Human Health (Ch. 4)	The mitigation measures outlined for the construction phase will also be implemented during the decommissioning phase. A decommissioning plan will be agreed with the local authorities prior to decommissioning of the Proposed Development.
Landscape & Visual (Ch. 5)	▪ There are no specific landscape and visual decommissioning stage mitigation measures
Material Assets: Traffic & Transport (Ch. 6)	▪ A decommissioning plan will be prepared for agreement with LCC including a traffic management plan and mitigation measures similar to those implemented during the construction phase will be put in place.
Material Assets: Built Services (Ch. 7)	▪ As per Construction Stage Mitigation Measures
Land & Soils (Ch. 8)	▪ Mitigation measures applied during decommissioning activities will be similar to those applied during construction where relevant.
Water & Hydrology (Ch. 9)	**Possible Impacts on Groundwater Vulnerability:** ▪ Implementing best practices for oil use and machinery refuelling to prevent any contamination of groundwater. ▪ All construction phase activities on-site will be carried out in strict accordance with a detailed Environmental Management Plan. ▪ EMP Monitoring to ensure adherence to best practices. **Surface and Groundwater Contamination from Oil/Fuel Spills and Leaks:** ▪ Mitigation will include the following: ▪ All plant and machinery will be serviced before being granted access to the site; ▪ Designate specific areas for refuelling and maintenance in a controlled manned, located on impervious surfaces/bunded trays to prevent spills from spilling / seeping into the ground; ▪ Only trained personnel will handle refuelling and maintenance to reduce the likelihood of accidental spills; ▪ A comprehensive spill response plan and procedures will be in place, that can be actioned in the event of an accident or emergency; ▪ Refuelling and equipment maintenance will be prohibited near watercourses or drainage areas to minimise contamination risks; ▪ All drilling operations will be closely controlled, with continuous monitoring of fluid returns to ensure minimal impact and prompt response to any issues; ▪ All drilling fluid and lubricants shall be biodegradable and non-toxic; ▪ Silt fencing should be in place to prevent contaminated runoff from reaching. surface water; ▪ 20 m buffer zones should be in place around all watercourses where possible;

Aspect	Table 7 - Decommissioning Phase Mitigation Measures
	▪ All activities will be completed in line with the EMP. ▪ Wastewater/greywater from the temporary construction compound will be transferred offsite by a suitably licensed wastewater facility for treatment and disposal. **Earthworks Leading to the Mobilization of Suspended Solids into Surface Waterbodies** ▪ Silt fencing will be installed prior to commencement of works, around the perimeter of the work site and along watercourses boundaries (including field drains where there is connectivity to the streams adjacent to the site which drain into the Camlin River) to capture and retain sediment before it enters surface waters. These silt fences will be embedded into the local soil to ensure water is adequately captured and filtered reducing the likelihood of suspended sediment in surface water being transferred into the local watercourses and field drains. ▪ Earthmoving activities will be ceased during heavy rainfall to reduce the likelihood of erosion and runoff. Construction activities will be planned where possible during dry periods of low rainfall to minimise the risk of erosion and sediment mobilisation caused by heavy rain. ▪ Disturbed areas will be revegetated as quickly as possible once earthworks are completed to promote natural soil stabilisation and reduce sediment runoff. ▪ All groundworks should be completed in line with the CEMP. ▪ Daily monitoring and inspections of runoff, plus surface water near construction sites will be completed to detect any increases in suspended solids and take immediate corrective actions. **Potential Effects on Surface and Groundwater WFD Status:** ▪ No direct discharge to streams or rivers. All runoff from work areas will pass through an in-line water treatment system before being released via buffered outfalls to vegetated natural surfaces. **Mitigation Measures for Decommissioning Activities in Flood-Prone Areas:** ▪ All topsoil and subsoil excavated during construction will be stored outside of the flood zone area to prevent loss or contamination during flooding events. ▪ A flood protection berm will be constructed around the excavation area for T2 to shield it from potential floodwaters. ▪ Construction materials will either be stored within the protection berm or in areas outside the flood zone to ensure they remain dry and uncontaminated during flood events. ▪ Temporary drainage infrastructure will be installed to effectively manage stormwater runoff, preventing water accumulation and mitigating localized flooding during periods of heavy rainfall. ▪ Measures will be taken to secure all reinforcements, ensuring they are properly anchored and remain stable during potential flooding scenarios. ▪ Construction activities will be scheduled for the drier summer months to minimize the risk of flooding-related disruptions and to improve construction efficiency. ▪ All procedures outlined in Environmental Management Plan (EMP) 11 will be strictly followed when Met Éireann issues a weather warning, ensuring proactive response to extreme weather conditions. **Surface water quality monitoring:**

Aspect	Table 7 - Decommissioning Phase Mitigation Measures
	▪ Surface water quality monitoring will be completed at the discharge point (downstream of the buffered outfalls of the drainage system) plus in the unnamed stream which will run through the T2 infrastructure and the Camlin River. The monitoring will include the following: ○ Visual inspection (colour, turbidity, odour, sheen) ○ In-situ physio-chemical parameters including Temperature, pH and Conductivity
Biodiversity (Ch. 10)	Mitigation measures for decommissioning will be similar to those for the construction phase, and will include pre-construction surveys of the site and the surrounding area, for the full range of flora and fauna. Mitigation will then be tailored to suit the baseline ecological condition found on the site at that time. However the magnitude required will be less, as track and turbine installation will not be required.
Ornithology (Ch 11)	During the decommissioning phase, disturbance limitation measures will follow from the construction phase described in Table 5 above. In addition, if winter roosting or breeding activity of birds of high conservation concern identified within monitoring activities, no works shall be undertaken within a species-specific buffer (as per Goodship, N.M. and Furness, R.W. 2022), in line with industry best practice. No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied.
Noise & Vibration (Ch. 12)	The decommissioning will entail similar activities to the construction phase. The mitigation measures described for the construction phase will also be applied to the decommissioning phase in order to ensure noise levels remain within criteria.
Air Quality (Ch. 13)	Mitigation measures as per the construction phase mitigation are applied.
Climate (Ch. 14)	Mitigation measures as per the construction phase mitigation are applied.
Cultural Heritage: (Ch. 15)	Prior to the decommissioning phase, an updated Archaeological Impact Assessment should be prepared incorporating potential changes to the legislative environment and associated baseline data used in the compilation of this EIAR chapter.