FEHILY TIMONEY

DESIGNING AND DELIVERING A SUSTAINABLE FUTURE

ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) FOR THE PROPOSED CLOONKETT WIND FARM, CO. CLARE

VOLUME 1 - NON-TECHNICAL SUMMARY

Prepared for: **Cloonkett Green Energy Ltd.**

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Date: **September 2025**

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1. INTRODUCTION

Fehily Timoney and Company (FT) has prepared this Environmental Impact Assessment Report (EIAR) on behalf of Cloonkett Green Energy Limited, a subsidiary of Greensource Sustainable Developments Ltd. (Greensource). Cloonkett Green Energy Limited intend to apply to An Coimisiún Pleanála (ACP), formerly An Bord Pleanála, for planning permission to construct a wind energy development wholly located in County Clare and includes lands in the townlands of Carrowreagh East, Cloondrinagh, Cloonkett, Burrenfadda, Shessiv, Craghera, and Glenconaun More. The Site is located approximately 19 km south-west of Ennis, approximately 20 km north-east of Kilrush and approximately 14 km west of Shannon Airport.

Common terms and acronyms used throughout this EIAR can be found in *Appendix 1.3 Glossary of Terms and Abbreviations*, contained in Volume III of this EIAR.

The Proposed Development assessed in this EIAR comprises the following elements:

- The '*Proposed Wind Farm*' (also referred to in this EIAR as the 'Site');
- The '*Proposed Grid Connection*' (also referred to in this EIAR as the 'GC');
- The '*Turbine Delivery Route*' (also referred to in this EIAR as the 'TDR');
- The '*Biodiversity Management and Enhancement Plan Lands*' (also referred to in this EIAR as the 'BMEP Lands');

1.1 Site Description

Cloonkett Wind Farm has been designed in compliance with the current Section 28 Ministerial Guidelines (section 28 of the Planning and Development Act 2000, as amended), and the current 'Wind Energy Development Guidelines 2006' (DoHLG, 2006). These current national guidelines are subject to targeted review, with the 'Draft Revised Wind Energy Development Guidelines' (DoHLGH WEDGs, 2019) having been published by the Department of Housing, Planning and Local Government in December 2019. If new Guidelines are adopted before this application is adjudicated on by An Coimisiún Pleanála, the applicant would welcome the opportunity to demonstrate compliance with same. Presented hereunder are the elements of the Proposed Development for which development consent is being sought and all other associated project components subject to EIA but for which development consent is not being sought within the current application.

The Proposed Development for which consent is being sought will consist of the following:

- Construction of 14 no. wind turbines with a blade tip height of 150 m, a hub height of 82 m and a rotor diameter of 136 m.
- Construction of permanent turbine foundations and crane pad hardstanding areas and associated drainage;
- Construction of 9.51 km of new internal access tracks and associated drainage infrastructure;
- Upgrading of 1.43 km of existing tracks and associated drainage infrastructure;
- Creation of 1 no. new access and upgrading of 1 no. existing agricultural access on the Local Road L2072 to serve as construction and operation access to the Site.
- Creation of 2 no. new accesses on the Local Road L6239 to serve as construction and operation access to the Site;

- 1 no. Water Framework Directive (WFD) watercourse crossing comprising a new clear span bridge to replace an existing ford crossing within the Site;
- Installation of new pipe and box culverts within the Site where proposed infrastructure crosses existing drains;
- All associated drainage and sediment control including interceptor drains, cross drains, sediment ponds and swales;
- Development of 5 no. on-site construction borrow pits with a combined footprint of 5.15 hectares and associated access and drainage infrastructure which will also be used as peat /spoil deposition areas;
- Creation of dedicated peat and spoil deposition areas and berms for the management of peat and spoil within the Site;
- 2 no. temporary construction compounds and associated ancillary infrastructure including parking;
- Forestry felling of 8.40 ha (84,047 m^2) to facilitate construction and operation of the Proposed Development;
- Installation of underground medium voltage electrical and communication cabling between the proposed turbines and the proposed on-site substation;
- Erection of 1 no. permanent meteorological mast to a height of 100 m above ground level with a 4 m lightning pole on top;
- Construction of 1 no. permanent onsite 220 kV electrical substation and associated compound including: (a) Welfare facilities; (b) Electrical infrastructure; (c) Parking; (d) Wastewater holding tank; (e)Rainwater harvesting tank; (f)Security fencing; (g) Overhead line (OHL) works (including the construction of 6 no. new galvanised steel pylons/towers and approximately 800 m of new overhead line. The OHL works also involve the removal of 1 no. existing galvanised steel tower) and associated infrastructure to facilitate a loop-in connection with an existing 220 kV overhead line.
- Temporary accommodation works along the proposed turbine delivery route to facilitate turbine component deliveries at two locations. 1.). on the L6180 within the townland of Ballyduneen. Works will include the laying of a load bearing surface, tree trimming, removal of street furniture and diversion of overhead utility service lines. 2.). on the L6180 road within the townland of Carrowreagh West. Works will include the laying of a load bearing surface, access track upgrade works, tree and hedgerow removal, replacement of an existing culvert with a new box culvert and diversion of overhead utility service lines.
- Biodiversity enhancement measures within the Site,
- All associated infrastructure, services and site works including excavation, earthworks, peat and spoil management and landscaping.

Certain temporary accommodation works associated with the TDR and the provision of passing opportunities along the local road network are subject to this EIA but for which planning consent is not being sought within the current application. These works to facilitate the delivery of turbine components to the Site are detailed further in Section *2.4.3 Turbine Delivery* and include hedge or tree cutting, relocation of powerlines/poles, lampposts, signage and temporary local road widening. For these locations, works have been identified and assessed in the EIAR, however, permission for these works will be sought separately with the local Planning Authority through road opening license as necessary.

1.1.1 Turbine Parameters used for EIAR Assessments

The proposed wind turbine generator (WTG) parameters assessed in this EIAR comprises a conventional three-blade horizontal axis wind turbine. Detailed dimensions of the proposed WTG are shown 0300-Series planning application detail drawings. The WTG specifications are precise and provide specific dimensions for the turbine structures which have been used in this assessment. The turbines will have a hub height of 82m and a rotor diameter of 136m with a tip height of 150m.

1.1.2 Permission Period

The applicant requests the grant of permission on the basis of a 40-year operational period from the date of full operational commissioning of the wind farm. With permission for the onsite substation and grid connection sought in perpetuity given that the substation will form part of the national electricity network. Therefore, the substation will be retained as a permanent structure and will not be removed.

Forty years is the anticipated minimum useful lifespan of wind turbines which are being produced for the market today. The lifespan of wind turbines has been increasing steadily in recent years and allowing this duration will improve the overall carbon balance of the development, therefore maximising the amount of fossil fuel usage that will be offset by the wind farm. Leaving the wind turbines in-situ until the end of their useful lifespan would be optimum from an environmental viewpoint, particularly in relation to carbon savings.

1.2 EIAR Structure

The EIAR has been prepared using the "*grouped format structure*" as outlined in EPA guidance document (EPA, 2022). Using this structure there is a separate chapter for each topic, e.g. air quality and climate, biodiversity, hydrology. The description of the existing environment, the Proposed Development and the potential effects, mitigation measures and residual effects are grouped in the chapter. The grouped format makes it easy to investigate topics of interest and facilitates cross-reference to specialist studies.

The EIAR is structured as follows:

- Volume I – Non-Technical Summary (NTS)
- Volume II – Main EIAR
- Volume III – Appendices to the Main EIAR
- Volume IV – Figures and Photomontages

It should also be noted, for the sake of completeness, that a separate Natura Impact Statement (NIS) and Planning Statement has also been submitted with the planning application, included Volume III of this EIAR. The application is also supported by Planning Drawings.

1.3 Competent Experts and Quality of the EIAR

Article 5(3) of the EIA Directive states that, in order to ensure the completeness and quality of the EIAR, that:

(a) the developer shall ensure the EIAR is prepared by competent experts;

(b) the competent authority shall ensure that it has, or has access to, sufficient expertise to examine the EIAR, and;

(c) where necessary, the competent authority shall seek from the developer any supplementary information, in accordance with Annex IV (the information to be contained in the EIAR), which is directly relevant to reaching a reasoned conclusion on the significant effects of the project on the environment.

The EPA (2022) *'Guidelines on the information to be contained in Environmental Impact Assessment Reports*' notes that the EIA Directive does not offer a definition of what would be considered competent expertise, and that the assessment may often require a range of experts to cover the full range of the complexity of an environmental factor.

The list of the experts who have contributed to an EIAR, showing which parts of the EIAR they have worked on, and their Curriculum Vitae's showing their qualifications and experience, is presented within *Appendix 1.1 - Contributors to the EIAR* of Volume III of this EIAR.

1.3.1 Contributors to the EIAR

Fehily Timoney and Company (FT) is a consultancy based in Cork, specialising in civil and environmental engineering, and environmental science. FT is well established as a leading consultancy in wind farm development in Ireland. The company has established a professional team specialising in wind farm development. This team has the support of many in-house engineers, scientists and planners.

FT was retained by the Applicant to undertake the detailed environmental assessment and prepare the EIAR for the Proposed Development, as well as preparing the application for consent for submission to The Board.

Specialist and competent experts that contributed to, and are responsible for, each EIAR chapter/topic are outlined in the Curricula Vitae's of contributors which are presented in *Appendix 1.1 Contributors to the EIAR*, of Volume III of this EIAR, wherein the competence, experience and relevant qualification(s) for each expert is detailed.

1.4 Difficulties Encountered

There were no difficulties encountered during the preparation of this EIAR.

2. DESCRIPTION OF PROPOSED DEVELOPMENT

2.1 Overview of the Proposed Development

The Proposed Development consists of a 14 no. turbine wind farm and associated infrastructure including internal access tracks, hard standings, permanent meteorological mast, onsite 220 kV loop in/out substation and associated grid connection infrastructure, internal electrical and communications cabling, temporary construction compounds, drainage infrastructure, biodiversity management and enhancement measures, temporary accommodations works along the Proposed Turbine Delivery Route and all associated works related to the construction of the Proposed Development.

An Coimisiún Pleanála (formerly An Bord Pleanála) deemed the Proposed Development is eligible as Strategic Infrastructure Development (SID) by way of a notice served under section 37B(4)(a) of the Planning and Development Act 2000 as amended and the application is being made directly to the Board (case ref. ABP-317616-23). The Board are the competent authority for the purposes of the Environmental Impact Assessment (EIA).

A 10-year planning permission and 40-year operational life from the date of commissioning of the Proposed Wind Farm is being sought; this reflects the lifespan of modern-day turbines.

A permanent planning permission is being sought for the Grid Connection and onsite 220 kV substation as these will become an asset of the national grid under the management of EirGrid and will remain in place upon decommissioning of the Proposed Wind Farm.

Cloonkett Wind Farm has been designed in compliance with the current Section 28 Ministerial Guidelines (section 28 of the Planning and Development Act 2000, as amended), and the current 'Wind Energy Development Guidelines 2006' (DoHLG, 2006). These current national guidelines are subject to targeted review, with the 'Draft Revised Wind Energy Development Guidelines' (DoHLGH WEDGs, 2019) having been published by the Department of Housing, Planning and Local Government in December 2019. If new Guidelines are adopted before this application is adjudicated on by An Coimisiún Pleanála, the applicant would welcome the opportunity to demonstrate compliance with same. Presented hereunder are the elements of the Proposed Development for which development consent is being sought and all other associated project components subject to EIA but for which development consent is not being sought within the current application.

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Certain temporary accommodation works associated with the TDR and the provision of passing opportunities along the local road network are subject to this EIA but for which planning consent is not being sought within the current application. These works to facilitate the delivery of turbine components to the Site are detailed further in Section *2.4.3 Turbine Delivery* and include hedge or tree cutting, relocation of powerlines/poles, lampposts, signage and temporary local road widening. For these locations, works have been identified and assessed in the EIAR, however, permission for these works will be sought separately with the local Planning Authority through road opening license as necessary.

2.3 Wind Turbines

The proposed wind turbine generator (WTG) parameters assessed in this EIAR comprises a conventional three-blade horizontal axis wind turbine. Detailed dimensions of the proposed WTG are shown 0300-Series planning application detail drawings. The WTG specifications are precise and provide specific dimensions for the turbine structures which have been used in this assessment. The turbines will have a hub height of 82m and a rotor diameter of 136m with a tip height of 150m.

2.3.1 Turbine Layout

The proposed wind farm layout reflects the outcome of iterative engineering and environmental constraints assessments aimed at eliminating or minimising adverse effects on the environment. The layout has been designed to minimise the potential environmental effects of the wind farm while at the same time maximising the energy yield of the wind resource passing over the Site.

The design rationale and evolution of the wind farm layout is described in EIAR Chapter 3. Site Selection and Alternatives.

Turbine location co-ordinates in Irish Transverse Mercator (ITM) are listed in Table 2-1.

Table 2-1: Turbine Coordinates

Turbine Number	ITM Easting	ITM Northing
T1	519119.8	660295.8
T2	519495.8	660400.0
T3	519533.6	660757.8
T4	519972.7	660304.3
T5	520426.1	660313.5
T6	520758.7	660269.0
T7	520903.1	660591.8
T8	521182.5	660933.5
T9	521397.1	660672.2
T10	521743.1	660613.8
T11	521753.4	660952.2
T12	521597.5	661230.3
T13	522213.5	660937.5
T14	522628.5	661174.4

The turbines will have multiple painted coatings to protect against corrosion with a light grey non-reflective finish.

It is proposed to install lighting on the turbines in accordance with the Irish Aviation Authority (IAA) requirements for aviation visibility purposes. The lighting configuration and type will be in accordance with the International Civil Aviation Organisation (ICAO) obstacle light requirements.

Based on information derived from the preliminary site investigation and site reconnaissance, and taking into consideration wind turbine manufacturer specifications, it is expected that wind turbine foundations shall be founded with the exception of Turbine T01. The founded turbines shall be reinforced concrete gravity foundations with depths of 3 m and diameters of 25 m.

The turbine foundations will be constructed using standard reinforced concrete construction techniques. Detailed construction methodologies for turbine foundations are provided in the CEMP in Appendix 2.1 of Volume III.

The turbine blades comprise fibreglass reinforced epoxy, carbon fibres and solid metal tip. The blades will be 68 m in length, with a swept area of 14,520 m^2.

The turbines will have a cut in wind speed of 3 m/s and cut out speed of 32 m/s; the turbine rotor rotation will be in a clockwise direction.

The dynamic operation range (the rate at which the blades rotate) of the proposed turbine is approximately 4 -12 revolutions per minute (rpm) which will be influenced by wind speed.

Each turbine will take approximately 3 to 5 days to erect (depending on weather) using two cranes.

2.4 Turbine Transport

Large components associated with the wind farm construction e.g. turbine blades and tower sections, will be transported to site via the identified turbine delivery route (TDR) which travels from the Port of Entry to Junction 12 between the M18 Motorway and the N85 National Road, via N68 and L-6180 to the Proposed Wind Farm Site entrance on the L2072 Local Road. It is understood that the loads associated with the turbine component deliveries can get to Junction 12 on the M18 without issue. Foynes has been used for turbines of this scale and Galway Port has recently been upgraded to accommodate turbine components greater in size to those proposed for Cloonkett.

A substation transformer unit will be transported to site which will be categorised as an abnormal load. As a result, an abnormal load permit will be sought for this movement. This load shall follow the same route to the site as the TDR.

The proposed turbine delivery route is presented in Figure 2.3. A *Delivery Route Selection and Assessment Report* was carried out to identify the optimum delivery route to site and is included as Appendix 13.1 in Volume III of this EIAR.

Temporary accommodation works will be required at some locations along the TDR to facilitate the delivery of large components to the site. No permanent road widening or junction accommodation works are required along the turbine delivery route. Some temporary hardcore surfacing will be required at roundabouts or areas of oversail. All temporary accommodation works associated with the TDR will be fully reinstated following the construction stage.

Overhead utilities and obstructions will need to be removed at several locations to provide adequate overhead clearance. The removal of overhead utilities will be by either temporary disconnections or permanent re-routing. Such works will be carried out by the utility providers in advance of turbine delivery to site. Further details and assessment of these works are provided in Chapter 13- Traffic and Transportation.

Temporary accommodation works will only be required during the operational phase in the unlikely event of a major turbine component replacement. The temporary accommodation works will not be required for the decommissioning phase as turbine components can be broken up on site and removed using standard HGVs.

Elements of the temporary accommodation works for the delivery of turbines are summarised below. Works within private lands at TDR Nodes 6 and 8 are included within the planning application red line boundary. All other works are within the public road corridor.

Table 2-2: TDR Temporary Accommodation Works

TDR Node Reference	Location	Planning Drawing Series No.	Summary of Proposed Temporary Accomodation Works
1	M18 Junction 9	COLLETT DRAWING NO. 380211-60A1.1	Removal of street furniture and road signs
2	Skehanagh Roundabout	COLLETT DRAWING NO. 380211-80A1.1	Chevron sign to be removed
3	Clareabby Roundabout	COLLETT DRAWING NO. 380211-85A1.1	Remove road signs and fence.
4	N85/N68 Roundabout	COLLETT DRAWING NO. 380211-90A1.1	Chevron sign to be removed. Splitter island to be cleared. Removal of street furniture and railing.
5	N68/R475 Roundabout	COLLETT DRAWING NO. 380211-95A1.1	Temporary hard standing across roundabout centre island. Splitter island to be cleared
6	N68/L6180 Junction	COLLETT DRAWING NO. 380211-500A1.1	Laying of load bearing surfacing, removal of street furniture, divert overhead utility service lines.
7	L6180 Left Hand Bend	COLLETT DRAWING NO. 380211-510A1.1	Laying of load bearing surfacing, tree trimming, divert overhead utility service lines.
8	L6180 / Proposed Cut Through Junction	COLLETT DRAWING NO. 380211-530A1.1 380211-540A1.1 380211-550A1.1 380211-560A1.1	Laying of load bearing surfacing, access track upgrade works, tree and hedgerow removal, divert overhead utility service lines.

A Traffic Management Plan (TMP) will be implemented in advance of any such works.

The schedule of turbine component deliveries will be determined by the turbine supplier however it is estimated that 7 convoys will be required to deliver all of the turbine components to site over the course of the turbine installation works which is expected to take place over the course of 7 months. This is based on a total of 7 no. loads per turbine to deliver blades, tower sections and nacelles, with each convoy consisting of components for two turbines at a time. Over the course of the installation period, it has been assumed convoys will be scheduled to deliver components to site every 4 weeks.

2.5 Construction

Subject to Planning Permission being granted for the Proposed Development, tree felling, upgrading of existing site tracks and the provision of new site tracks will precede all other activities. Drainage infrastructure will be constructed in parallel with the access track construction. This will be followed by the construction of the turbine hardstanding areas and foundations.

In parallel with these works the on-site electrical works i.e., the sub-station and internal cable network as well as off-site connection works to the national grid will be completed. Construction methodologies are provided in the CEMP in Appendix 2.1.

The construction of the Proposed Development in its entirety is expected to take 24 months.

The hours of construction activity for the Proposed Development will be limited to avoid unsociable hours as per Section 8.5 (d) of the code of practice for BS 5228: Part 1: 1997. Construction operations will generally be restricted to between 08:00 hours and 19:00 hours Monday to Saturday. It should be noted that it may be necessary to commence turbine base concrete pours earlier due to time constraints incurred by the concrete curing process. Work on Sundays or public holidays will only be conducted in exceptional circumstances or in an emergency. Additional emergency works may also be required outside of normal working hours as quoted above. Further details on working hours and restrictions of same are provided in the CEMP in Appendix 2.1.

2.6 Operation, Maintenance and Decommissioning/Reinstatement

Wind farm commissioning can take several months to complete from the erection of the final turbine to the commercial exportation of power to the national grid. It involves electrical and mechanical testing and control measures to check that the wind farm will perform and export power to the national grid, as designed and commissioning engineers working through an entire schedule of SCADA (Supervisory Control and Data Acquisition).

During the operational period, the turbines will operate automatically on a day-to-day basis, responding by means of anemometry equipment and control systems to changes in wind speed and direction. The turbine manufacturer or a service company will carry out regular maintenance of the turbines. Scheduled services will typically occur twice a year.

The operation of the wind turbines will be monitored remotely, and an operative working from a remote-control centre will oversee the day to day running of the proposed wind farm.

The applicant requests the grant of permission on the basis of a 40-year operational period from the date of full operational commissioning of the wind farm. With permission for the onsite substation and grid connection sought in perpetuity given that the substation will form part of the national electricity network. Therefore, the substation will be retained as a permanent structure and will not be removed.

Forty years is the anticipated minimum useful lifespan of wind turbines which are being produced for the market today. The lifespan of wind turbines has been increasing steadily in recent years and allowing this duration will improve the overall carbon balance of the development, therefore maximising the amount of fossil fuel usage that will be offset by the wind farm. Leaving the wind turbines in-situ until the end of their useful lifespan would be optimum from an environmental viewpoint, particularly in relation to carbon savings.

2.7 Decommissioning

On decommissioning, cranes will disassemble the above ground turbine components which will be removed off site for recycling. All the major component parts are bolted together, so this is a relatively straightforward process.

The foundation pedestals will be covered over and allowed to re-vegetate naturally. Leaving the turbine foundations in-situ is considered a more environmentally sensible option as to remove the reinforced concrete associated with each turbine would result in environmental nuisances such as noise and vibration and dust.

It is proposed that all the internal site access tracks and turbine hard standings will be left in place. These will continue to be used for forestry and agriculture. Turbine foundation pedestals and hardstanding areas will be covered over with topsoil previously stripped and used for landscaping purposes during the construction stage and left to revegetate naturally.

The temporary accommodation works along the TDR will not be required for the decommissioning phase as turbine components can be dismantled on site and removed using standard HGVs.

Grid connection infrastructure including the on-site substation and ancillary electrical equipment will form part of the national grid and will be left in situ.

The meteorological mast will be decommissioned using a similar methodology as the construction except in reverse.

It is expected that the decommissioning phase will take no longer than 6 months to complete.

3. SITE SELECTION AND ALTERNATIVES

3.1 Alternatives Considered

The requirement in relation to alternatives in the EIA process is set out in the Environmental Impact Assessment (EIA) Directive (2011/92/EU as amended by 2014/52/EU), in Article 5 (1)(d), which states that the following information regarding alternatives must be included in an EIAR:

> *"a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment"*

Article 5(1)(f) of the EIA Directive requires that the EIAR contains

> *"any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected"*

Annex IV of the EIA Directive states that the information provided in an EIAR should include a:

> *"description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option including a comparison of the environmental effects."*

This chapter has particular regard to the environmental considerations which influenced the selection of alternatives and details the evolution of the Proposed Development through alternatives considered, indicating the main reasons for selecting the chosen option taking into account the effects on the receiving environment and considering the comparison of environmental effects of each alternative.

The alternatives considered have been described in line with the Guidelines on the *Information to be Contained in Environmental Effect Assessment Reports* (EPA, 2022). The Guidelines state:

> *"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."*

This Chapter also details non-environmental factors of the design process where they are relevant to the evolution of the Proposed Development.

Consequently, taking account of the legislation and guidance requirements, this chapter of the EIAR addresses alternatives under the following main headings:

- 'Do Nothing' Alternative;
- Alternative Locations (the Strategic Site Selection process);
- Alternative Layouts (including alternative turbine numbers);
- Alternative Design (including transport routes, site access, and grid connection routes);
- Alternative Processes;

- Alternative Operational Life.

3.1.1 Do-Nothing Alternative

Under the "Do-Nothing" scenario, the Proposed Development would not proceed i.e. the development of a renewable energy project is not pursued, and the Site remains in use as agriculture, areas of commercial forestry and turbary activities with no changes made to the current land-use practice.

In the "Do-Nothing" scenario, the prospect of creating sustainable energy through County Clare's wind energy resource would be lost at this site.

The nation's ability to produce sustainable energy and reduce greenhouse gas emissions to meet EU targets and National targets, as set out above, would be impeded. This may contribute to Ireland incurring significant financial penalties from the EU if targets are not achieved and result in continued global warming. Additionally, it would affect Ireland's commitment to "pursue efforts" to limit warming as agreed to in the Paris Agreement (2015). This will result in continued significant negative effects to air quality and climate.

According to EirGrid Group's *All-island Generation Capacity Statement 2020 – 2029* (EirGrid, 2020), the growth in energy demand for the next ten years on the Island of Ireland will be between 17% and 41%. In the 'Do-nothing' scenario, importation of fossil fuels to maintain growing energy supply will continue and Ireland's energy security will remain vulnerable. A "Do-nothing" scenario would contribute to the strain on existing energy infrastructure and may affect national economic growth if energy demand cannot be achieved. This may be exacerbated by the government's plans to cease the burning of coal at Moneypoint as well as the termination of all peat burning at Bord na Móna's powerplants in 2020.

Under the "Do-Nothing" scenario, the socio-economic benefits associated with the proposed development will be lost. These benefits include the creation of c. 76 no. direct and indirect jobs during the operational phase of The Proposed Development. Furthermore, under the "Do-Nothing" scenario the local community will not benefit economically from the Community Benefit Fund associated with the Proposed Development which could be used to improve physical and social infrastructure in the local area.

In the "Do-Nothing" scenario, the potential environmental effects of the proposed development as set out throughout this EIAR will not occur. Table 3-1, of Chapter 3 – Site Selection and Alternatives Considered sets out the potential effects of the 'do-nothing scenario' compared to the residual effects associated with the proposed development in relation to the various environmental topics covered in the individual chapters of this EIAR.

3.1.2 Strategic Site Selection Process

Prior to the selection of the site for this development, the Applicant undertook a detailed screening exercise using selection criteria and several phases to assess the potential of several potential sites that may be suitable to accommodate a wind energy development. The site selection criteria included:

- Compliance with Planning Designation
- Avoidance of Environmental Designations (e.g. Special Protection Areas (SPAs) or Natural Heritage Areas (NHAs)
- Separation distance from dwellings
- Level of visual impact
- Proximity to Grid

- Wind Resource
- Site accessibility

This methodology applied represents Best Practice and generally aligns with the SEAI LARS[1] approach.

A technical review of potential candidate sites for wind energy development within the region was conducted using a desk-based geographical information system (GIS) screening exercise. The first step in the selection process was to examine high level constraints to eliminate areas which were deemed unsuitable for wind turbines. This identified all registered environmental designations (SAC, NHA, SPA) protected views, cultural and heritage sites, and other areas of special sensitivity.

The process of identifying a suitable wind farm site is influenced by many factors. At a macro scale, the national and regional planning policy together with distance from designated sites. Also, the available grid capacity; cumulative effects with existing and permitted wind farms, as well as other existing, permitted and proposed developments and the available wind speeds in an area are all integral factors. Additionally, other interrelated factors are considered including: the wind farm must, in non-environmental terms, be commercially viable to ensure it will attract the necessary project finance to progress to the construction phase and ultimately deliver renewable electricity to the National Grid which is an objective of National energy policy.

Alternative locations were eliminated in the early stages of the site selection process as the goal for this project was to deliver a large-scale wind farm with approximate MEC of 80MW. Following a comprehensive assessment of all criteria, the proposed development site was deemed suitable to progress as a potential wind farm location. The following is a summary of the methodology used in the screening process.

3.1.3 Alternatives Considered

The design of the Proposed Development has been an informed and collaborative process from the outset, involving engineers, environmental, hydrological, geotechnical, archaeological and transport specialists. The objective of which is the avoidance of significant environmental effects while designing a project which is technically feasible and maximising wind resource. Throughout the preparation of the EIAR, the layout of the Proposed Development has been revised and refined to take account of the findings of all site investigations and surveys, consultation and impact assessment, all of which have brought the design from its first initial layout to the current proposed layout.

The following alternatives were considered:

- Alternative site layouts.
- Alternative transport routes and site access.
- Alternative grid connection options.
- Alternative operational life.

[1] Sustainable Energy Authority of Ireland, Methodology for Local Authority Renewable Energy Strategies (April 2013) - Methodology-for-Local-Authority-Renewable-Energy-Strategies.pdf.

3.1.3.1 Alternative Layouts

The design of the Proposed Development was an iterative process which considered a range of alternative designs. These were influenced by potential environmental effects identified by additional environmental surveys/assessment, leading to the evolution of the developable area and the establishment of the final design as proposed. In total there were four (4 no.) design iterations considered, as shown in Table 3-4 below.

Also, a comparison of all the design iterations is presented in Figure 3-2 to Figure 3-6 inclusive.

Table 3-1: Alternative Wind Farm Design Options.

Layout No.	No. of Wind Turbines	Tip Height (m)	Rotor Diameter (m)	Total Approx. Installed Capacity (MW)
Preliminary Design Option Note 1	16	149.5-150	133-136	67.2 to 76.8
Design Iteration 1 Note 1	17	149.5-150	133-136	71.4 to 81.6
Design Iteration 2	15	150	136	67.5
Design Iteration 3	15	150	136	67.5
Design Iteration 4	14	150	136	63
Note 1 – the following turbine range was assessed: Nordex-N133, Enercon-E138 and Vestas-V136				

3.1.3.2 Alternative Transport Routes and Site Access

A total of six turbine delivery route (TDR) options were assessed as part of this EIA. These six route options are illustrated in Figure 3-5.

The delivery of turbines and associated items will arrive from either the port at Foynes and Galway and proceed to the M18 Motorway. Ultimately the most viable turbine delivery / abnormal load route (Preferred Route B) from Junction 12 of the M18 Motorway to the Site was determined as follows (Figure 2.3, Volume IV, Chapter 2 – Description of Development and Chapter 13 – Traffic and Transportation):

- Exits the m18 at the no. 12 junction turning onto the N85;
- Continue on the N85 for 3.8km;
- Take the 2nd exit on the Rock Road West Roundabout onto the N68;
- Continue on the N68 for 22.2km;
- Turn left at the N68/L-6180 junction onto the L-6180;
- Continue on the L-6180 for approximately 4km;
- Turn left onto the TDR Accommodation Bypass of the Six Crossroads Junction and then another left onto the L-2072; and
- Continue along the L-2072 and loads will reach the western site entrance on the right after 5km.

The optimum route, detailed above, was chosen to minimise enabling works along the routes whilst providing the most direct access to the site. The objective will be to maintain the strategic capacity and safety of the M18, N68 and N85 carriageway at all times, cognisant of the Regional Spatial and Economic Strategy, with key sectoral priorities for maintaining the N68 and N85 national road network to a robust and safe standard for users.

As presented in Chapter 13 – Traffic and Transportation of this EIAR and shown on planning drawings, only minor accommodation works will be required to allow for abnormal load delivery, which was a key consideration in selecting this route.

The location of the on-site construction compounds were selected relative to the location of the access into the Site and proximity to the on-site substation.

3.1.3.3 Alternative Grid Connection Options

TLI Group (the Consultant) were engaged by Cloonkett Green Energy Ltd (the Applicant) to identify and analyse potential grid connection options available for the proposed development in Cloonkett, County Clare.

A preliminary grid connection route feasibility assessment was done (Mullan Grid, 2022) where a number of potential routes to Moneypoint were proposed. Another GCR feasibility assessment was done by TLI in 2023, and this focused on three potential options to Moneypoint (see Figure 3-6). The technical details of the route options are outlined in Table 3-6.

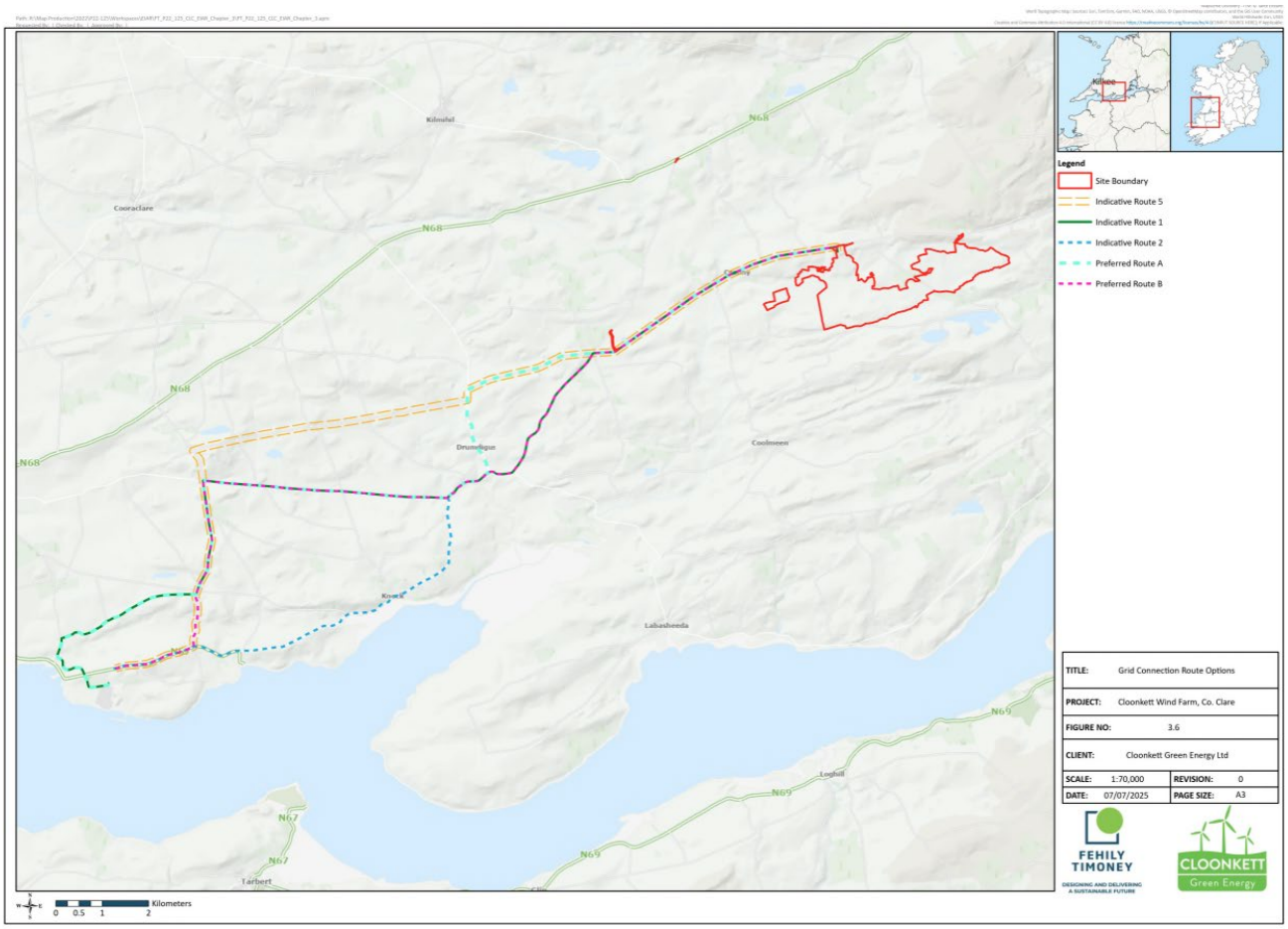

Figure 3-1: Tail Fed Grid Route Options to Moneypoint (please refer to Chapter 2 (and accompanying imagery) for the Final Proposed Grid Connection Option).

Table 3-2: Alternative Underground Cable (UGC) Grid Connection Route Options.

Layout No.	GCR Options	Grid Connection Type	Grid Connection Length (km)	Connecting To
Design Iteration 1 & 2	Option 1 (Indicative Route 1 on Figure 3.3 above)	Underground	23.75	Moneypoint
	Option 2 (Indicative Route 2 on Figure 3.3 above)	Underground	20.13	Moneypoint
	Option 3 (Preferred Route A on Figure 3.3 above)	Underground	24.82	Moneypoint
	Option 4 (Preferred Route B on Figure 3.3 above)	Underground	21.51	Moneypoint
	Option 5 (Indicative Route 5 on Figure 3.3 above)	Underground	21.25	Moneypoint
Design Iteration 3 & 4	Final Option	Loop-in/ OHL	On site connection	Cashla

Based on a detailed review of the proposed GCR's to Moneypoint, it was confirmed there was no capacity there for the energy output from the proposed wind farm in Cloonkett. Also, there is no capacity in Booltiagh 110kV (21km away) or Ennis 110kV (34km away). Therefore, the only viable option was to consider a 220 kV loop-in connection on site at Cloonkett Wind Farm.

Following a customer clinic with EirGrid where potential options were considered, it was determined that Prospect was not viable because there is no capacity there. Hence the optimum route was an on-site 220kV loop-in substation with connectivity to the existing overhead 200KV line. This option has the added advantages that it could be built offline with a relatively short outage for the loop-in; and provides additional bays/capacity and hence future-proofing the grid connection.

Furthermore, the tail fed options to Moneypoint raise a number of technical and environmental challenges. There are a significant number of watercourse crossings along all routes and protected bridge structures and national monuments, including the requirements to traverse National Roads. Additionally, some of the water courses are designated for protected species and discharge into the Shannon Estuary SAC. Therefore, the on-site connection is the most appropriate from an environmental perspective too.

3.1.3.4 Alternative Operational Life

The lifespan of wind turbines has been increasing steadily in recent years and allowing this duration will improve the overall carbon balance of the development, therefore maximising the amount of fossil fuel usage that will be offset by the wind farm. Leaving the wind turbines in-situ until the end of their useful lifespan would be optimum from an environmental viewpoint, particularly in relation to carbon savings.

Furthermore, it should be noted that section 7.20 of the Wind Energy Development Guidelines 2006 states for the following:

'The inclusion of a condition which limits the life span of a wind energy development should be avoided, except in exceptional circumstances'

Assuming the Proposed Development has an installed capacity of 63 MW, the proposed wind farm has the potential to produce approximately 193,158 MWh (megawatt hours) of electricity per year

A 40-year operational life will also have a positive effect on material assets by extending the offsetting of the use of fossil fuels for electricity production and increasing the amount of renewable electricity being supplied to the national grid, as required by EU and national renewable energy targets. This will also benefit Ireland's energy security for a longer period.

Potential adverse effects of a 40-year period of consent relate to residual short-term visual effects and short-term adverse noise effects on nearby residential receptors. However, the related assessments described in this Chapter deem these not significant (see Chapter 8. Noise & Vibration; Chapter 15. LVIA). There are no adverse effects expected from the Grid Connection (GC) because it will remain in place, and so too will the TDR. Therefore, a 40- year operational life will provide greater overall benefits, as shown in Table 3-6, below:

For the purpose of assessment of an alternative the 40-year operational life is compared to a 30-year operational life. A 30-year operational life is used for comparison purposes as 30 years would have traditionally been used as the operational life for a less modern wind farms.

Table 3-3: Potential Residual Environmental Effects For 40 Year Operation Life

Environmental Consideration	40-Year Operation Life	30-Year Operation Life
Air & Climate	Long-term positive effects on air quality and climate due to offset of CO_2 emissions from fossil fuels. Additional 10-year offset to CO_2 emissions.	Long-term positive effects on air quality and climate due to offset of CO_2 emissions from fossil fuels.
Noise & Vibration	Long-term slight to moderate adverse effects on nearby dwellings as a result of the operational noise. Short-term additional period of slight to moderate adverse effects on these receptors.	Long-term slight to moderate adverse effects on nearby dwellings as a result of the operational noise.
Biodiversity	Imperceptible and reversible effects during operational phase. Slightly longer duration of imperceptible impact.	Imperceptible and reversible effects during operational phase.
Ornithology	Slight-imperceptible reversible effect on bird species during operational phase. Slightly longer duration of slight-imperceptible adverse effects.	Slight-imperceptible reversible effect on bird species during operational phase.
Land, Soils, Geology	No residual effects expected.	No residual effects expected.
Hydrology & Water Quality	No residual effects expected.	No residual effects expected.
Population & Human Health	Long-term slight to moderate adverse effect on nearby dwellings from operational noise. Short-term additional period of noise at nearby dwellings.	Long-term slight to moderate effect on nearby dwellings from operational noise

Environmental Consideration	40-Year Operation Life	30-Year Operation Life
Material Assets	Long-term positive effect by offsetting use of fossil fuel. Greater offset due to additional period of operational phase.	Long-term positive effects by offsetting use of fossil fuel.
Traffic & Transport	Imperceptible adverse effects	Imperceptible adverse effects
Archaeology & Cultural Heritage	Indirect, imperceptible to moderate, adverse effects on the wider settings of a number of archaeological sites within the environs of the Site; following mitigation, these effects will be reversed following the decommissioning phase.	Indirect, imperceptible to moderate, adverse effects on the wider settings of a number of archaeological sites within the environs of the Site following mitigation, these effects will be reversed following the decommissioning phase
Landscape & Visual	Slight to moderate visual effects, subject to viewshed as assessed in Chapter 15. Additional short-term visual effect as a result of extended operational life.	Slight to moderate visual effect, subject to viewshed as assessed in Chapter 15.
Telecoms & Aviation	No potential adverse effects expected	No potential adverse effects expected

4. POLICY

4.1 Introduction

This Chapter of the EIAR outlines International, National, Regional and Local policy (where relevant) in combination with relevant legislation relating to the Proposed Development at Cloonkett, County Clare. The Proposed Development refers to all elements of the Proposed Development to be assessed in the EIAR, the details of which are set out within Chapter 2: Description of the Proposed Development. The key elements of the Proposed Development include the Proposed Wind Farm, Grid Connection, On-Site 220kV Substation, Turbine Delivery Route (TDR) and Nodes from the Port of Entry (i.e. Foynes Port or Port of Galway), and the Biodiversity Management Enhancement Plan (BMEP) Lands.

The Irish Planning Policy system is set within a hierarchical structure. EU Directives, Planning Legislation, Ministerial Guidelines, Government Policy and Capital programmes inform national policy

4.2 International Global Policies

International and European legally binding agreements to reduce the reliance on fossil fuels and to manage climate change internationally have been adopted into Ireland's National Energy Policy. Relevant international policies in relation to renewable energy and the need to prevent climate change include the *United Nations Framework Convention on Climate Change* and the *Kyoto Protocol*, which are legally binding agreements which are being facilitated through national energy and climate policy with a clear mandate to support onshore wind energy development within the state.

4.3 European Union Legislation and Policy

The various directives and policies of the EU set a clear mandate for each member state to transition to sustainable, renewable energy and reduce greenhouse gas emissions. The EU aims to reduce the EU's net greenhouse gas emission by at least 55% on 1990 levels by the end of this decade.

EU Legislation and Policies include:

- Renewable Energy Directives (REDII and REDIII);
- Clean Energy for all Europeans Package (2019);
- European Green Deal (December 2019);
- European Climate Law (July 2021);
- Clean Industrial Deal: A Plan for EU Competitiveness and Decarbonisation (July 2025)
- RePower EU Plan
- Commission Recommendation and Guidance to Member States (EU) 2024/1343 of 13 May 2024 on speeding up permit granting procedure for renewable energy and related infrastructure projects

4.4 National Energy and Climate Policy

National energy and climate policy is derived from the overarching European Policy which aims to unify the European Union in energy and climate goals. The following section sets out the relevant national policies which will influence the Proposed Development.

These policies are supported by the latest Programme for Government (2025) titled '*Securing Ireland's Future*' which presents strong climate governance in rapidly reducing climate change in order to protect and improve public health and quality of life and had identified wind energy as having a crucial role to play in this. The government are committed to rapid decarbonisation of the energy sector with an aim of providing the necessary actions to deliver national renewable electricity targets. These government ambitions support the ongoing generation of renewable energy from onshore wind sources, where they state the following commitments:

- To achieve 80% renewable electricity by 2030;
- Deliver 9 GW of onshore wind by 2030;
- Hold at least one RESS auction per year;
- Prioritizing and increase investment in the electricity grid;
- Develop a policy to address repowering and extend the life of existing onshore wind farms.

The importance in complying with the national energy policy at a local level cannot be overstated if Ireland is to achieve its national renewable energy targets. The increase in renewable electricity targets to 80% by 2030 indicates the need for significant escalation in renewable energy production in Ireland.

The following National Legislation and Policies include:

- The White Paper: Ireland's Transition to a Low Carbon Energy Future 2015-2030;
- Climate Action and Low Carbon Development (Amendment) Act 2021;
- Ireland's integrated National Energy and Climate Plans 2021-2023 (NECP's);
- Project Ireland 2040: National Development Plan 2021 – 2030 (NDP) and the National Planning Framework (NPF)
- Climate Action Plan 2025 (CAP25);
- Eirgrid Assessment of Progress with Carbon Budget Compliance;
- Climate Change Advisory Council (CCAC) Assessment;
- National Onshore Wind Targets – State of play (Jan 2025);
- National Energy Security Framework;

4.5 Regional and Local Plans

Regional and Local plans have also been adhered to, including the Southern Regional Spatial & Economic Strategy and the Clare County Development Plan 2023-2029 which sets out the wind energy strategy for the county. The Proposed Development at Cloonkett is located within an area zoned as being "*Acceptable in Principle*" for onshore wind development as per the current County Development Plan.

The Proposed Development contributes to the nation's target increase of renewable energy from 30% to 80% by 2030 and supports the doubling of onshore wind energy in Ireland by 2030 as set out in the Clare Climate Action Plan 2024.

4.6 Irish Energy & Environment Policies

The Proposed Development is in support of national policy. The project supports the enhancement of the competitiveness of rural areas and facilitates the development and diversification of the rural economy by supporting the energy sector and increasing the share of renewables in Ireland's energy mix.

The project supports national targets of climate change mitigation and reduction in greenhouse gas emissions where significant focus has been set out in the Climate Action and Low Carbon Development (Amendment) Act 2021. The ambitious programme for government is prioritising carbon neutrality and renewable energy generation. In light of this, it is important to rely on proven technologies such as on shore wind in order to meet the near-term objectives, as well as long-term objectives.

The Proposed Development promotes the generation of renewable energy at appropriate locations and supports the achievement of a low carbon economy by 2050. It is therefore considered that the Proposed Development is in line with national policy and supports the achievement of national energy and sustainability targets.

4.7 Clare County Development Plan 2023-2029

Specific policies relating to wind energy development in County Clare are contained within the current Clare County Development Plan (2023-2029), which came into effect on the 9th of March 2023.

The Proposed Development will support County Clare in becoming a low carbon County. The Proposed Development will contribute c. 63MW of energy generation to County Clare's Wind Energy targets, which would equate to c. 10.18% of County Clare's 550 MW onshore wind energy target and would account for c. 0.40% of Ireland's national target. This contribution would play a significant role in advancing Clare's renewable energy goals, supporting Ireland's broader climate commitments, and reinforcing the county's position as a leader in sustainable energy development.

The Proposed Development is wholly located within an area designated within the Clare County Development Plan 'Wind Energy Designation' as being within an area '***Acceptable in Principle'*** for wind energy development. This designation states the location of the Proposed Development is considered suitable for wind energy development, subject to the consenting process as outlined in the Wind Energy Strategy and adheres to the proper planning and sustainable development of the area.

4.7.1 Clare Renewable Strategy 2023-2029 (RES)

The Clare County Renewable Energy Strategy 2023-2029 (RES) contains Policy Objectives specific to wind energy development for the entire County and was adopted as part of the Clare County Development Plan 2023-2029. The RES contains both a vision and strategic aims which underpin the vision of Clare County Council for the lifetime of the RES, with the vision and relevant strategic aims as follows:

RES Vision:

A County Clare that is the national leader in renewable energy generation which supports energy efficiency and conservation, and which achieves balanced social and economic development throughout the County and assists in achieving national climate change mitigation targets.

The Proposed Development at Cloonkett directly supports the objectives of the Clare County Renewable Energy Strategy (RES) 2023–2029 by providing approximately 63 MW of new onshore wind capacity. This represents c. 10% of Clare's 550 MW wind energy target for 2030 and c. 0.40% of Ireland's national renewable electricity target, with potential to help exceed the county baseline.

5. EIA SCOPING, CONSULTATION & KEY ISSUES

5.1 Introduction

Consultation is an important part of the Environmental Impact Assessment (EIA) process. This chapter describes the consultation process and EIAR scoping that was undertaken in order to identify key effects from the proposed Cloonkett Wind Farm project to be included in the EIAR.

The consultation process carried out for the project has been a lengthy, detailed and thorough process. A number of points and submissions were raised as part of the consultation process which have informed the project design and this EIAR. This chapter presents the key points that arose through the consultation process and how these points were addressed in the EIAR. The consultation process, scoping and the various pre-application consultation meetings (e.g. with An Bord Pleanála, NPWS, EirGrid, Clare County Council) undertaken in respect of the proposed development are set out in this chapter. Following receipt of scoping responses, further consultation occurred with consultees as appropriate – for instance with the NPWS regarding surveying and bats and Eirgrid regarding the Grid Connection route.

Throughout the consultation process, specific regard has been taken to the *Code of Practice for Wind Energy Development in Ireland – Guidelines for Community Engagement* published on the 21st of December 2016 by the Department of Communications, Climate Action and the Environment.

> *"This Code of Good Practice is intended to ensure that wind energy development in Ireland is undertaken in observance with the best industry practices, and with the full engagement of communities around the country".*

The applicant had regard throughout the pre-planning process of the practical steps that renewable energy promoters should comply with, in engaging with communities as set out in this Guidance.

5.2 Scoping and Pre-Planning Consultation

The purpose of the EIA scoping process is to identify the key points and issues which need to be considered during the environmental impact assessment (EIA) of a project and to eliminate those that are not. The scoping process identifies sources or causes of potential environmental effects, the pathways by which the effects can happen, and the sensitive receptors which are likely to be affected. It defines the appropriate level of detail for the information to be provided in the EIAR. In essence, the primary focus of scoping is to define the most appropriate assessment of significant effects related to the proposed development which comprises the construction of 14 no. wind turbines and 1 no. permanent onsite 220 kV electrical substation and associated compound to facilitate a grid connection via an overhead line (the Proposed Development is described in detail in Chapter 2 of this EIAR.

A scoping request letter and scoping report outlining a description of the proposed project, draft mapping, preliminary table of contents of the EIAR and an outline of the methodology for the assessment was distributed to consultees on the 11th of September 2023. The recipients, listed in full in Table 5-1 and included, the Council, Government Departments, non-governmental organisations (NGOs), interested parties and key stakeholders. Consultees were invited to contribute to the EIAR by suggesting baseline data, survey methodologies and potential impacts that should be considered as part of the impact assessment process and in preparation of the EIAR.

Separate consultation was undertaken with telecom providers to determine that potential impact of the turbines on telecom and communication links.

For more information on this please refer to Chapter 16: Material Assets, Telecommunications and Aviation.

A copy of the scoping request letter and scoping report are included in Appendix 5-1 of Volume 3 of this EIAR.

The purpose of the EIA scoping process is to identify the key points and issues which are likely to be important during the Environmental Impact Assessment (EIA) of the Project and to eliminate those that are not. The scoping process identifies sources or causes of potential environmental effects, the pathways by which the effects can happen, and the sensitive receptors which are likely to be affected. It defines the appropriate level of detail for the information to be provided in the EIAR.

Consultation was carried out throughout the development of the EIAR and through various wind farm design iterations. The list of consultees is provided in Table 5-1 of Chapter 5 - EIA Scoping and Consultation. Consultees were invited to contribute to the EIAR by suggesting baseline data, survey methodologies and potential impacts that should be considered as part of the impact assessment process and in preparation of the EIAR.

Initial consultation commenced in September 2023 whereby consultees were invited to provide observations and comments in relation to an outline Proposed Development comprising 14 turbines. Copies of the consultation responses received are included in Appendix 5-2 of Chapter 5 - EIA Scoping and Consultation.

5.3 Conclusion of EIA Scoping

Consultation was carried out with a number of stakeholders, including Clare County Council, An Bord Pleanála, Government Departments, Non-Governmental Organisations, aviation organisations, and local residents. Their comments and feedback were incorporated into the project design iterations and to the assessments conducted in the EIAR as identified in this chapter.

Pre-planning consultation was held with Clare County Council to determine the key points and potential impacts of the proposed development and to inform the assessment methodology. Further detailed correspondence was received from Clare County Council during the scoping exercise which informed various aspects of the EIAR assessment.

Pre-planning consultation was held with An Bord Pleanála in accordance with Section 37B of the Planning and Development Act 2000 (as amended) to determine the key points and potential impacts of the proposed development and to inform the assessment methodology. These meetings also took place to conform with the Strategic Infrastructure Development (SID) process.

The public consultation stage commenced in September 2023 and has been facilitated for over 3 years through organising public consultation meetings and community workshops, door-to-door engagement, engagement with the local newspapers and representatives and materials circulated to local residents by post. The developer is committed to continued community engagement with residents as the planning process progresses.

A dedicated email address, phone number and postal address was provided with circulated materials so members of the public could directly contact the project team. This process was commenced as early as possible in order to inform the design of the project and to inform the EIA process prior to its commencement. A dedicated website was also set up to allow for further open communication between the applicant and community throughout the development process and to run-up to the application submission. In addition, a project website was set up to provide information and materials to inform the public of the proposed project.

Observations and issues that arose during the scoping and consultation process have informed the design, assessment and mitigation measures proposed as part of this project as set out throughout the EIAR.

6. POPULATION AND HUMAN HEALTH

6.1 Introduction

This Chapter assess the likely indirect and direct significant effects on Population and Human Health from the Proposed Development. The potential effects are initially considered without mitigation, and the residual effects post mitigation are described. The assessment considers the potential effects during all phases of the development which include construction, operation and decommissioning.

This EIAR Chapter 6 – Population and Human Health chapter assesses the following:

- Population:
  - Population and Settlement Patterns;
  - Employment and Economic Activity;
  - Land Use; and
  - Recreation, Amenity and Tourism.
- Human Health.
- Human Health and Safety including the potential for the Proposed Development to cause accidents and/or natural disasters and the vulnerability of the Proposed Development to potential disaster/accidents.

The assessment presented in this chapter draws upon the findings of other EIAR chapters, such as EIAR Chapter 4 – Policy, EIAR Chapter 7 – Air Quality and Climate, EIAR Chapter 8 – Noise and Vibration, EIAR Chapter 9 – Biodiversity, EIAR Chapter 10 – Soils, Geology and Hydrogeology, EIAR Chapter 11 – Hydrology and Water Quality, EIAR Chapter 12 – Shadow Flicker, EIAR Chapter 13 - Traffic and Transportation, EIAR Chapter 15 - Landscape and Visual Impact and EIAR Chapter 16 - Material Assets, Telecommunications and Aviation. In addition, other assessments are set out including those relating to potential effects on population statistics, socioeconomics, changes to land use, facilities, human perception, and human safety.

6.2 Population

The Proposed Development is located c. 19 km south-west of Ennis, approximately 20 km north-east of Kilrush and approximately 14 km west of Shannon Airport.

The area is predominantly rural in character consisting of one-off and small clusters of houses focused on the local road network. For the purposes of this assessment, a maximum radius of 20km set back from the boundary of the Proposed Development Site is considered an appropriate distance as the possible effects related to traffic, noise, visibility and any environmental considerations are greatly reduced at this distance.

As described within EIAR Appendix 8 – Noise and Vibration and Appendix 8.1 Baseline Noise Measurement, as provided in EIAR Volume III, baseline noise monitoring was undertaken at 10 locations, locations NL1 – NL10, to establish the existing background noise levels at each of the locations representing the nearest residential receptors to the north, south, east and west of the proposed wind farm, in line with the Wind Energy Development Guidelines (WEDGs, 2006).

Following completion of layout optimisation, and, in line with current best practice, a separation distance of 600m (4 times tip height) was achieved from the closest non-financially involved landowner. This is further supported by the ground proofing survey and planning application search last updated August 2025.

At a county level, in the 2016 Census, the total population of County Clare was 118,817 persons. This showed a slight increase from the previous census in 2011, which showed 117,196 persons resident in County Clare. However, according to the 2022 Census, the total population of County Clare was 127,938 persons, reflecting a 7.7% increase since 2016, and an 8% rise since the 2011 Census.

The most recent census in 2022 shows Killadysert ED has the largest population of both Kilfiddane and Killadysert ED's. In the census of 2022, the Kilfiddane ED showed a population of 345 persons, with 176 persons recorded as male and 169 female, with Killadysert having 955 persons, with 478 recorded as male, and 477 female. In the census of 2016, the Killadysert ED contained a population of 905 persons, (447 male/458 female), with Kilfiddane ED containing 325 persons 167 male/158 female). Kilfiddane had a 6.2% population increase between 2016 and 2022. Killadysert had 5.5% increase.

During the Construction Phase of the Proposed Development, employment and unemployment figures as shown in Table 6-2 Total Population aged 15+ State, County Clare and the 2 no. ED's, contained in Chapter 6 of Volume II, indicates that there is an available work force in County Clare due to the number of large and medium sized settlements in proximity of the Proposed Development. Therefore, it is expected that workers required for the Construction Phase of the Proposed Development will be drawn from settlements within the County.

The impact of the construction of the proposed temporary accommodation works will be the increase in construction-related traffic on the local road network. This will have several potential effects, including:

- Delay, traffic congestion, and disruption to road users;
- Road safety issues should the works not be carried out in line with good traffic management practices;
- Inappropriate parking of construction related vehicles in the public road in the vicinity of the works areas;
- Soiling of the public road leading to a general lack of cleanliness and poor skid resistance on roads;
- Damage to existing public road infrastructure.

These effects are short term in duration and slight in significance and considered likely during the construction stage. The likelihood of significant effects is slight.

The population of the Proposed Development ED's recorded in the 2022 Census was 345 for Kilfiddane ED and 955 for Killadysert ED, giving a total population of 1,300 persons. Workers that may be availing of temporary residence during the Construction Phase have been assessed as a population impact, but workers commuting daily and returning to their home residence are not considered as they have no impact on the local population during the construction phase.

The population of the Proposed Development Area will increase temporarily during construction hours and return back to normal outside of working hours on a daily basis over the 24-month construction period. As construction work is temporary, it is unlikely that workers coming from outside the ED's will take up residence within the Proposed Development ED's. However, some workers may choose to stay in accommodation in the larger settlements such as Ennis or Shannon or settlements located outside the ED's which are accessible via the N68 or M18 Limerick/Galway motorway. Overall, it is not expected that the construction of the Proposed Development will have a significant effect on population in the area.

Once constructed, there will be direct and indirect employment associated with the Operational Phase of the Proposed Development. Opportunities for mechanical and electrical contractors and craftspeople to become involved with the operation and maintenance, in addition to ecological monitoring and management of the BMEP.

According to the European Wind Energy Association's (EWEA) report *'Wind at Work'* (2009), it is estimated that 1.2 jobs are created per MW are during installation of wind energy projects based on 1 year construction period. Based on an installed capacity of 63MW, the Proposed Development could create 76 jobs, predominantly during the Construction and Decommissioning Phase. These jobs include operations and maintenance, backoffice support and indirect jobs created by other activities related to installed turbines including IPP/utilities, consultancy firms, research institutions, universities and financial services.

Operational Phase employees tend to be specialist contractors who move between developments and generally do not take up residence close to operating wind farms for the purpose of maintenance of wind farm.

Following completion of layout optimisation, a separation distance of 600m (4 times tip height) was achieved from the closest landowner, located over 518m from the nearest proposed wind turbine. Potential for effect on residential amenity due to noise, vibration, and dust during the Construction Phase, and Operational Phase in the form of visual effects, noise and shadow flicker would be anticipated if an appropriate setback distance was not applied.

It is not expected that the operation of the Proposed Development will have a significant effect on population in the area.

It is expected that decommissioning of the Proposed Development will not have a significant effect on Population in the area.

6.3 Socioeconomics, Employment and Economic Activity

Live register data, accessed in August 2025 (Last updated in August 2025 and available through (https://data.cso.ie), provides information relating to the number of people registering for Jobseekers Benefit, Jobseekers Allowance, or for various other statutory entitlements. The figure is useful to gauge unemployment estimations for an area, however, it is noted that the Live Register data includes part-time workers (working up to three days per week), seasonal workers and casual workers who are entitled to Jobseekers Benefit or Jobseekers Allowance and therefore, cannot be relied upon entirely for conclusive employment data. Furthermore, there was a significant increase in unemployment throughout the country due to the COVID-19 pandemic, however, the effects of this have largely receded.

The construction of the Cloonkett Wind Farm will create employment opportunities.

According to the *European Wind Energy Association's* (EWEA) report '*Wind at Work'* (2009), 1.2 jobs per MW are created during installation of wind energy projects based on 1 year construction period.

Using this figure, a projection of approximately 76 no. long term jobs could be created as a result of the Construction and Decommissioning Phase of the Proposed Development, which is anticipated to have an installed capacity of 63MW.

As a result, the Construction Phase of the Proposed Development will have a short-term, significant positive impact on the employment profile of the area around Cloonkett, and a short-term slight, positive impact on local businesses and services in the nearby towns and villages of the Study Area.

It is expected that the Proposed Development will have a significant effect on Socioeconomics, Employment and Economic Activity in the area.

In the context of the urgent need to deliver renewable projects and the projected shortfall in available projects to meet targets, every individual project is critical. The Proposed Development would contribute to increasing Ireland's renewable, domestically produced, wind energy, helping to reduce emissions, improve energy security and achieve renewable electricity targets such as those outlined in CAP25.

Increased renewable electricity production as a result of the Operational Phase of the Proposed Development will likely have a positive medium to long-term economic effect due to the cost savings associated with the avoidance of fossil fuel imports. This will also act cumulatively with other proposed, consented and existing renewable energy projects throughout the country in providing cost savings.

It is expected that the Proposed Development will have a significant effect on Socioeconomics, Employment and Economic Activity in the area.

As outlined in EIAR Chapter 1 – Introduction, and the Community Engagement Report (Appendix 5.2 of Volume III of this EIAR), for each megawatt hour (MWh) of electricity produced by the wind farm, the Proposed Development will contribute €2 into a community benefit fund for the RESS period i.e. the first 15 years of operation.

It is expected that the Proposed Community Benefit Scheme for the Proposed Development will have a significant effect on population in the area.

It is a reasonable assumption based on the available national and international literature that the provision of a wind farm at the proposed location would not have an adverse effect on the property values in the area and therefore, it is not expected that the Proposed Development will have a significant effect on Property Values in the area.

There will be a temporary to short-term slight, positive impact to socioeconomics, employment and economic activity in the Wind Farm Site associated with the employment of construction workers within the vicinity of the development during the decommissioning phase.

It is not expected that the decommissioning of the Proposed Development will have a significant effect on Socioeconomics, Employment and Economic Activity in the area.

6.4 Land Use

The Proposed Wind Farm is situated within a lowland site ranging from approximately 50-100 m altitude above sea level. The majority of the main study area consists of peatland habitats of varying conditions including actively cutover raised bog, re-vegetating cutover and turf banks, several intact raised bog remnants, and heathlands. The remainder of the site consists of commercial conifer plantation woodland with extensive drainage (planted previously on peatland substrates), semi-natural and intensely managed improved agricultural grasslands and scrub mosaics. The rural landscape surrounding the study area is dominated by intensely managed agricultural land.

The Site is located in a sparsely populated rural context. There are 161 residential properties within 2 km of the turbine array and 57 residential properties within 1 km of the turbine array as shown on Figure 2.4. The closest property to a turbine is located ca. 518 m distance. This property belongs to an involved landowner. All other residential properties are located greater than 600 m from the turbine array. The on-site substation is located 149 m from the nearest residential property.

The Site is situated within Catchment 27 of the Shannon Estuary North and spans the waterbody sub-catchments of the Carrowreagh East stream [EPA code 27C492] and the Cloonkett stream [EPA code 27C12].

The Cloonkett stream, a tributary of the River Cloon [EPA Code 27C02], flows west and borders the Site to the south while beyond it, further south, lie two proposed Natural Heritage Area (pNHA) lakes; Cloonsnaghta Lough (site code: 001004) and Gortglass Lough (site code: 001015). A second narrow tributary of the River Cloon, the Carrowreagh East stream, flows west within the north-west section of the Site. Both of these tributaries meet the River Cloon approximately 2 km west of the Site.

There is a small area of National Indicative Fluvial Mapped (NIFM) flood zone located within the extreme southern portion of the Site where biodiversity enhancements are proposed however there is no proposed wind farm infrastructure in this area. Refer to Chapter 11 and Appendix 11.3 for further details on site specific flood risk assessment.

As described in EIAR Chapter 10. Soils, Geology and Hydrogeology, the Site is characterised by the presence of low permeability subsoils and a relatively poor aquifer beneath the Site. Site is entirely underlain by Carboniferous (Namurian) Central Clare Group (CCG) bedrock. This is made up of a series of alternating stratigraphic sequences of marine and non-marine sediments comprising mudstone, siltstone and sandstone.

There are no recorded archaeological sites located within the boundary of the Wind Farm Site. There is one National Monument in State Care located within 10 km of the Site. This comprises an Augustinian Abbey located on Canon Island on the River Shannon at a distance of approximately 7.5km to the southeast of the Site (see EIAR Chapter 14. Cultural Heritage).

The TDR will be confined to the public road corridor with the exception of locations where temporary accommodation works (mainly comprising laying of load bearing surface, verge widening and street furniture/pole removal) will be required to facilitate the delivery of abnormal loads.

One TDR Node involves crossing private lands between the Local Roads L6180 and L2072. The location of these TDR Nodes is shown in Figure 2.3, Volume IV. Land use associated with this TDR Node is agricultural. Refer to Chapter 13 for further information on the TDR and associated temporary accommodation works.

The Proposed Development will result in a change of land use in areas where access tracks, wind turbine bases, hardstanding areas, met mast, substation and associated drainage infrastructure will be located. The lands affected are currently in use for Agricultural grassland, turbary or cutover Bog. Turbary and existing agricultural practises and uses will largely remain, therefore, the Proposed Development will have minimal adverse effects on existing land use. However, some land use within and in close proximity to the Site will be temporarily disrupted during the construction phase. This will occur on lands where turbines and associated infrastructure are proposed.

This is likely to have a temporary slight adverse effect on residential land-use due to noise nuisance because of machinery, however, it is not expected that the construction of the Proposed Development will have a significant effect on Land Use in the area.

The Operational Phase of the Proposed Development will result in a change of land use in areas where access tracks, wind turbine bases, hardstanding areas, met mast, substation, and associated drainage infrastructure will be located. The lands affected are currently in use for Agricultural grassland, turbary or cutover Bog. Turbary and existing agricultural practises and uses will largely remain, therefore, the Proposed Development will have minimal adverse effects on existing land use.

The Operational Phase will not adversely affect agricultural practices on lands adjacent to the Proposed Development. There are numerous examples of renewable energy developments throughout the country and internationally where livestock coexist, and routinely graze, in the same fields as wind turbines (AWEA, 2019). As such, there will be no significant adverse effects to existing agricultural land use as a result of the Proposed Development.

The BEMP lands are contracted for the lifetime of the Proposed development.

It is not expected that the decommissioning of the Proposed Development will have a significant effect on Land Use in the area.

6.5 Recreation, Amenity and Tourism

The latest statistics from Fáilte Ireland for overseas tourism relates to 2024, and these latest available figures show that in the year ending 2024, overseas and Northern Ireland tourist expenditure in the Republic was an estimated €6.6 billion, with a further €1.5 billion spent by overseas visitors on fares to Irish carriers. Domestic tourism expenditure amounted to €3.6 billion, making tourism a €12 billion industry. Every €1m of tourist expenditure helps to support 20 employees in tourism industries, with approximately 29 cents generated in tax, with Fáilte Ireland estimating between €3 billion was accrued by the Government through taxation of tourism in 2024.

The Proposed Development Site at Cloonkett is located c. 14km northeast of the *'Wild Atlantic Way'*, with the *'Shannon Estuary Way'* located c. 5km to the south of the Site at its nearest point. CDP Section 18.3.4 '*Place Making and Amenity Along Tourism Corridors'* define the '*Wild Atlantic Way'*, along with the *'Shannon Estuary Way'*, as the following:

> *The Wild Atlantic Way and the Shannon Estuary Way are essentially routes with potential stoppingoff points at the towns, villages and viewing points along the way. The road is the 'place' in this instance from which the coast and surrounding countryside is viewed. It follows that the roads along these need well-defined edges i.e. boundaries which are in character with the area, where setbacks are carefully tailored to the minimum required and are surfaced with locally occurring grasses.*

The most significant recreation activity/attractions in proximity to the Cloonkett Wind Farm site are tourist travel routes, trail walking, Glamping, Camping, and Sports Grounds and the cultural amenity associated with cultural and natural attractions. as shown below in Table 6-7. Further details on natural, cultural, archaeological and residential/commercial assets within the Zone of Influence (ZOI) of the Proposed Development are described within EIAR Chapter 15 - Landscape and Visual Impact.

Community facilities and services in proximity to the Proposed Development are centred on towns and villages in the area. The closest concentrated settlements are the villages of Killadysert (c. 2.8km Southeast), Lissycasey (c.5km North). The nearest large towns to the Proposed Development are Ennis, located c. 19km to the southwest, with Kilrush c. 20 km north-east and Shannon Airport approximately 14 km west.

The proposed TDR does not pass through or by any significant community facilities as it will remain within the public road network.

There are no significant tourism attractions located in direct proximity to the proposed Cloonkett Wind Farm site and TDR, with the closest being the Shannon Estuary Way (c. 5.5km South), and as such, the Construction Phase of the Proposed Development is not expected to impact on major tourism attractions, tourism numbers or tourism revenue.

Works to facilitate the delivery of turbine components to the Site are detailed further in EIAR Chapter 2 - Description of the Proposed Development, and include hedge or tree cutting, relocation of powerlines/poles, lampposts, signage and temporary local road widening. For these locations, works have been identified and assessed in the EIAR, however, permission for these works will be sought separately with the local Planning Authority through road opening license as necessary.

During turbine delivery, there is potential for indirect effects to residential/commercial receptors due to the transportation of large and bulky loads on the public roadway, especially once the transportation vehicles exit the M18 motorway. This will likely be as a result of traffic calming measures during the escorting of the turbine components. Temporary accommodation works will be required in these settlements.

Therefore, it is not expected that the construction of the Proposed Development will have a significant effect on Recreation, Amenity and Tourism in the area.

The most proximate significant tourist attractions to the Proposed Development is Shannon Estuary Way (c. 5.5km South), Wild Atlantic Way (c. 17km Southwest), Dromoland Castle (c. 17.5km Northeast) and Bunratty Castle (c. 22km East). Furthermore, the most proximate amenity facilities include walking trails, recreational amenities and historical sites associated with historical site all located within 15km of the site, with all relevant sites described further within EIAR Chapter 15 - Landscape and Visual.

An assessment of the Viewshed Reference Points (VRP's) over a 20km study area, as described in in EIAR Chapter 15 - Landscape and Visual, indicates that, in most instances, the proposed turbines will generally not be viewed in combination with other existing, permitted or in-planning wind turbines. There are no other large-scale developments within the vicinity of the Proposed Development in terms of cumulative effects with other forms of development. Overall, the Proposed Development will result in an intensification of wind energy development within this landscape context and within the surroundings of south county Clare as existing wind energy development is an established feature within the wider Study Area

Therefore, it is not expected that the operation of the Proposed Development will have a significant effect on Recreation, Amenity and Tourism in the area.

The Decommissioning Phase will have similar temporary effects as the Construction Phase with the movement of large turbine components away from the site. There may be a minor loss of roadside and trackside vegetation that has grown during the Operational Phase of the Project, but this can be reinstated upon completion of decommissioning. Areas of hard standing that are of no further use will be reinstated and reseeded to blend with the prevailing surrounding land cover of the time.

Furthermore, and described in detail within Appendix 2.1 CEMP of Volume III of this EIAR, within 2-3 years of decommissioning, there will be little evidence that a wind farm ever existed on the site, albeit the proposed onsite substation will remain in perpetuity as part of the national grid infrastructure, in addition to residually useful access tracks.

It is not expected that the decommissioning of the Proposed Development will have a significant effect on Recreation, Amenity and Tourism in the area.

6.6 Human Health & Safety

Human health in relation to this assessment refers to the nature and possibility for adverse health effects on humans. From analysis of the health statistics as returned with the 2022 census, the majority of the general health of those in Kilfiddane ED recording their health as being 'Very Good' (170 persons), 'Good' (137 persons) and 'Fair' (32 persons). In the Killadysert ED, health statistics are recorded as being 'Very Good' (485 persons), 'Good' (352 persons) and 'Fair' (86 persons).

The census data indicates that the population of the Proposed Development areas ED's is in a slightly better health condition overall especially for those stating that their Health was very good and Good when compared to the state and county averages. These higher figures for those within the 'Very Good' category within in the Proposed Development ED may be attributed to the predominantly rural nature of areas where they reside, and the associated health benefits of clearer air, along and sparse population of these sites in contrast to potentially slightly unhealthier densely populated areas with higher levels of various pollutants.

With respect to health and safety, the Health and Safety Authority (HSA) of Ireland monitor fatal workplace injuries throughout Ireland. In January 2025, the HSA confirmed 33 people lost their lives in work-related incidents during the year ending 2024 (Health and Safety Authority (2025)), which was a reduction of almost a quarter on the number of fatalities in 2023. The HSA also confirmed the construction sector saw a decline in fatalities from 10 in 2023 to 5 in 2024. Though this figure shows a decline of 50% on fatalities from 2023, it still indicates the danger levels which workers are exposed to on construction sites when compared to other economic sectors.

The Proposed Development will be constructed in accordance with national legislation including *'Safety, Health and Welfare at Work (Construction) Regulations'* 2013 (S.I. No. 291 of 2013) and other current regulations published at the time of construction.

Overall, the engineering solutions and inclusion of proper construction and safety protocols, as shown in the TMP, demonstrate the impacts to human health and safety within and in proximity to the site during construction has been adequately analysed and assessed, with appropriate mitigation measures applied. As a result of the mitigation measures, the impacts to human health and safety during the 24-month construction period is considered low during the Construction phase.

All drainage measures, including check-dams and /or silt traps, along the proposed access track will be installed in advance of the works along with the first layer of access track construction. Further details on hydrology and drainage are contained in EIAR Chapter 11 - Hydrology and Water Quality, the Surface Water Management Plan (SWMP) which is contained within EIAR Appendix 11.1 SWMP of Volume III of this EIAR.

Pollution prevention measures, such as use of spill kits, water treatment (if necessary), pollution responses plans will be incorporated into all phases of the Proposed Development. This would mitigate effects associated with releases of hydrocarbons, suspended soils and alkaline pH to the water environment. The drainage features will also provide water quality benefits during all stages of works allowing for the filtration and settlement of suspended solids and a means of isolating runoff from pollution incidents (See Appendix 2.1 CEMP and Appendix 11.1 SWMP of Volume III of this EIAR).

Overall, it is not expected that the construction of the Proposed Development will have a significant effect on Human Health & Safety in the area.

Potential human safety issues can occur due to falling ice from turbine blades in cold weather conditions. However, this is unlikely for the proposed development because modern wind turbines are fitted with antivibration sensors. These sensors detect any imbalance caused by the ice on the blades and will trigger the shutdown of turbines until the blades are clear of ice.

Potential effects to the safety of operation and maintenance staff are associated with working at heights, working at steep gradients or uneven ground, moving vehicles and machinery and working with high-voltage electricity. Appropriated trained and competent technical staff will be employed and industry best practice safety protocols will be implemented at all times. Therefore, impact to the safety of operation and maintenance staff is unlikely.

It is not expected that the operation of the Proposed Development will have a significant effect on Human Health in the area.

During the decommissioning works there is potential for negative impact on health and safety of the public, with impacts associated with the presence of a construction crew, increased traffic, presence of heavy goods vehicles and machinery, potential obstructions on the public road and potential obstruction to recreation and amenity trails. Potential impact to public health and safety during the decommissioning phase is considered temporary moderate and negative.

The CEMP (Appendix 2.1 CEMP of Volume III of this EIAR) for decommissioning works will be followed, clear signage will be utilized on public roads and walkways and the community will be informed of works prior to commencement to avoid any potential negative impact to public health and safety. Once good practice is followed, it is not expected that the decommissioning of the Proposed Development will have a significant effect on Human Health in the area.

A "zero shadow flicker" strategy will be implemented using turbine control software to cease turbine operation during periods when shadow flicker is predicted to occur. If this mitigation strategy is adopted, then minimal (near zero hours a year) shadow flicker would occur at any relevant receptors with habitable rooms and windows within 10 rotor diameters of the wind farm.

No cumulative impacts with other proposed or operational wind farms in the area are predicted to occur on any receptors in the study area.

As such, no significant shadow flicker impact is predicted at nearby receptors following implementation of mitigation measures such as a shadow flicker control system.

Following a review of literature regarding the potential impact of operational wind farms on human health, it is concluded that there is no scientific consensus to support an association between negative health impacts and responsible wind turbine development. The operational phase will therefore likely have a long-term, imperceptible, neutral impact on human health in proximity to the wind farm site.

For the Proposed Development, the whole grid connection, between the Wind Farm, the new 220kv on-site substation and connectivity to the existing OHL, is contained within the Site, therefore, the cable fully complies with the ICNIRP and EU guidelines on exposure of the general public to ELF EMF. The potential impact to human health as a result of electromagnetic interference associated with the Operational Phase of the Cloonkett Wind Farm will be negligible, imperceptible and not significant.

EU Directive 2013/35/EU on the minimum health and safety requirements regarding the exposure of workers to the risks from EMFs was transposed into Irish law on 1st July 2016 by the Safety, Health and Welfare at Work (Electromagnetic Fields) Regulations 2016 (S.I. No. 337 of 2016). The regulations impose a number of duties on employers to maintain safety during work procedures. This includes the carrying out of risk assessment, avoiding and reducing risk, employee information, training and consultation and health surveillance where appropriate. The Proposed Development will comply with both EU and Irish law and is not expected that the Proposed Development will have a significant effect on Health and Safety effects from Proposed Cables and Electromagnetic Interference in the area.

7. AIR QUALITY AND CLIMATE

This chapter identifies, describes and assesses the likely significant direct and indirect effects on air quality and climate arising from the construction, operation and decommissioning of the Proposed Development, as well as the effects of climate change on the Proposed Development and the ability of the Proposed Development to adapt to possible climate changes over the course of its lifetime.

European air quality legislation requires that each member state be defined in terms of Zones and Agglomerations for air quality, with Ireland divided into four zones. The EPA has designated four zones within Ireland:

- Zone A: Dublin City and its environs
- Zone B: Cork City and its environs
- Zone C: 24 cities and towns (such as Galway, Limerick and Waterford cities and towns such as Naas, Newbridge, Celbridge, Leixlip) with a population of greater than 15,000
- Zone D: covers the remainder of the country.

These zones were defined to meet the criteria for air quality monitoring, assessment and management described in the Framework Directive and Daughter Directives. The site of the Proposed Development, including the Grid Connection are in Zone D.

7.1 Existing Environment

The study area is located in Zone D and the air quality index for health map on the EPA website shows that the current air quality within the study area is classed as 1 – Good. In terms of climate, the dominant influence on Ireland's climate is the Gulf Stream. Consequently, Ireland does not suffer from the extremes of temperature experience by other countries at the same latitude. Climatic data from Met Eireann's Shannon Airport weather station is presented in the chapter.

7.2 Impact Assessment

If the Proposed Development does not proceed, local air quality and the microclimate will remain unchanged. On a national scale, there will be an increase in greenhouse gas emissions if increasing future electricity needs are not met by alternative renewable sources which has the potential to contribute to air pollution and climate change. The opportunity to contribute to Ireland's commitments under the Kyoto Protocol and to meet national targets as set out in the Climate Action Plan would also be lost.

While immediate forestry felling of 8.4 ha would not be required, clear felling forms part of the cycle of commercial forestry and without the Proposed Development clear felling would likely occur as normal, if at a later date. Air Quality.

The principal sources of potential air emissions during the construction of the Proposed Development will be from the Site, GC, TDR, and the haulage routes; from dust arising from earthworks, tree felling activities, trench excavation along cable routes, construction of the new access tracks, the temporary storage of excavated materials, the construction of the proposed substation, the movement of construction vehicles, loading and unloading of aggregates/materials and the movement of material around the site.

Due to the small number of human receptors (refer to Figure 6.2 within EIAR Volume IV which shows the Commercial, Residential and Mixed Receptors in the area), and distance from the source of the dust emissions, with the closest residential dwelling being approximately 360 m from the main entrance of the Site, the "sensitivity" of the area is "low", as per the criteria set out in the guidance (DMRB, 2007). For further information on human receptors, please refer to Chapter 6 – Population and Human Health, within EIAR Volume II.

Combining the large magnitude of the earthworks with the low sensitivity, the IAQM guidance indicates that the Risk of Dust Impacts are "Low Risk" for the Proposed Development. This will apply during the construction stage and is not likely to be a significant effect.

Calculations of HGV movements associated with the construction of the Proposed Development indicate an average daily increase of 46 HGV trips per day and increases to a peak of 71 HGV trips per day during the peak month which occurs in months 5, 6, 7 and 8 of the programme for HGV traffic (see Chapter 13, Section 13.6.1 of the EIAR).

An average workforce of 40 no. site staff is anticipated, increasing to 60 during peak periods. This is estimated to give rise to an average increase in LGV traffic of 59 no. trips per working day and rising to 73 no. during peak construction periods which occurs in month 20 and 21 of the programme for LGV traffic. The combined HGV and LGV average daily increase are 105 vehicles per day and rising to 143 vehicles per day during peak construction periods occurring in months 5, 6, 7 and 8 of the construction programme.

For context, these average daily increases in traffic are significantly below the threshold of 1,000 annual average daily traffic (AADT) referenced in standard traffic and air quality assessment criteria, below which construction traffic impacts are generally considered to be not significant. The relatively low volume of additional traffic is not expected to result in a likely significant effect on or air quality.

The Proposed Development does not meet or exceed any of the criteria set out in the UK DMRB. Therefore, the air quality assessment model is not required in this instance. Given the relatively small increase in traffic at the Site, and the conclusion of no significant impacts from Chapter 13 – Traffic and Transportation, no effects on air quality are expected.

Some receptors have the potential for dust soiling due to trucks travelling along local routes. This is a temporary, slight adverse effect, which is not considered to be significant.

Once the Proposed Development is constructed there will be no likely significant direct emissions to atmosphere. A diesel generator will be located at the proposed wind farm substation; however, this will only be operated as a back-up/emergency power supply.

Emissions from the diesel generator will therefore be infrequent. During use, a diesel generator will emit carbon dioxide, nitrogen oxide and particulate matter, however, due to the low usage, the effect will likely be imperceptible (therefore non-significant).

Maintenance vehicles will access the Site during the operational period, however, due to the low traffic movements involved (see Chapter 13), the potential adverse effects from their operation will be imperceptible and not significant. Additionally, the operational phase of the wind farm will result in positive effects on air quality due to the displacement of fossil fuels as an energy source. This would have a significant positive effect on Clare County Council meeting their CDP and CAP targets: and a slight, positive effect on Ireland meeting its various climate targets set out in Section 7.1.4 of this Chapter and in Chapter 4 – Policy. The likely effect on Climate Change on a global scale would be imperceptible and as such non-significant.

In terms of decommissioning, there will be truck movements required for removing the wind turbines, earthmoving to cover foundations, and landscaping resulting in vehicular emissions and dust. However, the number of truck movements will be significantly less than the construction phase and the likely potential adverse effects on air quality will be temporary, imperceptible and not significant.

There will also be emissions from machinery on site including for the movement of soil to cover the foundations, however, the related effects on air quality will be not significant. During the decommissioning phase, the substation, grid connection and ancillary electrical equipment will form part of the national grid and shall be left in situ. The internal ducts for cabling, and all the internal access roads, and turbine hard standings will be left in situ, resulting in no additional truck movements and hence no adverse effects from emissions from machinery.

As turbine foundations will be left in-situ following decommission, the Risk of Dust effects on air quality during the decommissioning stage will be imperceptible, temporary and not significant.

In terms of carbon losses and savings, in the absence of any Irish tools, the online Scottish Windfarm Carbon Assessment Tool (https://informatics.sepa.org.uk/CarbonCalculator/index.jsp) was used in July 2025 to estimate carbon savings as a result of the proposed construction and operation of the wind farm. Appendix 7.1, Volume III contains a summary of the variables / inputs used to generate a model for the Proposed Development.

Based on the *Scottish Windfarm Carbon Assessment Tool*, embodied carbon emissions associated with the manufacturing and transportation of turbines (14 no.), together with emissions from construction and decommissioning activities, will release 52,318 tonnes of CO_2 to the atmosphere. This is based on the assessment of the Vestas Model V136 which has a power output rating of 4.5 MW. This represents 22% of the total amount of CO2 emissions that will be offset by the Proposed Development. Losses during the construction and decommissioning phases will be due to reduced carbon fixing potential, losses from soil organic matter and losses due to felling forestry.

7.3 Mitigation Measures

The impact assessment has not identified any likely significant adverse effects on Air or Climate from the Proposed Development. However, while mitigation measures are not required, they are provided here as best practice.

Mitigation measures in relation to air quality include the use of a water bowser to spray works areas and haul routes; loads to be covered; revegetation of exposed soils; good maintenance of machinery; implementation of a dust control plan as part of the Construction and Environmental Management Plan; no idling of vehicles. As the operation of the wind farm will have positive impacts on air quality, mitigation measures are not required.

t is considered that the Proposed Development will have an overall likely positive non-significant effect in terms of carbon reduction and climate change. It will assist Ireland in meeting the EU's latest renewable energy targets set out in the Renewable Energy Directive (2023) which contains a binding target for 2030 of at least 42.5% but aiming for 45%. Also, it will aid in increasing the onshore wind capacity, as per the Climate Action Plan 2024. In terms of renewable energy, the target increase set in the Climate Action Plan 2024 in electricity generated from renewable sources is to increase to 80% by 2030, with 9GW of onshore wind capacity.

7.4 Residual Impacts

Following the implementation of the above mitigation measures, the Site, GC and TDR work areas will result in slight to moderate residual effects arising from fugitive dust emissions during construction activities involving excavations, felling or earthmoving. These will be localised in nature and as they will be associated with elements of the construction phase, they will be temporary in nature and will not result in any likely significant residual effects.

As no likely significant effects on air quality were identified for the construction phase in the pre-mitigation assessment, no likely significant residual effects will arise for the construction phase. While the proposed mitigation measures may reduce the magnitude and duration of the residual effects as compared to the premitigation effects, such mitigation measures are not required to reach a conclusion of no likely significant residual effects.

Should the Proposed Development not be developed, fossil fuel electricity generation will likely be the primary alternative to provide the required quantities of electricity. This will further contribute to greenhouse gas and other air pollutant emissions, as well as hindering Ireland in its commitment to meet its international commitments in relation to increasing renewable electricity production and reduction in GHG emissions.

7.5 Conclusion

There are no likely significant effects expected on Air Quality or Climate as a result of the construction, operation and decommissioning of the Proposed Development.

There are no likely significant cumulative effects expected on Air Quality and Climate as a result of other existing or proposed projects.

There will be a likely long term positive residual effect on Air Quality and Climate as a result of the Proposed Development due to the displacement of fossil fuels.

The mitigation measures identified in this Chapter will be adopted and implemented by the Contractor and have been incorporated into the construction stage CEMP included in Appendix 2.1, Volume III of the EIAR.

8. NOISE AND VIBRATION

8.1 Introduction

Baseline noise monitoring was undertaken at ten receptor locations surrounding the Proposed Wind Farm to establish the existing background noise levels in the vicinity of the Proposed Development. These are some of the closest locations to the Proposed Development as well as representing different noise environments in the vicinity of the Proposed Development.

8.2 Potential Effects

Noise predictions were undertaken to determine the likely impact during the construction works. BS 5228-1:2009+A1:2014 sets out sound power levels and LAeq noise levels of plant items normally encountered on construction sites, which in turn enables the prediction of noise levels at selected locations.

Construction noise modelling is based on the details presented in Chapter 2 Section 2.5 of this EIAR. Noise modelling was carried out using guidance and plant noise data from BS 5228:2009+A1:2014. The ground cover is predominately acoustically soft (G=1). Acoustically soft ground is normally assumed for agricultural land (G=1), and hard surfaces such as roads or concrete would be acoustically hard (G=0). The noise model assumes that the ground cover is a mix between acoustically hard and soft ground with a ground cover of G=0.75 to allow for pockets of acoustically hard ground. Percentage on time for plant is outlined for each of the plant items used during construction.

The construction noise model assessed all tasks with the potential to generate noise. These tasks included: deliveries and/or removal of material to and from site, tree felling, borrow pit activity, preparation of access roads, preparation of hardstands and drainage, pouring of foundations, installation of wind turbines and works associated with construction of the on-site substation, grid connection route and TDR accommodation works.

Deliveries of turbine and substation components to the site will be limited to the turbine delivery route (TDR) outlined in Chapter 13. The construction period is expected to take 24 months. The most intensive period of the works for HGVS will be months 5-7. The busiest construction period will include when the Internal access tracks, preparation of turbine foundations, turbine installation and substation works will be ongoing in parallel. The noise impact for construction works and related traffic will be mitigated by restricting movements along access routes to the standard working hours and excluding Sundays, unless specifically agreed otherwise. For example, during turbine erection and foundation pours, an extension to the working day may be required, i.e. 05:00 to 21:00, but this would be necessary only on a relatively small number of occasions. If turbine deliveries are required at night, it will be subject to agreement with the relevant planning authority and it would be ensured that vehicles on local roads do not wait outside residential properties with their engines idling, and that the local residents will be informed of any activities likely to occur outside of normal working hours. Site traffic is addressed as part of specific construction activities in subsequent sections.

Assuming all plant associated with tree felling is operating, the predicted cumulative noise at noise sensitive location R231 is 49.9 dB. Therefore, the predicted noise at the nearest noise sensitive location is below the daytime noise limit of 65 dB LAeq,1hr. The noise levels predicted at other locations in the vicinity of tree felling are lower. The noise associated with the felling activity is expected to have a slight effect that is temporary in duration.

In terms of the noise generated from tree felling construction activities, this not predicted to generate a significant effect.

Assuming all construction activities required for the borrow pit occurs simultaneously, the highest predicted noise level from the construction activities is 54.2 dB LAeq, 1hr which is below the 65dB LAeq, 1hr noise limit. The predicted construction noise from borrow pit activities at other locations is lower. The borrow pit construction activities are expected to have a slight effect that is temporary in duration.

In terms of the noise generated from borrow pit construction activities, this not predicted to generate a significant effect.

Assuming all construction activities required for the preparation of the access tracks occur simultaneously, the predicted noise level at the closest location to these construction activities is 56.7 dB LAeq,1hr which is below the 65 dB LAeq,1hr noise limit. The predicted level at locations farther from the works is lower. Noise from construction activities from construction of access tracks, hardstands and drainage are expected to have a slight effect that is temporary in duration.

Assuming all construction activities required for the preparation of the turbine foundations occur simultaneously, the predicted noise level from the construction activities is 50.9 dB LAeq,1hr. The predicted noise levels are below the 65dB LAeq,1hr noise limit. The construction works associated with the preparation of the turbine foundations are expected to have a slight effect that is temporary in duration.

In terms of the noise generated from construction of wind turbine foundations, this not predicted to generate a significant adverse effect.

Turbine components will be delivered to the Site and a mobile telescopic crane will lift the turbine components into place. A worst-case scenario would be the two cranes lifting turbine components 80% of the time was assumed, in addition to noise related to the delivery of turbine components. R193 is located approximately 675m from Turbine 1 and R167 is located approximately 625m from Turbine 14. The predicted noise levels are presented in Table 8-11. The predicted cumulative noise level at R193 is 45.5 dB LAeq,1hr. The predicted noise levels are below the 65 dB LAeq,1hr noise limit. The predicted noise from this activity at other locations are lower. The construction works associated with the installation of the wind turbines are expected to have a slight effect that is temporary in duration.

In terms of the noise generated from installation of the wind turbines, this not predicted to generate a significant adverse effect.

The cumulative predicted noise levels assuming all activity occurs simultaneously is predicted to be 44.3 dB LAeq,1hr at the nearest occupied dwelling which is below the construction noise limit of 65 dB LAeq,1hr. The works associated with the construction of the bridge is expected to have a slight effect which is temporary in duration.

In terms of the noise generated from the clear span bridge construction, this not predicted to generate a significant adverse effect.

The nearest occupied dwelling R193 is approximately 150m from the edge of the substation area. The highest cumulative predicted noise levels for both the Site Clearance and Preparation works and the preparation of hardstanding areas is predicted to be 57.0 dB LAeq,1hr at the nearest occupied dwelling which is below the construction noise limit of 65 dB LAeq,1hr. The works associated with the construction of the substation are expected to have a slight effect and temporary in duration.

In terms of the noise generated from construction works associated with the substation, this not predicted to generate a significant adverse effect.

The closest location to the grid connection works is R193, northwest of the substation, approximately 240m to underground grid connection works by the substation access track and 125m to the closest OHL pylon. The cumulative predicted noise levels from underground grid connection works at R193, assuming all activity occurs simultaneously is predicted to be 52.3 dB LAeq,1hr which is below the construction noise limit of 65 dB LAeq,1hr. The cumulative predicted noise levels from OHL connection works at R193, assuming all activity occurs simultaneously is 62.5 dB LAeq,1hr, which is below the construction noise limit of 65 dB LAeq, 1hr. The works associated with the grid connection works is therefore expected to have a slight effect and that is temporary in duration.

In terms of the construction noise generated from the grid connection route and overhead line connection works, this not predicted to generate a significant adverse effect.

TDR Nodes 6 to 8 involve laying of a load bearing surface and potential noise from these activities have been assessed. TDR Node 6 accommodation works are at the N68/L6180 interface. The nearest noise sensitive location is approximately 40m from the edge of the works. There are four noise sensitive locations within approximately 70m of the works. The closest noise sensitive location to TDR Node 7 accommodation works is at approximately 225m northeast of the works. The closest noise sensitive location to the Node 8 accommodation works is approximately 290m east of the works.

At TDR Nodes the predicted construction noise at the closest noise sensitive location to TDR 7 and 8 are below the daytime noise limit. Therefore, at these locations, the works are predicted to have a slight effect that is temporary in duration.

For the temporary road widening works between Node 8 and the site western entrance, the daytime limit may be exceeded when works are passing close to properties on the road. However, these works will be for a short duration at a particular property (i.e. typically less than 3 days) and where the works are to occur over an extended period, a temporary barrier or screen will be used to reduce noise level below the noise limit. There is a potential of a significant temporary effect from road widening works.

At 16 locations the noise limits are exceeded at the 6m/s windspeed by between 0.1 and 2.8 dB. The location where the largest exceedance occurs is northwest and central to the Proposed Wind Farm. This location also exceeds the nighttime criteria very marginally (by 0.2 to 0.4 dB) at 7m/s and 8m/s. The noise criteria are met at all other locations for the nighttime and also the daytime.

At the 16 locations where the noise limit is exceeded, there will be a long-term moderate effect. For the remaining locations, at some receptor locations, a new source of noise will be introduced into the soundscape, and it is expected that there will be long-term slight to moderate effect. The moderate significance of effect is at the closest dwellings to the Proposed Wind Farm.

In terms of the noise generated from operational noise from the proposed development, without mitigation, this not predicted to generate a significant effect.

On decommissioning, cranes will disassemble the above ground turbine components which would be removed off site for recycling. All the major component parts are bolted together, so this is a relatively straightforward process. The foundations will be covered over and allowed to re-vegetate naturally. It is proposed that the internal site access tracks will be left in place.

Grid connection infrastructure including substations and ancillary electrical equipment shall form part of the national grid and will be left in situ.

These activities will be undertaken during daytime hours, and noise will be of a lesser impact than for construction. Noise from decommissioning activities will be controlled through the relevant guidance and standards in place at the time of decommissioning.

8.2.1 Potential Cumulative Effects

There are a number of renewable energy projects in the area including:

- A 7-turbine windfarm at Crossmore, approximately 4.6km west of the site, which is due to commence operation in 2025
- Two solar farms at Manusmore and Clarecastle located over 17km from the development,
- Stonehall Solar Farm at Newmarket on Fergus (15.3km),
- A BESS storage facility at 17km from the development,
- A proposed biomass processing and storage facility, and
- A plant for production of biofuels (at 15km from the development).

Of the above developments, only the Crossmore windfarm is close enough that it has potential to contribute to noise from Cloonkett Windfarm.

It is not expected that there will be cumulative impacts with other large or small-scale developments in the vicinity of the proposed wind farm given the distance between the developments and nature of the works proposed as part of these developments.

The proposed seven (7 No.) turbine windfarm at Crossmore, approximately 4.6km west of the site has been assessed cumulatively with the Proposed Development.

Using the IOA GPG criteria, the cumulative noise from this wind farms has not been considered as the predicted noise from this wind farm more than 10 dB less than the predicted levels of the Proposed Development and will therefore have a negligible cumulative impact.

8.3 Mitigation Measures

The predicted noise levels from on-site activities from the proposed project is below the noise limits in BS 5228-1:2009+A1:2014.

Noise mitigation measures that shall be implemented during TDR accommodation works at Node 6, including phasing works so not all plant is operated at once or use of a temporary barrier or screen.

Noise mitigation for TDR road widening works between TDR Node 8 and the western site entrance will be implemented if works take place for an extended period at a given location. A temporary barrier or screen will be used to reduce noise levels below the noise limit where required. Also, the noise impact will also be minimised by limiting the number of plant items operating simultaneously where reasonably practicable.

In addition, several mitigation measures will be employed to minimise any potential impacts from the proposed project.

The noise impact for construction works traffic will be mitigated by generally restricting movements along access routes to the standard working hours and exclude Sundays, unless specifically agreed otherwise. For example, during turbine erection, an extension to the working day may be required, i.e. 05:00 to 21:00, but this would be necessary only on a relatively small number of occasions. If turbine deliveries are required at night, it will be ensured that vehicles on local roads do not wait outside residential properties with their engines idling, and that the local residents will be informed of any activities likely to occur outside of normal working hours.

The construction works on site will be carried out in accordance with the guidance set out in BS 5228:2009+A1:2014, and the noise control measures set out in the Construction Environmental Management Plan (CEMP) which is included in Appendix 2.1 of this EIAR. Proper maintenance of plant will be employed to minimise the noise produced by any site operations.

All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the project. Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use.

The proposed wind turbines have sound optimised (SO) modes of operation which generate reduced noise levels. These have been used to meet the noise criteria. Table 8-21 sets out the sound power data for these modes of operation.

Based on the predicted noise levels, for some receptors, a new source of noise will be introduced into the soundscape, and it is expected that there will be a long-term slight to moderate significant effect for dwellings within the 35 dB LA90 study area with a moderate significance of effect on the closest dwellings to the proposed wind farm.

In terms of the noise generated from operational noise from the proposed development, with mitigation, this not predicted to generate a significant effect.

As decommissioning works assume that there is no construction activities associated with the TDR route, the noise levels are predicted to be within the current daytime construction limits. The noise impact for construction works traffic will be mitigated by restricting movements along access routes to the standard working hours and exclude working on Sundays, unless specifically agreed otherwise with the local authority.

The decommissioning works, which will be of a lower impact than construction works, will be carried out in accordance with the policies and guidance required at the time of the works, and restricted to normal working hours, 08:00 - 19:00 hours Monday to Saturdays, in accordance with best practice.

8.4 Residual Effects

Construction (excluding TDR accommodation works) and decommissioning on-site activities with a duration longer than one month will be below the construction noise limit of 65 dB $L_{Aeq,1hr}$ at residential dwellings. As a result, residual construction impacts range between not significant to slight effect with the duration of effect described as temporary. Therefore, no likely significant effects arise.

There is potential for elevated noise levels due to the TDR accommodation works at Node 6, if all plant are operated simultaneously. With phasing of works or screening, this will result in a slight effect that is temporary. No significant likely effects arise.

TDR accommodation works between Node 8 and the Western site entrance may result in daytime noise limits being exceeded temporarily if works take place for an extended period close to properties. However, these works will be for a short duration for any individual property (i.e. typically less than 3 days at any particular receptor) and where the works are to occur over an extended period at a given location, a temporary barrier or screen will be used to reduce noise level below the noise limit and reduce any potential effect resulting in a moderate short-term residual effect,. that is temporary. No significant likely effects arise.

The operational wind farm noise levels meet the daytime and night-time noise limits derived using the Wind Energy Development Guidelines 2006. As detailed in the criteria section this is considered to be a current best practice approach. With the sound optimised modes as outlined in the Operational Mitigation, the predicted noise from the Proposed Wind Farm is below the noise limits at all noise sensitive locations. For some receptors closest to the Proposed Wind Farm, a new source of noise will be introduced into the soundscape, and it is expected that there will be a slight to moderate significance of impact, with dwellings closest to the Proposed Wind Farm with a long-term moderate significance of effect. No significant likely effects arise.

8.5 Conclusion

This Chapter has assessed the likely direct significant effects from noise and vibration arising from the construction, operation and decommissioning phases of the Proposed Development.

For on-site construction noise, associated with on-site activities: access track construction, wind turbine foundation and turbine installation and substation and on-site grid connection works (both underground grid connections and loop into the existing OHL), predicted noise is within recommended daytime limits. Therefore, the construction noise impact from on-site activities is predicted to be slight and temporary. Construction works for TDR accommodation works may exceed the daytime limit marginally at Node 6. With recommended mitigation measures the noise effect at this location is slight and temporary. In addition, there may be moderate short term effects during TDR road widening works between Turbine Node 8 and the western site entrance. Therefore, for construction works, with mitigation no significant likely effects arise.

Operational noise from the substation has been assessed. A baseline noise survey has been conducted to establish baseline noise levels and set the site operational noise limits based on the current 2006 WEDG guidelines. For the Proposed Substation, predicted daytime and nighttime noise are below the level that would lead to an adverse effect. Noise from the Proposed Wind Turbines has been assessed and are below the WEDG 2006 noise limits, with the recommended mitigation during the daytime at 6m/s and nighttime at 7 and 8m/s. With this mitigation, there will be a slight to moderate effect for dwellings within the 35 dB LA90 study area with a moderate significance of effect on the closest dwellings to the proposed wind farm. Therefore, for operational noise, with mitigation no significant likely effects arise.

9. BIODIVERSITY: FLORA AND FAUNA

The EIAR Biodiversity chapter presents an assessment of the likely significant effects from the Proposed Development of Cloonkett Wind Farm on ecological receptors, i.e. all aspects of biodiversity including terrestrial, aquatic and avian ecology. The assessment considers potential impacts and likely significant effects during the construction, operation, and decommissioning phases of the Proposed Development, as well as any likely cumulative effects of the Proposed Development considered in combination with any other similar projects within the zone of influence (ZoI).

The Proposed Development (also referred to as "the Site") is the area where all the Proposed Development (construction and operation) will take place, including all infrastructure, the Proposed Grid Connection, the Turbine Delivery Route and the Biodiversity Management & Enhancement Plan Lands (BMEP lands).

The ecological study area (ESA) for this Chapter includes the Proposed Development Boundary along with any species-or habitat-specific survey areas within the ZoI (e.g., watercourses downstream of the Site which have a direct hydrological connection). All surveys were undertaken in line with prevailing best practice guidelines and the impact assessment followed current Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines throughout.

The Proposed Development is located within a rural agricultural landscape, with the ESA dominated by peatland, commercial forestry and agricultural grassland habitats. Two streams, tributaries of the River Cloon [EPA 27C02] flow westwards through the Proposed Development Boundary; the Carrowreagh East [EPA 27C49 and the Cloonkett [EPA 27C12]. The Proposed Development features which are relevant to ecology include: 14 Vestas-136 model wind turbines (with a blade tip height of 150 m, a hub height of 82 m and a rotor diameter of 136 m); access tracks (both floating and founded), including a single river crossing over the Carrowreagh East; hardstanding areas at each turbine location; temporary compounds; drainage works; and a Proposed Grid Connection, consisting of 1 no. permanent 220kV electrical substation and associated compound with loop-in connection to existing overhead powerlines.

Ecological surveys were undertaken between May 2022 and March 2025. Surveys included: extended phase 1 surveys; habitat and vegetation surveys, including specialised surveys for Annex I quality habitats; bat surveys; terrestrial (non-volant) mammal surveys, including specific surveys for otter, badger, pine marten, red squirrel and hare; amphibian and reptile surveys; targeted invertebrate surveys, including Odonata and marsh fritillary surveys; breeding and wintering bird surveys; and an aquatic assessment, including fish habitat and freshwater pearl mussel surveys alongside a comprehensive water quality monitoring programme over a 12-month period. Where survey limitations are identified, while not considered to affect the validity or robustness of the impact assessment, a precautionary approach has been taken at an appropriate scale, and mitigation measures included to fully protect protected species and habitats.

Two European sites were identified as Important Ecological Features (IEFs) of international importance, namely: the Lower River Shannon Special Area of Conservation (SAC) [002165] and the River Shannon and River Fergus Estuaries Special Protection Area (SPA) [004077], due to the direct hydrological connection to the Site via tributaries of the River Cloon. Clonderalaw Bay proposed Natural Heritage Area (pNHA) [000027] was identified as an IEF of national importance, due to the hydrological connection via the River Cloon.

Three habitats on the Site were identified as having an ecological value assessed as national importance, namely: wet grassland [6410 quality]; active raised bog [7110 priority* quality]; and transition mire and quaking bog [7140 quality].

Other habitat IEFs on the site were assessed as county (regional) importance or local importance (higher value), namely: species poor wet grassland; raised bog mosaic; cutover raised bog; species-poor wet heath; poor acid flush; hedgerows; and scrub.

The Site supports a foraging and commuting population of lesser horseshoe bats of national importance. During the surveys a previously unknown breeding colony of this species (the Burrenfadda roost) was discovered on the Site. The ESA was identified as being of local importance (higher value) for a further six species of bats, including Nathusius's pipistrelle and whiskered bat *Myotis mystacinus*.

There was little evidence of otter utilising the ESA, however, as it is a feature of qualifying interest (QI) for the Lower River Shannon SAC, a precautionary assessment of international importance was applied to this species. Among other mammals, there was little evidence of badger activity, Irish hare was occasionally observed, and there was no evidence for presence of red squirrel or pine marten. However, as habitat was suitable for these species the ESA is considered to potentially contribute to populations of local importance (higher value).

A single pond identified on the Site supported small numbers of smooth newt and of the scarce blue-tailed damselfly, which are therefore considered further as a targeted population of local importance (higher value). Common frog was observed, but there was limited habitat suitable for spawning; this species is accounted for within mitigation proposed for smooth newt.

An actively breeding population of the marsh fritillary butterfly was identified within the ESA, and it is considered as a feature of county (regional) importance. A single common lizard was observed and, in view of the presence of suitable peatland habitat, it is considered to be a species of local importance (higher value).

The Site is considered of national significance for two species of birds: hen harrier and kestrel; it is of county (regional) importance for a further six bird species, all associated with water or wetland habitats: snipe; black headed gull (wintering), curlew, golden plover, grey heron and lesser black backed gull (breeding).

Within the Site itself there are no aquatic features considered IEFs. However, the ESA included the River Cloon downstream because of its freshwater pearl mussel population, a QI for the Lower River Shannon SAC. Furthermore, while no mussels were recorded from the two streams within the Proposed Development Boundary; eDNA results and habitat assessment suggest the potential for the species to be present. Therefore, taking a precautionary approach, the streams within the Proposed Development Boundary are considered to potentially contribute to a freshwater pearl mussel population of international importance. Other QIs include Atlantic salmon and three species of lamprey; therefore, while these were not surveyed directly, to limit disturbance to any potential freshwater pearl mussels present, the streams within the Proposed Development Boundary are similarly considered to potentially contribute to populations of these species of international importance.

As per the relevant guidelines, likely significant effects have been assessed for IEFs listed above. An effect is considered to be ecologically significant if the impact is predicted to affect the integrity or conservation status of an IEF at a specified geographical scale. All potential impacts are described in the absence of mitigation; however, it is important to recognise that the final design layout for the Site is the result of, and incorporates, significant embedded mitigation in order to inform the avoidance of potential impacts during the design phase. This has included an iterative design approach, of avoiding and minimising negative impact upon IEFs.

The construction phase could result in potentially significant effects on IEFs include: temporary and permanent habitat loss and fragmentation; loss or alteration of commuting/foraging habitat; degradation of habitats arising from changes to water levels and surface flow pathways; water quality impacts, including surface water run-off of sediments and/or an accidental pollution spill or those arising from hydrogeological connectivity; temporary creation of a barrier to movement at watercourse crossings; disturbance and displacement of fauna; extreme cases of individual animal mortality; spread of invasive alien species (IAS); and temporary lighting impacts from construction compounds.

Operational phase effects that could result in potentially significant adverse effects on IEFs including: collision risk to bird and bat species, water quality and habitat loss impacts due to creation of bat buffers; ongoing hydrological impacts (erosion/scouring) resulting in further habitat degradation and fragmentation; and lighting impacts at the substation and on the turbines. Decommissioning phase effects that could result in potentially significant effects on IEFs are as described for the construction phase, although with less excavation work required and a reduced risk of pollution. Potential adverse effects may include: disturbance and displacement of fauna; temporary lighting; and water quality effects arising from surface water run-off of sediments and/or an accidental pollution spill.

In the absence of mitigation measures, effects identified during the construction phase for Natura sites include: runoff and pollution causing short-term significant adverse effect on aquatic QIs, and loss of habitat causing permanent significant adverse effect on lesser horseshoe bats. As the freshwater pearl mussel population in the Lower River Shannon SAC is of international importance, disturbance is considered to be temporary for the duration of construction and significant at an international level. Removal of vegetation and/or conifers (commercial planting) is considered to have a long-term effect on lesser horseshoe bat and significant at a national level.

Loss of cutover raised bog habitat will have a permanent significant adverse effect at a county (regional) scale, while habitat degradation of peatlands may be a permanent significant adverse effect ranging from a local (higher) to county (regional) level in line with CIEEM guidelines.

At a local (higher) geographical scale, habitat loss and degradation of species-poor wet grassland, cutover raised bog, species-poor wet heath, poor acid flush hedgerow and scrub, along with the potential introduction and spread of IAS during the construction phase, are considered permanent significant adverse effects. Vegetation or tree removal will have a long-term significant effects on roosting bat species and on terrestrial (non-volant) mammals utilising these areas for foraging and commuting. Direct mortality of non-volant mammals and common lizard is considered a potential temporary significant adverse effect. Water quality effects may have short-term significant adverse effect on otter.

Among birds, direct disturbance of breeding waders, hen harrier and kestrel will be short-term, low significance on a regionally important population. For kestrel, disturbance of nesting sites would be a long-term adverse effect.

Where likely significant effects were identified, mitigation measures have been proposed to avoid, alleviate, reduce and offset identified likely significant effects on IEFs arising from the Proposed Development. The design of the Proposed Development incorporates extensive embedded mitigation to minimise potential impacts; these include infrastructure placement to minimise habitat loss and disturbance to species including lesser horseshoe bat; maintaining existing bat foraging corridors; buffers around water courses, extensive fencing off of riparian corridors and sensitive peatland habitats; and a single watercourse crossing to replace an existing ford. Further mitigation measures are described in a detailed Appendix 9.5 Biodiversity Management & Enhancement Plan (BMEP) and Appendix 9.6 Aquatic Habitats Management & Enhancement Plan (AHMEP), the latter particularly considering, freshwater pearl mussel.

Each covers the required mitigation to avoid negative impacts or offset any habitat loss, but also any enhancements that can be carried out to improve habitats relative to their current pre-construction baseline.

Construction and decommissioning phase mitigation includes applying a range of measures to avoid runoff of sediment, nutrients and pollutants into watercourses. Timing of the construction of the watercourse crossing will avoid vulnerable fish spawning periods, while terrestrial work includes mitigation to avoid disturbing nesting birds. There will be an Ecological Clerk of Works (ECoW) present during the construction period, who will have a 'Stop Works' authority to ensure measures to stop a pollution event or unscheduled habitat damage are implemented immediately. This will be carried out on the site through the implementation of a Biodiversity Enhancement Management Plan (BEMP) and agreed monitoring requirements.

Habitat loss will be subject to offset mitigation, in which habitat management and restoration will create habitat to offset that lost; peatland offsetting will be a 10:1 ratio, so 66.5 ha within the Site will have habitat management and restoration measures to offset the 6.65 ha of peatland lost to construction. Wet grassland loss will be 5.64 ha; this will be offset by 7.18 ha wetland grassland management and marsh fritillary habitat management. New riparian corridor habitats will be created along 7.72 km of fenced-off river, including further wet grassland and offsetting the 1.3 km of hedgerow and 3.4 ha of scrub habitat that will be lost; these will be designed to optimise their role as bat foraging areas.

Works will be sensitive to the potential presence of bats and other species that could be directly disturbed. A lesser horseshoe bat management plan has already been implemented by the developer for the Burrenfadda maternity roost population in line with National Parks and Wildlife Service (NPWS) and Bat Conservation Ireland (BCI) guidelines. This included protection of the roost building structure and habitat enhancement in its vicinity. Construction will be timed to commence outside of the bird breeding season. Where removal of suitable nesting habitat is required to facilitate the works, this will be undertaken before March in each construction year.

Operational phase mitigation will include maintaining buffers around turbines to dissuade bat foraging, along with appropriate curtailment of turbine operation when bats are most likely to be active. Specific habitat management measures are proposed to ensure optimum snipe breeding habitat during the operational phase, while nest boxes for kestrel will be installed and maintained around the periphery of the Site. Water quality will be maintained by minimising vehicle movements on site and by scheduled regular inspections of drainage infrastructure to ensure effective operation.

While there may be some temporary adverse residual effects, including temporary loss of habitats until replacement planting and created habitat, long term negative residual impacts are considered to be not significant. In contrast, positive residual impacts of the development compared to the 'do-nothing' scenario are predicted, as follows.

The biodiversity planting will provide a food resource for terrestrial mammals, bats and breeding birds, and will strengthen ecological corridors and provide a stepping stone for movement of fauna in the wider area. The lesser horseshoe bat roost remedial works and foraging habitat creation (i.e., already completed under NPWS licence) will likely improve the conservation status of the local and county population of this species.

Habitat enhancement, including an extra 7.08 ha of peatland above that required for mitigation, will increase the area of 'actively peat-forming' habitat over the lifetime of the Proposed Development (40 years). Peatland restoration will also have a positive impact on downstream water quality, which will also be enhanced by the provision of extended buffers in the restored riparian corridors. The single river crossing, while causing some temporary disruption during construction, will remove an existing ford and its associated input of sediment and pollutants to the river. These measures will have a positive impact on the habitat of the established freshwater pearl mussel population downstream.

10. SOILS, GEOLOGY AND HYDROGEOLOGY

This chapter has been prepared to examine the likely significant effects of the proposed Cloonkett Wind Farm, associated loop-in substation, overhead line (OHL) grid connection and turbine delivery route on existing geological conditions within the study area.

10.1 Receiving Environment

Based on regional and site-specific information available the type of geological/hydrogeological environment as per Figure 2 of the IGI Guidelines ([Ref xiii]) is Type A – Passive Geological / Hydrogeological Environments due to the presence of low permeability subsoils and a relatively poor aquifer beneath the Site

The GSI Quaternary mapping [[Ref iv]] indicates that much of the central and eastern portions of the site is underlain by Blanket Peat deposits. These deposits become more sporadic along the Sites' southern margin and within the western portion of the site. Isolated and often linear deposits of till derived from Namurian sandstones and shales were mapped along the northern margin of the Site. Large extents of bedrock or subcrop were recorded and mapped within the western portion of the Site, and along the site's southern margin.

The GSI 1:100,000 scale bedrock mapping [[Ref iv]] indicates the Site is entirely underlain by Carboniferous (Namurian) Central Clare Group (CCG). This is made up of a series of alternating stratigraphic sequences of marine and non-marine sediments comprising mudstone, siltstone and sandstone. Coal seams are also present within the CCG. However, coal seams or coal bearing stratum were not recorded within the exploratory hole logs, and no coal outcropping was observed during the extensive site reconnaissance surveys.

GSI 1:100,000 structural mapping [[Ref iv]] indicates the presence of both anticlinal and synclinal fold axis located along the southern boundary of the Site. These are mapped as trending in a broadly northeastsouthwest direction. Assessment of available aerial imagery [Ref iv] also indicates the presence of these structural features, which can be clearly seen as a series of similarly trending linear features. Bedding dips are typically recorded as greater than forty degrees (>40^{o}) with dip directions typically recorded as northwest to southeast (i.e. broadly perpendicular to the strike of the mapped anticlinal and synclinal structures).

GSI Physiographic mapping [[Ref iv]] along with field observation and assessment of available aerial photography [Ref iii] indicates the Site hosts a series of glacially derived landforms. Streamlined bedrock outcrops are visible along the southern extents of the Site forming symmetric grooves within the underlying folded bedrock layers. These have formed in a broadly northeast-southwest direction mirroring the orientation of the valley in which the Site is located. Three drumlin formations are mapped within the northwestern and southern extents of the Site. These also display a broadly northeast-southwest orientation. A small section of esker ridge is mapped approx. 160m north-east of Turbine T01; however, this feature was not observed in the field. In general, the topography of the Site, gently undulates as you move from subtle ridges of agricultural land into shallow depressions dominated by deposits of Blanket Peat. The Site predominantly lies within a low-lying area flanked by sometimes steep and rocky valley walls along the northern and southern extent? of the Site. Elevations range from approx. 50 to 120m AOD. Along the long axis of the Site, elevations range from 50 AOD in the west to 80m AOD in the east giving an overall gradient which gradually slopes down to the west towards the Cloon River.

Groundwater mapping [[Ref iv]] indicates that the entire Site is underlain by a Locally Important Aquifer – Bedrock which is Moderately Productive only in Local Zones.

The GSI's Groundwater Vulnerability mapping [Ref iv] within the Site ranges from 'M – Moderate' to 'E – Extreme' with the western half and southern extent of the Site within an area mapped as predominantly 'X – Rock at or Near Surface'. However, no outcropping bedrock was observed at or adjacent to the main infrastructure elements.

Based on GSI's Groundwater Vulnerability mapping [Ref iv], site walkovers and intrusive ground investigation, overburden deposits are generally 0 to 3.0m deep across most of the Site. The expected permeability for the subsoil is 'Low', but it may be locally 'High' within localised areas, where shallow weathered bedrock is present. It should be noted that bedrock outcrops were not observed at or adjacent to any of the main infrastructure elements within the Site.

The GSI's Groundwater Body (GWB) mapping (Ref iv) indicate the Site lies within the Kilrush GWB, which covers an area of approx. 400 km^2. The main aquifer lithologies of this GWB are sandstone, siltstone and mudstone (such as the CCG) and are described as being poorly productive bedrock.

There are 2 No. Public Supply Source Protection Areas for public water supply schemes within 20km of the wind farm Site, and these are:

- Glin Public Water Supply Scheme, approx. 14km to the southwest (recorded as being 'not in use');
- Drumcliff Springs Public Water Supply Scheme, approx. 18km to the northeast.

Based on a review of the current EPA and GSI groundwater databases, there are no Group Water Schemes (GWS) within the boundary of the Site. There are no GWS in the groundwater sub-catchment area in which the wind farm Site is located. However, there is 1 no. GWS within 20km of the Site. The Craggs Borrigone GWS is located approx. 13km to the southeast of the Site.

Based on a review of the GSI Groundwater Wells and Springs mapping [Ref iv] there are 2 no. groundwater wells recorded within the Site and 4 no. groundwater wells recorded within 1km of the Site. There are no mapped springs within the Site or within 1 km of the Site.

The GSI groundwater karst mapping [Ref iv] there are no karst features recorded within the Site. The closest karst feature is a turlough located approx. 12.5km to the southeast of the Site.

The GSI's online Geological Heritage database [Ref iv] indicates there are no audited or unaudited Geological Heritage Sites (GHSs) within the Site. The closest GHS is Foynes Island (site code LK012), which is located approx. 7km south of the Site.

The GSI Online Minerals mapping [Ref iv] accessed via the Public Data Viewer shows one quarry and four mineral occurrences within 5km of the Site.

Note that no occurrences of coal were observed within the Site during the reconnaissance surveys or within the trial pits or boreholes completed as part of the phased ground investigation.

Mineral occurrences of coal found within 5km of the Site typically present as very thin.

Findings from the walkover surveys confirm the central and western portions of the Site are predominantly underlain by a thin mantle of Blanket Peat with only localised areas displaying deeper deposits.

Findings from the peat probe surveys give a minimum, maximum and mean peat depth of 0m, 6.65m and 1.43m respectively. Approximately 36% of peat depths recorded were less than or equal to 0.5m (≤ 0.5m).

Trial pits were excavated at turbine, met mast, substation, borrow pit, and construction compound locations. Boreholes were advanced at five representative locations across the Site.

A geotechnical assessment was undertaken using findings from the site walkover surveys and intrusive ground investigations and is presented in Appendix 10.1 – Peat Stability and Geotechnical Assessment Report (GAR). Results from the drained and undrained stability analysis are summarised in Table 10-21 and Table 10-22. The analyses returned Factor of Safety Results of >1.3 for all infrastructure elements assessed, indicating the risk of peat landslide is 'Negligible and Insignificant'.

There are no known areas of soil contamination on the Site. No evidence of soil contamination was noted during Site walkovers or during the intrusive ground investigation. A review of existing aerial photography and historic ordnance mapping [ref iii] show no indication of potential contamination from historic land use. Mapping indicates that the Site all lie within agricultural lands with associated small clusters of agricultural buildings and residential properties. With the exception of a limited number of small disused quarries, no historic industrial land uses were observed.

10.2 Potential Effects

10.2.1 Do Nothing Effect

If the proposed Wind Farm were not constructed, it is likely that the current land uses will continue for the foreseeable future. The effect on the Soils, Geology and Hydrogeology would remain largely unaltered as a result.

10.2.2 Construction phase

During the construction phase, activities which may have an impact on soils, geology and hydrogeology prior to mitigation include:

Site Clearance:

Topsoil and vegetation clearance will be undertaken at the turbine and all ancillary infrastructure locations across the Site. In addition to the permanent infrastructure, 2 no. temporary construction compounds are proposed within the Site (Figure 2-2, Volume IV). These will also require removal of vegetation and topsoil prior to construction. Permanent felling of approximately 8.4 ha (84,047m2) of conifer plantation forestry is required.

Earthworks Associated with Construction:

The following earthworks excavations will be required:

- Excavation of Topsoil
- Excavation of Peat deposits
- Excavation of Glacial Till
- Excavation of bedrock at turbine and met mast base, on-site substation, and at the borrow pits.

The following filling and material deposition operations will be required:

- Deposition of surplus topsoil/peat and spoil in berms for reinstatement purposes around turbine bases hardstands, and within proposed designated Peat Deposition Area (PDAs). Details of peat and spoil management are presented in Appendix 10.3 – Peat and Spoil Management Plan.
- Importation and filling of site-won and imported General Fill and Engineering Aggregates

Slope Stability:

Direct effects to the existing environment associated with potential slope instability and failure include:

- Slope failures have the potential to effect the existing geological conditions from the removal and deposition of landslide/slope failure material and the exposure of underlying overburden deposits and bedrock to an increase in surface water runoff and subsequent increase in erosion. Slope failure also has the potential to have an effect on the safety of construction workers that could be in the vicinity of a landslide/slope failure event, existing infrastructure (roads, access tracks, turbines) and nearby residents / properties.
- The effect of a slope failure could potentially result in the influx of acidic and/or peat laden waters into downgradient surface water features resulting in a decrease in the receiving water's pH values. This may effect groundwater quality in the underlying Locally Important Aquifer and in any groundwater abstractions in the vicinity of a landslide event.

Construction of Internal Access Roads and Hardstands:

There will be approximately 10,940m (approx. 4,100m of this to be floated) of new internal access tracks associated with the Site. All access tracks will be approximately 5m wide along straight sections and wider at bends and as required. The tracks will be finished with a well graded aggregate. The drainage system will be installed adjacent to the internal access tracks. Existing drainage infrastructure will be maintained and upgraded where necessary. The following filling and material deposition operations will be required:

- Deposition of surplus topsoil, peat and Glacial Till deposits in berms for reinstatement purposes around, hardstands, temporary construction compounds and substation compound.
- Importation and filling of site won and imported stone for General Fill and Engineering Aggregates.

Internal Cabling and Grid Connection (GC):

Connection works will involve the installation of ducting, joint bays, drainage and ancillary infrastructure and the subsequent running of cables within existing agricultural fields to the proposed loop-in grid connection point. For cable trenches crossing public roads, the contractor shall excavate cable trenches and then lay high density polyethylene (HDPE) ducting in the trench in a surround of cement bound material (CBM).

A similar construction methodology will apply for cable trenches laid within the Site's access tracks. In this case the cable-ducts will generally be laid when the track is being constructed and will follow the edge of the Site access tracks. The trenches within these locations will generally be backfilled using the excavated material.

Direct effects to the existing environment associated with the proposed internal cabling and grid connection works include:

- Associated excavations and ducting may present a preferential pathway for the movement of groundwater and/or contamination in the subsurface. However, the subsoil is predominantly fine grained Glacial Till which has a low permeability, impeding any lateral movement of groundwater.
- The excavations for the grid connection trenches and joint bays can have a direct effect on the exposed soils and rock in the form of increased erosion from surface water ingress. Where the material excavated from the proposed grid connection excavations are not suitable for reuse as backfill or deposition on Site, this material shall be disposed of at a facility licenced (subject to environmental testing and classification) to accept this material.

Turbine Delivery Route (TDR):

The accommodation works associated with the TDR route will include the localised excavation of existing overburden deposits. The potential effect would be from the exposure of the overburden and underlying bedrock to erosion via surface water ingress during the works.

BMEP Lands:

It is proposed to restore approximately 73.58 ha of peatland within the Site during the Construction Phase. The proposed management and enhancement actions are summarised below and are discussed in greater detail within the BMEP (EIAR Volume III, Appendix 9):

- Drain management and damming;
- Bunding to maintain water table close to the surface;
- Reprofiling of peat hags where feasible to prevent further desiccation and erosion;
- Cessation of turbary/ turf cutting; • Prevention of burning;
- Removal of any invasive non-native species; and
- Restoration of borrow pits to include peat storage and the potential for restoration.
- Pre-, during, and post-construction phase monitoring of restoration areas

10.2.3 Operational Phase

Very few potential direct effects are envisaged during the operational phase of the Proposed Development. These are:

- Some construction traffic may be necessary for maintenance of turbines, hardstands and access tracks which could result in minor accidental leaks or spills of fuel/oil.
- The grid transformer in the Proposed Substation and transformers in each proposed wind turbine will be oil cooled. There is potential for spills / leaks of oils/battery fluids from this equipment resulting in contamination of soils and groundwater.

A small amount of granular material may be required to maintain access tracks during operation which will place intermittent minor demand on local quarries listed in Section 10.6.2.4 of Chapter 10.

10.2.4 Decommissioning Phase

The potential effects associated with decommissioning will be similar to those associated with construction but of reduced magnitude. During decommissioning, it may be possible to reverse or reduce some of the effects caused during construction by rehabilitating construction areas such as turbine bases and hardstanding areas. This will be done by covering with topsoil to encourage vegetation growth and reduce run-off and sedimentation. Other effects such as possible soil compaction and contamination by fuel leaks will remain but will be of reduced magnitude. Nevertheless, as noted in the Scottish Natural Heritage guidance on restoration and decommissioning of onshore wind farms (SNH, 2013) reinstatement proposals for a wind farm are made approximately 30 years in advance, so within the lifespan of the wind farm, technological advances and preferred approaches to reinstatement are likely to change.

10.2.5 Cumulative Effects

Appendix 1.2 provides a full list of cumulative developments proximate to the Site.

There are 17 no. operational windfarm developments within 20km of the Site, the closest of which is Crossmore Windfarm. Operational maintenance at these sites is not anticipated to create a supply issue for aggregates from local quarries as aggregate volumes required during the operational phase will be very low.

10.3 Mitigation Measures

The primary mitigation measure employed has been the design of the wind farm with detailed design and best practice implemented as shown below.

In order to reduce the impacts on soils, geology, hydrogeology and slope stability, infrastructure has been primarily located within areas of thinner peat/soft ground and lower slope gradients. Extensive work has already been undertaken at the preliminary design stage to apply risk avoidance by design which included:

- Peat probing, site walkover surveys and intrusive ground investigation to identify geotechnical constraints (e.g. peat deposits and evidence of historic landslip) likely to adversely affect the design of the Site.
- Relocation and micro-siting of turbines, hardstanding's and access roads based on the site assessment and geotechnical assessments in order to reduce ground risk associated with the Site.
- The works have been designed and checked by geotechnical and civil engineers, who are suitably qualified and experienced in excavation and earthworks design and construction methodologies. Details of experience and competence is included in Chapter 1.

The following will also be implemented:

- The Proposed Development has been designed in accordance with best practice methodologies to include (but not limited to) guidance documents from the EPA, IGI and the Scottish Executive.
- Any excavation and construction related works will be subject to a design risk assessment at detailed design stage to determine risk levels for the construction, operation and maintenance and decommissioning of the works. Identified effects will be minimised by the application of principles of avoidance, prevention and protection. Information on residual effects will be recorded.

- Given that the works comprise a significant proportion of excavation and earthworks, suitably qualified and experienced geotechnical personnel will be required on Site to supervise the works.
- A detailed method statement for each element of the works will be prepared by the Contractor prior to any element of the work being carried out. These method statements shall be reviewed and approved by a qualified geotechnical engineer.
- The Contract will require programming of the works such that earthworks are not scheduled during severe weather conditions. Where such weather is forecast, suitable measures will be taken to secure the works.

A Construction Environmental Management Plan (CEMP) has been prepared for the Proposed Development and is included in Volume III, Appendix 2.1. The CEMP defines the work practices, environmental management procedures and management responsibilities relating to the construction phase of the Proposed Development.

The CEMP sets out the key environmental management measures associated with the construction, operation and decommissioning of the Proposed Development, to ensure that during these phases of the development, the environment is protected, and any potential effects are minimized. The final CEMP will be developed further at the construction stage, on the appointment of the main Contractor to the Proposed Development to address the requirements of any relevant planning conditions, including any additional mitigation measures that are conditioned and shall be submitted to the planning authority.

10.3.1 Conclusion

The Proposed Development is not a sensitive site in terms of soil, geology and hydrogeology, and poses a low risk for landslide.

Findings from the site walkover surveys indicates no visual evidence of historic or contemporary landslides or ground instability at or adjacent to the proposed infrastructure locations.

A number of potential effects have been identified associated with the excavation of soil and rock on the site. The significance of these potential effects is assessed as being ‘imperceptible’ to ‘moderate/slight’ significance prior to mitigation.

The Proposed Development is not expected to result in any significant, negative cumulative effects with other existing, permitted or proposed developments in the vicinity.

With mitigation measures, put in place during construction, operational and decommissioning stage the Proposed Development will have an ‘imperceptible’ effect on the Site’s geological and hydrogeological receptors.

11. HYDROLOGY AND WATER QUALITY

11.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) including EIAR Volume III, Appendix 11.2 – Water Framework Directive Assessment has been completed by Wardell Armstrong who are a part of SLR Consulting Limited. The Surface Water Management Plan (Volume III, Appendix 11.1) and Drainage Design (EIAR Volume III, Appendix 2.3) and Flood Risk Assessment (Volume III, Appendix 11.3) has been completed by Fehily Timoney and Company (FT).

11.2 Existing Environment

The majority of the Site lies within the Shannon Estuary North Catchment, which has an overall area of 1,651 km^2. The Site occupies less than 0.22 % of the area of the Shannon Estuary North catchment and approximately 22.75 % of the Cloon (Clare)_SC_010 sub-catchment, which has a total area of 133 km^2.

All of the proposed turbines and the Proposed Wind Farm site are located within the Cloon (Clare)_020 sub basin, within which there are two tributaries (the most northern is the Carrowreagh East stream (EPA Code 27C49) and the southern tributary is called the Cloonkett Stream (EPA Code 27C12) ultimately discharge into the River Cloon (EPA Code 27C02) which is located approximately 2.4 km west, as shown on Figure 11-1, Volume IV of this EIAR.

The Carrowreagh East stream (EPA Code 27C49) flows east to west across the wind farm site, and it has a number of tributaries located within the Site:

- Cloonsnaghta (EPA Code 27C52);
- Craghera (EPA Code 27C53) and an order 1 unnamed watercourse; and
- Cloonkett North (EPA Code 27C54).

The Cloonkett Stream (EPA Code 27C12) flows east to west across the Site; it has two tributaries, the Glenconaun Beg (EPA Code 27G09 and the Lisnafaha (EPA Code 27L18) both of which are upstream of the Proposed Development and join the Cloonkett Stream (EPA Code 27C12) at the eastern boundary of the Site.

Within the Crompaun (West)_010 Sub-basin is the Drumdigus Stream (EPA Code 27D24), which is located 0.1 km north of the Site, as shown on Figure 11.1.1. The Drumdigus Stream (EPA Code 27D24) flows into the Crompaun West River (EPA Code 27C05) and eventually drains into the Shannon Estuary approximately 4.5 km south-west of the Site.

The Cloon River (EPA Code 27C02) drains into the Shannon Estuary approximately 6.3 km south-west of the Site.

The land within the study area is a mixture of pastural agriculture, peat habitat and commercial forestry. The Proposed Development site also includes some historical, and current turbary peat extraction.

The topography of the Proposed Development site is hilly and slopes from both the north and south towards the centre with elevations ranging from 90 m to 50 m approximately. Maximum elevation to the north of is approximately 90 m ordnance datum (OD) and maximum elevation in the south is approximately 75 m. From east to west, the Proposed Development site generally slopes to the west from an elevation of approximately 80 m OD to 50 m OD.

The turbine delivery route will utilise existing public roads, which cross a number of WFD watercourses. However, no upgrade works are required at locations where public roads utilised by the TDR cross existing watercourses.

Where the TDR crosses through private lands at TDR Node No. 8 (See Chapter 2, and Chapter 13 for details of temporary accommodation works associated with the TDR), it is proposed to replace an existing drain crossing with a permanent bottomless box culvert, thereby preserving the existing stream bed.

11.3 Potential Effects

During the construction phase, excavation and removal of vegetation cover and soil will be necessary and replaced with less permeable surfaces with a potential to contribute to an increase in runoff or a change in the hydrological response of the Site to rainfall.

There is potential for adverse effects on hydrology and water quality during the construction phase due to the release of hydrocarbons, contamination from wastewater, release of cement-based products and suspended solids. Mitigation measures will be applied as described in detail in the Surface Water Management Plan (Appendix 11.1) and the Construction and Environmental Management Plan (Appendix 2.1) to reduce these potential effects.

Site access by vehicle/foot are the main likely sources of potential impact during the operational phase by pollution from spills and leaks of fuel, oil and chemicals from vehicles and maintenance works. Additionally, transformer oil will be used in cooling the transformers associated with the facility which creates potential for oil spills during any oil replacement activity or leaks during the operational phase, although the likelihood of this is low. There is no significant risk of sediment release to cause increase suspended solids in surface waters during the operational phase as vegetation will not be disturbed during this phase.

As described in Chapter 2, wind turbines will be deconstructed and removed offsite for recycling. The hardstandings and foundation pedestals of the turbines will be covered over with topsoil (previously stripped and used for landscaping during the construction phase) and allowed to re-vegetate. This is considered more environmentally sensitive than removing the hardstandings and foundations. All internal site access tracks and turbine hardstandings will be left in place as these will continue to be used for forestry and agriculture.

Infrastructure that will be left in-situ following decommissioning includes; internal site access tracks, the on-site substation and ancillary electrical equipment that will form part of the national grid.

The temporary accommodation works along the TDR will not be required for the decommissioning phase as turbine components can be dismantled onsite and removed using standard HGVs.

The meteorological mast will be decommissioned using a similar methodology as the construction except in reverse. At the end of the operational phase the substation, OHL and related infrastructure will be left in situ and transferred to EirGrid. electrical equipment.

Hydrocarbons may be accidently released from vehicle and plant used during the decommissioning. There may also be released of sediments into the water environment as a result of shallow earthwork, soil movement and ground disturbance.

11.4 Mitigation Measures

Throughout the pre-application design stage, the initial layout and locations of the turbines, access tracks and ancillary infrastructure, including TDR, GC and substation, have been designed to avoid hydrologically sensitive areas. Fifty metre (50 m) setback buffers from all watercourses were applied to all watercourses during the design phase to minimise and/or eliminate potential risks to water quality. The access tracks have been routed to avoid undisturbed deep peat with floating tracked used for new sections where possible. In addition, the design has sought to make as much use of existing farm tracks across the Proposed Development as possible, upgrading where required, to minimise the requirement for entirely new tracks and watercourse crossings.

Underground cabling will where possible follow the same route as the access tracks to reduce the ground disturbance across the Site. The routing of access tracks and cabling have been designed to minimise the overall environmental effect and to limit the number of watercourse crossings. The retention of vegetation cover, where possible across the Proposed Development and the reinstatement of excavated vegetation top layer will prevent erosion and help to maintain the existing (pre-development) greenfield runoff characteristics. In addition, the retention and reinstatement of vegetation cover will also reduce the potential for dissolved inorganics (orthophosphate & Nitrates) to be mobilised into downstream watercourses. Also, controls are proposed for sediment that could potentially be released from the construction works, and retention of existing drainage routes and pathways for water movement (See Appendix 11.1, SWMP).

The SWMP includes a Surface Water Quality Monitoring Programme. This reflects the 12-month detailed water quality, water flow and depth monitoring that was completed during pre-Application stage to establish the baseline conditions, with particular attention to hydrometric data defined by FPM statutory and regulatory requirements (see Appendix 9.4, and Appendix 9.6 for further details). The water quality monitoring has taken into account the European Communities Environmental Objectives (Surface Water) (Amendment) Regulations 202210 thresholds are shown in Table 11-10. (SW Regs as amended).

Best practice construction methods will be used during the construction stage to minimise effects on water quality. Examples of further mitigative measures for key parts of the construction phase are identified below. These are outlined in more detail in the Construction Environmental Management Plan CEMP (Chapter 2 Appendix 2.1). An Ecological/ Environmental Clark of Works (ECoW) or hydrologist will present onsite to supervise construction works and in particular during high-risk activities such as large-scale concrete pours and watercourse crossing works

For instance, regarding good practice associated with mitigating the risk of hydrocarbon release during construction, as stated in the SWMP (Appendix 11.1), construction vehicles will be refuelled offsite, wherever possible. This will primarily be the case for road vehicles such as vans and trucks. Refuelling of mobile plant during construction will be carried out at the temporary compound, which will be equipment with the hydrocarbon interceptor. Any additional fuel containers, other than the fuel bowser, used for smaller equipment (such as generators, lights etc.) will be stored within additional secondary containment e.g. bund for static tanks or drip trays for smaller mobile containers. Taps/nozzles for fuels and storage containers for oils will be fitted with locks to ensure their use is controlled. Only designated trained and competent operatives will be authorised to refuel plant onsite.

Interceptor (cut-off) drains installed upslope of access tracks and areas of hardstanding will divert surface water runoff from undeveloped land around the constructed areas to disperse naturally within open ground without mixing with the construction phase drainage.

The proposed swales will intercept surface water runoff from access tracks and areas of hardstanding. The grass within the swales will provide some filtration to remove a portion of silt and other suspended solids. Silt traps will be provided upstream of outfalls from roadside swales.

11.4.1 Proposed Mitigation Measures for Flooding

The proposed turbine bases, access tracks and new compound areas will all increase the impermeable area within the Site potentially increasing the rate and volume of surface water runoff during storm events.

All access tracks will be constructed from aggregate which will allow a portion of rainfall to infiltrate and, therefore, reduce surface water runoff. Adjacent swales will also intercept and retain surface water runoff allowing this to disperse naturally via infiltration and evapotranspiration. Where swales are installed on sloped ground, check dam structures will be used within the channels to provide attenuation, allowing a portion of the flows to disperse naturally.

Swales and drainage channels will discharge runoff from access roads and areas of hardstanding to settlement ponds. These will be suitably sized to accommodate flows from storm events up to and including the 1 in 100-year storm event.

Settlement ponds will not discharge directly to any drain or watercourse. Rather, flows from the ponds will be dispersed diffusely over land to allow natural overland flow and percolation within the catchment.

Watercourse crossings have been designed and suitably sized to accommodate peak, or storm discharge rates so as not to cause risk of impeding flows during extreme storm events and causing flooding upstream of the crossing.

The cable trenches will be excavated in dry weather where possible and infilled and revegetated where appropriate. There will, therefore, be no increase in the risk of flooding. The surface water management system within the Site will ensure that there will be no increase in the risk of fluvial or surface water flooding downstream as a result of the Proposed Development.

11.5 Conclusion

The Site is located in the Shannon Estuary North catchment, (including the Cloon River (EPA Code 27C02) and Crompaun West River (EPA Code 27C05) and their tributaries, Lower River Shannon SAC, Clonderalaw Bay pHNA and River Shannon and River Fergus Estuaries SPA) is and the Mal Bay Catchment (including the Doonbeg River (EPA Code 28D02) and its tributaries)), which are classed as High sensitivity receptors.

Any increase in surface water runoff because of additional impermeable areas within the Site will be managed at all stages of development by a surface water drainage network incorporating swales, drainage channels and settlement ponds (see Appendix 11.1 SWMP). The network will be designed to retain high flows during storm events and allow these to disperse naturally, with no uncontrolled discharge to downstream areas.

Pollution prevention measures, such as use of spill kits, water treatment (if necessary), pollution responses plans will be incorporated into all phases of the Proposed Development. This will mitigate effects associated with releases of hydrocarbons, suspended soils and alkaline pH to the water environment.

The drainage features will also provide water quality benefits during all stages of works allowing for the filtration and settlement of suspended solids and a means of isolating runoff from pollution incidents.

The residual and cumulative effects of the Proposed Development are overall Not significant. This will be achieved with the proposed mitigation measures detailed in Section 11.5 and the SWMP contained in Appendix 11.1 in Volume III of this EIAR.

The WFDA presented in Appendix 11.2 indicates that the Proposed Development (alone or in combination with other plans and projects) will not cause deterioration in WFD status or to impede the ability of surface waters to achieve the objectives of the WFD and the Water Action Plan 2024.

12. SHADOW FLICKER

12.1 Introduction

This chapter presents the results of an assessment that has been conducted to determine the potential for shadow flicker effects at residential receptors in the area surrounding the Proposed Wind Farm. The description of the methodology is presented including a summary of relevant guidance and the scope of the assessment. A detailed appraisal of the existing environment and potential impacts caused by shadow flicker is outlined along with mitigation measures that may be required. The potential for cumulative impact with other existing and permitted wind farms in the area is also appraised.

12.2 Existing Environment

All receptors identified within the study area are assumed to be either residential or mixed residential and commercial buildings, and are located in a predominantly flat, rural landscape, with no major towns or large villages present. The majority of the area around the Proposed Wind Farm is farmland and some forestry, with trees and hedges along the field boundaries. With the limited potential for screening (i.e. proposed wind turbines well above ground), most of the receptors considered in this chapter are therefore likely to have clear line of sight to the proposed turbines. The locations of the proposed wind turbines in relation to the receptors are shown on Figure 12-1 (Appendix 4).

There are no existing wind turbines located within 10 rotor diameters of the properties considered in this assessment. The nearest wind farms to the Proposed Wind Farm are Crossmore Wind Farm approximately 4.6 km to the northwest, Lissycasey Wind Farm approximately 8 km to the north, Boolynagleragh Wind Farm, approximately 10 km to the north, and Kiltumper Wind Farm, approximately 12 km to the northwest. As such, because of these distances, the existing environment contains no prospect for cumulative shadow flicker effects to occur.

12.3 Potential Impacts

Of the 66 receptors identified within the study area, 65 have the potential to receive shadow flicker effects.

Total theoretical maximum levels, based on a worst-case scenario, exceed 30 hours per year at 36 receptors. When considering a more realistic scenario accounting for typical sunshine hours, 30 hours per year would be exceeded at 3 receptors.

Potential daily shadow flicker has been assessed based on the worst-case theoretical maximum levels, as the correction for annual average sunshine hours applied to the yearly levels cannot be applied on a daily basis. The data used to derive the correction is based upon monthly averages, which cannot be applied to daily levels with sufficient accuracy. Periods of cloudy weather are more likely to reduce the number of days shadow flicker can occur, rather than reduce the length of individual shadow flicker occurrences. As such, the assessment of daily impacts considers the maximum theoretical amount of shadow flicker only and is inherently conservative.

There is the potential for significant effects to occur as a result of shadow flicker at up to 43 receptors under worst-case conditions.

No cumulative impacts with other proposed or operational wind farms in the area are predicted to occur on any receptors in the study area due to distance from other projects that could possibly create shadow flicker.

12.4 Mitigation Measures

Shadow flicker control modules, consisting of light sensors and specialised software, will be installed on the turbines to ensure that mitigation is implemented to reduce shadow flicker occurrence at any receptor. The calculated theoretical shadow flicker periods can be input into the turbine control software and when the theoretically optimal on-site conditions for shadow flicker are met (i.e. the light intensity is sufficient and shadow flicker might occur) during operation, then individual turbines would cease operation until the on-site conditions change, or the theoretical period has passed.

Cloonkett Green Energy Ltd will provide protection from shadow flicker by committing to curtailing turbines for all instances where shadow flicker effects may occur at residential dwellings within 10 rotor diameters of the turbines; this procedure is defined as "zero shadow flicker" mitigation. The "zero shadow flicker" mitigation strategy will reduce levels of shadow flicker to near zero hours a year. However, it should be noted that when the conditions for shut down due to shadow flicker are met, there is a short period of time before complete shutdown occurs as the turbines gradually slow down and stop turning. This will depend on the reaction time of the shadow flicker control modules and the particular turbine type, as well as a gradual reduction in rpm i.e., the blades will not come to a sudden stop.

13. TRAFFIC AND TRANSPORTATION

13.1 Introduction

This Chapter of the EIAR assesses the likely significant direct and indirect effects of the proposed Cloonkett Wind Farm, associated grid connection (GC) and turbine delivery route (TDR) on the existing traffic conditions and the surrounding transportation network. The assessment includes changes to peak annual average daily traffic and the carrying capacity of the proposed haul route road network. Potential effects during the construction, operation and decommissioning phases of the Proposed Development are considered. Appropriate mitigation measures are identified to mitigate impacts where necessary. Potential cumulative impacts with other developments are also assessed.

13.2 Existing Environment

The nearest motorway to the Cloonkett site is the M18 which is c. 22km (straight line distance) east of the Proposed Development. The M18 connects Galway City to Limerick City via the N18 and the M6. The M18 runs from the outskirts of Athenry, Co. Galway, to the outskirts of Limerick City, near Shannon Town. The M18 forms part of the turbine delivery route (TDR) for the Proposed Development.

The closest national route to the site is the N68 which is c. 3.2km (straight line distance) north of the Proposed Development. The N68 is a national secondary road which connects the N85 outside Ennis to the N67 in Kilrush and passes through Lisseycasey Village. The N68 forms part of the haulage and turbine delivery route for the Proposed Development.

The closest regional road to the site is the R473 which is c. 3.1km (straight line distance) south of the Proposed Development. The R473 links Kilrush to Ennis and in an alternative route to the N68. The R473 connects the N67 in Kilrush to the N85 between Ennis and Clarecastle. The R473 will form part of the haulage route but not the turbine delivery route for the Proposed Development.

The closest local roads to the proposed development are the L-2072 local road which runs along the northern boundary of the site, the L-6238 local road which runs along the southern boundary of the site and the L-6239 which runs through the centre of the site. Additionally, the L-2128 runs along the east of the site and the L-2130 runs along the west of the site.

The proposed West Clare Greenway will be located approximately 17km southwest of the proposed Cloonkett Wind Farm Development. This greenway is proposed to be a walking and cycling route which commences in Kilrush and terminates in Ennis via Kilkee and Ennistymon.

13.3 Potential Effects

The construction activities associated with the project will lead to additional construction related traffic on the existing public road network over the duration of the construction works. Without appropriate mitigation measures, the proposed works have the potential to lead to a negative impact on the existing road network.

The delivery of turbine components including blades, tower sections and nacelles is a specialist transport operation owing to the oversized loads involved. The blades are the longest component and have been considered for the purpose of this assessment.

Turbine component deliveries will be carried out during off-peak times and will be done using a convoy and a specialist heavy haulage company. Turbine deliveries will also be escorted by An Garda Siochána. This will ensure the impacts of the turbine deliveries on the existing road network are minimized.

As further described in Section 13.4 of Chapter 13: *Traffic and Transportation*, accommodation works are required along the turbine delivery route such as hedge or tree cutting, relocation of powerlines/poles, lampposts, signage and temporary local road widening through the laying of compacted aggregate to verges. Prior to mitigation measures, this could include a negative impact on the existing road network such as delay and disruption to road users, road safety issues, inappropriate parking of construction vehicle, soiling of the public road and existing public road infrastructure damage.

The largest possible blade and tower components for the range of turbine options were considered and modelled using Autotrack vehicle modelling software to ensure that the potential environmental effects for the full range were fully assessed.

A small number of full-time wind farm personnel are expected to be present during the operational phase of the project.

Unforeseen or unplanned events such as emergency turbine repair works could potentially require the mobilisation of construction plant and personnel to site or grid route. The replacement of a large turbine component such as a blade will require a crane and the re-installation of some Turbine Delivery Route temporary accommodation works. In such an event, it is considered that negative or adverse effects on the receiving environment will be temporary in duration and not significant to slight following appropriate mitigation measures.

The likelihood of significant effects from the decommissioning phase is considered low. This phase is of short term duration, expected to take no longer than six months to complete. The associated traffic impact will be significantly less than the construction phase due to a considerably lower number of vehicle movements.

13.4 Mitigation Measures

To mitigate any likely significant adverse effects on the environment by traffic associated with the Proposed Development, the following measures will be implemented:

- A detailed Traffic Management Plan (TMP) will be prepared prior to commencement of construction. This plan will address construction traffic, road safety signage, phasing of the deliveries, and emergency access (as shown in the TMP in the CEMP).
- The contractor will be responsible for the implementation of all agreements between the developer and Clare County Council with the objective that the transportation needs for the Proposed Development will have a minimal impact on the road network and local communities . All vehicles hauling materials to and from the Site shall only use agreed transport routes. Outline Traffic measures are set out in the accompanying outline Construction Environmental Management Plan.
- All vehicles hauling materials to and from the Site shall only use agreed transport routes as illustrated on the Transport Route Figure 13-1. The proposed accesses will be created allowing adequate visibility sightlines in accordance with TII Standards DN-GEO-03060: Geometric Design of Junctions (priority junctions, direct accesses, roundabouts, grade separated, and compact grade separated junctions), May 2023, DN-GEO-03031: Rural Road Link Design, May 2023, and in accordance with the County Development Plan. Required sightlines will be maintained in both directions at the site entrance and existing hedgerows will be trimmed and removed as necessary.

- As the Site is bisected by an existing narrow tertiary local road, HGV's transporting materials from the construction borrow pits in the western side of the Site, to the eastern part of the site shall do so via the internal wind farm access tracks and cross the public road using the 2 no. proposed new site accesses on the Local Road L6239. No HGV traffic shall be permitted to travel along the L2072 between the west and east access points to minimise potential traffic and transportation related adverse effects on local residents along this section of road. All construction related HGV traffic moving between the west and eastern portions of the Site shall use the internal wind farm access track network and proposed crossing point.
- Public roads shall be kept free of mud, dust, spillages and debris from the construction site, construction plant or haulage vehicles. Any necessary measures shall be put in place at the Site entry/exit points.
- When necessary, banksmen will be stationed at the site entrances to ensure that construction traffic from the Proposed Development are managed accordingly so to minimise conflict with public traffic.
- Adequate signage shall be installed on approach to the proposed site entrance advising of the presence of a 'site access ahead' and 'construction traffic ahead'. The above signage shall be removed following completion of the construction phase.
- All construction related parking shall be accommodated within the site. Construction related vehicles will not be permitted to park on public roads. Turning space and parking will be provided in the temporary site compounds and near turbine hardstand areas.
- Traffic movements for the construction of the development will be discussed with local community representatives and where necessary and off-peak deliveries will be accommodated where possible.
- If any damage to existing footpaths or cycle lanes occurs during the delivery of components, these sections will be replaced by the awarded civils contractor as per The Purple Book (Guidelines for Managing Openings in Public Roads 2017 (SD12 Footways: Concrete Permanent Reinstatement).

During the operational phase of the Proposed Development, site entrances to the site to be maintained continually to ensure visibility conditions at these entrances has not deteriorated. Hedgerow maintenance, in compliance with the Wildlife Act 1976 as amended, will be required periodically to ensure continued visibility at site entrances.

In the event of decommissioning of the wind farm, the proposed access track and haulage route will be used in the decommissioning process. There would be increased traffic and potential risk of disturbance to underlying soils at the wind farm during the decommissioning phase, leading to the potential for silt within run-off entering receiving watercourses from the wheels of vehicles. Localised drainage and soil management will be deployed to avoid this risk.

Although there will be vehicle movements associated with the removal of wind array components during decommissioning, the number of vehicles will be significantly lower than that estimated for the construction phase given that it is likely that some access tracks will remain in situ.

14. ARCHAEOLOGY, ARCHITECTURAL AND CULTURAL HERITAGE

This chapter assesses the likely significant effects of the Proposed Development, as described in Chapter 2, on the cultural heritage resource, which encompasses heritage assets relevant to both the tangible resource, such as archaeological sites and architecture heritage structures, and non-tangible resources, including historical associations, folklore, tradition, place names.

There are no recorded archaeological sites located within the boundary of the wind farm site while there are 13 no. examples located within the surrounding 2km study area. None of these recorded archaeological sites are National Monuments in State Care or are subject to Preservation Orders but all are protected under the National Monuments Acts 1930 (as amended). There is one National Monument in State Care located within 10km of the Site. This comprises an Augustinian Abbey located on Canon Island on the River Shannon at a distance of c. 7.5km to the southeast of the Site.

There are no recorded prehistoric archaeological sites located within 2km of the Site. A review of monuments with potential visual alignment attributes (e.g., megalithic tombs, stone circles, stone rows) within lands extending for 10km from the Site revealed only one example within this area. This comprises a megalithic structure (CL049-037002-) located in Liscasey townland at a distance of c.6km to the north of the Site. The classification 'megalithic structure' is assigned to features constructed of large stones that, while comparable in certain respects with megalithic tombs, cannot be classified as a particular monument type based on their extant remains.

All of these sites are located within private lands not accessible to the public. A review of the landscape extending for 10m in all directions from the Site revealed that there are no National Monuments within this area. There are ten extant prehistoric archaeological monuments with potential visual alignments located in private lands within 10km of the Site and these comprise standing stone pairs, stone rows and an unclassified megalithic tomb. A review of Archaeological Survey of Ireland descriptions of these monuments revealed that There are no recorded archaeological sites located within the Site or within 220m of any proposed development areas and, therefore, no direct effects on the known archaeological resource are predicted during the construction phase.

There are no designated architectural heritage structures located within the Site or the surrounding 2km study area and, therefore, no direct effects on this element of the cultural heritage resource are predicted during the construction phase.

There were no potential unrecorded archaeological sites or architectural heritage structures identified within the Site during the desktop research and field surveys carried out as part of this assessment. The creation and subsequent development of the forestry plantations that occupy one of the proposed turbine locations (T12) and sections of site access tracks within the Site during recent decades have resulted in extensive ground disturbance at their locations. A Heritage Council of Ireland study on the impacts of forestry on the archaeological resource concluded that the processes involved in the planting, maturing and rotation of planted lands have a high potential to completely remove or to severely degrade any archaeological sites and associated sub-surface deposits that may exist within plantations (Johnson 1998). While there is a low potential for the survival of unrecorded archaeological sites within development areas in the forestry plantations, this cannot be completely discounted. The locations of the other turbines, and associated infrastructure, are within areas of bogland and marginal pasture fields that retain the potential to contain unrecorded sub-surface archaeological remains. As the existence, nature and extent of any unrecorded sub-surface archaeological remains within the Site are unknown; the magnitude of potential effects is indeterminable but if such remains are present, ground works during the construction phase will have the potential to result in permanent, direct, adverse effects on any unrecorded archaeological remains that may exist within the footprint of areas requiring ground excavation works and this will require mitigation.

There are no recorded archaeological sites located within 220m of any proposed development areas within the Site and there are no designated architectural heritage structures located within the Site or the surrounding 2km study area. The operational phase of the proposed development will, therefore, result in no direct effects on known elements of the archaeological and architectural heritage resources.

The construction, operational and decommissioning phases of the Proposed Development will not result in likely significant direct, indirect or cumulative effects on the known cultural heritage resource. The potential exists for likely significant direct effects on any unrecorded, sub-surface archaeological remains that may be located within the boundary of the Proposed Development.

A suitably qualified archaeologist will be employed to supervise the construction phase of the Proposed Development. A systematic advance programme of archaeological field-walking surveys will be undertaken within all construction areas located within forestry plantations following pre-construction tree felling to confirm whether there are any surface traces of any potential unrecorded archaeological or architectural heritage sites exist within these areas. Archaeological monitoring of ground excavation works during the construction phase will then be carried out licensed by the NMS. In the event that any archaeological sites are identified during monitoring, ground works will halt at the relevant location and the archaeological remains will be recorded and securely cordoned off. The NMS will then be consulted to determine further appropriate mitigation measures, which may include preservation in situ by avoidance or preservation by record through systematic archaeological excavations licensed by the NMS.

The Proposed Development will result in long term, indirect, slight visual effects on cultural heritage constraints within surrounding lands. No likely significant effects on these constraints will arise, and these slight indirect effects do not require mitigation.

The potential does exist for the presence of unrecorded, sub-surface archaeological features within proposed construction areas. In the event that any sub-surface archaeological remains are identified during the site investigations detailed in Section 14.6 of the EIAR Volume II, they will be cleaned, recorded and left to remain in situ within cordoned off areas while the NMS are notified and consulted in relation to appropriate future mitigation strategies, which may entail preservation in situ by avoidance or preservation by record through licensed archaeological excavation. No likely significant effects on potential unrecorded, sub-surface archaeological features will arise following the implementation of these mitigation measures.

In conclusion, no likely significant effects on the cultural heritage resource will occur as a result of the Proposed Development.

14.1 Existing Environment

There are no recorded archaeological sites located within the boundary of the Site while there are 13 no. sites located within the surrounding 2 km Study Area (Table 14-2). None of these recorded archaeological sites are National Monuments in State Care or are subject to Preservation Orders but all are protected under the National Monuments Acts 1930 (as amended). The Archaeological Survey of Ireland have not published inventory descriptions for the majority of the archaeological sites within the 2 km Study Area, and all are located within inaccessible third-party private lands.

The summaries of their existing condition presented in Table 14-2 are based on reviews of historic Ordnance Survey mapping and modern aerial/satellite imagery.

There is one National Monument in State Care located within 10 km of the Site. This comprises an Augustinian Abbey located on Canon Island on the River Shannon at a distance of c. 7.5 km to the southeast of the Site and details on this monument are provided below (Table 14-2).

Table 14-1: Recorded archaeological sites within 2km of proposed wind farm site

Monument No.	Class	Condition*	Townland	Approx. distance from nearest turbine	Approx. distance from nearest site infrastructure
CL049-028----	Ringfort	Levelled	Burrenfadda	1,635m north of T3	980 m north of site access track
CL049-031----	Ringfort	Extant	Lack	1,345 m northeast of T14	1,210 m northeast of peat deposition area
CL049-032----	Ringfort	Extant	Lack	2,030 m northeast of T14	1,945 m northeast of site access track
CL049-034----	Quarry	Levelled	Burrenfadda	1,840 m northeast of T3	1,245 m northeast of site access track
CL059-005----	Ringfort	Extant	Burrenfadda	825 m northwest of T3	220 m north of OHL pole
CL059-006----	Ringfort	Extant	Burrenfadda	1,060 m northwest of T3	530 m northwest of site access track
CL059-008----	Ringfort	Partly extant	Lisnafaha	990 m northeast of T2	500 m north of site access track
CL059-010----	Ringfort	Extant	Glenconaun Beg	1,390 m east of T14	1,200 m east of site access track
CL059-011----	Enclosure	Levelled	Coolsuppeen	1,890 m northeast of T14	1,730 m northeast of site access track
CL059-017----	Burial ground	Unknown	Cloondrinagh	1,785 m southwest of T1	1,560 m west of site access track
CL059-018----	Earthwork	Levelled	Cloonkett	560 m southwest of T1	225 m west of site access track
CL059-019----	Ringfort	Extant	Gortnacurra	1,875 m southeast of T14	1,690 m southeast of site access track
CL059-027----	Children's burial ground	Unknown	Gortnahaha	2,085 m southeast of T6	1,730 m south of borrow pit

14.1.1 Field Survey

A field survey of the development areas within the Site and the TDR nodes in green field locations was carried out in March 2025 during clear weather conditions that allowed good landscape visibility. The following section commences with a general overview of the existing environment within the Site and further details on the locations of Proposed Development areas within the Site are provided in Table 14-2. This table includes the distances of Proposed Development areas from the nearest archaeological site as well as summaries of the locations of each element of the Proposed Development as shown on the 19th century OS maps and aerial/satellite/LiDAR images.

In general, the terrain within the Site is undulating with slight downward slopes from low ridges to the north and south towards more level ground in central areas of the Site. The majority of the lower-lying lands within the Site are occupied by areas of overgrown bogland, including areas of cutaway bog, while the surrounding areas of enclosed farmland comprise vacant pasture fields, areas of which appear to have been reclaimed by modern land improvement works. A number of modern forestry plantations are located within the Site; one turbine (T12) and sections of site access tracks will extend into these plantations. There are no rivers extending within the Site, but it is drained by two minor streamlets (Carroweagh East and Cloonkett streams) as well as machine-cut land drains extending through areas of bogland and along the sides of field boundaries.

A number of existing stone-surfaced farm tracks extend through the green field areas within the Site and sections of the proposed site access tracks will follow these existing access routes. The routes of the proposed new site access tracks within the Site, including floating tracks within areas of bogland, were subject to field-walking inspections during the survey and no surface traces of potential unrecorded archaeological sites or architectural heritage features were noted along these routes.

Table 14-2: Description of wind farm construction areas with references to consulted desktop sources

Project Element	Nearest Archealogical Sites	Historic OS Maps	Aerial/ Satellite/ LiDAR images	Description
Turbine 1	Earthwork (CL059-018----) c.580 m to southwest	Shown as an area of vacant bogland	No potential unrecorded archaeological sites noted at location	Turbine and hardstand are within an area of vacant cutaway bog which is overgrown with rough grass cover. A proposed peat deposition area to the south of the turbine is within an undulating area of green field pasture. No surface traces of potential unrecorded archaeological sites or architectural heritage features were noted at the location
Turbine 2	Earthwork (CL059-018----) c.860 m to southwest	Shown within margin between bogland and vacant fields	No potential unrecorded archaeological sites noted at location	Turbine and hardstand are located within the margin between bogland at south and a pasture field with reed growth at north. No surface traces of potential unrecorded archaeological sites or architectural heritage features were noted at the location

Project Element	Nearest Archealogical Sites	Historic OS Maps	Aerial/ Satellite/ LiDAR images	Description
Turbine 3	Ringfort (CL059-005----) c.830 m to northwest	Shown within area of vacant fields	No potential unrecorded archaeological sites noted at location	Turbine and hardstand locations are within an area of vacant pasture fields that gently slope down to south. No surface traces of potential unrecorded archaeological sites or architectural heritage features were noted at the location
Turbine 4	Earthwork (CL059-018----) c.1,200 m to west	Shown within area of vacant fields	No potential unrecorded archaeological sites noted at location	Turbine, hardstand and a peat deposition area location are within a vacant pasture field under low grass cover. No surface traces of potential unrecorded archaeological sites or architectural heritage features were noted at the location
Turbine 5	Earthwork (CL059-018----) 1,630 m to west	Shown as area of vacant bogland	No potential unrecorded archaeological sites noted at location	Turbine and hardstand are within an overgrown area of cutaway bog. No surface traces of potential unrecorded archaeological sites or architectural heritage features were noted at the location
Turbine 6	Earthwork (CL059-018----) c.1,925 m to west	Shown as area of vacant bogland	No potential unrecorded archaeological sites noted at location	Turbine and hardstand are within a vacant area of overgrown cutaway bog located adjacent to a modern forestry plantation. No surface traces of potential unrecorded archaeological sites or architectural heritage features were noted at the location
Turbine 7	Ringfort (CL059-008----) c.1,880 m to northeast	Shown as area of vacant bogland	No potential unrecorded archaeological sites noted at location	Turbine and hardstand locations are within a vacant area of overgrown cutaway bog close to the edge of a modern forestry plantation. No surface traces of potential unrecorded archaeological sites or architectural heritage features were noted at the location
Turbine 8	Ringfort (CL059-008----) c.1,470 m to northeast	Shown as area of vacant bogland	No potential unrecorded archaeological sites noted at location	Turbine, hardstand and peat deposition area are located within a reclaimed pasture field adjacent to a modern forestry plantation. No surface traces of potential unrecorded archaeological sites or architectural heritage features were noted at the location

Project Element	Nearest Archealogical Sites	Historic OS Maps	Aerial/ Satellite/ LiDAR images	Description
Turbine 9	Ringfort (CL059-008----) c.1,560 m to northeast	Shown as area of vacant bogland	No potential unrecorded archaeological sites noted at location	Turbine and hardstand are within an overgrown area of cutaway bog. The location has been subject to modern peat extraction works and natural subsoil has been exposed. No surface traces of potential unrecorded archaeological sites or architectural heritage features were noted at the location
Turbine 10	Ringfort (CL059-008----) c.1,530 m to north	Shown as area of vacant bogland	No potential unrecorded archaeological sites noted at location	Turbine and hardstand locations are within vacant pasture fields. No surface traces of potential unrecorded archaeological sites or architectural heritage features were noted at the location
Turbine 11	Ringfort (CL059-008----) c.1,210 m to north	Shown as area of vacant bogland	No potential unrecorded archaeological sites noted at location	Turbine and hardstand are within an area of vacant cutaway bog which is overgrown with rough grass cover. No surface traces of potential unrecorded archaeological sites or architectural heritage features were noted at the location
Turbine 12	Ringfort (CL059-008----) c.980 m to northeast	Shown as area of vacant bogland	No potential unrecorded archaeological sites noted at location	Turbine and hardstand located within a modern forestry plantation containing closely set trees. No surface traces of potential unrecorded archaeological sites or architectural heritage features were noted at the location
Turbine 13	Ringfort (CL059-008----) c.1,190 m to north	Shown as area of vacant bogland	No potential unrecorded archaeological sites noted at location	Turbine and hardstand location is within an overgrown area of cutaway bog. A peat deposition area to the south is within vacant pasture. No surface traces of potential unrecorded archaeological sites or architectural heritage features were noted at the location
Turbine 14	Ringfort (CL059-008----) c.1,110 m to the northeast	Shown within margin between bogland and vacant fields	No potential unrecorded archaeological sites noted at location	Turbine and hardstand locations are within margin between area of cutaway bog at west and a vacant pasture field at east. The location of a peat deposition area to the north of the hardstand is within the pasture field. No surface traces of potential unrecorded archaeological sites or architectural heritage features were noted at the location

Project Element	Nearest Archealogical Sites	Historic OS Maps	Aerial/ Satellite/ LiDAR images	Description
Construction Compound	Ringfort (CL059-005----) c.620 m to northwest	Shown within area of vacant fields	No potential unrecorded archaeological sites noted at location	Located within a vacant pasture field with widespread reed growth. No surface traces of potential unrecorded archaeological sites or architectural heritage features were noted at the location
Substation	Ringfort (CL059-005----) c.350 m to northwest	Shown within area of vacant fields	No potential unrecorded archaeological sites noted at location	Located within an area of vacant pasture fields with widespread reed growth. No surface traces of potential unrecorded archaeological sites or architectural heritage features were noted at the location
Overhead Line	Ringfort (CL059-005----) c.220 m to north	Location shown as area of vacant fields	No potential unrecorded archaeological sites noted at location	Extends through a number of vacant pasture fields. No surface traces of potential unrecorded archaeological sites or architectural heritage features were noted
Met Mast	Earthwork (CL059-018----) c.450 m to southwest	Shown as area of vacant bogland	No potential unrecorded archaeological sites noted at location	Located within margin between bogland at west and vacant pasture fields at east. No surface traces of potential unrecorded archaeological sites or architectural heritage features were noted.
Borrow Pits Cloonkett Townland	Earthwork (CL059-018----) c.260 m to west	Shown within areas of vacant fields	No potential unrecorded archaeological sites noted at pit locations	There are four proposed borrow pits within this townland. Three are located within a gorse covered ridge line and the other is within a vacant pasture field to the north. No surface traces of potential unrecorded archaeological sites or architectural heritage features were noted at their locations
Borrow Pit Burrenfadda Townland	Ringfort (CL059-006----) c.490 m to northwest	Shown within area of vacant fields	No potential unrecorded archaeological sites noted at location	Location of borrow pit is within a low natural ridge covered with grass and gorse. No surface traces of potential unrecorded archaeological sites or architectural heritage features were noted
TDR Node Carrowreagh West townland	Ringfort (CL058-037----) c.1,020 m to southeast	Shown within area of vacant fields	No potential unrecorded archaeological sites noted at location	The route of a temporary trackway to the east of a sharp road bend extends through an area of sloping pasture fields. The majority of the route follows an existing stone surfaced farm track apart from one pasture field at the south end.

Project Element	Nearest Archealogical Sites	Historic OS Maps	Aerial/ Satellite/ LiDAR images	Description
				No surface traces of potential unrecorded archaeological sites or architectural heritage features were noted
TDR Node Ballybuneen townland	Ringfort (CL049-022----) c.380 m to northeast	Shown within vacant field	No potential unrecorded archaeological sites noted at location	An area of road widening on the southeast side of a junction on the N68 road will extend into the corner of an adjacent field. No potential unrecorded archaeological sites or architectural heritage features were noted at the location

14.2 Potential Impacts

There are no recorded archaeological sites located within the Site and the nearest recorded example (Ringfort CL059-005----) is located at a distance of 220 m from the nearest Proposed Development area and, therefore, there will be no likely significant direct effects on the known archaeological resource during the construction phase.

There are no designated architectural heritage structures located within the Site or the surrounding 2 km Study Area and, therefore, there will be no likely significant direct effects on this element of the cultural heritage resource during the construction phase.

There were no potential unrecorded archaeological sites or architectural heritage structures identified within the Site during the desktop research and field surveys carried out as part of this assessment. The creation and subsequent development of the forestry plantations that occupy one of the proposed turbine locations (T12) and sections of site access tracks within the Site during recent decades have resulted in extensive ground disturbance at their locations. A Heritage Council of Ireland study on the impacts of forestry on the archaeological resource concluded that the processes involved in the planting, maturing and rotation of planted lands have a high potential to completely remove or to severely degrade any archaeological sites and associated sub-surface deposits that may exist within plantations (Johnson 1998). While there is a low potential for the survival of unrecorded archaeological sites within development areas in the forestry plantations, this cannot be completely discounted. The locations of the other turbines, and associated infrastructure, are within areas of bogland and marginal pasture fields that retain the potential to contain unrecorded sub-surface archaeological remains.

As the existence, nature and extent of any unrecorded sub-surface archaeological remains within the Site are unknown; the magnitude of potential effects is indeterminable but if such remains are present, ground works during the construction phase will have the potential to result in likely significant permanent, direct, adverse effects on any unrecorded archaeological remains that may exist within the footprint of areas requiring ground excavation works and this will require mitigation.

The Proposed Development will require one watercourse crossing and this is over a section of the Carrowreagh East stream [EPA code 27C49] within the Site. This will entail the construction of a clear span bridge to carry an internal wind farm access track over this watercourse. This will not require any in-channel works and will have no predicted direct effects on any potential unrecorded underwater archaeological features. No likely significant effects on any potential underwater archaeological features will arise.

14.3 Mitigation Measures

A suitably qualified archaeologist will be employed to supervise the construction phase of the Proposed Development. A systematic advance programme of archaeological field-walking surveys will be undertaken within all construction areas located within forestry plantations following pre-construction tree felling to confirm whether there are any surface traces of any potential unrecorded archaeological or architectural heritage sites exist within these areas. Archaeological monitoring of ground excavation works during the construction phase will then be carried out licensed by the NMS. In the event that any archaeological sites are identified during monitoring, ground works will halt at the relevant location and the archaeological remains will be recorded and securely cordoned off. The NMS will then be consulted to determine further appropriate mitigation measures, which may include preservation *in situ* by avoidance or preservation by record through systematic archaeological excavations licensed by the NMS.

The Proposed Development will result in long term, indirect, slight visual effects on cultural heritage constraints within surrounding lands. No likely significant effects on these constraints will arise, and these slight indirect effects do not require mitigation.

There are a number of obligatory processes to be undertaken as part of archaeological licence applications which will allow for monitoring of and the successful implementation of the archaeological mitigation measures detailed above. These include the submission of method statements detailing the proposed strategy for all site investigations for the approval of the NMS as part of the licence applications. Reports will be compiled on all archaeological site investigations to comply with the licensing requirements which will clearly present the results in written, drawn and photographic formats. Copies of the reports will be submitted to the NMS, the Planning Authority and the National Museum of Ireland.

15. LANDSCAPE AND VISUAL IMPACT

The Proposed Development is contained within a broad, low-lying peatland and marginal farmland landscape approximately 5km to the north of the Shannon Estuary. Topography within the Central Study Area is a mixture of flat to gently undulating terrain, with remnant glacial landforms. Two small loughs are located to the south of the Site, including; Cloonsnaghta Lough (c.840m from Site) and Gortglass Lough (c.690m from Site). In terms of drainage, surface water generally flows south-eastward towards the Shannon Estuary, which forms the primary catchment for the area. However, the Cloon River c.2.3km west of the nearest turbine, also captures runoff which flows towards the Shannon Estuary.

The Wider Study Area exhibits a more varied and contrasting landscape pattern, with a clear distinction in landform and landscape features between the northern and southern extents. The northern/ northwest extents of the Study Area depict a more dramatic upland landscape along with extensive bogland. Most notably Slievecallan Mountain (391m AOD) the third highest mountain within Ireland, which is situated within an area of upland blanket bog c.15km northwest of Site. Ben Dash (267m AOD) is located approximately 9km to the north of the Proposed Development. Other features of note include; Doo Lough (the largest lake within the Study Area) approximately c.12.7km northwest of the Site, also surrounded by large areas of bogland. The landscape throughout the north/ northwest quadrant is intermittently punctuated with small loughs and connecting waterways that generally flows west towards the Atlantic coastline. The River Shannon Estuary is the dominant landscape feature within the Study Area occupying a notable area within the east/ southeast and southwest of the Study Area. The estuary defines the main boundary between County Clare/ Kerry to the wider southwest and County Clare/ County Limerick to the south of the estuary and serves as a transition between the intricate Atlantic coastline on the outer edge of the Study Area to the west and southwest, and the more elevated, upland areas to the north and east. The confluence of the Fergus and Shannon Estuaries is another notable feature 4.7km to the east of Site, with the surrounding topography gently sloping to water-level.

The landform within the southern extents of the Study Area is gently undulating, rising gradually towards the wider southern periphery where it transitions into a mosaic of bogland. In contrast, the broader southeastern and northeastern areas exhibit flat to gently undulating terrain, with landscape characteristics strongly shaped by the proximity of the Shannon Estuary. The River Fergus and River Rine, both flowing towards the estuary, have a further influence the northeastern extents of the Study Area.

Agricultural farmland represents the prevailing land use across the Study Area, framed by a geometric network of hedgerows. Nonetheless, both land use and vegetation distribution are strongly influenced by the area's varied topography and landscape features. The Site itself is distributed across a patchwork of peatland, fringed by blocks of conifer forestry, regenerating scrub and agricultural farmland.

In terms of the Central Study Area, this area exhibits a mosaic of peatland, pastoral farmland, commercial forestry, and dispersed rural dwellings. However, the prevailing landscape character remains that of a relatively cohesive and gently rolling rural environment.

The Slievecallan uplands, within the northwestern quadrant of the Study Area, is characterised by extensive areas of mountain moorland and bogland occupying the higher slopes and ridgelines, interspersed with large blocks of commercial coniferous plantation. Upland grazing occurs less frequently, typically on the transitional slopes, giving way to enclosed valley farmland within the more sheltered, lower-lying areas. Notably, this upland context has become closely associated with wind energy development with wind turbines predominantly concentrated within the elevated moorland zones.

Urban development is largely confined to the periphery of the Study Area, with Ennis, Shannon, Clarecastle and Kilrush comprising the principal settlements. In proximity to the Shannon Estuary, settlement patterns are more dispersed, with several communities closely linked to industrial activity. Here, energy and industrial land uses contribute notably to the local landscape character, influenced by the River Shannon's navigable access to major industrial installations such as Foynes Port and the Aughinish Alumina facility. Tarbert and Moneypoint power stations, situated on opposite banks of the estuary, represent key infrastructural assets within the national grid. These sites also serve as convergence points for multiple high-voltage transmission routes. Moneypoint, in particular, is a prominent feature within the wider landscape due to its twin chimneys, each exceeding 200 metres in height, which are among the tallest built structures in Ireland. Overall, the Study Area exhibits a strong functional and working landscape character, reflective of long-standing human interaction with the environment.

15.1 Potential Effects

The Proposed Development is situated within a landscape classification area designated as a 'Settled Landscape' within the Clare County Development Plan (CDP) described as; *"areas where people live and work".* The Clare CDP includes the objective; *"to permit development in these areas that will sustain economic activity and enhance social well-being and quality of life – subject to conformity with all other relevant provisions of the Plan and the availability and protection of resources. "*This indicates a landscape with capacity to accommodate change and not one subject to heightened protection. Furthermore, most of the proposed turbines, along with much of the Central Study Area, also fall within areas classified as 'Rural Areas under Strong Urban Influence', reflecting development pressure and human activity, rather than a sense of remoteness or untouched naturalistic character. These classifications support an understanding of the landscape as functioning and anthropogenic, valued primarily for its productivity and sustenance of the rural community.

The landscape sensitivities of the Central Study Area are primarily defined by the Shannon Estuary, which possesses a blend of scenic, recreational and cultural value. Expansive estuarine views from the shoreline are complemented by the Shannon Estuary Way, a recognised driving and cycling route that follows the estuary's edge and provides visual access to coastal landscapes and heritage features. These attributes contribute to a sense of scenic amenity in this part of the Study Area. However, it is worth noting that the estuary is located more then 4km from the Proposed Development, and therefore and there is a notable degree of visual and contextual separation between the Site and the more vulnerable landscape of the Shannon Estuary.

Overall, the Central Study Area is best described as a robust and actively managed rural landscape, valued for subsistence reasons. While certain areas, particularly along the Estuary, exhibit higher levels of sensitivity due to their scenic or cultural attributes, the predominant character of the Central Study Area is defined by its working, utilitarian function.

The proposed turbines, as well as the ancillary development, such as access and circulation roads, areas for the proposed Electrical Substation and hard standing for the proposed turbines, will impact the physical landscape of the proposed development site, as well as its character. However, the only envisaged landscape impact upon the Study Area (i.e., outside the Site) will be the likely impact upon landscape character from the proposed turbines.

15.2 Construction Phase

It is considered that the Development will have a modest physical impact on the landscape within the Site, because none of the proposed features are considered to have an extensive physical 'footprint'. The topography and land cover of the Site will remain largely unaltered. Aside from the 14 no. proposed turbines, construction will be limited to an Electrical Substation and Control Building, internal access tracks, Turbine Hardstands and a Temporary Construction Compound. Excavations will tie into existing ground levels and will be the minimum required to ensure efficient working. Any temporary excavations or stockpiles of material will be re-graded to marry into existing site levels and reseeded appropriately.

The finalised internal access track layout has been designed to avoid environmental constraints. The road layout has been designed to follow the natural contours of the land wherever possible reducing potential for areas of excessive 'cut and fill'. There will be an intensity of construction stage activity associated with the access tracks and turbine hardstands consisting of the movement of heavy machinery and materials, but this will be temporary/short term in duration and transient in location. The construction stage effects on landscape character from these activities will be minor.

Site activity will be at its greatest during the construction phase due to the operation of machinery on site and movement of heavy vehicles to and from Site. This phase will have a more notable and apparent impact on the character of the Site and cable routes than the operational phase. There will be some long-term/permanent effects on the physical landscape in the form of Turbine Foundations and hardstands, the existing/upgraded access tracks and a substation, but only the on-site substation and mast are likely to remain in perpetuity as part of the national grid network.

There will be some construction stage effects on landscape character generated by the intensity of construction activities (workers and heavy machinery) as well as areas of bare-ground and stockpiling of materials as identified in the Construction and Environmental Management Plan (CEMP). Such effects will be temporary/short term in duration and are, therefore, not considered to be significant. Overall, construction stage landscape effects are considered to be of a High-medium magnitude.

15.3 Operational and Decommissioning Phase

For most commercial wind energy developments, the greatest potential for landscape impacts to occur is as a result of the change in character of the immediate area, due to the introduction of tall structures with moving components. Thus, in some instances, wind turbines that may not have been a characteristic feature of the area become a new defining element of that landscape character. In this instance, wind turbines are an existing feature within the existing landscape context, with existing turbines located 8.3km to the northwest. Indeed, the entire Study Area encompasses over 90 existing turbines. Thus, the overall effect therefore, is one of intensification and extension of an established land use and not the introduction of a new and unfamiliar one. In terms of scale and function, the Proposed Development is well assimilated within the context of the Central Study Area, which exhibits of a range of working rural land uses. Although it represents a considerably higher level of built development than what currently exists on the Site, it will not detract notably from its productive, rural landscape character.

In terms of scale and function, the Proposed Development is well assimilated within the context of the central study area. This is due to the broad scale of the landform, landscape elements and land use patterns. These attributes prevent the height and extent of the Proposed Development from causing the type of scale conflict that can occur in more intricate landscape areas. Some of the rolling hills, ridges and the foothill landscape in the immediate surrounds of the Site have a notable working character due to the presence of the existing commercial conifer plantations and broad areas of pastoral farmland that occur within and around the Site. Although the Proposed Development represents a stronger human presence and level of built development than currently exists on the Site, it will not detract significantly from transitional working character.

It is important to note that in terms of duration, this Proposed Development represents a long term, but not permanent impact on the landscape and is reversible. The lifespan of the project is 40 years, after which time it will be dismantled, and the landscape reinstated to prevailing conditions. Within 2-3 years of decommissioning there will be little evidence that a wind farm ever existed on the Site, albeit the proposed on-site substation will remain in perpetuity as part of the national grid infrastructure, in addition to residually useful access tracks.

The decommissioning phase will have similar temporary impacts as the construction phase with the movement of large turbine components away from the site. There may be a minor loss of roadside and trackside vegetation that has grown during the operational phase of the project, but this can be reinstated upon completion of decommissioning. Areas of hard standing that are of no further use will be reinstated and reseeded to blend with the prevailing surrounding land cover of the time. It is expected that the decommissioning phase would be completed within a period of approximately 3 months.

16. MATERIAL ASSETS, TELECOMMUNICATIONS AND AVIATION

This Chapter describes Material Assets and Utility Infrastructure, Telecommunications and Broadcasting and Aviation that might potentially be affected by the Proposed Development. The potential effects are initially considered without mitigation, and the residual effects post mitigation are described. The assessment considers the potential effects during all phases of the development: construction, operation and decommissioning. This chapter assesses:

- Material Assets and Utilities (Gas, Water, Electricity Cables etc.);
- Telecommunications & Broadcasting; and
- Aviation.

16.1 Potential Effects

16.1.1 Material Assets - Utility Infrastructure

There are no Gas Networks Ireland (GNI) gas transmission line or Uisce Éireann (formally Irish Water) mains water line utility identified within the Site boundary.

Uisce Éireann require developers to engage in pre-planning consultation with them where there is a potential for proposed infrastructure to be constructed close to their assets. An onsite electricity substation will be constructed within the Proposed Development site to provide a connection point between the wind farm and the national grid via a loop-in connection to the existing Prospect – Cashla 220 kV OHL. Therefore, there are no interactions between the grid connection cable and Uisce Eireann assets so no pre-planning consultation or *'Building-over or Near an Irish Water Asset*' application to the Uisce Éireann's Diversions Team is required.

Accommodation works for the delivery of turbine components from Foynes Port to Proposed Development site will be brief to temporary non-significant negative effects on dwellings and commercial/industrial activities within the catchment of the services.

Turbine delivery works could potentially cause traffic disturbance and damage to road infrastructure if not properly planned and assessed. Pre-planning discussion on the TDR have taken place with Clare County Council's Roads Department, with any potential impact on road infrastructure is detailed in Chapter 13: Traffic & Transportation. A Traffic Management Plan (TMP) will be in place for the duration of the works.

Once the Cloonkett Wind Farm is operational, the potential for negative effects on Material Assets and Utility Infrastructure is minimal. Maintenance of access tracks and infrastructure may require small amounts of imported fill, however, the impact of this is likely to be slight/imperceptible.

No impact on existing water or gas utility infrastructure is expected at the wind farm site during the operational phase.

The direct effect of electricity generated by the proposed development will give rise to a reduction in the quantity of fossil fuels required for electricity generation across the State. This will give rise to a long-term slight positive impact on renewable energy resource and will contribute to reducing Ireland's dependency on imported fuel resources.

Decommissioning works will include removal of above ground structures including the turbines and met masts. Turbine foundations, access tracks and electrical assets such as substation buildings will be left in situ and taken in charge of by Eirgrid / ESB which will have a long-term slight positive effect on electricity infrastructure provision in the area.

There will be no likely negative impacts on utility infrastructure during the decommissioning phase.

Increased traffic numbers on the local, regional and national roads will have a temporary slight negative impact on the road network due to increased traffic.

16.1.2 Telecommunications and Broadcasting

The potential for electromagnetic interference from wind turbines occurs only during the commissioning and operational phase of the Proposed Development. There are no potential electromagnetic interference effects associated with the construction phase or decommissioning phase of the Proposed Development on telecommunications and broadcasting in the area.

As the proposed grid connection element is within the site, which contains no telecommunications and broadcasting infrastructure, there are no potential construction related effects for electromagnetic interference and broadcasting interests in the area associated with the Site or the TDR.

As identified and assessed in Chapter 14: Traffic and Transportation, a Traffic Management Plan will be agreed with Clare County Council in advance of any works on the TDR from Foynes Port to the site in Cloonkett. The schedule of turbine component deliveries will be determined by the turbine supplier, however, it is reasonable to assume that several convoys will be required to deliver all of the turbine components to site over the course of the turbine installation works.

Consultation regarding the potential for electromagnetic interference from the Proposed Development was carried out with the relevant national and regional broadcasters, fixed line and mobile telephone operators and other operators. As described within EIAR Chapter 5: EIA Scoping And Consultation, no telecommunication or broadcasting operators contacted during the consultation process raised any concerns regarding telecommunications or broadcasting networks operating in the licence-exempt frequency bands. Furthermore, there were no impacts reported by any of the telecommunications operators operating GSM Radio Access, Mobile Broadband Data Access, Tetra, Telemetry or TV/Radio Transmission networks.

The remaining findings of the consultation and desk-based study confirms there will be no significant electromagnetic interference effect caused by the Proposed Development.

Effects as a result of turbine delivery is only associated with the construction process. There is potential that overhead lines may require brief disruption in the unlikely event that a turbine component requires replacement - in this case the turbine delivery route is required to be used during the operational phase. This would result in a brief slight negative impact to telecommunications services along the TDR.

The potential for electromagnetic interference from wind turbines occurs only during the commissioning and operational phase of the Proposed Development. There are no electromagnetic interference impacts associated with the decommissioning phases of the Proposed Development, and therefore no mitigation is required.

The proposed on site substation and grid connection will be left in situ. There are no decommissioning related impacts on telecommunications and broadcasting interests in the area.

16.1.3 Aviation

As part of the scoping and consultation process for the Proposed Development, the Draft DoEHLG 2019 Guidelines show that construction infrastructure such as cranes required for the installation of turbines, wind turbines or any structure exceeding 90 metres in height can be an obstacle to low flying craft and to aerial navigation. Therefore, turbines and structures over 90m are required to be shown on aviation charts to aid aerial navigation from aviation centres such as airports and local airfields. Additionally, consultation was also conducted with the Irish Aviation Authority (IAA) and the Irish Air Corps (IAC) to ensure the Proposed Development had no impact with assets such as air navigation safety, airports, radar and aircraft guidance systems. In addition, the IAC state they are opposed to any wind farms or tall structures which may impact the following:

- Lands underlying military airspace used for flying activity, including designated Military;
- Operation Areas (MOA);
- Areas wherein military flying occurs at low levels;
- Critical low level routes in support of IAC operational requirements.

The IAC also state that, in an effort to enhance safety in locations where wind farms or masts are permitted, they should be illuminated by high intensity strobe lights, be identifiable hazards relative to additional lighting in the vicinity and remain visible to night vision equipment.

However, no impacts are anticipated following consultation with the Irish Aviation Authority, Air Navigation Ireland, Shannon Airport Authority, Ireland West Airport (Knock) and Irish Air Corps. No licenced or unlicenced aviation activity associated with airfields have been identified within 5km of the Proposed Development site.

Should the Proposed Development at Cloonkett be permitted, the turbine locations would be added to aviation flight charts and clearly marked as en-route obstacles. This would enable VFR pilots to plan their flight routes accordingly.

Any temporary accommodation works associated with the TDR will not affect aviation interests in the area.

Wind turbines within 30 km of a radio navigation aid have the potential to lead to electro-magnetic interference with these signals. However, as the proposed wind farm is c. 14 km from the Localizers and transmitting antennas and located in areas not in line with signals or transmitters, it is deemed very unlikely that turbines at the Proposed Development will have any impact on these ATS communications and radio navigational aids. Typically, interference to VHF communications systems will only occur when obstacles are in close proximity to the VHF transmitter. T15 is located within the Outer Horizontal Surface of Shannon Airport's Obstacle Limitation Surfaces (OLS) and will likely require further technical assessment to evaluate any potential obstruction.

The ground to blade tip height of the turbines at the Proposed Development at Cloonkett is 150m. Therefore, as the turbines exceed 100 meters in height, and are within 45km of Shannon Airport, this will require their inclusion in the Irish Aviation Authority (IAA) Electronic Air Navigation Obstacle Dataset.

Furthermore, the proximity of the turbines to the departure flight path for Runway 24 at Shannon Airport may require a detailed assessment to ensure no interference with instrument flight procedures. 4 no. turbines are within 15km of the Primary Surveillance Radar (PSR), making them likely detectable and necessitating a detailed radar assessment. 9 no. turbines are within 16km of the Secondary Surveillance Radar (SSR), and while reflected signals are unlikely to be detectable, a detailed assessment may still be requested. Annual flight checks for navigational aids are unlikely to be affected, but consultation with the IAA is recommended.

Though, no impact on Air Corps activities is expected, wind turbines may be considered as '*en-route obstacles*', requiring an aeronautical obstacle warning light scheme. Though the Proposed Development site at Cloonkett is located outside restricted areas for the Irish Air Corps and the Department of Defence, the Scoping Response received from the Minister for Defence, as contained within Chapter 5: EIA Scoping And Consultation, outlined the following:

"All turbines should be illuminated by Type C, Medium intensity, Fixed Red obstacle lighting with a minimum output of 2,000 candela to be visible in all directions of azimuth and to be operational H24/7 days a week. Obstacle lighting should be incandescent or, if LED or other types are used, of a type visible to Night Vision equipment. Obstacle lighting used must emit light at the near Infra-Red (IR) range of the electromagnetic spectrum, specifically at or near 850 nanometres (nm) of wavelength. Light intensity to be of similar value to that emitted in the visible spectrum of light.

Any Irish Air Corps (IAC) requirements for are separate to Irish Aviation Authority (IAA) requirements."

The potential obstacles for low-level operations of the Garda Air Support Unit (GASU) and Emergency Aeromedical Service (EAS) are unlikely to affect their operations due to the sparse population and terrain in the area.

Although the development is over 7km from Shannon Airport's Building Restricted Areas (BRA), no significant interference is expected. The turbines are within 25 nautical miles of Shannon Airport's VOR/DME, but there is sufficient clearance to ensure no impact on published Minimum Sector Altitudes (MSA).

During the decommissioning phase, the turbines will be dismantled and removed from the site, thereby removing all potential obstacles to future aviation interests. There will be no likely effects on aviation during the decommissioning phase.

16.2 Mitigation Measures

16.2.1 Material Assets - Utility Infrastructure

Existing services which may be impacted along the proposed TDR will be assessed in the pre-construction surveys prior to construction. This will minimise the impact in terms of disruption or damage to existing utilities. Communication with service providers will be maintained for the duration of the construction works, as necessary.

Where services are required to be interrupted to accommodate turbine delivery, residents and business in proximity to the works will be informed in advance. Additionally, the service providers will notify the public of any such interruptions or changes in water pressure, as is current practice.

The comprehensive turbine delivery procedure which will be implemented between the Foynes Port and the Proposed Development site at Cloonkett will include safety procedures, and a Garda escort.

Any accommodation works within the public road corridor will be carried out in advance of the turbine deliveries in agreement with the local authority and subject to a road opening license. The development will be constructed to ensure that all temporary/permanent works within the road curtilage of the national roads (N69, N85, N68) will be as per the Purple Book (Guidelines for Managing Openings in Public Roads, 2017). If any damage to existing footpaths or cycle lanes occurs during the delivery of components, these sections will be replaced by the awarded civils contractor as per The Purple Book (Guidelines for Managing Openings in Public Roads 2017 (SD12 Footways: Concrete Permanent Reinstatement).

It is likely that turbine delivery will take place outside of regular travelling/commuting hours in order to avoid potential traffic impacts on major routes.

16.2.2 Telecommunications and Broadcasting

Mitigation measures consist of mitigation by design to avoid impacts on telecommunication links. As there is no potential for electromagnetic interference from the Proposed Development on telecommunications, there are no mitigation measures proposed for the construction, operation, or decommissioning phase of the Proposed Development.

There is potential for broadcasting to be affected at receivers close to the Site during the operational phase, i.e. nearby dwellings. Mitigation by design has achieved with the closest residential property (Eircode: V15 FF83) being c. 517m Southeast of T1, and c. 558m South /Southwest of T2, which will reduce potential effects on receivers.

Overhead telecommunication lines along the TDR may be briefly disconnected during turbine delivery during the construction phase. Any interference to service will be brief (lasting less than 1 day) and potential effects to service will be communicated in advance to those affected. Notice will be provided to all stakeholders affected prior to works commencing.

16.2.3 Aviation

In line with standard practice for wind farm developments, the coordinates and elevations for turbines will be supplied to the IAA at the end of the construction phase. An aeronautical obstacle lighting scheme will be agreed with IAA in line with IAA's consultation response and applied to the proposed turbines. Should the proposed wind farm be permitted, the turbine locations would be added to aviation flight charts and clearly marked as en-route obstacles.

17. INTERACTIONS OF THE FOREGOING

This Chapter assesses the potential for interactions and inter-relationships between one aspect of the environment and another which can result in an impact being either positive or negative, as well as having varying significance. The chapter considers potential significant environmental effects that may occur in terms of the interaction and inter-relationships of Air Quality & Climate; Noise & Vibration; Biodiversity; Ornithology; Soils, Geology and Hydrogeology; Hydrology & Water Quality and FRA; Population and Human Health; Shadow Flicker; Traffic and Transportation; Archaeology, Architectural & Cultural Heritage; Landscape & Visual Impact; Material Assets, Telecommunications & Aviation as a result of the proposed project as described in Chapter 2 of this EIAR.

Table 17-1, below, provides a matrix detailing the key interactions and inter-relationships between the key environmental aspects of the proposed project, including the wind farm, on site substation and connection to the national grid via an existing overhead line (GCR) and turbine delivery route (TDR).

Each individual chapter of the EIAR has had regard to interactions between different potential impacts. For example, *Hydrology and Water Quality & FRA has had regard to potential impacts on Biodiversity; and Land, Soils and Geology* has had regard to potential impacts on both *Biodiversity, Hydrology and Water Quality & FRA and Traffic & Transportation*.

Table 17-1: Matrix of Interaction Between key Environmental Aspects

	Air Quality & Climate	Noise & Vibration	Biodiversity	Soils, Geology and Hydrogeology	Hydrology and Water Quality & FRA	Population and Human Health	Shadow Flicker	Traffic & Transportation	Archaeological, Architectural & Cultural Heritage	Landscape & Visual Impact	Material Assets, Telecommunications and Aviation
Air Quality & Climate											
Noise & Vibration											
Biodiversity											
Soils, Geology and Hydrogeology											
Hydrology and Water Quality & FRA											
Population and Human Health											
Shadow Flicker											
Traffic & Transportation											
Archaeological, Architectural & Cultural Heritage											
Landscape & Visual Impact											
Material Assets, Telecommunications and Aviation											

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