

Moanmore Lower Green Energy Limited

MOANMORE LOWER WIND FARM, CO. CLARE

Volume I NON-TECHNICAL SUMMARY (NTS)

APRIL 2025

Moanmore Lower Green Energy
Ltd.,
**C/O Greensource Sustainable
Limited,**
Station Road,
Adare,
Co. Limerick,
V94 C6HF.



Jennings O'Donovan & Partners Limited,

Consulting Engineers,
Finisklin Business
Park, Sligo.

Tel.: 071 9161416

Fax: 071 9161080

email:

info@jodireland.com



JENNINGS O'DONOVAN & PARTNERS LIMITED

*Project, Civil and Structural Consulting Engineers,
FINISKLIN BUSINESS PARK,
SLIGO,
IRELAND.*

Telephone (071) 91 61416

Fax (071) 91 61080

Email info@jodireland.com

Web Site www.jodireland.com

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Prepared by**Reviewed/Approved by**

Document	Name	Name
Final	Sarah Moore Padraig O'Dowd	David Kiely
Date	Signature	Signature
April 2025	 	

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David Kiely, Seamus Lee,
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Rose Davis

Technical Directors
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Audrey Phelan

Senior Associates

Seán Gilmartin, John McElvaney, Tomás McGloin

Associates

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Cáit O'Reilly, Monica Sullivan



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Moanmore Lower Green Energy Limited
MOANMORE LOWER WIND FARM, CO. CLARE

VOLUME I
NON-TECHNICAL SUMMARY REPORT

CONTENTS

1	INTRODUCTION	1
1.1	Planning History	5
2	ENVIRONMENTAL IMPACT ASSESSMENT (EIA)	5
3	PROPOSAL FOR THE MOANMORE LOWER WINDFARM	7
3.1	Wind Turbines	8
3.2	Site Access and Turbine Delivery Route (TDR)	9
3.3	Grid Connection Route (GCR)	11
3.4	Construction Phase	12
3.5	Site Restoration	14
3.6	Operational Phase	14
4	SITE SELECTION AND DESIGN	14
5	LEGAL AND POLICY FRAMEWORK	15
6	POPULATION AND HUMAN HEALTH	16
7	BIODIVERSITY	17
8	Aquatic Ecology	21
9	LAND, SOILS & GEOLOGY	25
10	HYDROLOGY, HYDROGEOLOGY AND THE WATER ENVIRONMENT	28
11	NOISE & VIBRATION	33
12	LANDSCAPE AND VISUAL	34
13	AIR AND CLIMATE	38
14	SHADOW FLICKER AND ELECTROMAGNETIC INTERFERENCE (EMI)	39
15	CULTURAL HERITAGE	40
16	MATERIAL ASSETS AND OTHER ISSUES	42
16.1	Land Use	42
16.2	Telecommunications	42
16.3	Electricity Networks	42
16.4	Air Navigation	43
16.5	Utilities (gas, water, waste)	44
16.6	Quarries	45
17	ACCESS, TRAFFIC AND TRANSPORT	46
18	INTERACTIONS OF THE FOREGOING	48

1 INTRODUCTION

This document presents the Non-Technical Summary (NTS) of the Environmental Impact Assessment Report (EIAR) which accompanies the application for planning permission for the proposed windfarm at Moanmore Lower, County Clare. The wind farm Site, as shown in **Figure NTS-1**, is located in south-west county Clare, 3km northwest of the town of Kilrush, 6.8km southwest of Cooraclare village and 7.1km north of the county boundary between counties Clare and Kerry. The Development is located within the townlands of Moanmore Lower, Moanmore South and Tullabrack. It is located within an area comprised of agricultural livestock grazing farmland, bog and scrub land. The location of the Project is shown in **Figure NTS-1**.

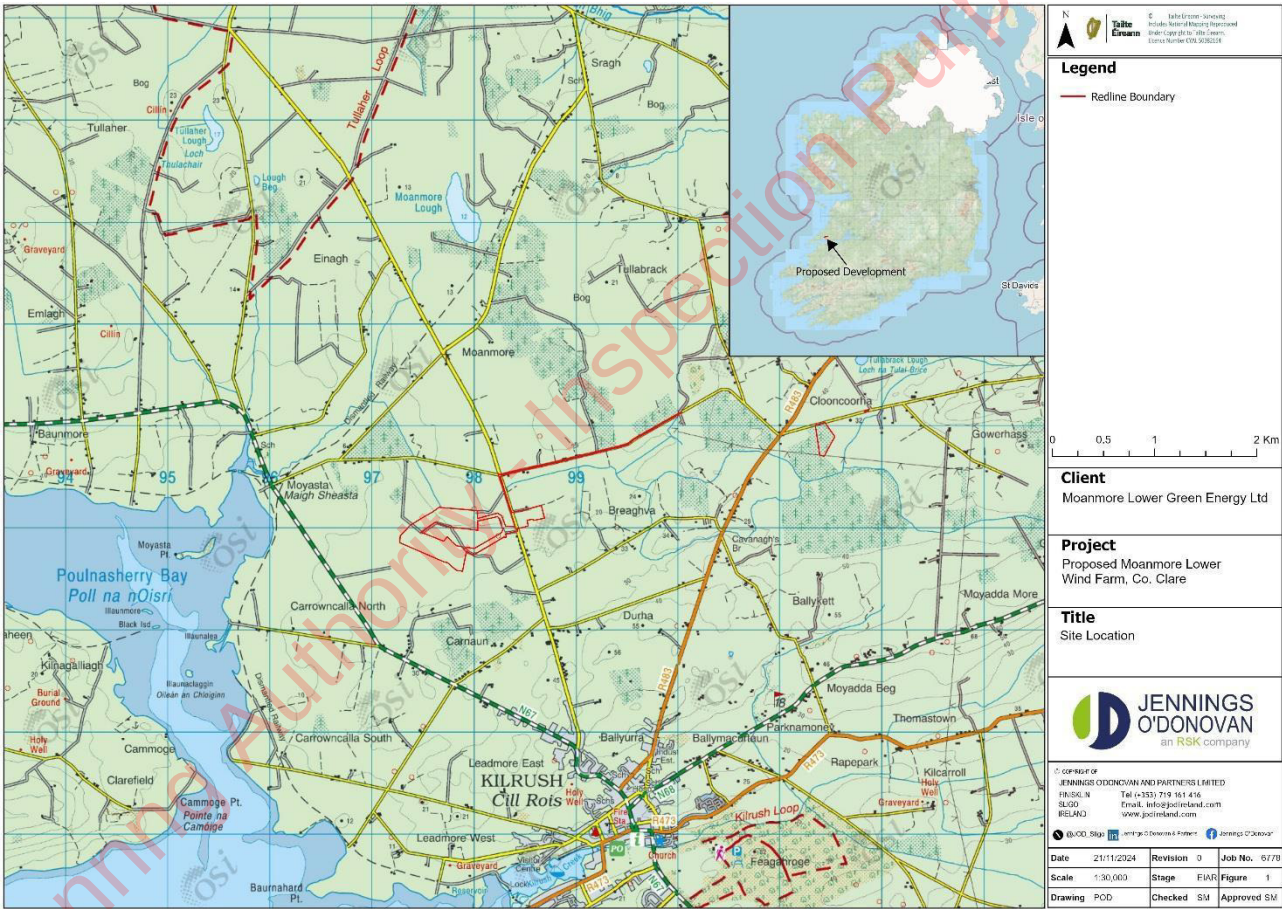


Figure NTS-1: Site Location

The Developer – Moanmore Lower Green Energy Ltd, is a subsidiary of Greensource Sustainable Developments Limited (Greensource Ltd.).

Greensource is an innovative Irish renewable energy company based in Adare, Co. Limerick that specialises in the development of renewable energy projects, working with communities from pre-planning to operation, and creating long-lasting local partnerships. Greensource has

over ten years development and operational experience. Greensource has a highly skilled and experienced team who are committed to developing projects with successful outcomes for all stakeholders. Working with integrity and care for the local environment, the team has a strong track record, having successfully completed wind energy and other renewable projects in the west of Ireland.

Permission is being sought by the Developer for the erection of 3 wind turbines, each with a capacity of 4-5MW, a rotor diameter of 136m, and a total height of 150m from ground to blade tip. The project includes the construction of site access tracks, hardstand areas, and turbine foundations, along with a new site entrance connecting to the L2034 and L6132 local roads. A temporary construction compound with associated facilities will be established, and both new and upgraded internal access tracks will be developed, including site drainage systems. The Development also involves the construction of an electrical substation, permanent spoil storage area, and all necessary cabling to connect the Moanmore Lower wind farm to the national grid via a 38kV underground cable to the Tullabrack 110kV substation. Additional features include two flood compensation areas, realignment of a local road to facilitate turbine component delivery, a blade transfer area, ancillary forestry felling to facilitate construction and operation of the development, landscaping and all associated ancillary works. The developer is seeking a 10-year planning permission and a 40-year operational lifespan from the commissioning date of the wind farm.

The entire Project is located within County Clare and it will have a total output of up to 15MW. The Site layout is shown in **Figure NTS-2a and NTS-2b**.



Figure NTS-2a: Project Layout

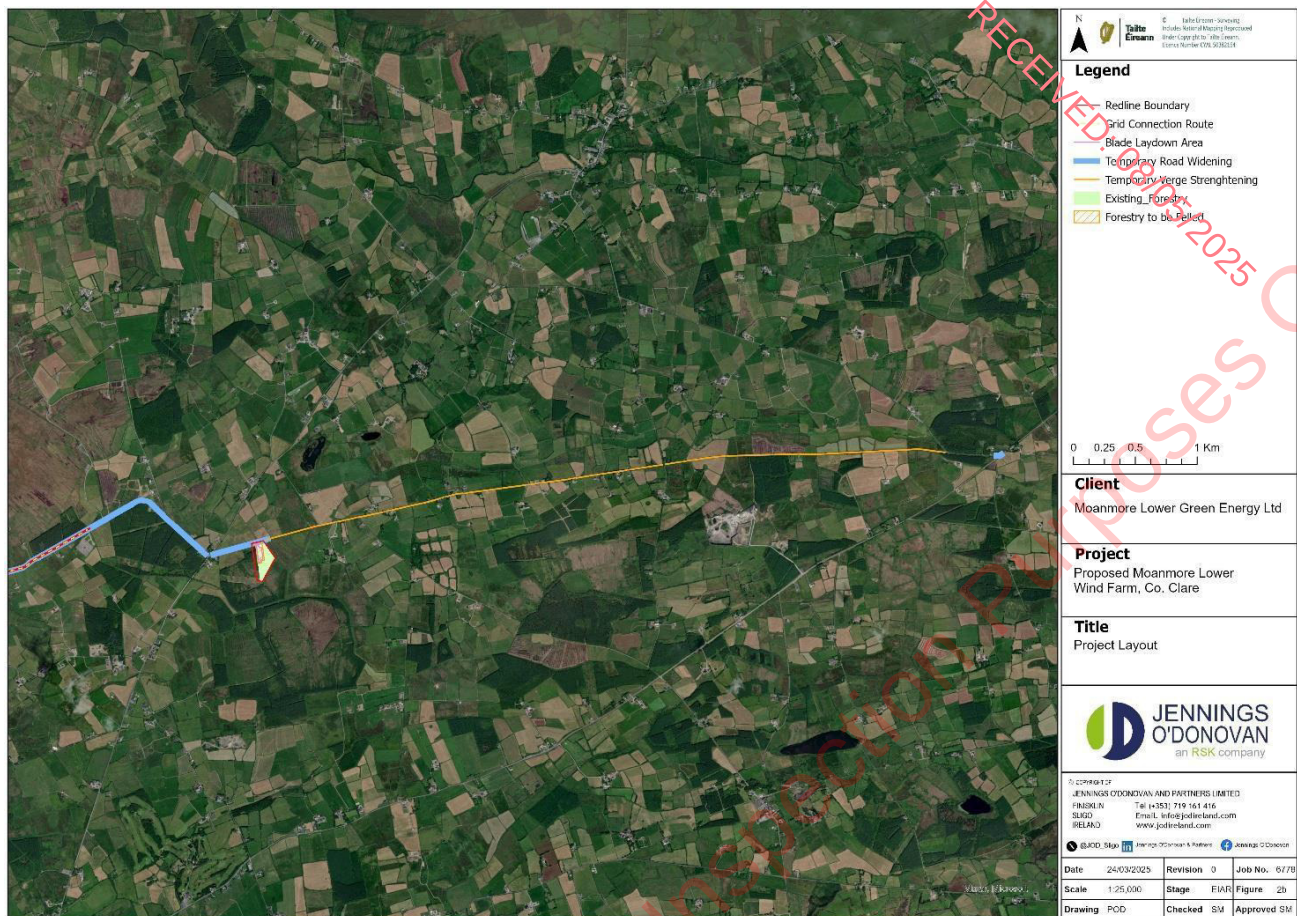


Figure NTS-2b: Project Layout

The EIAR presents information on the identification and assessment of the potential significant environmental effects of the Project and reports the findings of the Environmental Impact Assessment (EIA) which has been undertaken in accordance with the Planning and Development Act 2000, as amended and the Planning and Development Regulations 2001, as amended. The EIAR comprises the following documents:

- This Non-Technical Summary (Volume I)
- The Main EIAR Report (Volume II)
- Supporting Figures and Drawings (Volume III)
- Supporting Appendices (Volume IV)

These documents inform readers of the nature of the Project, likely environmental effects and measures proposed to protect the environment during each phase of the Project.

The Project will comprise the following phases:

- Construction of the Project
- Operation of the Project
- Decommissioning of the Project

1.1 **Planning History**

This is the first time that this particular wind farm development has been prepared, taking into account the reasons for refusal of surrounding wind farms in the past. The Developer has prepared an Environmental Impact Assessment Report (EIAR), Natura Impact Statement (NIS), and planning application for the proposed wind farm at Moanmore Lower, with careful consideration of the reasons that led to the refusal of nearby wind farm projects. **Chapter 1** of the EIAR, particularly **Table 1.2**, outlines the reasons for the planning refusals in the area and explains how these concerns have been addressed in the current EIAR and NIS.

The proposed Turbine Delivery Route and Blade Transfer Area are the same for the proposed Development and the proposed Ballykett Wind Farm (Planning Ref: 2460143).

2 **ENVIRONMENTAL IMPACT ASSESSMENT (EIA)**

An EIA is required where there are likely to be significant effects on the environment due to the nature, size, or location of a new development. Windfarms of the scale of the proposed Project typically legally require an EIA.

This EIAR has been prepared following a systematic approach to an EIA and project design, with knowledge of the potential effects being used to change the design so as to reduce those effects. The main EIA stages are:

- Scoping consultation (process of asking relevant organisations what they think should be included in the EIA) and how these topics are addressed
- Technical environmental assessments - baseline studies (understanding what the existing environmental conditions are), asking what potential significant environmental effects might occur, informing the design evolution and identification of measures to reduce undesirable effects
- Writing up the findings to include in the EIAR
- Submission of the planning application and EIAR

Scoping and pre-application consultation is important to the development of a comprehensive and balanced EIAR. Requests for Scoping Opinions were submitted to the prescribed statutory bodies and key consultees in August 2024. The request was accompanied by a Scoping Report which included a Description of the Project, a Site Location Map, and an outline of the baseline environment and proposed methodology for the various proposed assessments for the EIAR. Scoping Opinions received are included as **Appendix 1.3**.

The Developer undertook and completed a number of public consultation events as detailed in **Table 2.1**.

Table 2.1: Moanmore Lower Community Engagement

Date	Description of Activity
20 July 2022	Project Website Launched https://moanmorelowergreenenergy.ie/
22 July 2022	Article in Clare Champion on 22 July 2022
20 July 2022	Letter and Brochure posted to each household within 1 km of the project
20 July 2022	Letter and Brochure posted to each household within 2 km of the project
02 August 2022	Door-to-door visits to households within 1km of the proposed project site. Engaged with 20 residents and left a note and leaflet with 22 residents. Previous conversations were had with landowners (4). A total of 46 residential properties within 1km of the proposed turbines. When nobody was not at home, an information pack was left for the resident where possible.
11 August 2022	Calls to Local Representatives re: the proposed project
12 August 2022	Follow-up email with letters and project leaflet issued to councillors
1 September 2024	Website update detailing the name change for the proposed project
16 April 2025	Postal mailout to all households within 1 km of the project advising of the upcoming planning application submission and a leaflet with answers to the most frequently asked questions.
Ongoing	Face-to-face meetings are available for any community member who requests them. Communication with residents continues via phone calls and email on the dedicated email and phone line.

A report on the public consultation process has been prepared and can be found in **Appendix 1.5**. Public consultation was generally supportive of the project with the main concern raised being about impacts on the road network during the construction phase. Environmental effects have been assessed in chapters of the EIAR, broadly with one chapter per technical discipline, generally representing a type of receptor of potential effects. The assessments in each chapter follow a similar, systematic approach, to identify any effects that may be significant in the context of the EIA Regulations. The approach includes establishing the “baseline”, this being the current state of the environment, to which the Project will be added. This identifies the key receptors, including how sensitive they are to the sort of change that might be caused by the Project. The potential size (or magnitude) of change caused by the Project is then assessed, and the sensitivity and magnitude are considered together to form

a conclusion on significance. Effects can be desirable (or “positive”, or “beneficial”), or undesirable (or “negative”, or “adverse”). Mitigation is proposed where possible to prevent significant undesirable effects. The final proposed effects are those after mitigation has been applied and are the “residual effects”.

In accordance with the EIA Regulations, the assessment has considered 'cumulative effects'. These are effects that result from cumulative changes caused by past, present or reasonably foreseeable actions together with the Project.

3 PROPOSAL FOR THE MOANMORE LOWER WINDFARM

The Development will include the following main components:

- Erection of 3 no. wind turbines with an overall ground to blade tip height of 150m, with a rotor diameter of 136m and a hub height of 82m and a total generating capacity of 15MW,
- Construction of turbine hardstand areas and turbine foundations,
- Construction of new internal site access tracks and upgrade of existing site track, to include all associated site drainage,
- Construction of 1. no new site entrance along the turbine delivery route with access onto the adjoining local road network (L6132),
- Construction of 1 no. temporary construction compound with associated temporary site offices, parking areas and security fencing,
- Development of a site drainage network,
- Construction of 1 no. 38kV electrical substation with all associated electrical plant and equipment, security fencing, lightening protection, security cameras and gates, and all ancillary structures and works,
- 1 no. permanent spoil storage area,
- All wind farm internal cabling connecting the wind turbines to the electrical substation,
- All works associated with the permanent connection of the wind farm to the national electricity grid comprising a 38kV underground cable in permanent cable ducts from the proposed, permanent, on-site substation and to the existing Tullabrack 110kV ESNB Substation,
- 2 no. flood compensation areas,
- Vertical realignment of an existing crest curve on the L6132 local road in order to prevent grounding of abnormal load vehicles during delivery of turbine components,
- Ancillary forestry felling to facilitate construction and operation of the development,
- Construction of a blade transfer area off the L6132,

- Provision of 2 no. biodiversity enhancement areas,
- Upgrade of an existing site entrance onto the adjoining local road network (L2034) including the demolition of an existing wall and removal of hedgerow at the site entrance to facilitate abnormal load vehicles during delivery of turbine components and reconstruction of same wall and replanting of hedgerow,
- Landscaping and all associated ancillary works.

A 10-year planning permission and 40-year operational life from the date of commissioning of the entire wind farm is being sought.

The EIAR assesses the Project which includes the Development as outlined above; it includes improvements and temporary accommodation requirements to the existing public road infrastructure to facilitate delivery of abnormal loads and turbine delivery.

3.1 **Wind Turbines**

The proposed turbines will be of typical modern design and will be a three-bladed, rotor up wind of the tower, variable speed, pitched blade regulated machine. Turbine appearance will be a matt non-reflective finish in a white, off-white or grey colour. The foundation-to-tip height will be 150m.

The turbine will have a circular based tower, sitting on a reinforced concrete foundation. The tower will support the nacelle, rotor hub, and rotor blades. Commercial wind turbine towers are typically made of steel or a hybrid of steel and concrete. The nacelle is mainly metal (steel, copper, aluminium, etc.) with a metal/plastic/glass-reinforced plastic (GRP) body, while the blades can be made of a matrix of glass-fibre reinforced polyester or wood- epoxy or similar composite materials.

Each turbine will have a generator with a maximum capacity of 5MW giving an overall capacity up to 15MW. The turbines may be direct drive machines or may contain a gearbox. The final turbine will be chosen in a competitive tendering process as part of the Project financing process, after all necessary consents have been secured.

The final choice of turbine model has not been decided at this stage, but for the purposes of EIA and planning approval the candidate turbine model used for assessment is identified as a Vestas V136 wind turbine.

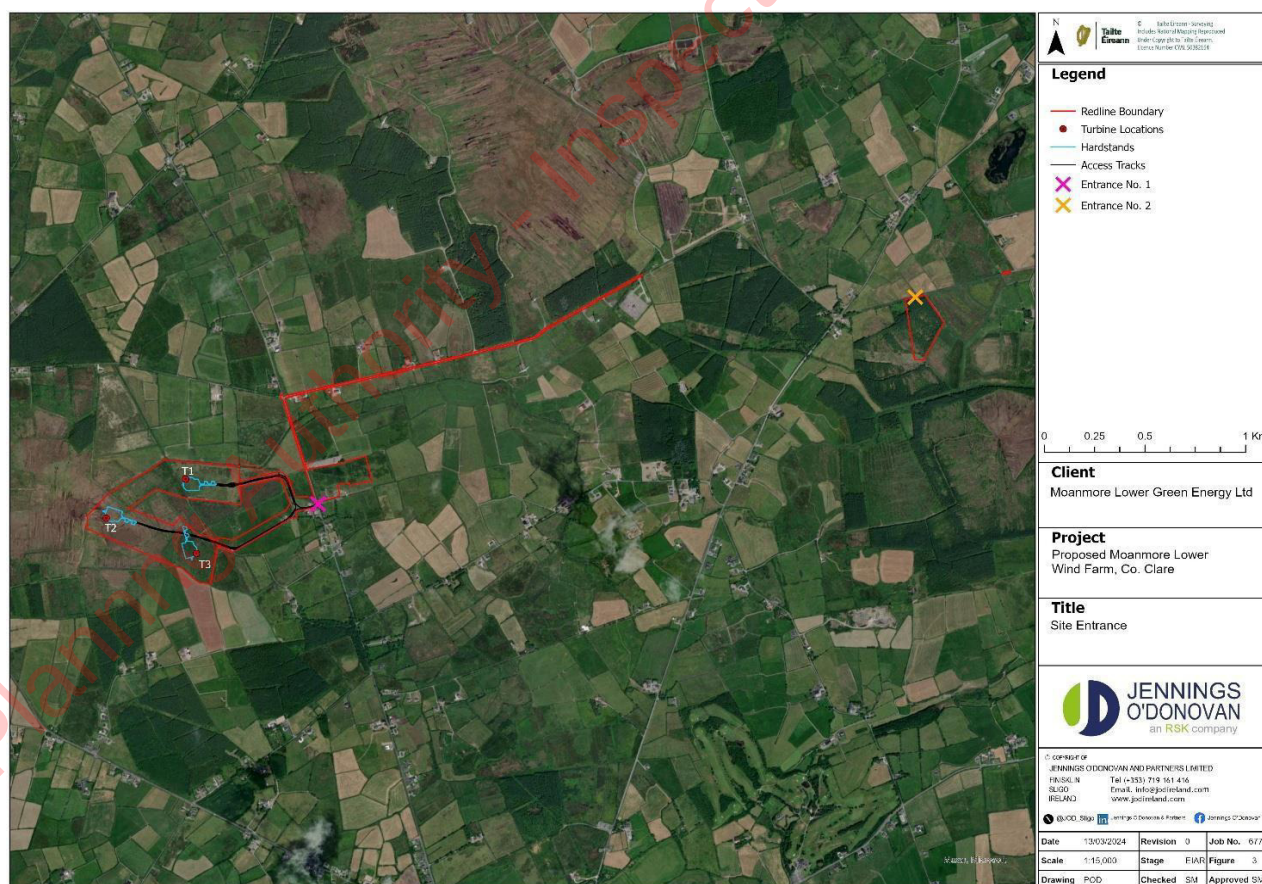
For the purposes of the assessments, the dimensions of the candidate turbine are presented in **Table 3.1**.

Table 3.1: Turbine Parameters

Turbine Parameter	Assessment Envelope
Turbine Blade Tip Height	150m
Rotor Diameter	136m
Hub Height	82m

3.2 Site Access and Turbine Delivery Route (TDR)

The site access will be from an existing entrance on the L2034 road. From the site this road which continues north for 0.5km before joining the L2036. The new entrance will allow abnormal load turbine delivery vehicles to safely access and exit the wind farm Site as well as achieve the required sightlines. This entrance will be used for delivery of both turbine components and building materials such as rock and concrete. The site entrance is shown on **Figure NTS-3**.

**Figure NTS – 3: Site Entrance**

It is proposed that the turbine nacelles, towers, hubs and rotor blades will be landed at the port of Foynes Co. Limerick. From there, they will be transported to the Site via the N69 from

the port site to the outskirts of Limerick City and then the N18, M18, N85, N68 to the L6132.

Components will be transferred on to a blade lifter trailer at a predetermined site along the L6132. The route continues along the L6132 onto the Tullabrack Cross at the R483. From here, it will be transported along the L2036 local road linking Tullabrack Cross to the L2034 and on to the Site.

Road widening and strengthening has previously been carried out on the local road network in order to facilitate the transportation of turbine components to other wind farm sites in the vicinity. All other traffic, including civil works related construction traffic and personnel vehicles will most likely approach the Site via the Haul Route specified.

The delivery of the turbines will require co-ordination with a number of statutory bodies including Clare County Council, and An Garda Síochána. An agreed programme of work will be established in the Traffic Management Plan which will be prepared by the Contractor ahead of any construction work commencing on the wind farm Site. The proposed Turbine Delivery Route is shown on **Figure NTS-4**.

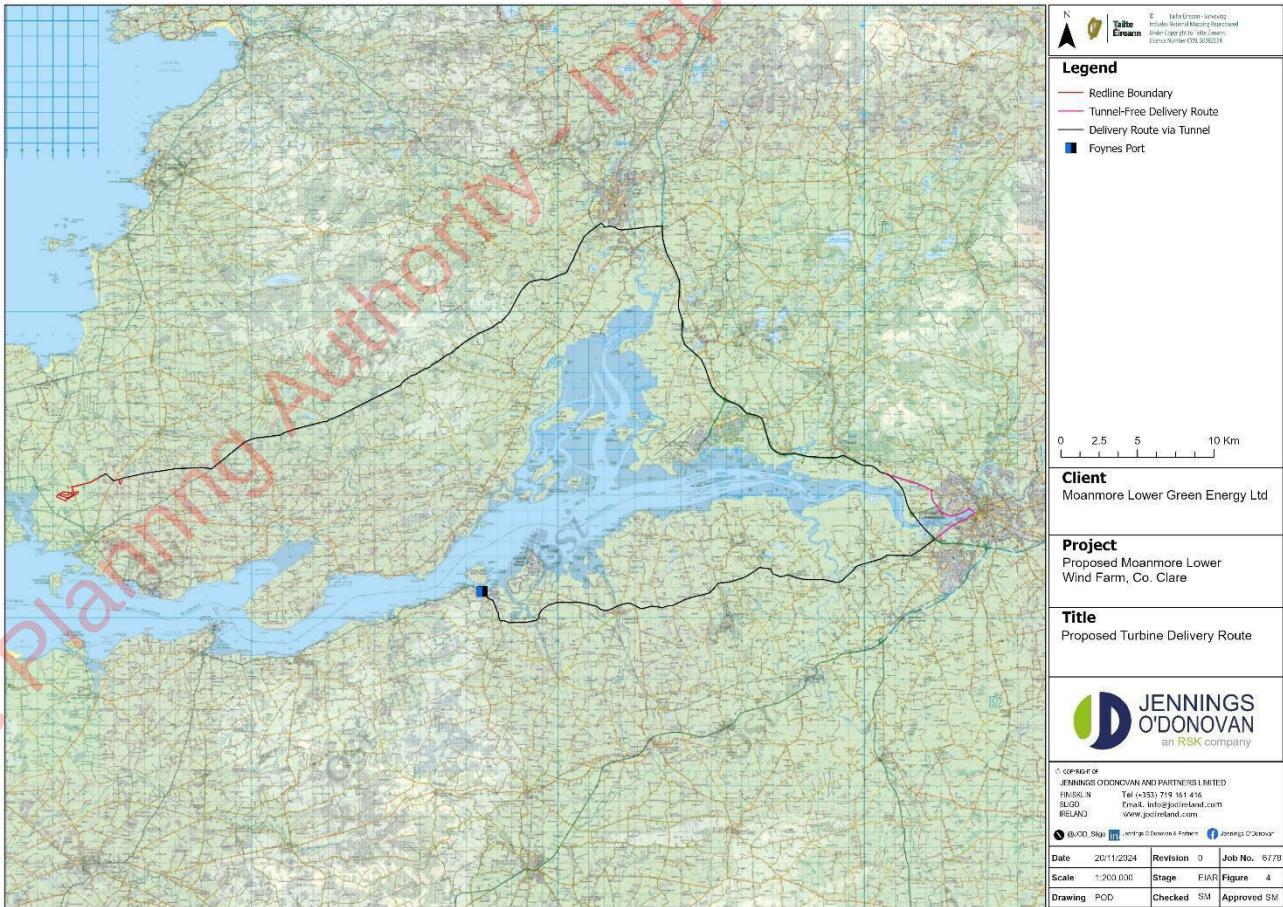


Figure NTS-4: Proposed Turbine Delivery Haul Route

3.3 **Grid Connection Route (GCR)**

Connection will be sought from the grid system operators by application to ESB Networks Limited. Moanmore Lower Green Energy Ltd has assessed a number of possible grid connection options for the Project. Following details assessment, it was concluded that a 2.76km, 38kV connection to Tullabrack 110kV substation is the most optimal route, having considered environmental and commercial aspects. However, this is subject to the substation having grid offtake capacity. The Grid Connection can be summarised as follows:

- Underground Cable (UGC) single 38kV circuit from Moanmore Lower wind farm utilising sections of primarily public roads and private lands (within the Site) to Tullabrack substation [approx. 2.76km].

The proposed Grid Connection Route (GCR) is presented in **Figure NTS-5**. The GCR assessment report carried out by BFA Consulting can be found in **Appendix 2.2**.

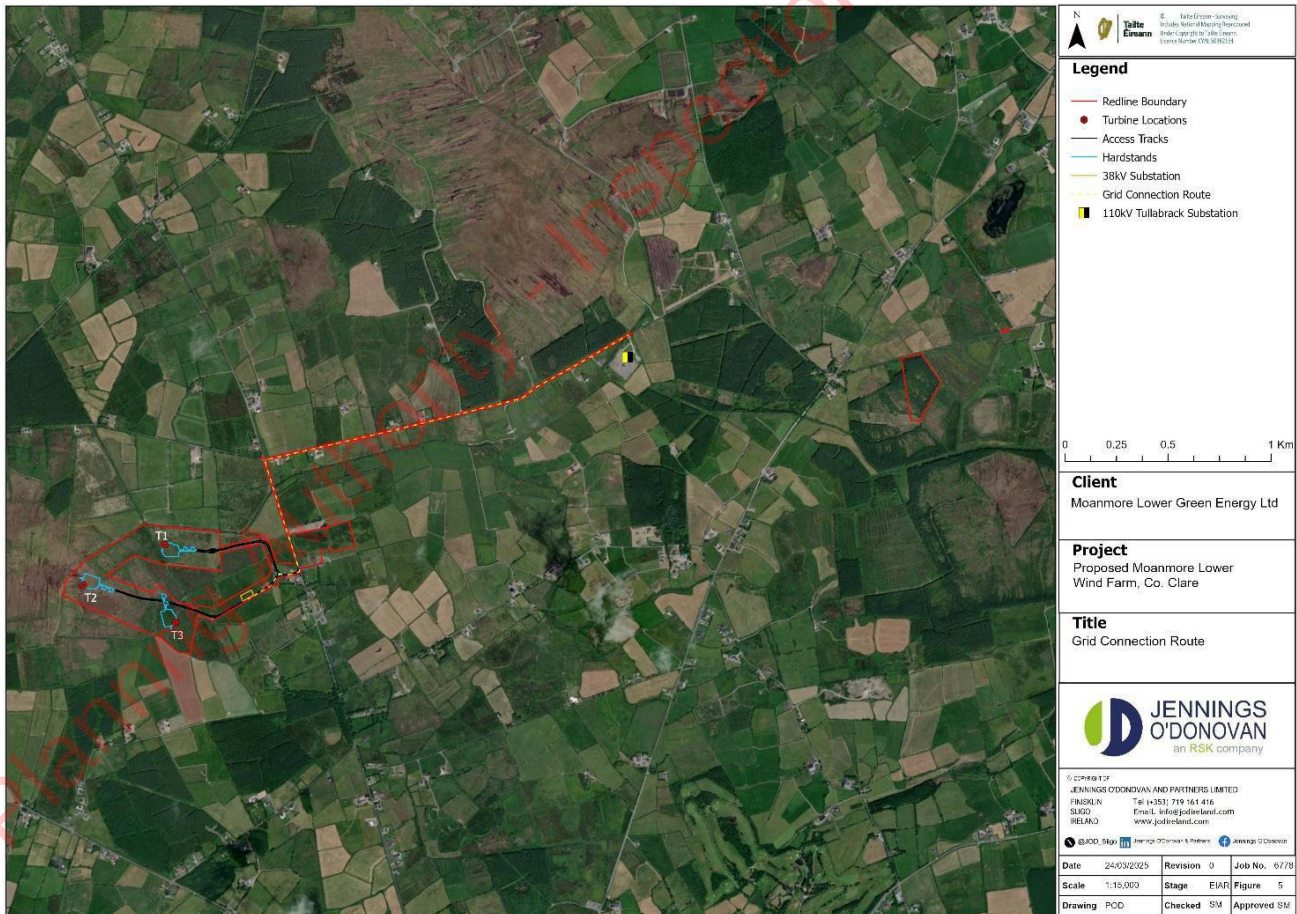


Figure NTS-5: Proposed Grid Connection Route

3.4 **Construction Phase**

Subject to planning consent, the construction phase will begin with site preparation works and will be complete when the turbines are erected and ready for commissioning, and when all waste has been removed from the Site. For this Project, the duration of the construction phase is expected to be 36-40 weeks. An indicative construction programme is set out at **Table 3.2**.

Table 3.2: Indicative Construction Programme

Materials	Timeframe (Week)
Site Establishment & Fencing	1
Construction of Flood Compensation Area	1-2
Construction of L2034 Site Entrance	1-2
Construction of Temporary Construction Compound	1-2
Construction of Site Access Roads and Internal Junctions	4-16
Construction of Turbine Hardstands and Turning Heads	8-20
Site drainage	4-20
Ready-mix concrete for Turbine Foundations	12-20
Steel reinforcement for Turbine Foundations	8-16
Foundation bolts	8-16
Verge widening at N68 / L6132 Junction	8
Construction of L6132 verge strengthening on Turbine Delivery Route 5.56km (Tullabrack cross to N68) Spoil Removal	8-20
Vertical realignment of L6132 crest curve on Turbine Delivery Route	8
Removal of Forestry for Blade Transfer Area	8
Construction of Blade Transshipment Area	8-20
Construction of L2036 verge strengthening on Turbine Delivery Route (Tullabrack Cross to (2034)	8-20
Construction of L2034 verge strengthening on Turbine Delivery Route	16-20
Substation building materials	8-20
Electrical switchgear	20-34
Electrical cables	20-32
Grid Connection works	8-20
Wind turbine components	20-28
Crane	20
Reinstatement of L6132 verges,	28-38
Reinstatement of L2036 & L2034 verges,	28-38
General reinstatement and demobilisation	36-40
Total	40

A Construction & Environmental Management Plan (CEMP) is appended to the EIAR in **Appendix 2.1**. The CEMP includes all the mitigation measures proposed within the EIAR. The CEMP is considered a working document and in the event of a grant of permission, will

be undated to include any conditional requirements of the permission. A Summary of the mitigation measures is included in **Appendix 17.1**.

In the event planning is granted for the Development, the CEMP provides a commitment to mitigation and monitoring and reduces the risk of pollution whilst improving the sustainable management of resources. The environmental commitments of the Project will be managed through the CEMP and will be secured in contract documentation and arrangements for construction and later phases, such that there will be a robust mechanism in place for their implementation. The CEMP addresses the construction phase, through to the commissioning, operation and final decommissioning phases (refer to Decommissioning Plan in EIAR **Appendix 2.1**).

An Ecological Clerk of Works (ECoW) with experience in overseeing wind farm construction projects will be appointed by the Developer for the duration of the construction phase so that the CEMP is effectively implemented. The contractor will be required to appoint an Environmental Manager.

The whole Project, from construction to commissioning to Reinstatement and demobilisation, will take approximately 40 weeks. In general, working hours for construction activity will be from 07:00 to 19:00 throughout the week, with reduced working hours at weekends, from 08:00 to 16.30 on a Saturday. No work will be carried out on Sundays or Public Holidays.

The turbines will be located across a wide area, however the land taken by the turbines and other infrastructure is a very small proportion of this, and efforts have been made to use existing access track infrastructure rather than using new land. The Site extends to 36.77ha, the majority of which is agricultural land with some cutover peatland and is in the ownership of local landowners. During the construction phase, the total permanent land-take required for the Project will be 5.32ha.

The Developer will appoint a Civil Contractor who will have overall responsibility for management, including environmental management on the construction site. The Civil Contractor will ensure that construction activities are carried out in accordance with the conditions of planning and the mitigation measures outlined in the EIAR, including the Construction Environmental Management Plan (CEMP) included as **Appendix 2.1**. The services of specialist advisors will be retained as appropriate, such as an archaeologist and ecologist, to be called on as required to advise on specific environmental issues.

3.5 **Site Restoration**

A Biodiversity Enhancement & Management Plan (BEMP), included in the EIAR as Appendix 6.11, has been developed to mitigate the ecological effects of habitat loss resulting from the Project. To enhance an area (4.04 ha) of cutover bog that has been used for grazing and is largely dominated by rushes. This will offset the loss of a relatively small area of cutover (c.0.8 ha) as a result of the proposed Development. Site restoration will focus on rehabilitating bog areas and implementing the Biodiversity Enhancement Plan. To manage sensitively an area of Annex I listed Molinia meadow (1.78 ha), of which a small part (c.200m²) is being affected by the Proposed Development. The meadow, which has been somewhat degraded though over-grazing, will be managed with a particular focus on providing suitable habitat for the marsh fritillary. The total area covered by the BEMP is 5.82 hectares, comprising 4.04ha of wet grassland and cutover bog, and 1.78ha of Molinia meadow and unplanted cutover bog. Restoration efforts will enhance the site's biodiversity and will be initiated at the earliest opportunity to minimize the storage of turf and other materials. Areas designated for habitat enhancement are shown in Figure NTS-2.

3.6 **Operational Phase**

The proposed operational lifespan for the Development is 40 years. During the operation of the wind farm, the turbine manufacturer, the wind farm operator, or a service company will carry out regular maintenance of the turbines. During the operational phase of the Development, turbine and infrastructure maintenance will be ongoing and regular. This is expected to continue to employ approximately 1 or 2 people on a permanent basis for regular operational and maintenance activities.

In addition, operation and monitoring activities will be carried out remotely with the aid of computers connected via a telephone broadband link. Routine inspection and preventative maintenance visits will be necessary to provide for the smooth and efficient running of the wind farm and Electrical Substation.

4 **SITE SELECTION AND DESIGN**

The Site layout design has evolved through a series of iterations, to avoid or minimise potential effects, including effects on views, human health, amenities, hydrology, peat, ecology and fisheries, ornithology and noise. Technical criteria such as wind speed, prevailing wind direction, existing infrastructure, topography and ground conditions were considered during the design process, in response to guidance documents, survey findings and responses from consultees. Overall, it is considered that the proposal represents an optimum fit within the technical and environmental parameters of the project, see **Chapter 3**

– **Section 3.5 - Strategic Site Selection** for more detail.

5 **LEGAL AND POLICY FRAMEWORK**

Chapter 4 of the EIAR sets out the relevant planning policy and legislative background to the planning application. The Project has had regard to The National Planning Framework, The Regional Spatial and Economic Strategy (RSES) for The Southern Regional Assembly Area and the Clare County Development Plan 2023 - 2029. These documents are relevant to the determination of the planning application by the planning authority.

The Climate Action Plan 2025¹ (CAP2025) was published in April 2025 and is the latest assessment and measurement of what has been achieved over the past year, building on actions taken in 2024. It sets out what need to be done in 2025 so Ireland is prepared to take on the challenges of our second carbon budget period 2026-2030.

CAP25 re-affirms the previous commitment to increasing the share of renewable electricity to 50% by 2025 and 80% by 2030. Overall, the share of renewable electricity generation in Ireland increased from 38.6% to 40.7% from 2022 to 2023. The figure for 2024 will likely be between 40% and the interim, end of year target of 50% set out in CAP25.

The targets are:

- onshore wind, 2GWs by 2025 and 9 GWs by 2030
- offshore wind, at least 8GWs by 2030
- solar, up to 5GW by 2025 and 8GW by 2030

¹Government of Ireland. (2025). Climate Action Plan 2025

https://assets.gov.ie/static/documents/Climate_Action_Plan_2025_updated_cover.pdf [Accessed 22/04/2025]

6 **POPULATION AND HUMAN HEALTH**

The potential effects of the construction, operational and decommissioning phases of the Project on socioeconomics, tourism and recreation and land use were identified and assessed in **Chapter 5** of the EIAR following desk-based collection of data and consultation with local stakeholders. The entire Project falls under the Municipal District (MD), west Clare and Electoral Divisions (ED) Kilrush Urban, Kilrush Rural, Einagh, and Clooncoorha.

The Site is located within an area comprised of agricultural livestock grazing farmland, bog, scrub land and is in the ownership of four local landowners. The land use will not be altered significantly by the construction, operation and decommissioning of the Project as current activities can continue alongside the development on the lands that have not been taken by the Project.

In advance of the construction phase, the Developer will hold a series of 'Meet the developer / Contractor' events as early as possible, allowing local contractors to learn about opportunities to bid for contracts, time to upskill, and time to prepare prior to bidding. The Developer has significant experience in organising these events.

Effects on the economy during both the construction and operational phases would be minor, both direct and indirect, and positive, due to the creation of job opportunities and subsequent spending of income in the local area and within Ireland as a whole.

The overall impact is predicted to be a **moderate, positive, short-term** impact during the construction and decommissioning phases and **moderate, positive** and **long-term** during the operational phase. The Project will not have a significant effect on the economy.

The Project will contribute to the offset of the burning of fossil fuels which has the potential to positively impact human health. There will be no significant effect on human health from the Project.

Overall effects of the Project with regards to tourism are considered to be short-term, slight, negative during the construction, operation and decommissioning phases. There will be no significant effect on tourism from the Project.

Cumulatively, together with other proposed wind farm developments in the region, if these are progressed, the effects would be positive and of minor significance. There is predicted to be a short-term, positive impact in terms of employment from the Project, if construction periods overlap.

There will be no significant cumulative effects to human health from noise during the construction, operation and decommissioning of the Project.

There will be no significant cumulative effects to tourism and amenity during the construction, operation and decommissioning of the Project.

7 **BIODIVERSITY**

The likely impacts on biodiversity associated with the Project have been assessed in **Chapter 6** of the EIAR. A detailed understanding of the baseline conditions at the Site has been gained following the collation of desktop information and data sources and ecological field surveys. The ecological field surveys completed at the Site include surveys for habitats, terrestrial mammals, bats and ornithology.

Eight European designated sites occur within a 15km distance of the proposed wind farm site (these are fully assessed in the AA Screening report and NIS which accompanies the application). The Project area has hydrological connectivity with four sites, the Lower River Shannon SAC, Carrowmore Dunes SAC, Mid-Clare Coast SPA and the River Shannon and River Fergus Estuaries SPA. One Natural Heritage Area (NHA) occurs within a 15km radius of the Site, along with a total of 13 proposed Natural Heritage Areas (pNHAs).

The Site of the proposed wind farm is dominated by wet grassland/semi-improved grassland habitat. This habitat is common throughout County Clare and the island of Ireland and is generally of low botanical interest - rated as Negligible to Local Importance (lower value). The Site supports a small area of *Molinia*-meadow type vegetation. At this site the vegetation has developed in an area of cutover bog and it is likely that the habitat has a more widespread distribution within the cutover bog areas of south-west Clare. As the sward has been degraded in parts by recent heavy grazing, its presence is rated as of Local Importance (higher value). *Molinia* meadow is listed on Annex I of the EU Habitats Directive. A fairly extensive area of cutover raised bog and an associated remnant of uncut raised bog occurs in the western half of the survey area. Although the small remnant area of intact raised bog has been affected by peripheral drainage/peat cutting over a long period of time and is not considered to be active, it is still of particular ecological interest as there are few other areas of uncut raised bog habitat remaining in this part of Co. Clare. As noted earlier, the bog type is former raised bog of the 'Western' category. Taking the entire bog resource (cutover and intact) at this site as an ecological unit, a ranking of County Importance is appropriate. The section of the Moyasta River in the vicinity of the Site has been dredged in the past and is classified as having "Poor-Moderate" ecological status quality under the current cycle of the

Water Framework Directive as amended. The aquatic survey rated the streams in the vicinity of the Site as of low ecological value. Nevertheless, the main channel of the Moyasta River provides a useful riparian corridor for wildlife and is rated as Local Importance (higher value).

No nationally rare or legally protected plant species listed in the Flora (Protection) Order 2022 were recorded from within the Site.

The Site supports a relatively low diversity of mammalian species, which is typical of bog habitats. The Irish hare and all deer species are protected under the Wildlife Acts. While not recorded breeding along the river, the likely presence at times of otter along the Moyasta River is of note as otter is listed on Annex II of the EU Habitats Directive as amended. All mammal species recorded on Site, or expected to occur, are listed (as relevant) as 'Least Concern' on the Irish Red List. The common frog and the common lizard are protected under the Wildlife Acts, though both are listed as 'Least Concern' on the Irish Red List.

The bat landscape association model suggests that the proposed wind farm Site is situated within a landscape of medium to high bat importance, particularly for four species: soprano pipistrelle, brown long-eared, Leisler's bat and Natterer's. During surveys, a total of nine species of bats were recorded, with Common Pipistrelle the most common species followed by Leisler's bat, soprano pipistrelle and Natterer's bat. All bats recorded are classified as 'Least Concern' on the Irish Red List and protected under the EU Habitats Directive as amended Annex IV and Wildlife Acts as amended. The Annex II species lesser horseshoe bat was not recorded during any of the passive surveys. The Moanmore Lower wind farm site generally lacks bat roosting opportunities and primarily represents a foraging habitat.

The habitats within the Site provide suitable foraging habitat for hen harrier (breeding and winter roosting sites within 5 km of Site) and merlin (mainly a winter visitor), both species listed on Annex I of EU Birds Directive as amended. Kestrel (Red-listed) occurs regularly in the area and hunts within the Site – kestrel is expected to breed within a 1-2 km distance of Site. Peregrine was recorded though is rare within the Site, while sparrowhawk and buzzard use the Site for hunting though both species are relatively scarce. Snipe occurs within the site in autumn/winter but was not recorded breeding. Snipe is Red-listed on account of a significant decline in the breeding population. The Red-listed barn owl was recorded roosting during winter within a ruined stone barn in the study area. A further Red-listed species, meadow pipit, breeds widely in the bog habitats. On the basis of providing foraging habitat for several bird species of high conservation importance, the Site is rated as of **Local Importance (higher value)** for birds.

A desktop study indicated that marsh fritillary has a fairly wide distribution within a 5 km radius of the site. While no larval webs were discovered on site, habitat suitability assessments classified one area of the site as having potential suitable habitat for marsh fritillary.

Potential impacts that could arise during the Construction, Operation and Decommissioning are assessed for designated sites and biodiversity interests within the Site and surrounding areas. For designated sites, there is potential for effects on the European sites and the proposed Natural Heritage Areas associated with the River Shannon system as a result of contaminants originating within the project area, and especially during the construction phase, reaching the relevant designated site and causing harmful effects on the interests of the designated site. The significance of any effect would be dependent on the magnitude and duration of a pollution event. Mitigation is therefore required to minimise this risk.

Impacts on terrestrial habitats and flora are considered under:

- permanent loss of habitat
- temporary loss of habitat
- disturbance to habitats
- changes to existing habitats

The Development will result in the permanent loss of a small area of degraded Molinia meadow, an Annex I listed habitat of local importance. The loss will be from the construction of T3 as it requires approximately 200m². The significance of the effect by the permanent loss of a small area of degraded Molinia meadow is rated as a Slight Negative Effect. Mitigation for loss of Molinia meadow will be provided through the BEMP. Some disturbance to Molinia meadow at the T3 construction area will also occur. Strict mitigation to minimise disturbance of Molinia meadow as a result of construction works will be implemented.

The principal impact is from the construction of turbine T2, which will result in the permanent loss of an estimated 0.8 ha of cutover bog, which is rated as a Significant Adverse effect of Permanent duration. Mitigation or compensation for loss of cutover bog will be provided through the BEMP.

Some disturbance to cutover bog will also occur around the location of T2 during the construction phase. Mitigation to minimise disturbance of cutover bog as a result of construction works will be implemented.

The proposed Development will result in a total loss of 265m of hedging which includes a 175 m bat buffer.

Mitigation will be provided to offset the loss of hedgerows on site.

The principal impact on terrestrial mammal species would be on the local otter population associated with the Moyasta River and the Shannon system if contaminants generated during the construction phase were to enter the local watercourses and affect the prey items of the otter. Mitigation to maintain water quality during the construction and operational phases of the Project will minimise the risk to the otter population. The common frog and common lizard populations would be affected by loss of cutover bog habitat during the construction works. Mitigation will be implemented for the common frog to minimise direct impacts on spawn, tadpoles and adult frogs within the construction zone. Mitigation will also be implemented for the common lizard.

For bats, due to the levels of nightly activity at each of the static bat detector locations, the three turbines are considered a medium risk for all the 'at risk' bat species, *i.e.*, common and soprano pipistrelle and Leisler's bat. A 'High' level of overall collision risk has not been identified for any bat species in any of the bat activity seasons. No significant collision related risk is likely.

However, mitigation to minimise the risk of bat collision will be implemented. The creation of buffers between the proposed turbines and surrounding vegetation will be put in place, and reduced rotation speeds will be implemented at all three turbines when the turbines are idling, this is known as 'feathering' of idling blades. 'Feathering' of idling blades may reduce fatality rates by up to 50% and does not result in loss of output (NatureScot, 2021). No additional control measures to avoid/reduce collision related bat fatalities are considered warranted for this project.

A comprehensive bat roost survey effort was employed, and no evidence of roosting in either structures or trees present within or immediately adjoining the proposed site could be found. Low productivity foraging habitat and suitable commuting habitat exists within the proposed wind farm site. No roosting was identified along the grid connection route or turbine delivery route (including the blade transfer area).

For birds, predicted or potential impacts are considered in detail under the following:

- Loss of habitats
- Potential disturbance to birds during construction
- Potential displacement of birds during operation

- Potential effects from noise during operation
- Potential barrier effect by presence of turbines
- Predicted collision risk to birds
- Potential effects on birds outside of wind farm study area

Where potential adverse impacts are identified, mitigation will be implemented to minimise the effects of the project. Pre-construction surveys for breeding bird species, will take place as required to establish the status of localised breeding species at the time of construction. Where necessary, restrictive zones will be established around identified nesting locations to prevent disturbance to breeding birds from construction activities.

With the implementation of mitigation measures as described, all of which are proven techniques that if applied as proposed will avoid or minimise adverse effects, and with rigorous monitoring from the pre-construction through to the post-construction phases of the project, predicted adverse effects on biodiversity as a result of the project can be eliminated or reduced to the levels of Slight to Moderate Significance. Of particular relevance from a local biodiversity perspective is that the BEMP will increase the net area of cutover bog at the site by reducing the amount of rush cover and subsequent management of the plot.

Pre-construction ecological surveys will be carried out as required following standard guidance. An Ecological Clerk of Works (ECoW) will be employed by the Developer and an Environmental Manager will be employed by the Contractor for the duration of the construction phase and will ensure that all mitigation measures relating to ecology described in this report and contained within the planning permission are implemented. Post-construction monitoring will focus mainly on the BEMP to ensure that the objectives of the Plan are being achieved.

8 **AQUATIC ECOLOGY**

Chapter 7 of the EIAR assesses the significant effects of the Project on Aquatic Biodiversity. Baseline surveys at watercourses near the Site and at watercourses on the proposed grid connection route (GCR) were carried out. A desktop study review was carried out of existing data from the National Biodiversity Data Centre (NBDC) and National Parks and Wildlife Service websites (NPWS); for records for fish, protected aquatic species and habitats, and invasive species, on watercourses at or hydrologically connected to the Project were examined.

No new watercourse crossings are required over any EPA mapped watercourse. Existing land drains have been consolidated on Site to reduce the number of water crossings. There are eight (No. 8) watercourse crossings of historic drains and mapped drains required for the construction of access tracks and hardstands within the Site. These water crossings will be constructed using pre-cast concrete or pre-formed plastic pipes.

The preferred grid connection route (GCR) is also located in the Moyasta_010 WFD river sub-basin and in the Wood River sub-catchment (Wood_SC_010). It involves the shortest distance, with one water crossing and therefore has the least potential environmental effects. It will connect the proposed Project to the existing Tullabrack 110kV Substation along a 2.76km route. The GCR can be summarised as follows: underground cable (UGC) single 38kV circuit from the proposed Moanmore Lower wind farm to Tullabrack substation utilising primarily public roads and private lands (within the Site).

The one existing watercourse crossing for the preferred GCR, is over the Moyasta river (EPA Code: 27M04), (WC01). The cabling for the GCR will be laid in the carriage of the bridge or will be installed using HDD.

The Turbine Delivery Route (TDR) has a total of 3 existing crossings (WC02-WC04) over EPA mapped watercourses along the L6132 where temporary verge strengthening is proposed. These existing watercourses cross at 3 no. locations over the Gowerhass Stream in the Shannon Estuary North catchment and the Tullagower River (EPA Code: 28T01) and the Brisla East Stream (EPA Code: 28B08) in the Mal Bay catchment. In the Mal Bay catchment, the proposed works along the TDR are located in the Doonbeg River sub-catchment (Doonbeg_SC_010) and the Doonbeg_030 WFD river sub-basin (Chapter 7: Figure 7-5).

At all three watercourse crossings steel plates will be placed on the verge for 10m each side of watercourse crossings. This will avoid excavation and disturbance of the existing ground.

Two of the three watercourse crossings are hydrologically connected to locations downstream where previous surveys of the Doonbeg river, by EirEco in 2012 & 2016, and MKO in 2014, identified the presence of Freshwater Pearl Mussels (Chapter 7: Figure 7-4)

Given the hydrological link of the location of the proposed temporary accommodation requirements on the TDR to the previous surveys where Freshwater Pearl Mussels were confirmed as being present almost 10 years ago, surveys were undertaken to investigate the

presence of FPM in a 3km stretch of the upper reaches of the Doonbeg River and its tributaries on the 9th and 10th of October 2023 (Chapter 7: Figure 7-7). The methodologies applied and the survey details can be found in **Appendix 7.2**. No live mussels were encountered and there was no evidence of mussel presence observed (e.g., empty shells) during stage 1 surveys. While FPM are known to exist in the downstream reaches of the Doonbeg catchment historically, none were recorded as part of this EIAR through the related aquatic and FPM surveys carried out.

The Blade Transfer Area (at which there will be felling) and the proposed road widening are both located in the Shannon Estuary North catchment. Within the Shannon Estuary North catchment, the Blade Transfer Area, and the other temporary TDR works are located in the Wood River sub-catchment (Wood_SC_010) and the Moyasta_010 WFD river sub-basin.

Site surveys and water sampling confirmed that surface water quality within watercourses in proximity to the Project Site is Moderate to Poor. Macroinvertebrate biodiversity is low and characterised by pollution tolerant species. The most likely source of the observed degradation in water quality is diffuse pollution from agricultural run-off. Some of the survey stations displayed characteristics of eutrophication (deterioration of water quality and the depletion of dissolved oxygen). All streams are subject to seasonal fluctuations in discharge, velocity, temperature, species richness and abundance, however eutrophication and agricultural pollution have been identified as a persistent issue resulting in the degradation of water quality in the area.

There was no sign of otter (*Lutra lutra*) tracks or spraint, or whiteclawed crayfish (*Austropotamobius pallipes*). The streams are considered to be of low value local importance.

It was noted that despite previous modifications and environmental pressures such as forestry and agriculture, the Moyasta River had a healthy brown trout (*Salmo trutta*) population present, with low densities of sea trout (*Salmo trutta trutta*), lamprey (*Lampetra* sp.), and three-spined stickleback (*Gasterosteus aculeatus*). European eel (*Anguilla anguilla*) which is a Red-listed species were only recorded at site M4 at the tidal reaches. There were no salmonoids recorded during the survey.

The Project does not overlap with any designated Special Areas of Conservation, Special Protected Areas, or National Heritage Areas. The Moyasta River is ecologically connected to two Natura 2000 sites, namely the Lower River Shannon SAC (site code: IE002165) and the River Shannon and River Fergus Estuaries SPA (site code: IE004077). These sites are

located approximately 2.5 km downstream of the proposed site; they are of international importance and have very high conservation value. The Moyasta River is hydrologically linked to Poulnisherry Bay, a designated shellfish water body protected under the WFD and implemented in Ireland through the Quality of Shellfish Water Regulations (S.I. 208 of 2008) as amended by EC (Quality of Shellfish Waters) (Amendment) Regulation 2009 (S.I. 55 of 2009).

An Appropriate Assessment Screening Report and Natura Impact Statement (BioSphere Environmental Services, 2024) have been prepared for the proposed Project which assesses significant likely effects on European designated sites (the Natura 2000 network), a number of which are hydrologically connected via surface water flow.

The main potential construction phase effects of the Project relate to the release of sediments into the drainage network arising from construction related Site works including the access track network, turbine foundations and associated hardstands, drainage network, electrical sub-station building and spoil storage area. These are considered to be short-term and localized. There is a low risk of nutrient release from the clear-felling of conifers required for the development of the blade transfer area, however, this is of a minor scale in comparison to the normal forestry activities taking place in the wider area. Release of suspended solids into watercourses can result in eutrophication and reduced oxygen levels due to minerals and nutrients such as phosphorus and nitrogen, and these may adversely affect the local ecosystem. Water quality degradation in surface and groundwater potentially causing a localised decrease in biodiversity from siltation or other forms of pollutants, especially concerning sensitive species, is the main impact of the potential effects described above. However, potential water quality degradation is considered to be a short-term effect during the construction phase and not permanent.

There is the potential for negative effects during maintenance events at the turbine site and/or grid connection sites, during which the risks would be similar to those identified during the construction phase (e.g., water quality degradation and eutrophication from the release of suspended solids).

Mitigation measures outlined in **Chapter 9** and **Appendix 2.1** CEMP include:

- Nature Based Solutions (NBS) will be implemented on the Site where possible. The use of Sustainable Drainage Systems (SuDS) on site will eliminate the risk to watercourses from sedimentation during the construction and operational phases of the proposed Project, as detailed on the **Appendix 2.1 CEMP**.
- All site drainage, as described in the surface water management plan (**Appendix 2.1**

CEMP - Appendix B SWMP) and shown on associated drawings, will be directed through either sediment traps, settlement ponds, and/or buffered drainage outfalls to ensure that total suspended solid levels in all waters discharging to any watercourse will not exceed 25 mg/l (IFI, 2016). All construction site run-off will be channelled through a stilling process to allow suspended solids to settle out and through a spill-containment facility prior to discharge.

- Daily monitoring of all sediment traps and settlement ponds will be undertaken by the Ecological Clerk of Works to ensure satisfactory operation and/or maintenance requirements.

Mitigation in place for this Project should result in slight to imperceptible effects in-combination with any other plan or project in the area. The proposed Project is considered unlikely to significantly contribute to cumulative effects in terms of water quality.

There will be no significant residual effect on aquatic ecology in the receiving waters downstream of the proposed Project for the duration of the construction, operational or decommissioning phases.

9 **LAND, SOILS & GEOLOGY**

Chapter 8 Soils & Geology, of the EIAR evaluates the effects of the Project arising from the construction/decommissioning and operational phases on the land, soils and geology within and surrounding the red line boundary. The assessment is based on desk studies and Site surveys.

The wind Farm is situated within an area comprised of agricultural livestock grazing farmland, bog, and shrub land. The Spoil Storage Area is located east of the wind farm Site along the L2034. It is comprised of agricultural livestock grazing farmland. The Blade Transfer Area is located in the townland of Tullabrack East, 5km north-east of the wind farm Site and is located within a mature conifer plantation.

Peat depth across the Site is generally very shallow to moderately deep with isolated pockets of deeper peat. The bedrock underlying the proposed wind farm and grid connection route include the sandstones and siltstones of the Central Clare Group and the Gull Island formation. There are no karst features located within or near the vicinity of any elements as part of the proposed Project.

The risk of landslides occurring on the proposed site under worst case scenario conditions has been determined to be generally low and is mapped as low risk in terms of landslide susceptibility in all areas. The wind farm site is relatively low-lying, and the risk of slope stability issues is low. No recorded landslide events are found within the redline boundary. The closest mapped landslide event is across the Shannon Estuary. It was recorded in 1997 and is located c. 25km to the southeast of the site (GSI_LS03-0050).

The Project is considered to be of 'Low Risk' to landslide susceptibility.

The likely significant effects on land, soils and geology arising during the construction phase as a product of the Project are identified as follows;

- Land take (temporary and permanent)
- Exposed soils
- Compaction, degradation and erosion of soils.
- Soil or land sealing
- Subsoil and bedrock removal
- Stability issues (excavation, vehicular movements, stockpiles)
- Soil contamination

The likely significant effects arising during the operational phase as a product of the Project are identified as follows:

- Land take (permanent).
- Soil compaction and subsidence
- Soil contamination

No new significant effects are anticipated during the decommissioning phase and are anticipated to be similar to those associated with the construction phase but at a reduced magnitude.

The potential effects to land soils and geology are considered localised, direct effects. However, there is the potential for soils and geology to intercept downstream receptors such as surface water and groundwater or ecology as indirect or secondary effects.

The cumulative effects of the soils and geology of the Project must consider the importance of soils and peatlands in particular in terms of ecological value and carbon value. Aim and objectives for soil quality and soil health have been outlined in the EU Soil Strategy (EC, 2021) which includes protecting and reducing degradation of soils. The proposed project

would help some of the actions by limiting drainage of wetlands and organic soils and restoring managed and drained peatlands, reducing erosion and restoring degraded soils.

Mitigation measures presented and described address the likely effects identified and include key design and management principals in line with cited industry Best Practice and Guidance.

Mitigation in summary includes:

- Mitigation by design, including mitigation by avoidance and reduction
 - Infrastructure designed to avoid potentially hazardous areas such as areas with deeper peat or shallow bedrock as far as possible and within the constraints of other environmental receptors.
 - Floating tracks where suitable and geotechnically feasible to reduce the excavation of peat.
 - Minimising the amount of soils and bedrock to be excavated / disturbed through design
- Mitigation by best practice
 - Minimising disturbance of soils by limiting vehicular movements and storage and arising outside of the footprint of the development.
 - Minimising the potential for stability issues by limiting vehicular movements and storage and arising outside of the footprint of the development.
 - Spoil management: excavated material will be appropriately segregated for reinstatement and stored appropriately to reduce the potential of erosion and degradation of soils.
- Mitigation by reuse
 - Spoil management: whenever possible, soil and rock will be reused immediately or stored at a temporary stockpile location to be used during reinstatement works.
 - Excavated bedrock will be reused for access tracks or hardstand fill material.

Mitigation measures outlined in **Chapter 8** are embedded into the CEMP which will be updated by the civil engineering contractor and agreed with relevant statutory agencies, prior to any works commencing on Site.

The residual effect on the geological receiving environment resulting from the construction phase of the Project remains slight for land take. There also remains a slight residual effect of soil contamination which is considered a localised effect, however if hydrocarbon contamination is intercepted by surface water features the effect is potentially regional.

The unavoidable residual effects on the soils and geology environment as a function of the Development is that there will be a change in ground conditions at the Site with natural

materials such as peat, subsoil and bedrock being replaced by concrete, subgrade and surfacing materials.

The residual effects associated with Decommissioning includes waste generation, hydrocarbon leakage and erosion of soil and rock.

Following the reinstatement works, it is expected that the wind farm Site will be returned as close to its present condition as possible. In particular, areas of peat and current drainage regimes will be reinstated and left to revegetate naturally with the passage of time and the Site will revert over time to a more natural drainage regime. The long-term residual effects associated with the Project will therefore be negligible.

Providing the prescribed mitigation measures outlined in Chapter 8 Soils and Geology: Section 8.5.2.8 are fully implemented and best practice is followed on Site, the risk of such potential effects will be significantly reduced or avoided.

In summary, no likely significant residual effects on the land, soils and geological environment have been identified.

10 **HYDROLOGY, HYDROGEOLOGY AND THE WATER ENVIRONMENT**

Chapter 9 Hydrology & Hydrogeology, of the EIAR assesses the likely significant direct and indirect effects of the Project on the hydrological (surface water) and hydrogeological (groundwater) environment. Both assessments for the Project were based on desk studies and Site surveys.

Regionally the wind farm Site, including the permanent spoil storage area, is located in the Shannon Estuary North surface water catchment within Hydrometric Area No. 27 of the Shannon Irish River Basin District.

More locally the wind farm Site is located in the Wood River sub-catchment (Wood_SC_010) and the Moyasta_010 WFD river sub-basin. The Moyasta River (EPA Code: 27M04) is mapped to flow to the northwest along the northern boundary of the wind farm Site, approximately 90m north of the T1. This river discharges into the Mouth of the Shannon coastal waterbody, approximately 1.5km northwest of the Site and flows out through Poulmasherry Bay into the Shannon Estuary.

Grid Connection Route

The GCR is also located in the Wood River sub-catchment (Wood_SC_010) and the Moyasta_010 WFD river sub-basin. There 1 no. existing crossing over an EPA mapped watercourse along the GCR. This crossing is proposed over the Moyasta River along the L2034. An existing bridge is present at this location.

A second watercourse is mapped in close proximity to the GCR in the vicinity of the existing Tullabrack 110kV substation. This watercourse is a tributary of the Moyasta River, referred to by the EPA as the Moanmore South stream (EPA Code: 27M14).

All watercourses draining the GCR discharge into the Moyasta River which connects to the Mouth of the Shannon coastal waterbody further downstream.

Turbine Delivery Route

The Blade Transfer Area is located in the Shannon Estuary North catchment whilst the proposed road widening and verge strengthening works are proposed in both the Shannon Estuary North catchment and the Mal Bay catchment (Hydrometric Area No. 28).

Within the Shannon Estuary North catchment, the Blade Transfer Area, vertical realignment area on the L6132 and the other temporary works along the TDR are located in the Wood River sub-catchment (Wood_SC_010) and the Moyasta_010 WFD river sub-basin. Meanwhile, in the Mal Bay catchment, the proposed works along the TDR are located in the Doonbeg River sub-catchment (Doonbeg_SC_010) and the Doonbeg_030 WFD river sub-basin.

A tributary of the Moyasta River, referred to by the EPA as the Gowerhass Stream (EPA Code: 27G13), flows to the south approximately 150m east of the Blade Transfer Area. This stream discharges into the Moyasta River approximately 215m to the southeast.

There are a total of 3 no. crossings over EPA mapped watercourses along public roads where temporary verge strengthening is proposed. Existing watercourse crossings exist at these 3 no. locations over the Gowerhass Stream in the Shannon Estuary North catchment and the Tullagower River (EPA Code: 28T01) and the Brisla East Stream (EPA Code: 28B08) in the Mal Bay catchment. No new additional crossings are required. At these 3 no. watercourse crossings upgrade works will be required and steel plates will be placed on the verge for 10m each side of watercourse crossings which will avoid excavation and disturbance of the existing ground.

The stream and rivers draining the TDR work areas discharge into the Doonbeg River and Doonbeg Estuary in the Mal Bay Catchment and into the Moyasta River and Mouth of the Shannon coastal waterbody in the Shannon Estuary North catchment.

There are no Group Water Schemes or Public Water Schemes mapped in the immediate vicinity of the Site. The closest mapped PWS is the Glin PWS. This PWS is located on the opposite side of the Shannon Estuary and approximately 19km southeast of the Site.

A search of private well locations was undertaken using the GSI well database (www.gsi.ie). All GSI mapped wells in the vicinity of the Site, the GCR and the proposed works areas along the TDR have a locational accuracy ≥ 1 km. These wells are listed as having agricultural and domestic uses and poor yield classes.

A map of local groundwater resources is included within Chapter 9: Figure 9.5.

There are no dwellings or buildings which may contain groundwater wells within 500m of any proposed turbine location.

Given the significant distances which exist between local dwellings and proposed infrastructure locations, local topography and prevailing groundwater flow directions, there is limited potential for effects on groundwater well supplies.

Due to the shallow nature of the proposed works along the TDR (road widening, vertical realignment area on the L6132 and Blade Transfer Area all occurring at ground level, with minor exaction requirements) and along the GCR (e.g. excavations < 1.2 m in depth), no effects on private groundwater well supplies will occur.

A Stage 2 flood risk assessment (**Appendix 9.1**) carried out for the Project determined that proposed turbine location T1, its associated hardstand and access tracks are mapped within the mapped fluvial flood zones (i.e. T1, its associated hardstand and site access tracks). Flood resilience measures have been proposed which include the placing of all infrastructure within the floodplain at an elevation above the 1 in 100-year fluvial flood level plus 30% factor to account for climate change, of 9.3 mOD. The turbine finished base level for T1 within the floodplain will be at an elevation of 9.6 mOD which includes a 0.3m freeboard above the worst case plus climate change flood level. This will ensure that the T1 can still be accessed for essential maintenance during flood events if required.

Analysis has shown that the volume of the proposed permanent infrastructure within the flood zone equates to 3,150m³ in a 1 in 100-year flood event plus climate change (plus 30%). The Project includes 2 no. flood compensation areas which involve reducing ground levels in the floodplain to replace the lost flood zone capacity. The flood capacity of the compensatory measures is equivalent to the flood capacity lost due to the proposed permanent infrastructure within the flood zones. Note that these areas have been named as 'flood compensatory areas' to align with the terminology used in the 'The Planning System and Flood Risk Management Guidelines for Planning Authorities' (DoEHLG, 2009). In addition, a number of culverts along access tracks within the flood zone will be installed to ensure that flood water flow routes will not be completely impeded. This will ensure that there is no displacement of floodwaters or increase in the downstream flood risk associated with the Project.

The Site Specific Flood Risk Assessment concludes that:

"The proposed development will include in its design and use the latest best practice guidance to ensure that flood risk within or downstream of the Site is not increased as a function of the Development i.e. a neutral impact at a minimum."

Furthermore, the Surface Water Management Plan (SWMP) has been designed to ensure that surface water runoff at the Site is managed effectively and does not exacerbate flood risk to the surrounding areas upstream and downstream. As the associated drainage - some of which is permanent for the lifetime of the Development, will be attenuated for greenfield runoff, the proposed Development will not increase the risk of flooding elsewhere in the catchment (upstream or downstream). Based on this information, the Development complies with the appropriate policy and flood risk guidelines for the area (including the flood risk objectives in the Clare County Development Plan (2023-2029)).

The likely significant effects on hydrology, hydrogeology arising during the construction phase as a product of the Project are identified as follows;

- Earthworks resulting in suspended solids entrainment in surface waters
- Clear felling
- Excavation Dewatering and potential effects on surface water quality
- Release of hydrocarbons
- Release of cement-based products
- Wastewater disposal

- Morphological changes to surface watercourses
- Groundwater levels during excavation works
- Groundwater quality in local well supplies
- Use of Siltbuster
- Horizontal Directional Drilling
- Biodiversity Enhancement
- Surface water quality due to fluvial flooding during construction
- Raised Bogs
- Hydrologically connected designated sites
- Doonbeg River Freshwater Pearl Mussel Sensitive Area
- Water Framework Directive Status

No new significant effects are anticipated during the decommissioning phase and are anticipated to be similar to those associated with the construction phase but at a reduced magnitude as no peat excavations are expected and the turbine foundations and hardstands will remain in-situ during decommissioning.

Mitigation measures outlined below and detailed in **Appendix 2.1 CEMP** and **Chapter 9 Hydrology and Hydrogeology – Section 9.7** address the likely effects identified and include key design and management principals in line with cited industry Best Practice and Guidance. Mitigation in summary includes:

- Mitigation by design. That is, avoiding potentially hazardous and sensitive areas.
- Minimising disturbance of soils and material, including limiting vehicular movements.
- Limiting or ceasing activity during unfavourable conditions.
- Precautionary and emergency response measures, particularly in relation to potential contaminants.
- Following details set out in management plans including Construction and Environmental Management Plan (CEMP).
- Include appropriate measures to mitigate secondary effects, namely, to receiving surface water network (**Chapter 9 Hydrology & Hydrogeology**).
- Important design considerations are prescribed and will be incorporated into detailed assessment and design for the bridge and associated access track within the flood zone.
- Nature Based Solutions including Sustainable Drainage Systems. This will include check dams, stilling ponds, improvement areas and promotion of peatland health.
- Passive and Active Construction Water management.

- Proper design and construction of watercourse crossings and any works associated with the drainage network, including bridge/culvert design, and practical measures such as over pumping during any required instream works.
- Monitoring, including continuous monitoring of water quality downstream of the Site.

With the implementation of mitigation measures outlined in **Chapter 7, 8 and 9** and **Appendix 2.1 CEMP** no significant effects on the water environment will occur during the construction, operation or decommissioning of the Project (works at the Site, Spoil Storage Area, along the GCR and along the TDR including the Blade Transfer Area).

11 **NOISE & VIBRATION**

This Section provides a summary of the detailed assessment of the potential noise effects for the Project, as described in **Chapter 10** of the EIAR. The effects of noise from the operation of the Project have been assessed using Wind Energy Development Guidelines (DoHLG, 2006) with the methodology described in ETSU-R-97 and the IOA Good Practice Guide. Noise levels during operation of the Development have been predicted using the best practice of calculation technique. They have been compared with the noise limits in the 2006 Guidelines and recent 2021 An Bord Pleanála decisions and found to be compliant.

For this assessment background noise levels were carried out at a residential location in the vicinity of the site between 28th June and 28th July 2022. The background noise levels measured at these locations were deemed representative of the background noise levels in the vicinity of the site. The predicted noise levels at each dwelling in closest proximity to the proposed wind farm site were calculated in accordance with ISO9613-2:1996 under a range of operating wind speeds standardised to 10m AGL.

The predicted noise levels have been compared with the appropriate noise limits based on the Wind Energy Development Guidelines (WEDGs, DoHLG, 2006). No exceedances of the limits from the operation of the development in isolation were noted at any third-party properties. There were three additional wind farms within 3km that were considered as part of the cumulative assessment, and with this site operating, the noise levels at the residential properties in the vicinity of the proposed Development resulted in a marginal change in the predicted noise level. The predicted noise levels did not exceed the limits when the cumulative noise levels were considered.

The current WEDGs (DoHLG, 2006) remain valid until the revised draft WEDGs (DoHLGH, 2019) are finalised and published. However, a mitigation strategy to incorporate a reduction in sound power level outputs with respect to directionality can be put in place to comply with potentially revised noise limit levels. All turbines have software incorporated so that the sound power levels can be reduced by direction and energy output.

The noise levels predicted at the nearest receptors are orders of magnitude below the level at which risk of hearing damage, or indeed negative health effects are possible. Noise during construction of the Development and decommissioning will be managed to comply with best practice, legislation, and guidelines current at that time so that effects are not significant.

12 **LANDSCAPE AND VISUAL**

Chapter 12 of the EIAR presents a Landscape and Visual Impact Assessment for the Development, carried out by a competent professional. The assessment identifies potentially significant effects as a result of the Development. It considers separately the effects on landscape and visual receptors, as well as the cumulative effect of the Development in combination with other windfarm developments.

The Study Area for the Development covers a radius of 20km in accordance with the WEDGs (DoHLG, 2006). The landscape assessment considers potential effects on the receiving and surrounding landscape with reference to a range of landscape character areas (LCAs) and criteria published in various technical documents. The visual assessment considers effects upon visual receptors (as agreed with consultees through the EIA Scoping process) including scenic amenity designations, centres of population, transport routes and local community views using 27 viewpoints from representative / sensitive visual receptor locations. Photomontages have been prepared for the viewpoints and the figures also include a wireline of the Development on its own, and a wireline with all other cumulative developments.

The site is contained within a slightly-sloping, low lying area approx. 3km to the north of the mouth of the River Shannon. This estuary 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 landscape within the Study Area is intermittently punctuated with small loughs and connecting waterways, as well as estuary bays such as Clonderalaw Bay and Poulmasherry Bay. Aside from the river Shannon, there are multiple watercourses in the Study Area.

The vegetation and land use follows the varied topography of the Study Area, which can be divided into quadrants for the purposes of describing it. Throughout the north-western coastal context, shoreline farmland mixes with riparian scrub and woodland and is dotted with rural residences and holiday homes vying for coastal views. The Slievecallan uplands in the north-eastern quadrant contain considerable portions of mountain moorland on its elevated slopes and ridges, alongside dense patches of conifer plantations. Less commonly, there are some areas of upland grazing, which give way to valley farmland in lower-lying areas.

The settlements of Kilrush, Kilkee, Doonbeg, Cooraclare and Tarbert account for the only notable urban land cover within the Study Area. Industrial and energy related land use is one of the defining features of this area due to its proximity to the River Shannon, which is used to access the busy Foynes Port and large Aughinish Alumina Plant, upriver to the east of the Study Area. The Tarbert and Moneypoint power stations, which lie on opposite sides of the Shannon within the Study Area, are the key electrical infrastructure nodes for the west of Ireland. Aside from being substantial industrial facilities in their own right, they provide hubs for numerous high voltage electricity lines which converge on them. At over 200m tall, the twin chimneys at Moneypoint are the second tallest structures in the country. Adding to this energy related land use, is a busy container shipping lane through the centre of the estuary that serves the industrial port of Foynes, east of the Study Area, as well as the presence of a number of operational wind farms which are situated throughout the central and Wider Study Area. The nearest of these, Moanmore Wind Farm and Tullabrack Wind Farm, are located within 3km to the northeast of the proposed wind farm.

In the Clare County Development Plan (2023-2029), which includes a Landscape Character Assessment, the Site falls within one Landscape Character Types (LCT) and one Landscape Character Areas (LCA).

The adjacent lands to the north of the Site are classified as LCT 'Coastal Plain and Dunes,' while the adjacent lands to the east are within the LCT 'Farmed Rolling Hills.'

The Site itself is located within 'LCA21 – Loop Head.' Nearby, the adjacent lands to the southeast, approximately 600m away, fall within 'LCA18 – Shannon Estuary Farmland,' and about 2.5km to the east lies 'LCA19 – Kilrush Farmland.'

Landscape policy is driven by determining which of three categories a particular landscape falls into and these are based around the various LCAs. The landscape of County Clare is subdivided into:

- Settled landscapes' - areas where people live and work;
- Working Landscapes – intensively settled and developed areas within Settled Landscapes or areas with a unique natural resource; and
- Heritage Landscapes: areas where natural and cultural heritage are given priority and where development is not precluded but happens more slowly and carefully.

In terms of landscape effects, there will be physical impacts on the land cover of the site and GCR as result of the Project during the operational phase, but these will be relatively minor in the context of this productive rural landscape. The scale of the proposed Development will be well assimilated within its landscape context without undue conflicts of scale with underlying land form and land use patterns where wind energy development is already a familiar feature. For these reasons the significance of the landscape impact is deemed to be Moderate-Slight within the site and its immediate environs. Beyond the central study area, the significance of landscape impact is deemed to reduce further as the wind farm becomes a proportionately smaller and more integrated component of the overall landscape fabric. Consequently, significant landscape impacts are not considered to occur.

The visual impact assessments for each of the 27 selected viewpoint locations are contained in the **Technical Appendix 11.1: Visual Impact** Assessments and are summarised within Chapter 11 based on receptor type.

In total, of the 27 viewpoints assessed as part of this LVIA, 12 are from within approximately 5km of the Site. Five of these 12 viewpoints experienced the highest likely visual impact recorded for the Development; that of 'Moderate' Visual Impact Significance. This is primarily owing to the proximity of these five receptors to the proposed turbines, but also the lack of substantial roadside hedgerows or trees at those sections. A further five viewpoints recorded a Moderate-slight visual impact significance, for similar reasons, while tending to be generally 2-5km from the Site, with the remaining two viewpoints in the Central Study Area likely to experience either Slight or Imperceptible visual impact significance.

Due to proximity, this receptor group has the most potential to experience a sense of overbearing from surrounding wind turbines. However, given that the 4 X tip height set back required by the 2019 Draft Revised Wind Energy Development Guidelines (600m in this case) has been adhered to, the turbines from the proposed Development will not appear overbearing and this is reflected in the visual impact assessment judgements. The setback distance also ensures that they will appear similar to other existing wind turbines in the vicinity without a sense of ambiguity from scale conflict / confusion (see Plate 11.3).

Thus, it is not considered that the proposed wind farm Development will generate significant visual effects in respect of local community receptors.

There is one settlement within the Central Study Area, this being Kilrush, however, the hamlet of Moyasta occurs northwest of the proposed Development. They registered visual impact significance of 'Moderate-Slight' and 'Moderate' respectively. Of those settlements within the wider study area (i.e. beyond 5km) that have some potential visibility of the proposed wind farm, none registered greater than 'Moderate-Slight' visual impact significance.

For the major route receptor category, the highest visual impact assessed is 'Moderate' (VP15 and VP9) along the N67, followed by 'Moderate-slight' along the N68. This is primarily owing to the proximity of these two receptors to the proposed turbines (i.e., all less than 1.5km distance), but also the lack of substantial roadside hedgerows or trees at those sections. Of the remaining nine viewpoints along major routes that were also assessed, none registered greater than 'Moderate-Slight' visual impact significance.

In respect of views from tourism, recreational and heritage features, 12 representative viewpoints were selected for the visual impact assessment. Notably, 10 of these 12 viewpoints are from the Wild Atlantic Way, the highest visual impact along which is deemed to be 'Moderate' at two locations, where both viewpoints are less than 6km from the Development. Further receptors such as the Tullaher Loop Walk recorded a likely visual impact significance of 'Moderate-slight'. Notably, two viewpoints (i.e. VP14 & 15) were captured from the dismantled West Clare Rail Line, which is proposed to be potentially developed, at some point in the future, as a public greenway. Both viewpoints are within 2km of the nearest proposed turbine, the likely visual impact significance is deemed to be 'Moderate-slight and 'Moderate'

In terms of the potential for cumulative impacts, there are 16 existing, permitted and in-planning wind farms contained within the Study Area. These are arranged in three distinct clusters within relatively discrete landscape settings and there are also three somewhat isolated developments. It is considered that the proposed wind farm will contribute to cumulative impacts in a very minor way at the scale of the Study Area where turbines are already a familiar feature and the Development represents marginal intensification. Within the central Study Area, there is a greater potential for cumulative impacts with two existing wind farms (Tullabrack and Moanmore) and a single in-planning wind farm development (Ballykett). However, there is a reasonable degree of cohesion between these modest scale developments where they either appear as a single larger entity or a series of discrete smaller

developments, but seldom with clutter or scale confusion or a strong sense of being surrounded by turbines.

Based on the landscape, visual and cumulative assessment contained herein, it is considered that there will not be any significant effects arising from the proposed Moanmore Lower Wind farm.

13 **AIR AND CLIMATE**

This section assessed the effect of the Project on air quality, given the potential for dust emissions, and the likely carbon dioxide reduction effects of the Project in operation. Mitigation measures for the reduction of dust are outlined in the EIAR **Chapter 12: Air and Climate**. The turbines are situated greater than 600m away from inhabited dwelling houses not connected with the Project. After mitigation, the residual effects were assessed as having the potential to result in a short-term imperceptible, negative impact on climate during construction. There will be long-term moderate, positive impact on climate as a result of reduced greenhouse gas emission during the operational phase.

The layout of the Development has been designed to minimise the potential environmental effects of the wind farm while utilising the maximum energy yield from the site's wind resource. The Project will contribute to a net national reduction in the emissions of greenhouse and other gases resulting from the combustion of fossil fuels.

Savings of carbon dioxide arise principally from the generation of electricity from the Project, such that generation from other sources (which emit carbon dioxide) are offset. The Project would result in a total installed capacity range of 12-15 Megawatts (MW). Approximately 8,389 (lower range) or 10,487 (higher range) tonnes of CO₂ will be displaced per annum from the largely carbon-based traditional energy mix by the Project. In total, it is estimated that 335,568 tonnes (lower range) or 419,460 tonnes (higher range) of CO₂ will be displaced over the proposed 40-year lifetime of the wind farm.

Ireland has set a target to achieve a 80% reduction in overall greenhouse gas emissions by 2030, setting a path to reach net-zero emissions by no later than 2050. The target for 2030 is to generate 80% of the country's electricity from renewable sources. The Project will contribute within a range of 12-15MW of installed capacity. The cumulative effect with other Irish renewable generation is considered to be a fundamental change in the climate effects of Ireland's energy supply, which is a major, positive effect, that is significant under the EIA

Regulations and will contribute to Ireland's binding emission reduction targets.

The avoidance of the production of electricity from coal, oil or gas-fired power stations, will lead to a slight, positive and long-term effect on air quality.

The Project has been assessed as having no significant direct or indirect effects on air quality during the construction, operation or decommissioning phases of the Project.

Potential cumulative effects were assessed as being of a slight, negative and short-term impact and not significant.

The nature of the Project is such that, once operational, it will have a moderate, positive and long-term, impact on the climate. It is considered that the cumulative impact will be positive in terms of carbon reduction and the climate also.

14 SHADOW FLICKER AND ELECTROMAGNETIC INTERFERENCE (EMI)

Shadow Flicker is the effect of light levels in a sunlit room noticeably varying as a result of the shadow of a turbine blade passing a window, causing a nuisance. Industry standard software was used to model the potential for shadow flicker to occur, based on the proposed turbine locations and dimensions and the locations of residential properties. The defined study area was based on the WEDGs (DoHLG, 2006) which extended to 2km of each proposed turbine. The house survey was ground truth-ed to confirm there are a total of 183 receptors within 2,000m of any turbine. There is one property (H1*) located less than 600m from the proposed turbines. However, H1* is an old cottage that is being used as an equestrian tack- room and is not considered a sensitive receptor in this EIAR. As H1 is not considered a sensitive receptor in this EIAR, there are 182 sensitive receptors within the shadow flicker Study Area see **Chapter 13 Section 13.2.4.**

The 'worst-case' assessment has identified the potential for shadow flicker to affect 84 sensitive receptors out of 182. Of the 84 affected sensitive receptors, 30 no. exceed the 2006 Guidelines recommendation of 30 minutes per day. Receptor H11 recorded the highest exceedance of the 2006 Guidelines with an exceedance of 43 minutes per day. It should be noted the 'worst case' assessment assumes worst-case conditions where the sun is always shining, no cloud cover is present, turbines are continuously rotating, and sensitive receptors are always occupied. This calculation is based solely on topography, excluding potential mitigating factors such as vegetation, buildings, or other structures.

Prior to mitigation, there will be likely significant shadow flicker effects on 30 no. sensitive

receptors. The Draft Revised Wind Energy Development Guidelines, December 2019, recommend that shadow flicker should not affect any sensitive receptor, therefore the relevant turbine (or turbines) must be shut down on a temporary basis until the potential for shadow flicker ceases. The mitigation measures to avoid exceedance of DoEHG Guideline 2006 limits (30 hours per year or 30 minutes per day) to the 30 no. properties highlighted in the above paragraph, are outlined in **Section 13.2.8**. The Development can also be brought in line with the Draft 2019 Guidelines should they be adopted while this application is in the planning system, through the implementation of the mitigation measures outlined in **Section 13.2.8**.

While separate wind farms are not likely to cause effects simultaneously, they could increase the cumulative total hours where a receptor is affected. In this instance, there is one operational wind farm (Moanmore Wind Farm) within a 2 km range of the turbines that may cause cumulative effects. The assessment showed 13 no. are predicted to be affected by the operational Moanmore Wind Farm and not the proposed Development (**Table 13.4**).

Following application of the proposed shadow flicker mitigation measure during the operational phase, it is concluded that residual shadow flicker effects would avoid adverse impacts on residential amenity in respect of shadow flicker (in accordance with objectives of the Clare Wind Energy Strategy, Annex A: Best Practice and General Considerations for wind energy developments in County Clare), align with the requirements of the Draft Revised Wind Energy Guidelines (2019) threshold limits, and would therefore be **not significant**.

15 **CULTURAL HERITAGE**

Chapter 14 of the EIAR presents a baseline study of and impact assessment on the cultural heritage of the Project and the surrounding region. The assessment was based on site inspections and a programme of desktop research to identify and record any archaeological, architectural, and cultural heritage assets that may be affected by the Development.

The significance of effect on an asset is considered by evaluating its value/sensitivity and how (and to what extent) it may be impacted based on the proposed design of the Development.

The Development will include the upgrading of an existing farm track, located 25m from the extant ringfort (CL057-037), as a Site Access Track during the construction phase. This is predicted to result in a negligible magnitude, short-term, imperceptible, adverse indirect effect

on the setting of this archaeological site. No other recorded archaeological sites with existing surface expressions are located within 1km of any Development locations, and no indirect effects on the settings of recorded archaeological monuments are predicted during the construction phase.

There are no Protected Structures within 1.3km of any proposed Development locations, and no structures listed in the National Inventory of Architectural Heritage (NIAH) are within the surrounding 2km Study Area. Consequently, no indirect effects on the settings of designated architectural heritage structures are anticipated during the construction phase.

Regarding the Grid Connection Route, no recorded cultural heritage constraints exist within the 100m wide corridor along the public roads, so no indirect effects on cultural heritage are predicted during construction. Similarly, for the Turbine Delivery Route work areas, the absence of recorded cultural heritage constraints within a 100m wide corridor centred on the public roads or near the Blade Transfer Area indicates that no indirect effects on the cultural heritage resource are anticipated during the construction phase.

An assessment has been made of the potential for significant effects of the Project on the cultural heritage resource. Following the application of effective mitigation measures based on best practice guidelines, including specialist archaeological inputs during the design of the Project combined with archaeological monitoring during the construction phase, the Project is not predicted to result in any likely significant effects on the cultural heritage resource.

While the Project will result in not significant to moderate, indirect, adverse effects on the settings of cultural heritage constraints within the surrounding landscape during the Operational phase, no predicted significant (direct, indirect, or cumulative) effects on the cultural heritage resource arising from the Development have been identified. The Project will not result in any direct adverse effects on any known archaeological sites, designated architectural heritage structures, or undesignated cultural heritage constraints.

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 archaeological monitoring of the construction phase, they will be cleaned, recorded, and left to remain in situ within cordoned-off areas while the National Monuments Service is notified and consulted regarding appropriate future mitigation strategies, which may include preservation in situ by avoidance or preservation by record through archaeological excavation.

The Project will result in not significant to moderate, indirect, adverse effects on the settings of cultural heritage constraints located in private properties within the surrounding landscape during the Operational phase. These indirect effects will be long-term in duration but will be reversed following the Decommissioning phase.

16 MATERIAL ASSETS AND OTHER ISSUES

Chapter 15 of the EIAR considers a number of other issues associated with the Project, including potential effects on Land Use – Agriculture, Telecommunications, Electricity Networks, Air Navigation, Quarries and Utilities (gas, water, wastes).

16.1 Land Use

The Site is predominantly utilised for agricultural livestock grazing with interspersed bog and shrubland areas. There are also a number of residential properties and established wind farms in the region. The Project, given its nature, is unlikely to result in indirect effects within its immediate footprint, and therefore effects on agriculture are considered imperceptible and not considered any further.

No significant effects are predicted on agricultural or forestry land use within the Site, nor are any significant effects expected on commercial forestry outside the Site.

16.2 Telecommunications

Operators of microwave communication links were contacted during the EIA process. Mitigation measures were adopted during the layout design to avoid impacting communication links. Disruption to television reception is considered unlikely following the switchover to digital broadcasting, as the signals are less susceptible to interference from turbines.

The implementation of mitigation measures will ensure no interference with communication links. Therefore, no significant effects are predicted on telecommunications or radio reception as a result of the Project.

16.3 Electricity Networks

There is one Grid Connection Route assessed in the EIAR as part of the Development:

- The on-site 20kV Electrical Substation will connect via 1 no. 38kV underground cable to the existing Tullabrack 110kV substation. At the existing Tullabrack 110kV substation, the cable will connect into existing infrastructure within the confines of the Electrical Substation and its compound. An update of the existing transformer in Tullabrack

substation is likely to be required.

The proposed Grid Connection Route will be located entirely along public roads/verges and will therefore have no effect on the overhead electricity network. Further details of the grid connection route can be found in EIAR **Appendix 2.2**.

The Development will contribute directly and in the long term to the electricity network by strengthening it through additional renewable energy generation.

When connected to the Tullabrack 110kV substation, the underground cable will connect into existing structures within the confines of the substation and its compound. An update of the existing transformer of the Tullabrack substation is likely to be required and thus will have a slight, positive, short-term effect in terms of enhancing critical infrastructure.

No significant adverse effects on the electricity network are anticipated. There will be a long-term slight positive residual impact on transmission infrastructure in the area (due to the installation of new infrastructure and provision of additional renewable electricity) and no impact on distribution. It is not proposed to utilise any elements of the distribution network.

16.4 Air Navigation

Operating wind farms have the potential to cause a variety of effects on aviation. Rotating wind turbine blades may impact on radar operations, although it is not likely at Moanmore Lower. The physical height of turbines can cause obstruction to aviation and the overall performance of communications, navigation and surveillance equipment. All structures over 150m in height are required to have lighting to warn aviation traffic.

The closest international airport is Shannon Airport, approximately 35km to the east of the Project. The closest regional airport is Kerry Airport, 53km to the south of the Project. The closest aerodrome is the Abbeyfeale Airfield, 31.5km to the south-east of the Development. Note these distances are direct distances and not driving distances.

Consultation with aviation operators was undertaken and with the Irish Aviation Authority. The IAA have requested an obstacle warning light system for the Project, the provision of coordinates of each turbine and tip height, and to notify them 30 days prior to any crane operations commencing. Shannon Airport Authority have requested if the turbines are within 45km of Shannon Airport's ARP (Aerodrome Reference Point) and are greater than 100m in height they would be required to be included in the IAA Electronic Air Navigation Obstacle

Dataset. Also, standard: Chapter Q (Visual Aids for Denoting Obstacles) of the Certification Specifications for Aerodrome Design – Current Issue, contained in the EASA aerodrome rules must be applied to the turbines as they would be regarded as an extensive object.

The turbine locations will be added to aviation maps prior to construction, and all requests from the Aviation Authority carried out to see that aviation safety protocols are followed. Therefore, effects on aviation as a result of the development will be negligible.

It is considered that the Project is not likely to have any significant effects on air navigation, once the mitigation measures set out above are implemented.

16.5 **Utilities (gas, water, waste)**

It is likely that waste will be generated onsite during the construction and decommissioning phases of the Development. All rubbish and waste/excess materials will be removed from Site to an appropriate licenced facility from where it will be reused/recycled, where possible, or disposed of accordingly.

A desk study of available information from the EPA did not identify any waste facilities, illegal waste activities, chemical monitoring points or industrial EPA licensed facilities within a 2km radius of the Site. The nearest waste facility to the Development is the Lisdeen Recycling Centre and Transfer Station, 6.5km northwest of the site. Clean (Ireland) Refuse & Recycling Company Limited is situated approximately 9.3 km to the north of the site.

There is no gas mains located within the Site. There is therefore no potential for impact.²

Given the detailed information provided by Uisce Éireann regarding water services within the Redline Boundary, it is reasonable to conclude that there is no potential for interference with local water services during the development. Based on this information, the risk of encountering existing water infrastructure is considered imperceptible.

Potential effects arising from the Project relating to existing water services have been assessed and are detailed in **Chapter 9: Hydrology and Hydrogeology**. These effects have been assessed as not significant.

There are no EPA-licensed or local authority-authorised waste facilities or activities located within the Site. The closest, authorised municipal waste facility is Lisdeen recycling centre and transfer station which is 6.5 km west of the Site and Clean (Ireland) Refuse & Recycling

Company Limited which is 9.3 km north of the Site.³

The residual effects of waste produced as a result of the construction, operational and Decommissioning phases of the Project are considered to be not significant.

16.6 **Quarries**

The crushed stone 38,465m³ for construction of the Project will come from licenced quarries in the locality such as:

- Tullagower Quarry, Kilrush
- Derrynalecka Quarry, Derrynalecka
- Glenmore Quarry, Glenmore
- Hehir Quarry, Bollyneaska
- Letterkelly Quarry, Letterkelly
- Liscormick Quarry, Liscormick
- Nagle Stone Quarry, Liscannor
- Luogh and Lisacannor Stone Company Ltd. Luogh Quarry, Doolin
- Ryans Quarry (Roadstone Ltd), Ennis
- Bunratty Quarry (Roadstone Ltd), Bunratty
- Bobby O'Connell and Sons Ltd Ballycar Quarry, Ardnacrusa
- Esker Readymix, Athenry

Concrete for the Turbine Foundations will also be sourced from one of the local providers listed above.

The effects of the Project on local quarries is considered to be adverse, long term and significant.

² Gas Networks Ireland. Available at: <https://www.gasnetworks.ie/corporate/company/our-network/pipeline-map/>. Accessed at 25/09/2024.

³ EPA Maps. Available at: <https://gis.epa.ie/EPAMaps/>. Accessed at 25/09/2024.

17 **ACCESS, TRAFFIC AND TRANSPORT**

Chapter 16 of the EIAR assesses the impact of construction traffic on the road network and its effects on nearby communities. The proposed wind farm development involves two primary traffic-related activities: the transportation of wind turbine components and the movement of construction materials, equipment, personnel, and excavated spoil between the main wind farm site and designated spoil storage areas. A computer model of turbine delivery vehicles was employed to identify sections along the Turbine Delivery Route (TDR) where road improvements are required to accommodate the delivery of the largest turbine components.

The turbine components will be shipped to Shannon Foynes Port and transported to the site using abnormal load vehicles via a route comprising the L6188, N69, N18, M18, N85, N68, and local roads L6132, L2036, and L2034, all managed by Limerick County Council, Clare County Council, Transport Infrastructure Ireland, and Direct Route Ltd. An alternative route avoiding the N18 Limerick Tunnel utilises the R510, R527, and R445, rejoining the N18 at Junction 4. Enabling works along these routes include road widening and strengthening, relocation of street furniture, temporary verge widening, vertical realignment of crest curves, construction of a blade transshipment area on the L6132, widening the L2036 to 5.5m, and creating an overrun area at the L2034/L2036 junction on third-party lands. These measures ensure the efficient and safe delivery of components to the site.

Additionally, it is anticipated that ready-mix concrete for turbine and substation foundations will be sourced from a local authorised quarry along the transport route. Construction workers will primarily access the site via the entrance on the L6132 but may require flexibility in their approach routes to accommodate varying travel circumstances.

It is estimated that during the wind farm construction, an approximate total of 4,227 loads of material and building supplies will be delivered and removed from the Site. The majority of granular materials for access track and turbine hardstand construction will be sourced from site excavations and processed on site. The majority of HGV movements to and from site will occur during the first five months of the construction period and will be associated with site road construction, turbine hardstand construction and turbine foundation construction.

Increased volumes of traffic will be generated by the proposed Development during the construction period. It is anticipated that a maximum of 159 HGV vehicles (318 HGV movements) will visit the Site on a daily basis during the period of weeks 8 to 24. The peak traffic of 159 HGV vehicles will occur on 3 days during this 3-month period when turbine foundations are poured. Concrete pours for individual turbine foundations will generate 81

HGV arrivals (162 HGV movements).

Following assessment of the Quality of effects on the public road network, it has been concluded that the Quality of effects will be neutral with increased traffic flows during the construction and decommissioning of the proposed Development with no permanent changes to the geometry of the public road network and its associated junctions. Grid connection works on the local road network requiring road closures have been assessed as negative due to the short-term disruption to public road users resulting from road closures and driver delay resulting from temporary traffic lights and traffic diversions.

Following assessment, it has been concluded that the significance of the effects on the public road network where traffic management / two-way traffic flows can be maintained during works has been assessed as slight. The significance of the effects has been assessed as moderate on local roads where road closures will be required to carry out the grid connection works.

Following assessment, it has been concluded that the duration of effects relating to increased HGV traffic flows in the vicinity of the Site have been assessed as Temporary and may last up to 10 months during the construction and decommissioning of the proposed Development, the maximum effects from increased HGV traffic flows will occur on 3 days during the 10 month construction period during the construction of turbine foundations.

Following assessment, it has been concluded that the duration of effects relating to grid connection works, enabling works on the Turbine Haul Route and delivery of turbine components have been assessed as short-term lasting less than one year.

A detailed Traffic Management Plan (**Appendix 16.2**) will be agreed with the relevant authorities and will detail the measures to be implemented during the construction phase.

This assessment has identified that the potential effects of the Project on traffic and transport during the construction and decommissioning periods are assessed as **Not Significant** on the national and regional road network and **Not Significant** on the local road network and within populated centres. The potential effects will occur for a **temporary** / **short term** duration during the construction and decommissioning periods of the Development. During the operations phase of the proposed Development the effects are assessed as **Non Significant**.

18 **INTERACTIONS OF THE FOREGOING**

Any potential impact on one element of the environment as a result of the Project may also impact on another. **Chapter 17** of the EIAR provides a summary of the interactions and interrelationships between environmental aspects of the Project. This includes significant effects from each EIAR chapter and also summarises the mitigation measures proposed to reduce either the likelihood or magnitude of these effects to an acceptable level.

Table 18.1 below outlines the different environmental aspects which have potential to interact because of the Project. Interactions have been clearly identified in the early stages of the Project and where the potential exists for interaction between environmental impacts, the EIAR specialists have taken the interactions into account when making their assessment. Potential interactions (both positive and negative) have been considered for the construction, operational and decommissioning phases of each of the different environmental aspects of the Project.

All environmental factors are interrelated to some extent. Having studied the interaction of potential impacts during the construction, operational and decommissioning phases of the Project, it has been determined that no amplification effect is anticipated. The Project will have some positive impacts on an international, national, regional and local level. It is important to note that the landscape and visual impacts are almost entirely reversible upon decommissioning of the Development.

Table 18.1: Summary matrix of Interactions of Negative Impacts during Construction and Operational Phases (Source: Adapted from EIAR Guidelines, 2022)¹

	Population & Human Health		Planning Policy		Biodiversity		Soils & Geology		Hydrology and Hydrogeology		Noise		Landscape & Visual		Material Assets		Cultural Heritage		Traffic & Transportation		Shadow Flicker		Air And Climate	
	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper	Const & Decom	Oper
Population & Human Health																								
Planning Policy																								
Biodiversity																								
Soils & Geology																								
Hydrology and Hydrogeology																								
Noise																								
Landscape & Visual																								
Material Assets																								
Cultural Heritage																								
Traffic & Transportation																								
Shadow Flicker																								
Air and Climate																								

Note: Const. = Construction phase; Oper = Operational phase Decom. = Decommissioning

Interaction or inter-relationship

No interaction or inter-relationship

¹. Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports. Available online at: <https://www.epa.ie/publications/monitoring--assessment/assessment/guidelines-on-the-information-to-be-contained-in-environmental-impact-assessment.php> [Accessed on 19/09/2024]