Dunbeg South Extension Wind Farm

Environmental Statement

Volume 1 - Non-Technical Summary



power for good

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Preface

This document is Volume 1 of the Environmental Statement (ES) for Dunbeg South Extension Wind Farm. The ES comprises:

- Volume 1: Non-Technical Summary (NTS)
- Volume 2: Main Report
- Volume 3: Figures (Maps & Illustrations)
- Volume 4: Technical Appendices

The aim of the NTS is to summarise the content and main findings of the ES in a clear and concise manner to assist the public in understanding what the environmental effects of the Carnbuck Wind Farm are likely to be. The full ES provides a more detailed description of the Proposed Development and the findings of the Environmental Impact Assessment (EIA) process.

The ES has been prepared by RES in consultation with Department of Infrastructure (Planning), various consultees and in collaboration with the subject specialists outlined below.

Specialism	Author
Introduction & the Proposed Development Planning Policy Design Evolution & Alternatives Noise Traffic & Transport Shadow Flicker	RES
Landscape & Visual	Shanti McAllister Landscape Planning & Design
Archaeology & Cultural Heritage	Gahan & Long
Ecology	Blackstaff Ecology
Ornithology	David Steele
Fisheries & Aquatic Ecology	Paul Johnston Associates
Geology & Water Environment	McCloy Consulting
Peat Slide Risk & Peat Management Plan	Natural Power
Socioeconomics	Oxford Economics

Commenting on the ES

The full ES, together with supporting documents submitted as part of the planning application, (including the Design & Access Statement and Pre-Application Community Consultation Report) will be available for viewing during normal opening hours at the address below. Electronic copies (USB memory stick) will be available free of charge.

Limavady Library
5 Connell Street
Limavady
County Derry / Londonderry
BT49 0EA
Tel: 028 7776 2540

An electronic version of the ES, and documents supporting the planning application, will be available to download free of charge from https://dunbegsouthextension-windfarm.co.uk/.

Paper Copies of the ES can be obtained at a cost of £100 from:

RES Ltd
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Electronic copies (USB memory stick) will also be available on request to the RES address above.

Introduction

This Non-Technical Summary (NTS) has been prepared in support of a planning application by RES Ltd for the proposed Dunbeg South Extension Wind Farm, hereinafter referred to as 'the Proposed Development', which is located in the townlands of Dunbeg and Dunmore, located to the north of A37 and to the west of the existing Dunbeg Wind Farm and lands to the south of A37 adjacent to a disused quarry.

A planning application has been submitted to Department of Infrastructure (Strategic Planning Directorate) in accordance with the Planning (Environmental Impact Assessment) Regulations, 2017. The regulations require an EIA to be carried out and the results of the EIA to be included in an Environmental Statement (ES) to accompany the planning application. The application follows a detailed assessment of the environmental and technical aspects of the site's suitability for development.

The Proposed Development comprises up to 4 three-bladed horizontal axis wind turbines, each up to 149.9 m maximum tip height. The development would include external electricity transformers; underground cabling; access tracks; turning heads; site entrances; crane hardstandings; control building and substation compound, off-site areas of widening to the public road and all ancillary works. During construction and commissioning there would be a number of temporary works including a construction compound with car parking; temporary parts of crane hardstandings and welfare facilities. The purpose of the development is for the generation of electricity.

The location of the Proposed Development is shown on Figure 1: Site Location.

The Applicant

RES is the world's largest independent renewable energy company. At the forefront of the industry for 40 years, RES has delivered more than 23GW of renewable energy projects across the globe and supports an operational asset portfolio exceeding 10GW worldwide for a large client base. RES is active in 11countries working across onshore and offshore wind, solar, energy storage and transmission and distribution. RES has developed 26 onshore wind farms in Northern Ireland totalling in excess of 400MW and operates over 134MW of wind capacity across Northern Ireland.

The Application Site

There are a number of key technical and environmental factors that influence the suitability of a site for a wind farm. The following are key attributes that contribute to a viable site, which the application site possesses:

- **Wind Speeds/Energy Yields**: Sufficiently high wind speeds to ensure energy production from the wind turbines that would yield an adequate return on investment;

- **Planning**: A site which complies with planning policy and in particular, avoids unacceptable effects on areas designated by statutory agencies; maintains appropriate distances from dwellings to avoid unduly impacting local amenity and; avoids impeding or interfering with major electromagnetic transmission and airport communication systems;
- **Area of Site**: A site must have sufficient area to accommodate the number of wind turbines required for economic viability;
- **Access**: Adequate vehicular access to a site using existing roads wherever possible to minimise the amount of civil works, particularly during the construction phase;
- **Local Terrain and Topography**: Terrain and topography affect wind flow across a site and need to be considered in relation to turbine performance, specification and life-span;
- **Ground Conditions**: A site must have suitable ground conditions for the construction of wind turbine foundations, erection of the machines and the provision of access tracks and cables.

The Proposed Development comprises 4 three-bladed turbines each up to 149.9 m maximum blade tip height. It would be located in the townlands of Dunbeg and Dunmore, located to the north of A37 and to the west of the existing Dunbeg Wind Farm and lands to the south of A37 adjacent to a disused quarry. The site is located in the southern portion of the Bineveagh Area of Outstanding Natural Beauty (AONB).

The site is currently used for rough grazing of sheep and cattle.

The Need for the Development

Climate Change

The Paris Agreement establishes a framework for global climate action including the mitigation of and adaption to climate change, support for developing nations and the transparent reporting and strengthening of climate goals. The European Union signed The United Kingdom of Great Britain and Northern Ireland up to the Agreement on 22 April 2016 and it came into force on the 18 December 2016.

COP28

The 28th UN Climate Change Conference of the Parties (COP28) took place in Dubia on 30th November – 13 December 2023, attended by the countries that signed the United Nations Framework Convention on Climate Change. The global stocktake was considered as the central outcome of COP28, it provides counties and other stakeholders to take inventory, to assess their progress toward meeting the goals of the Paris Agreement, and where they are not. The global stocktake recognised that we are currently not on track to limit global warming to 1.5ºC.

COP28 concluded with an agreement that signals the beginning of the end of the fossil fuel era.

Parties were called to take actions towards achieving a tripling of renewable energy capacity and doubling of energy efficiency improvements by 2030 at COP28. Ambitious economy-wide emission reduction targets, aligned with the 1.5ºC limit within the next round of their climate action plans by early 2025 were requested.

Strategic Energy Review

The Strategic Energy Review was first published in 2007 to establish a core energy policy for all of Europe (Commission of the European Communities, 2007). An agenda was agreed in order to achieve the key energy objectives of:

- Sustainability;
- Competitiveness and security of supply;
- Reducing greenhouse gas emissions by 20%;
- Obtaining 20% of energy consumed from renewable energy sources; and
- Improving energy efficiency by 20%.

The Review was updated in 2008 (Commission of the European Communities, 2008), in order to propose an Energy Security and Solidarity Action Plan, which focused on diversification of energy supply, energy efficiency and making the best of the European Union's indigenous energy resources.

Development of renewable energy reserves, including wind, solar, hydro, marine and biomass energy are seen as the main sources of indigenous energy.

The Energy Road Map 2050

The Road Map (Commission of the European Communities) sets out a long-term vision for renewable energy sources in the European Union and it forms an integral part of the Strategic European Energy Review. The Energy Roadmap 2050 sets out the transition and cost effective pathways for key economic sectors for achieving an 80-95% reduction in EU emissions by 2050. To achieve this goal, significant investment is needed in new low-carbon technologies and infrastructure, energy efficiency and renewable energy.

The 2050 target will not be shifted into national targets via EU legislation but allows more flexibility for Member Countries to meet their greenhouse gas emission reduction targets in the most cost effective method with regard to their own specific circumstances.

Security of Supply

A key policy driver for the development of renewable energy in Northern Ireland is the need to increase security of supply. There are potential adverse impacts on people and the economy in Northern Ireland through high volatile fuel costs, contributing to fuel poverty and high energy costs for businesses and industry. In addition, increasing focus on renewable energy can deliver environmental and climate change gains, reductions in carbon emissions, as well as investment and employment opportunities. With a lack of indigenous fossil fuels and no nuclear power

stations, Northern Ireland is keen to develop the full range of its available renewable energy resources to optimise the contribution that renewables make to the overall energy mix.

Wind is a free and inexhaustible resource which has an important role to play as part of a balanced energy mix. Wind energy enables us to generate our own electricity without reliance on imports and is not subject to sudden price fluctuations or the uncertainty of global markets. New onshore wind is now the cheapest source of electricity generation bar none. This makes onshore wind developments not only beneficial for the environment but also for bill payers in Northern Ireland.

The Proposed Development will result in a reduction in greenhouse gas emissions from the electricity generating industry by harnessing wind as an alternative to the burning of fossil fuels, in line with the government's energy goals. It is also important to highlight that energy production is not static and additional renewable generation will be required to be connected to maintain the Northern Ireland targets and subsequently achieve and maintain the UK renewable targets.

Northern Ireland Energy Strategy

The Department for the Economy published the new Energy Strategy – The Path to Net Zero Energy - in December 2021. It outlines a roadmap to 2030 aiming to deliver a 56% reduction in energy-related emissions, on the pathway to deliver the 2050 vision of net zero carbon and affordable energy. The Energy Strategy sets three main targets to drive these changes including delivering energy savings of 25% from buildings and industry by 2030; doubling the size of the low carbon and renewable energy economy to a turnover of more than £2bn by 2030; and meeting at least 70% of electricity consumption from a diverse mix of renewable sources by 2030. Such provisions would be in alignment with the Republic of Ireland's aim of 70% renewable electricity by 2030 as set out within the Region's Renewable Electricity Support Scheme (RESS). The Energy Strategy recognises that meeting this 70% target likely means doubling renewable energy capacity in order to meet new demands from heating our homes and powering our vehicles. A more ambitious target under the Climate Change (No.2) Bill of 80% renewable energy by 2030 and achieving carbon net zero by 2050 was passed in the Northern Ireland Assembly in March 2022.

In addition, other relevant frameworks and reference points apply, including the Climate Change Act 2008, under which the UK committed itself to reducing greenhouse gas emissions by at least 80% of 1990 levels by 2050. Included in this target is the reduction of emissions from the devolved administrations, including Northern Ireland.

Description of the Development

Planning permission is being sought for the Proposed Development comprising the following:

- Up to 4 three-bladed horizontal axis wind turbines of up to 149.9 m tip-height
- Associated external electricity transformers
- New Site Entrance (to access northern portion of the site)
- New Site Entrance (to access southern portion of the site) / or use of the permitted entrance for the Dunbeg South Wind Farm site (LA01/2022/0981/F) located the west of the proposed development.
- New access tracks
- Turning heads
- Control buildings and substation compound
- Off-site areas of widening to the public road and all ancillary works
- Turbine foundations
- Hardstanding areas at each turbine location for use by cranes erecting and maintaining the turbines
- Electricity transformers
- Approximately 2.2km of new access track if access to the southern site is via the permitted entrance for the Dunbeg South Wind Farm site (LA01/2022/0981/F) located the west of the proposed development (Option 1). Approximately 2.5km of new access track if access to the southern site is via a new entrance along the Broad Road (Option 2).
- On-site electrical, control and communications network of underground (buried) cables
- Temporary construction compound
- Permanent and temporary drainage works
- Associated ancillary works

The wind farm layout is shown in **Figure 2: Infrastructure Layout**.

Options

Two options for site track routes are also presented for the southern section of the site, the option elected will be dependent on which option is selected to access the southern portion of the site. **Figure 2 Infrastructure Layout** (Overview) presents the overview of both of the infrastructure options for the site. It is noted that only one of the Options will be developed (i.e. only if Option 1 is chosen then Option 2 will not be developed and vice-versa), this will be agreed prior to construction with Causeway Coast & Glens and the relevant roads authority. The preferred design is Option 1, however to ensure that the proposed development has been correctly assessed, the ES Chapters considers the impact of both options.

Land take

The turbines need to be spaced a suitable distance apart (taking into account the prevailing wind direction), so as not to interfere aerodynamically with one another. However the actual land developed is limited to the substation, wind turbine towers, transformers, crane hardstandings, and the access tracks. The actual land developed is limited to the substation, wind turbine towers, transformers, permanent crane hardstandings, and the access tracks, which account collectively for approximately 5.34% (Under Option 1) and 6.59% (Under Option 2) of the total area within the Planning Application Boundary.

Micrositing

Prior to construction the locations of the proposed wind turbines would be subject to micrositing, which allows for a small degree of flexibility in the exact locations of turbines and routes of tracks and associated infrastructure (50 m deviation in plan from the indicative design). Any repositioning would not encroach into environmentally constrained areas. Therefore, 50 m flexibility in turbine positioning would help mitigate any potential environmental effects: e.g. avoidance of unfavourable ground conditions or archaeological features not apparent from current records. The micrositing allowance has been taken into account in the EIA and is shown on **Figure 2: Infrastructure Layout**.

Wind Turbines

The wind turbine industry is evolving at a remarkable rate. Designs continue to improve technically and economically. The most suitable turbine model for a particular location can change with time and therefore a final choice of machine for the Proposed Development has not yet been made. The most suitable machine will be selected before construction, with a maximum tip height of up to 149.9 m.

Exact tower and blade dimensions vary marginally between manufacturers. Exact megawatt capacities also vary between manufacturers. For economic assessment purposes, a suitable candidate turbine currently available in the market place of 4.2 MW (with an overall tip height of 149.9 m) has been assumed.

Each turbine would have a transformer and switchgear. Depending on the turbine supplier, the transformer and switchgear may be located inside or outside each turbine.

The wind turbines would be erected on steel re-enforced concrete foundations. During the erection of the turbines, crane hardstanding areas would be required at each turbine base consisting of both permanent and temporary elements. After construction is complete, the temporary crane pad areas will be reinstated.

Site Tracks

The Proposed Development would result in the construction of approximately 2.2 km of new track under Option 1, of 2.6km under Option 2. The running width of the track would

be 4.5m on straight sections, with 0.25m wide shoulders on each side, totalling 5m. The permanent land take area for the new track would be approximately 14,308 m^2 under Option 1 or 19,192 m^2 under Option 2. However this upgrading entails maintenance, and no widening is proposed, therefore no additional land take will result. This sharing of infrastructure will help to minimise the impact of the Proposed Development.

The on-site access track layout has been designed to minimise environmental disturbance by avoiding sensitive habitats where possible; and keeping the length of track commensurate with the minimum required for operational safety. The track route also takes cognisance of the various identified environmental constraints.

6 new watercourse crossings will be required as part of the track layout (Under Option 1 – five crossings would be required, Under Option 2 – five would be required).

Electrical Connection, Control Building & Substation

Assuming the use of the currently available models, each wind turbine would generate electricity at low voltage and would have an ancillary transformer located either within or outside the base of the tower to step up the voltage to the required on-site distribution voltage. Each turbine would be connected to any adjacent turbines by underground cables.

The wind farm substation is proposed to be located on the central part of the site as shown in **Figure 2: Infrastructure Layout**. All power and control cabling on the wind farm will be buried underground in trenches located, where possible, along the route of site access tracks.

The wind farm control building will be designed and constructed to the standard required by NIE for the accommodation of NIE substation equipment and wind farm equipment. Where possible, local building materials and finishes will be used to ensure that the appearance is in keeping with other buildings in the area.

Construction Management

An Outline Construction Environmental Management Plan (OCEMP) is included within the Environmental Statement and a final CEMP will be prepared and agreed with the relevant statutory consultees prior to construction commencing. This will describe the detailed methods of construction and working practices, work to reinstate the site following completion of construction activities and methods to reinstate the site post operation. The CEMP will:

- Provide a mechanism for ensuring that measures to prevent, reduce and where possible offset potentially adverse environmental impacts identified in the ES are implemented;
- Ensure that good construction practices are adopted and maintained throughout the construction of the Proposed Development;
- Provide a framework for mitigating unexpected impacts during construction;
- Provide a mechanism for ensuring compliance with environmental legislation and statutory consents;

- Provide a framework against which to monitor and audit environmental performance.

The runoff drainage system will be designed to mimic natural conditions to mitigate against increased flashiness in water courses and reduced groundwater recharge. The SuDS will protect the status of water courses and ground waters.

Construction will be carried out according to Department of Agriculture, Environment & Rural Affairs (DAERA) and Construction Industry Research and Information Association (CIRIA) guidance for site works. Pollution control measures during the construction phase will be included in the Construction & Decommissioning Method Statement (CDMS), which will be agreed with the Planning Authority before starting construction work on site.

It is anticipated that the construction would take approximately 18 months. Construction work will take place between the hours of 0700-1900 Monday to Friday and 0700 – 1300 on Saturdays. Outside these hours, work at the site shall be limited to turbine erection, testing/commissioning works and emergency works. Deliveries may occur outside these times to minimise disruption to local residents.

A programme of reinstatement would be implemented upon completion of construction. This would relate to the construction compound, temporary areas of the crane hardstandings, cable trenches and track shoulders where appropriate. There remains a potential to use cranes during the operational phase of the Proposed Development, therefore the main crane hardstanding will remain uncovered.

Operation

The expected operational life of the wind farm is 35 years from the date of commissioning.

Each turbine at the Proposed Development would be fitted with an automatic system designed to supervise and control a number of parameters to ensure proper performance (e.g. start-up, shut-down, rotor direction, blade angles etc.) and to monitor condition (e.g. generator temperature). The control system would automatically shut the turbine down should the need arise. Sometimes the turbines would re-start automatically (if the shut-down had been for high winds, or if the grid voltage had fluctuated out of range), but other shut-downs (e.g. generator over temperature) would require investigation and manual restart.

The Proposed Development itself would have a sophisticated overall Supervisory Control and Data Acquisition system (SCADA) that would continually interrogate each of the turbines and the high voltage (HV) connection. If a fault were to develop which required an operator to intervene then the SCADA system would make contact with duty staff via a mobile messaging system. The supervisory control system can be interrogated remotely. The SCADA system would have a feature to allow a remote operator to shut down one or all of the wind turbines. This is monitored 24 hours a day, 7 days a week.

An operator would be employed to operate and maintain the turbines, largely through remote routine interrogation of the SCADA system. The operator would also look after the day-to-day logistical supervision of the Development and would be on-site intermittently.

Routine maintenance of the turbines would be undertaken approximately twice yearly to ensure the turbines are maintained to Industry Standard. This would not involve any large vehicles or machinery.

Decommissioning

One of the main advantages of wind power generation over other forms of energy production is the ease of decommissioning and the simple removal of components from the site. The residual impact on the site is limited to the continued presence of the foundations and access tracks. All above ground structures can be removed from the site.

If the Proposed Development obtains planning approval it is expected that a planning condition would be set to provide for the decommissioning and restoration of the site in accordance with a scheme agreed in writing with Department for Infrastructure (DfI), which would consider the long term restoration of the site at the end of the lifetime of the Proposed Development.

The Proposed Development will be decommissioned in accordance with best practice at that time and/or in compliance with any planning conditions. Current best practice includes the removal of all above ground structures (e.g. turbines, substation etc); the removal of certain underground structures where required (e.g. cables); and reinstatement of disturbed areas all of which will be subject to any necessary consents. Consideration will be given to the retention of wind farm access tracks if they utilise pre-existing farm infrastructure or are not located on sensitive habitats if such continued use could lead to the long term degradation of these habitats.

The EIA Process

The purpose of EIA is to provide adequate environmental information to enable stakeholders to understand the potential environmental effects of a project. The EIA identifies and assesses the potential environmental effects associated with the construction, operational and decommissioning of the Development. The assessment and potential effects are recorded in the ES.

Consultation

Public Consultation

RES is committed to finding effective and appropriate ways of consulting with all its stakeholders, including local residents and community organisations, and believes that the views of local people are an integral part of the development process. RES began the engagement process with the local community in March 2024 to facilitate a constructive consultation process which helped RES to understand and address any concerns as the project developed.

A Public exhibition was held in April 2024, whereby information was presented on exhibition boards including information which included detailed maps and information about the proposals, including: a map of the proposed layout; photomontages representing how the

proposed layout would appear from a range of viewpoints, and; Zone of Theoretical Visibility (ZTV) drawings. (A ZTV is a map-based diagram of where and how many wind turbines, or wind farms, would theoretically be visible from all parts of a given area.)

A Pre-Application Community Consultation (PACC) Report has been produced and is available for viewing at the locations listed in the Preface.

EIA Consultation

RES and the various chapter authors have undertaken pre-application consultation with relevant consultees, which has informed the EIA process and is detailed in each of the technical chapters within the Volume 2 (Main Report) of the ES.

Wind Farm Design Evolution & Alternatives

In accordance with EIA process and best practice the project team employed an iterative approach to the design of the Proposed Development. The design evolved throughout the EIA process as different constraints and adverse/ beneficial effects were identified and evaluated. This approach allowed mitigation measures to be integrated into the design in order to alleviate or remove significant effects of the Proposed Development. It also allowed measures to enhance beneficial effects of the Proposed Development to be incorporated into the design.

Following consultation and baseline characterisation of the Site, the following key topics were identified:

- Landscape and visual;
- Archaeology and cultural heritage;
- Vegetation and Peatland;
- Terrestrial Fauna;
- Ornithology;
- Fisheries;
- Geology and water environment;
- Noise;
- Traffic and Transport;
- Shadow flicker; and
- Socioeconomics.

The topics listed above were considered through the design with the aim of designing out significant effects. Where it was not possible to mitigate by design, the issues were considered further as part of the EIA.

A key tool in this process was the combined constraints drawing, which identifies constraints to development and sensitive features on the site. This drawing was iteratively updated as new information from surveys, site visits and consultation was received.

Initial Feasibility Stage

At the beginning of the development process an initial layout was produced to show the maximum potential extent of the development within the space available and in accordance with the design principles and preliminary environmental information, prior to baseline surveys being completed. The layouts were informed by the following constraints:

- Preliminary ecological constraints
- Preliminary watercourse buffers
- Slope
- Separation from housing
- Tip height + 10% to public roads, in accordance with the Best Practice Guidance to PPS 18[1].

This identified that the Site could potentially accommodate 5 turbines, to be further refined throughout the EIA process.

EIA Baseline Data Stage

Combined Constraints

Detailed environmental and technical surveys were completed to characterise the baseline environmental conditions on the Site and associated study areas, as described in more detail in chapters 4 to 12 of this ES. Any constraints to development, or avoidance areas, resulting from the baseline surveys were used to build up the combined constraints drawing.

Key constraints informing the layout are listed in the following sections. Further details on baseline surveys and mitigation by design are included in each technical chapter (Chapters 4 to 12).

The final Combined Constraints are shown in Figure 3 Combined Constraints.

Water Environment and Fisheries

Following the baseline survey the hydrology consultant recommended watercourse buffers of 50 m and 10 m depending on the sensitivity of the watercourse, which were agreed as appropriate by the fisheries consultant. Potential private water supplies in the area were also identified and buffer of 250m applied.

Terrestrial Fauna

A 25 m buffer was applied to a badger setts identified through the baseline surveys. Note that these are not marked on Figure 3 as their location is confidential.

All turbines have been positioned to maintain a minimum 50m buffer distance from the tip of the turbine blade to the top of the adjacent habitat feature. This is based on a (blade length of 58.5m, hub height of 91.4m and varying feature heights).

[1] Best Practice Guidance to Planning Policy Statement 18: Renewable Energy, DOE Planning & Environmental Policy Group, August 2009.

Public Roads and Overhead Electricity Lines

Buffers were applied to nearby public roads in line with the Best Practice Guidance to PPS18 which recommends a setback distance of at least tip height plus 10% between turbines and roads.

In keeping with the Energy Networks Association (ENA) L44 Issue 1 dated 2012 "Separation of Wind Turbines- Principles of Good Practice" a buffer of tip height plus %10 was applied to a 33kV overhead line crossing the Site.

Archaeology and Cultural Heritage

In consultation with the Archaeology and Cultural Heritage consultant the layout of Proposed Development has been designed to avoid significant effects on archaeological heritage assets in conjunction to appropriate mitigation.

Chapter 5: Archaeology & Cultural Heritage of the ES considers in detail the impact of the Proposed Development on the setting of a number of assets.

Mast in Southern Section of the Site

Following consultation the mast operators (located in the southern portion of the site) T1 was moved north west to allow sufficient fall-over distance buffer from the mast located in the southern portion of the site.

Peat Assessments

Following baseline peat probing and peat slide risk assessment, areas of deeper peat were avoided to limit excavation and spoil generation. It was agreed that further assessments were required before the layout could be finalised.

Landscape & Visual

Zone of Theoretical Visibility (ZTV) visualisations were prepared in order to indicate where all, or part of, the Proposed Wind Farm Development is likely to be visible from. The ZTV is first used to assist the identification of areas with theoretical visibility and the location of viewpoints as part of the baseline landscape and visual assessment. It is then used to aid the assessment of visual effects because the turbines would be the most visible element of the Proposed Wind Farm Development, particularly during the operational period. As described in earlier sections they are also useful in considering alternative turbine heights and geometries.

At an early stage of the EIA process a provisional list of viewpoints was created, from which provisional wirelines were generated, which were used to identify any potential landscape and visual issues with the turbine layout, as well as from the effects of the wind farm as a whole.

The presence of outlying turbines was addressed in the iterative design process and efforts were made to minimise instances where turbines were located at some distance or at noticeably different heights from the main grouping of turbines in order to create a compact layout that minimised the geographical extent and variable height within the Proposed Development whilst also maintaining an evenly spaced layout where turbine heights instances of stacking where also minimised.

The final turbine layout as shown in Figure 2 was assessed via a cumulative ZTV (as shown in Chapter 4 Figure 4.8, page 1 of 3) which indicated additional theoretical visibility across only 0.04% of the 30 km Study Area which would not already have theoretical visibility of other turbines in the Keady Cluster, all of which are either operational or consented.

Further assessment and refinement stage

The turbine layout was reviewed and refined in response to further assessment actions identified by consultant review and from the collaborative site visit, including the following:

- Noise assessment, based on the background noise survey
- Shadow flicker assessment
- Archaeological assessment
- Further ecological assessment
- Further peat stability assessment
- Engineering considerations

Noise and Shadow Flicker Assessments

Layout 1 was reviewed, it was recommended that T5 was moved south in order to increase the separation distance to houses, reduce noise and shadow flicker impacts. Full details of the noise and shadow flicker assessments are given in Chapters 10 and 12 respectively. Both chapters conclude that with appropriate mitigation there would be no significant effects on surrounding properties.

Water Environment

In addition to potential noise & shadow flicker constraints, it is noted that in in the first proposed layout that T4 is located within the watercourse buffer. Therefore it was agreed to move T4 out of the T4 out of the watercourse buffer.

Peatland

An area of deeper peat were encountered in the location in the north eastern portion of the site. This resulted in the northern portion of the site having a number of constraints which made it unfeasible to have 5 turbines across the site. It was advised to remove T5 from the layout and reposition T4 out of the areas in which deeper peat were encountered.

Ecology

In addition to the decision to remove T5 due to noise, shadow flicker and peat constraints, it was also evident that by removing T5 this enabled T1 (which had the highest levels of bat activity) being moved approximately 188m WNW of its original location. This open area away from former treelines and the old quarry is considered to be of much lower risk to bats.

Collaborative Site Walkover

A second multidisciplinary site walk-over was arranged by RES, involving engineering, ecology, peatland, geology and water environment specialists to collaboratively review and refine the layout, discuss interrelationships and mitigation, resolve potential conflicts and agree actions for further assessment. It was agreed to that by moving T4 west out of the area of deeper peat,

it would also result in T4 being located in a flatter area of land, thereby reducing the amount of earthworks necessary.

Final Turbine Layout

The final turbine layout is shown in Figure 2 and consists of 4 turbines of 149.9m tip height. The final layout, including turbines and infrastructure along with the combined constraints is shown in Figure 3. This demonstrates that every effort was taken to reduce impacts from the proposed development, as although the site could have accommodated 5 turbines, less impacts would be realised with 4 turbines.

A 50 m micrositing radius was applied to each of the turbines. The extent of this micrositing area was then reduced such that the micrositing avoids any of the combined constraints. The final micrositing areas are included in Figure 2: Infrastructure Layout.

Infrastructure Design Evolution

Engineering considerations

The following general principles were taken into consideration when designing the supporting infrastructure:

- Provision of two options for site entrances and associated tracks to enable southern section of proposed development to be accessed via consented Dunbeg South Wind Farm, or separately via a new entrance
- Avoidance of environmental and technical constraints (as shown in **Figure 3**)
- Design of the track layout to follow natural contours as far as possible, in order to avoid unnecessary amounts of excavation and reduce adverse hydrological impacts
- Minimisation of the overall length of access track
- Minimisation of the number of watercourse crossings, as far as possible
- Avoidance of steep slope areas to minimise earthworks
- Incorporation of measures to improve the visual appearance of the scheme, including reinstatement of some elements of temporary infrastructure following the construction period, reinstatement of road widening areas, and consultation with the landscape consultant on the position of the control room and substation building.

As well as the turbine positions, the layout of infrastructure was also a key consideration in the collaborative site walkovers described earlier in this chapter.

Key adjustments in response to constraints made through the design evolution are summarised in the following sections.

Vegetation and Peatland

Following the advice of the vegetation and peatland specialist a number of refinements were made to the track layout in order to minimise impacts to blanket bog habitats and deep peat including the following:

- Following the removal of T5 from the proposed development, T4 was moved west away from areas in which deeper peat (depths greater than 1.5m), the infrastructure track from the northern entrance to T4 was orientated in a way to avoid the areas of deep peat
- Design of site track (Option 2) to avoid wet modified bog in the southern portion of the site

Water Environment

The location and nature of watercourse crossings were reviewed with the hydrology and fisheries consultants. Following the mitigation detailed in Chapter 8: Fisheries and Chapter 9: Geology & Water Environment,

A number of refinements were made to avoid and reduce potential effects as far as possible, including the following:

- Reorientation of track from the northern entrance to T4 and movement of temporary construction compound to southern portion of the site to move the compound out of the watercourse buffer within the northern portion of the site.

Site Entrance Location

The entrance to the northern portion of the site was chosen given the presence of an existing entrance (to a vacant house) and the presence of suitable sightlines.

Initially, the site entrance to the southern portion of the site was located in the south eastern portion of the site, however it was noted on a site walkover that to achieve adequate sightlines at this location, significant levels of excavation would have been required to achieve this. Therefore the site entrance changed and subsequently the entrance to the southern portion of the site was located opposite the entrance to the northern portion of the site as demonstrated in the final site infrastructure drawing.

In order to minimise impacts the proposed development, the development has an option (Option 1) to use the existing infrastructure from Dunbeg South Wind Farm to enable an entrance to the southern portion of the proposed development. In the unlikely event that the Dunbeg South Wind Farm is not constructed a second entrance option (Option 2) opposite the entrance to the northern portion of the site is present.

Wind Farm tracks and Turbine Hardstandings

To enable potential access to the southern section of Dunbeg South Extension from the original consented Dunbeg South site, additional track was added to the southern portion of the site (Option 1 Tracks). The two additional tracks (Proposed Site Track Option 1) run from T2 to the south west and T1 to the south, heading into the consented track at the consented Dunbeg South Wind Farm. An additional site entrance option (Entrance to Southern Section Option 2) and internal track option (Proposed Site Track Option 2) was added to accommodate that the current proposed development can be accessed and all turbines can be accessed separately, in the unlikely event that Dunbeg South Wind Farm is not constructed and the current proposed

development will not be accessed via Dunbeg South. The Proposed Site Track Option 2 was located in a manner to avoid the habitat constraint identified by the ecologist, located in the southern portion of the site, shown in Figure 3.

Temporary Construction Compound and Control Building & Substation

The temporary construction and Control Building & Substation was initially located in the southern portion of the site, near the proposed entrance in the south eastern portion of the site. However, design evolution resulted in the entrance in south eastern portion of the site being removed, and therefore the temporary construction compound and Control Building & Substation was no longer suitable at this location, therefore the Control Building & Substation were relocated.

The temporary construction compound and control building & substation location in the northern portion of the site between T4 & T5 as it was determined that at this location the compounds and substation would be less visual. However, given the watercourse constraints identified, the temporary construction compound could not be located in this area. In addition, given that three of the four turbines were located in the southern portion of the site and therefore the majority of works would be completed in the southern section of the site.

The final location of the Temporary Construction Compound, Control Building and Substation are shown in Figure 2. This location was selected given the lack of constraints and relatively flat nature of this area of land, which would therefore limit the amount of earthworks required.

The buildings will be designed in a manner that is sensitive to the immediate landscape character with regards to location, scale, colour, and choice of materials.

Final Infrastructure Layout

The final infrastructure layout is shown in Figure 2. Once finalised, the Planning Application Boundary was drawn, ensuring sufficient space within the boundary for all features.

Other Design Considerations

TV interference

Wind turbines can potentially interfere with communication systems that use electromagnetic waves as the transmission medium (e.g. television, radio or microwave links). Wind turbines therefore may cause interference to television reception in the proximity of a wind farm, primarily for receptors in the 'shadow' of the turbines with aerials pointing through the wind farm, causing loss of picture detail, loss of colour or loss of audio. Microwave links can also be affected by the reflection, scattering, diffracting and blocking of the electromagnetic signal caused by wind turbines.

If the Proposed Wind Farm Development is consented, RES would agree a scheme of assessment and mitigation with the planning authority to be implemented in the case of complaints associated with television reception. Should interference to reception occur as a result of the Proposed Wind Farm Development, a range of viable mitigation measures can be considered, with the most suitable method chosen on a case by case basis. Any necessary work would be

undertaken in a timely manner following receipt of a valid complaint, and would be funded by the wind farm operator.

Electromagnetic Interference

RES has consulted with all organisations operating microwave links which could be affected by the Proposed Development.

The proposed Dunbeg South Extension turbines are clear of any microwave links and no objections were raised.

A telecommunications mast situated within the site boundary is operated by Telefonica / Virgin Media O2. There are no concerns regarding electromagnetic interference and only topple distance (110% of tip height) is to be observed, which was incorporated in the layout design accordingly.

Aviation

Wind turbines can potentially interfere with aviation operators by either physically affecting the safeguarding of an aerodrome by the close proximity of the turbines or through interference with the Air Traffic Control (ATC) radars that direct aircraft in flight. RES has consulted with all relevant organisations which could be affected by the Proposed Wind Farm Development.

NATS En Route (NERL) supplies air traffic service to all En Route aircraft navigating UK airspace. RES has consulted the published NATS safe-assessment maps which have been produced to indicate if a wind farm development will impact NERL infrastructure. The Proposed Wind Farm Development lies outside the safeguarding areas which identify need for further consultation with NERL and therefore the Proposed Wind Farm Development will have no impact on NERL infrastructure.

The Defence Infrastructure Organisation (DIO) consultation response stated that the Ministry of Defence (MOD) had concerns with regards to the Proposed Development given the potential to create a physical obstruction to air traffic movements. To address impact up on low flying given the location and scale of development, the MOD would require that conditions are added to any consent issued requiring that the development is fitted with aviation safety lightning and that sufficient data is submitted to ensure that structures can be accurately charted to allow deconfliction. As a minimum the MOD would require that the individual turbines are fitted with 25cd infra-red (IR) lighting.

Pre-submission consultation that was undertaken with airport located in close proximity to the Proposed Wind Farm Development; Derry City Airport. Derry City Airport indicated that a full Instrument Flight Procedure (IFP) Safeguarding assessment will be required to establish the exact infringement, its magnitude and any possible actions that could be used to mitigate this infringement, reducing that safety impact.

As no anticipated detrimental impact upon any aviation stakeholder has been identified it is considered that there will be no additional impact created when considered cumulatively with other existing, consented or proposed wind farms.

Environmental Effects

The following sections summarise the technical chapters of the ES.

Planning Policy

Landscape and Visual

The purpose of the Landscape and Visual Impact Assessment (LVIA) is to present a thorough and objective analysis of the landscape and visual character within a Study Area extending in a 30 km radius from the Proposed Development. This includes an analysis of landscape and visual receptors present within the Study Area including those occurring at close, medium and long range in accordance with best practice guidance on LVIA, wind energy development in Northern Ireland, and emerging Council policies and objectives in relation to the Study Area. The Baseline Assessment also considered non-statutory landscape classifications, and the information gleaned through driving and walking surveys of the Study Area to amplify and enhance the understanding of its landscape and visual character. The potential effects of the Proposed Development on these baseline conditions including direct, indirect, permanent, temporary and cumulative effects are then identified and analysed. All information is presented clearly and objectively in a manner that will inform the decision-making process with a well-reasoned methodology that is in accordance with best practice guidance. Landscape and visual effects are distinct although closely related to each other and addressed as such. The former relates to the effects on the physical landscape as a resource in its own right. The latter relates to the effects on specific views and general visual amenity as experienced by people (hereinafter referred to as visual receptors). Appropriate mitigation measures are proposed to address likely significant effects, where possible, and to assess any residual effects that would remain following the implementation of these measures.

The Binevenagh AONB designation was considered to be the key designation within the Study Area and the Proposed Development is located within the AONB. Landscape and visual receptors within the AONB were also regarded as being of greater sensitivity by virtue of their location in addition to any other characteristics that might otherwise make them sensitive to changes in their views (for example, statically located views from residential properties or scenic attractions). The site has visual appeal but occupies a small part of the overall AONB and would not be intervisible with many other parts of the AONB.

The Proposed Development is also located in accordance with the main stipulations of relevant planning policies and guidance including: the SPPS, which is the overarching policy document; PPS2 Policy NH6 in relation to the special qualities of AONB's; PPS 18 and its Best Practice Guidance which are generally promotive of wind energy development; and the Borough Council's defined approach to landscape planning as being forward-looking and reflective of the SPPS principle of clustering and consolidating existing developments in order to realise the benefits of renewable energy projects whilst also minimising the extent of cumulative effects on sensitive features within the Study Area, such as the Binevenagh AONB's key characteristics.

All policy documents (the SPPS, PPS 18 and its best practice and supplementary guidance) recognise that wind farms may be prominent elements in close range views but that this does not necessarily equate to unacceptable development.

The presence of the Keady cluster of existing and consented wind farms which surround the Proposed Development was also a key consideration in the assessment of landscape and visual effects, including cumulative effects. It is noted that there is also a repeated pattern of wind farm clusters throughout upland parts of the 30 km Study Area, including other parts of the Binevenagh range of hills. The Proposed Development's location within the same part of the landscape as the Keady cluster, and the other strong human factors that currently influence this landscape mean that there would be No Significant landscape effects resulting from the Proposed Development.

The Proposed Development is deemed to have No Significant effects on visual character for the same reasons. Wind energy development is a prominent visual element in all parts of the Study Area and the Proposed Development would have a negligible incremental effect on the manner in which wind energy development is perceived generally across the Study Area. Twenty viewpoints were shortlisted for detailed analysis in the LVIA as a result of the viewpoint selection process which identified parts of the Study Area and key groups of visual receptors that may be potentially affected by the Development. A detailed description of this selection process and a full list of Provisional Viewpoint Locations (PVPs) are provided in Technical Appendix 4.4. Detailed descriptions of the final Viewpoints are an integral part of the Visual Impact Assessment section of the LVIA chapter (starting at paragraph 4.115). The locations of final Viewpoints are indicated on all map-based Figures (Figures 4.1 – 4.8) and visualisations to accompany the detailed written analysis of these Viewpoints are provided in Figures 4.9 – 4.28.

Of these 20 viewpoints, none were deemed to experience a significant visual effect resulting from the Proposed Development. The Proposed Development would be visible on the side slope of Keady Mountain, often against a rising backdrop of rough grazing land and in conjunction with the busy A37 road corridor in close range views. It would also always be seen in conjunction with other wind farms in the Keady cluster which are either existing or consented. The proposed turbines would be positioned relatively equidistant between Dunbeg Extension and Dunbeg South and would thus have the effect of linking the two consented developments and creating a more coherent layout to the Keady cluster overall. However, its location within the cluster, rather than on an outer edge means the Proposed Development would not alter the overall composition or character of either the physical landscape or views.

Considering that none of the 20 viewpoints assessed as part of the LVIA are deemed to experience significant effects, and that no significant landscape effects have been identified, the LVIA concludes that the Proposed Development is acceptable in landscape and visual terms.

Archaeology and Cultural Heritage

It is proposed to construct an extension to the consented Dunbeg South Wind Farm, Limavady. The Development will involve construction of 4 wind turbines (maximum tip height 149.9m) and associated ancillary works.

An archaeological impact assessment has been conducted for the proposed development. This has assessed the potential impact of the Development on the known and potential archaeological and cultural sites within the site itself and its wider landscape. To facilitate the assessment of the wider landscape a 5 km search radius has been utilised. The assessment of the Development will look at both the potential physical impact upon any known or potential sub-surface archaeological features within the Site Boundary, and will further assess the impact upon the setting of those monuments of regional importance within the wider search area.

The baseline information was attained through a desk top survey and a site inspection. The desk top survey entailed a review of the Sites and Monuments Records, the Industrial Archaeological Records, the Historic Buildings Archive, Historic Gardens Records and the Defence Heritage Records, which are maintained by DFC:HED.

The desk top survey identified one archaeological monument within the red line boundary for the development. This monument LDY 02:17 is incorrectly located in NISMR map viewer and is not actually located within the site. Looking beyond the site, the survey identified a further the following:

- 73 locally important monuments
- 8 regionally important monuments
- 13 Industrial Heritage sites
- 17 Historic Buildings Records sites, of which 3 are listed buildings
- 1 Historic Garden
- 33 Defence Heritage sites

None of the identified sites will be physically impacted upon by the development. The concentration of known archaeological sites in the wider search area would suggest that there is the potential for previously unknown, sub-surface archaeological deposits to be located within the development area. Such remains may be identified during the construction phase of the development. Should this occur, any such remains may be adversely impacted upon. This impact can be significantly reduced through the implementation of an appropriate mitigation strategy. This can be achieved through the implementation of an archaeological condition on any future planning permission for the site.

Further assessment of the impact of the development on the setting of four of the regionally important monuments was conducted. This established that the proposed development will not impact upon the setting of these monuments.

Ecology

The study methodology for the Ecological Impact Assessment included both desktop and field survey methods in order to assess the potential impact on local ecological and nature conservation interest. The purpose of an ecological survey is to identify 'valued ecological receptors', those species and habitats that are valued in some way for their ecological function, their contribution to biodiversity or are protected by specific legislation. The following specialist surveys were undertaken during both the 2023 and 2024 field seasons; both on the site within the appropriate buffer zones:

- Habitats (Phase 1 & Phase 2)
- Bat survey (Static monitoring and GLTA (Ground Level Tree Assessment))
- Badger (& otter) survey
- Common lizard survey
- Smooth newt habitat survey

Features of conservation interest and importance were recorded and their locations were one of the key criteria that affected the wind farm layout. The location of the wind farm infrastructure avoids habitats and species of conservation interest where possible, and where this was not possible, mitigation and/or enhancement measures have been incorporated into the design to balance any detrimental impact.

The principal habitats on the site are areas of improved & semi-improved grassland, acid grassland, marshy grassland, scrub, coniferous woodland, dry modified bog and wet modified bog. Overall, the habitats on site are of lower conservation value, while the dry modified/wet bog are of moderate/high value, which have been avoided via the infrastructure design.

Ecological constraints determined from extensive site surveys have been used to evolve the layout and design of the Development. The impact assessment is therefore based on a wind farm design that already includes a number of important mitigation measures.

There will be no effects on designated conservation sites and there will be limited impacts on Northern Ireland priority habitats. These will be restricted to removal of a short length of hedgerow, to be replaced following construction, and culverting of short lengths of minor streams. Therefore, a habitat management plan has not been proposed.

Evidence of badger activity and possible evidence of lizard presence are both sufficiently remote from the proposed works that there are unlikely to be any significant impacts on these species arising from the works.

Several potential overwintering smooth newt habitats were identified onsite. Should any smooth newts be found during construction, they will be translocated to a minimum distance of 30m from construction activities by a suitably qualified ecologist, under NIEA licence. The receptor area will be habitat considered suitable for smooth newt by the appointed ecologist.

30-nights of static monitoring for bats was completed at each of the 4 turbines on the site (in parallel with a number of adjacent ‘paired’ habitat features). Moderate numbers of bats were

recorded foraging over he proposed turbine locations, the likely foraging and commuting routes along hedgerows and plantation edges have all been avoided during the emplacement of infrastructure; all turbines have been positioned to maintain a minimum 50m buffer distance from the tip of the turbine blade to the top of the adjacent habitat feature; therefore the site poses little risk to bats ofFollowing the precautionary principle, and due to the presence of several species of bat know for open-air foraging (i.e. considered at risk from turbine associated mortality; Leisler's bat (*N. leisleri*) high risk; and Common pipistrelle (*P. pipistrellus*); Soprano pipistrelle (*P. pygmaeus*) medium risk) a Bat Monitoring & Mitigation Plan (BMMP) has been recommended, this should ensure that the proposed Development will not have a significant impact on the local bat population.

Therefore, the potential effects of the Development on ecological receptors have been assessed and it is concluded that with the implementation of appropriate mitigation measures the effects would be reduced to a minor adverse or neutral effect that would not adversely affect the ecological integrity of the site and the wider area.

An assessment of cumulative impacts on the habitats and fauna of the area was also undertaken, and it was concluded that there will be no significant effects.

Ornithology

The ornithology assessment has been informed by a programme of baseline surveys commissioned by the Applicant and completed during a fifteen month period from April 2023 to June 2024 inclusive. The surveys have included breeding bird surveys, winter surveys, vantage point surveys, winter roost surveys and wider area surveys. All surveys have been completed in line with the relevant current guidance for bird surveys at onshore wind farms.

Snipe

During the baseline period there were three observations of territorial snipe within the survey area: these were in a small cluster within the southern part of the buffer area and are likely to represent a single breeding pair. Snipe were not found breeding within the Site boundary: the northern part of the Site is superficially suitable in places however closer investigation reveals that much or all of the marshy grassland vegetation in this area is secondary in nature and significant disturbance and drainage features are present.

The assessment of effects indicates the potential displacement of one pair of snipe due to disturbance by the construction works and appropriate mitigation measures are proposed.

Moorland Passerines

The baseline surveys found 27 passerine species breeding within the survey area. Almost half of the breeding passerines were exclusively or predominantly associated with the wooded areas and commercial forestry habitats, small wetland features and anthropomorphic habitat features. All the passerine species were also found in the wider surrounding area and are also widely distributed locally and at a regional level and the assessment of effects indicates there are unlikely to be any significant adverse effect on the local populations of breeding moorland passerines.

Winter Birds

The baseline surveys found a total of 35 bird species during the winter and migration seasons, about a third of which were associated predominantly with the woodland and commercial forestry habitats. None of the winter species were found in what could in any way be regarded as significant numbers and the assessment of effects indicates there are unlikely to be any significant adverse effects on the local populations of wintering birds.

Hen harrier

During the baseline period hen harriers were confirmed breeding in the wider surrounding area however they were not located particularly close to the Proposed Development. Furthermore, foraging activity by harriers in the immediate vicinity of the Proposed Development has been negligible and significant adverse effects on this species are considered highly unlikely.

Other Raptor Species

Other raptor species found to be regularly occurring in the vicinity of the Proposed Development are peregrine, buzzard and kestrel however no significant displacement or collision mortality effects have been identified for any of these species. There were single observations of two additional raptor species (merlin and white-tailed eagle) however these species are not regularly occurring within the vicinity of the Proposed Development.

Protected Areas

Three ASSIs are located within relatively close proximity of the Proposed Development. All three sites are designated for their natural habitat features and they can therefore be expected to support a significant number of bird species however none are designated specifically for ornithology features. The assessment of effects indicates there are highly unlikely to be any significant adverse effects on the bird communities occurring within these ASSIs.

Mitigation

There is to be an Ornithology Mitigation Strategy to protect breeding birds during the construction phase and an Ornithology Management and Monitoring Plan to monitor the effects of the Proposed Development on local bird communities. Assuming implementation of the proposed mitigation measures as described then there are no remaining residual effects and no likely cumulative effects have been identified.

Conclusions

The Site of the Proposed Development is relatively small in extent, is of relatively low sensitivity for ornithology and there are no protected areas in the vicinity that are designated specifically for ornithological features or that are otherwise likely to be affected by the Proposed Development in terms of their bird communities. Any adverse effects on local bird communities (which are expected to be limited) are likely to be due to disturbance during wind farm construction and any subsequent effects during the operational phase are unlikely to be significant for local bird communities.

Assuming full implementation of the mitigation measures then it is concluded that the Proposed Development is unlikely to have any significant adverse effects on bird populations at the local, regional or national scale.

Fisheries

This chapter outlines the potential effects of the Proposed Development on the fish stocks and fish habitats of key receptors; the River Roe, the Curly River, together with a series of small tributary streams which drain the area within the Site Boundary. The development is in the Curly River sub-catchment of the River Roe, the Curly River flows in a south-westerly direction to join with the River Roe at Limavady. The River Roe forms one of the major sub-catchments of the Foyle system.

The study focussed on the streams draining the area within the Site, all of which are small headwaters of the Curley River. Field surveys were carried out to assess stream quality, fish habitats and fish stocks within the site boundary and downstream to the confluence with the Curly River. The approach was based on the selection of six principal survey sites to establish a baseline for any future monitoring required during construction or operational phases, with additional surveys of connected river sections to record fish habitat quality.

The proposed site lies principally within the Curley River catchment which forms part of the River Roe and Tributaries Area of Special Scientific Interest (ASSI) and Special Area of Consveration (SAC). The River Roe and its Tributaries was declared an ASSI due to the physical features of the river and its associated riverine flora and fauna. The River Roe and its Tributaries was designated as a SAC due to the presence of Atlantic salmon (noted as an Annex II Species), and due to the presence of watercourses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation (Annex I Habitat).

The potential effects on fisheries and aquatic ecology were assessed for the construction, operational and decommissioning phases of the Development, and a series of mitigation measures are proposed to address significant effects.

Potential effects are mainly associated with ground disturbance during the construction phase and the entrainment of sediments in surface water drainage. Mitigation measures to address these impacts are recommended and focus on a bespoke surface water management plan and site drainage design using the principles of Sustainable Drainage, which promote the principles of on-site retention of flows and use of buffers and other silt removal techniques.

It is concluded that, provided the mitigation measures are implemented as specified, construction and operation of the proposed Development will have a Neutral effect on the fish stocks and aquatic biology of the Curly River and the wider River Roe Catchment. It follows that the development will have no effect on the Atlantic Salmon as the primary feature of the River Roe and Tributaries ASSI/SAC.

Geology and Water Environment

An assessment of the likely effects of the Proposed Development on geology and the water environment has been undertaken. The impact assessment involved a combination of desk study, site visits and consultation with various stakeholders including; Department of Agriculture, Environment & Rural Affairs; Causeway Coast and Glens Borough Council; Department for Infrastructure; and Department for Economy.

The assessment identifies the potential impacts on geology, hydrology and hydrogeology, including surface water, groundwater, abstractions, the potential for pollution of watercourses and flooding. It summarises the relevant legislation and guidance and provides appropriate baseline information enabling potential effects to be identified.

The assessment determined that the site is located on 'moderate quality agricultural land' and 'poor quality agricultural land', and the loss (or partial loss), of agricultural function is not significant and does not constrain the Proposed Development. The underlying geology is predominantly a mixture of clay, sand, gravel, and boulders varying widely in size and shape, with peat cover within discrete sections of the site. Bedrock underlying the site is composed of basalt. Groundwater flow paths within the bedrock are generally considered to be short (tens to hundreds of metres) with flow mainly following topography.

The current hydrology of the site consists of a number of natural source watercourses and streams and artificially modified agricultural drainage ditches and peat drains. All of the on-site surface water features drain in a northerly direction towards the Curly River. The Curly River is environmentally designated as part of the River Roe and Tributaries Special Area of Conservation (SAC) and Area of Special Scientific Interest (ASSI). The River Curly discharges to the main River Roe c. 7 km west from the Site.

Aspects of the design, construction, operation, and decommissioning of the Proposed Development that may impact on the receiving geological and water environment have been identified and the pathways of potential effects assessed. It has been determined that without mitigation, the Proposed Development would likely cause adverse effects on the water environment due to its hydrological link to environmentally designated and protected watercourses with significant fisheries interests downstream of the Site. Mitigation measures integrated as part of outline design, and others to be implemented throughout the lifetime of the Proposed Development to minimise potential adverse effects include:

- Design of site elements to minimise impact on the geological and water environment (e.g., careful consideration of the positioning of wind turbines, foundations, and areas of hard standing);
- Avoidance of significant water features based on baseline constraints mapping (i.e., establishing zones around watercourses where construction works are to be avoided);
- Careful management of water features where they come into contact with new infrastructure or upgraded access tracks;

- Implementation of a comprehensive surface water management plan comprising the use of SuDS (drainage) and silt management to prevent pathways for pollution reaching the wider environment as well as reducing any increased risk of flash flooding downstream; and
- Establishing pollution prevention procedures in accordance with NIEA requirements and guidance to minimise the risk to the wider environment posed by construction, operation and decommissioning-phase activities (e.g., spillage of oils or chemicals).

Implementation of the mitigation proposed would result in no significant residual effects to the receiving geology and water environment as a result of the Proposed Development. Monitoring the effect of the Proposed Development on the water environment and fisheries habitat will be provided through water quality monitoring.

An assessment of cumulative impacts was also undertaken, and it was concluded that there are no predicted significant water environment or geological effects arising from the Proposed Development in conjunction with any other pre-existing or consented development.

Peat

A Peat Slide Risk Assessment which comprised of two stages of peat probing was undertaken and concluded that the peat depths across the site are variable, with areas of the site exhibiting very shallow peat topsoil soil deposits, with the deepest pockets of peat in excess of 1m being avoid in the scheme layout. It is noted that none of the turbines are within significant peat deposits that have the potential for peat sliding. It is noted that where peat probes indicate shallow depths of 0.1m to 0.8m, the deposits are likely to be composed of a topsoil and mineral subsoil, thus the risk of peat sliding is none in these areas.

Noise

An assessment of the acoustic impact from operation of the proposed Dunbeg South Extension Wind Farm was undertaken and a discussion of the potential noise and vibration impacts associated with the construction and decommissioning of the site was provided.

The operational assessment was undertaken according to the guidance described in the 'The Assessment and Rating of Noise from Wind Farms', referred to as 'ETSU-R-97', as recommended for use in relevant planning policy. The assessment also adopts the latest recommendations of the Institute of Acoustics 'Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise'.

Representative baseline conditions (the "background noise levels"), at nearby residential properties, were taken from information supporting the planning application for the neighbouring consented Dunbeg South Wind Farm (Planning Reference LA01/2018/0200/F) which was supplemented by survey information supporting the planning application for the operational Dunbeg Wind Farm (Appeal Reference 2009/A0363). The various levels have been accepted by representatives of Causeway Coast & Glens Borough Council in their consideration

of two or more neighbouring consented and operational developments and are also considered appropriate for use for the purposes of assessing the Dunbeg South Extension.

The relevant ETSU-R-97 noise limits were determined using the information discussed above. The general principle regarding the setting of noise criteria is that limits should be based relative to existing background noise levels, except for relatively low background noise levels, in which case a fixed limit may be applied. The daytime limits are intended to preserve outdoor amenity, whilst the night-time limits are intended to prevent sleep disturbance.

A sound propagation model was used to predict the levels due to the operation of the proposed and neighbouring wind farms at nearby residential properties, over a range of wind speeds, taking into account the position of the turbines, the nearest residential properties, and the various installed and assumed turbine models.

A cumulative/combined operational noise assessment was completed to determine the potential impact of the Proposed Development at the same time as two existing schemes (Dunbeg & Dunmore Wind Farm) and one consented development located nearby (Dunbeg South Wind Farm). The cumulative predicted operational sound levels are marginally above the overall ETSU-R-97 noise limits when assuming that all the considered turbines are operating unrestricted. However, with appropriate precautionary mitigation measures, in the form of a noise management strategy and suggested planning controls applied to the Proposed Development and neighbouring Dunbeg South Wind Farm, for which a planning variation will be sought, predicted operational noise levels are below the limits at all properties for all considered wind speeds and directions. The Proposed Development therefore complies with the relevant guidance on wind farm noise and the impact on the amenity of all nearby properties would be regarded as acceptable.

Noise and vibration associated with the construction and decommissioning of the Proposed Development has been discussed with reference to BS 5228 and it has been determined that onsite construction noise levels are highly unlikely to exceed typical limiting noise criteria at nearby properties. However, appropriate mitigation measures will be adopted as a matter of due course.

Traffic & Transport

An assessment of the potential impact of the Proposed Development on traffic and transport was undertaken, involving consultation with Department of Infrastructure (DfI) Roads.

The proposed access route for abnormal indivisible loads (AILs) from Belfast Port has been used previously for the construction of various wind farms and is shown on **Figure 5: Turbine Delivery Route**. Lisahally Port has been used previously for the construction of Dunbeg Wind Farm which also utilises access directly onto the Broad Road (A37). From Lisahally, the route will travel onto Maydown Road and turn east onto the Clooney Road and travel east for approximately 28km via both Greysteel and Ballykelly before bypassing Limavady town on the Ballykelly Road and travelling southeast onto Broad Road. The site entrance is located on the Broad Road.

The proposed return route for the delivery vehicles is similar to the proposed delivery route noted above. Once the turbine components have been delivered, the vehicles will be shortened so they are no longer than a typical articulated HGV.

Widening works, either temporary road widening or vegetation removal, to facilitate oversail of the components will be required at locations along the AIL delivery route. The widening works, where required, will include the installation of hardstand areas and vegetation trimming to facilitate the passage of AILs, which then will be reinstated once turbine delivery has been undertaken. If road widenings require the removal of boundary features such as fences, trees or hedgerows, these will be reinstated at suitable locations. Reinstatement will also be applied to any street furniture which may be removed on a temporary basis. In the unlikely event that a replacement blade is required during the operational phase of the wind farm, the widenings will need to be reopened temporarily, after which they will be reinstated. Any works will be undertaken following consultation with DfI Roads.

Normal HGV deliveries of concrete and stone respectively will also utilise the A37 but could do so from either direction dependant on the source of material and subject to confirmation with DfI Roads. No passing bays will be required as the roads are two-way with adequate passing provided. The HGV Route is presented in Figure 4.

Where agreed by Dfl Roads, circular HGV haul routes may be implemented for the construction phase of the project.

The main traffic impacts are associated with the increase in HGV vehicle movements along the A44 and surrounding tertiary road network during the construction stage of the project. These roads have low levels of existing traffic and a small number of receptors will be affected. At worst, the frequency of vehicle movements is expected to be one vehicle every five minutes during the six days when the construction of each wind turbine foundation would occur.

Consideration has been given to the effect of increased HGV traffic flow on Severance, Driver Delay, Pedestrian Delay, Pedestrian Amenity, Fear and Intimidation, Accidents and Safety and Cumulative Impacts. Furthermore, consideration has been given to the environmental effects of any road improvement/widening works.

A Traffic Management Plan (TMP) will be developed and agreed with the local community and other relevant stakeholders, pre-construction, in order to control and mitigate impacts associated with increased vehicles movements.

Taking into account the existing vehicle movements on the affected roads, and the proposed type and frequency of vehicle numbers, it is considered that with the appropriate mitigation measures as set out above, there will be no significant impacts.

Shadow Flicker

A shadow flicker analysis of the Proposed Development was performed. Under certain combinations of geographical position, time of day, time of year and meteorological conditions, the sun may pass behind the turbine rotor and cast a shadow over neighbouring buildings' openings (i.e. windows and doors) where the contrast between light and shade is

most noticeable. To a person within that room the shadow, depending on its intensity, may appear to flick on and off, giving rise to an effect referred to as shadow flicker.

The Best Practice Guidance to Planning Policy Statement 18 (PPS18) states that at distances greater than 10 rotor diameters from a turbine, the potential for shadow flicker is very low.

An analysis of shadow flicker throughout the year from Dunbeg South Extension Wind Farm was carried out, taking into account the behaviour of the sun, the local topography and the turbine layout and dimensions. The analysis was performed using a turbine layout consisting of 4 turbines, each with maximum tip heights of 149.9m and maximum rotor diameter of 117m.

The Best Practice Guidance to PPS18 recommends that, "shadow flicker at neighbouring offices and residential properties within 500 m should not exceed 30 hours per year or 30 minutes per day". There are no offices or residential properties within 500 m of the Proposed Development turbines, so the Proposed Development is in compliance with this recommendation.

The results shows that no properties experienced exceedances in 30 hours of flicker per year within a radius of 10 rotor diameters from any turbine location.

In addition, it should be emphasised that the analysis provide an extremely conservative estimate of the extent that houses will be affected by shadow flicker, because:

- The analysis assumes that there is always sufficient lack of cloud cover, for there to be sufficient sunlight for shadows to be cast by the turbine;
- The analysis assumes that there is always enough wind for the turbine blades to be turning;
- The analysis assumes that the wind is always coming from the right direction for the turbine rotor to be facing towards the house, to thus cast a shadow;
- The analysis assumes that the property has windows and/or glazed doors facing towards the turbine;
- The analysis assumes there is no shielding, e.g. in the form of trees or outbuildings, between the turbine and the property.

Therefore, the actual amount of shadow flicker seen in these areas is likely to be much less.

In the event of shadow flicker causing a nuisance a range of mitigation measures can be incorporated into the operation of the wind farm to reduce the instance of shadow flicker. Mitigation measures include planting tree belts between the affected dwelling and the responsible turbine(s) or installing blinds at the effected property. In the unlikely event that there is extreme nuisance mitigation could include shutting down individual turbines during periods when shadow flicker could theoretically occur.

Mitigation has not been accounted for within the predictions presented in this chapter and, if required, should further significantly reduce the impact of potential shadow flicker predicted. Taking all this into account the effects of shadow flicker are not considered to be significant.

Socioeconomics

This chapter presents estimates relating to the direct, indirect and induced benefits that could be generated by the construction and operation of the Proposed Development. It also provides a brief discussion on the unquantifiable benefits associated with a development of this type and scale, and the current macroeconomic and socioeconomic environments.

The chapter concludes that the Proposed Development will provide a much-needed boost of activity to both Causeway Coast and Glens Borough Council area, and the regional economy. Job creation and economic activity will result throughout its construction, with a strong likelihood of local labour involvement. Both the construction and operational phase will generate increased tax and business rates revenue payable to central, regional and local Government.

Indeed, the Borough Council areas of Causeway Coast & Glens and Mid & East Antrim have both faced a challenging backdrop in recent years; with muted or declining employment opportunities between 2010 and 2019.

Growth within the Northern Irish labor market has shown moderate growth over the last decade between 2014 and 2024 at a rate of 1.2% per year. However, growth within Causeway Coast and Glens has under performed relative to regional growth, growing by 0.5% per year on average.

Within the construction sector, Causeway Coast and Glens recorded a marginal decrease in employment over the same time period with an average decrease 0.03% per annum, whereas across Northern Ireland, the sector noted an average rate of 1.2% per annum.

The current economic climate suggests that the labor market may struggle to maintain similar rates of growth. The muted forecast for labour market performance is in part a reflection of a weak demographic outlook, as total and working age populations are forecast to fall in Northern Ireland —a trend reflected across the majority of Northern Irish local authorities across the next decade but felt most strongly in Causeway Coast & Glens where the decrease in the working age population is forecast to be 8.2%, the largest of any local authority in Northern Ireland and over five times that of the regional average (1.6%).

As such, investment of this type and scale can provide positive (direct, indirect and induced) benefits across Northern Ireland; helping to provide and support economywide employment opportunities that would not otherwise have existed. It can also bring about catalytic benefits which can in turn attract further investment into Northern Ireland. For example, the knowledge, expertise and skills accumulated can act as a contributing factor to future investments in the area. Other local areas within Northern Ireland may also benefit as a result, helping to reduce the inequality across the region. Funding for such developments is usually project specific and involve a considerable amount of sunk cost. Therefore, if the Proposed Development does not take place the benefits, including the catalytic impact, are unlikely to be realised elsewhere in the Northern Ireland economy.

The Proposed Development is estimated to involve a capital spend of £30.6 million. Of this total, £11.8 million (nominal prices) will be realised within the Northern Ireland economy. The projected 18-month construction phase is estimated to create or sustain 115 total (direct, indirect and induced) job years of employment, £3.3 million (2019 prices) of wages and £7.4million (2019 prices) of gross value added (GVA) to the Northern Ireland economy.

The estimated total (direct, indirect and induced) benefits realised in Northern Ireland by the operational phase of the Proposed Development includes wages of £210,000 (2019 prices) and £560,000 (2019 prices) in GVA over the 35-year operating period.

We also expect a fiscal injection from the Proposed Development. During the construction, the UK Exchequer is estimated to benefit from increased tax revenue of £2.1 million, with an additional £60,000 expected in labour taxes each year of operation. Additionally, annual business rates for the proposed wind farm are estimated at almost £188,000.

The amount of electricity that could be produced by the Proposed Development is estimated at 56 GWh per year, which is enough electricity to meet the needs of 16,000 homes each year.

The Proposed Development is also estimated to reduce CO_2 emissions by 23,800 tonnes each year.

Conclusion

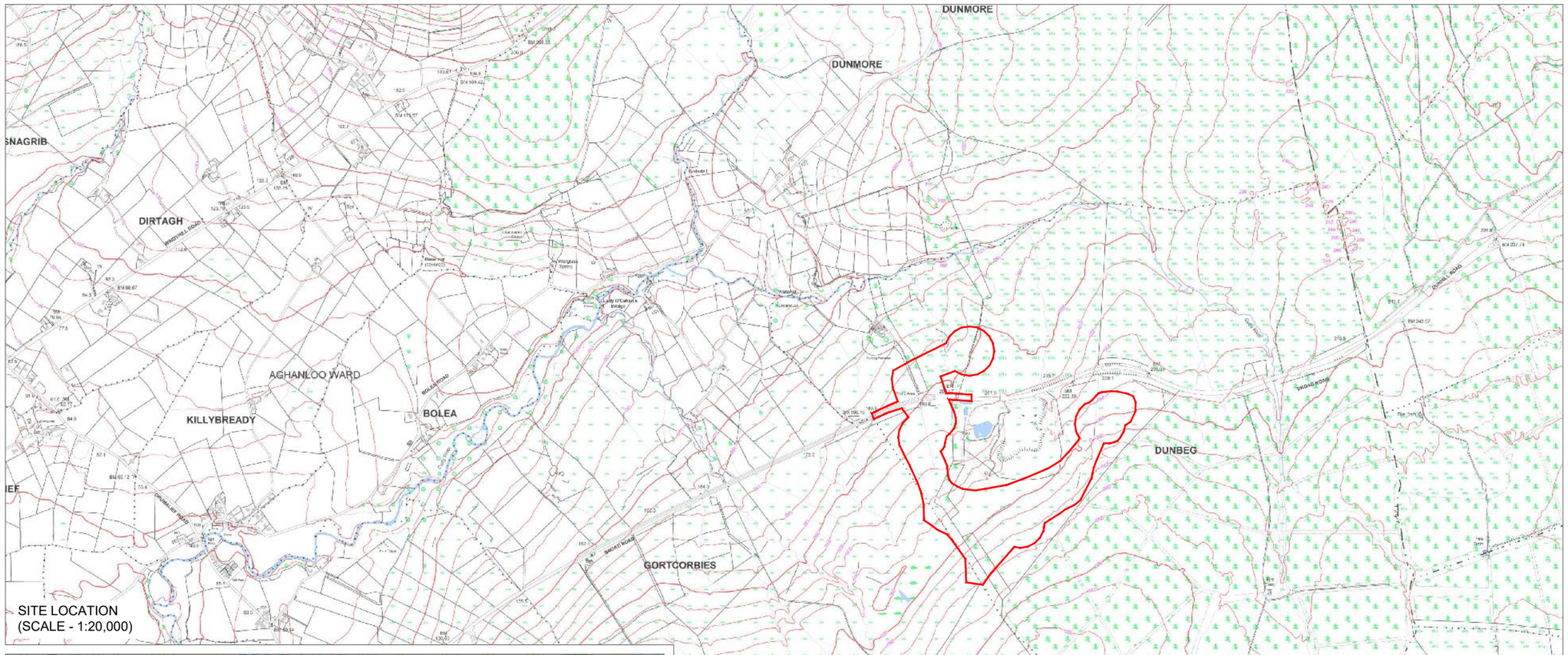
The potential effects of the Proposed Development have been assessed in accordance with regulatory requirements and good practice. The ES incorporates technical assessments of the Proposed Development based on the requisite legislation and the relevant planning policy framework. The ES has demonstrated that significant environmental effects associated with the construction, operation and decommissioning of the Proposed Development have been avoided or minimised through the use of the iterative design process and with the application of mitigation measures.

The amount of electricity that could be produced by the Proposed Development is estimated at 56 GWh per year which is equivalent to the electricity needs of 16,000 homes each year.

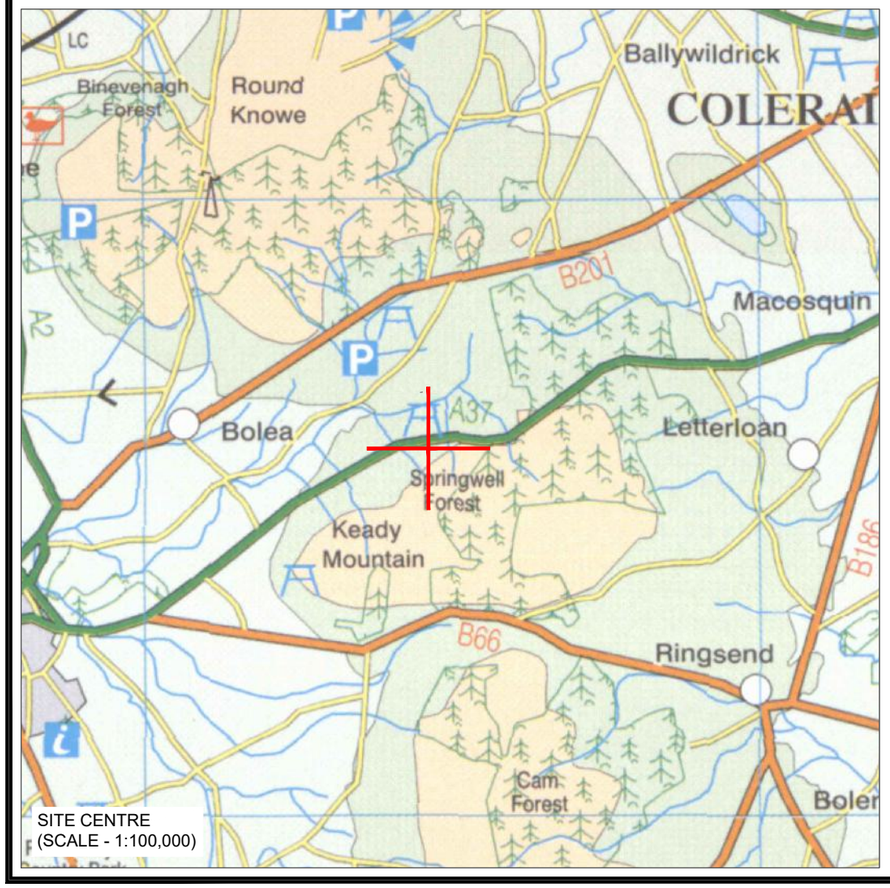
The Proposed Development is also estimated to reduce CO_2 emissions by 23,800 tonnes each year when compared against equivalent generation from non-renewable sources.

The Proposed Development will result in a reduction in greenhouse gas emissions from the electricity generating industry by harnessing wind as an alternative to the burning of fossil fuels, in line with the government's energy goals.

Figures



SITE LOCATION
(SCALE - 1:20,000)



SITE CENTRE
(SCALE - 1:100,000)

DUNBEG SOUTH EXTENSION WIND FARM

FIGURE 1

SITE LOCATION PLAN

SITE BOUNDARY

SITE CENTRE

LAYOUT DWG: N/A	T-LAYOUT NO.: N/A
DRAWING NUMBER: 05214-RES-LAY-DR-XX-003	REV: 0

SCALE - AS SHOWN @ A3

NON-TECHNICAL SUMMARY
2024

DUNBEG SOUTH EXTENSION WIND FARM

FIGURE 2

INFRASTRUCTURE LAYOUT (OVERVIEW)

- SITE BOUNDARY
- WIND TURBINE
- PROPOSED SITE TRACK
- PROPOSED SITE TRACK (OPTION 1)
- PROPOSED SITE TRACK (OPTION 2)
- DUNBEG SOUTH TRACKS
- WATERCOURSE CROSSING
- CRANE HARDSTANDING AREA
  - PERMANENT
  - TEMPORARY
- TEMPORARY CONSTRUCTION COMPOUND
- SMALL CONSTRUCTION COMPOUND
- CONTROL BUILDING & SUBSTATION COMPOUND WITH HARDSTANDING AREA
- ENTRANCE TO SOUTHERN SECTION (OPTION 1a)
- ENTRANCE TO SOUTHERN SECTION (OPTION 1b)
- ENTRANCE TO NORTHERN SECTION
- ENTRANCE TO SOUTHERN SECTION (OPTION 2)

LAYOUT DWG: N/A	T-LAYOUT NO.: N/A
DRAWING NUMBER: 05214-RES-LAY-DR-PE-001	REV: 3

SCALE - 1 : 10,000 @ A3

NON-TECHNICAL SUMMARY 2024

DUNBEG SOUTH EXTENSION WIND FARM

FIGURE 2

INFRASTRUCTURE LAYOUT (OPTION 1)

- SITE BOUNDARY
- WIND TURBINE
- PROPOSED SITE TRACK
- PROPOSED SITE TRACK (OPTION 1)
- DUNBEG SOUTH TRACKS
- WATERCOURSE CROSSING
- CRANE HARDSTANDING AREA
  - PERMANENT
  - TEMPORARY
- TEMPORARY CONSTRUCTION COMPOUND
- SMALL CONSTRUCTION COMPOUND
- CONTROL BUILDING & SUBSTATION COMPOUND WITH HARDSTANDING AREA
- ENTRANCE TO SOUTHERN SECTION (OPTION 1a)
- ENTRANCE TO SOUTHERN SECTION (OPTION 1b)
- ENTRANCE TO NORTHERN SECTION

LAYOUT DWG	T-LAYOUT NO.
N/A	N/A

DRAWING NUMBER	REV
05214-RES-LAY-DR-PE-002	1

SCALE - 1 : 10,000 @ A3

NON-TECHNICAL SUMMARY 2024

DUNBEG SOUTH EXTENSION WIND FARM

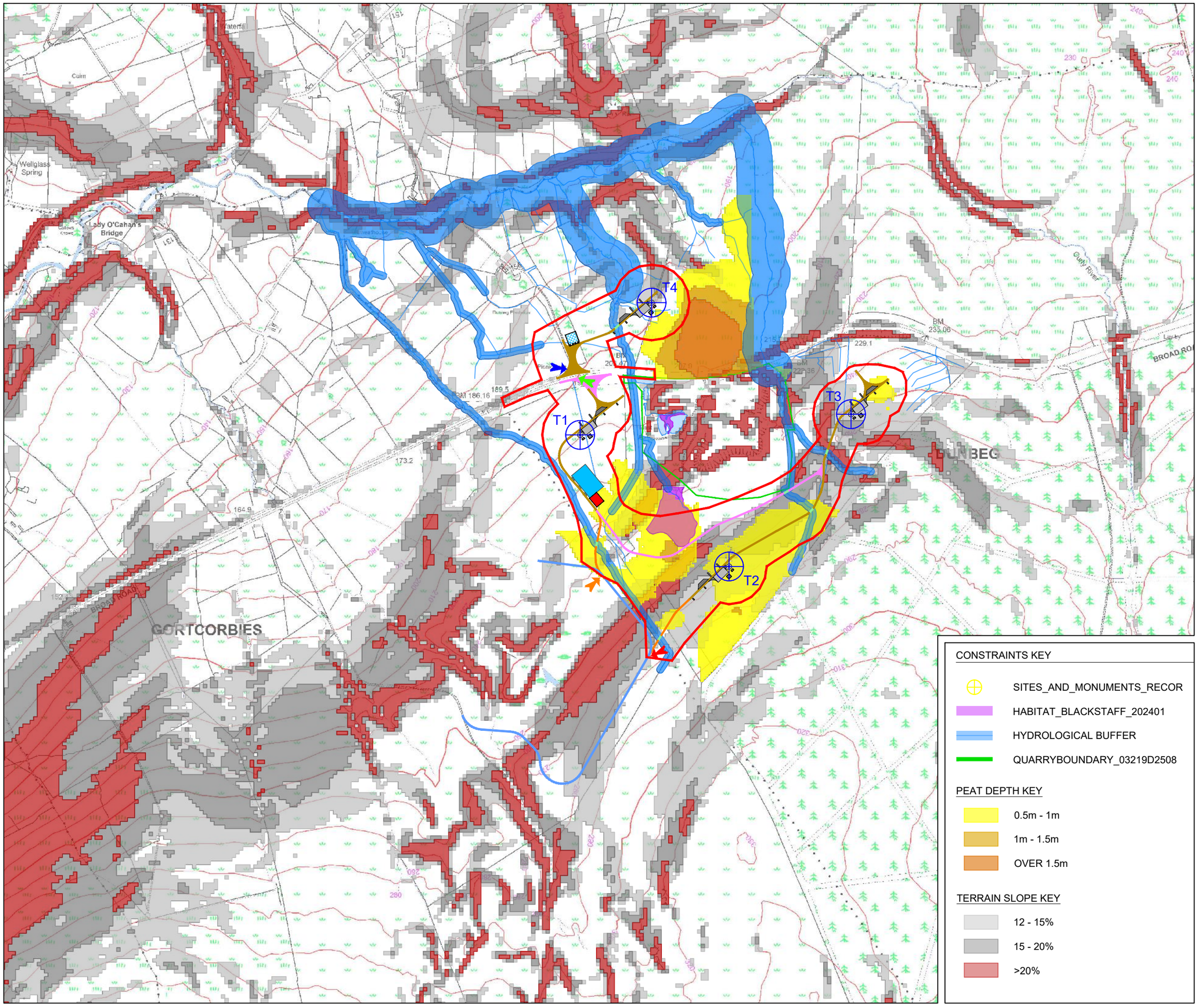
FIGURE 2

INFRASTRUCTURE LAYOUT (OPTION 2)

- SITE BOUNDARY
- WIND TURBINE
- PROPOSED SITE TRACK
- PROPOSED SITE TRACK (OPTION 2)
- DUNBEG SOUTH TRACKS
- WATERCOURSE CROSSING
- CRANE HARDSTANDING AREA
  - PERMANENT
  - TEMPORARY
- TEMPORARY CONSTRUCTION COMPOUND
- SMALL CONSTRUCTION COMPOUND
- CONTROL BUILDING & SUBSTATION COMPOUND WITH HARDSTANDING AREA
- ENTRANCE TO SOUTHERN SECTION
- ENTRANCE TO NORTHERN SECTION

LAYOUT DWG: N/A	T-LAYOUT NO.: N/A
DRAWING NUMBER: 05214-RES-LAY-DR-PE-003	REV: 1
SCALE - AS SHOWN @ A3	

NON-TECHNICAL SUMMARY 2024



KEY:

- SITE BOUNDARY
- WIND TURBINE
- PROPOSED SITE TRACK
- PROPOSED SITE TRACK (OPTION 1)
- PROPOSED SITE TRACK (OPTION 2)
- DUNBEG SOUTH TRACKS
- WATERCOURSE CROSSING
- CRANE HARDSTANDING AREA
  - PERMANENT
  - TEMPORARY
- TEMPORARY CONSTRUCTION COMPOUND
- SMALL CONSTRUCTION COMPOUND
- CONTROL BUILDING & SUBSTATION COMPOUND WITH HARDSTANDING AREA
- ENTRANCE TO SOUTHERN SECTION (OPTION 1a)
- ENTRANCE TO SOUTHERN SECTION (OPTION 1b)
- ENTRANCE TO NORTHERN SECTION
- ENTRANCE TO SOUTHERN SECTION (OPTION 2)

CONSTRAINTS KEY

- SITES_AND_MONUMENTS_RECOR
- HABITAT_BLACKSTAFF_202401
- HYDROLOGICAL BUFFER
- QUARRYBOUNDARY_03219D2508

PEAT DEPTH KEY

- 0.5m - 1m
- 1m - 1.5m
- OVER 1.5m

TERRAIN SLOPE KEY

- 12 - 15%
- 15 - 20%
- >20%

ISSUE	DRAWN	CHKD	APPD	DATE	REVISION NOTES
0	MC				First Issue

PURPOSE: OTHER	COORDINATES: TM65 IRISH GRID
SCALE: 1:10,000 @A3	DATUM: N/A
LAYOUT DRAWING: N/A	T-LAYOUT NO: PNIRcss028

PROJECT TITLE
DUNBEG SOUTH EXTENSION WIND FARM

DRAWING TITLE
COMBINED CONSTRAINTS & INFRASTRUCTURE LAYOUT

RES DRAWING NUMBER	REV
FIGURE 3	0

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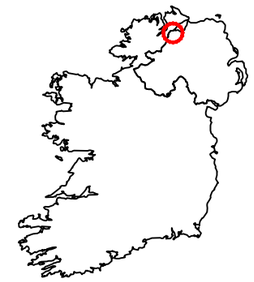
DUNBEG SOUTH EXTENSION WIND FARM

FIGURE 4

HGV DELIVERY ACCESS ROUTE

KEY:

- HGV DELIVERY ROUTE
- DUNBEG SOUTH (SITE)
- DUNBEG SOUTH EXTENSION (SITE)



SITE LOCATION - NOT TO SCALE

LAYOUT DWG: N/A	T-LAYOUT NO.: N/A
DRAWING NUMBER: 05214-RES-ACC-DR-PE-006	REV: 0
SCALE - 1:150,000 @ A3	
NON-TECHNICAL SUMMARY 2024	

KEY:

- TURBINE DELIVERY ROUTE
- DELIVERY DIRECTION
- DUNBEG SOUTH (SITE)
- DUNBEG SOUTH EXTENSION (SITE)

SITE LOCATION - NOT TO SCALE

OVERVIEW
SHEET 1 OF 14

ISSUE	DRAWN	CHKD	APPD	DATE	REVISION NOTES
1	MC	DM	DM	2024-07-17	FIRST ISSUE

PURPOSE: PRELIMINARY	COORDINATES: OS NI
SCALE: 1:100,000 @A3	DATUM: N/A
LAYOUT DRAWING: N/A	T-LAYOUT NO: N/A

PROJECT TITLE
DUNBEG SOUTH EXTENSION WIND FARM

DRAWING TITLE
DELIVERY ANALYSIS V117

FIGURE 5 NON-TECHNICAL SUMMARY — REV 1

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