BALLYGILBERT WIND FARM

Environmental Statement

Volumes 1 - Non Technical Summary

MANAGEMENT SYSTEM CERTIFICATION
ISO 9001 = ISO 14001 = OHSAS 18001
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Preface

1. This document is Volume 1 of the ES. The ES comprises:
   - Volume 1: Non-Technical Summary (NTS)
   - Volume 2: Main Report
   - Volume 3: Figures (Maps & Illustrations)
   - Volume 4: Technical Appendices

2. 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 Ballygilbert Wind Farm are likely to be. The full ES provides a more detailed description of the Development and the findings of the Environmental Impact Assessment (EIA) process.

3. 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; Design Evolution & Alternatives; Noise; Transport and Shadow Flicker	RES
Planning Policy	Turleys
Landscape and Visual	Shanti McAllister Landscape Planning & Design
Archaeology and Cultural Heritage	Orion
Ecology	Blackstaff Ecology
Ornithology	David Steele
Fisheries	Paul Johnston Associates
Geology and Water Environment Peat Slide Risk & Peat Management Plan	McCloy Consulting Natural Power
Socioeconomics	Oxford Economics

Commenting on the ES

4. The full ES, together with supporting documents submitted as part of the planning application (Design and Access Statement and Pre-Application Community Consultation Report) will be available (and CD copies available free of charge) for viewing (**BY APPOINTMENT ONLY DUE TO COVID-19 RESTRICTIONS)** and during normal opening hours at the address below:

   Local Economic Development Company (LEDCOM) Ltd,
   Willow Bank Business Park,
   Willowbank Road,
   Milbrook,
   Larne
   BT40 2SF
   Tel: 028 2826 9973

5. An electronic version of the reports supporting the application, including the ES, will be available to download free of charge from http://www.ballygilbert-windfarm.co.uk

6. Paper Copies of the ES can be obtained at a cost of £80 from the address below:

   RES Ltd
   Willowbank Business Park
   Willowbank Road
   Millbrook
   Larne
   BT40 2SF
   Email: jennifer.mccorry@res-group.com
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   Electronic copies (USB) will also be available on request to the address above.

1. Introduction

1. This Non-Technical Summary (NTS) has been prepared in support of a planning application by RES Ltd for the proposed Ballygilbert Wind Farm, hereinafter referred to as 'the Development', which is located approximately 3km North west of the village of Cairncastle, Larne, Co. Antrim.

2. 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 Environmental Impact Assessment (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.

3. The Development comprises 14 three-bladed, horizontal axis wind turbines, each up to a maximum of 149.9 m to tip height, with a total installed capacity of up to 58.8 MW. The Development would include an upgraded site entrance, access tracks, crane hardstandings, control building and substation compound, electricity transformers, underground cabling, energy storage containers and drainage works. During construction and commissioning there will be a number of temporary works including enabling works compound and construction compound with car parking, temporary parts of crane hardstanding, welfare facilities and off-site road widenings into 3rd party lands on the Brustin Brae Road, Ballycoose Road and Feystown Road.

4. Final wind farm capacity will vary depending on the outcome of planning permission and the turbine type selected. It is estimated that the wind farm could produce enough electricity to meet the needs of 61,900 homes each year[1], over 5,000 more than the current housing stock (of approximately 56,000[2]) in the local area.

The Applicant

5. RES is one of the world's leading independent renewable energy project developers with operations across Europe, the Americas and Asia-Pacific. At the forefront of renewable energy development for over 30 years, RES has developed and/or built almost 18,000 MW of renewable energy capacity

[1] For Ballygilbert, a load fact of 0.46 was provided by RES and applied to Oxford Economics' calculations. This load factor allows us to account for wake and electrical losses using typical wind speeds/directions etc. to give a realistic prediction of electricity output (rather than using a theoretical maximum level whereby it is assumed that wind blows for 24 hours a day 365 days a year on every wind farm site.)

[2] Oxford Economics Internal Model Suite.

worldwide. In the UK alone, RES currently has more than 1,000 MW of projects either constructed, under construction or consented. RES is active in a range of renewable energy technologies including onshore and offshore wind, solar, as well as enabling technologies such as energy storage.

6. RES has developed 16 onshore wind farms in Northern Ireland totalling 229 MW, which equates to 36% of Northern Ireland's onshore wind capacity. RES currently operates over 83 MW of wind capacity across Northern Ireland, has secured planning permission for a further 112 MW awaiting construction and has 92 MW in the planning system.

The Application Site

7. 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.

8. The Site is positioned on an upland plateau formed by Ballygilbert Hill, Black Hill and Scawt Hill in the southern part of the Antrim Coast and Glens Area of Outstanding Natural Beauty (AONB) and is accessed via the Feystown Road.

9. The Site is currently used for sheep and cattle grazing and predominantly comprises semi-improved agricultural land. The Ulster Way passes along the plateau. The lands are well managed with extensive stoned farm tracks providing access to agricultural fields which are bounded by mature hedgerows and stone walls.

The Need for the Development

Climate Change

10. The Paris Agreement (12 December 2015) sets out the need to hold the increase in global average temperature to "well below 2°C above pre-industrial levels and to pursue "efforts to limit the temperature increase to 1.5°C". To achieve this long-term temperature target, the text states "parties aim to reach global peaking of greenhouse gas emissions as soon as possible". The document also includes a ratcheting mechanism on climate action, with countries having to communicate nationally determined contributions to reducing global emissions.

11. It is clear that moving to a low carbon economy is now a globally shared goal and will require absolute emission reduction targets. For the first time, some 195 countries, including the world's largest emitters have now committed to act together to address climate change and to be held equally accountable. Countries will also be legally obliged to make new post-2030 commitments to reduce emissions every five years.

12. In October 2018, the landmark Intergovernmental Panel on Climate Change (IPCC) Report highlighted the importance of the limiting temperature increases to 1.5 degrees C. The report concludes that human-induced warming reached approximately 1°C above pre-industrial levels in 2017 and at the present rate, global temperatures would reach 1.5°C around 2040. *The IPCC's report recognises that in order to meet our climate change targets, up to 85% of global power generation needs to come from renewables by 2050.*

13. In February 2019, the Committee on Climate Change published a paper on "*Reducing emissions in Northern Ireland*", which was prompted by the Permanent Secretary for the of the Department of Agriculture, Environment & Rural Affairs (DAERA) in Northern Ireland requested the Committee's advice on how Northern Ireland could reduce greenhouse gas emissions between now and 2030.

14. Whilst Northern Ireland does not have any specific climate change legislation, greenhouse gas *emissions* from Northern Ireland contribute to the UK total under the Climate Change Act and therefore Northern Ireland has a key role to play in meeting our obligations under the Paris Agreement.

Net Zero

15. In May 2019, following a request from the Governments of the UK, Wales and Scotland, asking the Committee to reassess the UK's long-term emissions targets. The new emissions scenarios draw on ten new research projects, three expert advisory groups, and reviews of the work of the IPCC and others.

16. The report's key findings are that:

- The Committee on Climate Change recommends a new emissions target for the UK: net-zero greenhouse gases by 2050.
- In Scotland, we recommend a net-zero date of 2045, reflecting Scotland's greater relative capacity to remove emissions than the UK as a whole.
- In Wales, we recommend a 95% reduction in greenhouse gases by 2050.

17. A net-zero GHG target for 2050 will deliver on the commitment that the UK made by signing the Paris Agreement. It is achievable with known technologies, alongside improvements in people's lives, and within the expected economic cost that Parliament accepted when it legislated the existing 2050 target for an 80% reduction from 1990.

18. However, this is only possible if clear, stable and well-designed policies to reduce emissions further are introduced across the economy without delay. Current policy is insufficient for even the existing targets.

19. Following the publication of this report, the UK Government committed to enshrining in law a commitment to reach net zero carbon emissions by 2050 through an amendment to the Climate Change Act.

Security of Supply

20. A key policy driver for the development of renewable energy in Northern Ireland is the need to increase security of supply. There are also potential adverse impacts on local populations and the *economy* 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.

21. 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.

22. The 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 NI targets and subsequently achieve and maintain the UK renewable targets.

23. The Department for Economy has set out intentions of an Energy Strategy Options public consultation issued by the end of March 2021, with the responses from this informing a final Energy Strategy to be launched by November 2021.

24. Whilst still at consultation stage it is expected that the strategy will set out a 70% target and possible interim targets. 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). It is important to note that there is no cap upon the existing 40% target until it is superseded.

25. Furthermore, despite the current lack of an explicit, Northern Ireland specific, post-2020 renewables target, other relevant frameworks and reference points apply, including the Climate Change Act 2008, by 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.

2. Description of the Development

26. The main elements of the Development are as follows:

- 14 three-bladed horizontal axis wind turbines of up to 149.9 m tip-height
- Turbine foundations
- Hardstanding areas at each turbine location for use by cranes erecting and maintaining the turbines
- Electricity transformers
- Approximately 6.95 km of new access track and 0.88 km of upgraded access track
- Wind farm substation compound containing a control building
- Energy Storage Containers
- On-site electrical and control network of underground (buried) cables
- Connection from the substation to the local grid network

- Temporary construction compound
- Permanent and temporary drainage works
- Associated ancillary works
- Temporary enabling works compound
- New site entrance from the public road.

27. The wind farm layout is shown in **Figure 1.2: Infrastructure Layout**.

28. The actual area of permanent land take is limited to the control room and substation compound, energy storage area, wind turbine towers, permanent crane hardstandings and on-site access tracks, which collectively account for approximately 10.3% of the area within the planning application boundary. In addition, there will be an estimated 9,240m2 of hardstanding required on a temporary basis during construction.

29. 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.

Wind Turbines

30. 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 Development has not yet been made. The most suitable machine will be selected before construction, with a maximum tip height of 149.9 m.

31. For visual and acoustic assessment purposes, the most suitable candidate turbine available in the market place (currently of 4.2 MW nominal capacity and with an overall tip height of 149.9 m) has been assumed. Exact tower and blade dimensions vary marginally between manufacturers. A diagram of a typical 149.9 m tip height turbine is given in **Figure 1.4: Typical Wind Turbine Elevation**.

32. 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.

33. 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

34. The site entrance is located at an existing access to farm lands on the north side of the Feystown Road where pillars an agricultural gate marks a well-defined farm entrance.

35. Approximately 6.95 km of new access tracks and 0.88 km of upgraded access tracks are required within the site to enable the turbine components and construction materials to be transported to their locations, and to enable ongoing access during the operational period for maintenance visits.

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

37. Five watercourse crossings will be required as part of the track layout. These crossings would be designed to ensure that fish and mammal movements are not restricted, in addition to ensuring the crossing size is adequate for potential flood flows.

- One crossing of a significant watercourse.
- Four crossings of minor watercourses.

Electrical Connection, Control Building & Substation and Energy Storage

38. Assuming the use of the currently available models, each wind turbine would generate electricity at 690 V 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.

39. The wind farm control building and substation is proposed to be located on the eastern part of the site as shown in **Figure 1.2: 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.

40. The control building will be designed and constructed to the standard required by NIE for the accommodation of substation 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. The building will be staffed by maintenance personnel on a regular basis.

41. Four permanent containers housing an energy storage device, inverters and other ancillary equipment will be positioned adjacent to the control building and substation compound on hardstanding used originally for the temporary construction compound. These units are a means of storing electrical energy just like a rechargeable battery, cell phone or electric car. These are means by which power can be stored and released. The application is of course of a larger scale but the basic principle is the same.

Construction Management

42. An Outline Construction Environmental Management Plan (oCEMP) is included within the Environmental Statement and a Construction and Decommissioning Method Statement (CDMS) will be prepared if planning consent is granted. This will be submitted to the Department prior to any construction works taking place. 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 CDMS 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;
    - 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.

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

44. 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 CDMS.

45. 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.

46. 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 Development, therefore the main crane hardstanding will remain uncovered.

Operation

47. The expected operational life of the Development is 30 years from the date of commissioning. Wind turbines and wind farms are designed to operate largely unattended. Each turbine 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.

48. The 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.

49. 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.

50. 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.

51. A Habitat Management Plan will be implemented during the construction and operational phases of the Development, working with the site landowners, which will provide for the restoration and enhancement of blanket bog and heathland habitats on site.

Decommissioning

52. 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.

53. If the Development obtains planning approval it is expected that a planning condition would be set to provide for the decommissioning of the site in accordance with a scheme agreed in writing with the Planning Authority.

54. The Development will be decommissioned in accordance with best practice and/or in compliance with any planning conditions. Current best practice includes the removal of all above ground structures; the removal of all underground structures where required; 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.

3. The Environmental Impact Assessment (EIA) Process

55. 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

56. 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 over almost a year prior to the submission of the planning application, to facilitate a constructive consultation process which helped RES to understand and address any concerns as the project developed.

57. A public exhibition was held in September 2019 which included detailed information about the proposals, including: a map of the proposed layout; photomontages representing how the proposed layout would appear from a range of viewpoints; 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.) RES staff were available to answer questions and feedback was encouraged.

58. A Pre-Application Community Consultation (PACC) Report has been produced and is available for viewing at the location listed in Section 1 of this NTS.

EIA Consultation

59. 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

60. In accordance with EIA process and best practice the project team employed an iterative approach to the design of the 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.

61. Following consultation and baseline characterisation of the Site, the following key topics were identified:
    - Landscape and visual
    - Archaeology and cultural heritage
    - Ecology
    - Ornithology
    - Fisheries
    - Geology and water environment
    - Noise
    - Shadow flicker
    - Traffic and transport.
62. 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.
63. 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 Turbine Layout (Feasibility Stage)

64. 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, prior to baseline surveys had been completed. The layouts were informed by the following constraints:
    - Preliminary watercourse buffers
    - Slope
    - Known private water supply locations
    - 10 x rotor diameter separation from housing (1000m) / Double the minimum separation distance of 500 m).
    - 164.9 m buffer (tip height + 10%) to public roads (including the Ulsterway walking route), in accordance with the Best Practice Guidance to PPS 183. The Ulsterway was buffered based on mapping

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

information and a GPS survey carried out – both were buffered to ensure adequate setback.

65. This initial feasibility layout was reviewed by the Landscape Consultant. A Zone of Theoretical Visibility diagram (ZTV) and wirelines were produced for a provisional 17-turbine layout and the potential landscape and visual issues that would need to be considered if a wind farm were to be proposed on this site were considered in broad terms based on previous experience of assessing wind farms in other this part of the Study Area. This included a preliminary analysis of the site in its wider landscape context, including its location within the Antrim Coast and Glens AONB and its potential relationship with other wind turbines.

66. The feasibility appraisal recommended to review the proposed layout and with that in mind the turbines numbers were reduced.

Primary Turbine Layout (EIA Baseline Stage)

67. Prior to detailed site assessments being undertaken by external consultants, RES technical analysts undertook site visits to check that there were no physical characteristics on site that may impact upon the turbine performance such as topography.

68. RES engineering and construction undertook site visits with ecological and geology/hydrology consultants to review the turbine locations and to agree principles for the design of the onsite infrastructure based on the constraints determined to date.

69. Following this 3 Turbines were omitted, and this necessitated other changes to maximise the efficiency of the turbines and to create a balanced layout.

70. The revised layout was informed by the original constraints with the following amendments:

- Hydrological buffer 50 m;
- Hydrological buffer 10 m;
- Archaeological features - Knockdhu Area of Significant Archaeological Interest (ASAI)

71. The removal of 3 Turbines enabled some refinements to the layout.

- T15, T16, T17 were removed from the ASAI – limited infrastructure is proposed within the ASAI, access to the site is via the existing agricultural track to ensure limited works.
- T1 was removed to reduce the extent of the development.

72. The resulting 14 turbine layout with 117.0 m rotor diameter produced a more compact layout.

Combined Constraints

73. To ensure that all requirements were captured a combination of desktop and site-based surveys were undertaken to refine constraints. Detailed environmental and technical surveys were carried out to characterise the baseline environmental conditions on the Site and associated study areas, as described in more detail in chapters 4 to 13 of this ES. Any constraints to development resulting from the baseline surveys were used to build up the combined constraints drawing.

Landscape & Visual

74. As mentioned above a Landscape Consultant was involved throughout the design process to provide advice regarding the scale of the Development and turbine heights and geometry.

75. At an early stage of the iterative design process the number of turbines was reduced from 17 to 14. Whilst this had little effect on the theoretical zone of visibility over the 30 km Study Area is has resulted in a number of benefits in landscape and visual terms, namely:

    - The geographic extent of the Development was reduced at both the northern and southern ends of the upland plateau on which it was located and the most marked reduction in theoretical visibility was from locations within 5 km of the Development, particularly to the north within the centre of Glenarm and to the south around Knockdhu, Sallagh Braes and Agnew's Hill;
    - The position of 'T1' turbine was moved from its outlying location to the north of 'T2' and 'T3' and was instead located to the west of these turbines, creating a more coherent edge to the Development that better reflected the rounded shape of the underlying upland edge;
    - Turbines 'T15', 'T16 and 'T17' were removed from the layout, thus removing any turbines from Ballycoose Hill where they would have been more clearly visible from the Knockdhu car park located to the south of the Development.
    - The turbines in the final layout that is presented in this ES are evenly spaced in relation to each other and to the site topography which has resulted in a simpler layout with fewer variations in tip heights in relation to contour AOD levels;
    - There are fewer instances where 'stacking' of turbines occurs. Stacking is where two or more turbines will appear directly in front of each other in a view and will therefore result in a 'heavier' or more solid, and hence more prominent appearance;
    - Reducing the geographical spread of turbines across the upland plateau also means that the Development is viewed as a feature that is

subordinate to the wider landscape which is visible from key viewpoints within the AONB and in approaches to it.

76. Discussion with other members of the EIA project team was also carried out as part of the iterative design process. The archaeological consultant in particular has provided input into the selection of Provisional Viewpoints to ensure that cultural heritage sites are adequately represented. Chapters 4: Landscape & Visual and Chapter 5: Archaeology & Cultural Heritage of the ES provide detailed information with regards to these areas.

Archaeology

77. The proposed turbine locations, access road routes, construction activities and cable route have been placed to avoid all known archaeological heritage assets, and their immediate vicinity.

78. **Chapter 5: Archaeology & Cultural Heritage** of the ES considers in detail the impact of the Development on a number of assets, these include:

- ANT 029:019 – Giant's Tomb scheduled monument
- ANT 030:004 – Standing Stone scheduled monument
- ANT 035:002 – Giant's Grave scheduled monument
- ANT 035:005 – Knockdhu Fort
- ANT 035:053 – Cairn on Scawt Hill
- Knockdhu Area of Significant Archaeological Interest (ASAI)
- HB06/02/084 – RC Feystown Church
- AN/033 – Glenarm Registered Park

Ecology - Vegetation

79. The Development is situated on an upland massif which rises between the Antrim Coast (in the east) and Feystown (in the west). It is a few kilometres south of Glenarm and lies approximately a kilometre north of Sallagh Brae. The proposed access track and associated infrastructure is roughly oriented north to south along a series of low hills, each representing a separate land parcel. The southernmost land parcel, which will host the site entrance and the first 2 kilometres of access track surrounds the summit of Ballycoos (361m). This parcel consists primarily of poor semi-improved (acid) grassland with the tight sward associated with heavy sheep grazing. The ecology of the area is impoverished with the various field signs indicating badger usage of the area the only feature of note.

80. The route of the infrastructure then traverses an old stone wall (with associated mitigation to protect common lizards which were recorded from site) as it moves north and into the second land parcel (Scawt Hill (378m). The topography is complex in this part of the site and the resulting vegetation mosaic is thus more diverse; although heavy grazing pressure (and

local land drainage) have combined to limit the conservation value of the habitats present. However, interesting pockets remain in a few places. The iterative design process has allowed the majority of more interesting pockets of fen/flush and degraded blanket bog to be avoided during the emplacement of infrastructure. This has restricted most of the impacts to areas of poor acid grassland, poor marshy grassland/(poor) rush pasture and wet heath/degraded blanket bog. Acid grassland is by far the most abundant habitat, but it is only part of a larger mosaic containing all of the other habitats mentioned above. This complex habitat mosaics present in this land parcel (and the third land parcel containing Ballygilbert Hill (370m)) are the result (in part) of the myriad of water features present on site and how these pool and flow overland before coalescing into streams and watercourses. Considerable effort has been expended during the design process to weave the infrastructure around the watercourse buffers and larger GWDTEs present on site (in order to maintain the overland flow upon which these habitats depend). One of the larger fen/flushes on site (near T10) will form the core of one of the proposed Habitat Management Areas on site (in order to compensate for habitat loss associated with construction/operation of the proposed windfarm). In addition, surveys for smooth newt were conducted in this area, however none were recorded.

81. The third and fourth land parcels contain the hill from which the site derives its name, Ballygilbert. The most significant feature of this part of the site is the presence of a pocket of blanket peat which forms a small plateau immediately to the east of the summit ridge (between Black Hill and the aforementioned Ballygilbert Hill). This small area forms the source of at least three watercourses which flow from the site and also contains a number of small pools. Part of the bog is fenced off, possibly in an effort to prevent livestock from falling into and drowning in the numerous pools present. This enclosed area will be enlarged to incorporate all of the remaining degraded blanket bog; combined with a moratorium on grazing (and some targeted drain blocking), should create a second interesting and diverse Habitat Management Area.

82. The final (and most) northerly of the five land parcels encompasses the northern slopes of Black Hill. This area is more uniform in both aspect and habitat diversity; it consists primarily of poor (heavily grazed) acid grassland. Apart from a few pockets of wet heath, poor flush and poor rush pasture, this area has less ecological diversity.

Terrestrial Fauna

83. Aside from detailed botanical and habitat surveys (as well as surveys for common lizard, smooth newt and badgers) detailed bat surveys were also undertaken across the entire site, during the 2019 survey season (with over 400 nights of survey). Overall activity levels were negligible to low (with no bats recorded on greater than 50% of nights surveyed). Significant activity levels (BAI of 5 of higher) were noted on a single night at T5 (in spring) and T4 (during summer); as a result a precautionary Bat Monitoring & Mitigation Plan (BMMP) has been recommended. Once implemented in full this will ensure that there is no significant impact to the local bat population. In addition, a detailed and significant HMP (Habitat Management Plan) has been agreed, the implementation of which will result in a 'Net Gain' in biodiversity terms as a result of the proposed windfarm.

Water Environment and Fisheries

84. The hydrology consultant recommended watercourse buffers of 50 m and 10 m depending on the catchment size of the watercourse, which were agreed as appropriate by the fisheries consultant.

Public Roads

85. 165 m 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, this set back distance has also been applied to the Ulsterway Walking route which runs through the site.

Finalising Turbine Layout – EIA Baseline Stage – Final Layout

86. Using design principles agreed with environmental, engineering and technical disciplines, the infrastructure layout was developed and used to undertake baseline assessments.

87. During the course of the baseline surveys changes were made to the turbine layout the revised turbine layout is illustrated in Layout 2 – **Figure 3.1: Turbine Layout Evolution**.

88. A 50 m micro siting radius was applied to each of the turbines. The extent of this was then reduced such that the micro siting avoids any of the combined constraints. The final micro siting areas are included in **Figure 1.2: Infrastructure Layout**.

Infrastructure Design Evolution

89. The infrastructure design evolved through the EIA process. The following principles were taken into consideration when designing the supporting infrastructure:

- Avoidance of environmental and technical constraints (as shown in Figure 3.3)
- Design of the track layout to follow natural contours as far as possible, to avoid unnecessary amounts of excavation and reduce adverse hydrological impacts using the following methods:
- Maximise the use of existing track locations via upgrades;
- 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 (except where existing farm access tracks where in situ);
- Incorporation of measures to improve the visual appearance of the scheme, including reinstatement of temporary infrastructure following the construction period;
- Sympathetically locating control room building / substation / energy storage facility within the site surroundings.

Environmental Effects

90. The following sections summarise the technical chapters of the ES. The term 'Site' refers to the Preliminary Site Boundary of the wind farm, which is shown in **Figure 1.1: Site Location**, which is a larger area than the final planning application boundary, which is shown in **Figure 2: Infrastructure Layout**.

Planning Policy

91. This section explains how energy and planning policy considerations have been addressed by the Development, principally by reference to the other Chapters within the ES.

92. There is a raft of policy and guidance that informs the consideration of windfarm proposals such as this which together form a complex matrix of considerations.

93. In part due to the recognition that the 40% target set in the existing Strategic Energy Target has been met, the Department for the Economy has commenced work to developing a new Energy Strategy for Northern Ireland.

94. Whilst still at consultation stage it is expected that the strategy will set out a 70% target and possible interim targets. It is important to note that there is no cap upon the existing 40% target until it is superseded.

95. Furthermore, despite the current lack of an explicit, Northern Ireland specific, post-2020 renewables target, other relevant frameworks and reference points apply, including the Climate Change Act 2008, by 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.

96. The rationale for the project is clear. Making an energy infrastructure contribution of the scale proposed (58.8MW) will assist in the achievement of NI strategic energy targets and objectives, consistent with a wide range of International, European, UK and Regional level priorities.

97. There is a strategic qualified national presumption in favour of developing renewable energy projects of this type.

98. The established Planning Policy Statement 18(PPS18) approach to decision making advocated in planning policy is to balance the wider environmental, economic and social benefits of the project against the environmental impacts, attaching significant weight to the former.

99. The Strategic Planning Policy Statement changes this approach insofar as the PPS18 direction to attach significant weight to the benefits is replaced by a discretion for the decision maker to determine the appropriate weight to be attached to the benefits. This must mean that the large scale social, environmental and economic benefits associated with this project are attached significant weight. In weighing the acceptance of the proposals the following must be considered:

- The proposal will offer job creation and economic activity to the regional economy providing catalytic benefits to investment within Northern Ireland.
- Given the 30 year lifetime of the development it is expected that direct operational impacts equate to 30 jobs, £1.70 million direct wages and £5.71 million of direct Gross Value Added over the operational phase.
- Both the construction and operational phases will generate increased tax and business rates revenue and the proposal is estimated to involve a capital spend of £39.78 million.
- Based on rateable values of £13,293 per MW— it is calculated that the proposed development will increase rateable value by £0.8 million each year, or by £23.45 million over the project horizon.
- The amount of electricity that could be produced by the proposed development is estimated at 236.9gWh per year which is enough electricity to meet the needs of 61,900 homes each year , over 5,000 more than the current housing stock (of approximately 56,000) in the local area.
- The proposed development is also estimated to reduce CO_2 emissions by 109,000 tonnes each year.

100. The landscape and visual impact of the windfarm is not unacceptably adverse for the purposes of the SPPS and PPS18 Policy RE1 because the inherent characteristics of the landscape provide the capacity to absorb it. The effects – relative to the qualities that underpin the designation – would not undermine the overall AONB or compromise wider landscape and visual amenity to an unacceptable degree.

101. With the discretion to attach significant weight to the wider environmental, economic and social benefits arising from the proposal, and having regard to how the project demonstrates that it will have limited adverse impacts, the project is considered to meet the requirements of planning policy because there are no unacceptable adverse effects which are not outweighed by the local and wider environmental, economic and social benefits of the proposed development.

Landscape and Visual

102. The Landscape and Visual Impact Assessment (LVIA) methodology was specifically developed for wind farm development in Northern Ireland in accordance with best practice guidance. The Landscape and Visual Impact Assessment (LVIA) considered a 30 km radius Study Area and used a combination of existing desktop information (maps, planning policy and existing landscape character assessment documents), detailed site analysis of the Study Area and computer modelling.

103. The LVIA was carried out by an independent consultant and Chartered Landscape Architect with over 19 years' experience of preparing LVIAs. The LVIA methodology was specifically developed for wind farm development in Northern Ireland in accordance with best practice guidance. The aims of an LVIA are to:

- Present an objective analysis of the landscape and visual character of a defined area (i.e. the '*baseline conditions*' within the '*Study Area*' for this LVIA) in so far as they relate to the Development;
- Identify the potential effects of the Development on these baseline conditions including direct, indirect, permanent, temporary and cumulative effects;
- Clearly distinguish between *landscape effects* and *visual effects* which although closely related are also distinct from each other. 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 ('*visual receptors'*);
- Propose appropriate mitigation measures to address likely significant effects, where possible, and to assess any residual effects that would remain following the implementation of these measures;

- Present all information clearly and objectively with a well-reasoned methodology that is in accordance with best practice guidance and in a manner that will inform the decision making process.

104. Potential landscape and visual effects were assessed as separate but linked issues. The magnitude of landscape effects was derived from the extent to which physical changes would cause changes in landscape character and value. Visual effects relate to changes in the composition of views and people's perception of/responses to these physical changes. Viewers / visual receptors include local residents, tourists, walkers, farmers, general road users etc.

105. For both landscape and visual effects, the Significance of effect was derived from the assessment of Landscape Value, Sensitivity and Magnitude of change and by using objective professional judgement in relation to site circumstances.

106. An assessment of cumulative impact was also carried out. The purpose was to measure the incremental effect of the Development on the Cumulative Baseline, i.e. in combination with other wind farm developments, including operational, consented and proposed projects. In accordance with best practice guidelines existing and consented wind farms are considered to be part of baseline landscape and visual character as well as in the cumulative assessment. The assessment of effects of the Development takes consideration of their presence, or anticipated presence. The magnitude of cumulative change is dependent on a number of factors, including the presence of other wind farms and the degree to which these already influence landscape and visual character and the distance between the Development and other wind farms

107. The proposed site is located on an upland plateau within the Antrim Coast and Glens AONB. The current land use is grazing for sheep divided in part by stone walls and post and wire fences. The Ulster Way crosses the plateau.

108. The Development conforms to the general principles laid out in policy and best practice guidance. Both the SPPS and PPS 18 are broadly supportive of renewable energy developments as a means of mitigating against the effects of climate change and the BPG further states that, given their importance, is it important for society at large to accept wind farms as a feature of the Region for the foreseeable future. Both the SPPS and PPS18 refer to the socio-economic benefits of wind energy development which are analysed is Chapter 13. The BPG notes that some locations may be highly visible but that this does not necessarily render them unacceptable. The latter judgement depends on the degree of effect and sensitivity of the receiving landscape. The BPG also notes that groups of turbines can normally appear acceptable as single isolated features in open, undeveloped landscapes and this principle can be applied to the Development's position within its

landscape and visual context. Beyond 5 km the BPG notes that wind farms are likely to be visible as part of the wider landscape and prominent only in clear visibility, becoming less prominent as viewing distances increase.

109. The general principles contained within the SPG are also broadly supportive of wind energy developments in this type of landscape. The Development is located in accordance with seven of the 9 landscape and visual character issues that the SPG notes should be considered for wind energy developments within the Antrim Plateau region within which the Development is located. The Development maintains adequate separation distances from other wind farms and is of a form and layout that reflects the large scale and strong horizontal form of the uplands on which it is located as per the SPG's design principles.

110. However, the SPPS also requires that a cautious approach should be taken to siting renewable energy developments in designated landscapes where they would result in detrimental effects on the value of these landscapes. In this respect it is necessary to consider policy principles set out in Planning Policy Statement 2 (PPS 2) relating to AONBs and more detailed advice set out by the SPG in relation to specific Landscape Character Areas (LCAs) and also to the AONB Management Plan and Northern Ireland Regional Landscape and Seascape Character Assessments (NIRLCA and NIRSCA).

111. PPS 2 states that permission will only be granted in AONBs where the Development would be sympathetic to the character of the AONB in general and also of the particular locality. In broad terms this character lies in the tranquillity, cultural associations, distinctiveness, conservation interest, visual appeal and amenity value of the AONB. PPS 2 defers to the descriptions of LCAs and AONB Management Plans for further information on these elements. It is noted that the LCAs which combine to form the AONB are assessed by the SPG as being of much the same sensitivity to wind energy development as LCA 124 within which the Development would be located and many upland parts of these LCAs are described as being theoretically suitable locations. The sites of Elginny Hill and Rathsherry wind farms, which are located in the adjoining LCA 117 Central Ballymena Glens to the north of LCA 124, are specifically identified by the SPG as being particularly highly sensitive but have nevertheless been subject to planning consents.

112. The purpose of the Antrim Coast and Glens AONB Management Plan4 is to define special characteristics and identify mechanisms by which changes and developments can take place whilst maintaining the AONB's special character. The special characteristics that are identified in the Management Plan include the area's relative isolation from the rest of the country and its visual links with the Scottish coastline; the distinctive character of each of

[4] '*Antrim Coast and Glens Area of Outstanding Natural Beauty Management Plan 2008 – 2018'* (June 2008) Causeway Coast and Glens Heritage Trust

the nine Glens and the sequence of cliffs, headlands and bays along the coastline which are framed by the Antrim Plateau landscape which is located inland and above these parts of the landscape and overlooking this coastal landscape/ seascape (see paragraph 4.89 onwards for further detail).

113. In some respects the Development is in conformance with the Management Plans recommendations which use the NILCA to assess the character and qualities of individual LCAs within the AONB. LCA 124 where the Development is located is the only LCA which is described as already having wind farms and radio masts as prominent features of its existing character. In this respect the Development would not introduce a completely new visual character element although it would create a new physical landscape character element in on part of the LCA. Wind energy was not one of the types of development identified as a perceived threat to the qualities of the AONB during the public consultation stage of the Management Plan (perceived threats were quarrying, second homes in the countryside and agricultural intensification). Climate change is noted as an issue but the Management Plan identifies no clear mechanisms for mitigating its effects. This does not reflect the policy background provided by the SPPS and PPS 18 where wind farms are identified as a key and necessary response.

114. Landscape in general is a palimpsest meaning that it reflects historical changes and continues to be formed and re-formed with evidence of previous alterations being evident alongside current land uses. The Management Plan identifies this palimpsest as being a key characteristic of the AONB by noting that it is a landscape which has been shaped by over 9,000 years of human occupation. This is evidenced by field patterns, agricultural buildings and cultural heritage sites. In this respect the Development reflects the continuing trend of human activity influencing landscape character and utilising the availability of natural resources. It would be a long term but nevertheless temporary addition to the landscape and visual character of the site and the wider Study Area. When the wind farm ceases to operate the site will be returned to its current form. The Development may also assist the aims of the Management Plan to restore characteristic features of the AONB that are present on the site such as stone walls which have become degraded or lost via the process of agricultural intensification and which could, in places, be restored as part of the construction process.

115. However, in other respects the Development is not in strict conformance with the Management Plan which refers to wind farms as one of several types of vertical features which would have a significant impact on skylines and summits which are sensitive to change. Prominent hills and iconic features of landscape and cultural importance are noted as being characterised by a general lack of visual intrusion from vertical features such as pylons and telecommunications towers and this does apply to the site and adjacent

uplands. However, it is noted that these principles also apply to other existing and consented wind farms located around the edges of the AONB. The AONB notes that many parts of the uplands are relatively inaccessible which does not encourage tourists to prolong their visits or explore parts of the AONB aside from those which are easily accessible. Waymarked trails are noted as being generally poorly signed but this is not the case on this site where the Ulster Way is accessible and well signed and is therefore likely to attract relatively more visitors. However, the Development would pose no restriction to the continued use of the Ulster Way. Furthermore, research into the effects of wind farms on tourism revealed relatively high support and positivity towards renewable energy developments and found that the majority of tourists questioned would not be deterred from visiting a location because of the presence of a wind farm5.

116. SPG guidance does recommend that the creation of a cluster in this LCA may be appropriate but it also specifically advises against locating a wind farm in this particular part of the LCA which it describes as the northern finger of uplands and of utmost sensitivity because it provides the setting both for Glenarm and the coastal areas to the east. The Development would have a significant direct physical effect on the LCA within which it is located. The Development would also have indirect but significant effects on the setting of other LCAs and SCAs located within approximately 15 km because the upland plateau on which it is located forms a key character component of both the LCA within which it is located and also provides the setting for adjacent areas. Much of the landscape within 15 km is also located within the AONB boundary and landscape sensitivity is heightened by this fact.

117. Furthermore, the coastline is particularly sensitive and the Development would be located at the southern end of the AONB on the first upland area that would be visible on approaches from Belfast both along the scenic coastal drive and inland approaches from Larne/ Carrick direction.

118. Existing and consented wind farms are typically located along the south western and western edges of the AONB and are more closely associated with the lowlands around the A26 road corridor in the same part of the Study Area. The cluster of wind farms at Gruig/ Altaveedan are not highly visible from within the AONB. Rathsherry/ Elginny Hill are more visible but with approximately 16 km of 'undeveloped' lowlands in between. Nevertheless, the Development is located near the outer edge of the AONB and therefore visibility from within the AONB as a whole is not widespread. There is also a consented wind farm at Ballykeel located within the AONB approximately 5.5 km to the south of the Development and there are single turbines located

[5] Failte Ireland (2012) '*Visitor Attitudes on the Environment – Wind Farms*' and Northern Ireland Tourist Board (August 2011) '*Windfarms and Offshore Windfarms*'

throughout the Study Area including 11 known turbines located within 5 km of the Development. Whilst the Development would be highly visible from many parts of the Study Area within 15km and visual effects where they occur are often significant, vertical man-made structures are already a typical landscape character element within the AONB as well as the wider Study Area. Further analysis of relevant planning policy and guidance is contained from paragraph 4.56.

119. In relation to residential amenity there are no properties in proximity to the Development where views could be considered overbearing or dominant. The majority of properties located along the Feystown Road, which would be in closest proximity (approximately. 1 km) are orientated to take advantage of panoramic views to the south and south west. The rising side slopes of the upland plateau on which the Development would be located physically contain views to the rear of most properties from the north to south east and prevent views to the coastline.

120. The Development would have significant landscape and visual effects in some instances. Whether or not this outweighs the ever increasing importance of addressing climate change through the production of reliable renewable energy is a judgement that is beyond the scope of this chapter but it is an issue that should be afforded significant weight in the decision-making process in the context that three councils across Northern Ireland have recently declared a climate change emergency. With this in mind, the Development's location on a site that is, in many respects suitable in terms of its landscape and visual character, despite its AONB status, is pertinent.

Archaeology and Cultural Heritage

121. The Archaeology and Cultural Heritage chapter assessed the potential effects that the Proposed Development would have on the historic environment. It considers potential direct physical impacts, indirect effects resulting from changes to the setting of heritage assets (such as scheduled monuments and listed buildings) in the wider area, as well as potential cumulative effects due to the presence of other extant or proposed developments.

Potential for Direct Physical Impacts

122. The potential for buried archaeological remains to be present within the Application Site was assessed by a review of the available evidence undertaken within a Cultural Heritage Baseline Assessment (CHBA), which confirmed that the Application Site is unlikely to contain the buried archaeological remains of settlement activity from any period reviewed. However, the CHBA recognised that the Application Site is located in a prehistoric landscape with a number of funerary and potential ritual remains of interest, and that there are recorded non-designated buried remains of a

cairn and potential oval enclosure within the Application Site, as well as known remains recorded within the ASAI, which occupies the southernmost part of the Application site. These remains, and the potential for as yet undiscovered buried remains of interest, have been considered by the chapter and it is concluded that they are likely to be of no more than of local interest.

123. The Proposed Development was designed to avoid impacting on any recorded archaeological remains, and will therefore have no physical effects on the known remains identified by the CHBA. However, there is potential for some localised impacts to result to as yet unknown buried archaeological remains, which could result in a minor to moderate adverse effect. In response a programme of archaeological works is proposed, which would record any remains prior to construction, and would realise the research value of the remains. With the benefit of such a programme works, the significance of any effects to buried archaeological remains would be at most minor adverse.

Potential Indirect Effects due to Changes to the Setting of Heritage Assets

124. The assessment provided in this chapter was informed by a comprehensive assessment of the potential indirect impacts the Proposed Development could have on the significance of designated heritage assets in the wider area due to changes to their settings, which was provided by the CHBA provided in Appendix 5.1. This found that the Proposed Development would not significantly affect the great majority of the designated heritage assets in the wider area.

125. The CHBA considered 155 designated heritage assets in the wider area around the Application Site, and provided a detailed assessment of 50 of these, which were likely to have some potential intervisibility with the Proposed Development. It concluded that of these, only 8 would have potential effects that merit full assessment within the EIA:

- ANT 029:019 – Giant's Tomb scheduled monument
- ANT 030:004 – Standing Stone scheduled monument
- ANT 035:002 – Giant's Grave scheduled monument
- ANT 035:005 – Knockdhu Fort
- ANT 035:053 – Cairn on Scawt Hill
- Knockdhu Area of Significant Archaeological Interest (ASAI)
- HB06/02/084 – RC Feystown Church
- AN/033 – Glenarm Registered Park

126. As a consequence these were considered in detail by this chapter.

127. The potential effects to the remaining heritage assets in the wider study was considered in detail in the CHBA. It was concluded that the Proposed

Development would have no more than a slight effect on these, and that they would not comprise significant environmental effects. As such, it is not necessary to consider these effects in detail within this chapter. However, the CHBA is provided in Appendix 5.1, where detailed assessments of all the remaining heritage assets can be found if needed.

128. Due to their proximity to the Proposed Development, and the scale of the Proposed Development, the cairn on Scawt Hill, and the Standing Stone on the Ulster Way would be subject to moderate adverse degrees of effect, due to the loss of perceived prominence that would result from the Proposed Development. However, in both cases, the Proposed Development would not result in the loss of archaeological information, nor would it prevent understanding or appreciation of their archaeological and historic interest. As such, it is considered that the significance of the effect on both of these assets would be moderate adverse. This is considered to be a significant effect, but it is at the lowest end of the scale of possible significant effects outlined in Chapter 5 of the ES table 5.3. This relatively low level of significant effect, which is also medium term and reversible, should be capable of being made acceptable, provided sufficient benefits flow from the proposed development, and be made to accord with policy.

129. The Proposed Development would result in no more than a minor adverse effect to the remaining designated heritage assets assessed within the chapter, which would not comprise significant adverse effects. In all cases, the effects are medium term and reversible, and in no instance would the proposed development directly affect a key aspect of the significance of any of the heritage assets considered.

130. In response to the indirect effects to the standing stone and the cairn on Scawt Hill, some compensatory measures are proposed, comprising information boards key heritage assets affected, and placed along the Ulster Way. They would be based on known information, with some additional research, and would enhance appreciation and understanding of the archaeological interest of the assets. This would also serve to partially restore appreciation of the local prominence of these features, and would provide a clear heritage benefit to these assets. While such measures would not fully mitigate the effects of the Proposed Development, they would nonetheless constitute a clear benefit to their significance, which would be considered alongside the adverse effects. Such measures would be easily secured by means of a planning condition, or similar mechanism, following the grant of planning consent.

Cumulative Effects

131. The potential for cumulative effects has been considered for each of the heritage assets assessed by this chapter. The assessment of potential cumulative effects has been made with reference to the cumulative baseline

provided in Chapter 4 of the ES, together with information provided in the heritage viewpoints and LVIA.

132. The potential for cumulative effects was considered in detail, and it was found that the developments within the cumulative baseline are sufficiently far that they would not affect the significance of the heritage assets considered within this chapter. As a result, it is concluded that the presence of the developments within the cumulative baseline would not result in a materially higher level of effect to the identified heritage assets than what would result from the Proposed Development on its own.

133. In conclusion, the potential effects of the Proposed Development on the historic environment around the Application Site have been assessed, and it has been found that, with the benefit of imbedded mitigation measures, and some additional measures secured via planning condition, it would be possible to implement the proposed development in accordance with the requirements set out in policy RE1 of PPS 18 and paragraph 6.224 of the SPPS.

Ecology

134. 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 2019 and 2020 field seasons; both on the site within the appropriate buffer zones:

- Habitats (Phase 1 & Phase 2)
- Bat survey (Static monitoring and activity transects)
- Badger (& otter) survey
- Common lizard survey
- Smooth newt habitat survey
- Marsh fritillary butterfly habitat survey

135. 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.

136. The principal habitats on the site are extensive areas of improved & semi-improved grassland, acid grassland, marshy grassland, blanket bog, wet heath and fen. Several dry-stone walls are also present within the Planning Application Boundary. Overall, the habitats on site are of lower conservation value, while the blanket bog/wet heath and fen are of moderate/high value.

137. 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.

138. A series of generic and specific mitigation measures including a Habitat Management Plan and mitigation for common lizard have been proposed to mitigate effects on NI Priority Habitats and Species.

139. The Development will result in permanent and temporary habitat loss of 0.22 ha, largely comprising degraded wet (dwarf shrub) heath and lowland acid grassland, although small areas of other habitats will also be lost, such as marshy grassland, and poor acid grassland.

140. The extent of habitat loss has been used to inform the prescriptions detailed in the Habitat Management Plan, including a commitment to establish 170-times the area lost for NI Priority Habitats (wet dwarf shrub heath/lowland acid grassland). Three HMA's have been proposed (with a total area of 37.12 ha) to compensate for the loss of habitats during the 30-year lifetime of the Development.

141. After implementation of the mitigation measures proposed in this chapter it is assessed that there would be no significant residual adverse effects on Northern Ireland priority habitats (wet heathland/lowland acid grassland) as a result of the Development. Indeed, it is assessed that the Habitat Management Plan would deliver a net beneficial effect during operation by enhancing currently degraded blanket bog/wet heath and marshy grassland habitats.

142. There is no recorded usage of the area by otter, smooth newt or marsh fritillary butterfly, therefore no impacts to these species is likely. Mitigation for the herpetofauna found on site (common lizard) is proposed. This involves the mowing/hand clearance during the construction phase.

143. Several badger setts were found during survey, and a 25m buffer (Badger Protection Zone) has been applied to all sett entrances.

144. 30-nights of static monitoring for bats was completed at each of the 14 turbines on the site. Overall activity levels were low to negligible, however, a Bat Activity Index (BAI) above 5 was recorded on two separate nights (at single individual turbines) during the monitoring period. Therefore, a BMMP (Bat Monitoring Mitigation Plan) has been recommended as a precaution. In conclusion, and based on current knowledge, this should ensure that the

proposed Development will not have a significant impact on the local bat population.

145. 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.

146. 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

147. On-shore wind farms can potentially effect birds in two main ways – by displacement of birds around the turbine array (leading to indirect habitat loss) or by creating a risk of collisions with the turbines. Direct habitat loss from wind farms is usually relatively small scale compared to other sorts of developments and in most cases is unlikely to be significant for bird communities.

148. The ornithology assessment focuses on assessing potential displacement effects and collision risk effects of the Development. The assessment considers the potential effects on the bird communities found within the site and in defined surrounding buffer areas (including the Antrim Hills SPA). Where relevant, the assessment also considers the potential cumulative effects resulting from other existing or proposed wind farms in the vicinity of the Development.

Methodology

149. This chapter assesses the potential effects of the Development on bird communities and has been informed primarily by a programme of baseline ornithology surveys commissioned by the Applicant and completed during an initial two year period (commencing during winter 2012 and finishing in summer 2014) followed by a more recent 15 month update period (commencing in summer 2018 and finishing in August 2019). The surveys have included (as appropriate) breeding bird surveys, winter surveys, vantage point surveys and wider area surveys. All surveys have been completed in line with the current SNH guidance for bird surveys at on-shore wind farms.

Breeding Birds

150. Key species found within the breeding bird survey area (within 500 m of the turbines or 800 m for curlew) were snipe (eight breeding pairs) and red grouse (one or two breeding pairs). Seven species of moorland passerines

were also found breeding (a relatively small number due to the general uniformity of the habitat) including skylark, meadow pipit, stonechat, whinchat, wheatear and reed bunting – with the exception of skylark and meadow pipit (both of which were widely distributed over the survey area) passerine species were locally distributed and in very small numbers. Curlews were not present within the breeding bird survey area, however two pairs were found within the wider surrounding area (within 2 km but not closer than 800 m from the turbine locations).

Winter Birds

151. A total of 31 bird species were recorded during the winter surveys however most of these species are very widespread in distribution locally and regionally and were recorded within the survey area in relatively small numbers. Golden plovers were recorded within the survey area on a fairly regular basis during October to April however numbers were small and the flocks were very mobile, with no particularly favoured locations.

Raptor Breeding Activity

152. Raptor species found breeding within the wider surrounding area (within 2 km of the turbines) were peregrine (one pair), buzzard (five pairs), kestrel (one pair) and sparrowhawk (one pair). Hen harriers were not found breeding within the survey area. For peregrines there are two alternative nest sites (used by the same peregrine pair) located within the survey area and they are 700 m (location 1) and 2 km (location 2) distant from the nearest turbine locations. Each of the locations was occupied by peregrines at least once during the baseline survey period. For other raptor species, none of the breeding locations were closer than 1 km from the turbines.

Raptor Foraging Activity

153. Raptor species observed foraging within the survey area (within 500 m of the turbines) were peregrine, kestrel, merlin, buzzard, sparrowhawk and hen harrier however with the exceptions of buzzard and kestrel observation rates were relatively low or very low. The buzzard observations indicate regular use of the survey area by this species for foraging and most observations were during the breeding period with markedly fewer observations during the non-breeding period. Foraging kestrels use the survey area less frequently than buzzards and principally during the latter part of the breeding season and during the autumn / post-breeding period, with minimal or negligible activity during the winter and early breeding periods.

154. Hen harriers occur occasionally within the survey area during the late summer and autumn period and the observations certainly relate to birds (mostly juveniles) involved in post-breeding dispersal or migratory movements and there is no indication of regular foraging activity within the survey area during the breeding season. Peregrines occur in the survey area

throughout the year but activity levels are low with a slight indication of a peak during the late summer and early autumn period.

Effects on Bird Communities

155. For snipe, displacement of two or three breeding pairs (50% of territories within 400 m of turbines) might be expected to occur due to the Development. It is not certain that displaced snipe would be lost to the local breeding population, as there is extensive suitable habitat within the immediately surrounding area therefore it is possible that some or all of the displaced birds might be able to re-locate locally. However the possibility of some snipe being permanently lost cannot be excluded although any such losses would be significant at the local population level only. Habitat compensation measures for snipe have been included within the Habitat Management Plan.

156. For red grouse and moorland passerines there are not expected to be any significant permanent displacement effects, however some temporary disturbance is possible during the construction of the wind farm when that is during the breeding season. For curlews there are not expected to be any significant adverse effects as the two territories are located significantly more than 800 m away from the turbines.

157. For breeding raptors there are not expected to be any significant issues in relation to potential disturbance of breeding sites as all are located beyond the likely disturbance distances for the relevant species and in the case of peregrines there are also other mitigating factors. Foraging displacement is unlikely to be significant for any of the raptor species found within the survey area.

158. For peregrine and hen harrier the frequency of observations within the survey area during the baseline period is judged to be insufficient to warrant use of the Collision Risk Model and collision risk is unlikely to be significant for either species. For buzzards collision risk is equivalent to one bird every 2.0 years (range 2.1 – 1.9 years) and for kestrels is equivalent to one bird every 3.8 years (range 4.3 – 3.3 years) however for both species it is unlikely that the predicted collision risk would have a significant adverse effect on the distribution and abundance of the local populations or on the regional conservation status of the species.

Antrim Hills SPA

159. The results of the baseline surveys indicate that there is extremely unlikely to be any significant connectivity between the Development and the Antrim Hills SPA hen harrier and merlin populations.

Mitigation

160. An Ornithology Mitigation Strategy (OMS) would be completed during the construction of the wind farm where this is during the bird breeding season and would aim to avoid any significant disturbance to the relevant breeding bird species found within the vicinity of the Development. A Habitat Management Plan (HMP) would be initiated after planning consent and should include habitat enhancement measures that would be beneficial for breeding snipe. Habitat measures implemented for snipe are also likely to have a significant beneficial effect for several moorland passerine species found within the survey area.

161. It is concluded that the Development is unlikely to have any significant adverse effects on bird communities. Furthermore, measures included for breeding snipe within the HMP are likely to have a significant beneficial effect for several moorland passerine species found within the survey area.

Fisheries

162. The key receptors for this assessment are the Glenarm River and its main Linford Water tributary, together with a series of small tributary streams which drain the area within the Site Boundary.

163. The study focussed on the streams draining the proposed site and also on connected reaches of the Linford Water and Glenarm rivers. Field surveys were carried out to assess stream quality, fish habitats and fish stocks. The approach was based on the selection of nine principal survey sites to establish a baseline for any future monitoring required during construction or operational phases, with control and impact sites selected respectively on the Linford Water and main channel Glenarm River.

164. The proposed site lies within the Glenarm River catchment, which is a locally important for recreational angling for Atlantic salmon, brown trout and sea trout. With regard to fisheries administration and legislation, the proposed Development is located within the geographic area of responsibility of Inland Fisheries Division of the Department for Agriculture, Environment and Rural Affairs for Northern Ireland.

165. In general, the streams draining the site to the Glenarm River are of little fisheries value in terms of usable salmonid habitat due mainly to their diminutive size, lack of significant flow and absence of fish. However, the streams draining the site to the Linford Water tributary, such as the Feystown Burn and Clady Burn, are of greater significance due to the presence good quality fish nursery habitat and fair to moderate abundance of brown trout. Most of the streams draining the site are of Good to High water quality with good physical habitat supporting sensitive invertebrate species

166. 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.

167. 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.

168. There also is potential for obstruction of fish passage in the Feystown Burn and Clady Burn where site tracks are planned. Mitigation to address this impact is recommended and includes the use of bottomless culverts that preserve the natural stream bed and allow unimpeded fish movement.

169. 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 Glenarm River/ Linford Water and associated drainage streams.

Geology and Water Environment

170. An assessment of the likely effects of the 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; Mid and East Antrim Borough Council, Northern Ireland Water; Department for Infrastructure, and Department for Economy.

171. 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.

172. 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 Development. The underlying geology is a mixture of clay, sand, gravel, and boulders varying widely in size and shape, with areas of peat also identified. Bedrock is composed largely of basalt with an area of chalk and microgabbro to the east of the site. Groundwater flow within the bedrock is expected to be fractured with occasional localised conduit flow, discharging mainly to

the local surface water network with potentially some limited discharge to the coast.

173. The current hydrology of the site consists of a number of natural source watercourses and streams and artificially modified drainage ditches and peat drains. The majority of on-site surface water features drain to the Glenarm River and Linford Water (a tributary of the Glenarm River) with some draining to the Irish Sea (North Channel). Glenarm River flows into the Irish Sea (North Channel) 4.3 km to the north-east of the Site. Glenarm River and Linford Water are hydrologically linked to Glenarm Woods Area of Special Scientific Interest (ASSI) located approximately 2 km to the west of the Development. The Development is also located in proximity to Scawt Hill ASSI and Linford ASSI, both designated as important sites for Earth Sciences.

174. Aspects of the design, construction, operation, and decommissioning of the 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 Development would likely cause adverse effects on the water environment due to the hydrological link between the Development and 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 Development to minimise potential adverse effects include:

175. 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);

176. Avoidance of significant water features based on baseline constraints mapping (i.e. establishing zones around watercourses where construction works are to be avoided);

177. Careful management of minor water features where they come into contact with new infrastructure or upgraded access tracks.

178. 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 minimising the risk of flash flooding downstream;

179. 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).

180. Implementation of the mitigation proposed would result in no significant residual effects to the receiving geology and water environment as a result of the Development. Monitoring the effect of the Development on the water

environment and fisheries habitat will be provided through water quality monitoring.

181. 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 Development in conjunction with any other pre-existing or consented Development.

Peat

182. A Phase 1 Geotechnical Study including Peat Slide Risk Assessment was undertaken and concluded that the majority of the site exhibits shallow peat depths, which is generally considered to have a negligible peat slide potential. Peat depth in areas where development is proposed has been determined by the assessment to vary to a maximum depth of 1.6m. Peat in many of these areas is noted to have appeared to have been historically treated resulting in an increased shear strength further reducing the risk.

Noise

183. An assessment of the acoustic impact from both the construction and operation of the proposed Ballygilbert Wind Farm was undertaken taking into account the identified nearest residential properties.

184. The operational noise impact was assessed 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 methodology described in this document was developed by a working group comprised of a cross section of interested persons including environmental health officers, wind farm operators and independent acoustic experts. It provides a robust basis for assessing the noise impact of a wind farm and has been applied at the vast majority of wind farms currently operating in the UK.

185. ETSU-R-97 makes clear that any noise restrictions placed on a wind farm must balance the environmental impact of the wind farm against the national and global benefits that would arise through the development of renewable energy sources. 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'.

186. Representative baseline conditions (the "background noise level") at nearby residential properties were established by undertaking noise surveys. These measured levels were then used to infer the background noise levels at other nearby residential properties as the ETSU-R-97 document recommends. As background noise levels depend upon wind speed, as indeed do wind turbine noise emissions, the measurement of background noise levels at the survey

locations were made concurrent with measurements of the wind speed and wind direction. These wind measurements are made at the wind turbine site rather than at the survey locations, since it is this wind speed that would subsequently govern the wind farm's noise generation.

187. A sound propagation model was used to predict the noise levels due to the proposed wind farm at nearby residential properties over a range of wind speeds, taking into account the position of the proposed wind turbines, the nearest residential properties, and the candidate wind turbine type. The model employed (which considered downwind conditions at all times) took account of attenuation due to geometric spreading, atmospheric absorption, ground effects and barriers. It has been shown by measurement-based verification studies that this model tends to slightly overestimate noise levels at nearby residential properties.

188. The relevant noise limits were then determined through analysis of baseline conditions and the criteria specified by the ETSU-R-97 guidelines. The general principle regarding the setting of noise criteria is that limits should be based relative to existing background noise levels, except for very low background noise levels, in which case a fixed limit may be applied. This approach has the advantage that the limits can directly reflect the existing noise environment at the nearest residential properties and the impact that the wind farm may have on this environment. Different limits are applicable depending upon the time of day. The daytime limits are intended to preserve outdoor amenity, whilst the night-time limits are intended to prevent sleep disturbance.

189. The predicted operational noise levels are within noise limits at nearby residential properties at all considered wind speeds with the adoption of a noise management strategy. 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.

190. A construction noise assessment, incorporating the impact due to increased traffic noise, indicates that predicted noise levels likely to be experienced at the nearest residential properties exceed construction noise criteria for a short period of time although appropriate mitigation measures have been identified.

191. An acoustic assessment of the proposed energy storage facility in accordance with BS 4142: 2014 shows that the impact would be low and the levels insignificant in comparison to the wind farm noise levels.

Traffic & Transport

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

193. The proposed access route for AILs from Belfast Port has been used previously for the construction of various wind farms that have utilised the A8. From Belfast the route will travel north on the M2, onto the A8 at Sandyknowes Roundabout, continuing for c. 22km. The route exits onto Antiville Road, continuing onto Upper Cairncastle Road, and turning onto Brustin Brae Road. The exit onto Ballycoose Road is taken at Carncastle, becoming Feystown Road, which continues west onto the site entrance. See Figure 11.1: Delivery Route.

194. 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.

195. Reinstatement will be undertaken 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 at the site entrance will need to be reopened temporarily, after which they will be reinstated. Any works will be undertaken following consultation with DfI Roads.

196. It is proposed that Normal HGV load delivery routes (including stone and concrete) the A8, Antiville Road, Upper Cairncastle Road, Brustin Brae Road, Ballycoose Road and Feystown Road, with sources of material to be confirmed prior to construction.

197. The main traffic impacts are associated with the increase in HGV vehicle movements along the Ballycoose Road and Upper Cairncastle Road 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 6 days when the construction of each wind turbine foundation would occur.

198. 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.

199. A TMP will be developed and agreed with the relevant stakeholders post consent and pre-construction in order to control and mitigate impacts associated with increased vehicles movements.

200. 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

201. A shadow flicker analysis of the 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.

202. 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.

203. An analysis of shadow flicker throughout the year from Ballygilbert 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 14 turbines, each with maximum tip heights of 149.9 m and maximum rotor diameter of 117 m.

204. In accordance with The Best Practice Guidance to Planning Policy Statement 18 "Renewable Energy" (2009), as described above, analysis would be performed on all occupied houses within 1170 metres of any proposed wind turbine. There are 13 inhabited houses within ten rotor diameters of the proposed turbines.

205. It should be emphasised that this analysis provides an extremely conservative estimate of the extent that houses will be affected by shadow flicker. Due to frequent cloud cover, turbines not turning on at all times and turbine rotors not being aligned with the sun in a way to cast maximum shadow onto habitations, the actual amount of shadow flicker seen in these areas is likely to be much less.

206. Due to both the distance of the nearest residential properties to the Development, and proposed mitigation if required, it is concluded that the Development should not cause a material reduction to residential amenity owing to shadow flicker.

Socioeconomics

207. The Development will offer a much-needed boost of activity to the local and 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.

208. Indeed, the Mid and East Antrim economy has faced a challenging backdrop in recent years; and given its exposure to the manufacturing sector, the local area has struggled to create job opportunities over the last decade. Therefore, the labour market conditions have not been ideal in the lead up to the coronavirus outbreak, and its subsequent lockdown. Given the lockdown will have a significant impact on local businesses for at least the short term and put upward pressure on local unemployment, 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 are usually project specific and involve a considerable amount of sunk costs. Therefore, if the development does not take place the benefits, including the catalytic impact, are unlikely to be realised elsewhere in the Northern Ireland economy.

209. The Development is estimated to involve a capital spend of £39.78 million. Of this total, £10.41 million (nominal prices) will be realised within the Northern Ireland economy. The projected 18-month construction phase is estimated to create or sustain 120-132 total (direct, indirect and induced) job years of employment, £2.85-£3.09 million (2016 prices) of wages and £5.53-£6.19 million (2016 prices) of GVA to the Northern Ireland economy.

210. The estimated total (direct, indirect and induced) benefits realised in Northern Ireland by the operational phase of the proposed Development includes wages of £2.95 million (2016 prices) and £8.36 million (2016 prices) in GVA over the 30-year operating period.

211. We also expect a fiscal injection from the Development. During the construction, the UK Exchequer is estimated to benefit from increased tax revenue of £0.98-£1.06 million. Over the 30-year operational phase, an estimated £1.02 million revenue will be generated and a further £1.29-£1.56 million in benefit savings.

212. Based on rateable values of £13,293 per MW—we calculate that the Development will increase rateable value by £0.8 million each year, or by £23.45 million over the project horizon. From these values business rates are calculated and collected for local Councils and the Northern Ireland Assembly. By applying Mid and East Antrim non-domestic poundage rates, we estimate additional business rates of £0.46 million each year and £13.79 million, or 60.1 percent of the Development's rateable value, over the 30-year lifetime of the project.

Conclusion

213. The potential effects of the Development have been assessed in accordance with regulatory requirements and good practice. The ES incorporates technical assessments of the 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 Development have been avoided or minimised through the use of the iterative design process and with the application of mitigation measures.

214. The Development is a 58.8MW wind farm consisting of 14 x 4.2MW turbines. The amount of electricity that could be produced by the Development is estimated at 236.9gWh per year which is enough electricity to meet the needs of 61,900 homes each year6, over 5,000 more than the current housing stock (of approximately 56,0007) in the local area.

215. The Development is also estimated to reduce CO_2 emissions by 109,000 tonnes each year. This equivalent to 68,700 newly registered cars.8

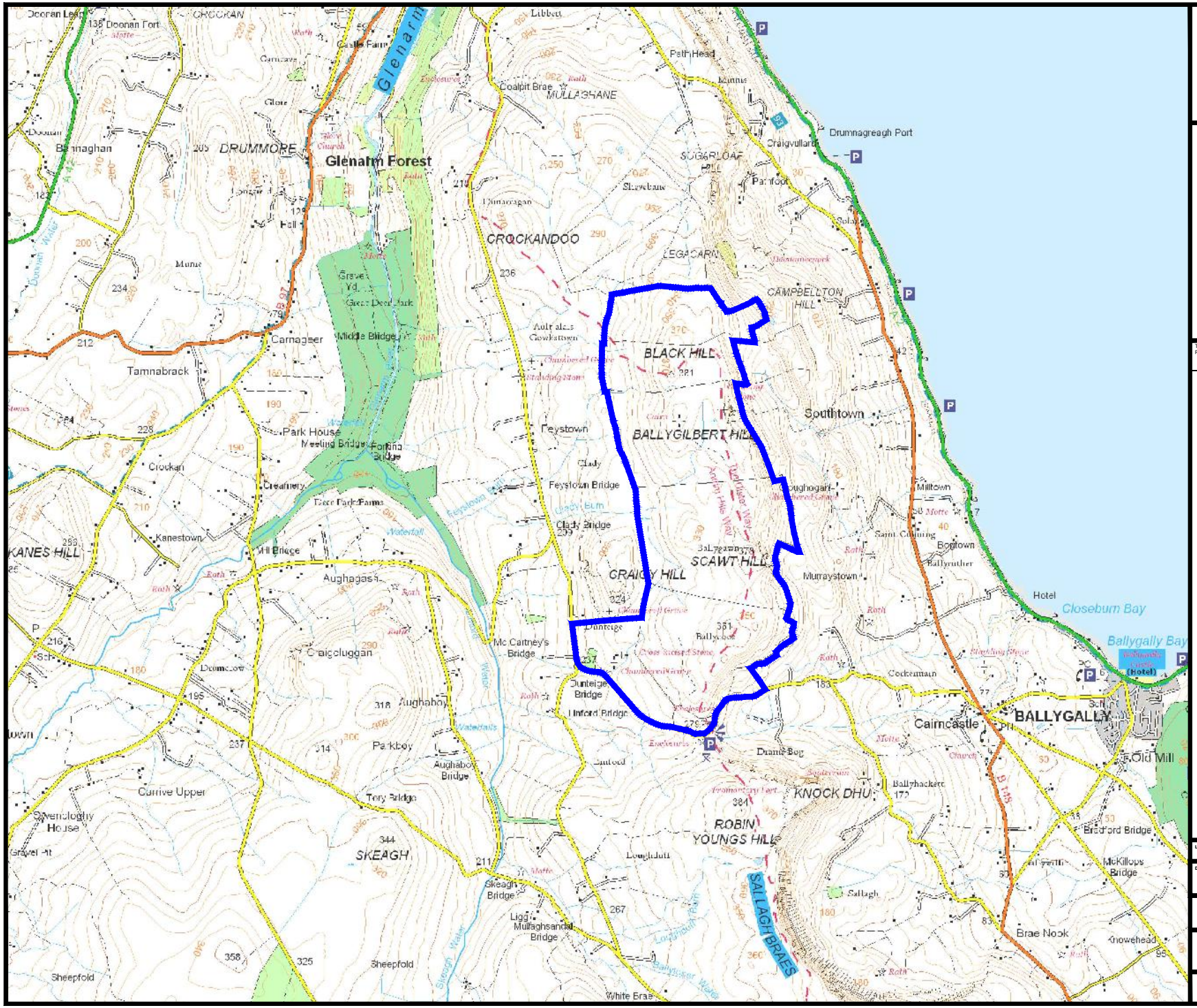
216. The Development will result in a reduction in greenhouse gas emissions from the electricity generating industry by harnessing wind as an alternative to the burning of fossil fuels, in line with the government's energy goals. It is also important to highlight that energy production is not static and additional renewable generation will be required to be connected to maintain the NI targets and subsequently achieve and maintain the UK renewable targets. Therefore, it is imperative that we maximise the production of electricity from renewable sources in suitable locations such as Ballygilbert, which with an estimated connection date of 2023/2024, can make an important contribution to Northern Ireland and the UK meeting and maintaining their respective renewable targets.

[6] For Ballygilbert, a load fact of 0.46 was provided by RES and applied to Oxford Economics' calculations. This load factor allows us to account for wake and electrical losses using typical wind speeds/directions etc. to give a realistic prediction of electricity output (rather than using a theoretical maximum level whereby it is assumed that wind blows for 24 hours a day 365 days a year on every wind farm site.)

[7] Oxford Economics Internal Model Suite.

[8] https://www.gov.uk/government/publications/new-car-carbon-dioxide-emissions

Figures



res

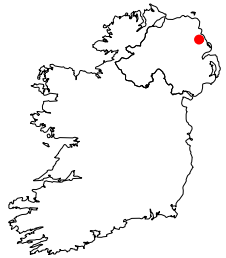
BALLYGILBERT WIND FARM

FIGURE 1.1

SITE LOCATION PLAN

KEY

SITE LOCATION



SITE LOCATION - NOT TO SCALE

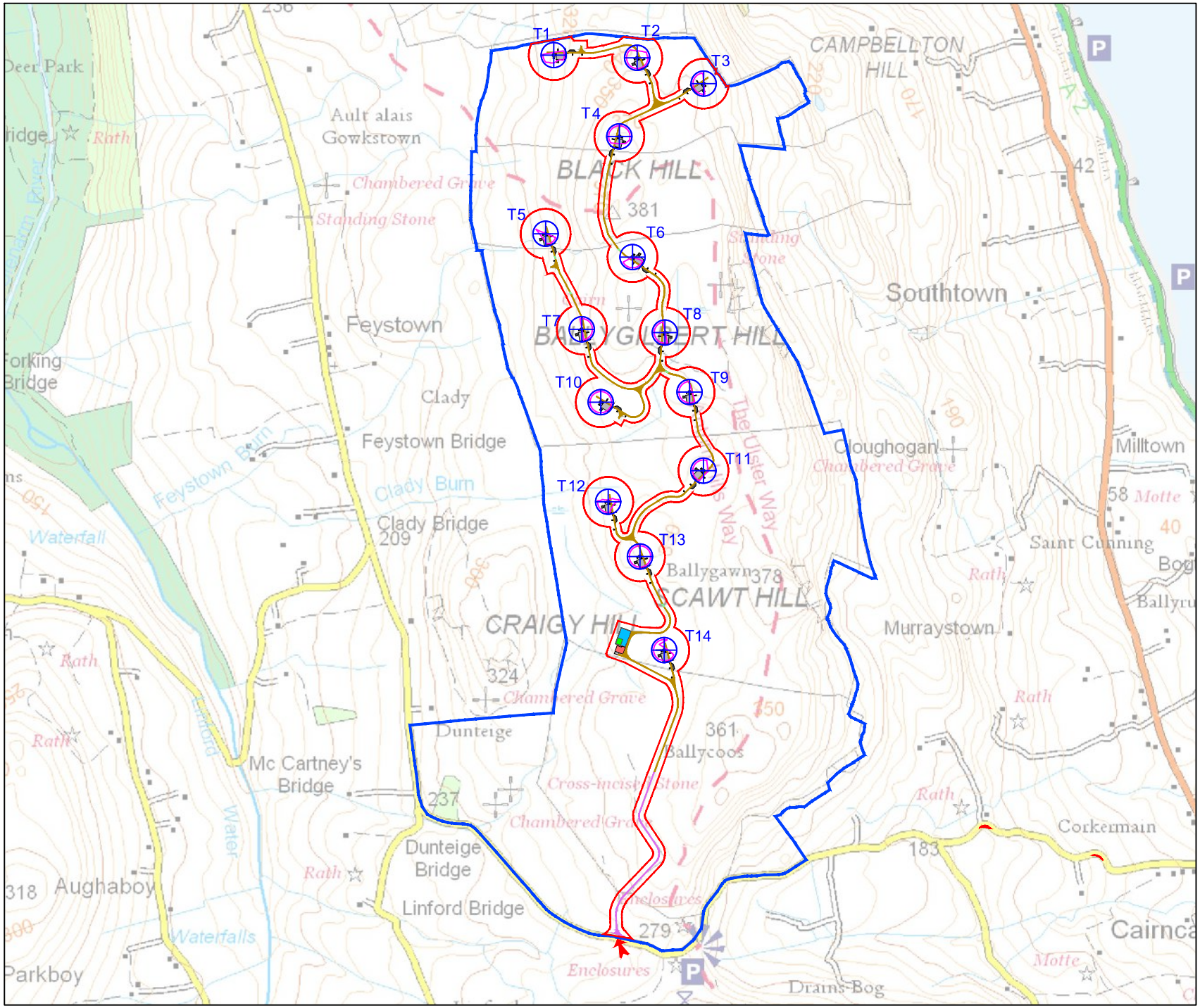
LAYOUT DWG	N/A	T-LAYOUT NO.	N/A

DRAWING NUMBER

03128-RES-LAY-DR-LE-001

SCALE - 1:50,000 @ A4

NON-TECHNICAL SUMMARY



BALLYGILBERT WIND FARM

FIGURE 1.3

INFRASTRUCTURE LAYOUT

KEY

- PLANNING APPLICATION BOUNDARY
- LAND UNDER APPLICANT CONTROL
- WIND TURBINE LOCATION
- TURBINE MICROSITING
- NEW SITE TRACKS
- UPGRADED SITE TRACKS
- WATERCOURSE CROSSING
- CRANE HARDSTANDING AREA
  - PERMANENT
  - TEMPORARY
- TEMPORARY CONSTRUCTION COMPOUND
- ENERGY STORAGE COMPOUND
- CONTROL BUILDING & SUBSTATION COMPOUND WITH PERMANENT HARDSTANDING AREA
- SITE ENTRANCE LOCATION

LAYOUT DWG	T-LAYOUT NO.
03128-RES-LAY-DR-TE-001	PNIRbgt058

DRAWING NUMBER
03128-RES-PRO-DR-PT-001

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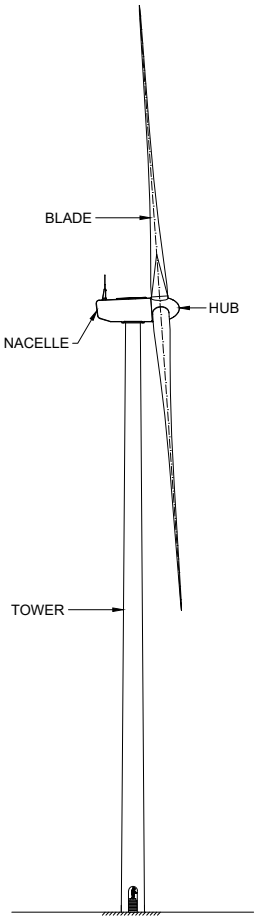
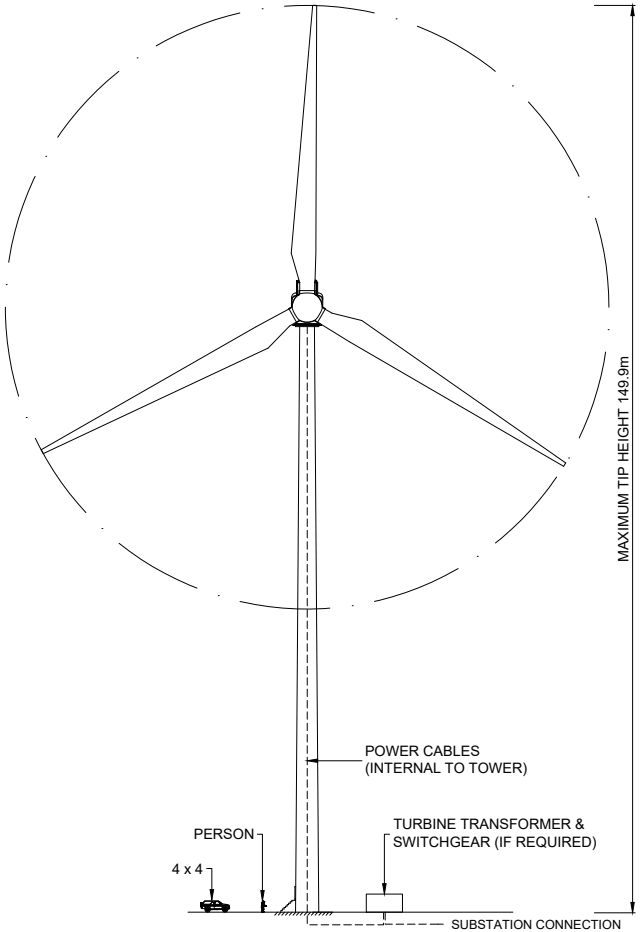


SIDE VIEW



FRONT VIEW

PHOTOGRAPH OF TYPICAL TURBINE

BALLYGILBERT WIND FARM

FIGURE 1.4

TURBINE ELEVATION

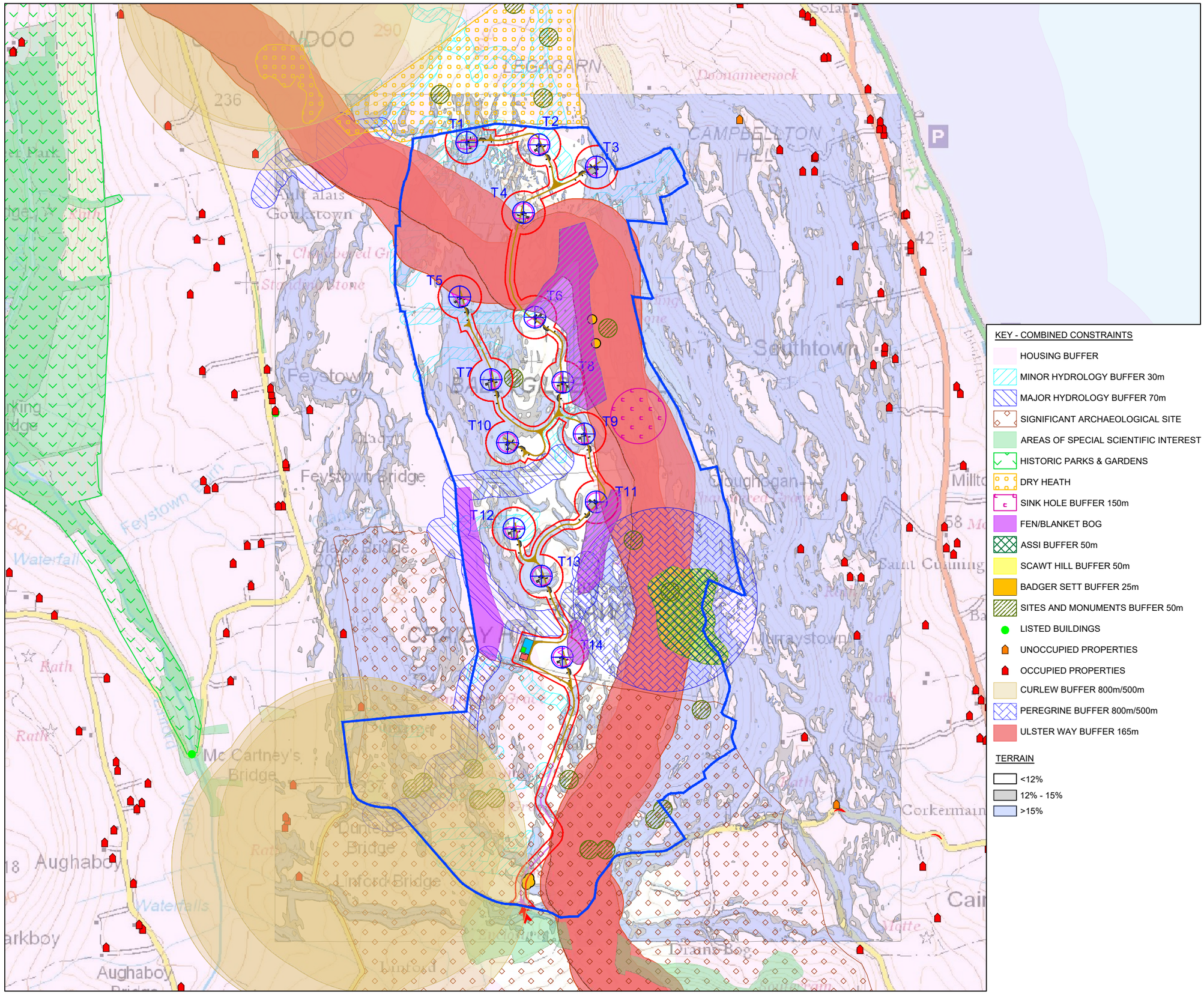
LAYOUT DWG	N/A	T-LAYOUT NO.	N/A

DRAWING NUMBER

03128D2901-01

SCALE - 1:1250 @ A4

NON TECHNICAL SUMMARY



KEY - COMBINED CONSTRAINTS

- HOUSING BUFFER
- MINOR HYDROLOGY BUFFER 30m
- MAJOR HYDROLOGY BUFFER 70m
- SIGNIFICANT ARCHAEOLOGICAL SITE
- AREAS OF SPECIAL SCIENTIFIC INTEREST
- HISTORIC PARKS & GARDENS
- DRY HEATH
- SINK HOLE BUFFER 150m
- FEN/BLANKET BOG
- ASSI BUFFER 50m
- SCAWT HILL BUFFER 50m
- BADGER SETT BUFFER 25m
- SITES AND MONUMENTS BUFFER 50m
- LISTED BUILDINGS
- UNOCCUPIED PROPERTIES
- OCCUPIED PROPERTIES
- CURLEW BUFFER 800m/500m
- PEREGRINE BUFFER 800m/500m
- ULSTER WAY BUFFER 165m

TERRAIN

- <12%
- 12% - 15%
- >15%

BALLYGILBERT WIND FARM

FIGURE 3.3

COMBINED CONSTRAINTS & INFRASTRUCTURE LAYOUT

KEY - INFRASTRUCTURE LAYOUT

- PLANNING APPLICATION BOUNDARY
- LAND UNDER APPLICANT CONTROL
- WIND TURBINE LOCATION
- TURBINE MICROSITING
- NEW SITE TRACKS
- UPGRADED SITE TRACKS
- WATERCOURSE CROSSING
- CRANE HARDSTANDING AREA
  - PERMANENT
  - TEMPORARY
- TEMPORARY CONSTRUCTION COMPOUND
  - ENERGY STORAGE COMPOUND
- CONTROL BUILDING & SUBSTATION COMPOUND WITH PERMANENT HARDSTANDING AREA
- SITE ENTRANCE LOCATION

LAYOUT DWG: 03128-RES-LAY-DR-TE-001

T-LAYOUT NO.: PNIRbgt058

DRAWING NUMBER: **03128-RES-IMP-DR-EN-001**

SCALE - 1:20,000 @ A3

ENVIRONMENTAL STATEMENT