



West Torrisdale Wind Farm

Environmental Impact Assessment Report Volume 2: Main Report

November 2024



Energy for
generations

Volume 2: Main Report

Glossary

1 Introduction

- 1.1 Introduction
- 1.2 Need for the Development
- 1.3 Purpose and Scope of the EIA Report
- 1.4 The Applicant
- 1.5 Environmental Impact Assessment (EIA) Process
- 1.6 Copies of the EIA Report
- 1.7 Commenting on the Application

2 Proposed Development

- 2.1 Introduction
- 2.2 Site Location
- 2.3 Proposed Development Description
- 2.4 Construction Activities
- 2.5 Operation Management and Maintenance
- 2.6 Decommissioning

3 Design Evolution

- 3.1 Introduction
- 3.2 Site Selection Considerations
- 3.3 Policy Considerations
- 3.4 Site Feasibility
- 3.5 Alternatives
- 3.6 Design Evolution and Alternative Layouts
- 3.7 Summary of Preferred Option

4 Seascape, Landscape and Visual Amenity

- 4.1 Introduction
- 4.2 Assessment Methodology and Significance Criteria
- 4.3 Baseline Conditions
- 4.4 Assessment of Potential Effects
- 4.5 Mitigation
- 4.6 Assessment of Residual Effects

4.7 Summary and Conclusions

5 Cultural Heritage

5.1 Introduction

5.2 Assessment Methodology and Significance Criteria

5.3 Baseline Conditions

5.4 Assessment of Potential Effects

5.5 Mitigation

5.6 Assessment of Residual Effects

5.7 Monitoring

5.8 Summary

6 Ecology

6.1 Introduction

6.2 Assessment Methodology and Significance Criteria

6.3 Baseline Conditions

6.4 Assessment of Potential Effects

6.5 Mitigation

6.6 Assessment of Residual Effects

6.7 Monitoring

6.8 Summary

7 Ornithology

7.1 Introduction

7.2 Assessment Methodology and Significance Criteria

7.3 Baseline Conditions

7.4 Assessment of Potential Effects

7.5 Mitigation

7.6 Assessment of Residual Effects

7.7 Monitoring

7.8 Summary

8 Hydrology and Hydrogeology

8.1 Introduction

8.2 Assessment Methodology and Significance Criteria

8.3 Baseline Conditions

8.4 Assessment of Potential Effects

8.5 Mitigation

8.6 Assessment of Residual Effects

8.7 Monitoring

8.8 Summary

9 Geology and Soils

9.1 Introduction

9.2 Assessment Methodology and Significance Criteria

9.3 Baseline Conditions

9.4 Assessment of Potential Effects

9.5 Mitigation

9.6 Assessment of Residual Effects

9.7 Monitoring

9.8 Summary

10 Traffic, Transport and Access

10.1 Introduction

10.2 Assessment Methodology and Significance Criteria

10.3 Baseline Conditions

10.4 Assessment of Potential Effects

10.5 Mitigation

10.6 Assessment of Residual Effects

10.7 Monitoring

10.8 Summary

11 Noise

11.1 Introduction

11.2 Assessment Methodology and Significance Criteria

11.3 Baseline Conditions

11.4 Assessment of Potential Effects

11.5 Mitigation

11.6 Assessment of Residual Effects

11.7 Summary

12 Aviation and Telecommunications

12.1 Introduction

12.2 Assessment Methodology and Significance Criteria

12.3 Baseline Conditions

12.4 Assessment of Potential Effects

- 12.5 Mitigation
- 12.6 Assessment of Residual Effects
- 12.7 Summary

13 Forestry

- 13.1 Introduction
- 13.2 Consultation
- 13.3 Legislation, Policy and Guidance
- 13.4 Forestry Study Area
- 13.5 Development of a Wind Farm Forest Plan
- 13.6 Baseline Conditions
- 13.7 Proposed Development Forest Plan
- 13.8 Requirement for Compensatory Planting
- 13.9 Forestry Waste
- 13.10 Forestry Management Practices
- 13.11 Standards and Guidelines
- 13.12 Summary

14 Shadow Flicker

- 14.1 Introduction
- 14.2 Assessment Methodology and Significance Criteria
- 14.3 Baseline Conditions
- 14.4 Assessment of Potential Effects
- 14.5 Mitigation
- 14.6 Assessment of Residual Effects
- 14.7 Monitoring
- 14.8 Summary

15 Schedule of Environmental Commitments

- 15.1 Introduction

Volume 2: Glossary and Abbreviations

Glossary

Term	Definition
Aeronautical radio navigation aids	Ground-based radio beacons that are used to assist aircraft to navigate.
Aesthetic Aspects	The key aspects of the landscape which contribute to its appearance (previously composition), such as: <ul style="list-style-type: none"> - Scale - Enclosure - Diversity - Form - Line - Contour - Balance - Movement - Pattern
Analysis (Landscape)	The process of breaking the landscape down into its component parts to understand how it is made up.
Analysis (Visual)	The process of identifying the nature of visibility in an area, which is determined through topographic analysis.
Assessment (Landscape)	An umbrella term for description, classification and analysis of landscape.
Baseline	The landscape and visual character of the study area as it exists at the commencement of the assessment process – i.e. prior to the development proposal under consideration.
Controlled airspace	A category of airspace in which all aircraft must obtain clearance from a controller prior to entry and must obey air traffic control instructions when inside the airspace.
Cumulative Effects	Effects arising from the addition or combination of developments. May be experienced in combination, concurrently or sequentially.
dB L _{A90}	The level of noise, in dB, exceeded for 90 percent of the specified time, usually used to define the A-weighted sound pressure level background level, but also used for wind turbine measurement and prediction.
dB or dB(A)	A measure of sound level using a logarithmic scale. The 'A' suffix denotes a filtering or 'weighting' of frequencies such that the defined decibel level provides a representative level relating to the sensitivity of human hearing.
Diversity	Where a variety of qualities or characteristics occur.

Dun	Iron Age of early historic fortified settlement.
Effect	The result of an impact on a landscape or visual receptor.
Element	A component part of the landscape (e.g. roads, hedgerows, woods).
Forest Plan	Management plan covering area of woodland
Forestry Study Area	Area of woodland assessed in the EIAR
Habitat Reinstatement	The replacement of temporarily removed vegetation and/or soil cover that is then allowed to naturally regenerate.
Habitat Restoration	Undertaking measures to actively regenerate degraded habitat.
Hertz (Hz)	The unit of frequency representing cycles per second
Horizontal Angle Subtended	The angle measured in degrees from the left most visible part to the right most visible part of any development.
Impact	The change arising for a landscape or visual receptor as a result of some form of alteration to the baseline.
In-addition cumulative effects	The In-addition cumulative effects - amounting what extra effects there would be on the seascape, landscape and visual resource that would be attributable to the Proposed Development of the Proposed Development taken together with other existing, consented or proposed wind farms.
In-combination cumulative effects	The In-combination cumulative effects - amounting to the effects of the Proposed Development taken together with other existing, consented or proposed wind farms.
Indirect Impacts	Impacts on the environment, which are not a direct result of the development but are often produced away from it or as a result of a complex pathway. Sometimes referred to as secondary impacts.
Instrument Flight Procedures	A series of written and graphical instructions to pilots to enable them to depart from and arrive at airports safely when flying in cloud or poor visibility.
Key characteristics	The elements of the landscape and/or their inter relationship which form the defining components of the landscape.
Landcover	Combination of land use and vegetation that covers the land surface.
Landform	See Topography.
Landscape	Human perception of the land conditioned by knowledge and identity with a place.

Landscape Capacity	An area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors. The degree to which a particular landscape character type or area is able to accommodate change without unacceptable adverse effects on its character. Capacity is likely to vary according to the type and nature of the changes being proposed. The capacity of the landscape is derived from a combination of Landscape Character Sensitivity, Visual Sensitivity and Landscape Value.
Landscape Character	The distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how this is perceived by people. It reflects particular combinations of geology, landform, soils, vegetation, land use and human settlement. It creates the particular sense of place in different areas of the landscape.
Landscape Character Type	A landscape type will have broadly similar patterns of geology, landform, soils, vegetation land use, settlement and field pattern discernible in maps and field survey records.
Landscape Effect	The consequence of change in the elements, characteristics, qualities and overall character of the landscape as a result of development. These effects can be positive, neutral or negative.
Landscape Evaluation	The process of attaching value (non-monetary) to a particular landscape, usually by the application of previously agreed criteria, including consultation and third-party documents, for a particular purpose (for example, designation or in the context of an assessment).
Landscape Fabric	Physical elements of the landscape or development site.
Landscape Factor	A circumstance or influence contributing to the impression of the landscape (e.g. scale, enclosure, elevation).
Landscape Feature	A prominent eye-catching element or landmark (e.g. church spire, wooded hilltop).
Landscape Impact	The change in the elements, characteristics, qualities and overall character of the landscape as a result of development.
Landscape Quality (or Condition)	Based on judgments about the physical state of the landscape and about its intactness. Also relates to the state of repair of individual features and elements which make up character in any one place.
Landscape Resource	The combination of elements that contribute to landscape context, character and value.
Landscape Sensitivity (to a specific type of change)	The extent to which a landscape can accept change of a particular type and scale and is assessed in relation a particular type of development. Based on a combination of susceptibility and value.

Landscape Value	The relative value or importance attached to a landscape (often as a basis for designation or recognition), which expresses commonly held national or local perception of its quality, special qualities and/or scenic beauty, tranquillity or wildness and cultural associations.
Landuse	The primary use of land, including both rural and urban activities.
Long Term Retention	Area of woodland retained beyond economic viability
L _{WA} - Sound Power Level	The fundamental measure of sound power. Sound power is the total sound energy radiated by a source per unit time. The subscript 'A' refers to an A-weighted sound power level.
Magnitude of landscape Impact	A measure of the amount of change to the landscape that would occur as a result of proposed development, generally based on the scale or degree of change to the landscape resource, the nature of the effect and its duration. This is based on a combination of largely quantifiable parameters, such as the distance to the proposed development, visible extent, degree of contrast with context, extent to which the development would be visible, and the duration of an impact.
Magnitude of visual Impact	A measure of the amount of change to the visual context that would occur as a result of a proposed development. This is generally based on the scale of change to the view with respect to the loss or addition of features in the view and changes in its composition, including the proportion of the view that would be occupied by the proposed development; the degree of contrast or integration of any new features of changes in the landscape with the existing or remaining landscape elements and characteristics in terms of form, scale, mass, line, height, colour and texture; duration and nature of the change, whether temporary or permanent, transient or persistent, etc.; the angle of view in relation to the main activity of the receptor(s); distance of the viewpoint from the proposed development; and extent of the area over which the changes would be visible.
Methodology	The specific approach and techniques used for a given study.
Mitigation Measures	Measures including any process, activity or design process to avoid, reduce, remedy or compensate for adverse impacts of a development.
Natural Reserves	Area of high conservation value within woodland
Otter Holt	A protected den used by otter for shelter, resting or breeding.
Perception (of Landscape):	The psychology of seeing and possibly attaching value or meaning to the landscape.

Perceptual Aspect	Elements of the landscape which evoke a response to the senses, such as: Wildness Remoteness Sense of security; and Tranquility
Primary Surveillance Radar	A device which transmits pulses of radio energy into the air and records reflections of those pulses from objects in the sky such as aircraft.
Quartering	The low hunting flights of owls and harriers where they fly low to the ground very slowly looking for prey
Receptor	Physical landscape resource, special interest or individual or group experiencing view liable to change as a result of the proposed development.
Receptor Location	Location occupied by identified receptors.
Residual Effects	Effect of development after mitigation proposals are taken into account.
Scoping	The process of identifying likely significant effects of a development on the environment – which may be carried out in a formal or informal way.
Secondary Surveillance Radar	A form of radar that sends out a query signal which is received by equipment in aircraft, which then respond with a coded reply that identifies that particular aircraft to the radar operator.
Shieling Hut	A small dwelling of stone or turf construction that was occupied on a seasonal basis by people tending animals on upland pastures.
Significance	A measure of importance or gravity of the environmental effect, defined by significance criteria specific to the environmental topic.
Skydancing	Hen harrier courtship behaviour, where the male and female fly in unison and mirror behaviours
Standard Instrument Departure	A type of IFP for aircraft departing from an airport.
Standard Terminal Arrival Route	A type of IFP for aircraft arriving at an airport.
Uncontrolled airspace	A category of airspace in which any aircraft can fly without clearance from or contact with any air traffic control agency.
Viewpoint Sensitivity	The extent to which a view would be altered by change of a particular type and scale, assessed in relation to the following: <ul style="list-style-type: none"> • Location and land use (receptor activity) at the viewpoint or context of the view. • Landscape character and quality at the viewpoint. • Importance of the view (which may be determined with respect to its popularity or number of affected people, its appearance in guidebooks, on tourist maps and the facilities provided for its enjoyment and references to it in literature and/or art).

	<ul style="list-style-type: none"> • Landscape character and quality of the intervening landscape.
Visibility Analysis	The process of identifying theoretical (based on digital modelling) and/or actual predicted areas from where any given development may be seen.
Visual Amenity	Particular composition of landscape elements that contribute to a view, or views.
Visual Effect	The consequence of change in the appearance of the landscape as a result of development, which may be positive or negative.
Visual Impact	The change in the appearance of the landscape and nature of views which may be adverse or beneficial.
Visualisation	Computer generated simulation or photomontage or other technique to illustrate how the proposed development would appear.
Zone of Influence	The area over which ecological features may be subject to significant effects as a result of the Proposed Development and its associated activities.
Zone of Theoretical Visibility (ZTV)	The area predicted to have views of a proposed development on the basis of a digital terrain model or digital surface model, which may/may not take account of landcover features.
Zone of Visual Influence or Viewshed	The area within which a proposed development will be visible.

Abbreviations

Abbreviation	Expanded Term
AADT	Annual Average Daily Traffic
ABC	Argyll and Bute Council
ABLWECS	Argyll and Bute Landscape Wind Energy Capacity Study
ADSFB	Argyll District Salmon Fisheries Board
AFT	Argyll Fisheries Trust
agl	Above Ground Level
AIL	Abnormal Indivisible Load
AIP	Instrument Approach Procedure

ANO	Air Navigation Order
AOD	Above Ordnance Datum
AP	Annual Probability
APDO	Approved Procedure Design Organisation
APQ	Area of Panoramic Quality
ARSG	Argyll Raptor Study Group
ATC	Automatic Traffic Counter
BAP	Biodiversity Action Plan
BGS	British Geological Survey
BoCC	Birds of Conservation Concern
BoP	Balance of Plant
BP	Borrow Pit
BPP	Bird Protection Plan
BTO	British Trust for Ornithology
CAA	Civil Aviation Authority
CAR	Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended)
CEMP	Construction (or Contract) Environmental Management Plan
CH VP	Cultural Heritage Viewpoint
CIEEM	Chartered Institute of Ecology and Environmental Management
CIRIA	Construction Industry Research and Information Association
CRA	Collision Risk Assessment
CRH	Collision Risk Height
CTMP	Construction Traffic Management Plan
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
DSA	Desk Study Area
DTM	Digital Terrain Model
DWPA	Drinking Water Protection Areas
EC	European Commission
EcIA	Ecological Impact Assessment

ECoW	Environmental Clerk of Works
ECU	Energy Consents Unit
EIA	Environmental Impact Assessment
EIA Regulations	Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Act
EPS	European Protected Species
EU	European Union
FCS	Forestry Commission Scotland
FES	Forest Enterprise Scotland
FISA	Forestry Industry Safety Accord
FL	Flight Level
FLS	Forestry and Land Scotland
FMS	Fisheries Management Scotland
FSA	Field Survey Area
FSA	Forestry Study Area
GBR	General Binding Rule
GCR	Geological Conservation Review
GDL	Garden and Designed Landscape
GE	Golden Eagle
GET	Golden Eagle Topography
GIS	Geographical Information System
GPA	Glasgow Prestwick Airport
GPG	Good Practice Guide
GPP	Guidance for Pollution Prevention
GPS	Global Positioning System
GWDE	Groundwater Dependent Terrestrial Ecosystem
GWFG	Greenland white-fronted goose
HER	Historic Environment Record
HES	Historic Environment Scotland
HGV	Heavy Goods Vehicles

HIAL	Highlands & Islands Airports Lt
HLAmap	Historic Land-Use Assessment map
HMP	Habitat Management Plan
HRA	Habitats Regulations Appraisal
IBA	Important Bird Area
IEF	Important Ecological Features
IEMA	Institute of Environmental Management and Assessment
IFP	Instrument Flight Procedure
INNS	Invasive Non-Native Species
IOA	Institute of Acoustics
JNCC	Joint Nature Conservation Committee
Km	Kilometres
LB	Listed Building
LBAP	Local Biodiversity Action Plan
LBO	Local Biodiversity Officer
LCT	Landscape Character Type
LDP	Local Development Plan
LEC	Lawrence Environmental Consultants
LED	Light Emitting Diode
Lights / LGV	Light Goods Vehicles
LMP	Land Management Plan
LSE	Likely Significant Effect
LTR	Long Term Retentions
LUPS	Land Use Planning System
m	Metre(s)
MAGIC	Multi-Agency Geographic Information for the Countryside
mAOD	Metres Above Ordnance Datum
MCA	Maritime & Coastguard Agency
MCIEEM	Member of the Chartered Institute of Ecology and Environmental Management
MoD	Ministry of Defence

MSA	Minimum Sector Altitude
MSS	Marine Scotland Science
NCR	National Cycle Route
NERL	NATS En Route plc
NFE	National Forest Estate
NHZ	Natural Heritage Zone
NPF4	National Planning Framework (4) for Scotland
NR	Natural Reserves
NRHE	National Record of Historic Environment
NRP	Natural Research (Projects)
NRTF	National Road Traffic Forecast
NS	NatureScot
NSA	National Scenic Area
NSR	Non-Statutory Register
NVC	National Vegetation Classification
OCEMP	Outline Construction Environmental Management Plan
OHL	Overhead Line
OHMP	Outline Habitat Management Plan
OS	Ordnance Survey
PAT	Predicted Aquila Territory
PLHRA	Peat Landslide Hazard Risk Assessment
PMP	Peat Management Plan
POI	Point of Interest
PPE	Personal Protective Equipment
PPP	Pollution Prevention Plan
PSR	Primary Surveillance Radar
PWS	Private Water Supply
RBMP	River Basin Management Plan
RD	Rotor Diameter
RIGS	Regionally Important Geological Site
RNP	Required Navigation Performance
Rpm	Revolutions per minute

RSPB	Royal Society for the Protection of Birds
RSR	Route Survey Report
SAC	Special Area of Conservation
SBL	Scottish Biodiversity List
SCT	Seascape Character Type
SEPA	Scottish Environment Protection Agency
SF	Scottish Forestry
SFS	Scotland's Forestry Strategy
SG	Supplementary Guidance
SID	Standard Instrument Departure
SLA	Special Landscape Area
SLVIA	Seascape, Landscape and Visual Impact Assessment
SM	Scheduled Monument
SNH	Scottish Natural Heritage
SPA	Special Protection Area
SPP	Scottish Planning Policy
SRMS	Scottish Raptor Monitoring Scheme
SSSI	Site of Special Scientific Interest
STAR	Standard Terminal Arrival Route
SuDS	Sustainable Drainage Systems
TAA	Terminal Arrival Altitude
TCC	Temporary Construction Compound
UHF	Ultra High Frequency
UK	United Kingdom
UKFS	UK Forestry Standard
UKWAS	UK Woodland Assurance Scheme
UV	Ultra Violet
UXB	Unexploded Bombs
UXO	Unexploded Ordnance
VP	Vantage Point
WFD	Waste Framework Directive

WLA	Wild Land Area
WLIA	Wild Land Impact Assessment
WoSAS	West of Scotland Archaeology Service
WPZ	Wind Protection Zone
WSI	Written Scheme of Investigation
ZOI	Zone of Influence
ZTV	Zone of Theoretical Visibility

1 Introduction

1.1 Introduction

1.1.1 This Environmental Impact Assessment (EIA) Report (EIAR) has been prepared by Ramboll UK Limited (Ramboll) on behalf of ESB Asset Development UK Limited ('the Applicant') in support of an application for consent¹ to construct and operate a wind farm and associated infrastructure with generation capacity of greater than 50 MW. The project is to be referred to as West Torrisdale Wind Farm ('the Proposed Development'). The Proposed Development will comprise up to 9 wind turbines with a tip height of up to 149.9 m and a predicted output of up to 6 MW per wind turbine, and will also include a Battery Energy Storage System (BESS) of up to 20 MW of energy storage, and ancillary infrastructure. The Application Boundary covers an area of approximately 391 hectares (ha), whereas the area within the Application Boundary where the wind turbines are located ('the Wind Turbine Array') covers an area of approximately 221 ha, approximately 4 km southwest of Carradale, in Argyll and Bute. The Proposed Development location is shown on **Figure 1.1** (EIAR Volume 3a) and the Application Boundary is shown on **Figure 1.2** (EIAR Volume 3a).

1.1.2 This EIAR uses the below terminology throughout:

- Proposed Development – All elements of the West Torrisdale Wind Farm development for which S36 consent and deemed planning permission are sought.
- Application Boundary – The red line boundary defining all elements of the Proposed Development for the purpose of the S36 application.
- Wind Turbine Array – the location of the wind turbines comprising the Proposed Development.
- Access Corridor – the land within the Application Boundary in which the access track connect the Wind Turbine Array with the A83 road.
- Study Area – the area in which the EIA is undertaken, defined for each technical topic as appropriate.

1.1.3 This Chapter is supported by the following figures and technical appendices:

- Volume 3a: Figures
 - **Figure 1.1: Site Location;** and
 - **Figure 1.2: Application Boundary.**
- Volume 4: Technical Appendices
 - **Technical Appendix 1.1: Consultation Register;** and
 - **Technical Appendix 1.2: Socio-economic Report**

1.1.4 Figures and technical appendices are referenced in the Main Report where relevant.

1.1.5 This EIA Report comprises four volumes:

- Volume 1: Non-Technical Summary (NTS);
- Volume 2: Main Report;

¹ An application for consent for the Proposed Development will be made to the Scottish Ministers under section 36 of the Electricity Act 1989, along with a request for a direction that planning permission be deemed to be granted under section 57(2) of the Town and Country Planning (Scotland) Act 1997 as amended.

- Chapter 1: Introduction
 - Chapter 2: Proposed Development
 - Chapter 3: Design Evolution
 - Chapter 4: Seascape, Landscape and Visual Impact Assessment
 - Chapter 5: Cultural Heritage
 - Chapter 6: Ecology
 - Chapter 7: Ornithology
 - Chapter 8: Hydrology and Hydrogeology
 - Chapter 9: Geology and Soils
 - Chapter 10: Traffic and Transport
 - Chapter 11: Noise
 - Chapter 12: Aviation
 - Chapter 13: Forestry
 - Chapter 14: Shadow Flicker
 - Chapter 15: Schedule of Environmental Commitments
- Volume 3a: Figures;
 - Volume 3b: Visualisations;
 - Volume 4: Technical Appendices; and
 - Volume 5: Confidential.

1.2 Need for the Development

1.2.1 The Scottish Government declared a climate emergency² in 2019. The Scottish Climate Change Plan 2020 reflects the increased ambition of the new targets set by the Climate Change (Emissions Reduction targets) (Scotland) Act 2019 to reach net-zero emissions. The Scottish Energy Strategy also includes a new 2030 'whole system' target for the equivalent of 50% of Scotland's heat, transport and electricity consumption to be supplied by renewable sources. Taking account of the policy context, there are a number of benefits associated with the Proposed Development. The project would bring a wealth of socio-economic benefits to the local community, including the creation of jobs and opportunities for local businesses and suppliers during the construction phase and for the lifetime of the project. This application therefore not only complies with Scottish Government planning and energy policy but would also lead to increased benefits both in respect of climate change, as well as local economic benefits.

1.3 Purpose and Scope of the EIA Report

1.3.1 This EIA Report has been prepared to accompany an application to Scottish Ministers under Section 36 of the Electricity Act 1989³ and has been prepared in accordance with The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (herein referred to as the 'EIA Regulations'). This EIA Report has been prepared to meet the requirements of Schedule 4 of the EIA Regulations and the Institute of Environmental Management and Assessment (IEMA) Quality Mark Criteria.

² <https://www.gov.scot/publications/global-climate-emergency-scotlands-response-climate-change-secretary-roseanna-cunninghams-statement/>

³ Electricity generation projects below 50MW are authorised under the Town and Country Planning (Scotland) Act, 1997. Those over 50MW are authorised under Section 36 of the Electricity Act, 1989

- 1.3.2 The Proposed Development for which the Applicant is seeking consent is as follows: the erection and 35-year operation of a wind farm development comprising up to 9 wind turbines, each with a maximum overall height to vertical blade tip of up to 149.9 m, together with ancillary infrastructure at each wind turbine; associated wind turbine foundations and hardstanding areas; access tracks with associated water crossings, passing places and turning heads; borrow pits; substation compound including a Battery Energy Storage System (BESS) and LiDAR; temporary site construction compound; network of electrical cables; a temporary concrete batching plant and associated ancillary works (as further described in **Chapter 2** (EiAR Volume 2)).
- 1.3.3 The Wind Turbine Array will be accessed from the A83 to the west via the existing Beinn an Tuirc Wind Farm track and upgraded forestry tracks leading to the Wind Turbine Array (as shown in **Figure 1.2**, EiAR Volume 3a).
- 1.3.4 The Proposed Development has a secured distribution (33 kV) grid connection offer for 2026, connecting to Carradale substation, located approximately 3 km to the northeast of the Wind Turbine Array. The grid connection infrastructure, between the proposed on-site substation and the Carradale Substation, would be the subject of a separate development consent application and is not considered further in the EIA.

Other Planning Documents

- 1.3.5 This Section 36 Application is accompanied by the following documents that do not form part of the EIA Report:
- Planning Statement;
 - Design and Access Statement (DAS); and
 - Statement of Community Consultation (SCC) Report.

1.4 The Applicant

- 1.4.1 ESB Asset Development UK Limited is part of ESB, Ireland's premier energy company, established in 1927 and is a leading independent power generator in the UK market. ESB has a track record of over 30 years as a successful investor in the UK and owns and operates wind farms across the UK and Ireland with a current generating capacity of over 700 MW.
- 1.4.2 In the UK, ESB has 14 wind farms in development in the planning system, and is aiming to bring its total investment in onshore wind to more than two gigawatts by 2030. As well as onshore wind, ESB is investing in the UK in:
- Offshore wind – ESB has taken 50% stakes in the 450 MW Nearth na Gaoithe project in the Firth of Forth and the 1,000 MW Inch Cape project off the Angus coast;
 - Electric vehicle infrastructure;
 - Carrington Power Station 880 MW combined cycle gas turbine; and
 - Renewable heating systems, such as installing the low carbon heating and cooling system in the V&A Dundee.
- 1.4.3 ESB is also an energy provider to businesses and householders across Scotland and the UK.
- 1.4.4 For further information about ESB in the UK visit: <https://www.esb.ie/>.

Statement of Competence

- 1.4.5 In accordance with regulation 5(5) of the EIA Regulations, by appointing Ramboll UK Limited (Ramboll) the Applicant has ensured that the EIA Report has been prepared by 'competent experts'. This EIA Report has been compiled and approved by professional EIA practitioners at Ramboll, holding relevant undergraduate and post-graduate degrees, membership of the Institute of Environmental Management and Assessment (IEMA) and Chartered Environmentalist status with the Society for the Environment. This EIA Report meets the requirements of the IEMA EIA Quality Mark Scheme. This is a voluntary scheme operated by IEMA that allows organisations to make a commitment to excellence in EIA and to have this commitment independently reviewed on an annual basis.
- 1.4.6 The project team comprises the companies presented in Error! Reference source not found. and each of the impact assessment chapters provides details of the relevant professional memberships of the author, code of practice followed and assessment methodology used.

Table 1.1: Project Team	
Team Member	Roles & Responsibility
ESB Asset Development UK Limited	Project Developer
Ramboll UK Limited	EIA Project Management Seascape, Landscape and Visual Impact Assessment Ecology Ornithology Hydrology Shadow Flicker
BiGGAR Economics	Socio-Economics
SLR	Geology Peat
CFA Archaeology	Cultural Heritage & Archaeology
Hayes MacKenzie	Noise
Pell Frischmann	Traffic & Transport
Aviatica	Aviation and Telecommunications
DGA Forestry	Forestry
JLL	Planning

1.5 Environmental Impact Assessment (EIA) Process

- 1.5.1 EIA is a process that identifies the potential environmental effects (both positive and negative) of a development and proposes measures to avoid, reduce and/or offset any adverse environmental effects and potentially enhance positive effects.
- 1.5.2 The Proposed Development is of a type listed in Schedule 2 of the EIA regulations (item (1) "a generating station"). On the basis that "*the development is likely to have significant effects on the environment by virtue of factors such as its nature, size or location*", an EIA is required. In this case, the Applicant has volunteered to undertake an EIA rather than request a formal screening opinion.
- 1.5.3 The key stages in the EIA process adopted for the Proposed Development are summarised below.

Scoping

- 1.5.4 The Applicant submitted a request for a Scoping Opinion to Scottish Ministers in February 2021. This request was accompanied by a Scoping Report, prepared by Ramboll on behalf of the Applicant, which set out a summary of the proposals; identified the potential significant environmental effects, and summarised the proposed scope of the EIA.
- 1.5.5 A Scoping Opinion was received from the Energy Consents Unit (ECU) on 26th April 2021. The contents of this and other consultation responses received are summarised in **Technical Appendix 1.1** (EIAR Volume 4), along with a list of all bodies consulted during the Scoping exercise.
- 1.5.6 In addition to seeking a Scoping Opinion, the Applicant conducted public exhibitions to seek the views of the local community. The exhibitions were held on the 9th, 10th, and 11th December 2021.
- 1.5.7 A summary of the representations received during the public exhibitions is provided in the PAC Report which accompanies this Section 36 Application.
- 1.5.8 Further details on the key issues identified through the Scoping and Consultation process are provided in **Chapter 3** (EIAR Volume 2).
- 1.5.9 Following Scoping and baseline characterisation, this EIA Report provides an impact assessment chapter for each of the following disciplines/factors/issues:
- Seascape, Landscape and Visual;
 - Cultural Heritage;
 - Ecology;
 - Ornithology;
 - Hydrology;
 - Geology and Soils;
 - Traffic, Transport and Access;
 - Noise and Vibration;
 - Aviation and Telecommunications;
 - Forestry; and
 - Shadow Flicker.

Non-significant Issues

- 1.5.10 During the Scoping process several issues were identified as not being likely to cause significant effects on the environment as a result of the Proposed Development. These issues are described below.

SOCIO-ECONOMICS

- 1.5.11 The Proposed Development is not expected to give rise to significant adverse socio-economic and tourism effects; therefore, a separate report on socio-economics and tourism has been provided as a Technical Appendix to this EIA Report (**Technical Appendix 1.2**, EIAR Volume 4). The Technical Appendix considers whether there is potential for adverse effects, as well as the potential socio-economic benefits arising from the Proposed Development.

AIR QUALITY

- 1.5.12 The Proposed Development is not considered likely to give rise to significant impacts on air quality. There is potential for it to give rise to localised and temporary construction effects associated with dust from soil stripping and earthworks, from excavation, potentially including occasional blasting, and from vehicles running over unsurfaced ground and exhaust emissions from fixed and mobile construction plant and construction vehicles. However, the nature of the construction activities is that they will be relatively short term, intermittent and controllable through the application of good construction practice, and also at sufficient distance from sensitive receptors to be considered low/negligible impact.
- 1.5.13 Construction works will be localised, short term, intermittent and controllable through the application of good construction practice. Fixed and mobile plant would be limited in size and number and would operate for short periods. The potential for nuisance effects on residential or recreational amenity will be limited and will be strictly controlled in accordance with a detailed Construction Environmental Management Plan (CEMP). An Outline CEMP is included as **Technical Appendix 2.1**, EIAR Volume 4. On this basis, there is no potential for significant construction or operational air quality effect and no Air Quality Assessment has been undertaken as part of this EIA Report.

ICE THROW

- 1.5.14 The maximum potential distance of ice falling from wind turbines can be approximated using the formula $1.5 \times (\text{rotor diameter} + \text{hub height})^4$. For the Proposed Development, based on a rotor diameter of 136 m and hub height of 82 m, the maximum distance from a wind turbine where ice could be expected to fall is therefore approximately 327 m. Through site design, the risk to public safety is considered to be very low because the distance from the wind turbines to the nearest public road, residential property or core path is greater than 327 m. In line with current guidance⁵, a permanent warning sign at the Wind Turbine Array entrance is proposed to alert the public to the possibility of ice throw under certain weather conditions. Considering the above, no potential significant impacts as a result of ice throw from the Proposed Development are anticipated and no ice throw assessment is provided within this EIA Report.

CLIMATE CHANGE

- 1.5.15 The Proposed Development itself will contribute to climate change mitigation through the production of renewable energy.
- 1.5.16 **Technical Appendix 2.2** (EIAR Volume 4) presents a statement of the expected carbon savings over the lifetime of the Proposed Development using the latest version of the Scottish Government's Carbon Calculator Tool⁶. It presents the carbon emissions associated with ground conditions, access preparations, foundation excavations, materials used, the transportation of materials and components to the Wind Turbine Array and any other carbon loss through tree felling or through degradation of peat/peaty soils.
- 1.5.17 The vulnerability of the Proposed Development to climate change will be considered as part of the detailed design of the Proposed Development which will consider potential consequences of climate change, e.g. increased flood risk potential and more extreme weather

⁴ Seifert, H., Westerhellwig, A. and Kroning, J. (2003) Risk Analysis of Ice Throw from Wind Turbines. Boreas, 6.

⁵ Scottish Renewables, Scottish Natural Heritage, SEPA and Forestry Commission Scotland (2015) Good Practice During Wind Farm Construction, Version 3, URL <http://www.snh.gov.uk/docs/A1168678.pdf> (Accessed 21/11/22).

⁶ <http://informatics.sepa.org.uk/CarbonCalculator/> [Accessed September 2023]

conditions. Appropriate design mitigation measures and embedded mitigation will be implemented, as necessary.

MAJOR ACCIDENTS AND DISASTERS

- 1.5.18 The EIA regulations require the consideration of the potential risks to human health, cultural heritage or the environment associated with the vulnerability of the Proposed Development to accidents and disasters. This requirement is interpreted as requiring the consideration of high consequence events (even if of low likelihood) which would result in serious harm or damage to environmental receptors.
- 1.5.19 Given the nature of the Proposed Development, the potential for effects related to the vulnerability to accidents and disasters is likely to be limited to those effects associated with extreme weather, mechanical failure or structural damage. Relevant types of accident/disaster, given the predominantly rural context of the Proposed Development, include:
- severe weather events, including high winds, high rainfall leading to flooding, or extreme cold leading to heavy snow and ice loading; fire;
 - traffic related accidents; and
 - mass movement associated with ground instability.
- 1.5.20 Severe weather resilience will be a core design component of the Proposed Development, and, includes consideration of flooding resilience and the ability to manage the Proposed Development remotely in the event that it is inaccessible due to hazardous weather conditions. This will include consideration of designing out health and safety risks associated with construction and operation (including accidents and disasters associated with fire and traffic movements) in accordance with the duties under The Construction (Design and Management) Regulations 2015.
- 1.5.21 Potential risks and hazard associated with mass movement (peat instability) have been assessed and presented as part of the **Technical Appendix 9.2** (EIAR Volume 4).
- 1.5.22 No other potential significant effects on human health, cultural heritage or the environment associated with the vulnerability of the Proposed Development to accidents and disasters have been identified and therefore no specific Major Accidents and Disasters assessment has been included in this EIA Report.

Baseline Characterisation

- 1.5.23 Baseline characterisation is the process by which the environmental conditions now and in the future, assuming no development in the Wind Turbine Array, are established. The process has included a combination of desk-based research, site surveys and empirical study and projection.
- 1.5.24 The environmental baseline adopted for the purposes of the EIA is stated in each of the technical chapters provided in this EIA Report. The baseline is normally taken as the current character and condition of a site and surrounds, and the potential significant environmental effects of the Proposed Development are then assessed in the context of the current conditions.

Mitigation by Design and Consideration of Alternatives

- 1.5.25 Following the baseline characterisation, the information collected on environmental constraints was used to inform the consideration of design alternatives. An iterative process was followed, whereby the Applicant considered a range of wind turbine layouts, height and

access proposals. The aim of the design element of the EIA process was to develop an optimal solution which seeks to maximise potential renewable energy generation for the Proposed Development, within technical and environmental constraints. The main aim was to avoid any significant environmental effects through the design, as far as reasonably possible. Further details on the design process adopted are set out within **Chapter 3** (EIAR Volume 2).

Impact Assessment

1.5.26 The next stage in the EIA process was to complete an impact assessment to address the potential significant effects remaining following the implementation of mitigation by design. An assessment chapter has been provided for each issue where it is considered that there may be significant effects associated with the construction, operation, decommissioning or restoration phases of the Proposed Development. Each assessment chapter considers primary, secondary, direct, indirect and cumulative effects and defines the assessment methodology used and the criteria by which a significant effect is defined.

Additional Mitigation

1.5.27 The impact assessment is used to identify where additional mitigation is required to address potential significant effects, where it has not been possible to avoid the effect through design of the wind turbine or infrastructure layout. Mitigation has been considered following a hierarchy of first seeking to avoid effects, followed by seeking a reduction in effects to a level not considered significant, and finally where necessary and possible, offsetting or compensatory measures are considered.

1.6 Copies of the EIA Report

1.6.1 Paper copies of the Non-Technical Summary (EIAR Volume 1) and Visualisations (EIA Volume 3b) along with USB sticks containing the full EIA Report will be made available to view at the following publicly accessible locations:

- Blackbird Tearoom, Carradale, Campbeltown, PA28 6QG; and
- Carradale Village Hall, Carradale, Campbeltown, PA28 6SB.

1.6.2 This EIA Report, including all figures, technical appendices and accompanying documents are available to view and download on the project website (www.esbenergy.co.uk/our-story-in-britain/about/our-story-in-britain/west-torrisdale-wind-farm) free of charge.

1.6.3 The application documents will be available via the Scottish Government energy consents portal (<https://www.energyconsents.scot/Default.aspx>) and Argyll and Bute Council planning portal.

1.6.4 The Applicant will work closely with the ECU to ensure all statutory consultees receive a physical copy of this EIA Report upon request.

1.6.5 For anyone who has difficulty accessing the documentation online, a DVD or USB copy will be made available free of charge. Hardcopies of the Non-Technical Summary can also be made available free of charge by contacting westtorrisdale@esb.ie.

1.6.6 In the interests of sustainability and the drive towards Net Zero carbon emissions, reference to the paperless (project website/DVD/USB) version is strongly recommended.

1.7 Commenting on the Application

- 1.7.1 When the application for the Proposed Development is lodged with Scottish Government the Applicant will advertise the application in accordance with legislation as follows:
- The Campbelltown Courier for two consecutive weeks;
 - The Argyllshire Advertiser for two consecutive weeks;
 - The Herald for one week;
 - The Edinburgh Gazette for two consecutive weeks; and
 - on the Applicant's project website at: www.esbenergy.co.uk/our-story-in-britain/about/our-story-in-britain/west-torrisdale-wind-farm
- 1.7.2 The advertisement will provide details of the date by when representations should be made. The Scottish Government will invite formal representations on the Proposed Development, which will be taken into account before any decision is reached on the application.
- 1.7.3 Any representations in relation to the application should be made to the Energy Consents Unit mail box, at representations@gov.scot, or by post to The Scottish Government, Energy Consents Unit, 4th Floor, 5 Atlantic Quay, 150 Broomielaw, Glasgow, G2 8LU, identifying the Proposed Development and specifying the grounds for representation. Written or emailed representations should be dated, clearly stating the name (in block capitals), full return email and postal address of those making representations.

2 Proposed Development

2.1 Introduction

2.1.1 This Chapter provides a description of the Proposed Development for the purposes of identifying and assessing potential significant effects. Information is provided on:

- the location of the Proposed Development;
- the physical characteristics of the Proposed Development, including, the land-use requirements during the construction and operational phases;
- the main characteristics of the construction and operational phase of the Proposed Development having regard to the type and quantity of expected residues and emissions; and
- typical activities associated with the decommissioning of the Proposed Development.

2.1.2 This Chapter is supported by the following figures and technical appendices:

- Volume 3a: Figures
 - **Figure 2.1: Proposed Development;**
 - **Figure 2.2: Indicative Wind Turbine Elevations;**
 - **Figure 2.3: Indicative Turbine Foundations;**
 - **Figure 2.4: Indicative Crane Hardstanding Dimensions;**
 - **Figure 2.5: Indicative Substation Building Layout;**
 - **Figure 2.6: Indicative Control Building Layout;**
 - **Figure 2.7: Indicative Access Track Detail (Plan and Sections);**
 - **Figure 2.8: Indicative Temporary Construction Compound Layout;**
 - **Figure 2.9: Indicative Battery Energy Storage System Layout; and**
 - **Figure 2.10: Cumulative Developments.**
- Volume 4: Technical Appendices
 - **Technical Appendix 2.1: Outline Construction Environmental Management Plan; and**
 - **Technical Appendix 2.2: Carbon Calculator.**

2.1.3 This EIA uses the below terminology throughout:

- Proposed Development – All elements of the West Torrisdale Wind Farm development for which S36 consent and deemed planning permission are sought.
- Application Boundary – The red line boundary defining all elements of the Proposed Development for the purpose of the S36 application.
- Wind Turbine Array – the location of the wind turbines comprising the Proposed Development.
- Access Corridor – the land within the Application Boundary in which the access track connect the Wind Turbine Array with the A83 road.
- Study Area – the area in which the EIA is undertaken, defined for each technical topic as appropriate.

2.2 Site Location

2.2.1 The Application Boundary covers an area of approximately 391 hectares (ha), whereas the area where wind turbines are located ('the Wind Turbine Array') covers an area of

approximately 221 ha and is located east of the A83 and west of the B842 approximately 4 km southwest of Carradale in Kintyre, Argyll and Bute (approximate Ordnance Survey British National Grid (OS BNG) reference for Wind Turbine Array centre: NR 76731 36486) as illustrated in **Figure 1.1** (EIAR Volume 3a).

- 2.2.2 The Wind Turbine Array within the Application Boundary is currently used for commercial plantation forestry, and lies between two watercourses: the Torrisdale Water to the north and the Lephincorrach Burn to the south. Beinn an Tuirc (454 m Above Ordnance Datum (AOD)) is located to the west of the Wind Turbine Array.
- 2.2.3 There are no residential properties within the Application Boundary. Individual residential properties are located at Lephincorrach to the south of the Wind Turbine Array and in Glen Torrisdale within the Torrisdale Estate to the northeast. The closest property, at Lephincorrach, is approximately 1.5 km east of the closest wind turbine (T9).
- 2.2.4 As illustrated on **Figure 2.10** (EIAR Volume 3a) the operational Beinn an Tuirc, Beinn an Tuirc Extension and Beinn an Tuirc Phase 3 Wind Farms are located approximately 0.87 km and 2.19 km west and 3.9 km southwest of the Wind Turbine Array. These wind farms have tip heights of 65 m, 110 m and 126 m respectively.

2.3 Proposed Development Description

- 2.3.1 The Proposed Development would comprise 9 wind turbines of up to 149.9 m to blade tip height along with associated infrastructure, arranged as illustrated on **Figure 2.1** (EIAR Volume 3a). The Proposed Development would include the following key components:
- 9 wind turbines, each up to a maximum tip height of 149.9 m (of up to 6 MW);
 - Permanent foundations supporting each wind turbine;
 - Associated crane hardstanding at each wind turbine location;
 - An external transformer at each wind turbine location;
 - A series of new on-site access tracks (approximately 4.9 km) with associated watercourse crossings where necessary and upgraded sections of existing access track (approximately 18.7 km);
 - Underground electrical cabling within the Wind Turbine Array;
 - A compound containing control building, substation (including outdoor transformer and control equipment) a Battery Energy Storage System (BESS) (of up to 20 MW) and LiDAR;
 - Temporary compounds including for construction, security and materials handling; and
 - Search areas for three borrow pits.
- 2.3.2 The locations of the proposed wind turbines and other infrastructure would potentially be subject to 'micrositing'. This process allows for minor changes in wind turbine or infrastructure locations to respond to possible variations in ground conditions across the site, which would only be confirmed following detailed site investigation work carried out immediately prior to construction. This process also provides scope for further mitigation of localised potential environmental effects through avoidance of sensitive features. It is anticipated that a micrositing distance of 75 m would be appropriate for the Proposed Development and would form a condition accompanying consent, should it be granted. Any repositioning would not encroach into environmentally constrained areas and would be carried out under the supervision of an Environmental Clerk of Works (ECoW) and an appropriately experienced and qualified engineer. The proposed locations for all infrastructure including wind turbines, tracks,

the substation including a BESS, borrow pit search areas and temporary compounds are shown on **Figure 2.1** (EIAR Volume 3a).

Wind Turbines and Turbine Layout

2.3.3 The coordinates of the proposed wind turbines are set out in **Table 2.1**.

Table 2.1: Wind Turbine Locations		
Turbine Number	Easting	Northing
T1	175893	636414
T2	175954	637212
T3	176214	637088
T4	176290	636293
T5	176799	636867
T6	176737	636272
T7	177122	636702
T8	177135	636243
T9	177483	636598

2.3.4 As described above, these locations would potentially be subject to micro-siting during the construction phase. The Construction Environmental Management Plan (CEMP) would include detailed guidance on the application of the proposed micro-siting tolerance. An Outline CEMP is included in **Technical Appendix 2.1** (EIAR Volume 4).

2.3.5 The exact model of wind turbine to be installed at the Proposed Development would be selected through a competitive procurement process. In each assessment in the EIA, a worst-case scenario of the turbine dimensions/characteristics has been used. An indicative wind turbine for the Proposed Development is shown on **Figure 2.2** (EIAR Volume 3a).

2.3.6 Wind turbines are available in a variety of colours, the most common being white, off white or light grey. The finish is normally semi-matt. The colour of the wind turbines would be agreed in consultation with Argyll and Bute Council (ABC).

2.3.7 Based on anticipated wind turbine generator technology, the generation capacity of a wind turbine of the size and design proposed, would be up to 6 MW.

2.3.8 It is proposed to install infra-red (IR) lighting on the turbines in a pattern that would be acceptable to the Ministry of Defence (MoD) for aviation safety purposes. The IR lighting proposed would not be visible to the naked eye. The substation buildings are likely to be equipped with passive infra-red controlled security lighting. These would illuminate the substation compound area when activated. Any effect would be temporary and not expected to be significant during normal operation of the Proposed Development.

Permanent Land Take

2.3.9 The Wind Turbine Array is approximately 221 ha. Within this area the permanent land take would be limited to the wind turbine hardstanding area (including permanent crane hardstanding), access tracks and substation and BESS hardstandings which account collectively for about approximately 4.5 % of the total area within the Wind Turbine Array.

2.3.10 The wind turbine foundations (**Figure 2.3**, EIAR Volume 3a) are made up of a central excavation of approximately 22 m diameter and an approximate depth of 3 m to 4 m subject

to prevailing ground conditions. Sloping batters would increase the excavated area to approximately 32 m diameter at ground level.

- 2.3.11 Each wind turbine requires a crane hardstanding to facilitate construction and maintenance. At each turbine there would be a 1,645 m² permanent hardstanding (**Figure 2.4**, EIAR Volume 3a).
- 2.3.12 A 2 m wide maintenance hardstanding would be created around the base of each turbine. The foundation excavation would be backfilled and covered with soil; the foundations would be approximately 1.5 m - 2.5 m deep, leaving only the concrete plinth exposed at ground level to which the steel tower would be attached.
- 2.3.13 The Proposed Development would result in the construction of approximately 4.9 km of new track. The required running width of the track would be typically a minimum of 4.5 m on straight sections, with 0.25 m wide shoulders on each side. Tracks would be wider on bends. Typical access track details are presented on **Figure 2.7** (EIAR Volume 3a). The total permanent land take area for the new and upgraded tracks would be approximately 118,330 m², which includes the hardstanding area for turning heads.
- 2.3.14 The substation compound would take up an area of approximately 12,256 m² within which the substation, control building, outdoor transformer and control equipment BESS and LiDAR would be located.

Temporary Land Take

- 2.3.15 The excavation area around each turbine would be up to 800 m² and would be temporary. In addition to the permanent hardstanding, an additional 1,821 m² of temporary hardstanding for laydown of turbine components and secondary crane pads during the construction phase would be required.
- 2.3.16 The main construction compound would require a hardstanding area of approximately 7,500 m² which would accommodate the temporary concrete batching plant.
- 2.3.17 Ancillary excavation works and material storage around other parts of the Proposed Development, such as those for cable trenching, would have a negligible impact on environmental receptors due to the relatively minor scale of the excavation or duration of the works and are not considered further in this EIA Report.
- 2.3.18 The area of temporary and permanent land take associated with the Proposed Development is presented in **Table 2.2**.

Project Element	Temporary (m²)	Permanent (m²)
Turbine Hardstanding's (including crane pads and blade pads)		14,805
Turbine Laydown Areas	16,389	
New and Upgraded Access Tracks (within the Application Boundary)		118,330
Substation Compound		1,256
Construction Compound	7,500	
Borrow Pits Search Area	42,051	
Cable Trench		6,060
Temporary Material Storage Areas	7,363	
Security Compound	250	
Total Land Take	3,125	194,060

Wind Turbine Foundations and Hardstanding

- 2.3.19 Wind turbines are typically fixed to reinforced concrete foundations, approximately 22 m in diameter. The foundations would be formed in excavations approximately 3 to 4 m deep, depending upon ground conditions (**Figure 2.3**, EIAR Volume 3a).
- 2.3.20 Prior to excavation, topsoil and existing vegetation will be lifted and stored appropriately. After completion, the foundation excavations will be backfilled with suitable excavated or imported material and the original vegetation will be reinstated around the permanent hardstanding areas where possible.
- 2.3.21 Concrete for construction, including turbine foundations, would mostly be batched on-site.
- 2.3.22 The turbines would be erected using mobile cranes. These require areas of hardstand adjacent to the turbine locations, which can support the load of the cranes on their outriggers. The permanent hardstands, typically up to approximately 30 m by 78 m dependent on site conditions, and approximately 1,821 m² of temporary hardstands at each turbine, are formed by excavating soft ground, and infilling with compacted stone. Temporary hardstand areas would be required for laydown of turbine components and for a small support crane to assist the main erection crane.

Electrical Cabling

- 2.3.23 Electrical connections from the wind turbines to the onsite substation and control building will be made via underground cables. All power and cabling on site will be laid in trenches approximately 1.5 m wide and 1 m deep, located adjacent to the access tracks, in the verge or close to the track which will allow for easy access to lay the cable.

On Site Substation and Battery Energy Storage System Compound

- 2.3.24 The substation compound would measure approximately 110 m x 75 m and would include the substation, control building, outdoor transformer and control equipment BESS and LiDAR.
- 2.3.25 The electrical cables would terminate at the substation as illustrated in **Figure 2.5** (EIAR Volume 3a). Located adjacent to the substation would be a control building measuring approximately 25 m x 20 m with a pitched roof up to 6.5 m, containing switchgear, control

equipment, basic welfare facilities including a toilet and parking area (**Figure 2.6**, EIA Volume 3a).

- 2.3.26 Located adjacent to the substation and control building in the same compound, would be a BESS measuring approximately 75 m x 45 m containing approximately eight battery containers, switchgear container, power conversion systems and security fencing (**Figure 2.9**, EIAR Volume 3a). The BESS is anticipated to comprise a lithium-ion battery technology solution, with modular elements comprising a number of battery housings (either standard containers that comply with International Organisation for Standardisation (ISO), electrical-houses ('eHouses') or otherwise) with associated 'heating, ventilation and air-condition' ('HVAC') systems, along with paired power conversion systems ('PCS') comprising bi-directional inverters and transformers as well as central switchgear, metering and transformer, and space for access and operations.
- 2.3.27 This area of technology is currently fast-evolving in terms of:
- technological advances in battery energy density and performance;
 - the design and existence of various potential service markets for providing revenues; and
 - opportunities for time-shifting of wind farm generation.
- 2.3.28 For this reason, an indicative design for the installation has been provided in **Figure 2.9** (EIAR Volume 3a) based upon certain parameters. These indicative parameters are considered to represent the realistic worst case scenario in EIA terms. The battery technology type for the Proposed Development will meet all the relevant safety and environmental standards. Any requirements for environmental (e.g. Pollution Prevention and Control (PPC) permitting) or health and safety consents (e.g. Control of Major Accident Hazards (COMAH)) will be discussed, confirmed and agreed with the relevant authority prior to construction.
- 2.3.29 Within the space provided by the substation construction compound based on the assumed parameters (and as illustrated indicatively on **Figure 2.9** (EIAR Volume 3a)), it is considered possible to achieve an arrangement comprising 2.6 m x 16.1 m ISO containers with top-mounted HVAC's, each with a single accompanying PCS, along with a single 2.6 m by 11.4 m switchgear container, assuming that other electrical elements (including metering and grid-connection transformer) could be either included within or shared with the Proposed Development substation compound. Based on a current industry Grid Battery Storage solution, where a 16.1 m-long container can host between 1.2 MW (power): 5.3 MWh (energy) at configuration for "maximum energy" (roughly 4.1 hours duration), and 7.2 MW: 3.8 MWh at "maximum power" (roughly 0.5 hours duration), this could relate to an indicative system of anywhere between 21.6 MW: 95.4 MWh to 129 MW: 68.4 MWh. Sufficient space within the substation compound remains to accommodate the BESS alongside any bunding and drainage required.
- 2.3.30 The final choice of battery model would ensure compliance with the above parameters. The number, dimension, housing type, finish, arrangement, security fencing and landscaping of BESS elements would be subject to A&BC consultation and approval prior to construction.

Temporary Construction Compounds

- 2.3.31 A temporary construction compound would be required to enable construction of the Proposed Development. The compound would be located as shown on **Figure 2.1** (EIAR Volume 3a). The compound area would include:
- access tracks and internal circulation routes for vehicles and pedestrians;

- lighting for security and safety during hours of darkness;
- surface water management measures;
- temporary office accommodation and welfare buildings (toilets, kitchen/canteen, drying rooms);
- equipment storage;
- a receiving area for incoming vehicles;
- maintenance and refuelling facilities;
- health, safety and wellbeing signage;
- waste, recycling and materials management facilities;
- general laydown areas; and
- parking

2.3.32 The temporary construction compounds' approximate dimensions would be 100 m x 75 m.

2.3.33 The indicative layout of the temporary construction compounds are shown on **Figure 2.8** (EIAR Volume 3a).

Access Tracks, Passing Places and Turning Heads

2.3.34 Access to the Wind Turbine Array would be taken from the existing Beinn an Tuirc Wind Farm track network. For more information on the delivery route to the Wind Turbine Array, see **Chapter 10** (EIAR Volume 2).

2.3.35 Within the Wind Turbine Array, approximately 4.9 km of new access tracks and approximately 5.8 km of upgraded track would be required to provide access to the wind turbines, substation and BESS compound, borrow pit search areas and construction compounds (**Figure 2.1**, EIAR Volume 3a). Typical access track designs are shown on **Figure 2.7** (EIAR Volume 3a).

2.3.36 Tracks would have a typical 5 m running width with appropriate widening on bends, at junctions and passing places.

2.3.37 In areas where the peat and topsoil are consistently less than 1 m deep, the vegetation and soil would typically be stripped to a suitable subsoil layer and the track (approximately 300 mm to 500 mm thick) would be constructed on the subsoil. The upper topsoil layer, together with turf, would be appropriately stored temporarily for use in landscaping and revegetating the track shoulders and track side drainage, where possible.

2.3.38 Once the soil has been removed, as described above, to a suitable founding layer, the road and running surface would be constructed by tipping and compacting aggregate to the required shape and thickness. Cross-sections of the final road shape following reinstatement of the roadside slopes by replacing the layers of excavated material in the correct order are presented in **Figure 2.7** (EIAR Volume 3a).

2.3.39 The on-site track layout has been designed to minimise environmental disturbance and land take by wherever possible avoiding areas of deeper peat and steep slopes in excess of 12 degrees as well as, wherever possible, avoiding or minimising encroachment on areas of identified environmental constraints.

2.3.40 A section of existing track, between the existing Beinn an Tuirc Extension Substation and the Wind Turbine Array, will be upgraded where rock slope outcrops will need to be excavated.

2.3.41 The track layout has been carefully designed to minimise the number of watercourse crossings where possible, as discussed in **Section 2.4**.

Borrow Pits

2.3.42 Borrow pit search areas have been identified covering a total of approximately 42,051 m² to supply material to construct the Proposed Development (coordinates provided in **Table 2.3**). The use of all of these borrow pits would provide a greater volume of rock than would be needed for the construction of the Proposed Development but allows for the current uncertainty of the quality of the rock at these locations. It is likely that only some of the borrow pit search areas would be required. For the purposes of the assessment all three borrow pit search areas will be assessed (**Technical Appendix 9.1**, EIAR Volume 4).

Borrow Pit Search Area No.	NGR Reference (Centre)		Approximate Dimensions (m)	Search Area (m²)
BP1	176930	636439	175 x 106	17046
BP2	176690	636573	165 x 103	15088
BP3	177025	636051	95 x 98	9916

2.3.43 Stone would be required for various purposes, primarily track and hardstanding construction. If the stone onsite is found to be suitable then a proportion of this could be won from foundation excavation and the remainder will be sourced from onsite borrow pits or from offsite quarries.

Connection to Electricity Grid

2.3.44 The Proposed Development would connect to the Carradale Substation, approximately 3 km from the Proposed Development substation. As the grid connection would be subject to a separate consenting process, and the details of the grid connection route are unknown at this stage, the grid connection is not considered further in the EIA.

2.4 Construction Activities

Construction Programme

2.4.1 The estimated construction period of the Proposed Development is approximately 22 months. This period is indicative only and may be subject to variation as a result of factors which include, but are not limited to, weather restrictions, ground conditions encountered through detailed investigation, turbine component and material delivery, timing of grid connection works and public highway constraints. However, this is considered to represent a realistic case for the purposes of assessment.

2.4.2 Felling required for the construction of the Proposed Development is anticipated to commencing in 2026. For further details on felling plans during the construction phase see **Chapter 13** (EIAR Volume 2).

2.4.3 Construction by the appointed Principal Contractor will begin following agreement of the detailed design and approval of any pre-commencement conditions with the appropriate consenting authority. Key construction activities will involve:

- public road improvement and junction creation;
- construction of main access track and forestry removal to the first borrow pit;
- construction of the temporary construction compounds;
- construction of all access tracks having established all required borrow pits;
- design and construction of temporary and permanent drainage measures;

- installation of temporary concrete batching plant;
 - construction of wind turbine foundations, crane hardstandings and laydown areas;
 - excavation of cable trenches;
 - laying of electricity and communications cables in trenches;
 - construction of substation, control building and outdoor equipment;
 - BESS element installation including battery units;
 - delivery, installation, testing and commissioning of wind turbines and ancillary equipment;
 - installation of external wind turbine transformers and switchgear in enclosed kiosks; and
 - reinstatement and restoration works in accordance with the Peat Management Plan.
- 2.4.4 The works are likely to follow the order as detailed above, however many activities will be undertaken concurrently to minimise the overall construction programme.
- 2.4.5 Site restoration will be undertaken as soon as possible in affected areas to minimise disruption to land use. Habitat management and restoration proposals, including compensatory planting, are detailed in the Outline Habitat Management Plan (OHMP) in **Technical Appendix 6.3** (EIA Volume 4).
- 2.4.6 Further ground investigation surveys will be undertaken prior to the main construction works beginning onsite to determine the specific quality of rock and the rock head depth underlying the locations for onsite infrastructure. Initial site investigations have informed the design of the onsite access tracks.
- 2.4.7 The appointed Principal Contractor will develop the details of the site design and construction methods in compliance with the Applicant's contract requirements and the EIA Report and in line with good construction practice.
- 2.4.8 The access tracks will be left in place following construction to provide access for maintenance, repairs and decommissioning of the Proposed Development. The construction works will be undertaken by a competent and experienced contractor in accordance with the Section 36 consent, should it be granted, and any associated conditions and also in accordance with good industry practice. Prior to commencing construction, a more detailed construction and reinstatement programme will be submitted to the consenting authority.
- 2.4.9 Traffic movements associated with the construction of the Proposed Development including required Heavy Goods Vehicles (HGV) and heavy/abnormal load movements are described in **Chapter 10** (EIA Volume 2).
- 2.4.10 An indicative construction programme is provided in **Table 2.4**.

Table 2.4: Indicative 22-Month Construction Programme																						
Task*	Month																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	█	█	█	█	█	█																
2					█	█	█															
3						█	█	█														
4							█	█	█	█	█	█	█	█	█	█						
5								█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
6															█	█	█	█	█	█	█	
7															█	█	█	█	█	█		
8									█	█	█	█	█	█	█							
9														█	█	█	█	█	█	█	█	█
10																			█	█	█	█

*Task:
 1. Forestry felling
 2. Site establishment
 3. Upgrading existing FLS Forestry tracks
 4. Construction of new access tracks and hardstanding's. Upgrading remainder of existing track
 5. Substation civil and electrical works
 6. BESS compound and installation
 7. Cable trenching and installation
 8. Turbine foundation construction
 9. Turbine delivery, erection and commissioning
 Site reinstatement and restoration works

Hours of Work

2.4.11 The normal working hours will be as follows:

- Monday to Friday 0700 - 1900;
- Saturday 0700 - 1600; and
- no working on Sundays or public holidays without prior written approval from ABC.

2.4.12 No works, with the exception of wind turbine delivery, the completion of wind turbine erection or emergency work, will take place outside these hours, and any such out-of-hours works will be subject to prior agreement with ABC, Transport Scotland and Police Scotland. The requirement for out-of-hours work could arise, for example, from delivery and unloading of abnormal loads or health and safety requirements, or to ensure optimal use is made of fair weather windows for the erection of wind turbines, wind turbine blades and the erection and dismantling of cranes.

Construction Traffic and Plant

2.4.13 Vehicle movements associated with construction works would include:

- Cars and minibuses for transporting construction personnel to the Proposed Development;
- Heavy goods vehicles (HGVs) for pre-construction delivery of site offices, construction equipment and materials;
- HGV abnormal load vehicles for delivery of the wind turbine components and base rings;
- Mobile road going cranes, used for the erection of the wind turbines; and
- Standard HGVs for transporting electric cable, steel reinforcement for foundations, construction plant fuel and other items and equipment.

2.4.14 A Traffic Management Plan (TMP) would be agreed in consultation with ABC and Transport Scotland. This would address the scheduling, routing and overall management of abnormal loads movements along with the programming and management of all other HGV movements (see **Technical Appendix 10.1**, EIAR Volume 4).

Watercourse Crossing Schedule

2.4.15 The number of watercourse crossings has been minimised through site design. Nevertheless, there is a requirement for seven crossings of watercourses within the Wind Turbine Array (one which is an existing crossing) as identified on 1:25k mapping and outlined in the Water Course Crossing **Technical Appendix 8.2** (EIAR Volume 4).

Standard Mitigation and Working Methods during Construction

Construction Environmental Management Plan (CEMP)

2.4.16 The assessment in this EIA Report has been carried out on the basis that standard mitigation measures would be implemented during the construction work, including compliance with both project wide and site-specific environmental management procedures, which would be included in the Construction Environmental Management Plan (CEMP). An Outline CEMP is provided in **Technical Appendix 2.1** (EIAR Volume 4). A detailed CEMP would be agreed with ABC and relevant Statutory Consultees prior to construction commencing. The CEMP would, as a minimum, include details of:

- construction methodologies;
- pollution prevention measures;

- public liaison provision;
- peat slide, erosion and compaction management;
- control of contamination/pollution prevention;
- drainage management and SuDS;
- water quality monitoring;
- management of construction traffic;
- control of noise and vibration; and
- control of dust and other emissions to air.

2.4.17 **Technical Appendix 2.1** (EIAR Volume 4) provides a list of generic mitigation measures that would be included in the CEMP and implemented during construction and decommissioning of the Proposed Development. It would be a contractual requirement that the appointed Principal Contractor complies with the CEMP.

Watercourse Crossings

2.4.18 **Technical Appendix 8.2** (EIAR Volume 4) contains details of the watercourse crossings required as part of the Proposed Development and the proposed crossing type together with the relevant requirements in relation to The Water Environment (Controlled Activities) (Scotland) Regulations 2011, as amended.

2.4.19 Typical watercourse crossings are presented in **Technical Appendix 8.2** (EIAR Volume 4) and the final crossing type would be identified as part of the detailed design of the Proposed Development prior to construction and in line with current best practice guidance.

Private Water Supplies

2.4.20 A review of Private Water Supplies (PWS) has been undertaken for a 2 km buffer around the Wind Turbine Array (see **Chapter 8**, EIAR Volume 2) which identified 10 PWS within a 2 km buffer but none located within the Wind Turbine Array.

2.4.21 Mitigation to prevent pollution impacts on any downstream PWS would be set out in a Water Management Plan which would form part of the CEMP, to ensure that the Proposed Development would not lead to significant impact to water abstraction and other hydrological receptors. The contents of the CEMP and the Water Management Plan would be agreed with Scottish Environment Protection Agency (SEPA) and ABC prior to commencement of construction works.

Peat Management Plan (PMP)

2.4.22 **Technical Appendix 9.3** (EIAR Volume 4) outlines the proposed working methods where the excavation of peat would be required and provides further details on potential volumes of peat excavated and the likely requirements for reinstatement. The Technical Appendix provides details of the predicted volumes of peat that would be excavated for the Proposed Development, the characteristics of the peat that would be excavated, and how the excavated peat would be reused and managed. This document would be updated during the detailed design stage and agreed with SEPA prior to construction and would be included in the final version of the CEMP.

2.4.23 The detailed peat surveys across the Wind Turbine Array have identified that approximately 87,833 m³ of peat would be excavated as part of the construction activities associated with the Proposed Development. The PMP outlines how excavated peat would be recovered, managed and reused.

Peat Slide Risk

- 2.4.24 **Technical Appendix 9.2** (EIAR Volume 4) provides further technical information on the potential risk and hazards associated with peat instability, and the proposed standard mitigation and working methods that would be implemented during construction to seek to avoid adverse effects associated with peat instability.

2.5 Operation Management and Maintenance

Life of the Project

- 2.5.1 The expected operational life of the Proposed Development is 35 years from the date of commissioning. Wind turbines and wind energy projects are designed to operate largely unattended. Each of the proposed wind turbines 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 wind turbine down should the need arise. Sometimes the wind turbines would re-start automatically (if the shutdown had been for high winds, or if the grid voltage had fluctuated out of range), but other shutdowns (e.g., generator over temperature) would require investigation and manual restart.

Operational Residues and Emissions

- 2.5.2 The EIA Regulations require that this EIA Report provides an estimate, by type and quantity, of expected residues and emissions (such as water, air and soil and subsoil pollution, noise, vibration, light, heat, radiation and quantities and types of waste produced) resulting from the construction and operation of the Proposed Development.
- 2.5.3 **Table 2.5**, provides a summary of the anticipated residues and emissions.

Table 2.5: Residues and Emissions	
Topic	Potential Residue/Emission
Water	<p>Construction:</p> <p>Occasional and low quantity discharges could arise from pumping, or over-pumping in order to dewater foundation excavations. Pollution sources could arise as a result of soil erosion or from oil/ fuel or chemical storage and use.</p> <p>All discharges would be managed in accordance with the Water Environment (Controlled Activities) (Scotland) Regulations 2011, as amended by The Water Environment (Miscellaneous) (Scotland) Regulations 2017. The proposals for water the control and management of water quality and quantity from the Proposed Development are presented in Technical Appendix 2.1 (EIAR Volume 4).</p>
Air	<p>Construction:</p> <p>The construction phase would require the transport of people and materials by road, with associated emissions to the atmosphere. There are no air quality management areas within the vicinity of the Proposed Development. Overall, the quantity of air emissions is expected to be low relative to the general background air emissions from road traffic. No significant air emissions are anticipated.</p> <p>Operation:</p> <p>Due to the nature of the Proposed Development it is expected that no significant point source or diffuse air emissions would be produced during its operation.</p>

Table 2.5: Residues and Emissions	
Topic	Potential Residue/Emission
	<p>The Proposed Development would contribute to providing renewable electricity, in turn displacing emissions associated with fossil fuel-based electricity generation elsewhere.</p> <p>The construction of the proposed infrastructure, and subsequent operation and decommissioning of the Proposed Development would include activities that either directly or indirectly result in CO₂ emissions. Technical Appendix 2.2 (EIAR Volume 4), calculates the greenhouse gas emissions and carbon payback times for wind farm developments in Scottish peatlands and concludes that the Proposed Development would 'pay back' the carbon emissions associated with its construction, operation and decommissioning in a 2.2year period.</p>
Soil and Subsoil	<p>Construction: Soil and subsoil excavation, handling and storage would be required during construction. All soil and subsoil would be stored temporarily for use in reinstatement, such that there would be no residue (surplus) remaining following the construction work. Further details on peat management are provided in Technical Appendix 9.3 (EIAR Volume 4).</p> <p>Operation: No requirement for soil or subsoil excavation or handling during the operation phase has been identified. No pollution sources have been identified for the operational phase.</p>
Noise and Vibration	<p>Construction: Noise sources during the construction phase would include increased traffic flows and noise from construction plant. Further details are provided in Chapter 11 (EIAR Volume 2).</p> <p>Operation: The wind turbines would generate noise during operation, and the noise levels would vary according to the wind speed. The location of residential receptors in relation to the Proposed Development was a consideration in the design process and the predicted noise levels are within acceptable limits. Full details of the noise impact assessment are present in Chapter 11 (EIAR Volume 2).</p>
Light	<p>Construction: Technical Appendix 2.1 (EIAR Volume 4) notes that temporary lighting would be required at the temporary construction compounds for security purposes and to ensure that a safe working environment is provided to construction staff. In addition, temporary lighting could be required to ensure safe working conditions at infrastructure locations during construction.</p> <p>All temporary lighting installations would be downward facing and all lights would be switched off during daylight hours and outwith working hours.</p> <p>Operation: It is proposed to install infra-red (IR) lighting on the wind turbines in a pattern that would be acceptable to the Ministry of Defence (MoD) for aviation safety purposes. The IR lighting proposed would not be visible to the naked eye. The substation buildings are likely to be equipped with passive infra-red controlled security lighting. These would illuminate the substation compound area when activated. Any effect would be temporary and not expected to be significant during normal operation of the Proposed Development.</p>
Heat and Radiation	<p>No significant sources of heat and radiation have been identified during either the construction or operational phase of the Proposed Development.</p>
Waste	<p>Construction: Technical Appendix 2.1 (EIAR Volume 4) provides details on pollution prevention control and waste management that would be implemented during construction. A Site Waste Management Plan would be designed</p>

Table 2.5: Residues and Emissions	
Topic	Potential Residue/Emission
	<p>to follow the principles of: Avoidance; Minimisation; Separable; Recyclable.</p> <p>Operation:</p> <p>The power generation aspect of the Proposed Development would not produce any waste emissions or pollutants. The general operation and maintenance of the Proposed Development has the potential to produce a small amount of waste. This is likely to be restricted to waste associated with the control building from employees and visiting contractors and the storage of oils and lubricants.</p>

2.6 Decommissioning

- 2.6.1 At the end of the Proposed Development's operational life, a decision will be made as to whether to refurbish, remove, or replace the wind turbines. If a decision were to be taken to decommission the Proposed Development, this will entail the removal of all the wind turbine components, transformers, the substation and BESS and associated buildings. Access tracks and underground cables will be left in place and foundations removed to a depth of 0.5 m below ground level to avoid environmental effects from removal. A Decommissioning Plan will set out environmental protection measures and restoration principles which will be implemented. This plan will be agreed with A&BC.
- 2.6.2 An assessment of the decommissioning phase of the Proposed Development has not been undertaken as part of the EIA as: i) the future baseline conditions (environmental and other developments) cannot be predicted accurately at this stage, and ii) the proposals for refurbishment/decommissioning are not known at this stage. However, an outline decommissioning strategy is included in the OCEMP (**Technical Appendix 2.1** (EIAR Volume 4)). It is assumed that the significance of impacts of decommissioning will be no greater, or less than the impacts of construction.

3 Design Evolution

3.1 Introduction

3.1.1 This Chapter provides a description of the reasonable alternatives studied by the Applicant, which are relevant to the Proposed Development and its specific characteristics, in accordance with regulation 5(2)(d) and schedule 4 (paragraph 2) of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. This Chapter provides a description of the main reasons for selecting the chosen option for the Proposed Development, taking into account the effects of the Proposed Development on the environment.

3.1.2 This Chapter is structured to provide the following:

- A review of the site selection considerations, including a review of the planning history, context and policy relevant to site selection and the site feasibility assessment;
- An overview of the design objectives for the Proposed Development;
- A description of the reasonable alternatives studied (noting that this is limited to those which are considered relevant to the Proposed Development); and
- A description of the final Proposed Development.

3.1.3 This EIA uses the below terminology throughout:

- Proposed Development – All elements of the West Torrisdale Wind Farm development for which S36 consent and deemed planning permission are sought.
- Application Boundary – The red line boundary defining all elements of the Proposed Development for the purpose of the S36 application.
- Wind Turbine Array – the location of the wind turbines comprising the Proposed Development.
- Access Corridor – the land within the Application Boundary in which the access track connect the Wind Turbine Array with the A83 road.
- Study Area – the area in which the EIA is undertaken, defined for each technical topic as appropriate.

3.2 Site Selection Considerations

3.2.1 The Application Boundary shown on **Figure 1.2** (EIA Volume 3a), is located west of the A83 and east of the B842, approximately 4 km southwest of Carradale, Argyll and Bute. The Wind Turbine Array occupies an area of approximately 221 hectares (ha) and is dominated by plantation forestry.

3.2.2 The Wind Turbine Array was chosen for a number of reasons:

- it has a high wind resource;
- it is in close proximity to the existing electricity grid network at the Carradale Substation;
- it is located in an area with established access for the delivery of wind turbine components;

- the Wind Turbine Array¹ is located outwith national and international statutory designations for landscape and nature conservation (**Figure 6.1** and **Figure 7.1**, EIAR Volume 3a) including:
 - Ramsar Sites;
 - Special Protection Areas (SPA);
 - Special Areas of Conservation (SAC);
 - Sites of Special Scientific Interest (SSSI);
 - National Nature Reserves (NNR); and
 - National Scenic Areas (NSA).
- it is an appropriate relative distance from residential receptors, with the closest property, at Lephincorrach, approximately 1.5 km east of the closest wind turbine (T9); and
- The Argyll and Bute Spatial Framework for onshore wind energy developments² identifies the Wind Turbine Array of Proposed Development as being located within Group 3 ('likely to be acceptable').

3.2.3 Detailed site selection criteria are outlined in the West Torrisdale Design and Access Statement that supports this Application³.

Current Land Use and Context

3.2.4 The Wind Turbine Array is located in an area primarily consisting of coniferous commercial woodland plantation, wet heath and marshy grassland, as shown on **Figure 6.2** (EIAR Volume 3a).

3.2.5 The Wind Turbine Array lies between two watercourses: the Torrisdale Water to the north and the Lephincorrach Burn to the south (**Figure 8.1**, EIAR Volume 3a). These watercourses originate in the moorland to the west of the Wind Turbine Array and ultimately discharge into Torrisdale Bay approximately 2 km east of the Wind Turbine Array. The Torrisdale Water flows through the northwest corner of the Wind Turbine Array and two tributaries originating within the Wind Turbine Array discharge into the Torrisdale Water. Two tributaries of the Lephincorrach Burn also originate within the Wind Turbine Array and flow south into the watercourse at the southern boundary of the Wind Turbine Array. Downstream and approximately 900 m east of the Wind Turbine Array a small hydro-electric scheme that supplies the local Beinn an Tuirc Distillery has been installed in the Lephincorrach Burn. The nearest Private Water Supply (PWS) (Torrisdale Castle) is located approximately 540 m east of the Wind Turbine Array. The forestry plantations within the Wind Turbine Array are served by a small, cut drains and runnels.

3.2.6 Beinn an Tuirc (454 m Above Ordnance Datum (AOD)) is located to the west of the Wind Turbine Array. The Kintyre Way, a long distance path that locally follows the route of an existing forestry track, passes through the southeasternmost part of the Wind Turbine Array between Ifferdale and Torrisdale.

3.2.7 There are no residential properties (**Figure 4.4.1, Technical Appendix 4.4**, EIAR Volume 4) within the Wind Turbine Array. Individual residential properties are located at Lephincorrach

¹ The Application Boundary along the Access Corridor does border designated sites at its southern midpoint and at its western extents where it joins the road network.

² Argyll and Bute Council - Figure 1 Spatial Framework for Wind Turbines over 50 metres to Blade Tip. Available at: https://www.argyll-bute.gov.uk/sites/default/files/spatial_framework_a0_small.pdf

³ West Torrisdale Design and Access Statement (2023)

and in Glen Torrisdale within the Torrisdale Estate to the east and northeast of the Wind Turbine Array. The closest property, at Lephincorrach, is approximately 1.5 km east of the closest wind turbine (T9).

- 3.2.8 As illustrated on **Figure 2.10** (EIAR Volume 3a), the operational Beinn an Tuirc, Beinn an Tuirc Extension and Beinn an Tuirc Phase 3 turbines are located approximately 0.87 km and 2.19 km west and 3.9 km southwest of the Wind Turbine Array. Beinn an Tuirc and Beinn an Tuirc Extension have tip heights of 65 m and 110 m respectively, whilst Beinn an Tuirc Phase 3 has tip heights of 126 m.
- 3.2.9 The Application Boundary (specifically the Access Corridor) does overlap with the Kintyre Goose Roosts Special Protection Area (SPA), Ramsar, Important Bird Area (IBA) and Site of Special Scientific Interest (SSSI), where the access track passes Lussa Loch for approximately 100 m.

3.3 Policy Considerations

- 3.3.1 The statutory Development Plan covering the Application Boundary comprises the following:
- National Planning Framework 4 (NPF4) (adopted on the 13th February 2023);
 - The Argyll and Bute Local Development Plan ('the LDP') (adopted 26th March 2015); and
 - Relevant Supplementary Guidance, particularly the Argyll and Bute landscape wind energy capacity study (LWECS) (approved 20th September 2017).

National Planning Framework 4

- 3.3.2 National Planning Framework 4 ("NPF4") is a key consideration for the design evolution of the Proposed Development. NPF4 is designed to support Scotland's commitment of reaching net zero emissions by 2045 and thereby tackling the climate change emergency and is of direct relevance to wind farm developments in Scotland.
- 3.3.3 NPF4 has been carefully considered throughout the design process of the Proposed Development. Key aspects of NPF4 that have informed the design evolution of the Proposed Development comprise the following:
- Policy 1 - to encourage, promote and facilitate development that addresses the global climate emergency and nature crisis;
 - Policy 3(b) – Development proposals for national or major development, or for development that requires an Environmental Impact Assessment will only be supported where it can be demonstrated that the proposal will conserve, restore and enhance biodiversity, including nature networks so they are in a demonstrably better state than without intervention;
 - Policy 4 - To protect, restore and enhance natural assets making best use of nature-based solutions;
 - Policy 5 - To protect carbon-rich soils, restore peatlands and minimise disturbance to soils from development;
 - Policy 6 - to protect and expand forests, woodland and trees;
 - Policy 7 - To protect and enhance historic environment assets and places; and
 - Policy 11(a) - Development proposals for all forms of renewable, low-carbon and zero emissions technologies will be supported.

The Argyll and Bute Local Development Plan 2

- 3.3.4 The statutory development plan for the site comprises the Argyll and Bute Local Development Plan 2 (LDP 2) (adopted February 2024)⁴ and associated statutory Supplementary Guidance (SG). The LDP2, as adopted, replaces the former Argyll and Bute Local Development Plan, which was adopted in March 2015 and its associated Supplementary Guidance. Further detail on LDP2 is provided within the Planning Statement which will be submitted along side this EIAR.
- 3.3.5 The recent adoption of NPF4, means that in the event of conflict between an LDP and NPF4, then NPF4 will prevail. The Argyll and Bute Spatial Framework⁵ for onshore wind energy developments identifies the site as being located outwith an area of significant protection and within Group 3 ('likely to be acceptable').

Onshore Wind Policy Statement

- 3.3.6 The Scottish Government published an updated Onshore Wind Policy Statement⁶ (OWPS) on 21 December 2022. It replaces the version published in November 2017.
- 3.3.7 The Ministerial Foreword makes it explicitly clear that seeking greater security of supply and lower cost electricity generation are now key drivers alongside the need to deal with the Climate Emergency. In this regard, the Cabinet Secretary for Net Zero, Energy and Transport states (page 3): "that is why we must accelerate our transition towards a net zero society. Scotland already has some of the most ambitious targets in the world to meet net zero but we must go further and faster to protect future generations from the spectre of irreversible climate damage". "Scotland has been a frontrunner in onshore wind and, while other renewable technologies are starting to reach commercial maturity, continued deployment of onshore wind will be key to ensuring our 2030 targets are met".
- 3.3.8 The Foreword states that onshore wind has the ability to be deployed quickly, is good value for consumers and is also widely supported by the public. The Minister further states that: "This Statement, which is the culmination of an extensive consultative process with industry, our statutory consultees and the public, sets an overall ambition of 20 GW of installed onshore wind capacity in Scotland by 2030. While imperative to meet our net zero targets it is also vital that this ambition is delivered in a way that is fully aligned with, and continues to enhance, our rich natural heritage and native flora and fauna, and supports our actions to address the nature crisis and the climate crisis".
- 3.3.9 This EIAR does not make any judgements regarding the 'acceptability' of the Proposed Development. A separate Planning Statement is provided which presents further details on policy relevant to the Proposed Development and an appraisal of the Proposed Development with reference to the energy and planning policy framework and other relevant material planning considerations.

⁴ Argyll and Bute Local Development Plan (2024). [Local Development Plan 2 | Argyll and Bute Council](#) [Accessed December 2024]

⁵ Argyll and Bute Council. Local Development Plan. Supplementary Guidance 2 – Windfarm map 1. https://www.argyll-bute.gov.uk/sites/default/files/Unknown/spatial_framework_a0_small.pdf [Accessed July 2023].

⁶ Available here - <https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2022/12/onshore-wind-policy-statement2022/documents/onshore-wind-policy-statement-2022/onshore-wind-policy-statement-2022/govscot%3Adocument/onshore-wind-policy-statement-2022.pdf>

3.4 Site Feasibility

3.3.10 The Applicant has completed a wide search of potential wind farm sites throughout Scotland and is in the process of taking a number of those forward as proposed developments. Potential wind farm sites are considered and screened against a series of technical, environmental and economic factors, using Geographical Information Systems (GIS) confirmed by site visits to assess known environmental sensitivities, as well as wind speed and energy yields, site access, distance from settlements, designations (such as scheduled monuments), aviation constraints, microwave and other telecommunication links, and proximity to the electricity grid and road network. Initial feasibility studies identified the Wind Turbine Array as a good location for a wind farm, benefitting from good wind resource, lack of environmental designations, good access and the potential capacity to accommodate onshore wind development.

Design Process

3.3.11 The Applicant appointed a team of specialist consultants to work alongside ESB in developing a wind farm proposal. Consistent with renewable energy policy (described in **Section 3.3**), the key overall objective is to maximise the energy generation potential of the Proposed Development, whilst having regard to the protection of sensitive environmental receptors. A design process was agreed with the team that included the following steps:

- Constraints mapping and analysis which included baseline studies, analysis and risk identification and design guidance;
- Design refinement and Design Workshop 1 (turbine chill);
- Phase 2 peat probing and Peat Slide Risk;
- Design refinement followed by consultation with SEPA on proposed layout (including inputs from public exhibition and Gatecheck 1);
- Design Workshop 2 (infrastructure chill);
- Engineering walkover and final evaluation; and
- Design Freeze.

3.3.12 A design brief was agreed with the Applicant to set out the key parameters for the Proposed Development. The design brief subsequently set the scope for constraint mapping. The brief included:

- Minimum of 9 turbines and a BESS;
- The Applicant would be responsible for defining minimum acceptable turbine spacing and acceptable slope/gradient for tracks. Design guidance from the Applicant confirmed the following requirements for infrastructure:
 - Details of land available (illustrated by the Wind Turbine Array); and
 - Requirements for turbine foundations, construction compounds, substation, laydown areas, access track geometry and crane hardstanding geometry.
- Road running width to be between 4.5 m and 7 m depending on gradient and bends;
- Road to have vertical grade no greater than 16 %; and
- Turning area to be provided allowing loaded or unloaded blade transports (as required).

3.3.13 Following agreement of the design brief, the team was instructed to undertake all necessary desktop studies and field work to identify key environmental receptors and constraints

(including cumulative constraints) of relevance to the design and assessment of the Proposed Development.

- 3.3.14 Further analysis was completed to categorise design constraints as either 'hard constraints' or 'soft constraints'. Hard constraints were defined as those features with formal protection as defined in legislation or adopted planning/industry guidance, whereas soft constraints were characterised as having potential to constrain the development but, subject to careful design consideration and/or mitigation measures, the Proposed Development could be accommodated.

Environmental Issues and Design Constraints

- 3.3.15 Following a baseline characterisation of the Wind Turbine Array, the key environmental issues for consideration in the design process were identified. A summary of the key design considerations is provided in **Table 3.1**.
- 3.3.16 Issues were considered through design with the aim of 'designing out' significant effects. Where it was not possible to mitigate by design, the issues have been considered further as part of the EIA.

Embedded Mitigation

- 3.3.17 As described above, through the design process the careful placement of the proposed turbines and other infrastructure within the Application Boundary has resulted in effective embedded mitigation, which avoids or minimises significant effects as far as is reasonably possible. **Table 3.1** provides a summary of design commitments.

Table 3.1: Mitigation by Design Commitments		
Topic	Mitigation by Design Commitment	Signposting of where Topic is Addressed in the EIAR
Seascape, Landscape and Visual Amenity	<ul style="list-style-type: none"> Keeping turbines below 150 m to maximum blade tip to reduce perceived scale of development relative to peninsula edge and to avoid the necessity of visible en-route obstruction lighting. Positioning turbines on the eastern side of the spine of the Kintyre peninsula to minimise views from Gigha and the western side of the peninsula from where disparities in turbine size between existing and proposed turbines would be most apparent. Setting back turbines from eastern edge of peninsula and hidden glens to minimise visibility and prominence from the sensitive landscapes / seascapes. Reducing turbine numbers from 13 to 9 to minimise stacking effects and provide a cohesive layout. Positioning the substation at the centre of the site where there is limited visibility from external viewpoints. 	Chapter 4 (EIAR Volume 2) provides an assessment of the residual effects of the Proposed Development on seascape, landscape and visual receptors.
Cultural Heritage	<ul style="list-style-type: none"> Siting of turbines and design of tracks and other infrastructure to avoid direct effects on archaeological remains. Committing to appropriate mitigation in the event of uncovering unknown heritage assets during construction. 	Chapter 5 (EIAR Volume 2) provides an assessment focussed on identifying the likely significant direct and indirect (setting) effects on cultural heritage assets.

Table 3.1: Mitigation by Design Commitments		
Topic	Mitigation by Design Commitment	Signposting of where Topic is Addressed in the EIAR
Ecology	<ul style="list-style-type: none"> Siting turbines and infrastructure to avoid sensitive habitats, including peat forming species as far as possible, based on both habitat mapping and peat probing surveys. With the exception of watercourse crossings, the design incorporates a minimum 50 m buffer distance around all mapped surface water features on-site, avoiding direct effects on riparian habitat. Areas of deep peat and blanket bog have been avoided where possible. Adoption of good practice drainage design during construction and operation, using a multi-tiered Sustainable Drainage System (SuDS) approach to control the rate, volume and quality of runoff from the Proposed Development in order to reduce potential indirect impacts on habitats downslope of proposed infrastructure due to alteration in the quality or quantity of surface water flows. The location of turbines and access tracks has been designed to avoid sensitive habitats, including peat forming species as far as possible based on both habitat mapping and peat probing surveys. 	<p>Chapter 6 (EIAR Volume 2) assesses the residual effects on aquatic and terrestrial habitats and protected species.</p> <p>Technical Appendices 9.2 – 9.3 (EIAR Volume 4) present the approaches to peat management and handling of peat.</p> <p>The GWDTE assessment is presented in Technical Appendix 8.1 (EIAR Volume 4).</p>
Ornithology	<ul style="list-style-type: none"> The Proposed Development avoids concentrations of breeding birds. The Proposed Development avoids any significant migratory route between roosting or feeding areas. 	<p>Chapter 7 (EIAR Volume 2) assesses the residual effects on birds, including presenting the results of collision risk analysis. The Chapter also describes the appropriate steps to be taken to avoid/ mitigate impacts identified.</p>
Hydrology	<ul style="list-style-type: none"> With the exception of watercourse crossings, the design incorporates a minimum 50 m buffer distance from all hydrological receptors. All infrastructure is outwith 250 m of Private Water Supplies Designing the watercourse crossing to accommodate a 1 in 200-year return period peak flow. Minimising the number of watercourse crossings (to 6 new crossings) through the design process, with the location of the crossing selected to reduce disturbance to watercourses and riparian habitat, where possible. Adoption of good practice drainage design during construction and operation, using a multi-tiered Sustainable Drainage System (SuDS) approach to control the rate, volume and quality of runoff from the Proposed Development. 	<p>Chapter 8 (EIAR Volume 2) assesses the residual effects on Hydrology.</p> <p>Technical Appendix 2.1 (EIAR Volume 4) outlines committed environmental management measures. Watercourse crossing designs are presented in Technical Appendix 8.2 (EIAR Volume 4).</p> <p>The GWDTE assessment is presented in Technical Appendix 8.1 (EIAR Volume 4).</p>
Geology and Soils	<ul style="list-style-type: none"> Peat depth probing was completed across the Wind Turbine Array. The design process involved avoiding the areas of greatest peat depths when siting the infrastructure, as far as possible, taking account of other 	<p>Chapter 9 (EIAR Volume 2) assesses the residual effects on Geology and Soils.</p>

Table 3.1: Mitigation by Design Commitments		
Topic	Mitigation by Design Commitment	Signposting of where Topic is Addressed in the EIAR
	<p>environmental constraints (e.g., sensitive habitats, ornithology, landscape and visual receptors etc.).</p> <ul style="list-style-type: none"> • Siting infrastructure in areas of negligible to low risk of peat instability, where possible. • Siting turbines and infrastructure to avoid sensitive habitats, including peat forming habitats as far as possible, based on both habitat mapping and peat probing surveys. 	<p>Technical Appendix 2.1 (EIAR Volume 4) outlines committed Environmental Management measures.</p> <p>Technical Appendices 9.2 – 9.3 (EIAR Volume 4) present the approaches to peat management and handling of peat.</p>
Traffic and Transport	<ul style="list-style-type: none"> • Locations for infrastructure were carefully selected to maintain appropriate gradients for construction and delivery vehicles as well as maintaining a coherent wind farm design and avoiding known environmental constraints where possible. • The Applicant is committed to the implementation of the measures in the Outline CEMP (Technical Appendix 2.1, EIAR Volume 4) in relation to management of construction traffic. 	<p>Chapter 10 (EIAR Volume 2) provides an assessment of the residual effects of the Proposed Development on Traffic and Transport.</p> <p>Technical Appendix 2.1 and 10.1 (EIAR Volume 4) outline the management of construction traffic.</p>
Noise	<ul style="list-style-type: none"> • Noise predictions at all receptors indicate the predicted construction and decommissioning noise levels would be below the BS5228: Part 1 2009+A1:2014 assessment criteria. • A noise assessment in accordance with ETSU-R-97 and the Institute of Acoustics good practice guidance indicates that the operational Proposed Development would meet the derived noise limits, both on its own and cumulatively with the operational, consented or proposed wind farms near to the NALs, whilst still meeting the Total ETSU-R-97 Noise limits established in accordance with ETSU-R-97 at all NALs. 	<p>Chapter 11 (EIAR Volume 2) provides an assessment of potential effects associated with construction and operational noise, including cumulative noise effects.</p>
Aviation and Telecommunications	<ul style="list-style-type: none"> • Adopt a maximum tip height of 149.9 m to reduce the requirement for visible aviation lighting. 	<p>Chapter 12 (EIAR Volume 2), provides an assessment of the residual effects of the Proposed Development on Aviation and Telecommunications.</p>
Shadow Flicker	<ul style="list-style-type: none"> • Turbines sited to minimise the potential significant effects from shadow flicker. 	<p>Chapter 14 (EIAR Volume 2), provides an assessment of the residual effects of the Proposed Development on Shadow Flicker.</p>

3.5 Alternatives

3.4.1 The “do nothing” scenario is a hypothetical alternative conventionally considered in EIA as a basis of comparing a site with the proposed development to the site if left undeveloped. This scenario is considered to represent the current baseline situation as described in the individual chapters of this EIA Report.

- 3.4.2 In the absence of the Proposed Development, it is anticipated that the Wind Turbine Array would continue to be managed primarily for forestry. This land use would continue whether or not the Proposed Development proceeds.
- 3.4.3 It is recognised that the baseline would not remain static for the lifetime of the Proposed Development. In particular, and apart from any changes arising from economic and agricultural policies and economic market considerations, it is predicted that the landscape and biodiversity would undergo some level of change (likely deterioration) as a result of the impact of climate change. Publications from the Landscape Institute⁷ and NatureScot⁸ consider the potential climate change effects on the landscape character. Due to the complexities and uncertainties inherent in attempting to predict the nature and extent of such changes to landscape and biodiversity during the lifetime of the Proposed Development, it has been assumed that the current baseline would prevail. It is considered that this represents a precautionary, and appropriate, approach for EIA Report preparation purposes.

3.6 Design Evolution and Alternative Layouts

- 3.5.1 Over the course of the development design process for the Proposed Development there have been four principal design iterations, shown on **Figures 3.1 - 3.4** (EIAR Volume 3a):
- Layout 1: Pre-Scoping Layout 2020.
 - Layout 2: Scoping Layout.
 - Layout 3: Design Workshop 1 Layout.
 - Layout 4: Gatecheck / Design Freeze Layout.

Layout 1: Pre-Scoping Layout 2020

- 3.5.2 The Pre-Scoping Layout 2020 (**Figure 3.1**, EIAR Volume 3a) considered the potential for siting turbines across the Wind Turbine Array, indicating that the Wind Turbine Array could theoretically accommodate up to 13 turbines with a maximum blade rotor diameter of up to 136 m. The pre-scoping layout was developed based on the following parameters:
- standard inter-turbine spacing of 5 x 3 rotor diameters within the land available;
 - avoidance of steep slopes in excess of 10 degrees; and
 - suitable separation from watercourses illustrated on 1:50,000 scale OS mapping.

Layout 2: Scoping Layout

- 3.5.3 The first major design iteration (**Figure 3.2**, EIAR Volume 3a) was made in January 2021 before submitting the Scoping Report⁹. The change in layout was primarily driven by landscape and visual analysis, with one turbine removed and several turbines repositioned to avoid stacking and provide a more cohesive layout. Turbine T3 was moved to pull it outwith a 50 m watercourse buffer.

⁷ Landscape Institute, (2008), Landscape architecture and the challenge of climate change. URL: <https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2016/03/LIClimateChangePositionStatement.pdf> [Accessed July 2023]

⁸ SNH, (2011), Commissioned Report No. 488: As assessment of the impacts of Climate Change on Scottish Landscapes and their contribution to quality of life: Final Report. URL: <https://www.nature.scot/sites/default/files/2017-08/Publication%202012%20-%20SNH%20Commissioned%20Report%20488%20>

⁹ West Torrisdale Scoping Report (2021) Available at: <https://www.energyconsents.scot/ApplicationDetails.aspx?cr=ECU00002224>

Layout 3: Design Workshop 1 Layout

- 3.5.4 The second major design iteration (**Figure 3.3**, EIAR Volume 3a) occurred in response to a review of key environmental constraints including geology, peat and forestry, as well as landscape and visual, and engineering constraints including slope and wind resource. Proposed wind turbines T9 and T7 were repositioned to avoid sensitive blanket bog habitats (Annex 1 habitat) and Class 2 Peatland habitats. Feedback as a result of submission of the Scoping Report and subsequent consultation responses were also considered. As a result, the number of turbines was reduced from 12 to 9 in order to minimise potential impacts and to ensure the layout worked from a wind resource and engineering perspective. Proposed access tracks and infrastructure elements were also developed following route assessments and a full topographical survey of the Access Corridor. It was concluded that the most practicable route to the Wind Turbine Array was to upgrade the existing forestry access track between the Beinn an Tuirc Extension substation and the Wind Turbine Array rather than creating a new route. This therefore avoided impacts on the surrounding habitat including the removal of peat.
- 3.5.5 This layout was presented at the public consultation events held in East and West Kintyre Community Council Areas in December 2021, the details of which are outlined in the Statement of Community Consultation Report¹⁰ which accompanies this Application.

Layout 4: Gatecheck / Design Freeze Layout

- 3.5.6 The final major design iteration (**Figure 3.4**, EIAR Volume 3a) followed Design Workshop 1 where the layout was reviewed against all environmental constraints, consultation feedback and updated information gathered during site walkovers. The Design Workshop 2 focussed on finalising the turbine positions taking into account peat, geology, hydrology, Phase 1 Habitat Survey data, National Vegetation Classification (NVC), Groundwater Dependent Terrestrial Ecosystems (GWDTEs), ornithology and private water supplies (PWS). Turbine positions were altered to accommodate the preliminary optimisation of earthworks for access tracks and crane hardstandings (based on a 3D model), while also positioning them to avoid sensitive habitats and areas of deeper peat.
- 3.5.7 This layout was consulted on through the Gatecheck Report, where no specific feedback was received.

3.7 Summary of Preferred Option

- 3.6.1 The preferred option taken forward for assessment is the Layout 4: Design Freeze Layout as presented in Chapter 2 and shown in **Figure 2.1** (EIAR Volume 3a).
- 3.6.2 By following the design guidance described in **Table 3.1**, the number of turbines was reduced from 13 to 9, infrastructure footprint has been optimised to minimise overall track length and the number of watercourse crossings. Likely significant effects have been avoided or minimised as far as reasonably practicable through the design process.

¹⁰ West Torrisdale Wind Farm - Statement of Community Consultation Report (2023)

4 Seascape, Landscape and Visual Amenity

4.1 Introduction

4.1.1 This Chapter is intended to identify and assess potential significant effects on the seascape, landscape and visual resource associated with the construction, operation and decommissioning of the Proposed Development. The Chapter comprises:

- a description of the scope and assessment methodology and significance criteria used in completing the impact assessment;
- a description of the existing seascape, landscape and visual baseline context and cumulative context against which to assess the effects of the Proposed Development, along with sensitive receptors that form priorities for consideration in the design and mitigation of the Proposed Development;
- a description of impact generators associated with construction and operation of the Proposed Development as well as an analysis of potential seascape, landscape and visual effects;
- a description of the design and mitigation measures proposed to address potential significant effects; and
- an assessment of residual seascape, landscape and visual effects remaining taking account of proposed mitigation measures.

4.1.2 The assessment has been carried out by Kyle Lafferty, Senior Landscape Architect at Ramboll UK Limited with Robert Bainsfair (Director, landscape architecture services in Ramboll UK Limited). Between them the assessors have over 33 years of experience working across a wide range of sectors including renewable energy and have extensive experience of managing and undertaking similar Seascape, Landscape and Visual Impact Assessments (SLVIA), including cumulative assessments. Robert Bainsfair has provided expert witness testimony for wind farm developments throughout Scotland and has authored key technical guidance in respect of repowering and decommissioning of onshore wind farms.

4.1.3 This Chapter is accompanied by the following figures and technical appendices:

- Volume 3a: Figures:
 - **Figure 4.8a: Cumulative ZTV: Proposed Development, Airigh Wind Farm and Allt Dearg Community Wind Farm**
 - **Figure 4.8b: Cumulative ZTV: Proposed Development, Allt Domhain Wind Farm and Auchadaduie Wind Farm**
 - **Figure 4.8c: Cumulative ZTV: Proposed Development, Beinn an Tuirc Wind Farm Phase 1 and Breackerie Wind Farm**
 - **Figure 4.8d: Cumulative ZTV: Proposed Development, Beinn an Tuirc Wind Farm Phase 2 and Beinn an Tuirc Wind Farm Phase 3**
 - **Figure 4.8e: Cumulative ZTV: Proposed Development, Blary Hill Wind Farm and Clachaig Glen Wind Farm S36c Variation**
 - **Figure 4.8f: Cumulative ZTV: Proposed Development, Cnoc Breacam Wind Farm and Cnoc Buidhe Wind Energy Hub**
 - **Figure 4.8g: Cumulative ZTV: Proposed Development, Coalashee Wind Farm and Cour Wind Farm**

- **Figure 4.8h: Cumulative ZTV: Proposed Development, Deucheran Hill Wind Farm and Deucheran Hill 2 Wind Farm**
 - **Figure 4.8i: Cumulative ZTV: Proposed Development, Eascairt Wind Farm and Earraghail Wind Farm**
 - **Figure 4.8j: Cumulative ZTV: Proposed Development, Freasdail Wind Farm and High Constellation Wind Farm**
 - **Figure 4.8k: Cumulative ZTV: Proposed Development, High Dalrioch Wind Farm and Islay Community Wind Turbine**
 - **Figure 4.8l: Cumulative ZTV: Proposed Development, Isle of Gigha Wind Farm and Isle of Gigha Wind Farm Extension**
 - **Figure 4.8m: Cumulative ZTV: Proposed Development, Killean Wind Farm and Rowan Wind Farm**
 - **Figure 4.8n: Cumulative ZTV: Proposed Development and Srondoire Community Wind Farm**
 - **Figure 4.8o: Cumulative ZTV: Proposed Development, Tangy Wind Farm 3 (Repowering) and Tangy Wind Farm 4.**
- Volume 3b: Figures:
 - **Figure 4.9a – 4.9f: Visualisation: Viewpoint 01: Torrisdale Bay Parking Area;**
 - **Figure 4.10a – 4.10f: Visualisation: Viewpoint 02: Dougarie Point, Arran;**
 - **Figure 4.11a – 4.11f: Visualisation: Viewpoint 03: Summit of Beinn Tarsuinn;**
 - **Figure 4.12a – 4.12f: Visualisation: Viewpoint 04: Glenbarr War Memorial;**
 - **Figure 4.13a – 4.13f: Visualisation: Viewpoint 05: Drumadoon Point, Arran;**
 - **Figure 4.14a – 4.14f: Visualisation: Viewpoint 06: Carradale Point;**
 - **Figure 4.15a – 4.15f: Visualisation: Viewpoint 07: Kintyre Way, near Torrisdale Castle;**
 - **Figure 4.16a – 4.16f: Visualisation: Viewpoint 08: B879 above the Millennium Beach;**
 - **Figure 4.17a – 4.17f: Visualisation: Viewpoint 09: B879 on entering Saddell from the South;**
 - **Figure 4.18a – 4.18f: Visualisation: Viewpoint 10: Skipness Point;**
 - **Figure 4.19a – 4.19f: Visualisation: Viewpoint 11: Skipness Castle;**
 - **Figure 4.20a – 4.20f: Visualisation: Viewpoint 12: Deucheran Hill;**
 - **Figure 4.21a – 4.22f: Visualisation: Viewpoint 13: South Pier, Gigha;**
 - **Figure 4.22a – 4.22f: Visualisation: Viewpoint 14: Isle of Gigha Jetty;**
 - **Figure 4.23a – 4.23f: Visualisation: Viewpoint 15: Kintyre Way at Kildalloig Bay;**
 - **Figure 4.24a – 4.24f: Visualisation: Viewpoint 16: On the Kintyre Way by Ballimenach Hill;**
 - **Figure 4.25a – 4.25f: Visualisation: Viewpoint 17: Carradale Golf Course/ Carradale Explorer Walk (Bench overlooking tees 6 and 15);**
 - **Figure 4.26a – 4.26f: Visualisation: Viewpoint 18: A83: Top of Clachan Hill;**
 - **Figure 4.27a – 4.27f: Visualisation: Viewpoint 19: B843, Machrihanish;**
 - **Figure 4.28a – 4.28f: Visualisation: Viewpoint 20: Machrie Moor Standing Stones;**
 - **Figure 4.29a – 4.29f: Visualisation: Viewpoint 21: Lochranza to Claonaig Ferry; and**

- **Figure 4.30a – 4.30e: Visualisation: Viewpoint 22: Lochranza to Claonaig Ferry (Kilbrannan Sound).**
- Volume 4: Technical Appendices:
 - **Technical Appendix 4.1: Seascape and Landscape Character Type Descriptions;**
 - **Technical Appendix 4.2: Designation and Classification Landscapes;**
 - **Technical Appendix 4.3: Viewpoint Assessment;**
 - **Technical Appendix 4.4: Residential Visual Amenity Assessment;**
 - **Technical Appendix 4.5: Wild Land Impact Assessment;** and
 - **Technical Appendix 4.6: Route Visibility Analysis.**

4.1.4 Figures and technical appendices are referenced in the text where relevant.

4.1.5 This assessment uses the below terminology throughout:

- Proposed Development – All elements of the West Torrisdale Wind Farm development for which S36 consent and deemed planning permission are sought.
- Application Boundary – The red line boundary defining all elements of the Proposed Development for the purpose of the S36 application.
- Wind Turbine Array – the location of the wind turbines comprising the Proposed Development.
- Access Corridor – the land within the Application Boundary in which the access track connect the Wind Turbine Array with the A83 road.
- Study Area – the area in which the EIA is undertaken, defined for each technical topic as appropriate.

4.2 Assessment Methodology and Significance Criteria

Scope of Assessment

4.2.1 The Study Area used in the SLVIA comprises a 40 km radius extending from the Wind Turbine Array. The 40 km Study Area is based upon guidance provided in NatureScot’s guidance on the visual representation of wind farms¹ and Ramboll’s experience of similar developments elsewhere in Scotland, with those receptors located outwith 40 km considered unlikely to experience significant residuals effects. The Study Area is illustrated on **Figures 4.1** (EIAR Volume 3a).

4.2.2 The SLVIA considers effects on:

- Landscape fabric, caused by changes to the physical form of the landscape and its elements;
- Seascape and landscape character, caused by changes in the pattern of key characteristic features and elements of the landscape as a result of the Proposed Development;
- Designations and classifications, caused by changes to the special qualities of such landscape as a result of the Proposed Development; and

¹ NatureScot 2017, Visual Representation of Wind Farms, Guidance – version 2.2 (available at <https://www.nature.scot/sites/default/files/2019-09/Guidance%20-%20Visual%20representation%20of%20wind%20farms%20-%20Feb%202017.pdf>)

- Visual amenity, caused by changes in the composition and scenic qualities of views on visual amenity as a result of the Proposed Development.
- 4.2.3 The SLVIA also assesses both in-addition effects (which pertain to what the Proposed Development adds to the cumulative context) and in-combination cumulative effects, (which concerns the total effect of the Proposed Development and other cumulative developments combined). It is important to note that the principal consideration of the cumulative assessment is that of in-addition cumulative effects. In essence the priority has been to establish what effects are specifically attributable to the Proposed Development and whether this represent a significant increase in the influence of wind energy development. Conversely, in-combination effects are more relevant in establishing the degree to which wind energy development is currently a key characteristic or 'the' defining characteristic of the seascape/landscape or view, and whether proposed developments would alter this.
- 4.2.4 The cumulative assessment considers both types of effect in respect of two different scenarios:
- Scenario one: Which comprises a baseline context which includes operational and consented (but currently unbuilt) wind farm developments; and
 - Scenario two: Which comprises the baseline context in Scenario one, along with proposed developments (i.e. those subject to a valid planning application).
- 4.2.5 In addition to in-planning developments mentioned in Scenario two, a number of scoping schemes have been incorporated into the assessment, including Allt Domhain, Cnoc Buidhe and Coalashee wind farms.
- 4.2.6 Scenario one has the highest degree of certainty and is considered most likely to form the development context in which the Proposed Development would be seen. In contrast, there is a high degree of uncertainty regarding the final design or likely consenting of in-planning and in-scoping schemes.
- 4.2.7 The scope of the assessment has been informed by consultation responses summarised in **Table 4.1**, below, and the following published guidance:
- Guidelines for Landscape and Visual Impact Assessment (GLVIA)²;
 - Landscape Character Assessment³;
 - Siting and Designing Wind Farms in the Landscape⁴;
 - Assessing Effects on Wild Land⁵; and
 - Guidance: Cumulative Effects of Wind Farms⁶.

Consultation

- 4.2.8 **Table 4.1** summarises the consultation responses received regarding the scope and approach adopted in the SLVIA and provides information as to how and where within the chapter the consultees comments have been addressed.

² Guidelines for Landscape and Visual Impact Assessment, third edition, Landscape Institute and Institute of Environmental Management and Assessment (2013)

³ Landscape Character Assessment The Countryside Commission and Scottish Natural Heritage (2002)

⁴ Siting and Designing Wind Farms in the Landscape, Guidance, Version 3a Scottish Natural Heritage (August 2017)

⁵ Assessing impacts on Wild Land Areas – technical guidance Nature Scot (September 2020)

⁶ Assessing the cumulative impact of Onshore Wind Energy Developments⁶ Scottish Natural Heritage (2012). Guidance – assessing cumulative landscape and visual impact of onshore wind energy development NatureScot. Available at: <https://www.nature.scot/doc/guidance-assessing-cumulative-landscape-and-visual-impact-onshore-wind-energy-developments> (Accessed: 17 April 2023).

- 4.2.9 It should be noted that scoping responses listed were given in respect of a preliminary 12 turbine scheme that was illustrated in the scoping submission in January 2021. Post scoping comments were based on the revised 9 turbine scheme that is illustrated in **Figure 4.1** (EIAR, Volume 3a).
- 4.2.10 Full details on the consultation responses can be reviewed in **Technical Appendix 1.1** (EIAR Volume 4).

Table 4.1: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
Energy Consents Unit (ECU) April 2021	Scoping Opinion	<i>"Scottish Ministers request that any additional viewpoints, water-based viewpoints, wireframes, ZTV and photomontages as requested by Argyll and Bute Council, NatureScot, Historic Environment Scotland are considered in full. It is recommended by the Scottish Ministers that the final list of viewpoints and visualisations should be agreed following discussion between the company, Argyll and Bute Council, North Ayrshire Council, Historic Environment Scotland and NatureScot."</i>	Noted. All viewpoints assessed within the SLVIA are detailed in Technical Appendix 4.3 (EIAR Volume 4). These have been agreed and finalised in consultations with Argyll and Bute Council (ABC) and NatureScot (NS).
Argyll and Bute Council (ABC)	Scoping	<i>"Argyll and Bute Landscape Wind Energy Capacity Study (ABLWECS) is a material consideration."</i>	The ABLWECS is addressed in the SLVIA (see Technical Appendix 4.1 , EIAR Volume 4), both in respect of the baseline characteristics and its analysis of potential developments and cumulative context.
		It is noted from that the proposal is located close to a number of locally and nationally designated and important landscapes. The designations/classifications detailed on page 14 of the Scoping Report which are intended to be Scoped out are noted and the Council has no comment to make in this regard.	Noted.
		It is noted that this document has not been referred to in the Scoping Report. The Capacity Study is a material consideration in the determination of wind farm proposals, and it is recommended that it is considered fully in the LVIA process, taking into account adjacent Landscape Character Types (LCTs) impacted by the proposal as well as the receiving LCT. It is considered that; the proposal is not supported by the development recommendations cited in the ABLWECS. The proposal is located within LCT 6 –	The ABLWECS is addressed in the SLVIA (see Technical Appendix 4.1 , EIAR Volume 4), both in respect of the baseline characteristics and its analysis of potential developments and cumulative context.

Table 4.1: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
		<p>Upland Forest Moor Mosaic which has very limited scope for the very large typology turbines (>130m). The ABLWECS recommends that wind farms in this LCT are sited in the less sensitive interior of the Kintyre uplands so as to avoid significant landscape and visual impacts on the settled coastal edge of Kintyre and on views from Arran. The ABLWECS recommends that <i>"turbines should not be sited on, or close by, the more pronounced and higher hill summits found in the southern and northern part of this character type including Beinn Bhreac and Beinn an Tuirc which form a scenic backdrop to the Carradale area."</i></p>	
		<p>Argyll and Bute Council requested viewpoints from the following locations:</p> <ul style="list-style-type: none"> • Ferry routes between Kennacraig and Port Ellen and Port Askaig; • Ferry route between Claonaig and Lochranza; • Ferry route between Tayinloan and Gigha; • Viewpoints representative of recreational watercraft; • Point with visibility from North Gigha; • Various points with visibility on the B842 – including Cour House (Category A listed building); • Point with visibility on the A83 – north of Clachan; • Point with visibility from Carradale Harbour; • Points with visibility in the Machrihanish area; and • Points with visibility from Knapdale/Kilberry Road. <p>It is noted from the ZTV that no visibility is indicated from Dun Skeig, Scheduled Monument. It is difficult to tell from the ZTV whether there will be visibility from Glenbarr War Memorial on the A83, it would be helpful if this could be confirmed.</p>	<p>Noted. A full list of viewpoints included within the SLVIA can be found within Technical Appendix 4.3 (EIAR Volume 4), all of which takes account of the aforementioned routes.</p> <p>To better understand the extent of visibility from the settlement of Glenbarr, a representative viewpoint has been included in the assessment, Viewpoint 4: Glenbarr War Memorial (Figure 4.12a – 4.12j, EIAR Volume 3b).</p>
		<p>It is noted that the turbines will not require visible aviation lighting. The Council understands that the advice of: NatureScot,</p>	<p>Noted.</p>

Table 4.1: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
		North Ayrshire Council and Historic Environment Scotland, will also be sought in regard to this chapter of the EIA where relevant. Subject to the above advice being taken into consideration the Council is satisfied with the intended approach.	
	Post-Scoping Report Submission	In response to a letter from Ramboll (25/03/21 - 'West Torrisdale Wind Farm Viewpoint Selection West Torrisdale Wind Farm Viewpoint Selection') the Council responded confirming its agreement with the advice on viewpoint selection provided by NatureScot in their Scoping consultation response date 26th March 2021. ABC also requested wireline images to illustrate the effect on the view from the Machrihanish area.	Noted. A series of illustrative images, which includes 360-degree cumulative wirelines and visualisations have been provided from a representative viewpoint along the B843 within Machrihanish (Viewpoint 19, Figure 4.27a – 4.27j, EIA Volume 3b).
	Pre-Gatecheck Meeting	The council would welcome an update on the proposed viewpoints and updated ZTV.	Following Scoping, a revised viewpoint list and ZTV that included additional viewpoints based on consultees responses was provided in the Gatecheck report of October 2022. A final list of viewpoints is provided within Technical Appendix 4.3 (EIA Volume 4) and an overall ZTV for the Proposed Development is included within Figure 4.3 (EIA Volume 3a).
		The council would also want to see the final cumulative list. It was noted in the meeting this wouldn't be finalised until closer to the submission. The proposed list would be included in the gatecheck report.	Noted. Cumulative developments included within the assessment are presented within Table 4.6 of this Chapter and were provided in the Gatecheck Report. The penultimate list of cumulative developments was agreed as comprehensive by ABC in February 2023. Subsequent to this a number of additional scoping schemes within 10 km of the Proposed Development were included due to their proximity and potential to contribute to significant cumulative effects.
NatureScot (NS)	Scoping	The location and scale of the Proposal could raise issues of	Noted. A detailed assessment has been carried out in relation to

Table 4.1: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
		<p>national interest and result in an objection from NatureScot.</p> <p>The Proposal includes 12 turbines with a maximum tip height of 149.9 m; significantly higher than the turbines of the immediately adjacent two operational and one consented Beinn an Tuirc Wind Farms to the west and south which have tip heights of 64 m, 100m and 126m.</p> <p>The Proposal is located close to a number of locally and nationally designated and important landscapes which reflect the sensitivity and special qualities of the area (see Scoping Figure 3.2: Landscape Designations).</p>	<p>impacts on local and national designations, please refer to Technical Appendix 4.2 and 4.5 (EIAR Volume 4).</p>
		<p>The Proposal could potentially result in significant adverse effects in relation to highly sensitive landscapes including the nationally important North Arran NSA and its setting, and North Arran Wild Land Area. An assessment should be provided of the effects of the proposed development on the relevant designated/ protected landscapes in accordance with guidance. For National Scenic Areas, the effects of the proposed development on the special qualities should be assessed in line with our draft guidance which has been appended to this letter.</p>	<p>Noted.</p> <p>A detailed assessment has been carried out in relation to impacts on local and national designations, please refer to Technical Appendix 4.2 and 4.5 (EIAR Volume 4).</p>
		<p>A wild land assessment should be provided for North Arran Wild Land Area. We can advise on the scope.</p>	<p>Noted. The SLVIA includes a separate Wild Land Impact Assessment (WLIA) on the North Arran Wild Land Area (WLA) that is in accordance with NatureScot’s guidance on assessing impacts on Wild Land Areas⁷ (see Technical Appendix 4.5, EIAR Volume 4).</p>
		<p>We are content that the designations listed on page 14 of the Scoping Report seem reasonable; and will confirm they can be scoped out of the assessment once we have ZTV information in accordance with guidance.</p>	<p>Noted. An updated ZTV (Figure 4.3, EIAR Volume 3a) has been provided as part of the SLVIA.</p>

⁷ NatureScot (202) – Revised 2023 to reflect NPF4) Assessing impacts on Wild Land Areas – Technical Guidance (available at)<https://www.nature.scot/doc/assessing-impacts-wild-land-areas-technical-guidance>)

Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
		In NatureScot's view, the Proposal is not supported by the recommendations of the Argyll & Bute Landscape Wind Energy Capacity Study 2017 (ABLWECS). The Proposal is located within LCT 6 – Upland Forest Moor Mosaic which has very limited scope for the very large typology turbines (>130m). In addition, we wish to highlight that the ABLWECS recommends that <i>"turbines should not be sited on, or close by, the more pronounced and higher hill summits found in the southern and northern part of this character type including Beinn Bhreac and Beinn an Tuirc which form a scenic backdrop to the Carradale area."</i>	Noted. The layout design has been carefully considered to minimise the impacts on sensitive LCTs and landscape features, taking cognisance from ABLWECS, refer to Section 4.5 of this Chapter.
		Impacts on the highly sensitive 'Rocky Mosaic' and 'Hidden Glen' Landscape Character Types (LCTs) are a key issue. The iterative design process should aim to avoid / minimise impacts on these LCTs.	Noted. Details of key landscape and visual design priorities are reported in Section 4.5 of this Chapter. Chapter 3 (EIAR Volume 2) provides a summary of the key design and decisions made during the course of the design of the Proposed Development.
		Landscape Character Type (LCT) boundaries should be as defined in the ABLWECS 2017 and other current wind capacity studies. Seascape should include all potentially significantly affected waterscapes.	The SLVIA references the ABLWECS boundaries and reference NS's sensitivity study for seascapes, refer to Technical Appendix 4.1 (EIAR Volume 4).
		It is noted that the turbines will not require visible spectrum aviation lighting.	This is the case and so no assessment of lighting effects is included in the SLVIA.
		We would be happy to provide further comment on viewpoints on receipt of appropriate supporting information, including: <ul style="list-style-type: none"> • A0 scale 45 km ZTV on a more detailed OS base map with viewpoint locations in accordance with our guidance; • Hub height ZTV with designations and viewpoints; • Further representative viewpoints and justification of the viewpoint selection including distance, designation, landscape character type, receptor type, direction etc.; and 	Noted. This has been included within the list of figures for the SLVIA (Figure 4.9a – Figure 4.30i , EIAR Volume 3a) and within Table 4.3.2 of Technical Appendix 4.3 (EIAR Volume 4).

Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
		<ul style="list-style-type: none"> Draft wirelines would also be helpful. 	
		<p>Welcomes the draft viewpoint selection, our comments are limited in the absence of the above information. We advise there are some viewpoint omissions/ additional viewpoints to be explored and considered for assessment viewpoints. Coastal and upland views are likely to be key. Some initial suggestions for additional LVIA assessment viewpoints to explore include representative views from:</p>	Noted.
		<p>'- Kilbrannan Sound including a viewpoint to represent the Lochranza - Claonaig ferry. Ferries are key transport routes in this area. Other ferries/ recreational water users using this body of water should also be considered in the written assessment.</p>	<p>The viewpoint assessment includes the Lochranza – Claonaig Ferry (Figure 4.30a – 4.30j, EIAR Volume 3b) and note that there are four other viewpoints which would take account of views across the water: from Skipness Point (VP10, Figure 4.18a – 4.18j, EIAR Volume 3b); Carradale Point (VP6, Figure 4.14a – 4.14j, EIAR Volume 3b); Drumadoon Point (VP5, Figure 4.13a – 4.13j, EIAR Volume 3b); and from the southern pier on Gigha (VP13, Figure 4.21a – 4.21j, EIAR Volume 3b).</p>
		<p>'- Viewpoints on the B842 to consider sequential views of the Proposal.</p>	<p>This has been included in the assessment on transport and recreational routes, see Section 4.6 of this Chapter.</p>
		<p>We request water-based viewpoints are included as assessment viewpoints as they are important receptors in this landscape where boats / water-based recreation is an important part of the tourist / visitor experience. While we appreciate the technical difficulties of producing water-based photomontage, wirelines and baseline photography should be provided as the very minimum with the limitations clearly stated on the visualisations.</p>	<p>Photography has been captured for the Lochranza-Claonaig ferry crossing (VP22, Figure 4.30a – 4.30j, EIAR Volume 3b) and four other viewpoints which would take account of water-based activities: from Skipness Point (VP10, Figure 4.18a – 4.18j, EIAR Volume 3b); Carradale Point (VP6, Figure 4.14a – 4.14j, EIAR Volume 3b); Drumadoon Point (VP5, Figure 4.13a – 4.13j, EIAR Volume 3b); and from the southern pier on Gigha (VP13, Figure 4.21a – 4.21j, EIAR Volume 3b).</p>
		<p>We also request wirelines from the viewpoints that have been tested and discounted.</p>	<p>Where specified individual viewpoints have been discounted, wireline images are provided in the Technical Appendix 4.3 (EIAR Volume 4) and a record of which</p>

Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
			viewpoints have been included and omitted.
		The Cumulative Base Plan should be to a 60 km radius unless a reduced radius is justified and agreed. We recommend also including consideration of small-scale proposals (50 m or less) within a 20 km radius. The focus of the assessment should be on potential significant cumulative interactions. The sites to be included in the CLVIA should be agreed with the Council. The assessment process should be in accordance with our guidance.	<p>The SLVIA used a 40 km radius Study Area. Where developments lay close to this extent they have been included in the SLVIA, as in the case of the Gigha wind turbines. This extent is considered to represent an appropriate cumulative context and one which represents the cumulative context that is most likely to contribute to significant effects, especially given the particular context (i.e. a slender peninsula surrounded by open water).</p> <p>No consideration has been given to wind turbines less than 50 m to maximum blade tip height above ground level.</p> <p>The penultimate list of cumulative developments was agreed as comprehensive by NS in February 2023. Subsequent to this a number of additional scoping schemes within 10 km of the Proposed Development were included due to their proximity and potential to contribute to significant cumulative effects.</p>
		The Proposal would extend the influence of wind farms into the coast compromising the emerging development pattern in the regional area. The proximity to the coast and pronounced hills and the scale (height and extent) are key concerns.	Noted. This has been incorporated into the design layout of the Proposed Development and addressed in Section 4.5.5 of this Chapter.
		Cumulative effects – including the potential concentrated band of turbines in southern Kintyre – in views from Arran, and associated coastal waters are of particular concern.	Noted. This has been addressed within the cumulative section of the SLVIA, refer to Section 4.4 of this Chapter.
		A reduction in the scale of turbines should be explored to avoid the impacts being compounded by the contrast in scale of turbines with closely associated wind farms on the peninsula.	The emergent pattern of development has been addressed both in the design of the Proposed Development and in the assessment presented in Section 4.5.5 of this Chapter.
		All ancillary infrastructure, should be visualised / described when likely to be visible.	Visible infrastructure such as site access tracks have been included where appropriate.

Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
		The Cultural Heritage section should be cross-referenced with the Landscape section of the EIA Report with representative assessment viewpoints and assessment of the effects of the proposal on the views and experience of the landscape; in particular, the effect on historic character as it contributes to landscape experience.	The Cultural Heritage and SLVIA Assessments are distinct assessments, however, and consider separate aspects, even of the same receptor locations. It is critical that no confusion or conflation of these topics occurs.
	Post-Scoping	<p>NatureScot responded in a separate email regarding VPs as follows:</p> <p>We have provided initial comments on the proposed viewpoint selection in our scoping response which was issued to ECU today and I have attached this (as well as the associated attachments) for your information.</p> <p>We are, however, unable to provide detailed comment until we receive a tip height ZTV on more detailed OS mapping as well as a hub height ZTV with landscape designations and proposed viewpoints shown. We welcome the VP table presented in your letter but kindly request that you also include the direction and distance of the viewpoint from the Proposal.</p> <p>If you are able to send us the additional ZTVs and viewpoint information, we will be able to advise further on viewpoint selection.</p>	Following Scoping, a revised viewpoint list and ZTV that included additional viewpoints based on consultees responses was provided in the Gatecheck report of October 2022.
		NatureScot confirmed they wished to receive the ZTVs (on as detailed OS mapping as possible) virtually in the first instance that should be sufficient.	<p>Following Scoping, a revised ZTV was provided in the Gatecheck report of October 2022.</p> <p>A ZTV for the Proposed Development has been included within the suite of figures accompanying the SLVIA, refer to Figure 4.3 (EIAR Volume 3a).</p>
	Pre-Gatecheck Meeting	The biggest concerns arise from a landscape perspective around the North Arran National Scenic Area, Wild Land areas, rocky coastal and hidden glen landscape character types.	The SLVIA addresses effects on the North Arran National Scenic Area (NSA) in Technical Appendix 4.2 (EIAR Volume 4) and on the North Arran WLA in Technical Appendix 4.5 (EIAR Volume 4). The rocky coastal and hidden glen landscape character types have been included within the SLVIA

Table 4.1: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
			and assessed in Technical Appendix 4.1 (EIAR Volume 4).
John Muir Trust	Scoping	John Muir Trust have noted that this development is at Scoping Stage and that the Landscape and Visual Impact Assessment will consider potential impacts on the North Arran Wild Land Area. If the proposed development proceeds to the planning application stage John Muir Trust will review the documentation at that stage	Noted. A detailed Wild Land Impact Assessment has been carried out as part of the SLVIA, refer to Technical Appendix 4.4 (EIAR Volume 4)
Mountaineering Council of Scotland	Scoping	<p>Mountaineering Scotland (MS) is in general content with the proposed methodology in the Scoping Report. Some raised the following points:</p> <p>The key LVIA receptors do not include hillwalkers. Hillwalkers on the popular North Arran Hills (within the NSA and WLA) should be included as key receptors.</p> <p>Only one upland viewpoint on Arran is proposed. The Scoping Report states that Goat fell has been chosen to demonstrate the absence of an effect on the NSA/WLA. MS sees no benefit in using Goat fell as a viewpoint. It has a sliver of (probably only blade-tip) visibility and a hub and blade-tip ZTV is quite adequate to demonstrate areas without visibility.</p> <p>It is particularly unsatisfactory to waste a viewpoint on demonstrating a negative when the ZTV shows extensive visibility from other hills within the NSA/WLA.</p> <p>We would suggest that as a minimum Beinn Tarsuinn (or another point on that ridge) should be a viewpoint. Ideally Beinn Bharrain would also be a viewpoint since, although the angle of view is similar to Beinn Tarsuinn, it is several kilometres closer to the proposed development site. Both of these suggestions are within the NSA and WLA, and the former ridge is particularly popular with walkers.</p>	<p>Noted.</p> <p>This sensitive receptor type has been included throughout the SLVIA, especially in respect of Arran summits. Please refer to Figure 4.6 and Figure 4.11a – j (EIAR Volume 3a and 3b).</p> <p>An alternative viewpoint in the NSA and WLA has been located on Beinn Tarsuinn and this has been included (VP3, Figure 4.11a – 4.11j, EIAR Volume 3b).</p> <p>We note the suggestion for a viewpoint on Beinn Tarsuinn and this has been included (VP3, Figure 4.11a – 4.11j, EIAR Volume 3b,) and have introduced a viewpoint from the Machrie Moor Standing Stones (VP20, Figure 4.28a – 4.28j, EIAR Volume 3b,) which ensures that there are four viewpoints from the west of Arran with potential views to the Proposed Development from varying altitudes and taking into account various types of receptors.</p>

Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
Scottish Rights of Way and Access Society (ScotWays)	Scoping	<p>You should be aware that other forms of public access to land may affect the proposed application site, in this case the Kintyre Way, a long-distance route which is used by walkers, runners and cyclists. This route is promoted by Scottish Natural Heritage as one of Scotland's Great Trails.</p> <p>As well as direct impacts of development upon public access, ScotWays has an interest in impacts on recreational amenity, so this includes the impact of wind farm development on the wider landscape. We anticipate that the applicant will take into account both recreational amenity and landscape impacts in developing their proposals for this site. We will consider these issues further should this scoping stage lead to a planning application.</p>	<p>Noted. Addressed within the recreational route part of the SLVIA, refer to Section 4.4 of this Chapter.</p> <p>Recreational amenity is addressed in Section 4.6 of the SLVIA.</p>
East Kintyre Community Council (EKCC)	Scoping Opinion	Viewpoint 8 needs to be moved (currently appears to be about the village hall) to the second tee on the golf course - since the golf course is a major tourism facility.	This viewpoint location has been changed to VP17: Carradale Golf Course (Figure 4.25a – 4.25j , EIAR Volume 3b).
West Kintyre Community Council	Scoping	<p>The cumulative analysis appears to omit Clachaig Glen Wind Farm which was consented in 2019 and is now the subject of a new application for a resizing of turbines.</p> <p>Due to the large number of wind farms already operation, consented, under construction or in-planning we are increasingly concerned with regards to the cumulative impact of yet another application for this relatively small and narrow rural peninsula, and this application will tip the visual and landscape balance from that of a landscape with windfarms to that of a wind farm landscape. This concern is especially important due to several other applications for the area being in-scoping alongside this application which if consented will all significantly impact on the area.</p>	An updated cumulative assessment is included in the SLVIA which addresses recent changes to the cumulative context, including and Clachaig Glen (in-planning) . Please refer to Section 4.6 of the SLVIA.
		<p>In order to assess accurately the visual impact this development may have on the area we request that viewpoints used to assess other developments in the area and in particular the cumulative impact be included in any</p>	The viewpoints proposed have been carefully considered against the viewshed of the Proposed Developments wind turbines at as follows:

Table 4.1: Consultation Responses

Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
		<p>planning application submitted, namely:</p> <ul style="list-style-type: none"> • A83 – top of Clachan Hill – north of the village of Clachan • Duns Skeig – west of Clachan and a significantly important ancient monument • A83 – Glen Barr war memorial • Ferry route between Islay and Kennacraig west Loch Fyne • Sound of Gigha 	<ul style="list-style-type: none"> • A83 – top of Clachan Hill (Viewpoint 18, Figure 4.26a – 4.26j, EIAR Volume 3b): The ZTV indicates a limited area of potential visibility at Clachan Hill and given the elevated nature of this location this viewpoint is included. • Duns Skeig – west of Clachan: The ZTV illustrates that there are no theoretical views towards the Proposed Development from either Clachan or west of Clachan, so this viewpoint is not included. • A83 – Glenbarr war memorial: VP 4 (Figure 4.12a – 4.12j, EIAR Volume 3b,) the northern edge of Glenbarr is very close to this viewpoint and would illustrate the type of view likely. This viewpoint has been included at the request of West Kintyre Community Council. • Ferry route between Islay and Kennacraig west Loch Fyne: Views would be from around 30 km and the nearest view would consist of up to 3 wind turbines theoretically visible at over 20 km. There would be no views of the Proposed Development from nearer than around 20 km. Given the distance and the amount of the Proposed Development that would potentially be visible there would not be significant effects, therefore this viewpoint will not be included. • Sound of Gigha: This is covered by VP13 (Figure 4.21a – 4.21j, EIAR Volume 3b,) which is from the pier in the south of the Isle of Gigha looking towards the Kintyre peninsula and over the Sound of Gigha. No further viewpoint is proposed.

Legislation and Policy Context

4.2.11 The scope and approach adopted in the SLVIA (including mitigation measures) takes cognisance of a number of relevant national and regional planning policies. A detailed assessment of policy is provided in the Planning Statement that accompanies the application for the Proposed Development.

National Legislation and Policy

4.2.12 The Scottish Government's planning policy on renewable developments is set out in the National Planning Framework 4 (NPF4) which sets out Scotland's spatial principles, regional priorities, national developments and national planning policy.

RELEVANT NPF4 POLICIES

4.2.13 NPF4 Policy 4: Natural Places states that development proposals which, by virtue of their type, location or scale will have an "unacceptable" impact on the natural environment will not be supported. However, the threshold of being "*unacceptable*" is a high bar and is not to be equated with "significant". As NPF4 policy 11e(ii), below, recognises, significant landscape and visual impacts are to be expected for some forms of renewable energy, and localised impacts have been considered acceptable on balance with planning policy and in the context of material benefits associated with developments.

4.2.14 Policy 4, Paragraph d) deals with local landscape designations and contains a different policy approach to that within the former Scottish Planning Policy (SPP) stating that:

"Development proposals that affect a site designated as ...a local landscape area in the LDP will only be supported where:

- *Development will not have significant adverse effects on the integrity of the area or the qualities for which it has been identified; or*
- *Any significant adverse effects on the integrity of the area are clearly outweighed by social, environmental or economic benefits of at least local importance."*

4.2.15 The policy now follows a similar construct for local or regionally important designations (i.e. Local Landscape Areas) to that for national level designations such as National Scenic Areas. The first limb of the policy refers to significant effects on the "*integrity*" of the area or "*the qualities for which it has been identified.*"

4.2.16 The second limb of Policy 4, Part d) provides that development proposals that affect a site designated as a local landscape area in the Local Development Plan (LDP) (Areas of Panoramic Quality (APQ)/Local Landscape Areas (LLA) and Sensitive Landscape Areas (SLA) in the case of the Proposed Development) will only be supported where any significant adverse effects on the integrity of the area are clearly outweighed by social, environmental or economic benefits of at least local importance. It must be noted that this is a new policy provision, reflecting the wider NPF4 policy that adverse effects (including adverse landscape and visual effects outside of a designated area) must be balanced against the benefits of a proposed development.

4.2.17 In respect of Wild Land the second half of NPF4 Policy 4, paragraph g) states that:

"Buffer zones around wild land will not be applied, and effects of development outwith wild land areas (WLAs) will not be a significant consideration."

4.2.18 There is a clear intention here to reduce the weight given to effects arising from developments outwith WLA. Notwithstanding this, the SLVIA contains a Wild Land Impact Assessment for the North Arran WLA.

- 4.2.19 NPF4 Policy 11, Section d states that *"development proposals that impact on international or national designations will be assessed in relation to Policy 4."*
- 4.2.20 NPF4 Policy 11, Section e, goes on to require that *"project design and mitigation will demonstrate how the following impacts are addressed:*
- *impacts on communities and individual dwellings, including, residential amenity, visual impact, noise and shadow flicker;*
 - *significant landscape and visual impacts, recognising that such impacts are to be expected for some forms of renewable energy. Where impacts are localised and/or appropriate design mitigation has been applied, they will generally be considered to be acceptable;*
 - *public access, including impact on long distance walking and cycling routes and scenic routes;*
 - *impacts on trees, woods and forests;*
 - *proposals for the decommissioning of developments, including ancillary infrastructure, and site restoration; and*
 - *cumulative impacts."*
- 4.2.21 Key to this policy is acknowledgement that the inevitability of significant localised effects for some renewable developments may be acceptable.

Local Policy

ARGYLL AND BUTE LOCAL DEVELOPMENT PLAN 2 ADOPTED FEBRUARY 2024

- 4.2.22 The Application Boundary lies solely within the ABC administrative area. LDP policies of relevance to the Proposed Development and the SLVIA are as follows:
- 4.2.23 Policy 02: Outwith Settlement Areas states that *"outwith the Settlement Areas shown on the proposals map, development will only be acceptable where it can be demonstrated that it accords with:*
- *an allocation of this plan, or*
 - *parts A, B or C as set out below, and*
 - *all other relevant policies of the LDP2.*

With respect to the third bullet point, particular attention is drawn to the need for development proposals to accord with Policies 70 to 76 with respect to landscape and the natural environment.

Development proposals will also be required to demonstrate that there will be no unacceptable adverse effects (either individually or cumulatively) on natural heritage resources, built and/or cultural heritage resources, and landscape and visual amenity. Where a major development is proposed, or for any development where there is preliminary evidence that there may be such adverse effects (and where a formal environmental impact assessment is not required), a landscape and visual impact assessment, natural heritage assessment, or built and/or cultural heritage assessment may be required. In circumstances where there is otherwise evidence of a risk to the environment (for example flood risk or environmental pollution) other assessments may be required. The need for any such assessments would be determined at the development management stage, generally through pre-planning application processes."

- 4.2.24 Policy 02, section B: Remote Countryside Area states that:

"Within the Remote Countryside Areas, only specific categories of development on appropriate sites will generally be supported. These comprise:

- Renewable energy related development;*
- Telecommunications/Digital or other infrastructure where a specific locational requirement has been demonstrated;*
- Development directly supporting agriculture, aquaculture, or other recognised countryside activity."*

4.2.25 Policy 04: Sustainable Development states that:

"In preparing new development proposals, developers should seek to demonstrate the following sustainable development principles, which the planning authority will also use in deciding whether or not to grant planning permission:

- a) Maximise the opportunity for local community benefit, including the creation of district (renewable) heat networks, where viable;*
- b) Make efficient use of vacant and/or derelict land including appropriate buildings;*
- c) Support existing communities and maximise the use of existing infrastructure and services;*
- d) Maximise the opportunities for sustainable forms of design including minimising waste, reducing our carbon footprint, increasing energy efficiency, solar panels, ground, water and air source heat pumps and other forms of renewable energy generation;*
- e) Avoid the use of locally important good quality agricultural land;*
- f) Utilise public transport corridors and active travel networks;*
- g) Avoid the loss of important recreational and amenity open space;*
- h) Conserve and enhance the natural and built environment and avoid significant adverse impacts on biodiversity, natural and heritage assets;*
- i) Respect the landscape character of an area and the setting and character of settlements;*
- j) Avoid places with significant risk of flooding, tidal inundation, coastal erosion or ground instability; and*
- k) Avoid having significant adverse impacts on land, air and water environment."*

4.2.26 Policy 20 – Gardens and Designed Landscapes states that

- "Development proposals affecting nationally important Gardens and Designed Landscapes will be supported where they protect, preserve or enhance their cultural significance, character and integrity and where proposals will not significantly impact upon important views to, from and within the site, or its setting.*
- Development proposals should protect and preserve in situ regionally or locally important Gardens and Designed Landscapes and their settings, wherever feasible.*
- All proposals affecting designated or non-designated Gardens and Designed Landscapes, or their settings shall be accompanied by an assessment that follows the principles set out in the most up-to-date relevant guidance published by Historic Environment Scotland.*
- In assessing proposals for development in or adjacent to gardens and designed landscapes particular attention will be paid to the impact of the proposal on all of the following:*
- The artistic, historical, horticultural, architectural, scenic, and nature conservation interest of the site;*

- *The site's original design concept, overall quality and setting; and*
- *Trees and woodlands and the site's contribution to local landscape character within the site including the boundary walls, pathways, garden terraces or water features."*

4.2.27 Policy 30 – The Sustainable Growth of Renewables states that:

"The Council will support renewable energy developments where these are consistent with the principles of sustainable development and it can be adequately demonstrated that there would be no unacceptable environmental effects, whether individual or cumulative, on local communities, natural and historic environments, landscape character and visual amenity, and that the proposals would be compatible with adjacent land uses.

4.2.28 Applications for all wind turbine developments will be assessed against the following criteria:

- *Impacts on communities and individual dwellings, including visual impact, residential amenity, noise and shadow flicker.*
- *Landscape and visual impacts.*
- *Effects on the natural heritage, including birds.*
- *Impacts on carbon rich soils, using the carbon calculator.*
- *Public access, including impact on long distance walking and cycling routes and those scenic routes identified in the NPF.*
- *Impacts on the historic environment, including scheduled monuments, listed buildings and their settings.*
- *Impacts on tourism and recreation.*
- *Impacts on aviation and defence interests and seismological recording.*
- *Impacts on telecommunications and broadcasting installations, particularly ensuring that transmission links are not compromised.*
- *Impacts on road traffic.*
- *Impacts on adjacent trunk roads.*
- *Effects on hydrology, the water environment and flood risk.*
- *Cumulative impacts arising from all of the considerations above.*
- *Net economic impact, including local and community socio-economic benefits such as employment, associated business and supply chain opportunities.*
- *The scale of contribution to renewable energy generation targets.*
- *Effect on greenhouse gas emissions.*
- *Impacts on trees, woods and forests.*

In assessing any application the Council will additionally have regard to the opportunities for energy storage, local energy networks, and long term environmental management of the site."

- .

4.2.29 Policy 70 - Development Impact on National Scenic Areas (NSA's) states that:

"Argyll and Bute Council will resist any development in, or affecting, National Scenic Areas that would compromise the objectives of their designation and the overall integrity of the

area either individually or cumulatively, or that would fail to safeguard Special Qualities of the area unless it is adequately demonstrated that:*

a) Any significant adverse effects on the landscape quality for which the area has been designated are clearly outweighed by social, environmental or economic benefits of national importance; and

b) The proposal is supported by an LVIA and has taken into account the content of any relevant Argyll and Bute Landscape Capacity Assessment."

4.2.30 Policy 71 – Development Impact on LLA states that:

"Argyll and Bute Council will resist development in, or affecting, a Local Landscape Area where its scale, location or design will have a significant adverse impact on the character of the landscape. All development proposals in or affecting a Local Landscape Area must demonstrate that:

a) Any significant adverse effects on the landscape quality for which the area has been designated are clearly outweighed by social, economic or environmental benefits of community wide importance;

b) The proposal is supported by a landscape and visual impact assessment and has taken account of the content of any relevant Argyll and Bute Landscape Capacity Assessment; and

c) The location, scale, design, materials and landscaping would be of a high standard and would safeguard or enhance the special qualities and character of the Local Landscape Area."

4.2.31 Policy 4 and 11 of NPF4 (ref. Paragraphs 4.2.13 to 4.2.31) provide further clarifications in respect of effects on designated landscapes.

4.2.32 Policy 72 – Development Impact on Areas of Wild Land refers to developments in Wild Land Areas. As the Proposed Development is outwith such a classified landscape, this policy is not considered pertinent to the SLVIA.

4.2.33 Policy 77 – Forestry, Woodland and Trees, which states:

"There is a strong presumption in favour of protecting our woodland resources. Particular care will be taken to ensure that ancient semi-natural woodland, native or long-established woods (including Atlantic Oakwoods), hedgerows and individual trees (including veteran trees) of high nature conservation value are safeguarded, conserved and, where possible, enhanced.

Removal of woodland resources will only be permitted where it would achieve significant and clearly defined additional public benefits. These benefits will be secured by attaching a planning condition or by requiring a developer to enter into a planning obligation.

Where woodland, hedgerows or individual trees are removed in association with development, adequate provision must be made for the planting of new woodland resources, including compensatory planting in accordance with the sequential approach set out in Policy 78 – Woodland Removal. Mitigation will be required where a development proposal would sever or impair connectivity between important woodland habitats."

4.2.34 Policy 78 – Woodland Removal

"Proposals that would involve the removal of woodland resources will be assessed against the criteria for determining the acceptability of woodland removal, as explained in Annex C of the Scottish Government's Control of Woodland Removal Policy.

Where this assessment concludes that compensatory planting would be appropriate, developers will need to provide for this in accordance with the advice in Annex 5 of the Scottish Government's Control of Woodland Removal Policy: implementation guidance, published February 2019, and the Argyll and Bute Woodland and Forestry Strategy.

All agreed compensatory planting will be located in accordance with the following sequential approach:

On-site (most preferable);

Off-site within Argyll and Bute, or

Elsewhere within Scotland (least preferable)."

ARGYLL AND BUTE LANDSCAPE WIND ENERGY CAPACITY STUDY (MARCH 2017)

- 4.2.35 The Argyll and Bute Landscape Wind Energy Capacity Study (ABLWECS) was originally published in March 2012 and updated in August 2017. It was intended as a strategic study to provide guidance in respect of the siting and design of wind energy development and is taken by ABC as a material consideration in consideration of individual wind farm applications in Argyll and Bute. It does not however, replace the need for a detailed landscape and visual assessment for specific development proposals.
- 4.2.36 ABLWECS draws from the 1996 Argyll and the Firth of Clyde Landscape Assessment but incorporates some revised landscape character types and considers the relative sensitivity of constituent landscapes to a number of different turbine typologies based principally on turbine heights. The Proposed Development comprises wind turbines of up to 149.9 m maximum blade tip height and is defined in ABLWECS as part of the very large typology (i.e. turbines over 130 m to blade tip). According to the Study the Proposed Development lies within the Craggy Uplands Landscape Character Type (LCT40), ABLWECS's guidance in respect of this landscape is discussed in **Section 4.5**.
- 4.2.37 It should be noted that, according to NatureScot's online guidance in respect of such Capacity Studies that they:
- "..are not an endpoint in themselves, but they serve to inform plans, policies, guidance and strategies at a range of scales. They should never be used in isolation to determine the acceptability of a development type in landscape terms. They do not replace the need for individual LVIAs and/or Environmental Assessments for individual proposals."*
- 4.2.38 Crucially, on the matter of what constitutes capacity, NatureScot in paragraph 10 of their guidance state that:
- "In the past, many so-called capacity studies actually dealt with susceptibility rather than capacity. Capacity is determined by wider spatial planning, societal and technical considerations."*

Potential Effects Scoped Out

- 4.2.39 Initially, the Zone of Theoretical Visibility (ZTV) in **Figure 4.3** (EIAR Volume 3a) was used to scope out potential landscape and visual receptors within the 40 km radius Study Area that would have no theoretical visibility of the Proposed Development. Additionally, some landscape and visual receptors that may have theoretically visibility have been excluded due to their

distance from the Proposed Development and intervening screening elements such as woodland and the built environment that are not taken into account by the ZTV. Where appropriate, further justification of the omission of receptors such as LCTs and landscape designations is provided based on the characteristics or special qualities of landscapes. Where these landscape and visual receptors have been excluded, a justification for their omission is detailed within **Technical Appendix 4.1** (EIAR Volume 4), for LCTs and SCTs and **Technical Appendix 4.2**, for Designations and Classifications (EIAR Volume 4).

- 4.2.40 Cumulative effects associated with the construction of the Proposed Development and other wind energy developments on the Kintyre peninsula have also been scoped out due to whether construction would overlap with Proposed Developments timetable.
- 4.2.41 Similarly, effects relating to the decommissioning of the Proposed Development are not assessed as such effects are anticipated to be equivalent or less than those expected to occur during its construction and are expected to be considered at the time of the formulation of a decommissioning plan.

Method of Baseline Characterisation

Extent of the Study Area

- 4.2.42 The Study Area for the SLVIA comprises a 40 km radius area extending from Wind Turbine Array. This accords with NS's guidance⁸ in respect of the size of turbines proposed and has been agreed with the Energy Consents Unit (ECU), ABC and NS during consultations.

Desk Study

- 4.2.43 A desk study was undertaken to establish the baseline context of the Proposed Development, including physical components of the landscape (i.e. landscape fabric) as well as the distinctive recognisable patterns of elements that form the landscape character of the area, and the special qualities of designated and classified landscapes.
- 4.2.44 Visual elements and receptors/ receptor locations were also identified including residents of settlements, road users on transportation corridors and recreational receptors on promoted trails and hill walkers at summits.
- 4.2.45 LCTs considered in the baseline and subsequent assessment were derived from the following:
- ABLWECS volume 1, August 2017; and
 - Scottish Landscape and Character Types Map and Descriptions, NatureScot, digital mapping published 2019⁹.
- 4.2.46 Descriptions of landscape designations and classifications contained in the SLVIA are derived from the following publications:
- North Arran Wild Land Area, NatureScot Description of Wild Land Area, Jan 2017¹⁰; and
 - An assessment of the sensitivity and capacity of the Scottish seascape in relation to windfarms Scottish Natural Heritage Commissioned Report No.103 (SNH, 2005).
- 4.2.47 Other datasets used in the preparation of this SLVIA included:

⁸ Scottish Natural Heritage Visual Representation of Wind Farms Guidance, Version 2.2, February 2017 (last accessed October 2024).

⁹ Available at <https://www.nature.scot/professional-advice/landscape/landscape-character-assessment/scottish-landscape-character-types-map-and-descriptions> (last accessed October 2024).

¹⁰ Available at <https://www.nature.scot/professional-advice/protected-areas-and-species/protected-areas/national-designations/national-scenic-areas> (last accessed October 2024).

- Ordnance Survey 1:50,000 and 1:250,000 mapping;
- Ordnance Survey 50 - 5 m Digital Terrain Model;
- Scottish Landscape Character Assessment data – Argyll and Bute data sets;
- Gardens and Designed Landscapes - Historic Environment Scotland datasets;
- National Scenic Areas - Scottish Government data sets;
- Argyll and Bute APQ/LLA – Argyll and Bute Council data sets;
- Wild Land Areas - NatureScot data sets; and
- Road network - Ordnance Survey Meridian 2 data sets.

Field Survey

4.2.48 Desktop findings were verified and augmented by targeted field reconnaissance undertaken during the summer and winter months of 2022 and March of 2023. During field reconnaissance key sensitive receptor locations including the selected viewpoints were visited and evaluated using draft wireline images, mapping, GIS/ GPS data collection systems and augmented reality tools such as Ventus AR.

Illustrative Materials

4.2.49 The SLVIA is illustrated by a range of tools including ZTV plans, photographs, wireline images, and photomontages. All outputs have been prepared in accordance with current best practice comprising:

- Visual Representation of Wind Farms Guidance, version 2.2, NatureScot 2017¹¹; and
- Landscape Institute (2019) Technical Guidance Note – 06/19 Visual Representation of Development Proposals¹².

4.2.50 ZTVs have been prepared to assist in the identification of areas from where there is potential visibility of the Proposed Development, illustrated in **Figure 4.3a, 4.3b, 4.4b** and **4.5b** (EIAR Volume 3a). ZTVs are based on Ordnance Survey (OS) digital terrain data supplied as a mixture of gridded height data at 5 m and 50 m interval resolution. This data does not reflect the screening effect of vegetation or built structures and so the visibility shown on the ZTVs is more extensive than would be experienced in reality. Where the ZTV shows no visibility, it is predicted that no wind turbines or other infrastructure would be seen.

4.2.51 In order to establish the cumulative theoretical visibility, ZTVs were prepared for all operational, under construction, consented and in-planning wind farm projects within 40 km of the Proposed Development, see **Figure 4.8** (EIAR Volume 3a)). The cumulative ZTVs are included in **Figure 4.8a - 4.8p** (EIAR Volume 3a).

4.2.52 Wireline visualisations (**Figure 4.9a - 4.30j**, EIAR Volume 3b) illustrate both the baseline wind farms (i.e. existing and consented) from each viewpoint, as well as cumulative developments including In-Planning and selected In-Scoping wind farms. Additionally, the cumulative assessment takes into account the operational LT40 overhead line (OHL) as this development represents large scale infrastructure in close proximity to the Proposed Development. A list of

¹¹ Available at: <https://www.nature.scot/visual-representation-wind-farms-guidance> ((last accessed October 2024.)

¹² available at <https://www.landscapeinstitute.org/visualisation/> ((last accessed October 2024.)

cumulative developments is provided in **Table 4.6** and displayed in **Figure 4.8** (EIAR Volume 3a).

Criteria for the Assessment of Effects

- 4.2.53 The aim of the SLVIA is to identify, predict and evaluate potential significant effects arising from the Proposed Development. Wherever possible, identified effects are quantified, but the nature of seascape, landscape and visual assessment requires interpretation by professional judgement. In order to provide consistency to the assessment, landscape sensitivity to the type of development proposed, the magnitude of impact, and assessment of significance of the residual effects has been based on pre-defined criteria. The level of residual effects has been determined by a comparison of the sensitivity of receptors and the magnitude of impact arising from the Proposed Development.
- 4.2.54 The SLVIA considers the seascape, landscape and visual effects on designated landscapes in the Study Area, including NSAs and local designations such as: Regional Scenic Areas (RSAs); Scenic Areas (SAs) and Sensitive Landscape Areas (SLAs). Landscape classifications such as WLAs and inventory listed GDLs have also been assessed. Where the ZTV demonstrates that there would be no possible views of the Proposed Development, designated landscapes are omitted from the SLVIA.
- 4.2.55 Representative viewpoints were chosen in consultation with ABC, NS, and non-statutory consultees in respect of this application, as summarised in **Table 4.1**. These viewpoints are considered to be representative of the main sensitive receptors in the Study Area. The viewpoints have also been checked against the cumulative ZTVs for existing/ consented and proposed wind farms within the Study Area in order to ensure that they provide representative coverage of potential cumulative visibility and related effects. Viewpoint locations are listed and described in **Technical Appendix 4.3** (EIAR Volume 4) and are included in **Figure 4.6** (EIAR Volume 3a).
- 4.2.56 Analysis of the potential effects on seascape, landscape and visual amenity arising from the Proposed Development at each of these viewpoints has been carried out. This analysis has involved the production of computer-generated wirelines and/ or photomontages to predict the operational views of the Proposed Development from each of the agreed viewpoints. The existing and predicted views from each of these viewpoints have been analysed to identify the magnitude of impact and the residual effects on landscape character and visual amenity at each viewpoint location.

Criteria for Assessing the Sensitivity of Receptors

SEASCAPE/LANDSCAPE SENSITIVITY

- 4.2.57 The sensitivity of the seascape and landscape is defined as 'high', 'medium' or 'low' based on professional interpretation of a combination of its susceptibility to the type of development proposed, and the value attributed to the seascape or landscape. In respect of susceptibility, paragraph 5.40 of the GLVIA notes that:
- "This means the ability of the landscape receptor (whether it be the overall character or quality/ condition of a particular character type or area, or an individual element and/ or feature, or a particular aesthetic and perceptual aspect) to accommodate the Proposed Development without undue consequences for the maintenance of the baseline situation and/ or the achievement of landscape planning policies and strategies."*
- 4.2.58 The following aspects inform the susceptibility of the landscape to wind energy development:

- Landscape scale and landcover;
- Existing land-use;
- The pattern and complexity/ simplicity of the landscape;
- Visual enclosure/ openness of views and distribution of visual receptors;
- The scope for mitigation, which would be in character with the existing landscape; and
- The degree to which the particular element or characteristic contribution to the landscape character and can be replaced or substituted.

4.2.59 The value of the landscape receptor is not simply dependant on a formal designation, but rather, is predicated on a number of other related factors, such as:

- Landscape quality and condition - the more intact the intrinsic characteristics of the landscape the higher the value;
- Scenic quality – the degree to which the landscape appeals to the senses (primarily but not exclusively visually);
- Rarity – this may be the presence of a rare feature or quality, and/ or the extent to which the character of the landscape is uncommon;
- Representativeness – the extent to which the landscape contains elements that are referred to as exemplary or considered important;
- Conservation interest – including the presence of valued wildlife, earth science, archaeological, historical or cultural aspects;
- Recreation value – where the landscape is evidently valued for recreational activity for which the experience of the landscape is important;
- Perceptual aspects – in particular, the sense of wildness and/ or tranquillity present within the landscape; and
- Associations with historic people or events.

VISUAL SENSITIVITY

4.2.60 Visual receptor sensitivity is also defined as High, Medium or Low based on an interpretation of a combination of parameters, and also relates to the susceptibility and value ascribed to visual receptors, vantage points (such as formalised viewpoints) or receptor locations. The criteria utilised in determining the susceptibility of visual receptors are in accordance with GLVIA which notes that susceptibility of visual receptors depends on:

- The occupation or activity of people experiencing the view at particular locations; and
- The extent to which their attention or interest may therefore be focused on the views and the visual amenity they experience at particular locations.

4.2.61 The value of the visual receptors has been determined by taking account of the following:

- Recognition of value as in a landscape designation or cultural heritage asset, and as noted in popular tourist guidebooks and references (e.g. the 'Queen's View');
- The land use or main activity at the viewpoint/ receptor location and receptor expectations;

- The frequency and duration of use of receptor location¹³; and
- The landscape character and quality of the intervening landscape.

4.2.62 In relation to land use at the viewpoint, visual sensitivity is defined in **Table 4.2**.

Table 4.2: Sensitivity in Relation to Receptor Type and Activity	
Sensitivity	Receptor Type and Activity
High	<ul style="list-style-type: none"> • Tourists and those engaged in outdoor recreational activities for which the landscape and views form a key part of their experience, including hill walkers and visitors to formal vantage points; • Passengers and Tourists travelling on key routes; • Passengers on trains and ferries where visual amenity and scenic qualities form an integral part of receptors experience and expectations; • Walkers on strategic recreational footpaths or on hills, cycle routes or rights of way; • Visitors to landscapes/ sites that have a strong physical, cultural or historic connection with the landscape or a particular view; and • Residential receptors at individual dwellings and within settlements.
Medium	Local road users/ commuters who are generally travelling alone and/ or are focused on the road rather than the adjoining landscape.
Low	<ul style="list-style-type: none"> • People engaged in outdoor sports or recreation (other than appreciation of the landscape); and • Receptors located in commercial and retail buildings, industrial complexes, and other locations where people's attention may be focused on their work or activity.

Criteria for Assessing the Magnitude of Impact

4.2.63 The magnitude of impact arising from the Proposed Development may be described as substantial, moderate, slight, negligible or none based on the interpretation of a combination of largely quantifiable parameters, as follows:

- The distance of receptors from the Proposed Development;
- The duration of the predicted impacts and whether they are reversible;
- The size and scale of the impact anticipated;
- The geographical extent of the Study Area, landscape character unit, designation or route that would be affected;
- The angle of view in relation to main receptor activity;
- The degree of contrast;
- The background context to the Proposed Development; and
- The extent and nature of other built development visible, including vertical elements.

4.2.64 **Table 4.3** provides a brief definition for different magnitudes of impact.

Table 4.3: Magnitude of Impact	
Magnitude	Definition
Substantial	Total loss or considerable alteration/ interruption of key elements, features or characteristics of the landscape character and/ or composition of views resulting in a substantial change to baseline conditions.

¹³ With cognisance of the high value ascribed to receptor locations within WLAs despite relatively low frequencies of use.

Magnitude	Definition
Moderate	Notable partial loss or alteration to one or more key features or characteristics of the baseline, resulting in a prominent, but localised change within a broader unaltered context.
Slight	Discernible loss or alteration to one or more key elements, features or characteristics of the baseline conditions. Change arising from the loss/ alteration would be discernible but underlying landscape character or view composition would be broadly consistent with baseline.
Negligible	Very limited or imperceptible loss or alteration to one or more key elements/ characteristics of the baseline. Change may be barely discernible.
None	No aspect of the Proposed Development would be discernible. The Proposed Development would result in no appreciable change to the landscape resource or view.

Criteria for Assessing Cumulative Effects

4.2.65 **Table 4.4** provides a brief definition for different magnitudes of cumulative impact.

Magnitude	Definition
Substantial	In-Addition The Proposed Development would represent a considerable or possibly fundamental increase in the influence of wind energy development on the character of the landscape and/ or the composition of views. In-Combination The Proposed Development, taken together with cumulative developments would constitute 'the' defining characteristic of the landscape or view, equivalent to a 'wind farm landscape.'
Moderate	In-Addition The Proposed Development would represent a notable and possibly considerable increase in the influence of wind energy development on the character of the landscape and/ or the composition of views. Moderate cumulative impacts may, however, equate to a localised change within an otherwise unaltered context. In-Combination The Proposed Development, taken together with cumulative developments would constitute 'a' defining characteristic of the landscape or view.
Slight	In-Addition The Proposed Development would represent a minor addition to the influence of wind energy development on the character of the landscape and/ or the composition of views. The change would be discernible, but the original baseline conditions would be largely unaltered. In-Combination The Proposed Development, taken together with cumulative developments would constitute 'a' characteristic element/feature in the landscape or view.'
Negligible	In-Addition The Proposed Development would represent a barely discernible addition to influence of wind energy development on the character of the landscape and/ or the composition of views. The baseline condition of the landscape or view would, for all intents and purposes, be unaffected. In-Combination The Proposed Development, taken together with cumulative developments would constitute a barely discernible feature or element in the landscape or view.
None	No other cumulative development would be apparent.

- 4.2.66 In assessing potential cumulative seascape, landscape and visual effects, consideration has been given to cumulative effects arising from combined and/ or consecutive (concurrent) visibility (where the observer is able to see two or more developments from one viewpoint location), and sequential effects (where a number of similar developments would be visible individually or simultaneously over a sequence of connected viewpoints, such as would be found along a road or footpath). This is in accordance with current NS guidance¹⁴.
- 4.2.67 A distinction is made, in the assessment, between In-addition effects (i.e. the additional effect attributable specifically to the Proposed Development when consider in the context of cumulative developments) and In-combination effects (i.e. the effect arising from the Proposed Development taken together with other wind farm development). This is considered appropriate in respect of this Proposed Development due to the extensive developed context and the Proposed Development's relationship to an established pattern of development.
- 4.2.68 The final list of cumulative developments for consideration has been agreed with ABC and NS and is summarised in **Table 4.6**. No consideration has been given to wind turbines less than 50 m to maximum blade tip height above ground level.

Criteria for Assessing Significance

- 4.2.69 **Table 4.5** illustrates how residual effects are determined by combining sensitivity of receptors with the magnitude of impact. For the purposes of this assessment **Major** or **Major/ Moderate** effects are considered to be significant.

Table 4.5: Residual Effects					
Landscape and Visual Sensitivity	Magnitude of Impact				
	Substantial	Moderate	Slight	Negligible	None
High	Major	Major/Moderate	Moderate	Moderate/Minor	None
Medium	Major/Moderate	Moderate	Moderate/Minor	Minor	None
Low	Moderate	Moderate/Minor	Minor	Minor/None	None

- 4.2.70 In line with the recommendations in the GLVIA this matrix is not used as a prescriptive tool or arithmetically, and the methodology and analysis of potential effects at any particular location must allow for the exercise of professional judgement. Descriptions of residual effects, especially those considered significant, are described in narrative text.
- 4.2.71 Landscape and visual effects can be adverse (i.e. having a detrimental effect on the physical elements, character and visual amenity of the area) or beneficial (i.e. having a positive effect on the landscape and visual amenity of the area through strengthening or augmentation of baseline conditions and/ or improvement of the existing landscape or views). For the purposes of this assessment residual effects are assumed to be adverse, unless stated otherwise.

Limitations and Assumptions

- 4.2.72 With the exception of the Residential Visual Amenity Assessment in **Technical Appendix 4.4** (EiAR Volume 4), the SLVIA focuses on receptors in publicly accessible locations.

¹⁴ Assessing the cumulative impact of Onshore Wind Energy Developments” Scottish Natural Heritage (2012). Guidance – assessing cumulative landscape and visual impact of onshore wind energy development NatureScot. Available at: <https://www.nature.scot/doc/guidance-assessing-cumulative-landscape-and-visual-impact-onshore-wind-energy-developments> ((last accessed October 2024.).

- 4.2.73 The data utilised in completion of the SLVIA have a number of inherent limitations related to data tolerances and levels of accuracy. However, these have been taken into account in the assessment.
- 4.2.74 Where distances to the Proposed Development are given, these relate to the distance to the nearest of the Proposed Development's turbines unless stated otherwise.

4.3 Baseline Conditions

Current Baseline

Landscape Baseline

TOPOGRAPHY AND HYDROLOGICAL LANDSCAPE FEATURES

- 4.3.1 **Figure 4.2** (EIAR Volume 3a) illustrates the topography within the Study Area. The Proposed Development is located on an undulating upland plateau moorland, within the central extent of the Kintyre peninsula. A notable feature within the plateau landscape are the small gently undulating hills which form small focal points within the wider landscape across the peninsula.
- 4.3.2 The topography of the Study Area is striking and varied, shaped by the volcanic activity and process of glaciation during the last ice age. Topographical features include the upland ridges and plateaux, ridges, loch and glens, as well as many sea loch, this includes Loch Tarbert, Loch Fyne and Kyles of Bute, rocky outcrops, sheltered bays and raised beaches, which all form the key characteristic and diverse coastline throughout the Study Area.
- 4.3.3 The inland topography of the Kintyre peninsula is predominately comprised of an upland plateaux landscape, with rounded ridges, craggy outcrops and an irregular slopes profile. Upland lochs, winding narrow glens and the wider river valleys all flow throughout the landscape. The Proposed Development itself is located on an undulating plateau on Kintyre at between 220 m and 290 m AOD. The coastal regions of the Kintyre peninsula are generally rock indented, consisting of uneven, hummocky rock within associated with small sandy bays and raised beaches.
- 4.3.4 The Isle of Gigha, the eastern most extent of coastal area of Islay and Jura, the western coastline of Knapdale and the southern extent of the Isle of Arran consist of narrow rocky ridges with a strong southwest – northeast orientation, extending out into the seascape, horseshoes shaped narrow sandy bays, raised beaches and extensive mudflats. Contrasted with the northern most extent of Arran, which consists of a high dissected landform with rugged glacial peaks, interspersed by plunging U-shaped valleys. The more dramatic eastern peaks/summits of the Isle of Arran are linked by a series of heavily serrated and knife edge ridgelines, whereas the summits/ hills to the west are more rounded. The coastal landscape of the Isle of Arran consists of a raised beach coast along the northern most extent and with more coastal lowlands to the south. The Knapdale peninsula contains contrasting areas of upland moorland and plateaux, upland parallel ridges, and glens.
- 4.3.5 The diverse nature of the overall topography helps to create a rugged skyline with a variety of differing types of views, the patterns of which can be applied to each of the islands and peninsulas: there are panoramic, long-distance views from the more elevated uplands across the seascape surrounding the islands, with views inland more restricted by locally elevated, undulating landform. Additionally, there are enclosed/ channelled views across those U-shaped and hidden valleys, in stark contrast to those wide-open views across the gently undulating topography of the low-lying bays and long, unimpeded views along coastal roads, which are

slightly elevated above the coastal plain. Views from the coastal areas further inland are often restricted by the adjacent rugged upland and moorland slopes.

LANDCOVER AND LAND-USE

- 4.3.6 A large proportion of the Study Area contains the open waters of the Sound of Jura, Sound of Islay, Sound of Gigha, West Loch Tarbert and Kilbrannan Sound, all of which are utilised by sea ferries, sea going vessels, pleasure boats and recreational craft. On land, the broad pattern of landcover and landuse within the Study Area is heavily influenced by topography and can be divided into accessible areas, which have largely been settled, cultivated or cleared for grazing or afforested with coniferous forestry plantation, and inaccessible areas which are highly characterised by broadleaf woodland, moorland and peat bogs.
- 4.3.7 Key landuse on Kintyre comprises coniferous forestry plantation, existing forestry tracks and borrow pits, all of which form a patch work of small areas of open moorland, interspersed by access tracks. The Proposed Development is located within an extensive area of coniferous forestry plantations. Additionally, there are a number of existing/ operational wind farm developments, settlements and road infrastructure, all of which are concentrated on the coastal fringes due to the inaccessible nature of the inner core of the peninsula, with exception to wind energy development, which is present throughout Upland Forest Mosaic Moor landscape on Kintyre peninsula.
- 4.3.8 The islands present are typified by woodland, coniferous forestry plantations, heather moorland and rough grassland. These land uses are often associated with access tracks, isolated dwellings and wind energy developments. The more accessible lowlands tend to be utilised for farming, particularly along the raised coastline of Arran where the level terraces are present. In the lowland areas of Bute, the landcover is dominated by a patchwork of agricultural fields enclosed by linear shelterbelts and mixed blocks of woodland vegetation.
- 4.3.9 Settlement within the Study Area is primarily concentrated along Kintyre, along the east and western coastal extents, in and around roads that traverse the coastline, in the form of scattered isolated farms and small villages, in sheltered locations, such as Campbeltown, Glenbarr, Carradale, Torrisdale and Torbeg.
- 4.3.10 There are a series of camping, caravan and picnic sites located along the coast throughout the Study Area, as well as a number of small ports/ jetties to serve the vast network of ferry crossings and recreational activities. There is a rich scattering of Gardens and Designed Landscapes throughout the Study Area, such as Brodick Castle and the Country Park on the Isle of Arran.
- 4.3.11 Wind farms form a key feature of the landscape within the Study Area, particularly on the Kintyre peninsula. There are two main clusters of existing wind energy development: a large cluster along the central extent of the peninsula, and the other towards the northern most extent. The larger clustering of development centres around the operational Beinn an Tuirc, Beinn an Tuirc 2, Beinn an Tuirc 3, Auchadaduie and Blary Hill. The smaller cluster to the north comprises the existing Cour and Freasdail developments. In addition to these developments transmission infrastructure, including substantiation and overhead lines are characteristic elements of the existing landscape.

SEASCAPE AND LANDSCAPE CHARACTER TYPES

- 4.3.12 There are 25 LCTs and SCTs within the Study Area, of which 14 would be subject to a degree of theoretical visibility of the Proposed Development and have therefore been taken forward to

the detailed assessment stage of the SLVIA. The Proposed Development, itself, would be situated within the Upland Forest Moor Mosaic LCT.

- 4.3.13 The location and extent of LCTs and SCTs is illustrated in **Figure 4.4a** (EIAR Volume 3a). This is based on the character types presented in the ABLWECS. There is a large overlap of LCTs between NS's character types and those of the ABLWECS, with the exception of a number of sub-types included in ABLWECS.
- 4.3.14 The full descriptions of the LCTs and SCTs are provided in **Technical Appendix 4.1** (EIAR Volume 4), which also identifies those LCTs and SCTs to be assessed. Those LCTs/ SCTs with no visibility as indicated in **Figure 4.4b** (EIAR Volume 3a) have been excluded from the assessment. Additionally, for those LCTs and SCTs with limited/ restricted visibility and located distantly from the Proposed Development have also been omitted, justification for their omission is detailed within **Technical Appendix 4.1** (EIAR Volume 4).
- 4.3.15 A sensitivity rating is ascribed to each of the LCTs and SCTs in accordance with GLVIA guidance, as noted in **Technical Appendix 4.1** (EIAR Volume 4). In addition, the sensitivities applied by the ABLWECS to the Upland Forest Moor Mosaic¹⁵, within which the Proposed Development is wholly located, and the adjacent Rocky Mosaic LCT are both considered within this SLVIA.
- 4.3.16 The ABLWECS allocates a high sensitivity to both the Upland Forest Moor Mosaic LCT (Host LCT) and the neighbouring Rocky Mosaic LCT to the type of development proposed.

Designations and Classifications

- 4.3.17 The location and geographical extent of the landscape designation and classifications within the Study Area are displayed on **Figure 4.5a** (EIAR Volume 3a). The special qualities of designations and classified landscapes within the Study Area are described in **Technical Appendix 4.2** and **Technical Appendix 4.5** (EIAR Volume 4), which also notes which landscapes have been included within the SLVIA due to potential visibility. Those landscapes which have no theoretical visibility, or which would have highly constrained theoretical visibility or have characteristics or special qualities that are not susceptible to the Proposed Development have been excluded from this SLVIA as they are unlikely to be impacted or significantly affected.
- 4.3.18 The Proposed Development is not located within a landscape designation or classification area.
- 4.3.19 Designated landscapes with theoretical visibility of the Proposed Development include:
- The North Arran NSA, which is situated 5.4 km east of the Proposed Development;
 - The East Kintyre (Coast) APQ, now a LLA¹⁶, lies 1.4 km east of the Proposed Development; and
 - North Arran SLA is located 6.7 km east of the Proposed Development.
- 4.3.20 There are four inventory GDLs within the Study Area. Most of these GDLs have no potential visibility of the Proposed Development. The one GDL that would have potential views of the Proposed Development is Achamore House, therefore it has been included within the SLVIA.
- 4.3.21 There is also one WLA within the Study Area, the North Arran WLA, which lies 9.8 km east of the Proposed Development.

¹⁵ Reference LCT06c/ ABLWECS

¹⁶ The extents of which is shown in Argyll and Bute Local Development Plan 2 Proposals Map for Kintyre, available at https://www.argyll-bute.gov.uk/sites/default/files/2024-07/LDP2_Map%20Template%20A1%20Kintyre.pdf (last accessed October 2024).

Visual Baseline

TRANSPORT NETWORK

- 4.3.22 The road network within the Study Area is generally confined to the coastlines and loch edges. Where landform permits, some minor routes may traverse the inland landscape, along valleys as narrow tracks, passing through farms, small settlement and towns/ villages. The main roads with predicted visibility include:
- A83: The main road on the Kintyre peninsula, which splits from the A82 at Loch Lomond and follows the eastern coastline of Argyll and Knapdale, along the edge of Loch Fyne, routing in a southwest direction before it reaches Kintyre. From Tarbert in the north of Kintyre, it follows the west coastline in a southerly direction ending in Kilchenzie;
 - B842: This route extends down the eastern coastline of the Kintyre peninsula, from Claonaig in the north to Southend along the southernmost tip of the peninsula;
 - B879: this road is located to the far north of Kintyre, routing along the eastern coastline of Kintyre, between Bridgend in the west and Carradale in the east; and
 - The String road: A minor coastal route situated on the western and northern most tip of the Isle of Arran, routing between Largymore in the south and Lochranza in the north.
- 4.3.23 In accordance with **Table 4.2**, the sensitivity of receptors on key transportation routes varies from Medium in respect of general commuters who may be travelling along and concentrating on the road rather than the adjoining landscape, to High in respect of tourists who are more likely to carry passengers, and who are likely to focus on the landscape.

FERRY CROSSINGS

- 4.3.24 Accessing the islands and peninsulas within the Study Area is mainly achieved by ferry. The coastal environment and the crossing of the varied seascape and sea lochs such as the Kilbrannan Sound, Sound of Bute, Sound of Gigha, the Firth of Clyde and Loch Fyne are tourist features in themselves. The ferry crossings within the potential of visibility of the Proposed Development are listed above (see **Section 4.3.6**).
- 4.3.25 Due to the large number of islands and peninsulas within the Study Area, ferry travel forms an important part of the transport network, particularly for tourism. There is a large network of ferry crossing which connect the islands to each other and those that fall within the ZTV are listed below:
- Campbeltown – Ardrossan, routing from Campbeltown within the Kilbrannan Sound to Ardrossan on the mainland, crossing the Firth of Clyde; and
 - Claonaig – Arran (Lochranza), routing northwest – southeast between the Kintyre peninsula and the Isle of Arran via the Kilbrannan Sound.
- 4.3.26 In accordance with criteria set out within GLVIA, tourist and ferry receptors are generally assumed to have a High sensitivity to the type of development proposed.

RECREATIONAL ROUTES AND SUMMITS

- 4.3.27 There are a number of long-distance routes, cycleways and core paths within the 40 km Study Area. These are illustrated on **Figure 4.7** (EIAR Volume 3a).
- 4.3.28 The key recreational trail within the Study Area with potential views of the Proposed Development is the Kintyre Way. The route starts at Tarbert Harbour in the north, extending southwards to Skipness, thereafter meandering across the central extent of the peninsula and

progressing to Campbeltown and Dunaverty Bay at its southernmost extent. At its closes, this route passes within 2 km to the east of the Proposed Development (at Torrisdale Bay).

- 4.3.29 Strategic recreational long distance walking trails are generally assumed to have a High sensitivity to the type of development being proposed due to the nature of their use, the often-scenic quality of their route, and their importance as a regional or national leisure tourist resource.
- 4.3.30 National Cycle Route 78 (NCR78) forms part of an on-road cycle route which follows the route of the B842 along the east coast of the Kintyre peninsula, from Campbeltown to Claonaig, where it crosses over the Knapdale on the B8001 and follows the south and east coast along the B8024.
- 4.3.31 Cycling opportunities also existing on the quieter roads and tracks on accessible land within the Study Area.
- 4.3.32 In addition to ferry crossings and key recreational routes, sea lochs such as the Kilbrannan Sound, Sound of Bute, Sound of Gigha, the Firth of Clyde and Loch Fyne are all important recreational attractions utilised by pleasure craft and sea kayakers.
- 4.3.33 A number of core paths are also present within 10 km of the Proposed Development, with those core paths located outwith the 10 km unlikely to experience significant residual effects. Those with theoretical visibility of the Proposed Development include:
- C304 – Glenbarr School route;
 - C088 (b) – (j) – Campbeltown to Claonaig;
 - C097 (a) – (c) – Carradale Bay circular;
 - C403 – Port na Cuile Seneval Wood, Carradale; and
 - C093 (a) – (b) – Carradale Forest circular.
- 4.3.34 With exception to C304, C403 and C093, all other core paths have alignment that correspond with strategic recreational trails, including the NCR78 and Kintyre Way and are therefore assessed as inclusions on these routes.

SETTLEMENT

- 4.3.35 The Study Area is well settled along Kintyre, with towns and villages adjoining roads, many of which follow the western and eastern extent of the coastline. Smaller groups of dwellings, farms and individual dwellings are scattered across the western and eastern extent of the peninsula, with the upland forest moor landscape being less settled. The ZTV in **Figure 4.3** (EIAR Volume 3a) has been utilised to identify which settlements would have theoretical visibility of the Proposed Development. These include:
- Glenbarr – Situated on the western most extent of the Kintyre peninsula, 8.75 km west of the nearest of the Proposed Development’s wind turbines;
 - Carradale – Situated upon the eastern coastline of Kintyre, 4.30 km northeast the nearest of the Proposed Development’s wind turbines; and
 - Torbeg – Located on the western most extent of the Isle of Arran, 14.2 km southeast of the nearest of the Proposed Development’s wind turbines.

- 4.3.36 There are 17 individual properties within a 3 km radius of the Proposed Developments wind turbines. These have been addressed within the Residential Visual Amenity Assessment (RVAA) set out in **Technical Appendix 4.4** (EIAR Volume 4).
- 4.3.37 In accordance with criteria set out within **Table 4.2**, residential receptors (including scattered dwellings as well as larger settlements) are generally assumed to have a high sensitivity to the type of development proposed.

Cumulative Context

- 4.3.38 **Table 4.6**, below, summarises the cumulative context at the time of commencement of the SLVIA in September 2023. The location of these developments is indicated in **Figure 4.8** (EIAR Volume 3a).

Status	Wind Farm	No of Wind Turbines	Max Blade Tip Height (m)	Direction from the Proposed Development	Approx. Distance from the nearest turbine (km)	Landscape Character Type
Operational	Allt Dearg Community Wind Farm	12	81	North	39.4	LCT06b: Knapdale Upland Forest Mosaic
	Auchadaduie Wind Farm	3	99.5	West	6.37	LCT06: Upland Forest Moor Mosaic
	Beinn an Tuirc	46	65	West	0.87	LCT06: Upland Forest Moor Mosaic
	Beinn an Tuirc 2	19	110	West	2.19	LCT06: Upland Forest Moor Mosaic
	Beinn an Tuirc 3	19	126	South/Southwest	3.90	LCT06: Upland Forest Moor Mosaic
	Blary Hill	14	110	West	3.89	LCT06: Upland Forest Moor Mosaic
	Cour	10	111	North/northeast	10.28	LCT06: Upland Forest Moor Mosaic
	Deucheran Hill	9	78	North	6.42	LCT06: Upland Forest Moor Mosaic
	Freasdail	11	100	Northeast	21.8	LCT06: Upland Forest Moor Mosaic
	Islay Wind Turbine	1	61	Northwest	41.74	LCT22: Coastal Parallel Ridges
	Isle of Gigha	3	45	Northwest	15.7	LCT22: Coastal Parallel Ridges
	Isle of Gigha Extension	1	52.5	Northwest	15.8	LCT22: Coastal Parallel Ridges

Status	Wind Farm	No of Wind Turbines	Max Blade Tip Height (m)	Direction from the Proposed Development	Approx. Distance from the nearest turbine (km)	Landscape Character Type
	Srondoire	3	120	North	39.8	LCT06b: Knapdale Upland Forest Mosaic
	Tangy	22	70	South/southwest	10.9	LCT06: Upland Forest Moor Mosaic
Consented	Airigh Wind Farm	14	149.9	North	29	LCT06b: Knapdale Upland Forest Mosaic
	Eascairt	13	100	North/northeast	18.84	LCT06: Upland Forest Moor Mosaic
	High Constellation	10	149.9	North/northeast	12.1	LCT06: Upland Forest Moor Mosaic
	Rowan	13	200	North	33.18 km	LCT06b: Knapdale Upland Forest Mosaic
	Tangy 3	16	149.9	South/southwest	9.64	LCT06: Upland Forest Moor Mosaic
	Tangy 4	16	149.9	South/southwest	9.64	LCT06: Upland Forest Moor Mosaic
In-planning	Breackerie	7	200	South/Southwest	23.50	LCT06c: Mull of Kintyre Upland Forest-Moor Mosaic
	Clachaig Glen	5	200	Northwest	6.22 km	LCT06: Upland Forest Moor Mosaic
	Earraghail	13	180	North/northeast	26.7 km	LCT06: Upland Forest Moor Mosaic
	Killean	9	180	North/northeast	7.2 km	LCT06: Upland Forest Moor Mosaic
In-scoping	Allt Domhain, formerly Arnicle	12	200	West	2.1 km	LCT06: Upland Forest Moor Mosaic
	Cnoc Breacam	18	149.9	North/Northeast	15.26 km	LCT06: Upland Forest Moor Mosaic
	Cnoc Buidhe Wind Energy Hub	33	230	Southwest	5.6 km	LCT06: Upland Forest Moor Mosaic

Status	Wind Farm	No of Wind Turbines	Max Blade Tip Height (m)	Direction from the Proposed Development	Approx. Distance from the nearest turbine (km)	Landscape Character Type
	Coalashee	19	220	Northwest	9.5 km	LCT06: Upland Forest Moor Mosaic
	Deucheran Hill 2 Wind Farm	23	220	North	7.11	LCT06: Upland Forest Moor Mosaic
	High Dalrioch	10	180	South/southwest	18.8 km	LCT06c: Mull of Kintyre Upland Forest-Moor Mosaic

4.3.39 It is apparent from the preceding list of wind energy developments that existing and consented wind energy development in the Study Area is currently focused in LCT06: Upland Forest Moor Mosaic and is:

- located at least 2 km inland from the coastal road on either side of the peninsula in a combination of open moorland and forested areas;
- comprised of turbines of up to 149.9 m to maximum blade tip; and
- largely distributed along the length of the peninsula but includes a concentration of existing and consented wind turbines comprising the operational Auchadaduie, Blary Hill, Beinn an Tuirc and Beinn an Tuirc 2 and Beinn an Tuirc 3 arrays midway.

4.3.40 In addition to the wind energy developments listed in **Table 4.6**, consideration has been given in the SLVIA, to the Crossaig to Inveraray 275 kV overhead line (LT40) which is now energised and operational. This development comprises a series of steel lattice towers to a nominal height of 60 m above ground level with conductors between them.

Future Baseline

4.3.41 In the event that the Proposed Development is not consented or progressed, the baseline landscape and visual context is expected to continue to contain a high degree of interest for wind energy development, including schemes that use turbines of a size exceeding that of the Proposed Development. It is also the case that the majority of such development will be concentrated in the Upland Forest Moor Mosaic landscape type or similar, thereby minimising intrusion into more sensitive landscapes along the coast.

Summary of Sensitive Receptors

Scoped Out Receptors

4.3.42 LCTs and SCTs scoped out of this SLVIA are detailed in **Technical Appendix 4.1** (EIAR Volume 4) and summarised as follows:

- LCT5a Bute Open Ridgeland – Limited area of theoretical visibility at over 38 km from the Proposed Development on the more elevated section of the LCT. The Proposed Development would not influence the key characteristics of this largescale LCT;
- LCT6a Loch Fyne Upland Forest Moor Mosaic – No theoretical visibility;

- LCT8 Moorland Plateau – Views of the Proposed Development would be confined to several more elevated/ isolated areas within the central extent of the LCT, at over 38 km from the Proposed Development. Therefore, it is predicted the Proposed Development would not directly influence the key characteristics of the LCT;
- LCT21 Low Coastal Hills - No theoretical visibility;
- LCT25 Sand Dunes and Machair – No theoretical visibility;
- LCT19a Bute Coastal Plain – Theoretical visibility of up to 5 blade tips of the Proposed Development from a limited geographical extent along the coastline at over 38 km;
- LCT62 Coastal Headlands – One area of theoretical visibility, limited to the upper slopes and summit of Cnoc nan Sgrath, located 22 km to the northeast of the Proposed Development – Therefore, the Proposed Development would not influence the overall key characteristics of the LCT; and
- SCT10 Outer Firth with Islands – Limited theoretical intervisibility comprising a maximum of five wind turbines from a small section of the seascape character type on the Isle of Bute at over 37.5 km from the Proposed Development. Therefore, it is unlikely the Proposed Development would have any influence on the key characteristics of the SCT.

4.3.43 Landscape designations scoped out of this SLVIA as discussed in **Technical Appendix 4.2** (EIAR Volume 4) include:

- Jura NSA - Theoretical visibility confined to the southern-extent of the NSA. Given the overall distance of over 36 km from the Proposed Development, significant effects on the special qualities of the NSA are therefore considered highly unlikely.
- Knapdale NSA –Theoretical visibility of the Proposed Development would be confined to the upper slopes/ summit of Cnoc Mor and Cnoc Stighseir in the NSA from where the Proposed Development would be seen distantly (over 34.45 km away) and in the context of existing and consented wind farms and would therefore not be anomalous or detract to a significant extent from the special qualities or integrity of this designated area.
- Bute & South Cowal Area of Panoramic Quality/LLA – Limited theoretical visibility at over 36 km distance from the Proposed Development to an area of theoretical visibility. Consequently, the Proposed Development would not detract to a significant extent from the special qualities or integrity of this designated area.
- Knapdale/ Melfort APQ/LLA – Highly constrained theoretical visibility, confined to the upper slopes/ summit of Cnoc nan Duarman and Cnoc a’ Bhor. Additionally, these more elevated areas of the APQ with theoretical visibility are highly characterised by coniferous forestry plantations, thereby reducing actual views of the Proposed Development from the APQ. Therefore, significant effects on the special qualities of the APQ are considered highly unlikely.
- Mull of Kintyre APQ/LLA – Theoretical visibility confined to a handful of geographical limited areas within the APQ, such as the northern slopes of Beinn Bhrea, Achnaslishaig Hill, Cnoc nan Gabhan and Cnoc Moy, at an overall distance of 25 km from the Proposed Development. Therefore, significant effects on the special qualities of the APQ are considered highly unlikely;
- South & East Islay APQ/LLA – Limited theoretical intervisibility at over 35 km distance from the Proposed Development to the area of potential visibility. Therefore, it is predicted

the Proposed Development would not detract to a significant extent from the special qualities or integrity of this designated area; and

- Jura, Scarba Lunga and Garvellachs WLA – The WLA is located within the Study Area, however theoretical visibility is constrained, and geographically limited to an isolated area near the upper slopes/ summit of Brat Bheinn and Cnoc na Gorra at a distance of over 45 km from the Proposed Developments wind turbines and would therefore not detract from the special qualities or integrity of this classified landscape.

4.3.44 The visual receptors scoped out of the SLVIA are:

- A846 – This road would have negligible visibility of the Proposed Development, views of the Proposed Development only occurring between Bowsmore to Port Ellen, over 38 km from the Proposed Development; and
- Core paths outwith 10 km from the Proposed Developments these would not be significantly impacted.

Scoped In Receptors

4.3.45 **Table 4.7**, provides a summary of sensitive receptors assessed in detail in the SLVIA.

Table 4.7: Summary of Sensitive Receptors		
Receptor	Sensitivity	Justification
Seascape and Landscape Character Types		
LCT03 Hidden Glens	High	Small scale landscape with high scenic quality.
LCT20 Rocky Mosaic	High	Complex pattern of landscape features and land uses with long range views.
LCT6c Mull of Kintyre Upland Forest-Moor Mosaic	High	Large scale landscape with simple landcover characterised by wind farms.
LCT14 Bay Farmland	High	Simple landform and land cover with unremarkable scenic quality.
LCT06 Upland Forest Moor Mosaic	High	Landscape with complex landforms and small-scale elements of high scenic value.
LCT22 Coastal Parallel Ridges	High	Large scale landscape with complex, dramatic landform.
LCT6b Knapdale Upland Forest Moor Mosaic	High	Complex landscape pattern of largely high scenic value and numerous antiquities of cultural interest.
LCT83 Rugged Upland – Ayrshire	High	Large scale, dramatic landscape with wildness characteristics.
LCT59 Raised Beach Coast and Cliffs	High	Small scale landscape with high scenic quality.
LCT65 Coastal Lowland Moor	High	Small, intimate scale landscape with sites of historical and cultural interest.
LCT61 Coastal Fringe with Agriculture	High	Complex pattern of landscape features and land uses with long range views.
LCT80 Rugged Moorland Hills and Valleys	High	Landscape with complex landforms and small-scale elements of high scenic value.
SCT01 Remote High Cliffs	High	Large scale landscape with strong vertical emphasis and high scenic quality.
SCT09 Sounds, Narrows and Islands	High	Complex pattern of landscape features and land uses with long range views.
Designations and Classifications		

Table 4.7: Summary of Sensitive Receptors		
Receptor	Sensitivity	Justification
North Arran NSA	High	Nationally important resource.
East Kintyre (Coast) APQ/LLA	High	This designation has no available citation setting out its special qualities, but is judged to have a high value and to have a high susceptibility to the type of development proposed.
North Arran SLA	High	Scenic quality and designation status
Achamore House GDL	High	Nationally important resource
Transport and Recreational Routes		
A83	High/ Medium	Tourist users focused on the adjoining landscape and local road users/commuters generally travelling alone and/or focused on road rather than adjoining landscape.
B842	High/ Medium	Tourist users focused on the adjoining landscape and local road users/commuters generally travelling alone and/or focused on road rather than adjoining landscape.
B879	High/ Medium	Tourist users focused on the adjoining landscape and local road users/commuters generally travelling alone and/or focused on road rather than adjoining landscape.
The String Road (Arran)	High/ Medium	Tourist users focused on the adjoining landscape and local road users/commuters generally travelling alone and/or focused on road rather than adjoining landscape.
Campbeltown – Ardrossan Ferry	High	Tourist users focused on the adjoining landscape.
Claonaig – Arran (Lochranza)	High	Tourist users focused on the adjoining landscape.
Kintyre Way	High	Strategic recreational long-distance footpath.
Cycle Route 78	High	Strategic recreational long-distance cycleway.
C304 – Glenbarr School route	High	Recreational footpath.
C088 (b) – (j) – Campbeltown to Claonaig	High	Recreational footpath.
C097 (a) – (c) – Carradale Bay circular	High	Recreational footpath.
C403 – Port na Cuile Seneval Wood, Carradale	High	Recreational footpath.
C093 (a) – (b) – Carradale Forest circular	High	Recreational footpath.
Settlement		
Glenbarr	High	Residential receptors.
Carradale	High	Residential receptors.
Torbeg (Arran)	High	Residential receptors.

4.4 Assessment of Potential Effects

Potential Construction Effects

- 4.4.1 The construction phase of the Proposed Development would last approximately 22 months in duration. The methods that would be utilised during the construction stage are detailed in **Chapter 2** (EIAR Volume 2).

4.4.2 The following elements and activities associated with the construction phase of the Proposed Development that have the potential to result in effects on the seascape, landscape and visual amenity of the Study Area:

- Construction of site access tracks;
- Construction of temporary site construction compounds incorporating site offices;
- Coniferous forestry, moorland and rough grassland vegetation removal of sections of commercial forest, including permanent felling around wind turbines and site infrastructure;
- Construction of site infrastructure, including a mixture of upgraded existing tracks and new tracks between wind turbine locations;
- Construction of laydown areas and crane pads;
- Construction of substation and compound, incorporating control building;
- Construction of the Battery Energy Storage System (BESS);
- Excavation and construction of wind turbine foundations;
- Erection of wind turbines with external transformers;
- Excavations of trenches for underground cables;
- Excavations of temporary mineral extraction sites (borrow pits);
- Establishment of a temporary concrete batching plant;
- Heavy goods vehicle (HGV) and abnormal indivisible load (AIL) deliveries to the site and movement of vehicles on-site; and
- Reinstatement work, including restoration of borrow pits and removal of temporary accommodation works.

Construction Landscape Effects

4.4.3 The majority of effects occurring during the construction phase would concern the disturbance of existing landcover within the Application Boundary and potential for long term change or loss of characteristic vegetation with consequent effects on the character and amenity of the Application Boundary. It is noted that the current land use and this landscape fabric is dominated by coniferous forestry plantations, which would be subject to ongoing restructuring over the life of the Proposed Development and is therefore of low sensitivity. The land within the Application Boundary includes one main area of coniferous forestry, Lephinbeag Wood. Further information is provided in **Chapter 13** (EIAR Volume 2); however, for the purposes of this Chapter, it is notable that the current land use creates a dynamic and constantly changing landscape fabric. A large proportion of the construction effects would be managed through adoption of good practice and careful construction management and monitoring regimes (such as those presented in outline Construction and Environmental Management Plan (CEMP), **Technical Appendix 2.1** (EIAR Volume 4). Given the localised, short duration and partially reversible nature of construction impacts, and the low sensitivity of the productive forest they are not considered likely to constitute significant effects on landscape fabric.

4.4.4 Whilst there is potential for construction works to impact on the seascape and landscape character of the Study Area, the relatively short duration, limited geographical extents of works and largely reversible nature of construction impacts means that effects on sensitive

neighbouring character types and landscape designations such as the North Arran NSA, SLA and WLA are unlikely to be significant.

Construction Visual Effects

- 4.4.5 Similarly, whilst there is potential for localised effects on the amenity of a number of residential receptors including transportation and recreational routes and summits and as such effects would be highly localised, of short duration and essentially reversible, effects would not be significant.

Potential Operational Effects

- 4.4.6 The operational life of the Proposed Development is proposed to be 35 years. Consequently, for the purposes of this assessment the operational life and corresponding effects are considered to be long term. The operational elements with the potential to affect the landscape and visual amenity of the Study Area are:
- Wind turbine generators and external transformers;
 - On-site access tracks and hardstanding areas;
 - Restored temporary mineral extraction area (three borrow pits);
 - Substation/ control building; and
 - BESS (contained within the footprint of the proposed substation).

Operational Landscape Effects

- 4.4.7 The fabric of the landscape within the Proposed Development has the potential to be impacted by the tracks and hardstandings that would be retained during the operational phase of the Proposed Development. The borrow pits have the potential to affect the fabric of the landscape. This would be wholly contained within the Upland Forest Mosaic LCT (LCT06).
- 4.4.8 The wider character of the landscape, seascape, designated and classified landscapes have potential to be impacted by views of the Proposed Development which has potential to draw wind energy development closer to the sensitive eastern edge of the Kintyre peninsula. However, it is also the case that the Proposed Development is likely to be seen in an existing developed context with consequent implications for the degree of contrast and the magnitude of impacts attributed to it.

Operational Visual Effects

- 4.4.9 The operational development including all associated development including the substation and BESS infrastructure has been located within a small elevated topographical basin to limit the extent of its visibility, as demonstrated in the ZTV in **Figure 4.3** (EIAR Volume 3a). Consequently, effects on visual amenity are likely to be restricted, due to the extent of intervening topography, reducing the overall visibility of the Proposed Development.

Potential Cumulative Construction Effects

- 4.4.10 Whilst there is potential for cumulative effects associated with the construction of the Proposed Development and a number of other wind energy developments on the Kintyre Peninsula, there is no certainty as to the nature of construction operations or timescales for either the Proposed Development or the cumulative developments identified in **Table 4.6**.

Potential Cumulative Operational Effects

- 4.4.11 Potential cumulative effects would arise as a result of the Proposed Development in conjunction with existing, consented, in-planning and in-scoping wind developments within the Study Area. Two scenarios are used to assess cumulative effects: in-addition effects and in-combination effects.
- 4.4.12 Of relevance to cumulative effects is the extent to which the Proposed Development would be consistent with the emergent pattern of development and avoid geographical distribution of development with consequent spreading of cumulative effects, especially in respect of sensitive landscape and visual receptors.

4.5 Mitigation

Mitigation during Construction

General Construction Mitigation Measures

- 4.5.1 The location and management of construction elements of the Proposed Development has been carefully considered to minimise environmental effects including potential seascape, landscape and visual effects during the construction stage. Additionally, the following general precautionary measures would be adopted in order to minimise landscape and visual effects:
- All working areas would be restricted as far as practicable to the specified areas and demarcated to prevent incursion of site plant into non-construction locations;
 - Material storage / temporary stockpiles would be retained for the shortest duration practicable and would be sited to avoid visual intrusion to neighbouring receptor locations; and
 - Peat materials would be placed wherever practicable to avoid double handling, reduce vehicle movements, and to reduce potential drying and oxidisation of the peat. Where this is not possible the peat shall be stored in accordance with **Technical Appendix 9.3**, EIAR Volume 4.

Excavations, Temporary Construction Compound and Lay-Down Areas

- 4.5.2 The location of temporary excavations, construction compounds and layby area is shown in **Figure 2.1**, EIAR Volume 3a.
- 4.5.3 Temporary site compounds and mineral extraction areas have been carefully located within forested parts of the site and/or in locations where topography would afford a degree of screening in order to minimise effects on neighbouring receptor locations.
- 4.5.4 These aspects, of the construction, along with the proposed laydown area would be retained for a short duration and reinstated to a condition consistent with the adjoining undisturbed landscape prior to energisation of the Proposed Development, thereby reducing the potential magnitude of impacts and residual effects attributable to construction works.

Mitigation during Operation

- 4.5.5 Mitigation of seascape, landscape and visual effects associated to the operation of the Proposed Development is primarily concerned with the siting and design of the Proposed Development. The siting and design of the Proposed Development has been influenced by a number of national and regional sources of guidance, including:

- NatureScot's current guidance on the siting and design of wind farms¹⁷;
- Argyll and Bute Wind Energy Capacity Study¹⁸; and
- Detailed site-specific analysis.

NatureScot Guidance

- 4.5.6 Paragraph 1.15 of the NatureScot guidance states that "wind farms should be sited and designed so that adverse effects on landscape and visual amenity are minimised and so that landscapes which are highly valued are given due protection."
- 4.5.7 Paragraph 2.16 states that "turbine size is also a key issue in upland landscapes, where they are viewed against, or from, landscapes of a more intricate scale and pattern; or where it is otherwise difficult to discern the landscape scale and distance. By illustrating the scale of an upland landscape, wind turbines may seem to conflict with the expansive nature of these areas."
- 4.5.8 Paragraph 2.20 goes on to propose that "ancillary elements for a wind farm development should be designed so they relate to the key characteristics of a landscape. It is important that these elements do not confuse the simplicity of the wind farm design, or act as a scale indicator for the turbines themselves. Undergrounding power lines within the wind farm, using transformers contained within tower bases (where possible), and careful siting of substations, transmission lines, access tracks, control buildings and anemometer masts will all help to achieve a coherent wind farm design. Simplicity of appearance and use of local, high-quality materials will further enhance this."
- 4.5.9 Paragraph 2.25 addresses the layout of turbines and suggests that "turbines can be arranged in many different layouts. The layout should relate to the specific characteristics of the landscape - this means that the most suitable layout for every development will be different."
- 4.5.10 Paragraph 3.24 goes on to state that "it is generally preferable for wind turbines to be grouped on the most level part of a site, so the development appears more cohesive, rather than as a poorly related group of turbines."
- 4.5.11 The guidance identifies skylines to be of critical importance and posits that the design should avoid detracting from, or overwhelming the character of distinctive skylines, as well as avoiding variable heights or overlapping turbines.
- 4.5.12 The guidance also discusses the relationship between wind farms. A key factor determining the cumulative impact of wind farms is the distinct identity of each development. This relates to their degree of separation and similarity of design between wind farms. This applies whether they are part of a single development, a wind farm extension, or a separate wind farm in a wider group. A wind farm, if located close to another of similar design, may appear as an extension. However, if it appears at least slightly separate and of different design, it may conflict with the other development.

Argyll and Bute Guidance

- 4.5.13 In considering the siting and design of the Proposed Development guidance provided in ABLWECS was referenced as a starting point.

¹⁷ Siting and Design of Wind Farms in the Landscape, Version 3a SNH (2017)

¹⁸ Argyll and Bute Landscape Wind Energy Capacity Study Argyll and Bute Council, Volume One (2017)

- 4.5.14 According to the ABLWECS the Proposed Development would be located within an area identified as the Upland Forest-Moor Mosaic (LCT06), which extends along the top of the Kintyre peninsula, and which is described as follows:

"a gently undulating plateau-like landform with smooth even slopes. This landscape has a simple land cover of extensive coniferous forestry and moorland. It is sparsely populated and already accommodates three operational wind farm developments. Many of these characteristics present potential opportunities to accommodate large scale wind farm development (i.e. 80-130m turbines) although the more complex smaller scale hills and occasional narrow settled glens on the fringes of this broad upland plateau and more pronounced higher hill summits are more sensitive as is the rugged and remote coast between Skipness and Tarbert. This landscape has an overall Medium sensitivity to large development typology and a Medium-Low sensitivity to the Medium typology (i.e. turbines up to 80m in height). This is a very sparsely settled area which is difficult to access in places although the Kintyre Way long distance footpath attracts walkers. Visibility of the interior of these uplands is restricted from roads and settlement within adjacent Low-lying coastal areas although there are longer views from across Loch Fyne and from Arran and Gigha. Visual sensitivity is judged to be High - Medium for the large typology and Medium for the Medium typology, reflecting the greater scope for turbines of this size to integrate with existing wind farm developments and minimise effects on views. No designated landscapes apply to the Kintyre area although it abuts a coastal APQ in places. Sensitivity in relation to landscape values is considered to be low for both of the typologies assessed (large and Medium) although this would increase at the transition with the APQ designated area as turbines visible on prominent skylines above the coastal fringe may indirectly affect special qualities."

- 4.5.15 ABLWECS suggests that key cumulative landscape and visual issues are as follows:

- Large turbines and/or more extensive wind farm developments sited on the edge hills and slopes of the Kintyre uplands where they would be likely to increase landscape and visual impacts on the settled coastal edge of Kintyre and on views from Arran and Gigha and would also undermine the established pattern of wind farm developments associated with the interior of these uplands;
- Potential effects on views from the A83 Tourist Route where operational and any further wind farm developments on both the Kintyre and Knapdale peninsulas could potentially be visible in the more open Kennacraig to Clachan area and sequentially in views between Lochgilphead and Inverneill;
- Extensions to operational wind farms may extend or exacerbate visual intrusion on sensitive skylines above the 'hidden glens' (LCT ABC3) or within the narrow-settled Barr Glen and Glen Lussa within this LCT;
- Cumulative effects associated with any additional wind farm development into the Mull of Kintyre Upland Forest Moor Mosaic character type (6c) in terms of views from the west coast of Arran which extend along the full length of the peninsula; and
- The pattern of wind farm developments seen along the spine of the Kintyre peninsula from Arran whether repeated clusters of separate wind farms along the length of the spine or a strategy of consolidating the existing foci for development may limit cumulative effects.

- 4.5.16 ABLWECS goes on to propose the following guidance with regard to the siting of large typology developments, including:

- Siting of development away from the more complex and irregular small hills found on the outer edges of Kintyre;

- Turbines should not be sited on, or close by, the more pronounced and higher summits found in the southern and northern parts of the Mull of Kintyre Upland Forest-Moor Mosaic LCT;
- Turbines should be sited to avoid intrusion on views to and from the rugged and remote coast between Skipness and Tarbert as this would affect the sense of 'wildness' associated with the seascape;
- Developments should avoid significant intrusion on views from the B8001 to the mountains of Arran; and
- Developments should also avoid significant intrusion in small scale neighbouring landscape types including Rocky Mosaic (LCT20) and the Hidden Glen (LCT03).

4.5.17 It is clear from **Figure 4.8** (EIAR Volume 3a) that proposals for wind energy development on the Kintyre peninsula have not followed a uniform pattern or been concentrated in what was previously considered the spine or central part of the peninsula. Moreover, the size of consented and operational turbines has increased to around 150 m maximum blade tip, with proposed schemes of up to 230 m also being brought forward, reflecting a national trend towards larger turbines in Scotland.

Detailed Site-Specific Analysis

4.5.18 **Chapter 3** (EIAR Volume 2) provides a summary of the key design and decisions made during the course of the design of the Proposed Development, all of which demonstrate that appropriate design mitigation has been applied.

4.5.19 It is clear from the description of the design process that seascape, landscape and visual priorities as well as the published guidance and recommendations made by NatureScot and ABC, summarised previously, were key influences on the design of the Proposed Development.

4.5.20 In seascape, landscape and visual terms, the siting and design mitigation applied included:

- Locating the Proposed Development within the 'areas with potential for wind farm development' as illustrated in the ABC Wind Farm Policy Map.
- Locating the Proposed Development at an appropriate distance from settlement and individual dwellings.
- Locating the Proposed Development away from distinctive landscapes to avoid significant intrusion in small scale neighbouring landscape types including Rocky Mosaic (LCT20) and the Hidden Glen (LCT03).
- Locating the Proposed Development away from distinctive landscapes landscape features the scale and form of which could be compromised.
- Positioning wind turbines on lower elevations of the plateau to create an even composition.
- Positioning the Proposed Development within the existing cluster of wind energy developments so that it appears consistent with the established characteristic elements of the landscape.
- Positioning wind turbines to ensure that the spread of wind development does not extend beyond the existing overall footprint of wind developments (the Proposed Development would be located in between existing Beinn an Tuirc Wind Farm, Beinn an Tuirc 2, Beinn an Tuirc 3 turbines and the in-scoping Allt Domhain development, with the Proposed Development wind turbines to the east).

- Minimising the extent to which the Proposed Development would be seen without the context of the operational Beinn an Tuirc, Beinn an Tuirc 2 and Beinn an Tuirc 3 wind farms.
 - The overall fit of the Proposed Development is consistent with the emerging cumulative pattern of development with larger turbines on the plateau and smaller turbines on the sloping sides of the upland fringe landform.
 - The careful consideration of topography ensures that the maximum blade tip elevation of the Proposed Development's wind turbines would be level or lower than with the small wind developments of Beinn an Tuirc, Beinn an Tuirc 2 and Beinn an Tuirc 3. This relationship is evidenced in the Visualisations (**Figures 4.11a- 4.11j**, EIAR Volume 3b).
- 4.5.21 Minimising the amount of site infrastructure and ancillary elements required, and carefully positioning these to take full advantage of the local topography undulations in order to screen such elements from receptors outwith the Proposed Development. The effectiveness of this approach is well demonstrated by the existing Beinn an Tuirc developments and illustrated in Viewpoint 3 from the Summit of Beinn Tarsuinn (**Figures 4.11a - 4.11j**, EIAR Volume 3b). The Proposed Development would sit in front of the smaller turbines with bases and lower parts of towers concealed by landform, and not break the skyline.
- 4.5.22 The design of the Proposed Development takes into account the smaller wind turbines of Beinn an Tuirc, Beinn an Tuirc 2 and Beinn an Tuirc 3 wind farms. Notably, the height difference of the Proposed Development has been accommodated by ensuring the proposed wind turbines of the Proposed Development are on lower ground and relate to the existing Beinn an Tuirc cluster. This relationship is evidenced in the Visualisations (**Figures 4.11a - 4.11j**, EIAR Volume 3b) which illustrate that the apparent vertical extent of the blade tip of proposed wind turbines is viewed at a similar height to the blade tips of the smaller Beinn an Tuirc, Beinn an Tuirc 2 and Beinn an Tuirc 3 turbines.
- 4.5.23 The above design mitigation has been applied in order to minimise the visual complexity that could occur when wind farms of varying sizes are located within close proximity to one another.
- 4.5.24 It is important to note that the proposed wind turbines have been located as far west as possible within the Wind Turbine Array in order to:
- Relate more closely to the operational Beinn An Tuirc, Beinn an Tuirc 2 and Beinn an Tuirc 3 developments.
 - Fit with the in-scoping Allt Domhain development.
 - To merge within the existing pattern of larger scale development located more centrally within the upland forest moor landscape with the smaller developments leading to the western and eastern edges of the Kintyre peninsula and neighbouring LCTs.
- 4.5.25 This approach also ensures that the proposed wind turbines would be further from the settlements in the eastern part of the Study Area, along the Kintyre peninsula.
- 4.5.26 Wind turbine type, relative size and geometry of turbines was also considered during the design of the Proposed Development. Given the age range and the diversity of the existing pattern of development in the vicinity it is inevitable that there will be a difference in the size of new developments and existing developments. In considering turbine geometry a range of factors were borne in mind, including:
- The proximity, relative visibility and prominence of neighbouring wind farms, larger wind turbines may be less obviously different when seen more distantly and less prominently.

- The degree to which contrasting schemes overlap and whether larger wind turbines are seen behind or in front of adjacent developments. Seen at distance and substantially overlapped by smaller wind turbines the contrast between existing and proposed wind turbines can be lessened. Conversely, when seen in front of small wind turbines, larger models do not distort the perspective of receptors, as in the case in views from locations to the east of the Proposed Development, including the view from the Summit of Beinn Tarsuinn (Viewpoint 3, **Figure 4.11a - 4.11j**, EIAR Volume 3b).
- Whilst rotor size differences can result in variations in rotor speed between neighbouring schemes, this can also be the case in respect of different models of wind turbines with the same geometry. It is also the case that some differences in rotor speed occur within individual wind farms as a result of differing wind conditions associated with topography, elevation and land cover.

4.5.27 The efficacy of the siting and design measures is evidenced by the relatively constrained viewshed indicated in the ZTV in **Figure 4.3** (EIAR Volume 3a). Matters pertaining to the design and appearance of the Proposed Development, including matters pertaining to appreciable wind turbine size differences, are discussed in relation specific viewpoint locations in **Technical Appendix 4.3**, EIAR Volume 4.

ENERGY STORAGE FACILITY

4.5.28 The control building and substation, along with potential associated BESS, would be located within the undulating elevated large-scale forested landscape within the Proposed Development. The buildings and housings would be positioned in between Torr a' Ghobhainn and Cnoc Breac, a local upper valley within the plateau, in order to provide some scope for screening this aspect of the Proposed Development from external receptor locations during construction and operation.

4.6 Assessment of Residual Effects

Residual Effects during Construction

Landscape Fabric

- 4.6.1 **Chapter 2**, EIAR Volume 2 details the land take associated with the construction of the Proposed Development. This indicates that the Proposed Development would cause temporary disturbance and change to around 0.4 hectares (ha) of the Application Boundary. Permanent land take would be approximately 19.4 ha.
- 4.6.2 The key change to the fabric of the landscape within the Proposed Development (which includes access tracks, substation and BESS infrastructure) would relate to some minor localised changes to topography and changes to characteristic land cover. This is considered to represent a highly localised effect, and one which would be largely reversible upon decommissioning of the Proposed Development. This would result in a magnitude of impact on the landscape fabric of Slight, reducing to None within the wider landscape. Consequently, the residual effect would be Moderate (**Not significant**), reducing to None within a short distance of the Proposed Development.

Seascape and Landscape Character Types

- 4.6.3 The effect of construction would be highly localised to construction locations and would be of relatively short duration and much of the disturbance would be ameliorated or removed during consequent reinstatement activities. The magnitude of impact on the seascape/ landscape

character types would be Slight, reducing to None within the wider LCT. The residual effect would be Moderate (**Not significant**), reducing to None.

Landscape Designations/ Classifications

- 4.6.4 As with the predicted effects on landscape/ seascape character types, effects on designated/ classified landscapes within the Study Area are anticipated to be not significant. The Proposed Development would be located wholly outwith designated or classified areas (as shown in **Figure 4.5a**, EIAR Volume 3a) and would therefore have no direct effect on designated/ classified landscape. Whilst indirect effects are likely, primarily as a result of operational cranes and the erection of wind turbines, such effects would be highly localised and would be for a short duration. This would result in a Negligible magnitude of impact, reducing to None within the wider landscape. Consequently, the residual effect would be Moderate/Minor (**Not significant**), reducing to None within a short distance from the Proposed Development.

Visual Amenity

- 4.6.5 Construction operations associated with the Proposed Development would be confined to locations within the Application Boundary that are screened/ partially screened from the majority of external receptor locations, such as settlements, transportation routes and the majority of recreational routes, with exception being those more vertical elements such as wind turbines and cranes being visible in close proximity to number of receptors, albeit it over a short section of their overall length, such as the small settlement of Torrisdale, B842 road corridor and the Kintyre Way long range walking route. However, as mentioned above, these aspect of construction operations would be for a relatively short duration and confined to short sections of the above receptor locations. This would result in a Slight magnitude of impact, reducing to None within the wider landscape due to topographical screening. Consequently, the residual effect would be Moderate (**Not significant**), reducing to None within a short distance from the Proposed Development.

Residual Effects during Operation

Landscape Fabric

- 4.6.6 No additional effects (compared to the construction phase) on landscape fabric would occur during the operational life of the Proposed Development. Replanted coniferous plantation on site would gradually mature, re-establishing the characteristic land cover and productive use of the site.

Seascape and Landscape Character Types

- 4.6.7 Twelve LCTs and two SCTs have been assessed in the SLVIA. These are listed and described in **Technical Appendix 4.1** (EIAR Volume 4) and where there is a variance in the character or level of effects from the Proposed Development in different units of the LCT/ SCT this is identified.

Based on the assessment undertaken **Significant** residual effects were found to be restricted to the following seascape and landscape types (refer to **Table 4.1.3** in **Technical Appendix 4.1**, EIAR Volume 4):

- LCT 20: Rocky Mosaic: in the Carradale Point – Saddell Bay unit: Residual effects would vary greatly in this unit from **Major** (significant) in more open locations (e.g. Carradale Point), to Moderate/Minor (not significant) in more enclosed locations close to the toe of the peninsula scarp slope (e.g. along the B879). Significant effects would be localised and primarily concern effects on scale and the transition between the neighbouring Upland

Forest Moor Mosaic LCT and the Rocky Mosaic coastal edge and establishment of a new prominent development in the backdrop to the LCT.

- LCT06: Upland Forest Moor Mosaic: Residual effects on this LCT would vary considerably from **Major** (significant) localised effects in the immediate vicinity of the Site, to Moderate/Minor (not significant) across much of the LCT were it would often be subject to partial screening and generally seen in the context of extensive existing wind farm developments.
- SCT 09 Sounds, Narrows and Islands: The residual effect on the Sounds, Narrows and Islands SCT would range from locally **Major/ Moderate** (significant) near Torrisdale and Carradale Bays, to Moderate along parts of the western side of Arran, and None along southern sections of the eastern coast of the Kintyre peninsula in close proximity to the Proposed Development to None (not significant) for those more distance locations, due to the intervening topography. Significant effects in this SCT would be localised and primarily concern effects on elevated backdrop to views.

4.6.8 Similarly, significant cumulative effects were identified for these three character types, as follows:

4.6.9 LCT 20: Rocky Mosaic: in the Carradale Point – Saddell Bay unit: Ranging from **Major** (significant) in-addition and in-combination effects in more open locations (e.g. Carradale Point), to Moderate/Minor (not significant) in more enclosed locations close to the toe of the peninsula scarp slope (e.g. along the B879). Significant cumulative effects would be localised and primarily concern views of the Proposed Development in conjunction with nearby Beinn an Tuirc, Beinn an Tuirc 2 and Beinn an Tuirc 3 turbines thereby intensifying the extent of development and drawing wind energy developments further towards the edge of the uplands and forming a prominent new development in the backdrop to the LCT.

4.6.10 LCT06: Upland Forest Moor Mosaic: The Proposed Development would appear within an established concentration of wind energy developments comprising Beinn an Tuirc, Beinn an Tuirc 2 and Beinn an Tuirc 3, as well as Blary Hill and Auchadaduie. This part of the LCT is consequently a 'wind farm landscape' where turbines form a major characteristic constituent of the landscape. In this context, significant in-addition effects are only likely to occur in the immediate vicinity of the Proposed Development. In the wider LCT, the Proposed Development would be partially screened by intervening topography and/or vegetation and blending in with the emergent pattern of development.

4.6.11 SCT 09 Sounds, Narrows and Islands: In-addition cumulative effects on the Sounds, Narrows and Islands SCT would range from locally **Major** (significant) near Torrisdale and Carradale Bays to Moderate (not significant) along parts of the western side of Arran, and None along southern sections of the eastern coast of the Kintyre peninsula. Significant effects in this SCT would be localised and primarily concern effects on the elevated backdrop formed by the Kintyre peninsula.

4.6.12 Effects in all other LCTs or SCTs within the Study Area would not be significant.

Landscape Designations

4.6.13 An assessment of effects on landscape designations and classifications is provided in **Technical Appendix 4.2**-(EIAR Volume 4) and a Wild Land Impact Assessment is set out in **Technical Appendix 4.5** (EIAR Volume 4).

- 4.6.14 Of the landscape designations and classifications considered in the SLVIA, only the East Kintyre APQ/LLA would be subject to significant effects on its special qualities. Effects would range from **Major** (significant) to None, with significant effects occurring in the vicinity of Torrisdale Bay and Carradale where the Proposed Development would affect the scale and character of the transition of between coast an upland forested moorland.
- 4.6.15 The Proposed Development would not, however, affect the majority of critical special qualities/characteristics of this designation and would be localised. Consequently, the Proposed Development would have no significant effects on the key characteristics of the APQ and would consequently not compromise its integrity.
- 4.6.16 Effects on the special qualities of the APQ/LLA would vary considerably due to the partly restricted cumulative visibility experienced within this designation. Effects would range from **Major** (significant) to None, with significant effects being confined to locations in the vicinity of Carradale where the Proposed Development would significantly increase the influence of the wind energy development on the scale and character of the transition of between coast an upland forested moorland.
- 4.6.17 The Proposed Development would not, however, affect the majority of critical special qualities of this designation and would be localised in extent. Consequently, the Proposed Development would not compromise its integrity.
- 4.6.18 In cumulative terms, the Proposed Development would only contribute to significant in-addition and in-combination effects in the East Kintyre APQ/LLA in the vicinity of Torrisdale and Carradale, Cumulative effects elsewhere being restricted by intervening vegetation and topography. and non-significant elsewhere.

Visual Amenity

TRANSPORT ROUTES

- 4.6.19 The transportation routes assessed are shown in **Figure 4.7** (EIAR Volume 3a) and **Technical Appendix 4.6** (EIAR Volume 4) which contains a statistical analysis of visibility of the Proposed Development as well as other wind farms developments within the Study Area from key transportation and recreational routes. The analysis also provides details of the relative distance of visible wind farms to allow for comparison and determination of potential cumulative effects, including sequential effects.

A83

- 4.6.20 The A83 traverses the Study Area in a general southwest – northeast orientation between the A82 at Loch Lomond and Kilchenzie to the settlement of Campbeltown. As indicated by the ZTV (refer to **Figure 4.3**, EIAR Volume 3a), the Proposed Development would be theoretically visible across a small section of the route as it traverses the western edge of the small settlement of Glenbarr, at which point the Proposed Development would be 9.5 km to the east. There would be intermitted theoretical views sustained for a 1.2 km stretch of the road as it routes through Glenbarr. However, it is likely that the Proposed Development would be indiscernible for much of this length as illustrated at Viewpoint 4: Glenbarr War Memorial (**Figure 4.12a - 4.12j**, EIAR Volume 3b).
- 4.6.21 The only section of the A83 that would have theoretical views of the Proposed Development would be from the small section of road near Glenbarr. There would be limited alteration to views from this small section, with the Proposed Development being discernible in places, any views would be short in duration. The underlying character would be broadly consistent with the baseline, which is highly characterised by wind energy development. Consequently, the

magnitude of impact would be overall None, with localised impact of Negligible near Glenbarr and the corresponding residual effect would be None overall, and Minor and Not significant in respect to receptors along the small extent of the route near Glenbarr.

- 4.6.22 In-addition cumulative effects: The Proposed Development would result in no appreciable change to the landscape resource or views from the majority of the A83, with exception to the small sections near Glenbarr, where the Proposed Development would result in a minor addition of wind energy development along this short section of the route. The magnitude of impact is considered to be None overall, and Negligible across the short section of the route near Glenbarr. The residual cumulative effect would be None, and Minor respectively, both are considered Not significant.
- 4.6.23 In-combination cumulative effects: The following wind energy schemes would be potentially visible in the same views as the Proposed Development (from the same location as noted above, Glenbarr): Beinn an Tuirc cluster (operational) Auchadaduie (operational), Blary Hill (operational), Allt Domhain (in-scoping), Cnoc Buidhe (in-scoping), Tangy 3 and 4 (consented), Breackerie (in-planning), Isle of Gigha (operational), Isle of Gigha Extension (operational), Airigh (consented), Allt Dearg (operational), Rowan (consented), Coalashee (in-scoping), Clachaig Glen Tip Increase (in-planning). The Proposed Development would always be seen within the context of some or all of the above noted developments, and most often within the context of the Beinn an Tuirc cluster, where it would appear to be part of it, rather than a wholly new development. The magnitude of impact would be Substantial, and the in-combination effect would be **Major/ Moderate** and significant. This is largely a result of the existing diversity and complexity of wind energy developments visible from the route along the western extent of the Kintyre peninsula, with the Proposed Development being a minor addition within the short section near Glenbarr.

B842

- 4.6.24 This is a regional road linking Claonaig to Southend on the eastern most extent of Kintyre. The route analysis demonstrates that less than half of the road (less than 12.5 km) would be subject to theoretical views of the Proposed Development, these views would be limited to the central and northern most extent the road. Theoretical views of the Proposed Development along the southern most extent would be fully screened by the intervening topography of Kintyre. Where the Proposed Development would be theoretically visible, views would be glimpsed over the short stretches of the road, partially screened by intervening mature roadside and woodland vegetation that forms a key characteristic of the landscape. The 7.5 km section between Saddell Bay and Carradale would have the most sustained theoretical views. However, there are large expanses of woodland and roadside vegetation on the western flank of the road that would filter/ screen views westwards.
- 4.6.25 The overall visual amenity of the B842 would be largely unaffected. There would be a slight change to views from the central section of the road between Saddell Glen and Carradale, where the Proposed Development would be theoretically visible. Views would be short lived/ glimpsed being partially/ fully screened by the adjacent roadside and woodland vegetation for much of the time, with larger gaps and greater visibility from areas such as Torrisdale Bay and Saddell Bay. The magnitude of impact would be Negligible overall, increasing to Slight between Saddell Bay and Carradale. From the wider route, the Proposed Development would represent a barely discernible addition to the landscape, however this would increase along the Carradale – Saddell Bay stretch, where the Proposed Development would represent a Minor addition of wind energy influence to composition of views. Therefore, the residual effect is Moderate/ Minor

(Not significant), increasing to Moderate (Not significant) along the Carradale – Saddell Bay section of the route.

- 4.6.26 In-addition cumulative effects: The Proposed Development would result in a minor addition to the overall influence of wind energy development along a 7.5 km stretch, between Carradale and Saddell Bay. From those more distant location near Carradale and Saddell Bay, the Proposed Development would be seen primarily in the context of the following wind energy developments: Beinn an Tuirc (operational), Beinn an Tuirc 2 (operational) and Beinn an Tuirc 3 (operational). The magnitude of impact is considered to be Slight, and the cumulative effect would be Moderate/ Minor and Not significant.
- 4.6.27 In-combination cumulative effects: The following schemes would be theoretically visible from the same length of route as the Proposed Development (same location referred to above): Beinn an Tuirc (operational), Beinn an Tuirc Extension (operational), Beinn an Tuirc Phase 3 (operational), Blary Hill (operational) and Allt Domhain (in-scoping). The Proposed Development would always be seen within the context of some or all of the above noted developments, and most often in combination with Beinn and Tuirc (operational) and Beinn an Tuirc Extension (operational) of which it would appear to be a part of. The magnitude of impact is considered to be Substantial, and the in-combination cumulative effect would be **Major/ Moderate** and significant. As described, this is largely as a result of the existing diversity and complexity of wind development visible from some of this route, with the Proposed Development representing a minor addition.

B879

- 4.6.28 The B879 road is located within the central extent of Kintyre, routing along the eastern coastline of Kintyre, between Bridgend in the west and Carradale in the east. As indicated by the ZTV (refer to **Figure 4.3**, EIAR Volume 3a), the Proposed Development would be theoretically visible across the entirety of the 2 km route, albeit it at distances of over 3 km to the southwest, partially backclothed by the upper slopes and summit of Torr a' Ghobhainn. Along the western and central extent of the route, the Proposed Development would be screened/ filtered by the adjacent and mature roadside and woodland vegetation. However, in views from the far east of the road, where there are less opportunities for screening the Proposed Development would be highly visible across the skyline to the southwest, as illustrated at Viewpoint 8: B879 above Millennium Bench (**Figure 4.16a - 4.16j**, EIAR Volume 3b).
- 4.6.29 Less than half of the route of the B879 would have actual views of the Proposed Development, due to the intervening roadside and woodland vegetation. From the eastern most extent there would be a notable increase in the influence of wind energy across the skyline to the southwest, however, this would be limited to glimpsed views between vegetation and of short duration. Consequently, the magnitude of impact would be Slight and the residual effect on the amenity of the B879 would be Moderate/ Minor and **Not significant**.
- 4.6.30 In-addition cumulative effects: The Proposed Development would represent a barely discernible addition to influence of wind energy development on the character of the landscape and/ or the composition of views. The baseline condition of the landscape or view would, for all intents and purposes, be unaffected. The magnitude of impact is considered Negligible, and the cumulative residual effect would be Minor and **Not significant**.
- 4.6.31 In-combination cumulative effects: The following schemes would be potentially visible in the same views as the Proposed Development (from the same locations as noted above): Beinn an Tuirc 2 (operational) and Beinn an Tuirc 3 (operational). The Proposed Development would

always be seen within the context of these two operational developments. The magnitude of impact would be considered Negligible, and the in-combination effect would be Minor and **Not significant**.

THE STRING ROAD

- 4.6.32 The String Road is a coastal road located along the western and northern most tip of the Isle of Arran, between Largymore in the south and Lochranza in the north. As indicated by the ZTV (refer to **Figure 4.3**, EIAR Volume 3a), the Proposed Development would be theoretically visible across majority of the route to the west, with the northern most extent being fully screened from the Proposed Development by the intervening topography of Meall Biorach. Along the western extent, the Proposed Development would be theoretically visible in views to the southwest and west, across the Kilbrannan Sound. However, the Proposed Development would form a notable new addition to views as illustrated in Viewpoint 2: Dougurie Point, Arran (**Figure 4.10a – 4.10j**, EIAR Volume 3b).
- 4.6.33 From the western and central extent of the road, the ZTV indicated intermittent theoretical views of the Proposed Development. Along the route, areas of roadside and woodland vegetation would further restrict the glimpses and potential views of the Proposed Development from this extent of the route. Any views of the Proposed Development would be seen within the context of other wind energy developments, at over 5 km. Around half of the route would have theoretical views of the Proposed Development. There would be limited alterations to views from this expansive outlook, views would be short in duration. Consequently, the overall magnitude of impact would be Slight and the residual effect on the amenity of the route would be Moderate/ Minor and **Not significant**.
- 4.6.34 In-addition cumulative effects: The Proposed Development would result in a minor addition to the influence of wind farm development along this route. The magnitude of impact is considered to be Slight, and the cumulative effect would be Moderate/ Minor and **Not significant**.
- 4.6.35 In-combination cumulative effects: The following schemes would be potentially visible from the same part of the route described above: Beinn an Tuirc (operational), Beinn an Tuirc 2 (operational), Beinn an Tuirc 3 (operational), Cnoc buidhe (in-scoping), Breackerie (in-scoping), Allt Domhain (in-scoping), Clachaig Glen Tip Increase (in-planning), Deucheran Hill (operational), Coalashee (in-scoping), Narachan (in-planning), Cour (operational) and High Constellation (consented). The Proposed Development would always be seen within the context of some or all of the above noted developments, and most often in combination with Beinn an Tuirc (operational), Beinn an Tuirc 2 (operational) and Beinn an Tuirc 3 (operational) of which it would appear to be a part of. The magnitude of impact is considered to be Substantial, and the in-combination cumulative effect would be **Major/ Moderate** and significant. This is largely a result of the existing diversity and complexity of wind developments visible from the western and central extent of the route, with the Proposed Development being a minor addition.

CAMPBELTOWN – ARDROSSAN FERRY ROUTE

- 4.6.36 The ferry route routes between Campbeltown, to the south of the Kintyre peninsula, to Ardrossan on the mainland, traversing the Clyde of Firth. As indicated on the ZTV (refer to **Figure 4.3**, EIAR Volume 3a), there would be some theoretical visibility with the Proposed Development from approximately 3 km east of the Campbeltown harbour and the southernmost extent of the Isle of Arran. This theoretical visibility would extend across the majority of the Kilbrannan Sound to the west of the Isle of Arran (refer to **Figure 4.3**, EIAR

Volume 3a), however due to intervening topography across the Isle of Arran, the Proposed Development would be fully screened as the route traverses through the Firth of Clyde. The Proposed Development would be visible across the water situated upon an elevated position within the landscape, albeit it partially backclothed and located at over 20 km to the northwest. Additionally, the Proposed Development would be seen within the context of other wind energy developments, behind Beinn an Tuirc Phase 3. Given the overall distance and existing wind energy context, the magnitude of impact is considered to be Negligible as the Proposed Development would barely alter the baseline of views from this route. The effect on visual amenity of the Campbeltown – Ardrossan route is predicted to be Moderate/ Minor (**Not significant**), reducing to None further east.

- 4.6.37 In-addition cumulative effects: Given the overall distance the Proposed Development would constitute a barely discernible addition to the influence of wind along the western most extent of the route given the constrained potential views. The magnitude of impact is considered to be Negligible, and the cumulative effect would be Moderate/ Minor and not significant.
- 4.6.38 In-combination cumulative effects: The following schemes would be potentially visible from the same part of the route described above: Beinn an Tuirc (operational), Beinn an Tuirc 2 (operational), Beinn an Tuirc Phase 3 (operational), Cnoc Buidhe (in-scoping), Breackerie (in-scoping), Allt Domhain (in-scoping), Clachaig Glen Tip Increase (in-planning), Deucheran Hill (operational), Coalashee (in-scoping), Narachan (in-planning), High Dalrioch (in-scoping), Breackerie (in-scoping), Tangy 3 and 4 (consented), , Clachaig Glen (in-planning), Blary Hill (operational) and Auchadaduie (operational). The Proposed Development would always be seen within the context of some or all of the above noted developments, and most often in combination with wind energy developments present within the Beinn an Tuirc cluster. The magnitude of impact is considered to be Substantial, and the in-combination cumulative effect would be **Major/ Moderate** and significant. This is largely a result of the existing diversity and complexity of wind development visible from the small sections of this route.

CLAONAIG – ARRAN (LOCHRANZA) FERRY ROUTE

- 4.6.39 This ferry route is located to the northeast of Kintyre, routing between Claonaig to Lochranza on the Isle of Arran. As illustrated by the ZTV (refer to **Figure 4.3**, EIAR Volume 3a), the Proposed Development would be theoretically highly visible from the entirety of the ferry route (approximately 8 km in total), with exception to 2 km west of the Lochranza harbour, this is due to topographical screening. The Proposed Development would be theoretically visible across the skyline to the southwest, albeit it at 24 km, partially screened by the intervening topography on Kintyre. Therefore, given the distance, existing wind energy context and partially screening, there would be minimal views of the Proposed Development from this route, the magnitude of impact is considered to be Negligible as the Proposed Development would barely alter the baseline views from this route. The effect on the visual amenity of the ferry route is predicted to be Moderate/ Minor – None and Not significant.
- 4.6.40 In-addition cumulative effects: The Proposed Development would result in a barely discernible addition to the influence of wind along this route given the constrained potential views. The magnitude of impact is considered to be Negligible, and the cumulative effect would be Moderate/ Minor and Not significant.
- 4.6.41 In-combination cumulative effects: The following schemes would be potentially visible from the same part of the route described above: Beinn an Tuirc (operational), Beinn an Tuirc 2 (operational), Beinn an Tuirc 3 (operational), Breackerie (in-scoping), Allt Domhain (in-scoping), Cnoc Buidhe (in-scoping), Clachaig Glen Tip Increase (in-planning), Deucheran Hill

(operational), Narachan (in-planning), Clachaig Glen (in-planning), Blary Hill (operational) and Auchadaduie (operational), Cour (operational), High Constellation (consented), Coalashee (in-scoping), Eascairt (consented), Cnoc Breacam (in-scoping), Sheirdrim Hill (in-planning), Inverary – Crossaig OHL (consented) and Earraghail (in-planning). The Proposed Development would always be seen within the context of some or all of the above noted developments, and most often in combination with wind energy developments present within the Beinn an Tuirc cluster. The magnitude of impact is considered to be Substantial, and the in-combination cumulative effect would be **Major/ Moderate** and significant. This is largely a result of the existing diversity and complexity of wind development visible from the small sections of this route.

KINTYRE WAY

- 4.6.42 The Kintyre Way forms one of the most important long-distance walking routes within the Study Area. The route starts in Tarbert Harbour, extending southwards to Skipness, thereafter criss-crossing the central extent of the Kintyre peninsula, ending in Dunaverty Bay to the far south.
- 4.6.43 Visual analysis of the route shows that, theoretically, the Proposed Development would come into view across a small section of the Kintyre Way, between Carradale and Saddell Glen (refer to **Figure 4.3**, EIAR Volume 3a). The Proposed Development would be seen in close proximity to the route, at its closest point being located 2 km to the east. However, as the route traverses southwards, the route is flanked on the west by dense mature roadside and woodland vegetation, partially screening the Proposed Development, albeit this is intermittent. Across this section of the trail, the Proposed Development would be seen within the context of the Beinn an Tuirc cluster.
- 4.6.44 The magnitude of the visual effect on the Kintyre Way is considered to be Negligible for most of the route and Substantial along the Carradale – Saddell Glen section since the Proposed Development would add large scale wind turbines in close proximity to the route, which would add to the existing complexity of wind development. The effect on the visual amenity of the Kintyre Way route is therefore predicted to comprise a localised **Major** (significant) effect, but Moderate/ Minor (not significant) overall.
- 4.6.45 In-addition cumulative effects: The Proposed Development would result in a minor addition to the influence of wind energy developments along this route. The magnitude of impact is considered to be Slight, and the cumulative effect would be Moderate/ Minor and not significant.
- 4.6.46 In-combination cumulative effects: The following schemes would be potentially visible in the same views as the Proposed Development (from the same locations as noted above): Beinn an Tuirc (operational), Beinn an Tuirc 3 (operational), Beinn an Tuirc Extension (operational), Allt Domhain (in-scoping). The Proposed Development would always be seen within the context of some or all of the above noted developments, and most often in combination with Beinn an Tuirc (operational) and Beinn an Tuirc Extension (operational) of which it would appear to be a part of. The magnitude of impact is considered to be Substantial, and the in-combination cumulative effect would be **Major/ Moderate** and significant. As described, this is largely as a result of the existing diversity and complexity of wind development.

NATIONAL CYCLE ROUTE 78

- 4.6.47 The route forms part of an old on-road cycle route which follows the route of the B842 along the east coast of Kintyre, from Campbeltown to Claonaig, where it crosses over the Knapdale on the B8001 and follows south and east coast along the B8024.
- 4.6.48 There are stretches of sustained theoretical visibility from Claonaig, with large gaps as it progressed southwards to Carradale, where theoretically visibility would increase throughout the route, before being fully screened by the adjacent topography further south near Grogport. Any possible views of the development would be to the west, away from the main outlook of the route, across the Kilbrannan Sound towards the Isle of Arran. Overall, the visual amenity of this route is considered to be slightly impacted by the Proposed Development and the effect on visual amenity is assessed to be Minor and Not significant.
- 4.6.49 In-addition cumulative effects: The Proposed Development would result in a minor addition to the influence of wind farms along this route. The magnitude of impact is considered to be Slight, and the cumulative effect would be Moderate/ Minor and Not significant.
- 4.6.50 In-combination cumulative effects: The following schemes would be potentially visible in the same views as the Proposed Development (from the same locations as noted above): Beinn an Tuirc (operational), Beinn an Tuirc 2 (operational), Beinn an Tuirc 3 (operational), Allt Domhain (in-scoping). The Proposed Development would always be seen within the context of some or all of the above noted developments, and most often in combination with Beinn an Tuirc (operational) and Beinn an Tuirc 2 (operational) of which it would appear to be a part of. The magnitude of impact is considered to be Substantial, and the in-combination cumulative effect would be **Major/ Moderate** and significant. As described, this is largely as a result of the existing diversity and complexity of wind development.

CORE PATHS

- 4.6.51 There are five core paths within approximately 10 km of the Proposed Development that are considered in this SLVIA, as it is unlikely that there would be significant effects on core paths beyond this distance.

C304 – GLENBARR SCHOOL ROUTE

- 4.6.52 This core path comprises a short route, between Glenbarr and Glenbarr School, wholly contained within the settlement of Glenbarr. The ZTV (refer to **Figure 4.3**, EIA Volume 3a) indicates that theoretical views of the Proposed Development would be possible across the lower half of the route, however these views would be intermittent, partially screened/ filtered by the adjacent built environment. Whilst the Proposed Development would be clearly visible within sections of this core path, it would not alter the components of the view being set behind, and within the same field of view as the operational wind turbines of Beinn an Tuirc and Beinn an Tuirc 2. The influence of wind development would be marginally increased. Therefore, the effect on the visual amenity of this core path is predicted to be Moderate and not significant.
- 4.6.53 Cumulative magnitude of impact would be Slight for in-addition cumulative effects, resulting in a Moderate (not significant) effect.
- 4.6.54 In-combination magnitude of impact would be Moderate given the range of existing wind developments is of diverse typologies and relatively complexity. This would represent a **Major/ Moderate** (significant) in-combination cumulative effect.

C088 (B) – (J) – CAMPBELTOWN TO CLAONAIG

- 4.6.55 This core path routes from Claonaig in the northeast to Campbeltown in the southwest, experiencing views eastwards across the Kilbrannan Sound towards the Isle of Arran. The Proposed Development would be theoretically visible across the southern and eastern most extent of the core path, with the central section being afforded screening by the intervening topography of the Kintyre uplands. As the route approaches Carradale, the Proposed Development would be fully screened, due to the upper slopes of the Carradale Glen. Additionally, this part of the route is through mature woodland and roadside vegetation, so any possible visibility would be heavily screened/ filtered.
- 4.6.56 The Proposed Development would add further wind turbines into the local area, however, since the core path is within the Beinn an Tuirc cluster of wind turbines, the inclusion of the Proposed Development would not substantially alter the current baseline view. The proposed wind turbines would be a notable addition into the views and as such the effect on the visual amenity is predicted to be Moderate and Not significant.
- 4.6.57 In-addition magnitude of impact is considered to be Slight for in-addition cumulative effects as most of the core path has views of the Beinn an Tuirc wind farm and the Proposed Development would result in an addition to wind turbines at the end of the walk. Given the size of the proposed wind turbines combined with proximity to the path the cumulative effect would be Moderate and Not significant.
- 4.6.58 In-combination magnitude of impact is assessed to be Moderate since the range of existing wind developments is of diverse typologies and relatively complex and clearly visible from this path. This would result in **Major/ Moderate** and significant in-combination cumulative effect.

C097 (A) – (C) CARRADALE BAY CIRCULAR

- 4.6.59 The core path is located within the settlement of Carradale and forms a loop. The ZTV (refer to **Figure 4.3**, EIAR Volume 3a) illustrates that theoretical views to the Proposed Development would be extensive across the entirety of the loop, with the Proposed Development rising above the skyline to the southwest, adjacent to the operation Beinn an Tuirc cluster of wind energy development.
- 4.6.60 Actual views of the Proposed Development from the core path would be limited, due to the extent of intervening roadside and woodland vegetation. From the southernmost extent of the pathway, the Proposed Development would result in a notable increase in the overall influence of wind energy development across the skyline to the southwest, however, this would be limited to glimpsed views between vegetation and of short duration. Consequently, the magnitude of impact would be Slight and the residual effect on the amenity of the C097 core path would be Moderate/ Minor and not significant.
- 4.6.61 In-addition and in-combination cumulative effects – the Proposed Development would represent a barely discernible addition to influence of wind energy development on the character of the landscape and/ or the composition of views. The baseline condition of the landscape or view would, for all intents and purposes, be unaffected. The magnitude of impact is considered Negligible, and the cumulative residual effect would be Minor and Not significant.

C403 – PORT NA CUILE SENEVAL WOOD, CARRADALE

- 4.6.62 This core path is located north of Carradale, routing across the landscape to the north and northwest, the route is generally open along the southern extent, and enclosed by coniferous forestry to the north. The ZTV (refer to **Figure 4.3**, EIAR Volume 3a) indicated extensive

theoretical visibility along the southernmost aspect, however in actual views the Proposed Development would be partially screened by the intervening roadside vegetation and the built environment. Whilst the Proposed Development would be clearly visible within sections of this core path, it would not alter the components of the view being set behind, and within the same field of view, as the operational wind turbines within the Beinn an Tuirc cluster. The influence of wind development would be marginally increased. Therefore, the effect on the visual amenity of this core path is predicted to be Moderate and Not significant.

- 4.6.63 Cumulative magnitude of impact is considered to be Slight for in-addition cumulative effects, due to the addition to the influence of wind along this route given the constrained potential views, resulting in a Moderate and Not significant effect.
- 4.6.64 In-combination magnitude of impact is assessed to be Slight since the range of existing wind developments is of diverse typologies and relatively complex. This would result in a Moderate in-combination cumulative effect which is Not significant.

C093 (A) – (B) CARRADALE FOREST CIRCULAR

- 4.6.65 This core path is located north of Carradale and forms a circle walking route around the summit of Cnoc nan Gabhar, the route is highly characterised by coniferous forestry vegetation. As indicated by the ZTV (refer to **Figure 4.3**, EIA Volume 3a), theoretical views would be limited to the westernmost extent of the core path. However, given the extent of adjacent coniferous forestry vegetation actual views of the Proposed Development would be fully screened from the route. Therefore, the magnitude of impact would be None, with a residual effect of None which is Not significant.
- 4.6.66 The in-addition cumulative magnitude of impact is considered to be None for in-addition cumulative effects, resulting in a residual effect of None which is Not significant.
- 4.6.67 In-combination magnitude of impact is assessed to be None, due to the extent of screening provided by the adjacent topography and coniferous forestry vegetation. This would result in a Not significant in-combination cumulative effect.

SETTLEMENTS

GLENBARR

- 4.6.68 Glenbarr is a small settlement along the central extent of the Kintyre peninsula, and 8.75 km west of the Proposed Development. Key views from the settlement are westwards towards Isle of Islay. Most of the settlement would have theoretical views of the Proposed Development as illustrated in the ZTV (refer to **Figure 4.3**, EIA Volume 3a), albeit at over 8.75 km, partially screened by intervening coniferous forestry vegetation and would be seen within the context of a number of wind energy developments within the Beinn an Tuirc cluster. The magnitude of impact is deemed to be Negligible. The overall effect on the visual amenity of the small settlement of Glenbarr is assessed to be Moderate/ Minor and Not significant.
- 4.6.69 In respect of the cumulative assessment, the cumulative ZTVs (refer to **Figure 4.8d – 4.8p**, EIA Volume 3a) demonstrate that there would be theoretical views of the operational Beinn an Tuirc, Beinn an Tuirc 2, Beinn an Tuirc 3, Blary Hill and Auchadaduie wind farms from parts of the settlement. However, actual views would be afforded some screening due to intervening coniferous forestry to the east. Moreover, these actual views would be restricted further by local topography combined with the intervening-built environment.

- 4.6.70 Cumulative magnitude of impact is considered to be Negligible for in-addition cumulative effects since any views there may be, are likely to be of the tips of the proposed wind turbines. The cumulative effect would be Moderate/Minor and not significant.
- 4.6.71 In-combination magnitude of impact is assessed to be moderate given the potential for views of the operational Beinn an Tuirc, Beinn an Tuirc Extension, Beinn an Tuirc Phase 3, Blary Hill, Auchadaduie wind farms and the in-scoping developments of Cnoc Buidhe, Allt Domhain and Coalashee. The in-combination cumulative effect is predicted to be **Major/ Moderate** and significant.

CARRADALE

- 4.6.72 The village of Carradale is located to the west of Skipness Point and north of Torrisdale Bay, approximately 4.3 km northeast of the Proposed Development. The ZTV (refer to **Figure 4.3**, EIAR Volume 3a) indicated that the majority of the settlement would have theoretical visibility of the Proposed Development, especially along the southern most extent. However, field reconnaissance suggests that actual views would be restricted by the intervening roadside and woodland vegetation, and the built environment that would act to screen/ filter views towards the Proposed Development.
- 4.6.73 It is anticipated that views would be partially limited by the localised landforms, woodland and roadside vegetation, and the built environment, especially along the southern extent of the settlement. Therefore, the magnitude of impact on the settlement is considered to be Slight and the corresponding effect on visual amenity would be Moderate and Not significant.
- 4.6.74 The cumulative ZTVs in **Figure 4.8a – 4.8p** (EIAR Volume 3a) indicate theoretical views of the operational Beinn an Tuirc, Beinn an Tuirc 2, Beinn an Tuirc 3 and the in-scoping Allt Domhain. These developments would be potentially visible in combination with the Proposed Development from the more elevated sections of the settlement. It is considered high likely that much of the theoretical visibility would be screened by the intervening woodland and roadside vegetation, and the built environment.
- 4.6.75 The cumulative in-addition magnitude of impact would be Negligible due to the extent of screening between the settlement the Proposed Development. Consequently, the cumulative effect would be Moderate/ Minor and not significant.
- 4.6.76 In-combination magnitude of impact would be Moderate given the potential for views of the operational Beinn an Tuirc, Beinn an Tuirc 2, Beinn an Tuirc 3 and in-scoping Allt Domhain wind farms. The in-combination cumulative effect is predicted to be **Major/ Moderate** and significant.

TORBEG

- 4.6.77 This small settlement is located on the western extent of the Isle of Arran, adjacent to the Kilbrannan Sound, 14.2 km southeast of the Proposed Development. Potential views of the Proposed Development would be widespread across the settlement (refer to **Figure 4.3**, EIAR Volume 3a), albeit it at over 14.2 km, partially screened by the intervening-built environment and roadside vegetation. Moreover, the Proposed Development would be seen within the context of other large-scale wind energy developments, such as the operational Beinn an Tuirc, Beinn an Tuirc 2 and Beinn an Tuirc 3 wind farms. Given its partially restricted visibility, distance position relative to the settlement, and the substantially developed context, the magnitude of impact would be Slight, and the residual effect on visual amenity of the settlement would be Moderate and not significant.

- 4.6.78 The cumulative in-addition magnitude of impact is considered to be Negligible since any views the Proposed Development would be barely discernible within the context of the various cumulative wind developments. The cumulative effect would be Moderate/ Minor and not significant.
- 4.6.79 In-combination magnitude of impact is assessed to be moderate given widespread context of wind development on the horizon. The in-combination cumulative effect is predicted to be **Major/ Moderate** and significant.

INDIVIDUAL PROPERTIES – RESIDENTIAL VISUAL AMENITY

- 4.6.80 Individual properties are not generally included within the SLVIA because the purpose of the planning system is not to protect private views and the general outlook from individual properties. However, an RVAA was prepared which considers the potential impacts on individual properties to establish whether any will be subject to effects which could lead to the properties becoming an unattractive place to live, which would not be in the public interest. The RVAA (**Technical Appendix 4.4**, EIAR Volume 4) noted three properties within 3 km of the Proposed Development and concludes that there would not be overbearing effects on the visual amenity from these dwellings.

VIEWPOINT ASSESSMENT

- 4.6.81 Twenty-two viewpoints have been selected to assess the effect of the Proposed Development from representative viewpoints within the Study Area. The Viewpoint Assessment, **Technical Appendix 4.3** (EIAR Volume 4) assesses the viewpoints in respect of their baseline context and residual effects arising from the operational phase of the Proposed Development. The Viewpoint Assessment is accompanied by a series of visualisations in **Figure 4.9a - 4.30i** (EIAR Volume 3b).
- 4.6.82 The Viewpoint Assessment noted significant residual effects on the landscape character and visual receptors at:
- Viewpoint 1: Torrisdale Bay Parking Area – The Proposed Development is located 2.3 km to the west of the viewpoint location, refer to **Figures 4.9a – 4.9j** (EIAR Volume 3b);
 - Viewpoint 6: Carradale Fort – The Proposed Development at its closest point is situated 4 km west of the viewpoint location, refer to **Figures 4.14a – 4.14j** (EIAR Volume 3b);
 - Viewpoint 7: Kintyre Way near Torrisdale Castle – The Proposed Development is located 1.4 km northwest of the viewpoint, refer to **Figures 4.15a – 4.15j** (EIAR Volume 3b); and
 - Viewpoint 17: Carradale Golf Course/ Carradale Explorer Walk (Bench Overlooking Tees 6 & 15) – The Proposed Development is situated 4.7 km to the southwest of the viewpoint location, refer to **Figures 4.25a – 4.25j** (EIAR Volume 3b).
- 4.6.83 Of these, Viewpoint 6 and 17 would also be subject to significant In-addition cumulative effects, Whilst significant in-combination cumulative effects have been noted for most of the assessment viewpoints this is a feature of the extensive and complex cumulative baseline on the Kintyre peninsula, and not specifically a result of the inclusion of the Proposed Development.

4.7 Summary and Conclusions

- 4.7.1 The preceding SLVIA was undertaken in accordance with current professional standards and takes cognisance of the outcome of consultations. **Section 4.2** of this Chapter sets out the methodology used in undertaking the SLVIA.
- 4.7.2 The SLVIA considers effects on:
- Landscape fabric, caused by changes to the physical form and constituents of the landscape;
 - Seascape and landscape character, caused by changes to key characteristics and qualities of the seascape/landscape; and
 - Visual amenity caused by changes to the visual composition of views and the wider visual resource.
- 4.7.3 The SLVIA assesses in-addition and in-combination cumulative effects attributable to the Proposed Development when considered in conjunction with operational, consented and proposed wind farms.
- 4.7.4 The scope of this assessment has been influenced by a combination of:
- Consultation outcomes;
 - Planning policy and formal published guidance; and
 - Preliminary and revised visual analysis.
- 4.7.5 **Section 4.3** of this Chapter provides a description of the existing seascape, landscape and visual context and receptors liable to potential direct or indirect effects with the Study Area and includes details of the cumulative developments present and emergent pattern of development.
- 4.7.6 **Section 4.4** of this Chapter identifies the potential sources of landscape and visual effects during the construction, operational phases of the Proposed Development, along with the likely effect on the seascape, landscape and visual baseline context and concludes that the principal impacts would occur during the operational life of the Proposed Development during which time, the greatest potential for significant effects would be the Proposed Development's wind turbines. However, other components, such as site infrastructure, could also contribute to the effect on the landscape and visual resource.
- 4.7.7 In response to the baseline context and the analysis of potential sources of effects, **Section 4.5** of this Chapter discusses proposals for embedded mitigation measures to avoid or minimise potentially significant effects. These primarily relate to the siting, layout and design of the Proposed Development, and take cognisance of current national guidance including Policy 11 of NPF4, as discussed in **Section 4.2**.
- 4.7.8 **Section 4.6** of this Chapter identifies the residual seascape, landscape and visual effects (i.e. the effect of the Proposed Development, taking into account all identified mitigation measures) during the construction and, operation phases of the Proposed Development. These preceding findings are summarised in **Table 4.8**. It is apparent from the SLVIA that the Proposed Development would result in some significant effects, but such effects would be confined to locations within 5 km of the Proposed Development and localised (i.e. experienced intermittently and/or affecting a limited geographical extent and not compromising the character or special qualities of the seascape and landscape or the visual amenity of the Study

Area. Such effects are not untypical for such a development. It is also the case that the most sensitive landscapes within the Study Area (including the nationally important Arran NSA and WLIA and numerous GDLs) would not be significantly affected.

- 4.7.9 The Cumulative Context Plan, **Figure 4.8** (EIAR Volume 3a), illustrates the wind energy developments considered in the cumulative assessment. It differentiates the operational schemes from consented and those in-planning. Other in-scoping sites are shown for completeness. It is apparent from the cumulative plan that wind energy existing and consented wind energy development in the Study Area is currently:
- focused in LCT06: Upland Forest Moor Mosaic and set within a substantially developed context than spans the width of the peninsula and encloses the Proposed Development on three sides;
 - located at least 2 km inland from the coastal road on either side of the peninsula in a combination of open moorland and forested areas; and
 - comprises turbines of up to 149.9 m to maximum blade tip.
- 4.7.10 Along the wider Kintyre peninsula wind farms (including current in-planning and in-scoping schemes) are distributed along the entire length of the peninsula with consequent potential for the establishment of contiguous development along the top of this prominent landmass. In contrast, the Proposed Development is positioned within a notable cluster of existing wind farms that enclose it on three sides, thereby limiting its cumulative effect. The efficacy of the siting and design of the Proposed Development is evidenced by the limited number of significant effects, including cumulative effects identified in the SLVIA.
- 4.7.11 The appropriateness of the location and design of the Proposed Development in landscape and visual terms is evidenced by the limited number of significant landscape or visual effects that are reported in this SLVIA.
- 4.7.12 **Table 4.8** provides a summary of the potential significant effects identified for landscape and visual receptors.

Table 4.8: Summary of Potential Significant Effects of the Proposed Development			
Potential Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/Residual Effect
Construction			
Landscape Receptors			
Landscape Fabric	In accordance with Section 4.5 and the Construction Environmental Management Plan (CEMP).	Implementation and monitoring of mitigation measures and CEMP.	Not significant
Landscape Character Types: <ul style="list-style-type: none"> • LCT03: Hidden Glens; • LCT20: Rocky Mosaic; • LCT06c: Mull of Kintyre Upland Forest-Moor: Mosaic; • LCT14: Bay Farmland; • LCT06: Upland Forest Moor Mosaic; 	As above	As above	Not significant

Table 4.8: Summary of Potential Significant Effects of the Proposed Development			
Potential Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/Residual Effect
<ul style="list-style-type: none"> LCT22: Coastal Parallel Ridges; LCT06b: Knapdale Upland Forest Moor Mosaic; LCT83: Rugged Upland – Ayrshire; LCT59: Raised Beach Coast and Cliffs; and LCT65: Coastal Lowland Moor. 			
North Arran NSA	As above	As above	Not significant
North Arran SLA	As above	As above	Not significant
East Kintyre (Coast) APQ/LLA	As above	As above	Not significant
North Arran WLA	As above	As above	Not significant
Achamore House GDL	As above	As above	Not significant
Visual Receptors			
Settlements including Glenbarr, Carradale, and Torbeg	As above	As above	Not significant
Transport routes including the A83, B842, B879, the String Road,	As above	As above	Not significant
Ferry Routes, including the Campbelltown to Ardrossan Ferry and Claonaig to Arran Ferry	As above	As above	Not significant
Recreational Routes including the Kintyre way, National Cycle route 78, and Core paths	As above	As above	Not significant
Operation			
Landscape Receptors			
Landscape Fabric	In accordance with Section 4.5.	Embedded mitigation	Not significant
Landscape Character Types: <ul style="list-style-type: none"> LCT03: Hidden Glens; LCT20: Rocky Mosaic; LCT6c: Mull of Kintyre Upland Forest-Moor Mosaic; LCT14: Bay Farmland; LCT06: Upland Forest Moor Mosaic; LCT22: Coastal Parallel Ridges; LCT6b: Knapdale Upland Forest Moor Mosaic; LCT83: Rugged Upland – Ayrshire; 	As above	As above	Significant, albeit localised effects would occur in: <ul style="list-style-type: none"> LT20: Rocky Mosaic Carradale Point – Saddell Bay unit; the Kintyre Upland Forest Moor Mosaic (LCT06:) Sounds, Narrows and Islands SCT09 near Torridon and Carradale.

Table 4.8: Summary of Potential Significant Effects of the Proposed Development			
Potential Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/Residual Effect
<ul style="list-style-type: none"> LCT59: Raised Beach Coast and Cliffs; and LCT65: Coastal Lowland Moor. 			
North Arran NSA	As above	As above	Not significant
North Arran SLA	As above	As above	Not significant
East Kintyre (Coast) APQ/LLA	As above	As above	Localised significant effects on one special quality. Designations integrity not undermined.
North Arran WLA	As above	As above	Not significant
Achamore House GDL	As above	As above	Not significant
Visual Receptors			
Settlements including Glenbarr, Carradale, and Torbeg	As above	As above	Not significant
Transport routes including the A83, B842, B879, the String Road,	As above	As above	Not significant
Ferry Routes, including the Campbelltown to Ardrossan Ferry and Claonaig to Arran Ferry	As above	As above	Not significant
Recreational Routes including the Kintyre way, National Cycle route 78, and Core paths	As above	As above	Significant localised effects on the Kintyre Way
Cumulative Operation			
Landscape Receptors			
Landscape Fabric	In accordance with Section 4.5.	Embedded mitigation	Not significant
Landscape Character Types: <ul style="list-style-type: none"> LCT03: Hidden Glens; LCT20: Rocky Mosaic; LCT6c:Mull of Kintyre Upland Forest-Moor Mosaic; LCT14: Bay Farmland; LCT06: Upland Forest Moor Mosaic; LCT22: Coastal Parallel Ridges; LCT6b: Knapdale Upland Forest Moor Mosaic; LCT83: Rugged Upland – Ayrshire; LCT59 : Raised Beach Coast and Cliffs; and LCT65: Coastal Lowland Moor. 	As above	As above	Not significant. No significant in-addition effects, but Significant in-combination effects in <ul style="list-style-type: none"> Upland Forest Moor Mosaic (LCT06); Knapdale Upland Forest Moor Mosaic (LCT06b) Bay Farmland (LCT14); Rocky Mosaic (LCT20); Coastal Parallel Ridges (LCT22); Raised Beach Coast and Cliffs (LCT59);

Table 4.8: Summary of Potential Significant Effects of the Proposed Development			
Potential Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/Residual Effect
			<ul style="list-style-type: none"> • Coastal Fringe with Agriculture (LCT61); • Coastal Lowland Moor (LCT65); • Rugged Moorland Hills and Valleys (LCT80); • Rugged Upland – Ayrshire (LCT83); • Sounds, Narrows and Islands (SCT09).
North Arran NSA	As above	As above	In-addition effects would not be significant, but significant in-combination effects are predicted.
North Arran SLA	As above	As above	In-addition effects would not be significant, but significant in-combination effects are predicted.
East Kintyre (Coast) APQ/LLA	As above	As above	No significant cumulative effects
North Arran WLA	As above	As above	In-addition effects would not be significant,, but significant in-combination effects are predicted.
Achamore House GDL	As above	As above	Not significant
Visual Receptors			
Settlements including Glenbarr, Carradale, and Torbeg	As above	As above	In-addition effects would not be significant, but significant in-combination effects are predicted at each of the settlements listed.
Transport routes including the A83, B842, B879, the String Road,	As above	As above	In-addition effects would be Not significant, but Significant in-combination effects are predicted on the A83, B842, and the String Road.
Ferry Routes, including the Campbelltown to Ardrossan Ferry and Claonaig to Arran Ferry	As above	As above	In-addition effects would not be significant, but Significant in-

Table 4.8: Summary of Potential Significant Effects of the Proposed Development			
Potential Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/Residual Effect
			combination effects are predicted.
Recreational Routes including the Kintyre way, National Cycle Route 78, and Core paths	As above	As above	In-addition effects would not be Not significant, but Significant in-combination effects are predicted on National Cycle Route 78, and the following Core Paths: <ul style="list-style-type: none"> • C304 Glenbarr school route; • C088 (B) – (J) – Campbelltown to Claonaig

5 Cultural Heritage

5.1 Introduction

5.1.1 This Chapter considers the potential significant effects on cultural heritage (historic environment sites and features, archaeology, and built heritage; hereafter referred to as 'heritage assets') associated with the construction, operation, and decommissioning of the proposed West Torrisdale Wind Farm ('the Proposed Development'). This Chapter details the results of a desk-based assessment and field survey and draws on comments provided by Historic Environment Scotland (HES), and West of Scotland Archaeology Service (WoSAS), cultural heritage advisors to Argyll and Bute Council (ABC).

5.1.2 The specific objectives of this Chapter are to:

- describe the cultural heritage baseline;
- describe the assessment methodology and significance criteria used in completing this impact assessment;
- describe the potential effects, including direct, indirect and cumulative effects;
- describe the mitigation measures and, where appropriate, monitoring measures proposed to address potential significant effects; and
- assess the residual effects remaining following the implementation of mitigation.

5.1.3 This assessment has been carried out by Mhairi Hastie BSc (Hons) MSc FSA Scot MCIfA of CFA Archaeology Ltd (CFA) based in Musselburgh, East Lothian, a Registered Organisation (RO) of the Chartered Institute for Archaeologists (MCIfA). She has over 15 years full time experience of producing Environmental Impact Assessment (EIAs) for renewable energy developments, and for other industrial and commercial development across the UK.

5.1.4 This Chapter is supported by the following figures and technical appendices:

- Volume 3a: Figures
 - **Figure 5.1: Cultural Heritage: Inner Study Area;** and
 - **Figure 5.2: Cultural Heritage: Outer Study Area.**
- Volume 3b: Visualisations
 - **Figure 5.3-5.12: Cultural Heritage Visualisations**
- Volume 4: Technical Appendices
 - **Technical Appendix 5.1: Heritage Assets within the Inner Study Area;** and
 - **Technical Appendix 5.2: Heritage Assets within the Outer Study Area.**

5.1.5 Figures, visualisations, and technical appendices are referenced in the text where relevant.

5.1.6 This assessment uses the below terminology throughout:

- Proposed Development – All elements of the West Torrisdale Wind Farm development for which S36 consent and deemed planning permission are sought.
- Application Boundary – The red line boundary defining all elements of the Proposed Development for the purpose of the S36 application.

- Wind Turbine Array – the location of the wind turbines comprising the Proposed Development.
- Access Corridor – the land within the Application Boundary in which the access track connect the Wind Turbine Array with the A83 road.
- Study Area – the area in which the EIA is undertaken, defined for each technical topic as appropriate.

5.2 Assessment Methodology and Significance Criteria

Scope of Assessment

5.2.1 This Chapter considers the following effects during the construction, operational and decommissioning phases of the Proposed Development:

- Direct effects on cultural heritage assets within the Application Boundary;
- Effects on the settings of heritage assets in the wider landscape;
- Cumulative direct effects on cultural heritage assets within the Application Boundary; and
- Cumulative effects on the settings of heritage assets in the wider landscape.

5.2.2 This Chapter assesses cumulative effects as arising from the addition of the Proposed Development to other cumulative developments, which are the subject of a valid planning application. Operational and under construction developments are considered as part of the baseline, and they are taken to be such for the assessment of effects of the Proposed Development on the settings of heritage assets. Developments that are consented but not yet under construction and those that are subject of valid planning application are considered as being potential additions to the baseline and are considered in the cumulative impact assessment. Developments close to the end of their operational life, where relevant, have been included as part of the baseline to present 'worst case scenario', where relevant.

5.2.3 This assessment is based on the Proposed Development as described in **Chapter 2** (EIAR Volume 2).

5.2.4 The scope of this assessment has been informed by consultation responses summarised in **Table 5.1** and the following guidelines/policies:

- National Planning Framework 4 (NPF4) (2023¹);
 - Policy 7: Historic Assets and Places;
- Historic Environment Scotland Policy Statement (HESPS) (2019²);
- Planning Advice Note 1/2013: Environmental Impact Assessment (PAN1/2013³);
- Planning Advice Note 2/2011 (PAN2) (2011⁴);
- Argyll and Bute Local Development Plan 2 (2024⁵)

¹ Scottish Government (2023) National Planning Framework 4 (NPF4).

² Historic Environment Scotland (2016a) Historic Environment Scotland Policy Statement (HESPS).

³ Scottish Government (2013) Planning Advice Note 1/2013 (PAN 1): Environmental Impact.

⁴ Scottish Government (2011) Planning Advice Note 2/2011 (PAN 2): Planning and Archaeology.

⁵ Argyll and Bute Council (2024) Argyll and Bute Local Development Plan 2 (LDP2).

- Policy 15: Supporting the Protection, Conservation and Enhancement of Our Historic Built Environment.
 - Policy 16: Listed Buildings.
 - Policy 19: Scheduled Monuments.
 - Policy 20: Gardens and Designed Landscapes.
 - Policy 21: Sites of Archaeological Importance.
- Chartered Institute for Archaeologists, Code of Conduct (CIfA, 2014 revised 2022⁶);
 - Chartered Institute for Archaeologists, Standard and Guidance for Historic Environment Desk-Based Assessment (CIfA, 2014 updated 2020⁷);
 - Principles of Cultural Heritage Impact Assessment in the UK (IEMA, 2021⁸);
 - Managing Change in the Historic Environment: Setting (HES, 2016 updated 2020⁹);
 - Designation Policy and Selection Guidance (HES, 2019¹⁰); and
 - Environmental Impact Assessment Handbook (Scottish Natural Heritage (SNH) and HES, 2018¹¹)

Consultation

5.2.5 **Table 5.1** summarises the consultation responses received regarding Cultural Heritage and provides information on where and/or how they have been addressed in this assessment. The following organisations made comment on archaeology and cultural heritage: HES and WoSAS.

5.2.6 Full details on the consultation responses can be reviewed in **Technical Appendix 1.1** (EIAR Volume 4).

Table 5.1: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
ECU April 2021	Scoping Opinion	WoSAS (AS) advised that without access to their usual datasets they were unable to check details in the scoping report, but advised that the topics cited, and the proposed actions appear appropriate.	Follow up consultation was carried out with HES and WoSAS (letters dated 26/04/2021) providing clarification and seeking a resolution of issues raised by HES in their Scoping Opinion. A list of proposed visualisation viewpoints was provided and
		WoSAS welcomed that targeted walkover surveys would be undertaken as the area is under-surveyed generally. As the application area is forested, WoSAS would also add the requirement for a post-felling walkover survey as a preliminary stage to determine the presence of identifiable features or sites.	
		WoSAS welcomed the intention for post scoping consultation with Historic Environment Scotland (HES) and themselves regarding the selection of	

⁶ Chartered Institute for Archaeologists (CIfA) (2014, revised 2022) Code of Conduct.

⁷ Chartered Institute for Archaeologists (CIfA) (2014, updated 2020) Standard and Guidance for Historic Environment Desk-Based Assessment.

⁸ Institute of Environmental Management & Assessment (IEMA) (2021) Principles of Cultural Heritage Impact Assessment.

⁹ Historic Environment Scotland (2016, updated 2020) Managing Change in the Historic Environment: Setting.

¹⁰ Historic Environment Scotland (2019, updated 2020) Designation Policy and Selection Guidance

¹¹ Scottish Natural Scotland and Historic Environment Scotland (2018) Environment Impact Assessment Handbook.

Table 5.1: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
		<p>sites for setting/visual assessment and mitigation of direct issues.</p> <p>HES (A42) confirmed that, in principle, there may be scope for a wind farm development at this location without adverse effects on Scheduled Monuments such that they might object, subject to robust assessment and, if appropriate, mitigation by re-design.</p> <p>Advised that the proposed approach to assessment is unacceptable and if an assessment were to be presented on this basis HES would be likely to object to the Proposed Development because of a lack of information.</p> <p>Advised that the Proposed Development is likely to be visible from an important group of Scheduled Monuments, and a Property in Care (PIC) of Scottish Ministers, on Machrie Moor, Arran (SM 90207). These monuments are further than 10 km away from the Proposed Development but are particularly sensitive to impacts on their settings.</p> <p>Agreed that visualisations are likely to be required for:</p> <ul style="list-style-type: none"> ▪ Airds Castle (SM 3177); ▪ Carradale, Fort (SM 2180); ▪ Saddell Abbey (SM 3645); and ▪ Saddell House, Fort (SM 3539). <p>Agreed that photomontages are likely to be required for the first three of these assets. HES will be able to advise if a photomontage is required for Saddell House, Fort when they have reviewed the wireline, as proposed in the Scoping Report.</p> <p>HES would be happy to engage further with the applicant and confirm whether they are content with a proposed list of scheduled monuments for detailed assessment.</p> <p>This should be informed by a robust appraisal and the results and rationale behind the selection of monuments for detailed assessment clearly set out for review.</p>	<p>draft wirelines (based on the scoping layout) for these were provided.</p>
HES 19/05/2021	Post-Scoping Follow-up Response	<p>Welcomed the proposed inclusion of the Scheduled Monuments of Machrie Moor in the assessment and agreed that the proposed location for the viewpoint at the stone circle near Moss Farm is appropriate.</p> <p>Recommended that some of the upstanding stones in this monument be included in the foreground of the photomontage to illustrate potential impacts.</p>	<p>Machrie Moor Scheduled Monument (SM 90207) has been added to the visualisation and includes several of the standing stones (Figure 5.11, EIAR Volume 3b).</p>
		<p>Welcomed the clarification provided on the scope of the assessment and that consideration would be given to all scheduled monuments within 10 km. Confirmed that it is acceptable that the assessment describes those excluded</p>	<p>Noted A 10 km Outer Study Area from the outermost wind turbines has</p>

Table 5.1: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
		from detailed assessment, and why, in a summary table in an EIAR Appendix.	been adopted, with the inclusion of the Machrie Moor Scheduled Monument (SM 90207) which lies outwith 10 km.
		<p>Welcomed the ongoing consultation on those assets intended to be excluded from detailed assessment and those where detailed assessment is merited. Provided further comment on the specific assets mentioned and the wirelines supplied.</p> <ul style="list-style-type: none"> ▪ Carradale Fort (SM 2180) welcomed that a photomontage would be produced to allow a robust assessment of potential impacts and that potential impacts on the fort's setting would be subject to full assessment. If adverse impacts are confirmed the photomontage and full assessment should be used to inform mitigation. ▪ Airds Castle (SM 3177) welcomed that a photomontage would be produced to allow a robust assessment of potential impacts and that potential impacts on the castle's setting would be subject to full assessment. If adverse impacts are confirmed the photomontage and full assessment should be used to inform mitigation. ▪ Saddell Abbey (SM 3645) welcomed that a photomontage will be produced to illustrate impacts and a full assessment of potential impacts undertaken. If adverse impacts are confirmed the photomontage and full assessment should be used to inform mitigation. ▪ Saddell House, Fort (SM 3539) Content that a wireline will be sufficient to inform the assessment of impacts on its setting. ▪ Saddell Castle (LB 18403) agreed that an external viewpoint, taken from the beach looking towards the castle is likely to be the best representation of the potential impacts. In light of the screening provided it appears that this will be adequate to assess impacts on this asset. ▪ Garvalt, Dun (SM 3740), Blary, Dun ENE of (SM 3077) Carragh an Talaidh, chambered cairn, Brackley (SM 189) Sunadale, Dun 275m NE of (SM 3643) agreed that the level of visibility demonstrated by the draft visualisations is not likely to cause significant impacts on the setting of any of these assets. Content that the monuments are excluded from detailed assessment, and impacts can be appropriately included in a table in the EIAR Appendix cross-referenced to the relevant wirelines. 	<p>Noted</p> <p>A list of visualisations included within the assessment is provided in Table 5.6 and assessment of the potential impacts of the Proposed Development on the setting of these heritage assets is provided in Technical Appendix 5.2 (EIAR Volume 4) and Section 5.4.</p>

Table 5.1: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
		<p>Advised that, other than the Machrie Moor Scheduled Monuments (SM 90207), there are no other assets falling outside the ZTV¹² where specific views may be affected and should be considered.</p> <p>Recommended that this approach be agree with the Council as well.</p>	<p>Machrie Moor Scheduled Monument (SM 90207) has been included in the assessment (Figure 5.11, EIAR Volume 3b).</p>
		<p>Advised that HES would be happy to continue to engage in dialogue once the relevant photomontages have been prepared and site visits to those monuments that are being taken forward for detailed assessment have been carried out.</p>	<p>The points raised previously by HES are addressed in their responses on viewpoints CH1 to CH10 (see above Table 5.1: HES 19/05/2021, Post Scoping Follow-up Response,). There has been no appreciable change to the layout of the Proposed Development, therefore no further consultation has been necessary.</p>
WoSAS 17/08/2021	Post Scoping Consultation	<p>Confirmed agreement of the proposed visualisations list agreed with HES but queried whether NSR Sites had been taken into consideration.</p>	<p>Confirmed in email response (17/09/2021) that NSR (Non-Statutory Register) Sites had been considered but none with sensitive settings, or requiring assessment by visualisation, had been identified.</p>
		<p>Agree that there is "a generally low archaeological potential for new discoveries of undisturbed archaeological remains" within the forested area.</p>	<p>Noted</p>
WoSAS 18/8/2021	Post Scoping Consultation	<p>Confirmed agreement to the 10 km Outer Study Area for designated sites with NSRs to 5 km.</p>	<p>Noted The agreed Outer Study Areas have been applied for the assessment. None of the NSR Sites within 5 km of the outermost wind turbines are predicted to have</p>
		<p>Accepted that none of the NSR sites within 5 km need assessment in this case.</p>	

¹² Zone of Theoretical Visibility

Table 5.1: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
			visibility of the Proposed Development. See also Section 5.3 for assets scoped out of assessment.

Potential Effects Scoped Out

5.2.7 On the basis of the desk-based assessment and survey work undertaken, the professional judgement of the EIA team, experience from other relevant projects, and policy guidance or standards, the following topic areas have been 'scoped out'.

- Indirect effects on cultural heritage assets resulting from disturbance from vibration, dewatering or changes in hydrology.
- Temporary setting effects on cultural heritage assets resulting from construction activities such as the presence of cranes and other machinery. These construction activities would be temporary, resulting in a short-term / low effect on heritage assets in close proximity to the Proposed Development and would have no permanent effects.

Method of Baseline Characterisation

Extent of the Study Area

5.2.8 Two Study Areas were used for this assessment:

- The Inner Study Area: the Application Boundary forms the Study Area for the identification of heritage assets that could receive direct impacts arising from the construction of the Proposed Development. **Figure 5.1** (EIAR Volume 3a) shows the Application Boundary, the Proposed Development layout and the locations of heritage assets identified and described in **Technical Appendix 5.1** (EIAR Volume 4).
- The Outer Study Area: a 10 km Study Area, extending from the outermost wind turbines of the Proposed Development, and including the Inner Study Area, has been used for the identification of cultural heritage assets whose settings may be affected by the Proposed Development (including cumulative effects). The Study Area extent was agreed by statutory consultees as being appropriate. One additional heritage assets (Machrie Moor, Stone Circles, Cairns, Hut Circles and Fields, Arran (SM 90207)) outwith the 10 km Study Area, was specifically identified by statutory consultees as requiring assessment given that it has theoretical intervisibility with the proposed wind turbines (**Table 5.1**). Assets identified as having settings sensitive to change are included in the assessment, even where no visibility is predicted from the asset, as views towards or across such sites may be important aspects of the settings. **Figure 5.2** (EIAR Volume 3a) shows the Proposed Development, together with the blade tip height Zone of Theoretical Visibility (ZTV) and the locations of heritage assets which are included in the assessment. A list of these heritage assets is provided in **Technical Appendix 5.2** (EIAR Volume 4), which also provides a tabulated summary assessment of the predicted impacts on their settings on an asset-by-asset basis.

5.2.9 The consideration of cumulative effects on the settings of heritage assets also uses the 10 km Study Area. The locations of the other wind energy developments in the wider area are shown on **Figure 5.2** (EIAR Volume 3a). The cumulative developments included in the assessment are those agreed with consultees and listed in **Chapter 4** (EIAR Volume 2).

Desk Study

5.2.10 The following information sources were consulted as part of the desk-based assessment:

- HES Spatial Data Warehouse (HES, 2024a¹³): provided up-to-date data on the locations and extents of Scheduled Monuments, Listed Buildings, Conservation Areas, Inventory Gardens and Designed Landscape, and Inventory Historic Battlefields;
- ABC Historic Environment Record (HER) provided by WoSAS, heritage advisors to ABC: a digital database extract for all assets within 5 km of the Proposed Development was obtained initially in July 2021, ahead of field survey; updated data was then acquired in March 2023 and in October 2024 and checked against the original data.
- National Record of Historic Environment (NRHE) online database (HES, 2024b¹⁴): online for any information additional to that contained by the HER;
- Map Library of the National Library of Scotland: for Ordnance Survey maps and other historic resources;
- Historic Land-Use Assessment Data for Scotland (HLAMap) (HES, 2024c¹⁵): for information on the historic land-use character of the Site and the surrounding area;
- Modern aerial photographs imagery available on-line through Google Earth and Bing Maps: examined in order to identify any potential earthwork remains within the site and to provide information on current land-use character of the Site; and
- Relevant bibliographic references were consulted to provide background and historic information.

Field Survey

5.2.11 The proposed wind turbines would be sited within an area that is currently commercial forest plantation. Field survey was therefore limited to targeting the locations of known heritage assets (including any identified through desk-based assessment) and areas of open ground where these were not covered with brush of felling debris within the Application Boundary. The field survey was undertaken between 26 July 2021 and 29 July 2021.

5.2.12 The aims of the field survey were to:

- Identify and record the character, extent and current condition of the heritage assets identified during the desk-based assessment within the Inner Study Area.
- Identify heritage assets with statutory and non-statutory designations in the Outer Study Area and assess their sensitivity to change within their settings.

5.2.13 The position of assets (and where appropriate their extents) identified during the 2021 survey were logged using a Global Positioning System (GPS) device with sub-metre accuracy. The

¹³ Historic Environment Scotland (2024a) Historic Environment Scotland Spatial Data Warehouse. Available at: <http://portal.historicenvironment.scot/spatialdownloads>

¹⁴ Historic Environment Scotland (2024b) National Records for the Historic Environment (NHRE; Canmore). Available at: <https://pastmap.org.uk/>

¹⁵ Historic Environment Scotland (2024c) Historic Land-Use Assessment Data for Scotland (HLAMap). Available at: <https://hلامap.org.uk/>

baseline condition of identified assets was recorded on pro-forma monument recording sheets and by digital photography.

5.2.14 Site visits to assess the character and sensitivity of the setting of selected heritage assets in the Outer Study Area (**Figure 5.2**, EIAR Volume 3a) were also undertaken on 26 July 2021 and 29 July 2021. The site visits focused on those heritage assets with the most potential to receive significant effects on their settings (i.e. those closest to the Wind Turbine Array and those considered, on preliminary analysis of the blade tip height ZTV, to potentially be the most sensitive to change within their settings). Factors considered in the assessment of the setting of heritage assets undertaken during the field visit were those set out in HES's guidance document, 'Managing Change in the Historic Environment: Setting' (HES, 2016 updated 2020), namely:

- The locations and orientation of the asset;
- Important views of, or from, the heritage asset;
- The importance, if applicable, of designed settings; and
- Any obvious views or vistas.

Criteria for the Assessment of Effects

5.2.15 The effects of the Proposed Development on heritage assets have been assessed on the basis of their type (direct effects, effects on setting and cumulative impacts) and nature (adverse or beneficial). The assessment takes into account the value/sensitivity of the heritage asset and its setting and the magnitude of the predicted impact. The following impacts, as defined in Environmental Impact Assessment Handbook (SNH/HES, 2018) Appendix 1, Paragraph 44, have been considered:

- Direct impacts: occur where the physical fabric of the asset is removed or damaged, or where it is preserved or conserved, as a direct result of a proposal. Such impacts are most likely to occur during the construction phase and are most likely to be permanent.
- Indirect impacts: occur where the fabric of an asset, or buried archaeological remains, is removed or damaged, or where it is preserved or conserved, as an indirect result of the proposal even though the asset may lie some distance from a proposal. Such impacts are most likely to occur during the construction phase and are most likely to be permanent.
- Setting impacts: these are generally direct and result from a proposal causing change within the setting of a heritage asset that affects its cultural significance or the way in which it is understood, appreciated, and experienced. Such impacts are generally, but not exclusively, visual, occurring directly as a result of the appearance of a proposal in the surroundings of the asset. However, they may relate to other senses or factors, such as noise, odour or emissions, or historical relationships that do not relate entirely to intervisibility, such as historic patterns of land-use and related historic features. Such impacts may occur at any stage of a proposal's lifespan and may be permanent, reversible, or temporary.
- Cumulative impacts: can relate to the physical fabric or setting of assets. They may arise as a result of impact interactions, either of different impacts of a proposal itself, or additive impacts resulting from incremental changes caused by a proposal together with other projects already in the planning system or allocated in a Local Development Plan.

- Adverse effects are those that detract from or reduce cultural significance or special interest of heritage assets; and
- Beneficial effects are those that preserve, enhance, or better reveal the cultural significance or special interest of heritage assets.

Criteria for Assessing the Sensitivity of Receptors

5.2.16 Cultural heritage assets are given weight through the designation process. Designation ensures that sites and places are recognised by law through the planning system and other regulatory processes. The level of protection and how a site or place is managed varies depending on the type of designation and its laws and policies (HES, 2019 updated 2020).

5.2.17 **Table 5.2** summarises the relative sensitivity of those heritage assets relevant to the Proposed Development drawing on the guidance provided in the SNH/HES Handbook (2018).

Sensitivity of Assets	Definition / Criteria
High	Assets valued at an international or national level, including: <ul style="list-style-type: none"> ▪ Scheduled Monuments; ▪ Category A Listed Buildings; ▪ Inventory Garden and Designed Landscapes; ▪ Inventory Historic Battlefields; and ▪ Non-designated assets that meet the relevant criteria for designations.
Medium	Assets valued at a regional level, including: <ul style="list-style-type: none"> ▪ Archaeological sites and areas that have regional value (contributing to the aims of regional research frameworks); ▪ Category B Listed Buildings; and ▪ Conservation Areas.
Low	Assets valued at a local level, including: <ul style="list-style-type: none"> ▪ Archaeological sites that have local heritage value; ▪ Category C Listed Buildings; and ▪ Unlisted historic buildings and townscapes with local (vernacular) characteristics.
Negligible	Assets of little or no intrinsic heritage value, including: <ul style="list-style-type: none"> ▪ Artefact find-spots (where the artefacts are no longer in situ and where their provenance is uncertain); and ▪ Poorly preserved examples of particular types of features (e.g. quarried and gravel pits, dilapidated sheepfolds, etc)

Criteria for Assessing the Magnitude of Change

5.2.18 The magnitude of impact (adverse or beneficial) has been assessed in the categories, high, medium, low and negligible as described in **Table 5.3**.

Magnitude of Impact	Definition / Criteria	
	Adverse	Beneficial
High	Changes to the fabric or setting of a heritage asset resulting in the complete or near complete loss of the asset's cultural significance.	Preservation of a heritage asset in situ where it would otherwise be completely or almost completely lost.

	Changes that substantially detract from how a heritage asset is understood, appreciated, and experienced.	Changes that appreciably enhance the cultural significance of a heritage asset and how it is understood, appreciated, and experienced.
Medium	Changes to those elements of the fabric or setting of a heritage asset that contribute to its cultural significance such that this quality is appreciably altered. Changes that appreciably detract from how a heritage asset is understood, appreciated, and experienced	Changes to important elements of a heritage asset's fabric or setting, resulting in its cultural significance being preserved (where this would otherwise be lost) or restored. Changes that improve the way in which the heritage asset is understood, appreciated, and experienced.
Low	Changes to those elements of the fabric or setting of a heritage asset that contribute to its cultural significance such that this quality is slightly altered. Changes that slightly detract from how a heritage asset is understood, appreciated and experienced.	Changes that result in elements of a heritage asset's fabric or setting detracting from its cultural significance being removed. Changes that result in a slight improvement in the way a heritage asset is understood, appreciated and experienced.
Negligible	Changes to fabric or setting of a heritage asset that leave its cultural significance unchanged and do not affect how it is understood, appreciated and experienced.	

Assessment of Effects on Setting

5.2.19 The SNH/HES Handbook (2018) Appendix 1, paragraph 42 advises that:

"In the context of cultural heritage impact assessment, the receptors are the heritage assets and impacts will be considered in terms of the change in their cultural significance".

5.2.20 Historic Environment Scotland's guidance document, 'Managing Change in the Historic Environment: Setting' (HES, 2016), notes that:

"Setting can be important to the way in which historic structures or places are understood, appreciated and experienced. It can often be integral to a historic asset's cultural significance".

"Setting often extends beyond the property boundary or 'curtilage' of an individual historic asset into a broader landscape context".

5.2.21 The guidance also advises that:

"If proposed development is likely to affect the setting of a key historic asset, an objective written assessment should be prepared by the applicant to inform the decision-making process. The conclusions should take into account the significance of the asset and its setting and attempt to quantify the extent of any impact. The methodology and level of information should be tailored to the circumstances of each case".

5.2.22 The guidance recommends that there are three stages in assessing the impact of a development on the setting of a historic asset or place:

- Stage 1: identify the historic assets that might be affected by the Proposed Development;
- Stage 2: define and analyse the setting by establishing how the surroundings contribute to the ways in which the historic asset or place is understood, appreciated and experienced; and,

- Stage 3: evaluate the potential impact of the proposed changes on the setting, and the extent to which any negative impacts can be mitigated.

5.2.23 The SNH/HES EIA Handbook (2018) Appendix 1, paragraph 43 advises that:

"When considering setting impacts, visual change should not be equated directly with adverse impact. Rather the impact should be assessed with reference to the degree that the proposal affects those aspects of setting that contribute to the asset's cultural significance".

5.2.24 Following these recommendations, the wind turbine blade tip and hub height ZTVs for the Proposed Development were used to identify those heritage assets from which there could be theoretical visibility of one or more of the proposed wind turbines, and the degree of theoretical visibility.

Criteria for Assessing Cumulative Effects

5.2.25 The assessment of cumulative effects on heritage assets is based upon consideration of the effects of the Proposed Development on the settings of assets with statutory designations and non-statutory designations within the Outer Study Area, in addition to the likely effects of other consented and proposed (at the application stage) developments.

5.2.26 As noted above, operational and under construction developments are considered as part of the baseline and are taken to be such for the assessment of effects on the settings of heritage assets. Developments that are consented but not yet under construction and those that are the subject of valid planning applications are considered as being potential additions to the baseline and are considered in the cumulative impact assessment.

5.2.27 The assessment takes into account the relative scale (i.e. size and number of wind turbines) of the identified developments, their distance from the affected assets, and the potential degree of visibility of the various developments from the assets under consideration. The relevant cumulative developments, as agreed with consultees, for consideration in the EIA are listed in **Chapter 4, Table 4.6**. Professional judgement has been applied to determine those most likely to have adverse impacts on cultural heritage interests.

Criteria for Assessing Significance

5.2.28 The sensitivity of the asset (**Table 5.2**) and the magnitude of the predicted impact (**Table 5.3**) are used to inform an assessment of the significance of the effect (direct effect or effect on setting), summarised using the formula set out in the matrix in **Table 5.4**. The matrix employs a graduated scale of significance (from Negligible to Major effects) and where two outcomes are possible through application of the matrix, professional judgement supported by reasoned justification, has been used to determine the level of significance.

Sensitivity of Asset	Magnitude of Impact			
	High	Medium	Low	Negligible
High	Major	Major / Moderate	Moderate / Minor	Minor
Medium	Major / Moderate	Moderate	Minor	Minor / Negligible
Low	Moderate / Minor	Minor	Minor / Negligible	Minor / Negligible
Negligible	Minor	Minor / Negligible	Minor / Negligible	Negligible

- 5.2.29 In the assessment that follows, **Major** and **Moderate** effects are considered to be **Significant** for the purposes of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (EIA Regulations). **Minor** and **Negligible** effects are considered '**Not Significant**'.
- 5.2.30 Where a Significant effect on the setting of an asset is predicted as a result of change within its surroundings, using the approach outlined above, an assessment has been made as to whether that effect would result in a significant adverse effect on the integrity of the setting (NPF4 Policy 7). For the purpose of the assessment, the integrity of the setting is considered to be maintained if the setting's contribution to the cultural significance of the monument, and its capacity to convey that significance to visitors, would not be compromised by the Proposed Development either alone or cumulatively.

Limitations and Assumptions

- 5.2.31 The desk-based assessment draws on the records in the A&BC HER, provided in digital Geographic Information System (GIS) dataset acquired initially in July 2021 ahead of the field survey. It is assumed that the data provided was accurate and up to date at the time it was acquired. Updated data was acquired in March 2023 and again in October 2024 and checked against the original data; no discrepancies were identified.
- 5.2.32 Designated heritage assets within the Outer Study Area have been identified from the HES database downloaded from the HES website in October 2024. That data is assumed to have been accurate and up to date at the time of acquisition.
- 5.2.33 The locations of some shielings were digitised from modern aerial photographs but were subject to verification in the field.
- 5.2.34 The field survey did not attempt to enter forestry compartments and surveying over felled forestry areas was limited due to the steep terrain and the presence of a thick layer of lying brash and felled tree trunks which both hampered progress and became a health and safety hazard. It is not thought likely that the restrictions imposed by the terrain and the current land-use has resulted in the collection of an incomplete baseline.
- 5.2.35 All features identified through the desk-based assessment (those in the HER and those digitised from other sources) were visited, checked, and their locations updated during the field survey. The records presented here are therefore an accurate record of the current baseline known to exist within the Application Boundary.

5.3 Baseline Conditions

- 5.3.1 This section provides a summary of the current and predicted future cultural heritage baseline within the Inner and Outer Study Areas.
- 5.3.2 Numbers in brackets in this section refer to heritage asset numbers depicted on **Figures 5.1** and **5.2** (EIAR Volume 3a) and listed in **Technical Appendices 5.1** and **5.2** (EIAR Volume 4).

Current Baseline

Heritage Assets within the Inner Study Area

DESIGNATED HERITAGE ASSETS

5.3.3 There are no Scheduled Monuments or Listed Buildings within the Application Boundary, and no part of the Proposed Development lies within an Inventory Garden and Designed Landscape, Inventory Historic Battlefield, or Conservation Area.

NON-DESIGNATED HERITAGE ASSETS

PREHISTORIC PERIOD

5.3.4 There are no known sites of prehistoric date within the Application Boundary, but the HER does record the find-spot of a polished stone axe head (4).

MEDIEVAL/POST-MEDIEVAL SETTLEMENT

5.3.5 The only heritage assets found within the Application Boundary are three groups of shieling huts. Shieling huts were associated with summer grazing of livestock and are usually considered to be of medieval or later date, although some excavated huts have been demonstrated to have prehistoric origins (Gilmour & Church, 2002¹⁶; Carter et al, 2005¹⁷).

5.3.6 A group of 18 shieling huts (1a-r) is located on the banks of an unnamed tributary of the Torrisdale Water. First recorded in 2009 as a group of seven huts and a separate group of two huts; field survey for this assessment found a total of 18 shieling structures including shieling huts and small drystone-built cells (probably used for storage). The shieling huts are distributed along and close to two unnamed watercourse that are tributaries of the Torrisdale Water. They are not depicted on early Ordnance Survey maps (1869 & 1900) indicating that they were no longer in use by the mid-19th century. They are presumably therefore of 18th century or earlier date. As a large aggregation of shielings, a relict of former pastoral practices preserved in the landscape and with the potential to contain archaeological information on the use of such seasonal pastoral sites on Kintyre, they are assessed as being of heritage value at a regional level and to be of medium sensitivity.

5.3.7 Two other shielings (2a-b) which lie along the north bank of the Torrisdale Water, first identified during a forestry survey in 2013, are likewise not depicted on early Ordnance Survey maps (1869 & 1900) indicating that they too were no longer in use by the mid-19th century and are similarly presumably of 18th century or earlier date. They are a smaller group than those above (1) and likely to contain only limited archaeological information on the use of such seasonal pastoral sites on Kintyre, although they are complementary to the larger group described above. As an isolated pair of apparently single-phase shielings, they are assessed as being of heritage value at a local level and to be of low sensitivity.

5.3.8 A third small group of shielings (3a-d), first identified in 1997, are recorded along an unnamed tributary of the Guesdale Water high above an existing forestry haul road on steep and rugged terrain, unusual for shielings. These too are not depicted on early Ordnance Survey maps (1869 & 1900) indicating that they too were no longer in use by the mid-19th century and are, like those described above, presumably of 18th century or earlier date. They are a small

¹⁶ Gilmour, S & Church, M (2002) 'On the edge of the earth? Recent research in Uig, Lewis', Scottish Archaeological News 38, 20002, 6-7.

¹⁷ Carter, S Dalland, M Long, D & Barrie, D (2005) 'Early land-use and development in Arisaig', Scottish Archaeological Internet Report (SAIR) Report 15, 2005.

discrete group and may be associated with seasonal pastoral practices associated with occupation lower down in Saddell Glen and likely to contain some limited archaeological information on the use of such seasonal pastoral sites on Kintyre. As a small group of apparently single-phase shielings, they are assessed as being of heritage value at a local level and to be of low sensitivity.

Archaeological Potential of the Inner Study Area

- 5.3.9 The Application Boundary is currently in use as commercial forestry on steep and rugged ground with lots of knolls and narrow, incised watercourses and thin topsoil over exposed bedrock. Examination of historic maps (Roy (1747-55) and Ordnance Survey 1st edition (1869)) reveals that the land within the Application Boundary was open moorland during the 18th and 19th centuries with only some small areas of pastureland immediately adjacent to Tarbet to Campbeltown Road (now A83), although the results of the desk-based study and field survey show that there was some seasonal occupation of the area around the headwaters of the Torrisdale Water.
- 5.3.10 The current land-use and mainly thin topsoil suggest a low archaeological potential except in discrete areas close to and along the Torrisdale Water and Lephincorrach Burn, and their associated small tributaries. In afforested areas, ploughing and drainage works, as well as planting and subsequent tree root growth and the effect of wind-throw, is likely to have disturbed or destroyed the integrity of any surviving buried archaeological deposits that might formerly have been, or may still be, present.
- 5.3.11 Overall, it is considered that there is a low to negligible potential for hitherto undiscovered buried archaeological remains to survive within the Application Boundary.

Heritage Assets within the Outer Study Area

- 5.3.12 Based on analysis of the blade tip ZTV, and as shown in **Figure 5.2** (EIAR Volume 3a) and detailed in **Technical Appendix 5.2** (EIAR Volume 4), there are 60 designated heritage assets within the Outer Study Area.
- 5.3.13 Within 5 km of the outermost wind turbines there are:
- Eight Scheduled Monument, of high sensitivity (six with predicted visibility of the Proposed Development);
 - Two Category A Listed Buildings, of high sensitivity (one with predicted visibility of the Proposed Development);
 - Eight Category B Listed Buildings, of medium sensitivity (four with predicted visibility of the Proposed Development);
 - Three Category C Listed Buildings, of low sensitivity (one with predicted visibility of the Proposed Development); and
 - Three NSR Sites, of high sensitivity (none with predicted visibility of the Proposed Development).
- 5.3.14 Within 5 km to 10 km of the outermost wind turbines there are an additional:
- Twenty-eight Scheduled Monuments, of high sensitivity (four with predicted visibility);
 - Three Category A Listed Buildings, of high sensitivity (none with predicted visibility); and

- Eight Category B Listed Buildings, of medium sensitivity (one with predicted visibility).

5.3.15 There are no World Heritage Sites or Inventory Historic Battlefields (BLT) within the Outer Study Area.

Future Baseline

5.3.16 If the Proposed Development was not to proceed, the current land-use as commercial forestry would be likely to continue on a cyclical felling and replanting basis, with some potential for the extension of areas covered by forestry and for new areas of woodland planting to be identified. The forestry land-use regime would be subject to the normal requirements of UK Forestry Standards and would result in limited potential disturbance to identified historic assets. It is probable that only natural decay through erosion, or impacts arising from self-seeded forestry trees, would affect heritage assets surviving within forested areas.

Summary of Sensitive Receptors

Scoped Out Receptors

5.3.17 It was agreed through consultation with WoSAS that none of the NSR Sites located within 5 km of the proposed outer wind turbines required assessment in terms of potential impacts on their settings from the Proposed Development, and accordingly, these have been scoped out of the assessment (see **Table 5.1** above for details).

5.3.18 Assessment of the effects of the Proposed Development on Category C Listed Buildings more than 5 km from the Proposed Development have been scoped out. These are minor vernacular buildings that have localised settings that would not be significantly affected by the Proposed Development.

Scoped In Receptors

5.3.19 A summary of the receptors identified as being sensitive to the Proposed Development and which have been 'scoped in' to the assessment are given in **Table 5.5**, together with the justification for inclusion.

5.3.20 Receptors that have been scoped into the assessment are those which have the potential to experience significant adverse effects and those assets identified by HES as requiring detailed consideration.

Receptor	Sensitivity	Justification
Scheduled Monuments up to 10 km from the outermost wind turbines. A list of these is provided in, Technical Appendix 5.2 (EIAR Volume 4), along with their relative sensitivities.	High	These are monuments protected by statute. The consent of Scottish Ministers is required before any works are carried out which would have the effect of demolishing, destroying, damaging, removing, repairing, altering, adding to, flooding or covering up a Scheduled Monument. In addition, effects of the Proposed Development works upon the setting of a Scheduled Monument form an important consideration in the granting or refusal of planning consent to conduct development works.

<p>Category A and B Listed Buildings up to 10 km from the outermost wind turbines.</p> <p>A list of these is provided in Technical Appendix 5.2 (EIAR Volume 4), along with their relative sensitivities.</p>	High to Medium	<p>Buildings which are statutorily protected as buildings of special architectural or historic interest. They are protected under the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 (1997 Act).</p> <p>Planning authorities and Scottish Ministers are required to have special regard for the desirability of preserving Listed Buildings and their settings and any features of special architectural or historic importance they possess.</p>
<p>Category C Listed Buildings up to 5 km from the outermost wind turbines.</p> <p>A list of these is provided in Technical Appendix 5.2 (EIAR Volume 4), along with their relative sensitivities.</p>	Low	<p>Buildings which are statutorily protected as buildings of special architectural or historic interest. They are protected under the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 (1997 Act).</p> <p>Planning authorities and Scottish Ministers are required to have special regard for the desirability of preserving Listed Buildings and their settings and any features of special architectural or historic importance they possess.</p>
<p>Other non-designated heritage assets within the Application Boundary.</p> <p>A list of these is provided in Technical Appendix 5.1 (EIAR Volume 4), along with their relative sensitivities.</p>	Low	<p>A range of other non-designated archaeological sites, monuments and areas of historic interest which do not have statutory protection but are curated by the local planning authority.</p>

5.4 Assessment of Potential Effects

Potential Construction Effects

- 5.4.1 Any ground-breaking activities associated with construction of the Proposed Development (such as those required for wind turbine bases and crane hardstanding, access tracks, cable routes, compounds, and laydown areas, and borrow pits) have the potential to disturb or destroy heritage assets. Other construction activities, such as vehicle movements, soil and overburden storage, and landscaping also have the potential to cause direct, permanent, and irreversible effects on heritage assets.
- 5.4.2 Any ground-breaking activities associated with the construction of the Proposed Development also have the potential to disturb or destroy any buried, hitherto unrecorded archaeological remains present within affected areas. However, it has been assessed that, there is a low to negligible potential for further buried archaeological remains to survive within the Inner Study Area and given the limited construction footprint of the Proposed Development, it is assessed that there is a negligible likelihood of encountering buried archaeological remains during construction.
- 5.4.3 The assessment of potential construction impacts has been carried out with reference to the Proposed Development layout and cultural heritage assets shown on **Figure 5.1** (EIAR Volume 3b).

Direct Effects

- 5.4.4 No direct construction impacts are predicted on the three non-designated heritage assets identified within the Inner Study Area (**Figure 5.1**, EIAR Volume 3a).

5.4.5 Construction work could potentially have a high magnitude direct adverse effect on any hitherto undiscovered remains that may be encountered during construction of the Proposed Development.

5.4.6 Measures are proposed in **Section 5.5** to ensure that any discoveries are properly addressed.

Potential Operational Effects

Direct Effects

5.4.7 There are no heritage assets likely to receive a direct effect during operation of the Proposed Development as any required maintenance or replacement works would use the as-built tracks and infrastructure to facilitate such works.

Setting Effects

5.4.8 The assessment of operational effects on the settings of heritage assets has been carried out with reference to the layout of the Proposed Development and locations of the cultural heritage assets, shown on **Figure 5.2** (EIAR Volume 3a). The criteria detailed in **Tables 5.2-5.4** have been used to assess the nature and magnitude of the effects which are set out in summary form in **Technical Appendix 5.2** (EIAR Volume 4).

5.4.9 Those heritage assets for inclusion as visualisations were identified from initial appraisal of the blade tip height ZTV and the visualisations were then agreed through post-scoping consultation with HES and WoSAS. A list of the visualisations included within the assessment is provided in **Table 5.6** and reference to supporting visualisations is provided in **Technical Appendix 5.2** (EIAR Volume 4), and the following assessment, where applicable. The visualisations (photomontages and wirelines) that inform the assessment are provided in **Figures 5.3-5.12** (EIAR Volume 3b).

5.4.10 The visualisations include the operational and under-construction wind farms that constitute the present baseline and show consented and proposed developments (where applicable) that form part of the cumulative assessment.

5.4.11 In addition to the cultural heritage visualisations, cross-reference is made to Landscape and Visual Amenity (LVIA) viewpoints (VPs) where appropriate. Details of the LVIA VP cross-referenced within the following assessment is provided in **Table 5.6** and **Technical Appendix 5.2** (EIAR Volume 4).

Fig Ref	Fig Title – Site Name (& Ref No)	Viewpoint Location
CH VP1, Figure 5.3 (EIAR Volume 3b)	Carradale Fort (SM 2180)	From western rampart of fort
CH VP2, Figure 5.4 (EIAR Volume 3b)	Airds Castle (SM 3177)	From within the castle enclosure
CH VP3, Figure 5.5 (EIAR Volume 3b)	Saddell Abbey (SM 3645)	From the abbey ruins
CH VP4, Figure 5.6 (EIAR Volume 3b)	Saddell House, Fort (SM 3539)	From centre of fort
CH VP5, Figure 5.7 (EIAR Volume 3b)	Garvalt Dun (SM 3740)	From centre of dun

CH VP6, Figure 5.8 (EIAR Volume 3b)	Blary Dun (SM 3077)	From centre of dun
CH VP7, Figure 5.9 (EIAR Volume 3b)	Carragh an Talaidh, chambered cairn, Brackley (SM 189)	From centre of cairn
CH VP8, Figure 5.10 (EIAR Volume 3b)	Sunadale Dun (SM 3643)	From centre of dun
CH VP9, Figure 5.11 (EIAR Volume 3b)	Machrie Moor, Stone Circles, Cairns, Hut Circles and Fields (SM 90207 & PiC 92)	From centre point of complex stone circle at Moss Farm
CH VP10, Figure 5.12 (EIAR Volume 3b)	Saddell Bay (Saddell Castle (SM 18403) & Saddell House (LB 18404)	From rocky shoreline just east of a cottage along the coastal path.
LVIA VP1, Figure 4.9 (EIAR Volume 3b)	Torrisdale Castle (LB 18396)	From car park alongside B842 at Torrisdale Bay looking west towards the castle

- 5.4.12 The following discussion details the assessment findings for those assets where potentially significant adverse effects have been identified through the tabulated assessment and those assets identified by HES as requiring detailed consideration, even where the significance of the predicted effect is assessed as being not significant in EIA terms.
- 5.4.13 The assessment of all other heritage assets, for which non-significant effects have been identified, is discussed in **Technical Appendix 5.2** (EIAR Volume 4).
- 5.4.14 It was agreed through consultation with HES that Garvalt, Dun (SM 3740), Balry, Dun (SM 3077) and Sunadale, Dun (SM 3643) could be excluded from detailed assessment (set out below) as the impact on the settings of these assets were not likely to cause concern (see **Table 5.1**). Assessment of the potential impact on the settings of these heritage assets from the Proposed Development are provided in the tabulated assessment set out in **Technical Appendix 5.2** (EIAR Volume 4) and cross reference provided to wireline visualisations (**Table 5.6**), where appropriate.

SCHEDULED MONUMENTS

CARRADALE FORT (SM 2180)

- 5.4.15 This monument comprises the earthwork remains of a vitrified prehistoric fort standing on the summit of Carradale Point and occupying an elongated peninsula which is cut off from the adjacent mainland at high tide. As the remains of a later prehistoric fort, in a commanding and strategic location, it has the potential to provide information on settlement activity and social status in the Iron Age. The fort is a Scheduled Monument, of heritage value at the national level, and is assessed as being of high sensitivity.
- 5.4.16 The fort is positioned in a strategic position on the east coast of Kintyre and would have been prominent from many vantage points in the surrounding landscape, in particularly from around Carradale Bay and Torrisdale Bay, and would also have been prominent in views from the sea when approaching the bay or passing along the coastline. The location of the fort provides a good vantage point to view the surrounding area and gives extensive views to the coastal approach from the north, eastwards across the Kilbrannan Sound to Arran, and towards the southern approach from the wider seaway. It would have controlled movement in and out of Carradale Bay, a natural bay and safe boat landing point and controlled access through the Kilbrannan Sound. The key characteristics of the monument's setting that contribute to its

cultural significance are its coastal position, especially its proximity to and control of access to the landing place at Carradale Bay, the extensive views that can be gained along the coast and across the Kilbrannan Sound, together with its prominent visibility from the sea approaches along and across from the Kilbrannan Sound.

- 5.4.17 The operational Beinn an Tuirc and Beinn an Tuirc Phase 3 Wind Farms are both visible in views to the west from Carradale fort (**Figure 5.3a**, CH VP1, EIA Volume 3b), the existing wind turbines visible on the opposite side of Carradale Bay and beyond the skyline.
- 5.4.18 The fort lies 3.9 km from the nearest proposed wind turbine (T9). The ZTV modelling predicts that all nine wind turbines (tips and hubs) (**Figure 5.2**, EIA Volume 3a), would be theoretically visible in views to the west. Key views from the fort along the coastline, to the north and south, and over the Kilbrannan Sound, to the east, would be unaffected. A photomontage visualisation from the western rampart of the fort (**Figure 5.3f**, EIA Volume 3b) shows that the proposed wind turbines would be visible on the horizon of higher ground on the opposite side of Carradale Bay seen together with, and in the foreground of, the operational Beinn an Tuirc Wind Farms. The topography of the intervening hills would screen visibility of other parts of the Proposed Development infrastructure, and only the proposed wind turbines would be visible from the fort. The LVIA photomontage visualisation from Dougarie Point, Arran (**Figure 4.10a**, EIA Volume 3b)) showing the view looking across the Kilbrannan Sound, to the east coast of Argyll, and towards Carradale fort, shows that the Proposed Development would be seen in the same arc of view as the fort from the Kilbrannan Sound on the seaward approach to the coast, the proposed wind turbines being visible beyond the fort but at a higher elevation, seen along the skyline together with the operational Beinn an Tuirc Wind Farm and Beinn an Tuirc Extension, but visually distinguishable from and separate from the fort.
- 5.4.19 The Proposed Development would be a discernible new element to the wider landscape surroundings of the fort and would give rise to a noticeable change to the overall setting of the monument. However, it would not interrupt or disrupt any of the key views to or from the fort that contribute to understanding its cultural significance. The views from the fort over the surrounding seaways would not be affected, views of the fort from the seaways would not be interrupted, and its strategic position at the mouth of Carradale Bay would be retained. It would remain possible for any visitor to understand the fort, its strategic coastal location, and its landscape and seascape surroundings. The presence of the Proposed Development in the wider landscape setting of the fort would not appreciably alter the way in which the fort and its setting are experienced and appreciated.
- 5.4.20 Overall, the impact of the Proposed Development on the setting of the fort is assessed, using the criteria in **Table 5.4** and professional judgement, as being one of **low** magnitude on those aspects of the setting of Carradale fort that contribute to appreciation of its cultural significance, resulting in an adverse effect of **Minor** significance (**Not Significant** in EIA terms).

AIRDS CASTLE (SM 3177)

- 5.4.21 This monument comprises the fragmentary remains of a likely medieval castle, located on the summit of a rock outcrop around 300 m south of Carradale Harbour. The upstanding remains consist of the fragments of a stone curtain wall, which appears to have originally enclosed the entire summit. The castle was held by the Lords of the Isles until its forfeiture to the Crown in the late 15th century and the monument has the potential to provide a wealth of information

on the construction and occupation of a castle which was occupied over several hundred years. The castle is a Scheduled Monument, of heritage value at the national level, and is assessed as being of high sensitivity.

- 5.4.22 The castle is positioned in a strategic position on the east coast of Kintyre and would have been prominent from many vantage points in the surrounding landscape and from the sea when approaching or passing along the coast. The location of the castle provides a good vantage point to view the surrounding area and gives extensive views to the coastal approach from the north, eastwards across the Kilbrannan Sound to Arran, and towards the southern approach from the wider seaway. Like Carradale fort, discussed above, it would have controlled movement in and out of Carradale Bay, a natural bay and safe boat landing point and controlled access through the Kilbrannan Sound. The key characteristics of the monument's setting that contribute to its cultural significance are its coastal position, especially its proximity to and control of access to the landing place at Carradale Bay, the extensive views that can be gained along the coast and across the Kilbrannan Sound, together with its prominent visibility from the sea approach along and across the Kilbrannan Sound.
- 5.4.23 The operational Beinn an Tuirc and Beinn an Tuirc Extension Wind Farms are both visible in views to the south southwest from Aird's Castle (**Figure 5.4a**, EIA Volume 3b), the existing wind turbines visible beyond the skyline. The operational Beinn an Tuirc Phase 3 Wind Farm is visible in distant views to the southwest from the castle, seen on the skyline, while the operational Cour Wind Farm is visible on the skyline to the north from the castle (**Figure 5.4b**, EIA Volume 3b).
- 5.4.24 The castle remains lie 4.9 km from the nearest wind turbine (T9). The ZTV modelling predicted that seven wind turbines (tips and hubs) (**Figure 5.2**, EIA Volume 3a) would theoretically be visible in views to the west southwest. Key views from the castle across the Kilbrannan Sound to the east and along the coastline to the north and south, would be unaffected. A photomontage visualisation from within the castle's enclosure on the west side (**Figure 5.4f**, EIA Volume 3b) shows that the proposed wind turbines would be visible on the horizon of higher ground on the opposite side of Carradale Bay along with the operational Beinn an Tuirc Extension Wind Farm, although visually separate from and at a closer distance than Beinn an Tuirc Extension. The topography of the intervening hills would screen visibility of other parts of the Proposed Development infrastructure, and only the proposed wind turbines would be visible from the castle ruins. The LVIA photomontage visualisation from Dougarie Point, Arran (**Figure 4.10a**, EIA Volume 3b) shows that the Proposed Development would be seen in the same arc of view as the castle from the Kilbrannan Sound on the seaward approach to the coast, the proposed wind turbines visible beyond the castle ruins at a higher elevation but seen on the skyline, together with the operational Beinn an Tuirc Wind Farm and Beinn an Tuirc Extension, but visually distinguishable from and separate from the castle ruins.
- 5.4.25 The Proposed Development would be a discernible new element to the wider landscape surroundings of the castle and would give rise to a noticeable change to the overall setting of the monument. However, it would not interrupt or disrupt any of the key views to or from the castle that contribute to understanding its cultural significance. The views from the castle over the surrounding seaways would not be affected, views of the castle from the seaways would not be interrupted, and its strategic position at Carradale Bay would be retained. It would remain possible for any visitor to understand the castle, its strategic coastal location, and its landscape and seascape surroundings. The presence of the Proposed Development in

the wider landscape setting of the castle would not appreciably alter the way in which the castle and its setting are experienced and appreciated.

- 5.4.26 Overall, the impact of the Proposed Development on the setting of the castle is assessed, using the criteria in **Table 5.4** and professional judgement, as being one of **low** magnitude on those aspects of the setting of Aird's Castle that contribute to appreciation of its cultural significance, resulting in an adverse effect of **Minor** significance (**Not Significant** in EIA terms).

SADDEL ABBEY (SM 3645)

- 5.4.27 This monument comprises the fragmentary remains of a Cistercian Abbey, believed to have been founded in 1160 AD by Somerled, first Lord of the Isles, and was a daughter house of Mellifont, in the diocese of Armagh. The abbey originally consisted of a church, together with three main ranges of conventual buildings grouped around a cloister on the south side of the church. Only the presbytery and the north transept of the church, and part of the south claustral range now survive as standing remains. The abbey operated as a centre of worship for three centuries but was abandoned by the late 15th century. Many of the buildings were dismantled in the 16th century and the stone reused to build other structures on the Saddell Castle estate. The monument also includes fourteen carved stone grave slabs, dating to the 14th - early 16th century, that stand in a recently constructed shelter.
- 5.4.28 The abbey is the only Cistercian abbey to be founded from Ireland and it has the potential to provide a wealth of archaeological information about ecclesiastical architecture and monastic life during the 12th-15th centuries; while the grave slabs have the potential to contribute to our understanding of ecclesiastical organisation, funerary practices, and production of monumental sculpture in western Scotland during the medieval period. The abbey remains and the grave slabs are a Scheduled Monument, of heritage value at the national level, and are assessed as being of high sensitivity.
- 5.4.29 The abbey remains stand on a slightly raised promontory immediately above the confluence of the Saddell Water and Allt nam Manach (the Stream of the Monks), just west of the B842 public road, and in a relatively sheltered position at the southeast end of Saddell Glen. This pastoral situation on the valley floor contributes to the abbey's sense of place. The abbey was positioned close to the main routeway along the coast, which likely followed the route now taken by the B842 public road, and it lies close to Saddell Bay which would have provided both a safe landing place on the seaward approach to the abbey and coastal resources for the abbey occupants. Views out from the abbey take in surrounding farmland of Saddell Glen (**Figure 5.5a**, EIAR Volume 3b) and would, in the past, have included the coastal strip to the east and to Saddell Bay, now obscured by vegetation and the village (**Figure 5.5b**, EIAR Volume 3b). High hill ridges are present to the south, west and north of the abbey and these concentrate views along the Saddell Glen, which runs in a northwest to southeasterly direction. The abbey overlooks complementary farmland which would have likely been utilised by the monks during its occupation. The abbey has historic association with Saddell Abbey (SM 3645) which was built by the Bishop of Argyll in 1508, and which lies around 600 m to the southeast of the abbey on the opposite side of the B842 public road. The abbey, and carved stones, are a promoted visitor site and visitors to the site approach from the east from Saddell village. The key characteristics of the abbey's setting that contribute to its cultural significance are its coastal situation, the tranquil valley along and across which views extend, and its historical association with the surrounding farmland, Saddell village, and the bay, and Saddell Castle.

- 5.4.30 The abbey ruins lie 4.3 km from the nearest wind turbine (T8). A wireline and photomontage visualisation from the northern edge of the abbey ruins (**Figures 5.5e and 5.5f**, EIAR Volume 3b) show that six wind turbines (three at hub height) would be visible beyond the skyline, partially screened by Cnoc na Caillich, Cnocmalaich and Creag an Fhithich, and topographically separate from the abbey ruins. The topography of the intervening hills would screen visibility of all other parts of the Proposed Development infrastructure, and only the upper parts of proposed wind turbines (notably the three hubs (T1, T4 and T6)) would be visible from the abbey ruins. The Proposed Development would not be visible in views of the abbey complex when approached by visitors from Saddell village and the abbey's association with the village, with Saddell Bay and with Saddell Castle beyond (**Figures 5.5b and 5.5c**, EIAR Volume 3b) would not be adversely affected. The Proposed Development would however be a new element in the wider landscape surroundings of the abbey ruins, and the introduction of modern wind turbines into an otherwise rural, pastoral setting would result in a noticeable alteration to its currently tranquil landscape setting.
- 5.4.31 Overall, it is assessed, using the criteria in **Table 5.4**, that the impact of the Proposed Development on the setting of the abbey is assessed as being of low magnitude, resulting in an adverse effect, based on professional judgement as being one of **Moderate** significance (**Significant** in EIA terms) as the current rural setting of the abbey ruins would be challenged to some degree by the introduction of the Proposed Development.
- 5.4.32 However, whilst the effect on the setting of the abbey ruins is assessed as being significant in EIA terms, it is necessary to consider whether the predicted effect would 'significantly adversely affect the integrity of its setting' (NPF4 Policy 7(h) ii). As noted above, the key contributors to the abbey ruin's cultural significance are its coastal situation, the views along and across the Saddell Glen and its relationship with the surrounding valley farmland, and its historical association with Saddell village and the bay and Saddell Castle beyond. These qualities of its setting would be retained, and it would still be possible for any visitor to the abbey ruins to understand and appreciate these qualities. As such, the impact of the Proposed Development would not amount to a significantly adverse effect on the integrity of its setting (NPF4 Policy 7(h) ii).

SADDEL HOUSE, FORT (SM 3539)

- 5.4.33 This monument comprises the earthwork remains of a likely Iron Age fort surviving in an area of woodland on the summit of a promontory of Cnocan a' Bhachail just north of Pluick Point, on the eastern edge of Saddell Bay. As the generally well-preserved remains of a later prehistoric fort, it has the potential to provide information on settlement activity and social hierarchies in the Iron Age. The fort is a Scheduled Monument, of heritage value at the national level, and is assessed as being of high sensitivity.
- 5.4.34 The fort is positioned in a prominent position on the east coast of Kintyre overlooking Saddell Bay, to the southwest, and along Saddell Glen, to the northwest. It would have controlled access to the landing place at Saddell Bay and movement into the Glen. The fort currently stands in mature woodland (Pluick Wood) which limits visibility out from the fort; however, during its occupation, it would have had extensive views of the coastal approach from the east across the Kilbrannan Sound and views across to Arran and towards the southern approach from the wider seaway. The key characteristics of the monument's setting that contribute to its cultural significance are its coastal position, especially its proximity to and control of access to the landing place at Saddell Bay, the extensive views that can be gained along the coast

and over the seaways, together with its likely prominent visibility from the sea approach along and from across the Kilbrannan Sound.

- 5.4.35 A wireline visualisation showing the predicted bare-earth view from the fort (**Figure 5.6a**, EIA Volume 3b) shows that five wind turbines (two at hub height) would be visible in views to the north northeast. The nearest proposed wind turbine (T8) would be 4.7 km from the fort, the wind turbines seen in distant views beyond the skyline and largely screened from view by Cnoc na Caillich and Cnocmalaulach. The Proposed Development would be seen together with both the operational Beinn an Tuirc and Beinn an Tuirc Extension Wind Farms, each visually separate from the others but in the same view. The intervening topography would screen visibility of other parts of the Proposed Development infrastructure, and only the upper parts of three proposed wind turbines (T1, T4 and T6) would be likely to be visible to the northwest from the fort (**Figure 5.6e**, EIA Volume 3b). Key views from the fort to the east and south-east overlooking Saddell Bay and the Kilbrannan Sound would not be affected. The Proposed Development would be seen in the same view of the fort from the Kilbrannan Sound on the seaward approach to the coast, the proposed wind turbines being visible beyond the fort but at a higher elevation and largely screened from view (see for example **Figure 4.13a**, EIA Volume 3b).
- 5.4.36 The Proposed Development would be a discernible new element in the wider landscape surroundings of the fort and would result in a noticeable change to the overall setting of the monument. However, at 4.7 km away, the proposed wind turbines would not be visually dominant, and it would not interrupt or disrupt any of the key views to or from the fort that contribute to understanding its cultural significance. It would remain possible for any visitor to understand the fort, its topographical location, its landscape and seascape surroundings, and its associations with nearby monuments.
- 5.4.37 Overall, the impact of the Proposed Development on the setting of the fort is assessed, using the criteria in **Table 5.4** and professional judgment, as being one of **low** magnitude on those aspects of the setting of Saddell House Fort that contribute to appreciation of its cultural significance, resulting in an adverse effect of **Minor** significance (**Not Significant** in EIA terms).

MACHRIE MOOR, STONE CIRCLES, CAIRNS, HUT CIRCLES AND FIELDS (SM 90207 & PIC 92)

- 5.4.38 This monument comprises an area of Machrie Moor on the Isle of Arran in which a rich archaeological landscape of prehistoric ritual/funerary remains and domestic structures survive. Remains include stone circles, chambered cairns, hut circles and field systems that are spread over an area of relatively flat land within the Machrie basin, to the east of Tormore and south of the Machrie Water. The best-known part of the monument is a group of six stone circles in the northeastern part of the complex. These stone circles are a HES Property in Care (PIC) and an internationally renowned visitor site. The grouping of stone circles is rare and suggests that this was a ceremonial centre serving the inhabitants of the Machrie basin, if not the whole Island, with archaeological evidence suggesting that the stone circles were a focus of ritual and ceremonial activity for at least 1500 years. As the exceptional remains of a Neolithic and Bronze Age ritual and domestic landscape, the stone circles, and the archaeological remains in the landscape surrounding the stone circles, have the potential to provide information on early prehistoric funerary/ritual and settlement activity and practices, with extensive multi-period buried remains likely surviving within the site. The stone circles, and surrounding remains combined, are a Scheduled Monument, of heritage value at an international level, and assessed as being of high sensitivity.

- 5.4.39 The stone circles stand in an area of open moorland with views across the west coast of Arran overlooking the Kilbrannan Sound to the Kintyre Peninsula beyond (**Figure 5.11a**, EIAR Volume 3b). High hillslopes are present to the north (**Figure 5.11b**, EIAR Volume 3b) and east (**Figure 5.11c**, EIAR Volume 3b) of the site, and the open moorland setting backdropped by high hillslopes provides a distinctive sense of place for the monument. The stone circles themselves are visually impressive, and photos of these are used to promote Scotland's heritage in many national guidebooks and websites. The stone circles are situated below a prominent notch in the skyline to the northeast where Machrie Glen is divided into two steep sided valleys and archaeological evidence suggests that the site was chosen to allow good visibility of the midsummer sunrise where it intersects this notch at the summer solstice (HES, 2004¹⁸; Burl, 2005¹⁹) (see, for example **Figure 5.11c**, EIAR Volume 3b), notch at right of frame). Visitors to the stone circles approach from the east along a footpath from a designated carpark adjacent to the Tormore to Auchgallon public road. The key characteristics of the monument's setting that contribute to its cultural significance are its open moorland setting, its association with related monuments in the surroundings, and the views obtained to the east towards hillslopes and the midsummer sunrise point.
- 5.4.40 The operational Beinn an Tuirc, Beinn an Tuirc Extension, Beinn an Tuirc Phase 3, Deucheran Hill and Cour Wind Farms are all visible in views to the west from the monument (**Figure 5.11a**, EIAR Volume 3b), the existing wind turbines seen on the horizon in distant views on the opposite side of the Kilbrannan Sound.
- 5.4.41 The stone circles lie 13.4 km from the nearest proposed wind turbine (T9). The ZTV modelling predicts that all nine wind turbines (**Figure 5.2**, EIAR Volume 3a) would be theoretically visible in the views to the west northwest. Key views from the stones circles towards the hills in the east and the notch at the head of Machrie Glen (midsummer sunrise point) would be unaffected by the Proposed Development, and the Proposed Development would not be visible in views of the monument when approached from the visitor's car park. A photomontage visualisation taken from the western edge of the stone circle complex at Fingal's Cauldron Seat (towards the centre of the Scheduled Area) (**Figure 5.11f**, EIAR Volume 3b), shows that the Proposed Development would be visible on high ground on the opposite side of the Kilbrannan Sound, and largely backclothed by hillslopes. The Proposed Development would be seen together with and in the foreground of the operational Beinn an Tuirc Wind Farm (**Figure 5.11f**, EIAR Volume 3b). Some of the associated infrastructure may also be visible amongst the hills and forestry, although, at 13.4 km distant, this is unlikely to be visually prominent. Views in other directions from the stone circles, north towards the Machrie Water, and south towards Tor Righ Mor, would remain unaffected by the Proposed Development, and the relationship between the stone circles and other associated remains in the wider surroundings would be retained and the visual links between these would remain uninterrupted.
- 5.4.42 The Proposed Development would be a new feature within the wider landscape surroundings of the stone circles. However, at 13.4 km away, the proposed wind turbines would not be visually dominant, and it would remain possible for any visitor to the monument to understand

¹⁸ Historic Environment Scotland (2004) Machrie Moor Stone Circles & Moss farm Road Stone Circle: Statement of Significance.

¹⁹ Burl, A (2005) A Guide to the Stone Circles of Britain, Ireland and Brittany, Yale University Press, p118.

the stone circles, their topographical locations, their landscape surroundings, their key alignments and their association with other monuments in the group.

- 5.4.43 Overall, the impact of the Proposed Development on the setting of the stone circles is assessed, using the criteria in **Table 5.4** and professional judgement, as being one of **low** magnitude on those aspects of the setting of Machrie Moor Stone Circles that contribute to appreciation of its cultural significance, resulting in an adverse effect of **Minor** significance (**Not Significant** in EIA terms).

LISTED BUILDINGS

SADDELL CASTLE (LB 18403)

- 5.4.44 This 16th century tower house stands in a coastal position on the east coast of Kintyre at the south end of Saddell Bay. The Castle is a Category A Listed Building, of heritage value at the national level. As a complete 16th century tower house with historic connections to the Bishop of Argyll and the Campbells of Saddell, it is assessed as being of high sensitivity.
- 5.4.45 The Castle stands near the shore at the mouth of Saddell Water. It is four storeys high and has a battlemented wall walkway around the roof. Wide, open views are afforded from the Castle across Saddell Bay, to the northeast, to the east overlooking the Kilbrannan Sound and across to Arran, and south to the wider seaway. Woodland to the northwest of the Castle now screens the view out in that direction from ground level, although, open views in that direction, looking along Saddell Glen, are likely afforded from upper levels of the Castle and from the battlement wall walkway. The Castle was built by the Bishop of Argyll in 1508 and has historic associations with Saddell Abbey (SM 3645) which lies around 600 m to the northwest of the Castle on the opposite side of the B842 public road. The Castle is also historically linked with Saddell House (LB 18396), standing around 350 m to the northeast, which was built as a modern replacement for the Castle by the Campbells of Glen Saddell in the late 18th century. Today the Castle is a property of the Landmark Trust and approached by visitors from the B842 public road, in the northwest, along a tree-lined road. The Castle is a prominent landmark standing in and controlling access to the bay, and it can be seen together with Saddell House in views from the bay, when approaching from or passing along the coastline. The key characteristics of the Castle's setting that contribute to its cultural significance are its coastal position, its historical association with Saddell Abbey and Saddell House in its immediate surroundings, the extensive views that can be gained along the coast and across Saddell Bay, and its prominent visibility from the sea approach along and across the Kilbrannan Sound.
- 5.4.46 The Castle lies 5 km from the nearest wind turbine (T8). The ZTV modelling predicts that five wind turbines (three at hub height) (**Figure 5.2**, EIAR Volume 3b) would be visible in views to the northwest from the Castle. Woodland to the northwest of the Castle would screen views of the Proposed Development from ground level at the Castle itself, although the Proposed Development, would likely be seen from upper floors of, and from the battlement wall walkway to, the Castle. In these views the wind turbines would be visible beyond the skyline of Saddell Glen, where screening would be provided by intervening topography. The Proposed Development would not be visible in views of the Castle from the approach road from the west, or in views from the Castle to Saddell House (LB 18404) or vice versa.
- 5.4.47 A photomontage visualisation from the shoreline just south of the Castle (**Figure 5.12f**, EIAR Volume 3b) shows that from this viewpoint the Proposed Development would be seen in the

same views as the Castle, with six wind turbines (three at hub height) being visible beyond the skyline and at a higher elevation than the Castle. The topography of the intervening hills would screen visibility of other parts of the Proposed Development infrastructure, and only the upper parts of the proposed wind turbines would be visible. Views of the Proposed Development would also be seen in the same arc of view as the Castle from the Kilbrannan Sound on the seaward approach to the coast, the proposed wind turbines being visible beyond the Castle but at a higher elevation, and largely screened by intervening topography (see for example **Figure 4.13a**, EIAR Volume 3b). The Proposed Development would be a new feature in these views but would be visually separate from views of the Castle, and it would still be possible for any visitor to understand the Castle, its coastal location, its landscape and seascape surroundings, its position controlling access to the Saddell Bay and its associations with Saddell Abbey and Saddell House.

- 5.4.48 Overall, the impact of the Proposed Development on the setting of Saddell Castle is assessed, using the criteria set out in **Table 5.4** and professional judgement, as being one of **low** magnitude on those aspects of the setting of Saddell Castle that contribute to appreciation of its cultural significance, resulting in an adverse effect of **Minor** significance (**Not Significant** in EIA terms). The character, special architectural and historic interest of the Castle would remain intact and undiminished.

TORRISDDALE CASTLE (LB 18396)

- 5.4.49 This early 19th century Castle stands, within mature woodland policies together with associated buildings, including a Gate House and Stables (LB 18397), in a coastal position on the lower southwest facing slope of Toff a' Ghobhainn. The Castle was designed and built James Gillespie Graham, one of Scotland's most famous architects, renowned for his gothic style mansions and churches. The Castle is a Category B Listed Building, of heritage value at the regional level, and is assessed as being of medium sensitivity.
- 5.4.50 The Castle stands to the west of the B842 public road and Torrisdale Bay. The main (front) elevation of the Castle is oriented to the southeast overlooking the bay and out towards the Kilbrannan Sound. The rear (northwest) elevation overlooks a number of garden terraces surrounded by woodland, and distant views in this direction are restricted by rising ground. The Castle is approach from the B842 by two driveways, one from the southeast, and the other from the northeast, both drives running through mature woodland. The Castle is a prominent landmark visible whilst travelling along the B842 public road and from the sea when passing Torrisdale Bay, the Castle visible in these views framed by woodland and backdropped by hillslopes (**Figure 4.9a**, EIAR Volume 3b).
- 5.4.51 The bare-earth blade tip ZTV (**Figure 5.2**, EIAR Volume 3a) predicts that from the Castle there would be no theoretical visibility of the Proposed Development, neither would there be any visibility of the Proposed Development from the garden/terraces surrounding the Castle, nor from the associated Gate House and Stables (LB 18397) located to the southwest of the Castle. Key views from the Castle to the east across Torrisdale Bay and the Kilbrannan Sound would be unaffected.
- 5.4.52 Views of the Castle, within its woodland setting, can be obtained from the southeast, from the A842 public road and from Torrisdale Bay. A photomontage visualisation positioned at the car park alongside the B842 at Torrisdale Bay (**Figure 4.9f**, EIAR Volume 3b) and looking towards the Castle shows that there would be visibility of four wind turbine tips seen in the

same arc of view as the Castle from this viewpoint. The proposed wind turbines would, however, be visually separate from the Castle, seen beyond Cnoc nan Ghobhainn and would not be seen directly behind the Castle or in front of Cnoc nan Ghobhainn. Although a new feature within the landscape surrounding the Castle, the proposed wind turbines would be partially screened by topography, and it would still be possible for any visitor to appreciate and understand the topographical position of the Castle, the designed landscape setting of the Castle, and the key views from the Castle overlooking Torrisdale Bay and the coast. The Castle would remain a prominent landmark.

- 5.4.53 Overall, the impact of the Proposed Development on the setting of Torrisdale Castle is assessed, using the criteria set out in **Table 5.4** and professional judgement, as being one of **low** magnitude on those aspects of the setting of Torrisdale Castle that contribute to appreciation of its cultural significance, resulting in an adverse effect of **Minor** significance (**Not Significant** in EIA terms). The character, special architectural and historic interest of the monument would remain intact and undiminished.

SADDELL HOUSE (LB 18404)

- 5.4.54 This late 18th century Georgian mansion stands within the coastal strip behind Saddell Bay. The House is a Category B Listed Building, of heritage value at the regional level. As a restored Georgian mansion with historic connections to the Campbells of Glen Saddell, it is assessed as being of medium sensitivity.
- 5.4.55 The house stands at the centre of Saddell Bay and has a commanding position overlooking the bay. The front (northwest) elevation of the house is oriented looking along Saddell Glen with open views across arable farmland to the village of Saddell. Views from the rear (southeast) elevation of the house overlook Saddell Bay and the Kilbrannan Sound and across to Arran. The house is a prominent local landmark, visible from coastal locations and from the Kilbrannan Sound when approaching the bay, or when passing along the coastline. The house is also visible standing within the bay and backdropped by seascape, whilst travelling along the B842 to the northwest. The house was built in the 18th century as a more modern residence for the Campbells of Glen Saddell who owned Saddell Castle (SM 18403) and which stands around 350 m to the southwest, at the south end of Saddell Bay. These historically associated buildings can be seen together in views from the bay, and from the Kilbrannan Sound. Today the house is a property of the Landmark Trust and approached by visitors either along a track from Home Farm from the northwest, or along a footpath from Saddell Castle from the southeast. The key characteristic of the house's setting that contribute to its cultural significance are its coastal position within Saddell Bay, its historic association with Saddell Castle, the extensive views that can be gained out across Saddell Bay and the Kilbrannan Sound, and its prominent visibility from the sea approach along and across the Sound.
- 5.4.56 The house lies 4.9 km from the nearest wind turbine (T8). The ZTV modelling predicts that three wind turbines (two at hub height) (see Figure 5.2 (EIAR Volume 3a)) would be visible in views to the northwest from the house, visible beyond the skyline and largely screened by Cnoc na Caillich and Cnocmalavilach. The Proposed Development would not be visible in views approaching the house from Home Farm or from Saddell Castle. A photomontage visualisation from the shoreline just south of Saddell Castle (LB 18403) (**Figure 5.12a**, EIAR Volume 3b) shows that from this viewpoint the Proposed Development would be visible in the same view as both Saddell Castle and Saddell House, with six wind turbines (three at hub height) being visible beyond the skyline and at a higher elevation than the house (**Figures 5.12a and**

5.12f, EIAR Volume 3b). The topography of the intervening hills would screen visibility of other parts of the Proposed Development infrastructure, and only the upper parts of the proposed wind turbines would be visible. The Proposed Development would also be seen in the same arc of view as the house from the Kilbrannan Sound on the seaward approach to the coast (see for example **Figure 4.13a**, EIAR Volume 3b). The proposed wind turbines would be visible beyond the castle but at a higher elevation and largely screened by intervening topography. The Proposed Development would be a new feature in these views, but the proposed wind turbines would be seen visually separate from the House, and it would still be possible for any visitor to understand the House, its coastal location, its landscape and seascape surroundings, and its associations with Saddell Castle.

- 5.4.57 Overall, the impact of the Proposed Development on the setting of Saddell House is assessed, using the criteria set out in **Table 5.4** and professional judgement, as being one of **low** magnitude on those aspects of the setting of Saddell House that contribute to appreciation of its cultural significance, resulting in an adverse effect of **Minor** significance (**Not Significant** in EIA terms). The character, special architectural and historic interest of the monument would remain intact and undiminished.

Potential Decommissioning Effects

Direct Effects

- 5.4.58 There are no heritage assets within the Proposed Development site likely to receive a direct effect during decommissioning of the Proposed Development as decommissioning works would use the as-built tracks and infrastructure to facilitate decommissioning.

Setting Effects

- 5.4.59 Decommissioning of the Proposed Development would remove all of the setting effects on heritage assets that have been identified for the operational phase.

Potential Cumulative Construction Effects

- 5.4.60 Construction of the Proposed Development would not give rise to any cumulative direct effects on any cultural heritage assets.

Potential Cumulative Operational Effects

- 5.4.61 The Proposed Development could, in combination with other developments in the area that are consented but not yet built, or are subject of a valid planning application, result in adverse cumulative effects on the setting of cultural heritage assets.
- 5.4.62 Developments that are at the Scoping stage are excluded because there is insufficient information of the size and scale of the development proposed and uncertainty whether they will be progressed to formal application. However, where proposed wind farms 'in scoping' would be visible from assets provided with visualisations, these are included in the wirelines accompanying the photomontages. In only two instances (Carradale Fort (**Figure 5.3a**, CH VP1, EIAR Volume 3b) and Machrie Moor (**Figure 5.11a**, CH VP9, EIAR Volume 3b) does this have any relevance for cultural heritage interests. In neither instance would the cumulative impact result in a significantly adverse effect.

- 5.4.63 Operational and under construction developments are considered as part of the baseline and are included in the assessment of effects of the Proposed Development on the settings of heritage assets set out above.
- 5.4.64 **Figure 5.2** (EIAR Volume 3a) shows the Proposed Development along with the locations of other operational/under construction and consented wind farms, and those at the application (in planning stage), together with those cultural heritage assets within the Outer Study Area (with the Proposed Development blade tip height ZTV).
- 5.4.65 Where visible from the designated heritage assets described in the assessment of operational effects above, the various cumulative developments listed in **Chapter 4: Landscape and Visual Amenity** are shown on the cumulative wirelines.
- 5.4.66 There is no predicted visibility of any cumulative developments from Saddell Abbey (SM 3645), Saddell Castle (LB 18403), Saddell House (LB 18404) or Torrissdale Castle (LB 18396), therefore no cumulative effect on the settings of these monuments would arise from the operation of the Proposed Development in combination with other cumulative development on these assets.
- 5.4.67 The cumulative assessment for the remaining assets discussed in detail above is summarised in the subsequent sections. It is assessed that there would be no significant cumulative operational effects as a result of the Proposed Development in combination with the cumulative developments.

Carradale Fort (SM 2180)

- 5.4.68 Viewpoint VP1 (**Figure 5.3b**, EIAR Volume 3b) shows that the consented High Constellation and Eascairt Wind Farms would be visible in views to the north from the Scheduled Monument, the closest, High Constellation Wind Farm, being 12.3 km away. These two developments would be visible on the skyline in distant views to the north, viewed in a separately arc of view from the Proposed Development, and largely screened from view by intervening topography.
- 5.4.69 At over 12 km the cumulative developments would have little or no adverse influence on the setting of the fort and the cumulative impact of the consented and proposed wind farm developments, in addition to and in combination with the Proposed Development, would constitute a change to its setting of negligible magnitude and **Minor** significance (**Not Significant** in EIA terms).

Airds Castle (SM 3177)

- 5.4.70 Viewpoint VP2 (**Figure 5.4b**, EIAR Volume 3b) shows that the consented High Constellation and Eascairt Wind Farms, and the proposed Earraghail Wind Farm would be visible in views to the north from the Scheduled Monument; the closest, High Constellation Wind Farm, being 10.7 km away. These cumulative developments would be visible on the skyline in distant views and viewed in a separately arc from the Proposed Development.
- 5.4.71 At over 10 km the cumulative developments would have little adverse influence on the setting of the castle ruins and the cumulative impact of the consented and proposed cumulative developments, in addition to and in combination with the Proposed Development, would

constitute a change to its setting of low magnitude and **Minor** significance (**Not Significant** in EIA terms).

Saddell House Fort (SM 3539)

5.4.72 Viewpoint VP4 (**Figure 5.6b**, EIAR Volume 3b) shows that the proposed Earraghail Wind Farm would be visible in views to the north from the Scheduled Monument in distant views around 30 km away and viewed separately from the Proposed Development. At this distance the cumulative development would have no appreciable adverse influence on the setting of the fort and the cumulative impact of the proposed Earraghail Wind Farm, in addition to and in combination with the Proposed Development, would constitute a change to its setting of negligible magnitude and **Minor** significance (**Not Significant** in EIA terms).

Machrie Moor, Stone Circles, Cairns, Hut Circles and Fields (SM 90207 & PiC 92)

5.4.73 Viewpoint VP9 (**Figure 5.11a**, EIAR Volume 3b) shows that the Proposed Development would be seen in the same arc of view as the consented High Constellation Wind Farm and the proposed Clachaig Glen and Killean Wind Farms. The consented and proposed developments would continue the line of existing wind turbines visible on the skyline in views to the west of the Scheduled Monument, on the opposite side of the Kilbrannan Sound. The Proposed Development would be the closest of these cumulative development to the Scheduled Monument.

5.4.74 From this viewpoint, at over 13 km away, the cumulative impact of the consented High Constellation Wind Farm and the proposed Clachaig Glen and Narachan Wind Farms in addition to and in combination with the Proposed Development would be of low magnitude and **Minor** significance (**Not Significant** in EIA terms).

5.5 Mitigation

5.5.1 Planning Advice Note 1/2013: Environmental Impact Assessment (PAN1/2013) describes mitigation as a hierarchy of measures: prevention, reduction, compensatory (offset) measures. Prevention and reduction measures can be achieved through design, whilst compensatory measures offset effects that have not been prevented or reduced.

5.5.2 The emphasis in Planning Advice Note (PAN) 2/2011: Planning and Archaeology (PAN2) is for the preservation of important remains in situ where practicable and by record where preservation is not possible. The mitigation measures presented below therefore take into account this planning guidance and provide various options for protection or recording and ensuring that, where practical, surviving assets are preserved intact to retain the present historic elements of the landscape.

Mitigation by Design

5.5.3 The results of the desk-based assessment and field survey were digitised as GIS data, showing the locations (and where relevant, the extent) of heritage assets. The layout of the Proposed Development, including the positioning of proposed wind turbines and the siting of other infrastructure, has subsequently been designed to avoid direct effects to assets within the Application Boundary and to minimise effects on the settings of heritage assets as far as possible. The Proposed Development layout therefore embeds design mitigation into the siting of the proposed wind turbines and the ancillary infrastructure.

Mitigation during Construction

- 5.5.4 All mitigation works presented in the following paragraphs would be secured by means of an appropriately worded planning condition and would take place prior to, or, where appropriate, during, the construction of the Proposed Development. All works would be conducted by a professional archaeological organisation, and the scope of works would be detailed in one or more Written Scheme(s) of Investigation (WSI) developed in consultation with (and subject to the agreement of) WoSAS, acting on behalf of ABC.
- 5.5.5 Based on the results of the desk-based study and the field survey, and taking account of the current forestry land-use, there are no specific areas where construction works are expected to encounter buried archaeological remains. It has also been assessed that there is a low to negligible potential for hitherto undiscovered archaeological remains to be present within the Application Boundary.

Watching Briefs

- 5.5.6 Monitoring of ground-breaking works in the form of an archaeological watching brief may be required, at the discretion of WoSAS, cultural heritage advisors to ABC. If required under the terms of a condition of consent, the scope of any required archaeological watching brief(s) would be agreed through consultation with WoSAS in advance of development works commencing and would be set out in the WSI.

Post-excavation

- 5.5.7 If archaeologically significant discoveries are made during archaeological monitoring, and it is not possible to preserve the discovered remains in situ, provision would be made for the excavation where necessary, of any archaeological deposits encountered. The provision would include the consequent production of written reports on the findings, with post-excavation analysis and publication of the results of the works, where appropriate.

Construction Guidelines

- 5.5.8 Written guidelines would be issued for use by all construction contractors, outlining the need to avoid causing unnecessary damage to known heritage assets. These guidelines would be set out within a detailed Construction Environmental Management Plan (CEMP), to be secured by means of a planning condition.
- 5.5.9 The guidelines would set out arrangements for calling upon retained professional support in the event that buried archaeological remains of potential archaeological interest (such as building remains, human remains, artefacts, etc.) should be discovered in areas not subject to archaeological monitoring.
- 5.5.10 The guidelines would make clear the legal responsibilities placed upon those who disturb artefacts or human remains.

Mitigation during Operation

- 5.5.11 As the built infrastructure would be used to facilitate maintenance, repair and replacement activities, no mitigation is required in relation to cultural heritage within the Application Boundary during the operational lifetime of the Proposed Development.

- 5.5.12 No mitigation measures are proposed in relation to the potential operational (setting) effects of the Proposed Development on the setting of heritage assets within the wider landscape.

Mitigation during Decommissioning

- 5.5.13 No predicted effects on cultural heritage assets have been identified during the decommissioning stage and accordingly no mitigation is considered necessary.

5.6 Assessment of Residual Effects

Residual Construction Effects

- 5.6.1 Taking the aforementioned recommended mitigation into account, there would be no significant residual direct effects on any cultural heritage assets within the Application Boundary.

Residual Operational Effects

- 5.6.2 The residual effects of the Proposed Development on the settings of designated heritage assets would be the same as the predicted operational effects described above (**Section 5.4**) and assessed in tabulated format in **Technical Appendix 5.2** (EIAR Volume 4).
- 5.6.3 One residual effect, on the setting of one Scheduled Monument, Saddell Abbey (SM 3645), has been assessed as being of **Moderate** significant (**Significant** in EIA terms) as the current rural setting of the abbey would be challenged to some degree by the introduction of the Proposed Development. However, the key contributors to the abbey ruin's significance would be retained and it would still be possible for any visitor to the abbey ruins to understand and appreciate these qualities. As such, the integrity of the setting of the monument and its capacity to inform and convey its cultural significance, would be unhindered and the impact of the Proposed Development would not amount to a significant adverse effect on the integrity of its setting (NPRF Policy 7 (h) ii).
- 5.6.4 All other impacts, affecting the settings of heritage assets in the surrounding landscape, would give rise to residual effects that would be of no more than **Minor** significance (**Not Significant** in EIA terms). These effects would be removed following decommissioning.

Residual Decommissioning Effects

- 5.6.5 There would be no residual direct effects arising from decommissioning of the Proposed Development.
- 5.6.6 Decommissioning the Proposed Development would remove the operational effects (impacts on their setting) on heritage assets, resulting in no residual effects.

Residual Cumulative Construction Effects

- 5.6.7 There would be no residual cumulative construction effects arising from the Proposed Development in combination with other cumulative developments.

Residual Cumulative Operational Effects

- 5.6.8 The assessment of potential cumulative effects has identified no significant cumulative impacts from the proposed development in combination with other development that are either

consented or in planning. All cumulative effects arising from the consented and proposed cumulative developments in combination with the Proposed Development would be of no more than **Minor** significance (**Not Significant** in EIA terms).

5.7 Monitoring

Construction Phase Monitoring

5.7.1 No monitoring is recommended.

Operation Phase Monitoring

5.7.2 No monitoring is recommended.

Decommissioning Phase Monitoring

5.7.3 No monitoring is recommended.

5.8 Summary

5.8.1 A desk-based assessment and a walk-over field survey have been carried out to establish the archaeology and cultural heritage baseline within the Application Boundary. The assessment has been informed by consultation responses provided by HES and WoSAS.

5.8.2 Three heritage assets were identified within the Inner Study Area. These are three groups of former shielings huts associated with summer grazing and usually considered to be of medieval or later date, although some have been dated to the prehistoric period. One of the groups of shieling huts, comprising 18 well-preserved huts, is assessed as being of heritage value at a regional level and of medium sensitivity; the other smaller groups of shieling huts are assessed as being of heritage value at a local level and of low sensitivity.

5.8.3 An assessment of the known cultural heritage resource within and in the immediate vicinity of the Inner Study Area, and the current and past land-use, indicates that there is a low to negligible likelihood of hitherto unidentified archaeological remains being present within the site.

5.8.4 No direct construction impacts are predicted on the three heritage assets recorded within the Inner Study Area and no specific detailed mitigation is recommended.

5.8.5 Mitigation is proposed to address the possibility that other archaeological remains could be discovered during construction work. Following application of the proposed mitigation, there would be no significant residual direct effects on cultural heritage.

5.8.6 Within 5 km of the outermost wind turbines there are eight Scheduled Monuments, two Category A Listed Buildings, eight Category B Listed Buildings and three Category C Listed Buildings. There are an additional 28 Scheduled Monuments, three Category A Listed Buildings and eight Category B Listed Buildings within 5 km to 10 km of the outermost wind turbines. This assessment has resulted in the identification of a **Moderate** significant effect (**Significant** in EIA terms) on the setting of one Scheduled Monument: Saddell Abbey (SM 3645). The Proposed Development would be a new element in the wider landscape surroundings of the abbey ruins, and the introduction of modern wind turbines into an otherwise rural, pastoral setting would result in a noticeable alteration to its current tranquil

landscape setting. However, the key contributors to the abbey ruin’s significance would be retained and it would remain possible for any visitor to the abbey ruins to understand and appreciate these qualities. As such the integrity of the setting of the monument and its capacity to inform and convey its cultural significance, would be unhindered and the impact of the Proposed Development would not amount to a significant adverse effect on the integrity of its setting (NPRF Policy 7 (h) ii).

- 5.8.7 All other effects on the settings of heritage assets within the Outer Study Area are assessed as being of no more than **Minor** significance (**Not Significant** in EIA terms).
- 5.8.8 There are no predicted significant cumulative impacts on heritage assets in the Inner Study Area or Outer Study Area from the Proposed Development in combination with other cumulative developments that are either consented or in planning.

Table 5.7: Summary of Potential Significant Effects of the Proposed Development			
Potential Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/Residual Effect
Operation			
Moderate adverse effect on the setting of Scheduled Monument, Saddell Abbey (SM 3645).	None proposed.	N/A	Significant

6 Ecology

6.1 Introduction

6.1.1 This Chapter considers the potential significant effects on ecology associated with the construction, operation and decommissioning of the Proposed Development. The specific objectives of this Chapter are to:

- describe the ecological baseline;
- describe the assessment methodology and significance criteria used in completing the impact assessment;
- describe the potential effects, including direct, indirect and cumulative effects on ecological features;
- describe the mitigation measures proposed to address potential significant effects; and
- assess the residual effects remaining following the implementation of mitigation.

6.1.2 The assessment has been carried out by Nadine Little of Ramboll UK Limited (Ramboll). Nadine is a principal ecological consultant and Associate member of the Chartered Institute of Environmental Management (CIEEM), with a Masters in Wildlife Biology and Conservation and over nine years' experience of undertaking ecology surveys and Ecological Impact Assessments (EcIA).

6.1.3 This chapter is supported by the following figures and technical appendices:

- Volume 3a: Figures
 - **Figure 6.1: Designated Sites;**
 - **Figure 6.2: Phase 1 Habitat Survey Results;**
 - **Figure 6.3: National Vegetation Classifications Survey Results;**
 - **Figure 6.4: Potential Groundwater Dependent Terrestrial Ecosystems;**
 - **Figure 6.5: Target Notes;** and
 - **Figure 6.6: Bat Detector Locations.**
- Volume 4: Technical Appendices
 - **Technical Appendix 6.1: Ecology Methodology and Results;**
 - **Technical Appendix 6.2: Fish and Aquatic Invertebrate Survey Report;** and
 - **Technical Appendix 6.3: Outline Habitat Management Plan.**

6.1.4 Figures and technical appendices are referenced in the text where relevant.

6.1.5 This assessment uses the below terminology throughout:

- Proposed Development – All elements of the West Torrisdale Wind Farm development for which S36 consent and deemed planning permission are sought.
- Application Boundary – The red line boundary defining all elements of the Proposed Development for the purpose of the S36 application.
- Wind Turbine Array – the location of the wind turbines comprising the Proposed Development.
- Access Corridor – the land within the Application Boundary in which the access track connect the Wind Turbine Array with the A83 road.
- Study Area – the area in which the EIA is undertaken, defined for each technical topic as appropriate.

6.2 Assessment Methodology and Significance Criteria

Scope of Assessment

- 6.2.1 This Chapter considers effects on the following ecological features:
- designated nature conservation sites;
 - habitats, such as peatlands and wetlands, potentially affected by habitat loss and fragmentation;
 - Groundwater Dependent Terrestrial Ecosystems (GWDTEs);
 - protected mammals, such as bats, otter *Lutra lutra* and pine marten *Martes martes*;
 - fish, such as brown trout *Salmo trutta*;
 - amphibians, such as common frog *Rana temporaria*; and
 - reptiles, such as common lizard *Zootoca vivipara*.
- 6.2.2 This Chapter assesses cumulative effects as arising from the addition of the Proposed Development to other cumulative developments, which are the subject of a valid planning application. Operational and under construction developments are considered as part of the baseline unless their full environmental effects are not yet felt and, therefore, cannot be accounted for in the baseline. Developments close to the end of their operational life will be included as part of the baseline to present a 'worst-case scenario'.
- 6.2.3 The assessment is based on the Proposed Development as described in **Chapter 2** (EIAR Volume 2) and has been completed in accordance with best practice EcIA guidelines from CIEEM¹.
- 6.2.4 Potential impacts and effects on ornithological features and forestry are addressed separately in **Chapter 7** and **Chapter 13** (EIAR Volume 2), respectively.
- 6.2.5 The scope of the assessment has been informed by consultation responses summarised in **Table 6.1** and the following guidelines/policies:
- EC Directive on the Conservation of Natural Habitats and Wild Flora and Fauna, 92/43/EEC 1992²;
 - Conservation of Habitats and Species (Amendment) (EU Exit) Regulation 2019³;
 - The Conservation of Habitats and Species Regulations 2017⁴;
 - Conservation (Natural Habitats Etc.) Regulations 1994⁵;
 - Wildlife and Countryside Act 1981⁶;

¹ CIEEM (2018), Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Marine. Version 1.2. Winchester: CIEEM.

² EC Directive on the Conservation of Natural Habitats and Wild Flora and Fauna, 92/43/EEC. URL: http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm [Accessed 17th February 2023].

³ The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations. URL: [https://www.legislation.gov.uk/ukdsi/2019/9780111176573#:~:text=%20The%20Conservation%20of%20Habitats%20and%20Species%20\(Amendment\),of%20capturing%20or%20killing%20fish%20are%E2%80%94%20More](https://www.legislation.gov.uk/ukdsi/2019/9780111176573#:~:text=%20The%20Conservation%20of%20Habitats%20and%20Species%20(Amendment),of%20capturing%20or%20killing%20fish%20are%E2%80%94%20More) [Accessed 17th February 2023].

⁴ The Conservation of Habitats and Species Regulations. URL: <https://www.legislation.gov.uk/ukdsi/2017/1012/contents/made> [Accessed 17th February 2023].

⁵ The Conservation (Natural Habitats Etc.) Regulations (as amended). URL: <http://www.legislation.gov.uk/ukdsi/1994/2716/contents/made> [Accessed 17th February 2023].

⁶ The Wildlife and Countryside Act (as amended). URL: <http://www.legislation.gov.uk/ukpga/1981/69> [Accessed 17th February 2023].

- Nature Conservation (Scotland) Act 2004⁷;
- Wildlife and Natural Environment (Scotland) Act 2011⁸;
- UK Post-2010 Biodiversity Framework 2012⁹;
- Town and Country Planning (Scotland) Act 1997¹⁰;
- The Electricity Works (Environmental Impact Assessment) (Scotland) Act 2017¹¹;
- The Ramsar Convention on Wetlands 1971¹²;
- National Planning Framework 4 (NPF4)¹³;
- UK Biodiversity Action Plan (BAP) 2010¹⁴;
- Scottish Biodiversity List (SBL) 2005¹⁵;
- 2020 Challenge 2013¹⁶;
- Argyll and Bute Local BAP¹⁷; and
- Argyll and Bute Biodiversity Duty Action Plan¹⁸.

Consultation

6.2.6 **Table 6.1** summarises the consultation responses received regarding ecology and provides information on where and/or how they have been addressed in this assessment.

6.2.7 Full details on the consultation responses can be reviewed in **Technical Appendix 1.1** (EIAR Volume 4).

Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
NatureScot (NS) 12 th May 2020	Consultation on survey scope	'Carry out National Vegetation Classification (NVC) surveys of any UK BAP priority habitats or Annex 1 habitats of the EC Habitats Directive ¹⁹ if these are found within the field survey area. Any new or modified access tracks that will be required to accommodate the Proposed Development will also need to be surveyed and assessed as part of	Targeted NVC survey of sensitive habitats (such as peatlands and wetlands) was undertaken, as detailed in Technical Appendix 6.1 (EIAR Volume 4). New or modified tracks within the Access Corridor were also surveyed and assessed as part of the EIA and results of the

⁷ Nature Conservation (Scotland) Act (as amended). URL: <http://www.legislation.gov.uk/asp/2004/6/contents> [Accessed 17th February 2023].

⁸ Wildlife and Natural Environment (Scotland) Act. URL: <http://www.legislation.gov.uk/asp/2011/6/enacted> [Accessed 17th February 2023].

⁹ UK Post-2010 Biodiversity Framework. URL: <http://jncc.defra.gov.uk/page-6189> [Accessed 17th February 2023].

¹⁰ Town and Country Planning (Scotland) Act. URL: https://www.legislation.gov.uk/ukpga/1997/8/pdfs/ukpga_19970008_en.pdf [Accessed 17th February 2023].

¹¹ Electricity Works (Environmental Impact Assessment) (Scotland) Regulations. URL: <http://www.legislation.gov.uk/ssi/2017/101/contents/made> [Accessed 17th February 2023].

¹² Ramsar Convention on Wetlands. URL: <http://www.ramsar.org/about-the-ramsar-convention> [Accessed 17th February 2023].

¹³ NPF4. URL: <https://www.gov.scot/publications/national-planning-framework-4/> [Accessed 17th February 2023].

¹⁴ UK BAP. URL: <http://jncc.defra.gov.uk/default.aspx?page=5155> [Accessed 17th February 2023].

¹⁵ SBL. URL: <https://www.nature.scot/scottish-biodiversity-list-documents> [Accessed 17th February 2023].

¹⁶ The 2020 Challenge. URL: <http://www.gov.scot/Publications/2013/06/5538> [Accessed 17th February 2023].

¹⁷ The Argyll and Bute Local BAP. URL: <https://www.argyll-bute.gov.uk/sites/default/files/Unknown/AandB%20BAP%20Draft.pdf> [Accessed 17th February 2023].

¹⁸ Argyll and Bute Biodiversity Duty Action Plan. URL: [https://www.argyll-](https://www.argyll-bute.gov.uk/sites/default/files/argyll_and_bute_council_biodiversity_duty_action_plan_final_version_april_2016_2.pdf)

[bute.gov.uk/sites/default/files/argyll_and_bute_council_biodiversity_duty_action_plan_final_version_april_2016_2.pdf](https://www.argyll-bute.gov.uk/sites/default/files/argyll_and_bute_council_biodiversity_duty_action_plan_final_version_april_2016_2.pdf) [Accessed 17th February 2023].

¹⁹ The Conservation of Habitats and Species Regulations. URL: <https://www.legislation.gov.uk/uksi/2017/1012/contents/made> [Accessed 17th February 2023].

Table 6.1: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
		the Environmental Impact Assessment (EIA). If you are unable to undertake the 2020 spring bat survey in May, due to COVID restrictions, we would also accept spring 2021 data.'	surveys are discussed in Section 6.3 of this Chapter. Where existing tracks were not proposed to be modified, no surveys were undertaken. The spring bat survey was undertaken in 2021 as surveyors were not able to get out to the Site in 2020 due to COVID restrictions. The methodology of this survey is provided in Technical Appendix 6.1 (EIAR Volume 4).
NS 26 th March 2021	Scoping opinion	'Any new tracks should be subject to appropriate ecological surveys and assessment. If track widening works are required then ecological surveys should also be conducted in those areas if there is a possibility of protected species or habitats being present.'	New or modified tracks within the Access Corridor were also surveyed and assessed as part of the EIA and results of the surveys are discussed in Section 6.3 of this Chapter. Where existing tracks were not proposed to be modified, no surveys were undertaken.
		'Avoid the siting of turbines and associated infrastructure on areas of nationally important peatland and areas of deep peat. The EIAR should demonstrate that any significant effects have been substantially overcome by siting, design or other mitigation. Details of all mitigation, including a peatland management plan and a habitat management plan should be included in the EIAR.'	The layout of the Proposed Development has, as far as possible, been designed to avoid habitats of highest ecological importance and highest sensitivity to impacts. This was considered by this assessment to include high-quality and active peatlands and areas of deep peat, where possible. Where any significant effects occur, mitigation has been proposed and is detailed in Section 6.5 . An Outline Peatland Management Plan (OPMP) is provided as Technical Appendix 9.3 and an Outline Habitat Management Plan (OHMP) is provided as Technical Appendix 6.3 (EIAR Volume 4).
NS 21 st December 2021	Pre-gatecheck meeting	'NS would welcome information on habitat management/restoration proposals and where compensation planting/habitat restoration is proposed in relation to the Site.'	Habitat management and restoration proposals, including compensatory planting, are detailed in the OHMP in Technical Appendix 6.3 (EIAR Volume 4). Compensatory woodland planting is also detailed in Chapter 13 (EIAR Volume 2).
		'If the Deucheran Hill Wind Farm operational life is extended, the Proposed Development should consider how to tie into their Habitat Management Plan (HMP).'	The Deucheran Hill Wind Farm operational life extension was screened in September 2019 as being a non-EIA development, but no application to extend the

Table 6.1: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
			<p>operational life of Deucheran Hill Wind Farm has been submitted to ABC. Reference to the Deucheran Hill Wind Farm HMP has been included in the OHMP for the Proposed Development in Technical Appendix 6.3 (EIAR Volume 4).</p> <p>The Deucheran Hill Wind Farm habitat enhancement programme²⁰ aims to provide an increase in good quality heather habitat. The management area comprises over 400 ha, with up to 200 ha for new areas of heather. Measures include bracken spraying, reduced grazing pressure and tree removal.</p>
Marine Scotland Science (MSS) July 2020	Scoping opinion	<p>A scoping response was not received but generic MSS scoping guidance outlines how fish populations can be impacted during the construction, operation and decommissioning of a wind farm development and informs developers as to what should be considered in relation to freshwater and diadromous fish and fisheries, during the EIA process.</p> <p>'In addition to identifying the main watercourses and waterbodies within and downstream of the Proposed Development area, the Applicant should identify and consider, at this early stage, any areas of Special Areas of Conservation (SACs) where fish are a qualifying feature and proposed felling operations particularly in acid sensitive areas.'</p>	<p>MSS scoping guidance has been followed during the EIA process.</p> <p>No SACs where fish are a qualifying feature are present within or downstream of the Wind Turbine Array. The impact of felling operations is considered in Chapter 13 (EIAR Volume 2). While the Proposed Development crosses a number of watercourses, the design has aimed to locate infrastructure at least 50 m from watercourses, where possible. The design and assessment of watercourse crossings is provided in Technical Appendix 8.2 (EIAR Volume 4).</p>
		<p>'The Applicant will be required to provide a gate check checklist in advance of their application submission that should signpost the Energy Consents Unit (ECU) to where all matters relevant to freshwater and diadromous fish and fisheries have been presented in the EIAR.'</p>	<p>The MSS EIA checklist has been reviewed to confirm that the EIA contains the required information. A figure of the Proposed Development is provided as Figure 2.1 (EIAR Volume 3a). Fish surveys and results are detailed in Technical Appendix 6.2 (EIAR Volume 4) and Section 6.3 of this Chapter. Potential impacts and cumulative</p>

²⁰ Appendix B: Deucheran Hill Habitat Enhancement Programme. URL: <https://portal360.argyll-bute.gov.uk/my-requests/document-viewer?DocNo=20563101> [Accessed 24th May 2023].

Table 6.1: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
			impacts are considered in Section 6.4 of this Chapter. Mitigation measures are proposed in Section 6.5 of this Chapter.
		<p>'The Applicant should specifically discuss and assess potential impacts and appropriate mitigation measures associated with the following:</p> <ul style="list-style-type: none"> ▪ any designated area, for which fish is a qualifying feature, within and/or downstream of the Proposed Development area; ▪ the presence of a large density of watercourses; ▪ the presence of large areas of deep peat deposits; ▪ known acidification problems and/or other existing pressures on fish populations in the area; and ▪ proposed felling operations.' 	Potential impacts and appropriate mitigation measures are detailed in Sections 6.4 and 6.5 of this Chapter, respectively. No designated areas for fish occur within or downstream of the Wind Turbine Array. There is also no large density of watercourses or large areas of deep peat present in the field survey area (Section 6.2.12 of this Chapter). No acidification problems and/or other existing pressures on fish populations are known to occur in the area. Potential impacts and mitigation measures associated with felling operations are detailed in Chapter 13 (EIAR Volume 2).
		'MSS recommends that a water quality and fish population monitoring programme is carried out to ensure that the proposed mitigation measures are effective. A robust, strategically designed and site-specific monitoring programme conducted before, during and after construction can help to identify any changes, should they occur, and assist in implementing rapid remediation before long-term ecological impacts occur. If the Applicant considers that such a monitoring programme is not required then a clear justification should be provided.'	A water quality and fish population monitoring programme were not considered to be required as no fish were recorded in the field survey area.
Fisheries Management Scotland (FMS) 22 nd February 2021	Scoping opinion	'The Proposed Development falls within the catchment relating to the Argyll District Salmon Fisheries Board (ADSF) and Argyll Fisheries Trust (AFT). It is important that the proposals are conducted in full consultation with both organisations.'	Both organisations were contacted during the Scoping stage but no response was received.
		'We strongly recommend that MSS guidelines are fully considered through planning, construction and monitoring phases of the Proposed Development.'	MSS guidelines have been followed.
Royal Society for		'The EIAR should include a full survey, impact assessment and	Habitat surveys have been completed within the field

Table 6.1: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
the Protection of Birds (RSPB) 16 th March 2021	Scoping opinion	proposals for mitigation in relation to important habitats on this Site. Mitigation should ideally minimise any impact and avoid areas of high-quality habitats found on the Site. 'Particular attention should be given to peatland. The majority of the Site falls into Class 5 on NS's Carbon and Peatland map ²¹ . Ten of the proposed 12 turbines would be situated on Class 5 however Turbines 11 and 12 seem to be being proposed to be placed on Class 2 peatland.'	survey area and the methodology is detailed in Technical Appendix 6.1 (EIAR Volume 4). Impacts on habitats and any mitigation required are detailed in Section 6.4 and 6.5 , respectively, of this Chapter. As far as possible, the design of the Proposed Development has sought to avoid high-quality habitats. The layout has now reduced to nine turbines, with repositioning of the remaining turbines to avoid deeper peat and sensitive habitats, where possible.
		'The EIAR should consider what mitigation measures are required to minimise the impact on important species and contain detailed ecological justification for any such proposals. Ideally, this should include relevant time frames for mitigation in relation to Site development.'	Mitigation measures required for ecological features are included in Section 6.5 of this Chapter, including time frames, where relevant.
ECU 26 th April 2021	Scoping opinion	'Scottish Ministers request the Applicant review MSS's generic scoping guidelines for both onshore wind farm and overhead line development, which outline how fish populations can be impacted during the construction, operation and decommissioning of a wind farm development and informs developers as to what should be considered, in relation to freshwater and diadromous fish and fisheries, during the EIA process.'	MSS guidelines have been followed.
		'Scottish Ministers are aware that the majority of the peatland within site boundary is Class 5. However, the northeast corner of the Site is located within a Class 2 peatland area. Additionally, if the access route approaches the site from the west through Beinn an Tuirc, then there is Class 1 peatland in this area. Class 1 peat comprises nationally important carbon-rich soils, deep peat and priority peatland habitat. Therefore, track design should be given careful consideration. Scottish Ministers recommend early engagement with SEPA and	The layout of the Proposed Development has, as far as possible, been designed to avoid habitats of highest ecological importance and highest sensitivity to impacts. This was considered by this assessment to include high-quality and active peatlands and areas of deep peat, where possible. Where any significant effects occur, mitigation has been proposed and is detailed in Section 6.5 of this Chapter.

²¹ Carbon and Peatland 2016 Map. URL: <https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/> [Accessed 8th March 2023].

Table 6.1: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
		to take on board advice provided by Argyll and Bute Council (ABC) and NS.'	
ABC 20 th April 2021	Scoping opinion	'The EIAR should identify the location of all built elements, which should be sited to avoid habitats of importance, wetlands, areas of deep peat and blanket bog, watercourses and abstractions, in order that areas of particular vulnerability to damage from development, or which have higher pollution sensitivity, may be protected from unnecessary impacts associated with the Proposed Development.'	The layout of the Proposed Development has, as far as possible, been designed to avoid sensitive ecological features, such as blanket bog and wetlands. Where any significant effects occur, mitigation has been proposed and is detailed in Section 6.5 of this Chapter.
		'The Local Biodiversity Officer (LBO) notes that nearby designations include: Sites of Special Scientific Interest (SSSIs) and Special Protection Areas/Important Bird Areas (SPAs/IBAs).'	The location of SSSIs in relation to the Application Boundary is shown on Figure 6.1 (EIAR Volume 3a). No impacts are predicted and this is detailed in Section 6.4 of this Chapter and Technical Appendix 6.1 (EIAR Volume 4). SPAs/IBAs are considered in Chapter 7 (EIAR Volume 2).
		'The LBO requests a more detailed survey on habitats affected by the access routes to the footings of the turbines and treatment of excavations and further information on borrow pits.'	This survey has been undertaken and the methodology is described in Technical Appendix 6.1 (EIAR Volume 4). Results are provided in Section 6.3 of this Chapter. The treatment of excavations and further information on Borrow Pits is provided in Chapter 2 (EIAR Volume 2) and Technical Appendix 9.3 (EIAR Volume 4).
		'The LBO notes that no ecological surveys have been completed therefore requests that the following surveys are carried out: <ul style="list-style-type: none"> ▪ European Protected Species (EPS) - otter and bat species; ▪ other species: red squirrel <i>Sciurus vulgaris</i>, badger <i>Meles meles</i>, pine marten and fish species; and ▪ identify any Invasive Non-Native Species (INNS). 'All surveys should be carried out at the optimum time of year by a suitably qualified person and include mitigation.'	Ecological surveys for protected and notable species, and INNS, were undertaken in June and November 2021. While the November 2021 surveys were completed outwith the optimum time of year for surveying habitats, it involved a much smaller area to cover the Access Corridor to the Wind Turbine Array. However, the habitats were similar to those already recorded elsewhere in the field survey area (plantation woodland, peatland and wetland), therefore, no limitations on the survey results are considered to exist. Mitigation is included for

Table 6.1: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
			significant effects and as standard good practice, as detailed in Section 6.5 of this Chapter.
		'The scoping layout indicates that 2 of the turbines (T11 and T12) will be located on Class 2 Peatland on the Carbon and Peatland Map (2016), which are nationally important carbon rich soils. In terms of the Spatial Framework detailed in Scottish planning policy, the site would fall within Group 2: Areas of Significant Protection due to the presence of Class 2 Peatland. Recognising the need for significant protection, in these areas wind farms may be appropriate in some circumstances. In accordance with Scottish planning policy, further consideration will be required to demonstrate that any significant effects on the qualities of these areas can be substantially overcome by siting, design or other mitigation. Prior to design freeze repositioning of these turbines should be a consideration.'	The layout has now reduced to nine turbines, with repositioning of these turbines to avoid deeper peat and sensitive habitats, where possible.
Scottish Environment Protection Area (SEPA) 27 th October 2021	Post-scoping consultation	'We are satisfied with the GWDTE assessment and appreciate the thorough evidence to back up the conceptual model of the water supply to wetlands on the Site. We agree with the conclusions that the wetlands on-site are unlikely to be dependent on groundwater.'	Noted.
		'In relation to mitigation, we welcome the proposals to maintain surface water runoff and connection to surface waterbodies to minimise impact to the wetland habitats on-site. We look forward to further detail on this within the full EIA. Please note the nature conservation value of the wetland communities should inform any prioritisation of mitigation efforts to benefit the wetlands.'	Details on maintaining surface water runoff and hydrological connectivity in wetland habitats are provided in Section 6.5 of this Chapter. Wetlands have been prioritised based on their geographic importance, as described in Technical Appendix 6.1 (EIAR Volume 2).
SEPA 5 th December 2022	Gatecheck response	'The EIA should also demonstrate that appropriate buffers have been implemented for the Site design to sensitive receptors such as GWDTEs, water features and private water supplies.'	Appropriate buffers have been used, where possible. Where not possible, mitigation is proposed to protect potential GWDTEs and water features, as detailed in Section 6.5 of this Chapter. The protection of Private Water Supplies (PWS)

Table 6.1: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
			is detailed in Chapter 8 (EIAR Volume 2).

Potential Effects Scoped Out

Habitats

6.2.8 Habitats assessed to be of less than local value are scoped out from further consideration in the assessment on the basis that, given their low ecological value, effects on these habitats would not be considered significant in terms of the EIA regulations. Accordingly, coniferous woodland plantation, recently felled coniferous woodland, continuous bracken, bare peat and other habitat (existing access tracks) have been scoped out of this assessment. These habitats are not included under legislative or conservation lists as a priority habitat types. Felling impacts and effects on coniferous woodland plantation are considered in **Chapter 13** (EIAR Volume 2).

Protected and Notable Species (Badger, Red Squirrel, Water Vole and Wildcat)

6.2.9 No records of these species were recorded and the habitats in the field survey area are considered to be of low suitability for badger, red squirrel and (Scottish) wildcat *Felis silvestris grampia*, therefore, they are not considered further in the assessment. Suitable habitat for water vole *Arvicola amphibius* is restricted to peripheral marshy, meanders situated downstream of the Lussa bridge, though no field signs were recorded throughout the field survey area. This species is also not considered further in the assessment.

6.2.10 Surveying for these species would still be included in the standard pre-construction protected species survey, as detailed in **Section 6.5**.

Invertebrates

6.2.11 Surveys of this species group were considered unnecessary as the EcIA adopts a precautionary approach and includes appropriate mitigation, where required, to avoid significant effects.

Method of Baseline Characterisation

Extent of the Study Area

6.2.12 The ecology Study Area comprises a desk Study Area and a field survey area as shown on **Figure 6.1** and **Figure 6.2** (EIAR Volume 3a).

6.2.13 The desk Study Area comprises the field survey area and a 10 km buffer beyond the Wind Turbine Array and a 2 km buffer beyond the Access Corridor. This area is considered to represent the Zone of Influence (ZOI) in which impacts on ecological features could occur.

6.2.14 The field survey area comprises the area within the Wind Turbine Array and up to 250 m beyond. Field surveys were also undertaken around the Access Corridor but to a lesser extent due to the low potential for an impact upon features in this area since only sections where rock slope outcrops are present would need to be upgraded, plus track widening to the south and southwest of the Wind Turbine Array.

Desk Study

6.2.15 A desk study to collect existing baseline data for the ecology Study Area, such as the location of designated nature conservation sites or other natural features of potential ecological importance, was undertaken, drawing upon the following data sources:

- NatureScot (NS) Sitelink²²;
- Scotland's Environment Carbon and Peatland map²³; and
- Multi-Agency Geographic Information for the Countryside website (MAGIC)²⁴.

6.2.16 Further details of desk study methodology are provided in **Technical Appendix 6.1** (EIAR Volume 4).

Field Survey

6.2.17 The following field surveys were undertaken, with their methodology described in **Technical Appendix 6.1** (EIAR Volume 4):

- Phase 1;
- targeted NVC;
- protected species;
- bat activity and roost assessment; and
- fish habitat assessment, aquatic invertebrate sampling and electro-fishing.

6.2.18 An additional field survey was undertaken in October 2024 to confirm the conditions on site remain the same as identified previously.

Criteria for the Assessment of Effects

6.2.19 Impact assessment methodology, excluding the criteria for assessing significance detailed below, is described in **Technical Appendix 6.1** (EIAR Volume 4).

Criteria for Assessing Significance

6.2.20 An effect is considered to be either significant or not significant. For the purposes of EcIA, a significant effect is an effect that either supports or undermines biodiversity conservation objectives for important ecological features or for biodiversity in general. In broad terms, significant effects encompass impacts on the structure and function of defined sites, habitats or ecosystems and the conservation status of habitats or species (including extent, abundance and distribution)²⁵. Significant effects are assessed with reference to the geographical importance of the ecological feature. However, the scale of significance of an effect may not be the same as the geographic context in which the feature is considered important. For example, a significant effect on a species protected by national legislation does not necessarily equate to a significant effect on its national population.

6.2.21 For the purposes of this EcIA, apart from in exceptional circumstances, a significant effect, as referenced by the Electricity Works (Environmental Impact Assessment) (Scotland)

²² NS SiteLink. URL: <https://sitelink.nature.scot/home> [Accessed 16th February 2023].

²³ Scotland's Environment Carbon and Peatland Map. URL: <https://map.environment.gov.scot/sewebmap/> [Accessed 16th February 2023].

²⁴ MAGIC Map. URL: <http://magic.defra.gov.uk/> [Accessed 16th February 2023].

²⁵ CIEEM, (2018), Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.2. Winchester: CIEEM.

Regulations 2017²⁶, is only considered to be possible where the feature in question is considered to be of regional, national, or international importance. That is not to say that impacts from the Proposed Development could not result in significant effects on features of county or local importance, simply that those effects are not likely to be significant under EIA Regulations, unless the effect is likely to undermine biodiversity conservation objectives (such as local policies for no net loss) or biodiversity in general. Whether an effect at local or county importance is considered to be significant or not significant under the EIA Regulations is made clear in the impact assessment of each ecological feature.

Limitations and Assumptions

- 6.2.22 It should be noted that the availability and quality of the data obtained during desk studies is reliant on third party responses and recorders. This varies from region to region and for different species groups. Furthermore, the comprehensiveness of data often depends on the level of coverage, the expertise and experience of the recorder and the submission of records to the local recorder.
- 6.2.23 The habitat and faunal surveys provide a snapshot of ecological conditions and do not record plants or animals that may be present in the ecology Study Area at different times of the year. The absence of a particular species cannot be confirmed definitively by a lack of field signs and only concludes that an indication of its presence was not located during the survey effort. However, surveys for faunal species were undertaken during optimal periods for locating field signs.
- 6.2.24 Surveys were impacted by coronavirus restrictions where the spring season of bat surveys was unable to be completed in April/May 2020 and was instead completed in April/May 2021, meaning the bat activity data collected was split across two years instead of being collected all in the same year. This approach was agreed with NS, as detailed in **Table 6.1** and is not considered to be a limitation on the bat activity data collected. Due to the change in layout of the Proposed Development from Scoping to the final design, the bat detectors were not placed exactly at final turbine locations as the surveys were undertaken based on the Scoping layout. This is not considered to be a limitation as the detectors had good coverage of the field survey area and all of the habitats within it.

6.3 Baseline Conditions

Current Baseline

Statutory Designated Nature Conservation Sites

- 6.3.1 No statutory designated nature conservation sites for ecological features occur within the field survey area, as shown on **Figure 6.1** (EIAR Volume 3a). The statutory designated nature conservation sites for ecological features that occur in the desk Study Area are not considered to have potential connectivity with the Proposed Development, as detailed in **Technical Appendix 6.1** (EIAR Volume 4). As a result, no statutory designated nature conservation sites for ecological features are considered further in this Chapter.

²⁶ Electricity Works (Environmental Impact Assessment) (Scotland) Regulations. URL: <http://www.legislation.gov.uk/ssi/2017/101/contents/made> [Accessed 17th February 2023].

Non-statutory Designated Nature Conservation Sites

- 6.3.2 There are no areas of woodland identified as ancient woodland²⁷ in the field survey area or impacted by the Proposed Development, as shown on **Figure 6.1** (EIAR Volume 3a). An area of ancient woodland occurs 500 m to the northeast of the Wind Turbine Array but is separated from the Wind Turbine Array by Torrisdale Water and a steep gorge, therefore no impact pathways are considered to exist, and this area is not considered further in the assessment. The woodland within the Application Boundary occurs on the semi-natural woodland inventory.
- 6.3.3 Native and Ancient Woodlands are important for biodiversity and nature conservation. Ancient Woodland is defined as an area of woodland that has been continually wooded since 1750, and there is a strong presumption in Scottish Planning Policy against the removal of woodland on Ancient Woodland sites²⁸. However, the woodland included on the semi-natural woodland inventory in the ecology Study Area is primarily coniferous woodland plantation, which offers limited support for biodiversity and is, therefore, not considered further in this assessment.

Argyll and Bute Local BAP

- 6.3.4 The ecology Study Area is located in the Argyll and Bute BAP area²⁹. The BAP covers the period of 2010-2015 but is yet to be updated. It should be read in conjunction with the Argyll and Bute Biodiversity Duty Action Plan³⁰. The priority habitats and species present in Argyll and Bute and included in the BAP that are relevant to the Proposed Development based on the habitats and species recorded in the field survey area, are detailed in **Table 6.2**.

Habitat	Species
Atlantic woodland	Lichen species
Native Caledonian pinewoods	Bats
Peatlands (blanket bog and heath)	Otter
Planted conifer forest	Red deer <i>Cervus elaphus</i>
Wet woodland	Red squirrel
Standing and running water	Brown hare <i>Lepus europaeus</i>
Upland flushes, fens and swamps	Water vole
Purple moor-grass <i>Molinia caerulea</i> and rush pastures	(Scottish) Wildcat
	Atlantic salmon <i>Salmo salar</i>
	Adder <i>Vipera berus</i>

²⁷ A Guide to Understanding the Ancient Woodland Inventory. URL: <https://www.nature.scot/sites/default/files/2018-11/A%20guide%20to%20understanding%20the%20Scottish%20Ancient%20Woodland%20Inventory%20%28AWI%29.pdf> [Accessed 9th March 2023].

²⁸ The Scottish Government's Policy on Control of Woodland Removal. URL: <https://forestry.gov.scot/publications/285-the-scottish-government-s-policy-on-control-of-woodland-removal/viewdocument/285> [Accessed 9th March 2023].

²⁹ The Argyll and Bute Local BAP (2010-2015). URL: <https://www.argyll-bute.gov.uk/sites/default/files/Unknown/AandB%20BAP%20Draft.pdf> [Accessed 9th March 2023].

³⁰ Argyll and Bute Biodiversity Duty Action Plan (2016-2021). URL: https://www.argyll-bute.gov.uk/sites/default/files/argyll_and_bute_council_biodiversity_duty_action_plan_final_version_april_2016_2.pdf [Accessed 9th March 2023].

Field Surveys

6.3.5 Full details of the results of the field surveys undertaken for the Proposed Development are provided in **Technical Appendix 6.1** (EIAR Volume 4). Summarised results are provided in this Chapter.

PHASE 1 HABITATS

6.3.6 The dominant habitats present in the field survey area are coniferous woodland plantation, wet heath and marshy grassland, as shown on **Figure 6.2** (EIAR Volume 3a). Target notes are shown on **Figure 6.5** (EIAR Volume 3a) and described in **Table 6.1.14** in **Technical Appendix 6.1** (EIAR Volume 4). Potentially sensitive habitats recorded in the field survey area are detailed in **Table 6.3**³¹.

Habitat Type	Area within Field Survey Area (m ²)
A1.1.1 Semi-natural Broadleaved Woodland	42,724.71
A2.2 Scattered Scrub	28,520.31
B5 Marshy Grassland	255,537.52
D1 Dry Heath	1,072.75
D2 Wet Heath	562,913.26
E1.6.1 Blanket Bog	278,475.94
E1.7 Wet Modified Bog	18,825.35

6.3.7 Running water habitat is also present in the field survey area, including Torrisdale Water and Lephincorrach Burn. A number of watercourse crossings occur as part of the Proposed Development and further details are provided in **Technical Appendix 8.2** (EIAR Volume 4).

6.3.8 *Rhododendron ponticum*, an INNS, was recorded throughout the field survey area, as shown by Target Notes 1, 8, 10, 13, 15-20, 22-24, 27 and 30 on **Figure 6.5** (EIAR Volume 3a).

GWDTEs

6.3.9 The habitats classified during NVC surveys are shown on **Figure 6.3** (EIAR Volume 3a). The NVC results were used to determine the potential groundwater dependency of the habitats present in the field survey area. Two high, four high/moderate and four moderate potential GWDTEs were recorded, as shown on **Figure 6.4** (EIAR Volume 3a), with their NVC types shown on **Figure 6.3** (EIAR Volume 3a). **Table 6.4** provides further information on the potential GWDTEs recorded in the field survey area. **Technical Appendix 6.1** (EIAR Volume 4) provides full details on the full names of all NVC communities, which have been shortened here for ease.

³¹ The area within the Proposed Development footprint is considered in **Section 6.4**. This is the baseline of what is present in the field survey area and is used to calculate the percentage loss shown in **Tables 6.7 to 6.8**.

Table 6.4: Potential GWDTEs and their Extent		
NVC Community	Groundwater Dependency³²	Area within Field Survey Area (m²)
M6, M6a and M6d	High	206,651.71
U16c		189,725.62
M6/W1 and M6/U20/W1	High/Moderate	72,416.65
M23/W1		26,206.89
M19/M23/M25		64,630.22
U16/M15/H12		96,536.20
M15c	Moderate	236,185.16
MG9		2,816.20
MG9/M15/H12		2,670.51
MG10a		101,164.04

- 6.3.10 Further information on the hydrological and hydrogeological sensitivity and an assessment of the groundwater dependency of the potential GWDTEs is provided in **Technical Appendix 8.1** (EIAR Volume 4). However, in consultation with SEPA, it has been agreed that the wetlands present in the field survey area are unlikely to be dependent on groundwater. As a result, these habitats are not considered further in relation to groundwater dependency in this assessment. These habitats are still considered further in relation to other impacts, such as habitat loss, as detailed in **Section 6.4**.

PROTECTED AND NOTABLE SPECIES

BATS

- 6.3.11 Full details of the results of the bat surveys are provided in **Technical Appendix 6.1** (EIAR Volume 4). The locations of bat detectors are shown on **Figure 6.6** (EIAR Volume 3a).
- 6.3.12 Five bat species comprising common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *P. pygmaeus*, brown long-eared bat *Plecotus auritus*, noctule *Nyctalus noctula*, and *Myotis spp.*³³ were recorded in the field survey area. **Table 6.5** provides a summary of the bat activity recorded at each detector per season. No roosting locations or trees suitable for bat roosts were recorded in the field survey area. The most common bat species in the field Study Area was soprano pipistrelle, followed by common pipistrelle.

³² Guidance on Assessing the Impacts of Wind farm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems. URL: https://www.sepa.org.uk/media/143868/lupsgu31_planning_guidance_on_groundwater_abstractions.pdf [Accessed 1 April 2021].

³³ Unlike many other bat species, *Myotis spp.* do not have a specific call frequency but sweep through all frequencies very rapidly. As a result, even computer analysis software cannot identify the species with any particular accuracy. Given the location of the field survey area, it is likely that the *Myotis spp.* records are Daubenton's bat *Myotis daubentonii*.

Detector Name	Closest Turbine and Distance Away ³⁴	Number of Bat Passes			Phase 1 Habitat Type at Detector Locations	Total Number of Passes per Detector
		Spring	Summer	Autumn		
BD-T11 (Anabat 2)	T5 (187.5 m)	1	0	1	Coniferous woodland plantation and wet heath	2
BD-T06 (Anabat 4)	T4 (196.3 m)	0	8	0	Coniferous woodland plantation	8
BD-T01 (Anabat 5)	T1 (437.5 m)	7	67	43	Coniferous woodland plantation and wet heath	117
BD-T08 (Anabat 6)	T3 (337.5 m)	0	0	8	Recently felled coniferous woodland	8
BD-T10 (Anabat 7)	T6 (137.5 m)	0	1	0	Coniferous woodland plantation	1
BD-T03 (Anabat 8)	T1 (312.5 m)	30	59	47	Coniferous woodland plantation, running water and marshy grassland	136
BD-T02 (Anabat 10)	T1 (62.5 m)	1	0	1	Coniferous woodland plantation	2
BD-T09 (Anabat 12)	T6 (125 m)	3	102	0	Recently felled coniferous woodland, wet heath and wet modified bog	105
BD-T13 (Anabat 13)	T9 (287.5 m)	3	3809	534	Recently felled coniferous woodland	4346
BD-T12 (Anabat 14)	T7 (175 m)	0	0	2	Coniferous woodland plantation and wet heath	2
BD-T05 (Anabat 15)	T2 (50 m)	1	228	36	Coniferous woodland plantation and wet heath	265
Total Number of Passes per Season		46	4274	672		

6.3.13 Overall bat activity in the field survey area was low (<200 bat passes per night) for all species across all seasons, except for soprano pipistrelle at detector BD-T13 where the activity was moderate (>200 bat passes per night) for four nights in August 2020.

PROTECTED TERRESTRIAL MAMMALS

6.3.14 Target notes for protected and notable terrestrial mammals are shown on **Figure 6.5** (EIAR Volume 3a) and described in **Technical Appendix 6.1** (EIAR Volume 4). The following protected and notable terrestrial mammals were recorded:

- Possible pine marten scat in the southwest of the field survey area (Target Note 3). Suitable habitat for a pine marten den was recorded on the route of the access track within the Wind Turbine Array, though no den was found (Target Note 28);

³⁴ The only turbine not mentioned in **Table 6.5** is Turbine T8. The closest bat detector to Turbine T8 was detector BD-T12 at 300 m away.

- Otter spraints on Lephincorrach Burn (Target Notes 5 and 6) and Torrisdale Water and its tributaries (Target Notes 9, 11 and 21); and
- Hare *Lepus sp.* scat beside Lephincorrach Burn (Target Note 4), likely mountain hare *L. timidus*.

6.3.15 No confirmed protected dwellings (such as pine marten dens or otter holts) were recorded in the field survey area.

FRESHWATER INVERTEBRATES

6.3.16 Full details of the freshwater invertebrate survey is provided in **Technical Appendix 6.2** (EIAR Volume 4). The main findings are summarised below.

6.3.17 A total of 23 freshwater invertebrates were recorded across the six sampling sites (17 in Torrisdale Water and 18 in Lephincorrach Burn). On Torrisdale Water, the water quality as determined by invertebrate species present, changed from high to poor to moderate within a short downstream distance, though the habitat itself did not seem to be particularly poor. This could have occurred from a chronic water quality problem or poor quality invertebrate habitat. On Lephincorrach Burn, two of the sites were good and the third was moderate, giving no indication of recent pollution or disturbance.

FISH POPULATION AND HABITAT SURVEYS

6.3.18 Full details of the fish survey are provided in **Technical Appendix 6.2** (EIAR Volume 4). The main findings are summarised below.

6.3.19 No fish were recorded in the field survey area. Brown trout were recorded at two sites downstream of the field survey area on both Torrisdale Water and Lephincorrach Burn.

6.3.20 Much of the habitat surveyed appeared suitable for brown trout, but the habitat is fragmented by high gradient river channel sections and obstacles to the upstream migration of fish. Patches of suitable habitat may be too small to support a population of trout. Smaller, coarse riverbed substrates also appear to be unstable, which may affect the productivity of spawning sites and aquatic invertebrates. However, three potential spawning sites were found in Torrisdale Water and five in Lephincorrach Burn, as detailed in **Technical Appendix 6.2** (EIAR Volume 4), though none of these occur within 50 m of the Application Boundary.

REPTILES AND AMPHIBIANS

6.3.21 Target notes for reptiles and amphibians are shown on **Figure 6.5** (EIAR Volume 3a) and described in **Technical Appendix 6.1** (EIAR Volume 4).

6.3.22 Common frog (Target Notes 7 and 14) and common lizard (Target Note 12) were recorded in the field survey area. Suitable habitat for adder was also present along the Access Corridor (Target Note 29) but no sightings were recorded.

UPDATE SURVEY VISIT

6.3.23 An update survey visit was undertaken by Ramboll ecologists in October 2024. The extent of the Application Boundary was surveyed to ensure the habitats identified previously were still present. All habitats previously identified were still present, with the only difference being some areas of conifer woodland that has been felled. Felled areas were recorded immediately south of the Wind Turbine Array, adjacent to the access track and adjacent to the access track immediately east of Beinn an Tuirc Wind Farm.

Future Baseline

- 6.3.24 The future baseline of the field survey area under the “do nothing” scenario is unlikely to change significantly in the absence of the Proposed Development. The coniferous woodland plantation is likely to be harvested by clear fell methods in rotating sections (coupes) before the trees reach maturity at 40-70 years. Without the Proposed Development, the forest would likely be felled within the next two decades. These areas would typically be restocked with a coniferous species dominant mix, albeit possibly with some smaller areas of broadleaved woodland. **Chapter 13** (EIAR Volume 2) contains further details on the future felling schedule for the area.
- 6.3.25 The peatland habitats are considered unlikely to change significantly in the absence of the Proposed Development as the open habitats would continue to be impacted and shaped by afforestation and grazing. The majority of habitats are already modified by the surrounding coniferous woodland plantation and grazing by deer, which are expected to continue. Therefore, the distribution of species present within the field survey area is unlikely to change significantly in the future. However, climate change may have an effect on future species distribution. Temporary to long-term displacement of forest species is likely as coniferous woodland plantations are clear felled and replanted and species recolonise the previously displaced area.

Summary of Sensitive Ecological Features

- 6.3.26 A summary of the ecological features identified from the scope of the assessment in **Section 6.2** as being sensitive to the potential impacts of construction, operation or decommissioning of the Proposed Development and that have, as a result, been ‘scoped-in’ to the assessment is given in **Table 6.6**, together with the rationale for their inclusion. Features scoped out of the assessment are detailed in **Section 6.2**.

Feature	Sensitivity	Justification
Broadleaved woodland and scrub	Local	Woodland covers approximately 19 % of Scotland, with under a quarter of these woodlands considered native ³⁵ . The SBL ³⁶ includes terrestrial woodland habitats, including upland birchwood. Three scattered areas of this woodland type occurs in the field survey area, with scrub limited to the Access Corridor. Native woodland cover is relatively scarce across the wider ecology Study Area. All broadleaved woodlands play an important role in the ecosystem, offering shelter and foraging opportunities for a wide range of protected and notable species, including specialists and generalists. As such, woodland and scrub are considered to be of local importance.
Wetlands (marshy grassland)	Local	Wetlands are sensitive to changes in hydrology and hydrogeology and are a priority under the Water Environment and Water Services (Scotland) Act ³⁷ . The examples of marshy grassland in the field survey area are generally in good condition, with increased diversity and naturalness compared to the surrounding habitats, such as coniferous woodland plantation. Due to the small and fragmented patches present in the woodland rides of the field survey area, with larger expanses elsewhere in the

³⁵ Walton, P., Eaton, M., Stanbury, A., Hayhow, D., Brand, A., Brooks, S., Collins, S., Duncan, C., Dundas, C., Foster, S., Hawley, J., Kinninmonth, A., Leatham, S., Nagy-Vizitiu, A., Whyte, A., Williams, S., and Wormald, K., (2019), The State of Nature Scotland 2019. The State of Nature Partnership.

³⁶ The Scottish Biodiversity List. URL: <https://www.nature.scot/scottish-biodiversity-list-documents> [Accessed 14th March 2023].

³⁷ Water Environment and Water Services (Scotland) Act. URL: <https://www.legislation.gov.uk/asp/2003/3/contents> [Accessed 14th March 2023].

Feature	Sensitivity	Justification
		ecology Study Area, this feature is considered to be of local importance.
Peatlands (blanket bog, wet modified bog, and dry and wet heath)	Regional (blanket bog) County (wet modified bog, and dry and wet heath)	<p>These habitat types are included in Annex 1 of the EC Habitats Directive³⁸ and are sensitive to environmental change, such as changes to hydrology, carbon function, species composition and nutrient status. Much of the peatland habitat in the UK is in poor condition due to damage from anthropogenic activities such as drainage, grazing and peat extraction.</p> <p>The examples of blanket bog within the field survey area are of varying condition and subject to modification and Access Corridor but do include areas of higher floral diversity of active peat-forming species and the presence of pools. However, there are peatlands within Argyll and Bute in better condition than those found within the field survey area. The blanket bog in the field survey area does not have continuous units that are greater than 25 ha and although it supports peat-forming vegetation, a low frequency of drains/peat cutting and a natural surface pattern, it does not support indicators of national importance³⁹, such as an abundance of bog-moss-rich ridges and hummocks or hollows with brown beak-sedge <i>Rhynchospora fusca</i>. There is some woodland invasion from adjacent areas of coniferous woodland plantation. As such, this feature is considered to be of no more than regional importance.</p> <p>The wet modified bog within the field survey area lacks significant peat-forming vegetation and is generally poorer quality, with low species diversity and rare or absent bog-moss <i>Sphagnum sp.</i> However, this habitat has the potential to recover and return to active, peat-forming blanket bog, therefore this feature is considered to be of county importance.</p> <p>The wet and dry heath within the field survey area is also of varying condition, with some areas supporting peat-forming vegetation and other areas dominated by common heather <i>Calluna vulgaris</i> and deer grass <i>Trichophorum cespitosum</i>. As such, this feature is also considered to be of county importance.</p>
Running water	Local	Two main watercourses (Torrisdale Water and Lephincorrach Burn, and their tributaries) within the field survey area. Standing and running water provides habitat for otter, water vole, amphibians, fish and invertebrates. As a result, this feature is considered to be of local importance.
INNS (rhododendron)	Local	<p>Reduce plant diversity through competition and the formation of dense stands. Rhododendron is subject to legal controls under Schedule 9 of the Wildlife and Countryside Act 1981⁴⁰. This Act was amended by the Wildlife and Natural Environment (Scotland) Act 2011⁴¹ to enable Scotland to adopt a recognised approach to dealing with INNS. Under these Acts, it is illegal to allow INNS to spread (whether intentionally or recklessly).</p> <p>Rhododendron occurs throughout the ecology Study Area and the further spread of this species is likely without appropriate mitigation, therefore this feature is considered to be of local importance, especially as it is also widespread in the surrounding area.</p>

³⁸ EC Directive on the Conservation of Natural Habitats and Wild Flora and Fauna. URL:

http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm [Accessed 14th March 2023].

³⁹ Advising on Carbon-rich Soils, Deep Peat and Priority Peatland Habitat in Development Management. RL: <https://www.nature.scot/doc/advising-carbon-rich-soils-deep-peat-and-priority-peatland-habitat-development-management> [Accessed 14th March 2023].

⁴⁰ : <http://jncc.defra.gov.uk/page-1377> [Accessed 28/06/17]

⁴¹ <http://www.legislation.gov.uk/asp/2011/6> [Accessed 28/06/17]

Feature	Sensitivity	Justification
Bats	County	Bats are an EPS under the EC Habitats Directive ⁴² . Bat activity is moderate for soprano pipistrelle in the east and low across the rest of the field survey area for all other species. Activity is dominated by common pipistrelle and soprano pipistrelle, which are two common species that are at a high risk of adverse effects on their populations, with two other species present (brown long-eared bat and <i>Myotis spp.</i>) that are at a low risk of adverse effects on their populations. The fifth species (noctule) is at high risk of adverse effects on its populations but was recorded at a very low level (two passes in total across all seasons). Bat species are considered to be of county importance.
Pine marten	Local	This species receives full protection under Schedule 5 of the Wildlife and Countryside Act 1981 ⁴³ and certain methods of killing or taking pine martens are illegal under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) ⁴⁴ . Pine marten is also an SBL species ⁴⁵ . The Mammal Society ⁴⁶ reported that there has been an increase in the geographical range and population size of pine marten, with a continuous expansion in Scotland over the last 20 years, which is predicted to continue. Given the low level of activity recorded in the field survey area, with a single potential scat recorded, the population of pine marten is considered to be of local importance.
Otter	Local	Otter is classified as an EPS under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) ⁴⁷ . Otter is also an SBL species ⁴⁸ . Since the 1990s, otters have been considered widespread throughout Scotland. The most recently reported national survey results (2011-12) recorded otter presence at approximately 80 % of sampled sites (which included all 44 SACs designated for otter in Scotland and other random sites across the countryside). This has slightly decreased since the previous national survey in 2003-04 but could be due to factors affecting detectability, such as weather ⁴⁹ . The Mammal Society ⁵⁰ also reports an increase in the geographical range and population size of otter, predicted to continue increasing. Given the low level of activity recorded in the field survey area, with five spraints recorded and no protected dwellings present, the population of otter is considered to be of local importance.

⁴² EC Directive on the Conservation of Natural Habitats and Wild Flora and Fauna, 92/43/EEC. URL:

http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm [Accessed 14th March 2023].

⁴³ The Wildlife and Countryside Act (as amended) (1981): <http://www.legislation.gov.uk/ukpga/1981/69> [Accessed 17th August 2021].

⁴⁴ The Conservation (Natural Habitats Etc.) Regulations (as amended) (1994): <http://www.legislation.gov.uk/uksi/1994/2716/contents/made> [Accessed 17th August 2021].

⁴⁵ The Scottish Biodiversity List (2005): <https://www.nature.scot/scottish-biodiversity-list-documents> [Accessed 17th August 2021].

⁴⁶ Mathews, F., Kubasiewicz, L.M., Gurnell, J., Harrower, C.A., McDonald, R.A., Shore, R.F. (2018), *A Review of the Population and Conservation Status of British Mammals: Technical Summary*. Natural England: Peterborough.

⁴⁷ The Conservation (Natural Habitats Etc.) Regulations (as amended). URL: <http://www.legislation.gov.uk/uksi/1994/2716/contents/made> [Accessed 17th February 2023].

⁴⁸ The Scottish Biodiversity List. URL: <https://www.nature.scot/scottish-biodiversity-list-documents> [Accessed 17th February 2023].

⁴⁹ Trends of Otters in Scotland. URL: <https://www.nature.scot/trend-notes-otters-scotland> [Accessed 17th February 2023].

⁵⁰ Mathews, F., Kubasiewicz, L.M., Gurnell, J., Harrower, C.A., McDonald, R.A., Shore, R.F. (2018), *A Review of the Population and Conservation Status of British Mammals: Technical Summary*. Peterborough: Natural England.

Feature	Sensitivity	Justification
Mountain hare	Local	Mountain hares are protected under Schedule 5 of the Wildlife and Countryside Act (as amended) ⁵¹ and are a species of 'Community interest' listed on Annex V of the Habitats Directive ⁵² . Given the very low level of activity recorded in the field survey area (one scat), mountain hares are likely to be common in the heather moorland outwith the Application Boundary and only use the woodland within the Application Boundary occasionally for cover. As a result, they are considered to be of local importance.
Fish (brown trout)	Local	Brown trout is a priority species in the UK BAP ⁵³ but receives little protection within conservation legislation. Brown trout was not recorded in the field survey area, with the species only recorded in two sites downstream of the field survey area, therefore, fish species are considered to be of local importance.
Reptiles and amphibians (common lizard and common frog)	Local	Common lizard is protected from intentional or reckless killing or injury under the Wildlife and Countryside Act (1981) ⁵⁴ . Common frog receives limited protection under this Act and only against trade. These species are also widespread in the ecology Study Area ^{55,56} , therefore, they are considered to be of local importance.

6.4 Assessment of Potential Effects

Potential Construction Effects

Habitats

- 6.4.1 Construction activities have the potential to degrade or destroy terrestrial habitats either directly through excavation, compaction or modification (e.g. vegetation removal) or indirectly as a result of dewatering or from the accidental release of fuels, lubricants or other chemicals. The construction of nine permanent turbine hardstanding areas, permanent access tracks and a substation would cause permanent habitat loss. The construction of potentially three borrow pits, a construction compound, security compound, two material storage areas, and a laydown area would cause temporary habitat loss in the short- to medium-term until habitats are reinstated following completion of the Proposed Development. The effects per habitat type is considered below.
- 6.4.2 **Figure 6.2** (EIAR Volume 3a) shows the Proposed Development overlaid on the habitats mapped using Phase 1 methodology.
- 6.4.3 **Table 6.7** and **Table 6.8** set out the percentage of permanent and temporary habitat loss⁵⁷ by habitat type within the field survey area, respectively. Direct habitat loss during construction includes the working areas for each turbine site (turbine base and hardstanding area⁵⁸), the area of proposed new access track (running width a minimum of 4.5 m, with

⁵¹ The Wildlife and Countryside Act (as amended) (1981): <http://www.legislation.gov.uk/ukpga/1981/69> [Accessed 17th August 2021].

⁵² The Conservation of Habitats and Species Regulations. URL: <https://www.legislation.gov.uk/uksi/2017/1012/contents/made> [Accessed 17th February 2023].

⁵³ UK BAP. URL: <http://jncc.defra.gov.uk/default.aspx?page=5155> [Accessed 17th February 2023].

⁵⁴ The Wildlife and Countryside Act (as amended). URL: <http://www.legislation.gov.uk/ukpga/1981/69> [Accessed 17th February 2023].

⁵⁵ Common Lizard: <https://www.arc-trust.org/common-lizard> [Accessed 17th February 2023].

⁵⁶ Common Frog: <https://www.arc-trust.org/common-frog> [Accessed 17th February 2023].

⁵⁷ Calculated using ArcPro from landtake and infrastructure data provided by the Applicant.

⁵⁸ During habitat loss calculations, there was no distinction between areas of permanent hardstanding and temporary laydown areas within the data provided by the Applicant, therefore, as a worst-case scenario, all these areas were considered to result in permanent habitat loss.

0.25 m wide shoulders on each side and 1.5 m wide cable trenches), and the working areas for the substation, borrow pits and construction compound and laydown area⁵⁹. Indirect habitat modification is calculated as a 10 m buffer around the areas of direct habitat loss as this is considered to represent the worst-case scenario of habitat that is likely to be indirectly modified by the Proposed Development.

		Direct Habitat Loss		Indirect Habitat Modification/ Degradation	
Habitat	Total Habitat in Field Survey Area (m ²)	Area Lost (m ²)	Percentage Lost (%)	Area Modified (m ²)	Percentage Modified (%)
B5 Marshy Grassland	255,537.52	2,876.45	1.13	17,401.03	6.81
D2 Wet Heath	562,913.26	4,743.47	0.84	17,048.56	3.03
E1.6.1 Blanket Bog	278,475.94	3,224.29	1.16	9,893.17	3.55
E1.7 Wet Modified Bog	18,825.35	1,664.92	8.84	2,218.80	11.79
Totals	1,115,752.07	12,509.13	1.12	46,561.56	4.17

		Direct Habitat Loss		Indirect Habitat Modification/ Degradation	
Habitat	Total Habitat in Field Survey Area (m ²)	Area Lost (m ²)	Percentage Lost (%)	Area Modified (m ²)	Percentage Modified (%)
B5 Marshy Grassland	255,537.52	8.08	0.003	160.99	0.063
D2 Wet Heath	562,913.26	1,124.65	0.20	980.93	0.17
Totals	818,450.78	1,132.73	0.14	1,141.92	0.14

6.4.4 The permanent loss or degradation of marshy grassland would comprise 20,277.48 m² (7.94%) of the total recorded in the field survey area⁶¹. The temporary loss or degradation of marshy grassland would comprise 169.07 m² (0.07%) of the total recorded in the field survey area. This would be a moderate magnitude impact⁶² due to the potential to disrupt the functioning of the habitat, especially as the marshy grassland in the field survey area is

⁵⁹ The existing access track to be upgraded would involve the excavation of rock slope outcrops at two discrete corners, and widening from the temporary material storage area to the proposed wind turbines, which have been covered by field surveys, as shown on **Figure 6.2** (EIAR Volume 3a). No other construction work along the existing access track outwith these areas is proposed and there would, therefore, be no effect on habitats in these areas.

⁶⁰ There would be no temporary loss of blanket bog or wet modified bog as a result of the Proposed Development.

⁶¹ The habitats within the field survey area are considered to be representative of the habitats present in the ecology Study Area e.g. the habitats present in the field survey area are not rare or significantly different to the habitats present in the ecology Study Area. As a result, the use of the field survey area to consider percentage loss of any given habitat is considered to be appropriate for this assessment.

⁶² Impact assessment methodology, including the characterisation of impacts, is described in **Technical Appendix 6.1** (EIAR Volume 4).

fragmented within the woodland rides and is already subject to modification from the surrounding coniferous woodland plantation. As marshy grassland is sensitive to changes in hydrology, loss of this feature would be considered an adverse effect on a feature of local importance.

- 6.4.5 The permanent loss or degradation of wet heath would comprise 21,792.03 m² (3.87%) of the total recorded in the field survey area. The temporary loss or degradation of wet heath would comprise 2,105.58 m² (0.37%) of the total recorded in the field survey area. This would be a moderate magnitude impact due to the potential to disrupt the functionality of the habitat, especially as the wet heath in the field survey area is fragmented within the woodland rides and is already subject to modification from the surrounding coniferous woodland plantation. As wet heath is an Annex 1 habitat⁶³, loss of this feature would be considered an adverse effect on a feature of county importance.
- 6.4.6 The permanent loss or degradation of blanket bog would comprise 13,117.46 m² (4.71%) of the total recorded in the field survey area. No blanket bog would be temporarily lost or degraded. The permanent loss or degradation would be a moderate magnitude impact due to the potential to disrupt the functionality of the habitat, especially as the blanket bog in the field survey area is fragmented within the woodland rides and is already subject to modification from the surrounding coniferous woodland plantation. As blanket bog is an Annex 1 habitat⁶⁴, blanket bog on the Kintyre peninsula has been greatly disturbed by afforestation/other anthropogenic activities and much of the blanket bog in Scotland is in poor condition, further loss or degradation of this feature would be considered an adverse effect on a feature of regional importance.
- 6.4.7 The permanent loss or degradation of wet modified bog would comprise 3,883.72 m² (20.63%) of the total recorded in the field survey area. No wet modified bog would be temporarily lost or degraded. Although wet modified bog has the potential to return to blanket bog, the examples in the field survey area are species-poor and would likely require active restoration measures in the medium-term to return to blanket bog. As a result, although the permanent loss or degradation would be a moderate magnitude impact, it would not be considered an adverse effect given the habitat quality.
- 6.4.8 Due to the proximity of running water to the Proposed Development, there is potential for pollution or surface water run-off to enter this habitat. Although the magnitude and duration of the impact would depend on the nature of the pollution event, based on a precautionary approach, it has been considered to result in an adverse effect on a feature of local importance. The effect would be localised to watercourse crossing areas, with most running water habitat protected from construction activities by a 50 m buffer. Details on the number of watercourses that are within and outwith the watercourse buffer are provided in **Technical Appendix 8.2** (EIAR Volume 4), with the locations of all crossings shown on **Figure 8.2** (EIAR Volume 3a).

INNS

- 6.4.9 Rhododendron plant material and the surrounding soil (soil within 7 m of these species) can cause ecological damage and is subject to legal control to prevent its spread. The affected

⁶³ EC Directive on the Conservation of Natural Habitats and Wild Flora and Fauna, 92/43/EEC. URL: http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm [Accessed 14th March 2023].

⁶⁴ EC Directive on the Conservation of Natural Habitats and Wild Flora and Fauna, 92/43/EEC. URL: http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm [Accessed 14th March 2023].

plant and soil is classified as controlled waste, which means it can only be removed and disposed of by a licensed waste removal expert at an authorised landfill site. Construction of the Proposed Development could cause the spread of rhododendron through transfer of contaminated plant material or soil where infrastructure occurs close to the INNS, such as at Target Notes 8, 16, 23, 27 and 30, as shown on **Figure 6.5** (EIAR Volume 3a). This would be considered an adverse effect.

Bats

- 6.4.10 No bat roosts would be disturbed, destroyed or damaged as a result of construction activities. Construction has the potential to result in a short-term, low magnitude displacement impact on bats that forage and commute in the coniferous woodland plantation, particularly as areas of the plantation are removed. The Proposed Development would involve a combination of keyholing and clear felling of entire coupes back to the edge of the Wind Turbine Array or management boundaries. All coupes where turbines are proposed would be fully felled, with replanting allowed up to a 100 m radius Wind Protection Zone (WPZ) around the turbines. This would leave areas of functioning habitat and linear features for foraging and commuting bats within the field survey area, as shown on **Figure 13.6** (EIAR Volume 3a). As a result, this would not be considered an adverse effect.

Pine Marten

- 6.4.11 No protected dens would be disturbed, destroyed or damaged during construction. Construction of the Proposed Development would result in the permanent loss of coniferous woodland plantation suitable for use by pine marten. This is considered to be a low magnitude impact in the context of the available habitat resource remaining in the ecology Study Area. Construction activity would also likely have a localised, negligible magnitude and infrequent disturbance impact on this species at a low level given the low activity of pine marten within the Application Boundary. As a result, this would not be considered an adverse effect.

Otter

- 6.4.12 No protected holts or resting areas would be disturbed, destroyed or damaged during construction. Construction of the Proposed Development in the vicinity of the watercourses, such as Torrisdale Water and its tributaries, has the potential to disturb otter moving along the watercourses as a result of noise, vibration or light. Most construction activities would occur a minimum of 50 m from watercourses, except at watercourse crossings. A small area of habitat is likely to be lost but is unlikely to extend beyond 15 m at each watercourse crossing. Full details of conceptual watercourse crossing design is provided in **Technical Appendix 8.2** (EIAR Volume 4). Disturbance would be localised to watercourse crossings and would be a short-term, low magnitude impact on this species given the low level of activity of this species in the field survey area. No barriers to movement along the watercourses would exist following construction. As a result, this would not be considered an adverse effect.
- 6.4.13 Pollution from the accidental release of fuels, lubricants or other chemicals as well as changes in drainage patterns and silt released into aquatic habitats could directly affect otter e.g. from contact with corrosive substances or by coating fur, or indirectly by reducing fish numbers, though the fish population within the field survey area is low/absent. The magnitude and duration of the impacts would depend on the nature of the pollution event but, based on a precautionary approach, this would be considered an adverse effect on an ecological feature of local importance.
- 6.4.14 Construction impacts could also result in the direct injury/accidental death of individual otter from increased vehicle traffic on existing and new tracks. However, the low vehicle speed

limits would reduce the magnitude and frequency of this impact, and this would not be considered an adverse effect.

Mountain Hare

- 6.4.15 Construction activities could result in the direct disturbance or injury/accidental death of individual mountain hares e.g. from vehicle collisions. Construction activities could also have the potential to degrade or destroy mountain hare habitat either directly as a result of, for example, excavation, compaction, or modification (e.g. vegetation removal, covering) or indirectly as a result, for example, of dewatering, or from the accidental release of fuels, lubricants or other chemicals. Some activities could cause permanent degradation or destruction, for example where turbine foundations are constructed or permanent new access tracks are formed, but in most cases, impacts from construction would be on a common species and would be of a temporary and negligible magnitude due to the availability of habitat in the surrounding area and the small extent of habitat involved, therefore, this would not be considered an adverse effect. Mountain hares are also extremely unlikely to be involved in vehicle collisions due to the swift movement and timid nature of this species, therefore impacts would be of a negligible magnitude and this would not be considered an adverse effect.

Fish

- 6.4.16 Construction impacts have the potential to result in the degradation or destruction of aquatic habitats, either directly by excavation or compaction, or indirectly by pollution from the accidental release of fuels, lubricants or other chemicals as well as changes in drainage patterns and silt released into aquatic habitats. Direct effects are considered unlikely due to the protective 50 m buffer around watercourses and the avoidance of work in the watercourse at watercourse crossings, where possible. Most watercourse crossings are on minor watercourses not suitable for fish, as detailed in **Technical Appendix 8.2** (EIAR Volume 4), and no fish were recorded in the field survey area, therefore an adverse effect is unlikely. Brown trout were recorded downstream of the field survey area at a low density, therefore, a high magnitude pollution event could affect this species further downstream, though is unlikely to lead to a high fish kill given the low population numbers.

Reptiles and Amphibians

- 6.4.17 Construction impacts could result in the direct disturbance or injury/accidental death of individual reptiles and amphibians (e.g. from vehicle collisions). Construction activities could also have the potential to degrade or destroy reptile and amphibian habitat either directly (e.g. from excavation, compaction, or habitat modification) or indirectly (e.g. from dewatering, or from the accidental release of fuels, lubricants or other chemicals). Some activities could cause permanent degradation or destruction, for example where turbines are constructed or permanent new access tracks are formed, but in most cases, impacts would be temporary and negligible magnitude due to the small area of habitat involved, and on common and low-sensitivity species groups. As a result, this would not be considered an adverse effect. Reptiles and amphibians are also unlikely to be involved in vehicle collisions due to the swift movement and timid nature of these species groups, particularly common lizard, which is the only one protected by legislation from intentional or reckless killing or injury. As a result, impacts would be of a negligible magnitude and this would not be considered an adverse effect.

Potential Operational Effects

Habitats and Protected and Notable Species

- 6.4.18 Operational impacts on habitats (terrestrial and aquatic), pine marten, otter, and reptiles and amphibians are considered possible through the accidental spillage of fuels, chemicals and lubricants during maintenance works, leading to habitat loss or degradation. This could be an adverse effect, though would be localised to watercourse crossing areas for aquatic habitats and species, with most watercourses occurring a minimum of 50 m from Application Boundary.
- 6.4.19 Operational and maintenance impacts could result in the direct disturbance or injury/accidental death of individual pine marten or otter e.g. from vehicle collisions. However, these species are considered extremely unlikely to be involved in vehicle collisions due to their swift movement, timid nature and crepuscular/nocturnal peak activity when vehicles are unlikely on-site. The activity level in the field survey area was also extremely low. Therefore, impacts would be of a negligible magnitude and would not lead to an adverse effect.

INNS

- 6.4.20 No operational impacts are considered to occur on INNS as all operational activities would occur from access tracks and infrastructure that were established during the construction stage.

Bats

- 6.4.21 The highest level of activity occurred at detector BD-T13 in the east of the field survey area around Torr a' Ghobhainn, as shown on **Figure 6.6** (EIAR Volume 3a). Given this pattern of moderate activity in the east for soprano pipistrelle and low activity of bat passes across the rest of the field survey area throughout the bat activity season, it is considered to be likely that the moderate activity recorded in summer 2020 represents repeated passes by a low number of individual bats. This could have been caused by a foraging opportunity given the felled and open moorland habitats in this area i.e. the hatch of a large number of flying invertebrates at that time that caused a low number of individual bats to swarm in the area. Additionally, there are no features, such as a suitable mature tree or potential roost locations, in the vicinity that would account for the brief but sudden increase in bat passes detected at this location in summer 2020. Bat activity at this location was low in spring 2021 and autumn 2020, which could be attributed to a lack of invertebrate foraging due to season and/or lower temperatures.
- 6.4.22 The main operational impact on bat species is direct collision with wind turbines leading to bat fatalities. It is unlikely that internal haemorrhaging due to indirect barotrauma is responsible for a significant number of bat fatalities, with collision the more likely cause of the majority of bat fatalities around wind turbines⁶⁵.
- 6.4.23 Overall, the field survey area is considered to support a low number of individual foraging and commuting bats dominated by common and widespread species, such as common and soprano pipistrelle, with most activity at a low level across the survey season. Given the results of the bat surveys that indicate a low number of individual bats, the field survey area is not considered to support important bat populations, although pipistrelle species and noctule are at high risk of collision with turbines, with medium and high population

⁶⁵ Lawson, M., Jenne, D., Thresher, R., Houck, D., Wimsatt, J., Straw, B., (2020), An Investigation into the Potential for Wind Turbines to Cause Barotrauma in Bats. PLoS ONE 15(12): e0242485.

vulnerability, respectively⁶⁶. The risk to pipistrelle species from collision is considered to be low when taking into account the moderate activity recorded in the east of the field survey area given the location of the proposed substation in this area and the nearest turbine occurring more than 250 m to the north. The risk to noctule from collision is considered to be low when taking into account the very low level of activity recorded across the field survey area. Whilst direct collision would be adverse impacts, these are considered to involve a low number of individuals from roosts in unknown locations in the wider area. A potential roost location in the wider area includes buildings that are situated more than 1 km from the nearest turbine (Turbine T9) at Glenhead and Lephincorrach Farm. The data suggest that in the eastern part of the field survey area closest to this potential roost location, there is an increase in bat activity over the summer months compared to the rest of the field survey area. As a result, the effect of collision in the eastern part of the field survey area over the summer months is considered to be adverse due to this higher level of activity.

- 6.4.24 Indirect impacts of wind turbines on bats also include disturbance and displacement from foraging, commuting or migrating areas. A moderate magnitude of disturbance and displacement is likely to occur where bat activity is moderate in the east of the field survey area, especially as some of the habitat would be removed for the proposed substation. However, this is considered to involve a low number of individual bats and would not lead to an adverse effect. As bat activity is low in the rest of the field survey area, the magnitude of this impact is considered to be low.

Potential Decommissioning Effects

- 6.4.25 Decommissioning impacts would involve personnel and machinery accessing locations across the field survey area to dismantle and remove infrastructure, including turbines, hardstanding and site buildings, as detailed in **Chapter 2** (EIAR Volume 2). Concrete foundations would be broken down to approximately 0.5 m below ground level. The access tracks and electrical cables would be left in-situ to minimise habitat disturbance. The overall impacts of decommissioning would be short-term, intermittent and temporary. Existing access tracks would be used to access the infrastructure to be decommissioned. Construction compounds would be re-installed at the same locations used during construction, where possible i.e. on habitats previously disturbed by the construction of the Proposed Development. As a result, no adverse effects on habitats are predicted, with habitats allowed to recover and regenerate following the removal of infrastructure.
- 6.4.26 There may be a temporary and short-term disturbance impact on protected species, such as pine marten and otter, in the field survey area but this would be restricted to the access tracks and other infrastructure and is not considered to be an adverse effect.

Potential Cumulative Construction Effects

- 6.4.27 Arncliffe Wind Farm is an in-scoping cumulative development located approximately 2 km to the west of the Application Boundary. The scoping report for the development details that there is the potential for significant effects on peatland habitats, bat species and otter in the absence of mitigation. However, proposed mitigation would include the avoidance of deep peat, a 50 m protective watercourse buffer and suitable buffer distances between turbines and features used by bat species to reduce any potential impacts to non-significant levels. An

⁶⁶ SNH, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter and the Bat Conservation Trust, (2019), SNH, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter and the Bat Conservation Trust (2019), Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation.[Accessed 16th February 2023].

HMP would also be produced that would aim to restore a greater area of peatland than the area lost as a result of the development.

- 6.4.28 Blary Hill Wind Farm is an operational cumulative development that was completed in early 2022 and is located approximately 4 km to the west of the Application Boundary. The EIA for the development details that it would lead to a loss of 1.5 ha of peatland habitat, which is not considered to be significant as it involves wet modified bog rather than blanket bog. Further disturbance of otter would also occur, though this was not considered to be significant.
- 6.4.29 Clachaig Glen Wind Farm is a consented and in-planning cumulative development located approximately 5 km to the northwest of the Application Boundary. The EIA for the development details that it would lead to a loss of 2 ha of peatland habitat, which is considered to be significant for blanket bog. Further disturbance of otter would also occur, though this was not considered to be significant.
- 6.4.30 Narachan Wind Farm is an in-planning cumulative development located approximately 8 km to the north of the Application Boundary. The EIA for the development details that it would lead to a loss of 2.62 ha of blanket bog following a reduction in the number of proposed turbines from 17 to 11, plus disturbance of otter, though neither effect was considered to be significant.
- 6.4.31 Cnoc Buidhe Wind Farm is an in-scoping cumulative development located approximately 10 km to the southwest of the Application Boundary. The scoping report for the development details that the site is dominated by coniferous woodland plantation, with smaller areas of blanket bog and wet heath. Protected species surveys were still to be undertaken. As a result, the cumulative development is likely to lead to the loss of peatland habitat. Proposed mitigation would include the avoidance of deep peat, a 50 m protective watercourse buffer and suitable buffer distances between turbines and features used by bat species to reduce any potential impacts.
- 6.4.32 Coalashee Wind Farm an in-scoping cumulative development located approximately 9 km to the northeast of the Application Boundary. The scoping report for the development details that habitat or protected species surveys have not yet been completed but there is likely to be peatland habitats present, alongside bat species and otter. The EIA for the development will aim to demonstrate that significant biodiversity enhancement will be undertaken.
- 6.4.33 Tangy IV Wind Farm is a consented cumulative development located approximately 9 km to the southwest of the Application Boundary. The EIA for the development details that it would lead to the loss of 1.51 ha peatland habitat, none of which is in a favourable condition or considered to be of national importance.
- 6.4.34 In summary, the cumulative loss of peatland from the Proposed Development (2.91 ha) in addition to the cumulative developments⁶⁷ loss of 7.63 ha, is considered to be low, especially when also viewed in terms of the habitat resource available within the cumulative developments and the wider area. A cumulative disturbance impact to otters is also considered to be likely.

⁶⁷ The cumulative developments in the assessment are considered to be relevant as they occur within the 10 km ZOI and are projects that have either been applied, consented or refused but are subject to appeal, as detailed in **Technical Appendix 6.1** (EIAR Volume 4). Habitat loss areas were not present for the in-scoping developments since they are at an early stage in the planning process and not all surveys have been undertaken.

Potential Cumulative Operational Effects

- 6.4.35 Arnicle, Cnoc Buidhe and Coalashee Wind Farms are in the scoping stage, therefore, bat collision risk data is not yet available. However, it is considered that there is potential for a cumulative collision risk for these developments, though it is likely to be low given the similarity of the habitats with the Proposed Development.
- 6.4.36 Within the EIAR, Blary Hill Wind Farm was considered to have a medium risk for bat collision but it was not significant due to the low level of bat activity recorded.
- 6.4.37 Within the EIAR, Clachaig Glen Wind Farm was considered to have a medium risk for bat collision.
- 6.4.38 Within the EIAR, Narachan Wind Farm was considered to be low risk for bat collision but the effect of bat mortality was considered to be significant due to the site supporting a small population so any loss could be of a high magnitude at a population level.
- 6.4.39 Within the EIAR, Tangy IV Wind Farm was considered to lead to a non-significant effect from bat collision due to the low level of bat activity recorded.
- 6.4.40 In summary, despite the low levels of bat activity and the absence of roosts, there is the potential for a cumulative effect on bats from collision mortality, whereby the combined low levels of activity are considered to become a moderate level of activity when assessed cumulatively.

6.5 Mitigation

Mitigation by Design

- 6.5.1 The layout of the Proposed Development has, as far as possible, been designed to avoid the habitats of highest ecological importance and with the highest sensitivity to impacts, as detailed in **Chapter 2** and **Chapter 3** (EIAR Volume 2). This was considered in this Chapter to include active peatlands and deep peat, where possible. The majority of turbines have been positioned in areas of poorer quality peatland. Where it has not been possible to entirely avoid blanket bog or wet heath habitats, turbines have been positioned as close to the edge of areas of those habitat types and on the shallowest peat, to reduce impacts on the natural functions of those habitats. Furthermore, where the Proposed Development occurs in areas of blanket bog, as far as possible, the locations have been selected to avoid those areas of higher quality, active and deep peat. Peat depth >1 m has been avoided by the design of the Proposed Development, therefore floating roads are not required.
- 6.5.2 Measures also taken into account during design include micro-siting to avoid good quality and active peatland and, where required, features incorporated into access tracks, such as hydrological culverts to minimise the potential effects on the hydrological characteristics of peatland and wetland habitats. Further details of hydrological mitigation to reduce the significance of potential adverse effects on the hydrology are described in **Chapter 8** (EIAR Volume 2).
- 6.5.3 The WPZ, a buffer of 100 m from turbines to the nearest woodland, has been applied as a mitigation measure for all bat species and is larger than the standard 50 m buffer⁶⁸. This is

⁶⁸ SNH, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter and the Bat Conservation Trust, (2019), SNH, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter and the Bat Conservation Trust (2019), Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation.[Accessed 16th February 2023].

considered to be adequate mitigation in most lower collision-risk situations, such as those found across the majority of the Wind Turbine Array, excluding turbines T7 and T9.

Mitigation during Construction

- 6.5.4 In the absence of mitigation, adverse effects are predicted on:
- habitats (blanket bog, wet heath, marshy grassland, and running water);
 - INNS; and
 - protected and notable species (otter).
- 6.5.5 Specific mitigation for habitat loss is provided under 'Mitigation During Operation' as habitat restoration would be undertaken during the operational phase of the Proposed Development. Specific mitigation for habitat reinstatement of temporary infrastructure, pre-construction protected species surveys, pollution prevention, maintaining hydrological connectivity and surface water management is provided as standard practice construction environmental management measures and are detailed in the outline Construction Environmental Management Plan (CEMP) in **Technical Appendix 2.1** (EIAR Volume 4). These measures would avoid and/or mitigate adverse effects on habitats and otter in relation to pollution and disturbance. Further mitigation, that is not addressed in the design of the Proposed Development or included as standard practice construction environmental management measures, is detailed below.

INNS

- 6.5.6 A specific method statement/management plan would be produced for groundworks within a 7 m zone around rhododendron and included in the CEMP. This management plan would detail the removal and disposal requirements for rhododendron in order to avoid its spread. Measures would include power washing of all vehicles/equipment and footwear/Personal Protective Equipment (PPE) before leaving contaminated areas and no movement of material contaminated with rhododendron or soil within 7 m of plants to other areas within the Application Boundary. Control of rhododendron would be considered as a good practice measure to improve the biodiversity of the field survey area and is detailed in **Technical Appendix 6.3** (EIAR Volume 4).

Otter

- 6.5.7 The watercourse crossings would be suitably designed to allow continued mammal movement along the watercourses, and minimise riparian habitat loss. The design of watercourse crossings is detailed in **Technical Appendix 8.2** (EIAR Volume 4).

Mitigation during Operation

- 6.5.8 In the absence of mitigation, adverse effects are predicted on:
- Habitats (terrestrial and aquatic); and
 - protected and notable species (bats, pine marten, otter, and reptiles and amphibians).

Habitat Restoration and Enhancement

- 6.5.9 Active restoration of the peatland habitats in the field survey area, both the habitats impacted by the Proposed Development and habitats that are already modified, would be carried out in line with **Technical Appendix 6.3** (EIAR Volume 4) and is anticipated to be controlled by a planning condition. Active restoration is defined here as the process of actively encouraging the regeneration of degraded peatland habitats. Degraded peatland habitats are those that are reduced in quality. A minimum of 40,898.79 m² of peatland would be restored in areas of

modified blanket bog that no longer contain a significant proportion of peat-forming vegetation. The overall aim would be to restore a larger area of peatland than the area lost. This would mitigate the permanent and temporary loss and modification of peatland as a result of the Proposed Development.

- 6.5.10 There is also the opportunity for habitat enhancement on-site, as detailed in **Technical Appendix 6.3** (EIAR Volume 4). The creation of broadleaved woodland and the removal of rhododendron could benefit species by providing shelter and feeding opportunities, and by removing an INNS from the field survey area.

Pine Marten, Otter and Reptiles and Amphibians

- 6.5.11 The risk of pollution from surface run-off to terrestrial and aquatic habitats would be prevented by standard run-off control measures, such as interceptor drains and silt traps to assist in maintaining water quality, which are already included within the design of the Proposed Development. Additionally, interceptor drains would be used to control the flow of any run-off from operational activities.
- 6.5.12 Where possible, appropriate pollution response spill kits and silt mitigation measures would be installed at or close to watercourse crossing locations.

Bats

- 6.5.13 Although the risk of bat casualties is considered to be low across the majority of the field survey area, the reduction of rotation speeds to below 2 revolutions per minute (rpm) while idling by pitching the blades out of the wind ('feathering') can reduce fatality rates by up to 50%⁶⁹. This does not result in a loss of output and would be used as a good practice measure. This would be applied to all the turbines within the field survey area.
- 6.5.14 A low-level, focused curtailment strategy would also be used for two turbines (Turbines T7 and T9) for the months of July, August and September only as this would reduce the collision risk for the period and location of peak bat activity. Curtailment would involve increasing the cut-in speed at Turbines T7 and T9 to 6.5 m/s⁷⁰ as bat activity is higher at lower wind speeds⁷¹. Overall, curtailment is an effective operational mitigation measure of reducing bat fatalities at wind farms⁷². The effectiveness of the curtailment strategy would be monitored, as detailed in **Section 6.7**.
- 6.5.15 A bat-friendly lighting design would be used to minimise the spillage of artificial light from the proposed substation onto bat foraging habitat. The lighting scheme would be take into account good practice guidelines⁷³ which include:
- using LEDs where possible;

⁶⁹ SNH, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter and the Bat Conservation Trust, (2019), SNH, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter and the Bat Conservation Trust (2019), Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation.[Accessed 16th February 2023].

⁷⁰ *Ibid.*

⁷¹ Adams, E.M., Gulka, J., Williams, K.A., (2021), A Review of the Effectiveness of Operational Curtailment for Reducing Bat Fatalities at Terrestrial Wind Farms in North America. PLoS ONE 16(11): e0256382.

⁷² *Ibid.*

⁷³ Bats and Artificial Lighting in the UK. URL: <https://cdn.bats.org.uk/uploads/pdf/Resources/ilp-guidance-note-8-bats-and-artificial-lighting-compressed.pdf?v=1542109349> [Accessed 17th March 2023].

- directing lighting to where needed and avoiding spillage, including the use of hoods, cowls, shields etc. to avoid spillage onto areas of vegetation;
- only lighting areas that need to be lit, and using the minimal level of lighting required to comply with building regulations;
- using movement sensors or timers on security lighting, where possible; and
- avoiding lamps emitting wavelengths below 540 nm (blue and Ultra Violet (UV) ranges) and with a correlated colour temperature >2700 K.

Mitigation during Decommissioning

6.5.16 No mitigation is required as there are no adverse effects predicted as a result of the decommissioning of the Proposed Development.

6.6 Assessment of Residual Effects

Residual Construction Effects

Habitats

6.6.1 Following completion of construction of the Proposed Development (including reinstatement work), residual adverse effects are anticipated for the medium-term (approximately ten to fifteen years), until peatland habitats have re-established. Permanent habitat loss would occur in blanket bog (13,117.46 m²) due to the excavation of turbine bases, other infrastructure and access tracks. A minimum of 40,898.79 m² of degraded peatland would be restored towards good-quality, active blanket bog and/or wet heath following the completion of construction, and in the medium- to long-term would provide a local beneficial effect, particularly as the majority of peatland is currently modified by the surrounding coniferous woodland plantation. The aim is that by restoring degraded peatland, it would become actively peat-forming blanket bog and/or wet heath, which is able to store increased levels of water and carbon dioxide, helping with flood prevention and climate change, respectively. The aim is also to restore a larger area of blanket bog than the area lost. As a result, residual effects are predicted to be **Not Significant**.

6.6.2 Implementation of the proposed CEMP would avoid adverse effects from pollution events on habitats, with residual effects predicted to be **Not Significant**.

6.6.3 Overall, with the completion of the mitigation and good practice measures detailed in this chapter, whereby the most ecologically valuable and sensitive habitats have been avoided by design and measures to reduce impacts on all other habitats of higher value and sensitivity have been employed, the effects on habitats are predicted to be **Not Significant**.

INNS

6.6.4 Implementation of the proposed CEMP would avoid adverse effects from the spread of rhododendron by managing construction in its vicinity and by reducing its presence within the Application Boundary, with residual effects predicted to be **Not Significant**.

Otter

6.6.5 Implementation of the proposed CEMP, including pollution prevention measures and a pre-construction protected species survey, plus the design of watercrossings to allow continued otter access, would avoid adverse effects on otters, with residual effects predicted to be **Not Significant**.

Residual Operational Effects

Habitats and Protected and Notable Species

6.6.6 Following the application of standard mitigation and good practice measures, such as pollution prevention measures, the residual effects on these ecological features during operation are predicted to be **Not Significant**.

Bats

6.6.7 Following the application of mitigation to increase cut-in speeds at two turbines plus good practice measures to reduce rotation speeds when idling and the use of sensitive lighting, which would reduce bat fatalities and avoid the disturbance of bats at their main foraging habitat in the east of the field survey area, the residual effects on bats are predicted to be **Not Significant**.

Residual Decommissioning Effects

6.6.8 There would be no adverse decommissioning effects pre-mitigation and, consequently, residual effects as a result of decommissioning are predicted to be **Not Significant**.

Residual Cumulative Construction Effects

6.6.9 The cumulative developments in combination with the Proposed Development would lead to loss of 9.04 ha of peatland habitat. However, these impacts are considered to be of low magnitude and would not result in significant effects due to the small proportions involved. HMPs would have the potential for beneficial effects on peatlands through habitat restoration and enhancement. For example, restoration works at Tangy IV Wind Farm would result in the addition of 27.7 ha of blanket bog in target condition. New broadleaved woodland creation as part of the HMP would further enhance the habitats. As a result, no residual cumulative construction effects on habitats are predicted.

6.6.10 Given the good practice measures and watercourse protection buffers across all cumulative developments, the cumulative disturbance of otters is predicted to be unlikely and **Not Significant**.

Residual Cumulative Operational Effects

6.6.11 All cumulative developments mentioned have committed to a minimum protective buffer of 50 m between turbines and key habitat features, which would lower the bat mortality risk. As a result, no residual cumulative operational effects on bats are predicted.

6.7 Monitoring

Construction Phase Monitoring

6.7.1 No monitoring is required as there will be no significant residual effects. However, as a good practice measure, the monitoring of habitat restoration, particularly peatland restoration, would be implemented during the operational phase. Further details of monitoring requirements are provided in **Technical Appendix 6.3** (EIAR Volume 4).

Operational Phase Monitoring

6.7.2 Operational phase monitoring of bats is required to assess the effectiveness of curtailment at Turbines T7 and T9, and to confirm the risk to bats across the rest of the field survey area. Monitoring would be undertaken for a minimum of three years following construction and

would involve concurrent carcass searches and bat activity surveys using static detectors. The results of the surveys would be used to inform the success of the curtailment regime and confirm whether the scope of the strategy needs to be adjusted if there is a reduced (or increased) risk to bats when compared to this assessment. The methodology would follow guidance in SNH *et al.* (2019)⁷⁴, which is summarised below.

Carcass Searches

- 6.7.3 Ideally, suitable trained dogs with handlers would be used to locate bat carcasses as dogs are significantly more efficient and faster than humans in locating carcasses⁷⁵. However, where this is not possible, appropriately trained operational staff would carry out a systematic search for bat casualties on the ground below all wind turbines in the field survey area (focusing on the hardstanding). Searches would be undertaken as early in the morning as possible at 2-4 day intervals during July-September and would preferentially be undertaken after periods of poor visibility, such as fog or low cloud, where possible. Prior to starting the surveys, scavenger and observer efficiency would be calibrated using dead bats or similar-coloured mammals of an equivalent size, such as mice. A minimum of ten carcasses would be used for each.

Bat Activity Monitoring

- 6.7.4 Activity surveys would be used to assess bat activity post-construction to confirm the ongoing need for curtailment mitigation. Construction of the Proposed Development could reduce bat activity in the field survey area relative to that recorded for this assessment and to a level where curtailment is no longer needed.
- 6.7.5 Static detectors would be deployed for the same duration and at the same density as the detectors deployed for this assessment, and would cover one complete bat activity season.

Decommissioning Phase Monitoring

- 6.7.6 No monitoring is required during the decommissioning phase of the Proposed Development as impacts during decommissioning are not considered likely to lead to significant residual effects.

6.8 Summary

- 6.8.1 This Chapter has considered potential impacts and their associated effects on ecological features, such as habitats and protected species in line with best practice guidance from CIEEM⁷⁶.
- 6.8.2 The field survey area was surveyed in 2020 and 2021 to provide baseline information on habitats and faunal species. Surveys included an extended Phase 1 Habitat Survey, NVC surveys and static bat activity surveys. The dominant habitats are coniferous woodland plantation, wet heath and marshy grassland. Potential GWDEs were recorded but these are unlikely to be groundwater dependent in the setting of the field survey area and as such, not

⁷⁴ SNH, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter and the Bat Conservation Trust, (2019), SNH, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter and the Bat Conservation Trust (2019), Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation.[Accessed 16th February 2023].

⁷⁵ *Ibid.*

⁷⁶ CIEEM (2018), Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Marine. Version 1.2. Winchester: CIEEM.

⁷⁶ EC Directive on the Conservation of Natural Habitats and Wild Flora and Fauna, 92/43/EEC. URL: http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm [Accessed 17th February 2023].

a significant consideration. Protected species surveys identified the presence of common pipistrelle, soprano pipistrelle, brown long-eared bat, noctule, *Myotis spp.*, pine marten, otter, common frog and common lizard. The species recorded are common and widespread throughout the ecology Study Area. Rhododendron was recorded throughout the field survey area.

6.8.3 Without the application of mitigation, adverse effects are predicted on habitats (peatland, running water and marshy grassland), INNS, bats and otter. Following the application of mitigation, such as a CEMP, peatland restoration, a curtailment strategy and bat friendly lighting, no significant residual effects are predicted.

Table 6.9: Summary of Potential Significant Effects of the Proposed Development			
Potential Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/Residual Effect
Construction			
Loss and degradation of habitat (peatland and running water)	<ul style="list-style-type: none"> ▪ Implementation of HMP, including habitat restoration and enhancement, as provided in Technical Appendix 6.3 (EIAR Volume 4). ▪ Standard pollution prevention measures in CEMP. 	Design, HMP and CEMP	Not Significant
Spread of INNS	<ul style="list-style-type: none"> ▪ Working methods in management plan and CEMP for work within 7 m of all rhododendron. ▪ Control of rhododendron in the field survey area as an enhancement measure in the OHMP. 	CEMP	Not Significant
Disturbance of otter	<ul style="list-style-type: none"> ▪ Standard pollution prevention measures in CEMP. ▪ 50 m protective buffer around watercourses. ▪ Design of watercrossings to allow continued passage. 	Design and CEMP	Not Significant
Operation			
Pollution of habitats	<ul style="list-style-type: none"> ▪ Standard pollution prevention measures. 	Design, and spill kits stored close to watercourse crossings and in vehicles	Not Significant
Bat disturbance and mortality	<ul style="list-style-type: none"> ▪ Feathering during idle speed at all turbines, and bat friendly lighting. ▪ Curtailment strategy at Turbines 7 and 9, with post-construction monitoring. 	Design and via blade pitch control system, plus suitably trained personnel for post-construction monitoring	Not Significant
Decommissioning			
None.			
Cumulative Construction			
Loss of blanket bog	<ul style="list-style-type: none"> ▪ Peatland restoration. 	HMP	Not Significant

Table 6.9: Summary of Potential Significant Effects of the Proposed Development			
Potential Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/Residual Effect
Disturbance of otter	<ul style="list-style-type: none"> ▪ Standard pollution prevention measures in CEMP. ▪ 50 m protective buffer around watercourses. ▪ Design of watercrossings to allow continued passage. 	Design and CEMP	Not Significant
Cumulative Operation			
Bat mortality	<ul style="list-style-type: none"> ▪ 50 m protective buffer between linear habitat features and turbines. 	Design	Not Significant

7 Ornithology

7.1 Introduction

7.1.1 This Chapter considers the likely significant effects on Ornithology associated with the construction, operation and decommissioning of the Proposed Development. The specific objectives of this Chapter are to:

- describe the Ornithology baseline;
- describe the assessment methodology and significance criteria used in completing the impact assessment;
- describe the potential effects, including direct, indirect and cumulative effects;
- describe the mitigation measures proposed to address likely significant effects; and
- assess the residual effects remaining following the implementation of mitigation.

7.1.2 The assessment has been carried out by Danny Oliver MCIEEM, Principal Ornithologist, Ramboll. Danny has ten years' experience with Ramboll designing and undertaking ornithological field surveys and undertaking ornithological impact assessments including previous wind farm projects similar to the Proposed Development.

7.1.3 This Chapter is supported by the following figures and technical appendices:

- Volume 3a: Figures
 - **Figure 7.1: Designated Sites;**
 - **Figure 7.2: Bird Survey Locations;**
 - **Figure 7.3 a - d: Vantage Point Survey Results;** and
 - **Figure 7.4: Moorland Bird Survey Results.**
- Volume 4: Technical Appendices
 - **Technical Appendix 7.1: Ornithology Methodology;** and
 - **Technical Appendix 7.3: Habitats Regulations Appraisal.**
- Volume 5: Confidential
 - **Technical Appendix 7.2: Ornithology Confidential Results**
 - **Figure 7.5a: Confidential Black Grouse Survey Results;**
 - **Figure 7.5b: Confidential Breeding Raptor Results;** and
 - **Figure 7.6: Confidential GET Model.**

7.1.4 Figures and Technical Appendices are referenced in the text where relevant.

7.1.5 The assessment uses the below terminology throughout:

- Proposed Development - All elements of the West Torrisdale Wind Farm development for which S36 consent and deemed planning permission are sought.
- Application Boundary - The red line boundary defining all elements of the Proposed Development for the purpose of the S36 application.
- Wind Turbine Array - the location of the wind turbines comprising the Proposed Development.
- Access Corridor - the land within the Application Boundary in which the access track connect the Wind Turbine Array with the A83 road.
- Study Area - the area in which the EIA is undertaken, defined for each technical topic as appropriate.

7.2 Assessment Methodology and Significance Criteria

Scope of Assessment

- 7.2.1 This Chapter considers effects on:
- protected sites designated for ornithological species; and
 - bird species and populations in and around the Application Boundary at all times of year.
- 7.2.2 The assessment is based on the Proposed Development as described in **Chapter 2** (EIAR Volume 2). This Chapter focusses on the effects of the construction, operation and decommissioning phases of the Proposed Development upon Important Ecological Features (IEF)¹ aligning with Ecological Impact Assessment (EcIA) Guidelines from the Chartered Institute of Ecology and Environmental Management² (hereafter the 'CIEEM EcIA Guidelines'). This assessment has been prepared with reference to the applicable legislative framework and national and local planning policy, as listed below. Specific guidance documents for habitats and species are referenced throughout this chapter and the accompanying Technical Appendices.
- 7.2.3 The scope of the assessment has been informed by consultation responses summarised in **Table 7.1** and relevant guidelines/policies listed below.

Legislation

- 7.2.4 Relevant legislation has been reviewed and considered as part of this ornithology assessment. Of relevance are:
- Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds³;
 - EC Directive on the Conservation of Natural Habitats and Wild Flora and Fauna, 92/43/EEC 1992⁴;
 - Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019⁵;
 - The Conservation of Habitats and Species Regulations 2017⁶;
 - Conservation (Natural Habitats Etc.) Regulations 1994⁷;
 - Wildlife and Countryside Act 1981⁸;
 - Nature Conservation (Scotland) Act 2004⁹;

¹ These are any ornithological entity which could be impacted by the Proposed Development, including species, habitats or designated sites.

² CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.1. Available: <https://cieem.net/wp-content/uploads/2018/08/ECIA-Guidelines-2018-Terrestrial-Freshwater-Coastal-and-Marine-V1.1.pdf> [Accessed December 2022]

³ EC Directive on the Conservation of Wild Birds (2009): <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32009L0147> [Accessed March 2023].

⁴ EC Directive on the Conservation of Natural Habitats and Wild Flora and Fauna (1992): http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm [Accessed March 2023].

⁵ The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations (2019): [https://www.legislation.gov.uk/ukdsi/2019/9780111176573#:~:text=%20The%20Conservation%20of%20Habitats%20and%20Species%20\(Amendment\),of%20capturing%20or%20killing%20fish%20are%E2%80%94%20More](https://www.legislation.gov.uk/ukdsi/2019/9780111176573#:~:text=%20The%20Conservation%20of%20Habitats%20and%20Species%20(Amendment),of%20capturing%20or%20killing%20fish%20are%E2%80%94%20More) [Accessed March 2023].

⁶ The Conservation of Habitats and Species Regulations (2017): <https://www.legislation.gov.uk/uksi/2017/1012/contents/made> [Accessed March 2023].

⁷ The Conservation (Natural Habitats Etc.) Regulations (as amended) (1994): <http://www.legislation.gov.uk/uksi/1994/2716/contents/made> [Accessed March 2023].

⁸ The Wildlife and Countryside Act (as amended) (1981): <http://www.legislation.gov.uk/ukpga/1981/69> [Accessed March 2023].

⁹ Nature Conservation (Scotland) Act (as amended) (2004): <http://www.legislation.gov.uk/asp/2004/6/contents> [Accessed March 2023].

- Wildlife and Natural Environment (Scotland) Act 2011¹⁰;
- UK Post-2010 Biodiversity Framework 2012¹¹;
- Electricity Act 1989¹²;
- The Electricity Works (Environmental Impact Assessment) (Scotland) Act 2017¹³; and
- the Ramsar Convention on Wetlands 1971¹⁴.

Planning Policy

7.2.5 Relevant planning policies reviewed for this assessment were:

- National Planning Framework 4¹⁵;
- UK Biodiversity Action Plan (BAP) 2010¹⁶;
- Scottish Biodiversity List (SBL) 2005¹⁷;
- 2020 Challenge 2013¹⁸;
- Argyll and Bute Local BAP¹⁹; and
- Argyll and Bute Biodiversity Duty Action Plan²⁰.

Guidance

7.2.6 Best practice guidance has been implemented when undertaking field surveys and in the assessment of significance of effects, as detailed in **Technical Appendix 9.1** (EIAR Volume 4).

Consultation

7.2.7 **Table 7.1** summarises the consultation responses received regarding Ornithology and provides information on where and/or how they have been addressed in this assessment.

7.2.8 Full details on the consultation responses can be reviewed in **Technical Appendix 7.1** (EIAR Volume 4).

¹⁰ Wildlife and Natural Environment (Scotland) Act (2011): <http://www.legislation.gov.uk/asp/2011/6/enacted> [Accessed March 2023].

¹¹ UK Post-2010 Biodiversity Framework (2012): <http://jncc.defra.gov.uk/page-6189> [Accessed March 2023].

¹² Electricity Act (1989): <https://www.legislation.gov.uk/ukpga/1989/29/contents> [Accessed March 2023].

¹³ The Electricity Works (Environmental Impact Assessment) (Scotland) Act (2017): <http://www.legislation.gov.uk/ssi/2017/101/contents/made> [Accessed March 2023].

¹⁴ Ramsar Convention on Wetlands (1971): <http://www.ramsar.org/about-the-ramsar-convention> [Accessed March 2023].

¹⁵ National Planning Framework (2023): <https://www.gov.scot/publications/national-planning-framework-4/> [Accessed July 2023]

¹⁶ UK BAP: <http://jncc.defra.gov.uk/default.aspx?page=5155> [Accessed March 2023].

¹⁷ The Scottish Biodiversity List (2005): <https://www.nature.scot/scottish-biodiversity-list-documents> [Accessed March 2023].

¹⁸ The 2020 Challenge: <http://www.gov.scot/Publications/2013/06/5538> [Accessed March 2023].

¹⁹ The Argyll and Bute Local BAP. URL: <https://www.argyll-bute.gov.uk/sites/default/files/Unknown/AandB%20BAP%20Draft.pdf> [17th February 2023].

²⁰ Argyll and Bute Biodiversity Duty Action Plan. URL: https://www.argyll-bute.gov.uk/sites/default/files/argyll_and_bute_council_biodiversity_duty_action_plan_final_version_april_2016_2.pdf [17th February 2023].

Table 7.1: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
Argyll and Bute Council (ABC), 20/04/2021	Scoping Opinion	The Local Biodiversity Officer (LBO) notes that nearby designations include: SSSI's and SPA/IBA.	These designated sites are discussed in Section 7.3 .
		"The LBO notes that these have yet to be identified in terms of ornithological interest." With regard to the cumulative impact assessment.	A full cumulative impact assessment has been undertaken in Section 7.4 , following NatureScot (NS) guidance.
Scottish Natural Heritage (SNH), now NS, 24/10/2019	Pre-scoping Consultation	Ornithology surveys to follow NS guidance. Two years of survey recommended.	Two years of Vantage Point (VP) surveys have been undertaken, as described in Section 7.2 .
		<i>"Proposed scope provided by Ramboll on 11/10/2019. NS content with revised location of VP 2 provided by Ramboll on 23/10/2019 but did stress again that we will need to speak to NRP about VP1 ahead of commencing surveys."</i>	VP 2 was moved to avoid this nest location, but it was not used in either year of survey. The surveys were discussed with Natural Research Projects (NRP).
		Potential for significant cumulative impacts on golden eagles.	A full cumulative impact assessment has been undertaken in Section 7.4 , following NS guidance.
		A Predicted Aquila Territory (PAT) model is available for this pair of eagles (G/KM3) and can be provided under licence agreement with us.	A PAT Model has been obtained. A Golden Eagle Topography (GET) model also been obtained and run for Proposed Development. The GET for the Proposed Development is shown on Figure 7.6 .
		The post construction monitoring of Beinn an Tuirc Wind Farm indicates that the areas to the north and north east of BaT are the most important parts of the eagle territory and these areas were improved as part of the Habitat Management Plan (HMP).	This is considered in Section 7.4 .
		For Greenland white-fronted geese (GWFG), it's worth noting that whilst the nearest SPA loch (Lussa Loch) is located approximately 5 km southwest of the site, Loch Arnicle (approximately 3.6 km to the west of the site) is regularly used as a roosting loch by the Glenbarr flock of GWFG. No detailed information on hen harrier usage of the site but there is suitable habitat for them within the site boundary.	GWFG were not recorded frequently crossing the Wind Turbine Array. Hen harrier were recorded flying within the Wind Turbine Array, mostly below collision risk height.

Table 7.1: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
Scottish Natural Heritage (SNH), now NS, 14/05/2020	Pre-scoping Consultation	<p>"Our view is that the proposed VP survey approach (missing survey effort in Year 1) is not ideal and if you do decide to carry on with this approach, then the EIA Report will need to acknowledge the data gaps and address survey limitations. If this gap is deemed to be significant, then additional survey effort may be required."</p> <p>Recommend continuing survey form adjusted VP 2 location.</p>	Two years of VP (till October 2021) surveys have been undertaken, as described in Section 7.2 along with limitations.
Nature Scot (NS), 26/03/2021	Scoping Response	<p>Potential for disturbance impacts on Kintyre Goose Roosts SPA from access track.</p> <p>"Therefore, an assessment of the impacts of the Proposal on the SPA should be included within the EIA. We advise that information to support an appropriate assessment is likely to be required."</p>	See Technical Appendix 7.3 (EIA Volume 4).
		<p>"In addition to the surveys, we advise that the Argyll Raptor Study Group (ARSG) is contacted to gain information on other historical eagle nests within the site."</p>	The data has been purchased and is described in Technical Appendix 7.2 (EIA Volume 5).
		<p>"The EIA should assess potential impacts on golden eagle within NHZ14 with reference to our guidance - Assessing the significance of impacts on bird populations from onshore wind farms that do not affect protected areas (2018)."</p>	A full cumulative impact assessment has been undertaken in Section 7.4 , following NS guidance.
		<p>As the Proposal is within forestry, it will be important to consider how habitat changes will impact future activity on site.</p>	Section 7.4 considers the requirement for mitigation for the loss of eagle habitat.
		<p>"A cumulative assessment should be undertaken of the impacts on the population of eagles in the whole of NHZ 14."</p>	A full cumulative impact assessment has been undertaken in Section 7.4 , following NS guidance.
		<p>"While there has been some debate around the PAT model and GET model, recent wind farm applications have used both models and compared them with the vantage point data they have gathered to assess the likelihood of use over the Proposal site. We suggest that this approach would also work well here."</p>	PAT and GET modelling has been obtained from NS and is used to inform this impact assessment in combination with VP data.
NS, 07/12/2022	Pre-gatecheck Consultation	<p>"White tailed eagle activity has been noted to the north of the site. NS would be interested to see if there was any activity at the West Torrisdale site, particularly in the felled areas of the site in the Year 2 surveys."</p>	White-tailed eagle activity is described in Section 7.3 .

Table 7.1: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
RSPB Scotland, 16/03/2021	Scoping Response	Potential impacts on Kintyre Goose Roosts SPA to be fully considered.	Potential impacts on white-fronted goose are assessed in Section 7.4 and Technical Appendix 7.3 (EIAR Volume 4).
		"The following Annex 1 bird species may all occur within or close to the proposal: golden eagle, white-tailed eagle, hen harrier, peregrine and merlin. Other Birds of Conservation Concern and important Local Biodiversity Action Plan (LBAP) species include black grouse. The potential impacts on all of these species should be adequately covered within the EIAR."	These species are target species of the surveys. All species listed have been recorded during bird surveys and reported in Section 7.3 .
		Assessment should consider impacts on birds throughout the year, in line with guidance from NS. Surveys should establish raptor use of the Proposed Development and should include CRA. Assessment should consider potential changes in habitats within the Application Boundary following the construction of the Proposed Development.	These are considered in Section 7.4 .
		"This site lies within an area of forestry plantation which forms part of the KM3 golden eagle pair's home range. Therefore, a cumulative assessment of impacts on the ability of the range to support golden eagles should be undertaken."	Section 7.4 considers the requirement for mitigation for the potential loss of eagle habitat.
		"White-tailed eagles are increasingly being reported from around this area, via both visual sightings and satellite tag information. We advise that since there is a possibility that birds may occupy this area within the project lifetime, ongoing assessment and mitigation are required. Survey work should therefore occur throughout the planning and installation periods (as well as post-construction)."	Pre and post construction surveys for the Proposed Development are considered in Section 7.7 .
		"We have historic records (of black grouse) within 2 km of this proposal. Any proposal should fully assess impacts on this species, including noise, and should avoid siting turbines close to any lek sites, especially those comprising of 4 or more birds. Consideration should also be given to mitigation works for the species within the site and surrounding area, where required and habitat enhancement works in the surrounding area should be given serious consideration."	Black grouse surveys have been undertaken and a full assessment of potential impacts on the species are included in Section 7.4 .

Table 7.1: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
		<i>"The proposal is close to the Kintyre Goose Roosts SPA and associated feeding grounds. Birds using the Kintyre Goose Roosts SPA may overfly the proposed windfarm site to reach feeding and roosting sites thereby the risk to these birds must be assessed as part of a HRA. Sufficient information must be provided with the application to enable an Appropriate Assessment to be undertaken."</i>	Potential impacts on white-fronted goose are assessed in Section 7.4 and Technical Appendix 7.3 (EIAR Volume 4).
		<i>"The EIAR should include a full survey, impact assessment and proposals for mitigation in relation to important habitats on this site. Mitigation should ideally minimise any impact and avoid areas of high quality habitats found on the site. Particular attention should be given to peatland."</i>	The mitigation hierarchy has been used when considering potential mitigation options, this is outlined in Section 0 .
		<i>"An assessment of cumulative bird impacts in relation to other existing, consented, and proposed projects (predominantly forestry and wind farms), within this NHZ should be undertaken. This should assess impacts on the NHZ populations especially applicable to golden eagle. NS have guidance on the assessment of cumulative effect of windfarms which should be referred to."</i>	A full cumulative impact assessment has been undertaken in Section 7.4 , following NS guidance.
East Kintyre Community Council (EKCC), 15/02/2021	Scoping Response	<i>"The ornithological constraints needs to include the Habitat agreement set up for the Golden Eagles, the divers and other birds - this is not currently shown. Similarly the Ornithology VPs used for the study need to be expanded to include both the Habitat Agreement Area and Rhonadale since the latter is closest to the proposed site and is the nesting location for the Eagles."</i>	The bird survey locations used gave good coverage of the Wind Turbine Array and the area around it. Lots of activity was recorded from two golden eagle territories, one to the north of the Wind Turbine Array and one to the south. Activity was also recorded from hen harriers and golden plovers. Surveys have recorded no flights of divers crossing the Wind Turbine Array. These surveys have been undertaken over two years, therefore there is a good understanding of how birds use the Wind Turbine Array. The results of the surveys are reported in Section 7.3 .

Potential Effects Scoped Out

- 7.2.9 Potential impacts on Arran Moors SPA and Sound of Gigha SPA, and their associated SSSIs, are not considered to be possible due to the lack of connectivity with the Proposed Development.
- 7.2.10 Breeding raptor species that were not identified during the Breeding Raptor Surveys have been scoped out of the assessment. This includes potential disturbance impacts on merlin, which were last recorded breeding in the Desk Study Area in 1992.

Method of Baseline Characterisation

Extent of the Study Area

- 7.2.11 The ornithology baseline was established using an Ornithology Desk Study Area (Ornithology DSA) and an Ornithology Field Survey Area (Ornithology FSA). The Ornithology DSA was defined as a 20 km buffer around the Wind Turbine Array for sites of international²¹ importance and 2 km for those of national²² importance, as shown on **Figure 7.1** (EIAR Volume 3a). The Ornithology FSA extended up to 2 km beyond the Wind Turbine Array.

Ornithology Desk Study

- 7.2.12 A desk study was undertaken using the NS SiteLink²³ website to identify designated nature conservation sites within the Ornithology DSA including Special Protection Areas (SPAs), which are of international importance, and Sites of Special Scientific Interest (SSSIs) and National Nature Reserves (NNRs), which are of national importance. Data was also purchased from Argyll Raptor Study Group (ARSG) using a search buffer of 2 km around the Wind Turbine Array.
- 7.2.13 The desk study also uses the Scottish Raptor Monitoring Scheme (SRMS) 2020 Annual Monitoring report²⁴ and Musgrove *et al*, 2013²⁵ to establish population baselines for the bird species assessed.

Ornithology Field Survey

- 7.2.14 Field surveys were undertaken between October 2019 and September 2021. All field surveys were undertaken by subcontractors from Lawrence Environmental Consultants (LEC). LEC surveyors are based in Lochgilphead and specialise in surveys in Argyll and Bute.
- 7.2.15 More detailed information on the surveys undertaken is provided in **Technical Appendix 7.1** (EIAR Volume 4). The survey locations described below are shown on **Figure 7.2** (EIAR Volume 3a).

VANTAGE POINT SURVEYS

- 7.2.16 Vantage Point (VP) surveys commenced in October 2019 and were completed in September 2021.

²¹ i.e., Special Protection Areas (SPAs) and Ramsar sites

²² i.e., Sites of Special Scientific Interest (SSSIs) and National Nature Reserves (NNRs)

²³ NatureScot SiteLink: <https://sitelink.nature.scot/home>. Accessed July 2023.

²⁴ Challis, A., Wilson, M.W., Eaton, M.A., Stevenson, A., Stirling-Aird, P., Thornton, M. & Wilkinson, N.I. (2022). Scottish Raptor Monitoring Scheme Report 2020. BTO Scotland, Stirling.

²⁵ Musgrove, A., Aebischer, N., Eaton, M., Hearn, R., Newson, S., Noble, D., Parsons, M., Risely, K. & Stroud, D. (2013) Population Estimates of Birds in Great Britain and the United Kingdom. *British Birds* 106 • February 2013 • 64–100.

7.2.17 The VP surveys were designed to provide optimal coverage, especially of open areas that have potential to be used by raptor species, such as golden eagles, when hunting or displaying, or using commuting routes. Each survey location was surveyed twice per month, with each individual survey lasting three hours²⁶. This equates to 72 hours of annual survey time from each VP survey location, which is in line with NS guidance²⁷. Survey timings were spread evenly across the day so surveys from the same location were not undertaken at the same time in adjacent months, potentially leading to a temporal bias in results. Surveys were only undertaken in favourable weather conditions, relative to the typical weather on Kintyre.

MOORLAND BIRD SURVEYS

7.2.18 Areas of moorland were surveyed using the Brown and Shepherd (1993) methodology²⁸. The survey methodology was developed to census breeding waders; however, the survey was adapted to record all bird species. The Moorland Bird FSA (defined as a 500 m buffer around the Wind Turbine Array) was surveyed four times, from April to June 2021.

7.2.19 Population and territory estimates were derived using results recorded from the survey visits.

7.2.20 Areas of plantation woodland were not surveyed, as per NS Guidance²⁹.

BLACK GROUSE SURVEYS

7.2.21 Black grouse surveys were undertaken to cover the Wind Turbine Array plus a buffer of 1.5 km. Methods followed those outlined in Gilbert et. al. 1998³⁰.

SCHEDULE 1 LISTED SPECIES OF RAPTOR SURVEYS

7.2.22 At least four visits, additional to the breeding season VP surveys, were undertaken in January, March, April and May 2021. These surveys were undertaken following best practice guidelines for the key target species³¹. The initial visit involved the entire Wind Turbine Array being walked and all suitable nesting locations or raptor activity recorded, particularly display flights. Subsequent visits involved a combination of searching and watching from locations within the Wind Turbine Array for activity, whitewash, prey remains, pellets and moulted feathers. Birds carrying prey to a particular area and alarm calling are considered to be good indicators of breeding. This survey also considers potential raptor nesting beyond the Application Boundary, given the number of raptor nests in the wider area and the potential importance of the Application Boundary as an associated foraging area.

Collision Risk Assessment

7.2.23 A Collision Risk Assessment (CRA) was undertaken following guidance from NS³². This used the flight data gathered during the VP surveys to predict the level of collision mortality associated with the Proposed Development for each of the species assessed. The model uses the amount of time each species spent flying at Collision Risk Height (CRH, 12.5 m to 150 m)

²⁶ It should be noted that there was a gap in survey coverage due to surveyors not being able to access the site during the Coronavirus pandemic. This is discussed in the Limitations and Assumptions section.

²⁷ NatureScot (2017) Guidance: Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms. NatureScot, Battleby.

²⁸ Brown F. and Shepherd K. B. (1993) A Method for Censusing Upland Breeding Waders, *Bird Study*, 40:3, 189-195, DOI: 10.1080/00063659309477182.

²⁹ NatureScot (2017) Guidance: Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms. NatureScot, Battleby.

³⁰ Gilbert, G., Gibbons, D.W. & Evans, J. (1998) *Bird Monitoring Methods*, RSPB/BTO. pp. 394-396.

³¹ Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. and Thompson, D. (2009) *Raptors A Field Guide for Surveys and Monitoring*. The Stationary Office: Edinburgh. ISBN 978 0 11 497345 2.

³² NatureScot (2000) *Windfarms and Birds: Calculating a theoretical collision risk assuming no avoiding action*. NatureScot Guidance Series.

within the Wind Turbine Array along with parameters from the turbines to calculate a predicted collision mortality assuming no avoiding action. This number is reduced using the prescribed avoidance rate for each species, provided by NS³³.

7.2.24 This process is described in more detail in **Technical Appendix 7.1** (EIAR Volume 4).

Golden Eagle Topography Modelling

7.2.25 Golden Eagle Topography (GET) Modelling was undertaken covering the Ornithology FSA. This provides an estimate of golden eagle activity for each location dependent on factors that have been shown to be preferential to golden eagles, following Fielding *et al* (2020)³⁴:

- Slopes of greater than 10°;
- Altitude higher than 300 m; and
- With 300 m of a ridge.

7.2.26 The output of this model has been used to predict areas of potentially higher golden eagle activity, and is considered alongside the desk study and field survey data collected to inform the golden eagle baseline. This process is described in more detail in **Technical Appendix 7.1 (EIAR Volume 4)**.

Limitations and Assumptions

7.2.27 It should be noted that the availability and quality of the data obtained during desk studies is reliant on third party responses and recorders. This varies from region to region and for different species groups. Furthermore, the comprehensiveness of data often depends on the level of coverage, the expertise and experience of the recorder and the submission of records to the local recorder.

7.2.28 Due to a combination of coronavirus and access issues, the VP survey effort in Year 1 (October 2019 to September 2020) was not complete as landowners prevented access to the site for surveys while the coronavirus lockdown was in operation. At VP location 1, the survey effort was less than the best practice amount by six hours (66 as opposed to 72). At VP location 2, the survey effort was less than the best practice guidance amount by 12 hours (60 as opposed to 72).

7.2.29 It is acknowledged that the reduced survey effort, in particular between March 2020 and May 2020, as a result of the coronavirus access restrictions, coincides with the period when target species such as golden eagle and hen harrier increase their hunting activity to provide food for their young. However, it is considered that the second year of survey (when the best practice amounts of 72 hours of survey were undertaken from each survey location) compensates for this loss in data gathering and ensures that a sound baseline has been collected.

Criteria for the Assessment of Effects

Criteria for Assessing the Sensitivity of Receptors

7.2.30 Impact assessment methodology, excluding the criteria for assessing significance detailed below, is described in **Technical Appendix 7.1** (EIAR Volume 4). The criteria for defining

³³ NatureScot (2019) Avoidance Rates for the Onshore SNH (now NatureScot) Wind Farm Collision Risk Model. NatureScot Guidance Series.

³⁴ Fielding, A.H., Haworth, P.F., Anderson, D., Benn, S., Dennis, R., Weston, E. and Whitfield, D.P. (2020), A simple topographical model to predict Golden Eagle *Aquila chrysaetos* space use during dispersal. *Ibis*, 162: 400-415. <https://doi.org/10.1111/ibi.12718>

importance of features and characterising impacts are provided in **Technical Appendix 7.1** (EIAR Volume 4).

- 7.2.31 Ornithological features are given an importance rating based on a geographic scale as follows: International; National; Regional; County or Local. The classification of importance assesses ornithological features in relation to their population size, diversity, rarity, fragility, typicalness, connectivity with surroundings, intrinsic value, recorded history, and potential value.

Criteria for Assessing the Magnitude of Change

- 7.2.32 The magnitude of impact is predicted quantitatively where possible, considering the duration and reversibility of effects, and is considered spatially and temporally as described within **Table 7.2**. Impacts can be adverse or beneficial.
- 7.2.33 Impacts have also been characterised based on their nature, including duration, frequency, likelihood and reversibility. Further information is provided in **Technical Appendix 7.1** (EIAR Volume 4).

Impact Magnitude	Description
High	Total/near total loss of a bird population due to mortality or displacement or major reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. 50 to 100 %
Medium	Partial reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. 10 % to 50 %
Low	Small but discernible reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. 1 % to 10 %.
Negligible	Very slight reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Reduction barely discernible, approximating to the 'no change' situation. Less than 1 %.

Criteria for Assessing Cumulative Effects

- 7.2.34 Cumulative effects have been assessed following guidance from NS on assessing cumulative ornithological impacts from wind farm developments (NS, 2018)³⁵. Cumulative effects are assessed by considering the impacts of the Proposed Development at the same time as the impacts arising from another development. This is done additively, i.e. adding the impacts of multiple developments together and assessing if the resulting cumulative effect is significant or not.
- 7.2.35 Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Cumulative effects are particularly important in EcIAs as many ornithological features are already exposed to background levels of threat or pressure and may be close to critical thresholds, where further impacts could cause irreversible decline and significant cumulative effects. Further impacts can also make habitats and species more vulnerable or sensitive to change.
- 7.2.36 Cumulative effects have been considered within Natural Heritage Zone (NHZ) 14, as requested by NS and RSPB, see **Table 7.1**.

³⁵ NatureScot (2018) Assessing the Cumulative Impacts of Onshore Wind Farms on Birds. Guidance Series.

7.2.37 Developments included in the cumulative effects assessment are the following types of future development within the same Zone of Influence (ZOI):

- Installed and operational wind farms;
- proposals which consent has been applied for;
- proposals that have been granted consent but have not yet been started or have been started but are not yet completed (i.e. under construction); and
- proposals that have been refused permission but are subject to appeal.

Criteria for Assessing Significance

7.2.38 An effect is considered to be either significant or not significant. For the purposes of EcIA, a significant effect is an effect that either supports or undermines biodiversity conservation objectives for important ecological features or for biodiversity in general. In broad terms, significant effects encompass impacts on the structure and function of defined sites, habitats or ecosystems and the conservation status of habitats or species (including extent, abundance and distribution)³⁶. Significant effects are assessed with reference to the geographical importance of the ornithological feature. However, the scale of significance of an effect may not be the same as the geographic context in which the feature is considered important. For example, a significant effect on a species which is protected by national legislation, does not necessarily equate to a significant effect on its national population.

7.2.39 For the purposes of EIA, apart from in exceptional circumstances, a significant effect, as defined by the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017³⁷ (the 'EIA Regulations') is only considered to be possible where the feature in question is considered to be of regional, national, or international importance. That is not to say that impacts from the Proposed Development cannot result in ornithologically significant effects (under the EIA Regulations) on features of county or local importance, simply that those effects are not likely to be significant under EIA Regulations, unless the effect is likely to undermine the conservation status or distribution of the species. Whether an effect at local or county importance is considered to be significant or not significant under the EIA Regulations is made clear in the impact assessment for each ornithological feature.

7.2.40 Mitigation and/or compensation is proposed for all effects considered significant under the EIA Regulations. Where appropriate, as part of additional good practice, mitigation and/or compensation may be proposed for ornithologically significant effects on features of county or local importance, but which are not considered to be significant in EIA terms.

³⁶ CIEEM, (2018), Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.2. Winchester: CIEEM.

³⁷ The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 <http://www.legislation.gov.uk/ssi/2017/101/contents/made> [Accessed March 2023]

7.3 Baseline Conditions

Current Baseline

Desk Study

DESIGNATED SITES

- 7.3.1 The designated sites within the Ornithology DSA are shown on **Figure 7.1** (EIAR Volume 3a). As shown on **Figure 7.1** (EIAR Volume 3a), there are no statutory or non-statutory ornithological designations within the Wind Turbine Array. The Application Boundary does overlap with the Kintyre Goose Roosts Special Protection Area (SPA), Ramsar, Important Bird Area (IBA) and Site of Special Scientific Interest (SSSI), where the existing access track passes Lussa Loch (the existing access track overlaps the SPA boundary for approximately 90 m).
- 7.3.2 There are several areas classified as part of Kintyre Goose Roosts SPA within the DSA. These sites are also listed as a Ramsar, an IBA and notified as SSSI, as Kintyre Goose Roosts SSSI, Rhunahaorine Point SSSI (also notified for breeding little tern *Sternula albifrons*) and Tangy Loch SSSI separately. Kintyre Goose Roosts SPA, and its constituent SSSIs, are classified for non-breeding Greenland white-fronted goose *Anser albifrons flavirostris*, with the nearest discrete area (Lussa Loch) approximately 5.5 km to the southwest of the Wind Turbine Array. This SPA has potential connectivity³⁸ with the Site, as it lies within the potential commuting distance for foraging Greenland white-fronted goose (core range 5 to 8 km).
- 7.3.3 There are two further SPAs within the 20 km DSA. Arran Moors SPA and its associated SSSIs are located 11.5 km east of the Wind Turbine Array at its closest point and is classified for breeding hen harrier *Circus cyaneus*. This is greater than the prescribed connectivity distance for hen harrier (core range of 2 km up to maximum 10 km) and is across a stretch of sea so connectivity between the Proposed Development and this SPA is not considered likely to exist. Sound of Gigha SPA is a Marine SPA is located 8.6 km west of the Wind Turbine Array and is classified for the following non-breeding species:
- Common eider *Somateria mollissima*;
 - Great northern diver *Gavia immer*;
 - Red-breasted merganser *Mergus serrator*; and
 - Slavonian grebe *Podiceps auritus*.
- 7.3.4 Connectivity between this SPA and the Proposed Development is not considered to be likely as it would involve marine species regularly crossing 8.6 km of land.

BIODIVERSITY ACTION PLAN

- 7.3.5 The Argyll and Bute Biodiversity Action Plan (BAP) lists the following species as priority species:
- Common scoter *Melanitta nigra*;
 - Black-throated diver *Gavia arctica*;
 - Red-throated diver *Gavia stellata*;
 - Osprey *Pandion haliaetus*;
 - Dunlin *Calidris alpina*;
 - Common cuckoo *Cuculus canorus*;
 - Skylark *Alauda arvensis*;
 - Twite *Carduelis flavirostris*;
 - Golden plover *Pluvialis apricaria*;
 - Tree sparrow *Passer montanus*;

³⁸ NatureScot (2016) Assessing Connectivity with Special Protection Areas (SPAs). Guidance.

- Greenland white-fronted goose *Anser albifrons flavirostris*;
- Barnacle goose *Branta leucopsis*;
- White-tailed eagle *Haliaeetus albicilla*;
- Corncrake *Crex crex*;
- Arctic skua *Stercorarius parasiticus*;
- Herring gull *Larus argentatus*;
- Little tern *Sternula albifrons*;
- Common tern *Sterna hirundo*;
- Arctic tern *Sterna paradisaea*;
- Chough *Pyrhocorax pyrrhocorax*;
- Peregrine *Falco peregrinus*;
- Redshank *Tringa totanus*;
- Lapwing *Vanellus vanellus*;
- Black grouse *Lyrurus tetrix*;
- Wood warbler *Phylloscopus sibilatrix*;
- Nightjar *Caprimulgus europaeus*;
- Spotted flycatcher *Muscicapa striata*;
- Pied flycatcher *Ficedula hypoleuca*;
- Redstart *Phoenicurus phoenicurus*;
- Hen harrier *Circus cyaneus*;
- Curlew *Numenius arquata*;
- Ring ouzel *Turdus torquatus*;
- Golden eagle *Aquila chrysaetos*;
- Merlin *Falco columbarius*;
- Short-eared owl *Asio flammeus*;
- Song thrush *Turdus philomelos*; and
- Swift *Apus apus*.

PURCHASED DATA

- 7.3.6 Data were purchased from ARSG on the breeding raptor records held by the group within 2 km of the Site (10 km for golden eagle). The results are described in detail in **Technical Appendix 7.2** (EIAR Volume 5).
- 7.3.7 There are two known golden eagle territories within 2 km of the Wind Turbine Array that have been occupied since 2018. There are two further territories within 10 km of the Wind Turbine Array that have been occupied since 2018. There are two hen harrier territories within 2 km of the Wind Turbine Array, one nested successfully in 2020 and the other had a single bird present in 2012. A merlin territory was present within 2 km of the Wind Turbine Array in 1992.

Field Surveys - VP Surveys

- 7.3.8 The results of the VP surveys are shown on **Figures 7.3a – c** (EIAR Volume 3a). The results of Year 1 of the VP surveys are summarised in **Table 7.3**. The results of Year 2 of the VP surveys are summarised in **Table 7.4**.

Species	Total		In Ornithology FSA		In FSA at CRH		Crossing the Wind Turbine Array at CRH	
	Flights	Individuals	Flights	Individuals	Flights	Individuals	Flights	Individuals
Black grouse	3	8	3	8	3	8	0	0
Canada Goose	1	9	1	9	1	9	1	9
Golden Eagle	46	58	46	58	43	54	2	3
Golden Plover	14	1,712	14	1,712	14	1,712	4	601
Hen Harrier	30	35	30	35	30	35	4	6
Merlin	3	3	3	3	3	3	1	1
White-tailed Eagle	1	1	1	1	1	1	0	0

Species	Total		In Ornithology FSA		In FSA at CRH		Crossing the Wind Turbine Array at CRH	
	Flights	Individuals	Flights	Individuals	Flights	Individuals	Flights	Individuals
Black grouse	2	2	2	2	2	2	0	0
Golden Eagle	32	49	31	48	31	48	1	1
Unidentified Geese	1	180	1	180	1	180	0	0
Greylag Goose	1	8	1	8	1	8	0	0
Golden Plover	9	338	9	338	9	338	0	0
Hen Harrier	25	26	25	26	24	25	6	6
Merlin	2	2	2	2	2	2	0	0
Peregrine	1	1	1	1	1	1	1	1
Short-eared Owl	2	2	2	2	2	2	1	1

BLACK GROUSE**YEAR 1**

7.3.9 Three black grouse flights were recorded during the VP surveys between October and September during the 2019/2020 survey season. All flights were recorded from VP 2 with two single birds flying on the 31st October 2019 and the 31st August 2020. A group of six birds were recorded on the 14th November 2019 flying close to the Wind Turbine Array, approximately 200 m to the south. All flightlines were recorded to the south-southwest of the Wind Turbine Array. All eight birds were flying at CRH, in a height range of 20-50 m.

YEAR 2

7.3.10 Two flights of single black grouse were recorded from VP 2 to the south of the Wind Turbine Array, both birds were flying in a southeast – northwest direction at CRH, north of Cnocmalavilach. These flights were recorded in February and April 2021.

HEN HARRIER**YEAR 1**

7.3.11 Hen harrier flights were recorded on 30 occasions (involving 35 birds). Flights were recorded from both VP locations with birds flying individually or in pairs. Flights were observed to the north and west of the Wind Turbine Array, with four flights recorded within the Wind Turbine Array at CRH. Flights were recorded in October 2019 and January, February, March, July, August and September 2020. Other behaviours recorded included hunting and interacting, indicating that hen harrier territory use the Wind Turbine Array in a variety of ways. Juvenile hen harriers were recorded landing in trees in August but flew off again within a minute. This suggests that the Wind Turbine Array is potentially suitable for roosting hen harrier, but the lack of repeat sightings suggests that birds roost elsewhere, outside of the Wind Turbine Array.

YEAR 2

7.3.12 25 hen harrier flights were recorded in the second year of VP surveys, with these flights involving 26 individuals. Flights were recorded in October, November and December 2020 and in January, March, April, June, July, August and September 2021. Flights were recorded all around the Wind Turbine Array, with six flights (involving six birds) crossing the Wind Turbine Array at CRH.

GOLDEN EAGLE**YEAR 1**

7.3.13 Golden eagle flights were recorded on 46 occasions during the 2019/2020 survey season. In total, 58 birds were recorded flying mostly individually but also in pairs on a few occasions. Flights were recorded in every month from October 2019 to April 2020 and then again from August to September 2020. No flights were recorded in June and July 2020. Flights were recorded to the north, south and west of the Wind Turbine Array, mostly at CRH, entering the Wind Turbine Array outer edges twice in total from northeast and from southwest. Activities included hunting, gliding and displaying.

YEAR 2

7.3.14 Golden eagles were recorded from both VP 1 and 2 on 32 occasions, and 49 individuals were recorded flying individually or in pairs. Flights were recorded in every month from October to December 2020 and from January to April 2021. No flights were recorded from May to July 2021, with flights again recorded in August and September 2021. The flightlines were

concentrated to the north of the Wind Turbine Array with fewer flights recorded to the west and south of the Wind Turbine Array than in the previous year.

WHITE TAILED EAGLE

YEAR 1

7.3.15 One white-tailed eagle flight was recorded from VP 2 in the 2019/2020 survey season to the northeast of the Wind Turbine Array , a near adult individual that landed on the slope of Meall Donn. The flight was recorded in November 2019, was about 500 m from the Wind Turbine Array and at CRH.

YEAR 2

7.3.16 No white-tailed eagle flights were recorded in Year 2 of the VP surveys.

GREYLAG GOOSE

YEAR 1

7.3.17 No greylag goose flights were recorded in Year 1 of the VP surveys.

YEAR 2

7.3.18 One greylag goose flight of eight individuals was recorded flying from east to west to the north of the Wind Turbine Array. This flight was recorded in November 2020 and was at CRH.

UNIDENTIFIED GOOSE

YEAR 1

7.3.19 No unidentified goose flights were recorded in Year 1 of the VP surveys.

YEAR 2

7.3.20 A flight of approximately 180 unidentified grey geese was recorded from VP location 2 in April 2021. The birds were too far away to get a confirmed identification and are classed as unidentified geese, but this flight is considered potentially to be the only record of Greenland white-fronted geese recorded during the field surveys. For this assessment this flight is considered to be of Greenland white-fronted goose using the precautionary approach as this species known to migrate north during the spring. The flight was recorded at CRH, but outside of the Wind Turbine Array to the east.

CANADA GOOSE

YEAR 1

7.3.21 One flight of a group of nine Canada geese *Branta canadensis* was recorded from VP 1 during the 2019/2020 survey season. The group crossed the northwest corner of the Wind Turbine Array in November 2019 from Beinn an Tuirc flying at CRH.

YEAR 2

7.3.22 No Canada goose flights were recorded in Year 2 of the VP surveys.

MERLIN

YEAR 1

7.3.23 Three flights of single merlin were recorded during the 2019/2020 survey season, all of them carrying out hunting activity at CRH and all recorded in August 2020. The flights were recorded to the south, west and northwest of the Wind Turbine Array. One bird flew across the northeastern corner of the Wind Turbine Array.

YEAR 2

- 7.3.24 Two merlin flights were recorded during the 2020/21 survey season, one recorded at CRH to the west of the Wind Turbine Array in February 2021. A flight crossed the northeastern corner of the Wind Turbine Array, but below CRH in November 2020.

GOLDEN PLOVER

YEAR 1

- 7.3.25 14 golden plover flights, involving 1,712 individuals, were recorded between December and April during the 2019/2020 survey season. All flights were recorded from VP1, with the smallest group featuring nine and the largest group as many as 500 individuals. A few single birds were also recorded. The flight activity was most intense and concentrated to the west of the Wind Turbine Array, between Beinn an Tuirc and Cnoc Donn, with flights associated with a golden plover roost. Flights were recorded within the Wind Turbine Array, including the largest flock of approximately 500 birds recorded as flying at CRH.

YEAR 2

- 7.3.26 Nine golden plover flights, involving 338 individuals, were recorded during Year 2 of the VP surveys. The flights were recorded in December 2020, January 2021 and September 2021 and none of the flights crossed the Wind Turbine Array. Flights were located to the north and west of the Wind Turbine Array, again associated with a roost.

GOLDEN PLOVER ROOST

- 7.3.27 During the VP surveys golden plover were recorded using a roost approximately 1 km to the west of the Wind Turbine Array. The highest number of birds recorded using the roost was approximately 500, recorded in a flight in March 2020. This roost is likely used as a staging location during golden plover migration to feed and rest before continuing the migration.

PEREGRINE

YEAR 1

- 7.3.28 No peregrine flights were recorded in Year 1 of the VP surveys.

YEAR 2

- 7.3.29 A flight of a single peregrine was recorded from VP location 2 in March 2021. The peregrine flew from west to east crossing the northwestern part of the Wind Turbine Array and flying at CRH.

SHORT-EARED OWL

YEAR 1

- 7.3.30 No short-eared owl flights were recorded in Year 1 of the VP surveys.

YEAR 2

- 7.3.31 Two short-eared owl flights were recorded, both involving single birds. These flights were recorded in January and February 2021, with the birds in questions hunting on both occasions. During the January flight the bird was chased by a golden eagle in a predation attempt and fled crossing the Wind Turbine Array in the north and flying at CRH.

Field Surveys – Moorland Bird Surveys (MBS)

- 7.3.32 The results of the MBS are shown on **Figure 7.4** (EIAR Volume 3a). These results are summarised in **Table 7.5**.

Species Code	Species	Number of Records
B.	Blackbird <i>Turdus merula</i>	1
CH	Chaffinch <i>Fringilla coelebs</i>	3
CK	Common cuckoo	4
GL	Grey wagtail <i>Motacilla cinerea</i>	3
HC	Hooded crow <i>Corvus cornix</i>	1
K.	Kestrel <i>Falco tinnunculus</i>	1
M.	Mistle thrush <i>Turdus viscivorus</i>	1
R.	Robin <i>Erithacus rubecula</i>	1
RG	Red grouse <i>Lagopus lagopus scotica</i>	9
S.	Skylark <i>Alauda arvensis</i>	12
SC	Stonechat <i>Saxicola rubicola</i>	1
SK	Siskin <i>Carduelis spinus</i>	1
SN	Snipe <i>Gallinago gallinago</i>	2
W.	Wheatear <i>Oenanthe oenanthe</i>	2
WC	Whinchat <i>Saxicola rubetra</i>	1
WR	Wren <i>Troglodytes troglodytes</i>	1
WW	Willow warbler <i>Phylloscopus trochilus</i>	20

7.3.33 The commonest species recorded during the Moorland Bird Surveys were willow warbler and skylark. Six amber-listed species of medium conservation concern were recorded during the Moorland Bird Surveys, these were:

- Grey wagtail;
- Kestrel;
- Snipe;
- Wheatear;
- Wren; and
- Willow warbler.

7.3.34 Four red-listed species of high conservation concern were recorded during the Moorland Bird Surveys, these were:

- Common cuckoo;
- Mistle thrush;
- Skylark; and
- Whinchat.

³⁹ Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win I. (2021). The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. *British Birds* 114: 723-747.

⁴⁰ The colours indicate the range of conservation concern, from green being the least to red being the highest.

- 7.3.35 Surveys were not undertaken within the coniferous plantation present throughout most of the Wind Turbine Array, but common crossbill *Loxia curvirostra*, a species listed on Schedule 1 of the Wildlife and Countryside Act 1981, were recorded as incidental records during surveys within the Wind Turbine Array.

Field Surveys – Black Grouse Surveys

- 7.3.36 The results of the black grouse surveys are shown on **Figure 7.5a** (EIAR Volume 3A) and are described in more detail in **Technical Appendix 7.2** (EIAR Volume 5). Two black grouse leks were recorded in close proximity to each other, one 100 m from the Wind Turbine Array and the other 80 m. These leks are 470 m and 640 m, respectively, from the nearest turbine (T9) and involved two and one male black grouse respectively.

Field Surveys - Breeding Raptor Surveys

- 7.3.37 The results of the Breeding Raptor Surveys are described in detail in **Technical Appendix 7.2** (EIAR Volume 5). Both golden eagle territories within 2 km of the Wind Turbine Array were occupied in 2021, with the northern pair building up the nest but not laying and the southern pair present at the start of the year but absent from March onwards. Two roosts were identified close to the Application Boundary; a roost 100 m west of the Wind Turbine Array in a rowan *Sorbus aucuparia* and a roost in conifers 90 m south of the Access Corridor.
- 7.3.38 An osprey nest was recorded 210 m from the Access Corridor.

Future Baseline

- 7.3.39 The future baseline of the Field Study Area under the "do nothing" scenario is unlikely to change significantly in the absence of the Proposed Development. The coniferous plantation is likely to be harvested by clear fell methods before the trees reach maturity at 40-70 years. Without the Proposed Development, the forest would be felled within approximately the next two decades. These areas are then typically restocked for another rotation of the process, albeit possibly with some smaller areas of broadleaved woodland. As such, the suite of bird species occurring on-site that uses the coniferous plantation is considered unlikely to change. Temporary to long-term displacement of forest species is likely as coniferous plantations are clear felled and replanted and species recolonise the previously displaced area. However, those activities are already part of the wider landscape baseline.
- 7.3.40 The peatland habitats are also considered unlikely to change significantly in the absence of the Proposed Development as the open habitats would continue to be impacted and shaped by afforestation and grazing. The majority of habitats are already modified by the surrounding coniferous plantation and grazing by deer, which are expected to continue. Therefore, the distribution of bird species using the open areas around the Wind Turbine Array is considered unlikely to change.
- 7.3.41 The only expected change would be from climate change with more extreme conditions resulting in more yearly variation in species survivability and associated greater fluctuations in populations.

Summary of Sensitive Receptors

Scoped In Receptors

- 7.3.42 Kintyre Goose Roosts SPA, Ramsar and SSSIs have been scoped into the assessment as it lies within connectivity distance of the application boundary.

- 7.3.43 All species recorded crossing the Wind Turbine Array at CRH during the two years of VP survey have been included in the assessment.
- 7.3.44 Birds breeding within the Application Boundary, including all species recorded during the MBS and other species with potential to breed within the Application Boundary in future, have been scoped into the assessment.
- 7.3.45 Black grouse leks have been scoped into the assessment and assessed for their potential to be disturbed by the Proposed Development.
- 7.3.46 Potential impacts on golden eagle are assessed, including collision risk, disturbance and displacement.
- 7.3.47 Potential impacts on golden plover are assessed, including collision risk and potential disturbance impacts on the roost identified.
- 7.3.48 Potential impacts on breeding raptors recorded during the Breeding Raptor Survey are also assessed. Species recorded include hen harrier and osprey.

Feature	Nature Conservation Value	Justification
Kintyre Goose Roosts SPA, Ramsar and SSSIs	International	<p>The SPA is classified for non-breeding Greenland white-fronted goose, regularly supporting 2,300 wintering birds, 16% of the GB population (between 1991 and 1996).</p> <p>The SPA and Ramsar is split into six discrete locations:</p> <ul style="list-style-type: none"> ▪ Loch Garasdale; ▪ Rhunahaorine Point; ▪ Loch an Fhraoich; ▪ Lussa Loch; ▪ Tangy Loch ; and ▪ Black Loch. <p>The closest point of the SPA to the Wind Turbine Array is Lussa Loch, 5.5 km to the southwest. The Wind Turbine Array lies with three of the discrete locations located to the north and three located to the south, with potential for flights between lochs to cross the Wind Turbine Array. Per NS Connectivity Guidance⁴¹ there is considered to be potential connectivity between this SPA and the Proposed Development.</p> <p>The Application Boundary overlaps the SPA where the access track passes Lussa Loch. There is potential for impacts to occur here if significant traffic passes the loch through winter when the geese are present for roosting.</p> <p>No confirmed flights of Greenland white-fronted geese were recorded during the field surveys. One flight of unidentified grey geese was recorded, which is assumed to be Greenland white-fronted geese. This flight involved approximately 180 birds flying to the east of the Wind Turbine Array and would have been of birds migrating north in the spring. No flights were recorded crossing the Wind Turbine Array.</p> <p>The spring population of Greenland white-fronted goose in the UK and Ireland has gradually increased from 18,854 in 2015 to</p>

⁴¹ NatureScot (2016) Assessing Connectivity with Special Protection Areas (SPAs). Guidance.

Table 7.6: Nature Conservation Value of Important Ornithological Features Scoped-In		
Feature	Nature Conservation Value	Justification
		21,509 in 2020. The population in Argyll (excluding Islay) is 4,256 ⁴² .
All target species recorded flying within the Wind Turbine Array at CRH	Species dependent (all Regional)	A CRA is undertaken for all species of bird recorded as crossing the Wind Turbine Array at CRH. Potential collision risk impact is assessed in Table 7.9 . This was run for all species recorded crossing the Wind Turbine Array at CRH apart from Canada goose, which are a non-native species and considered to be of local importance.
Breeding birds (not including Schedule 1 raptors)	Local	All bird nests are legally protected under UK law meaning that a significant effect is possible if any are destroyed due the construction or operation of the Proposed Development. Additionally common crossbills are listed on Schedule 1 of the Wildlife and Countryside Act 1981, affording them additional protections from disturbance at their nesting sites.
Black grouse leks	Regional	Two black grouse leks were identified during surveys, 490 m and 640 m from the nearest proposed turbine (T9). There is considered to be potential for these leks to be disturbed by the Proposed Development. Five flights of ten individual black grouse were recorded during the VP survey programme within the Ornithology FSA.
Golden eagle	Regional	The site lies between two golden eagle territories, both within the Ornithology FSA. Both of these territories have potential to be disturbed by the construction of the Proposed Development. 77 flights of 106 individual golden eagles were recorded during the two VP survey programme within the Ornithology FSA. While many flights were recorded around the Wind Turbine Array, only three flights of four individuals passed within the Wind Turbine Array during the two years of VP survey. There is potential for collision risk and disturbance impacts on golden eagle during the operation of the Proposed Development. The 2020 SRMS Report ⁴³ confirms that 51 golden eagle territories were identified in Argyll ⁴⁴ in 2020.
Hen harrier	Regional	Two hen harrier territories were identified in the Ornithology FSA from data purchased from ARSG. These territories have potential to be impacted by the Proposed Development. 55 flights of 61 individual hen harriers were recorded during the VP survey programme within the Ornithology FSA, with 10 flights of 12 individuals crossing the Wind Turbine Array at CRH. The 2020 SRMS Report ⁴⁵ confirms that 29 hen harrier territories were identified in Argyll in 2020.
Osprey	Regional	One osprey territory was identified 210 m from the Access Corridor. No osprey flights were recorded in the Ornithology FSA.

⁴² Fox, T., Francis, I., Norriss, D. & Walsh, A. (2020) Report of the 2019/2020 International Census of Greenland white-fronted geese. Greenland White-fronted Goose Study and National Parks and Wildlife Service.

⁴³ Challis, A., Wilson, M.W., Eaton, M.A., Stevenson, A., Stirling-Aird, P., Thornton, M. & Wilkinson, N.I. (2022). Scottish Raptor Monitoring Scheme Report 2020. BTO Scotland, Stirling.

⁴⁴ Argyll Raptor Monitoring Area is very similar in boundary to Natural Heritage Zone 14 area, but differ in the former includes Mull, Coll and Tiree and the latter includes Arran.

⁴⁵ Challis, A., Wilson, M.W., Eaton, M.A., Stevenson, A., Stirling-Aird, P., Thornton, M. & Wilkinson, N.I. (2022). Scottish Raptor Monitoring Scheme Report 2020. BTO Scotland, Stirling.

Feature	Nature Conservation Value	Justification
		The 2020 SRMS Report ⁴⁶ confirms that 17 osprey territories were identified in Argyll in 2020.
Golden plover	Regional	A golden plover roost was identified 1 km west of the Wind Turbine Array. This roost is likely a staging location for golden plover migrating up or down the west coast of Scotland and recorded 500 birds using it at its peak. 23 flights of 2,050 individual golden plover were recorded during the VP survey programme within the Ornithology FSA, with four flights of 601 individuals crossing the Wind Turbine Array at CRH. No population estimate for Argyll could be sourced, so the Scottish population estimate (400,000 birds during winter ⁴⁷) is used as the baseline.

7.4 Assessment of Likely Effects

Potential Construction Effects

Destruction or Disturbance of Species' Nests or Black Grouse Leks

DESIGN SOLUTIONS AND ASSUMPTIONS

- 7.4.1 As part of the Construction Environmental Management Plan (CEMP) a Bird Protection Plan (BPP) will be prepared that will set out standardised measures to be taken to avoid potential impacts on bird species. The mitigation hierarchy set out in the BPP will be adhered to. This will establish that all identified nests (and leks) will be retained/avoided in the first instance. The BPP will also set out that works will maintain a species-specific buffer around nests (these will be stated in the BPP and enforced by an Environmental Clerk of Works (ECOW) to avoid/reduce potential disturbance impacts. Where this exclusion zone cannot be maintained, or a feature must unavoidably be destroyed as a last resort, the BPP will stipulate that a licence will be sought from NS. The BPP will also state that works shall be timed to minimise potential disturbance to black grouse, with no works being undertaken at lekking times within disturbance distance of the identified leks.
- 7.4.2 There is potential for active birds' nests (not including Schedule 1 raptor nests) to be damaged or destroyed where works are required around nests, including tree felling. Installation of the access tracks within the Wind Turbine Array may also result in damage or disturbance to nests if installed in the breeding season (March-August inclusive). While this would result in a **Not Significant** effect, in EIA terms, all species of birds' nests are protected under the Wildlife and Countryside Act 1981⁴⁸ therefore any nest destroyed would be considered a legal offence and therefore mitigation is required.

⁴⁶ Challis, A., Wilson, M.W., Eaton, M.A., Stevenson, A., Stirling-Aird, P., Thornton, M. & Wilkinson, N.I. (2022). Scottish Raptor Monitoring Scheme Report 2020. BTO Scotland, Stirling.

⁴⁷ Musgrove, A., Aebischer, N., Eaton, M., Hearn, R., Newson, S., Noble, D., Parsons, M., Risely, K. & Stroud, D. (2013) Population Estimates of Birds in Great Britain and the United Kingdom. *British Birds* 106 • February 2013 • 64–100.

⁴⁸ The Wildlife and Countryside Act (as amended) (1981): <http://www.legislation.gov.uk/ukpga/1981/69> [Accessed July 2023]

7.4.3 There is also potential for breeding birds to be disturbed by construction works and felling activities conducted near their nest sites. This could result in the abandonment and failure of the nest in the year of the works. This effect would be greatest in areas where woodland felling or access track construction is required. For species of the passerine dominated general breeding bird assemblage, typically those not afforded specific protection under Schedule 1 of the Wildlife and Countryside Act 1981, the number of nest sites which could potentially be affected is likely to be small and the impact is unlikely to result in a discernible effect on the local populations of the species concerned. Any such disturbance effects on general breeding birds are therefore considered to be **Not Significant**.

7.4.4 There is also the possibility that the works could impact on the nests of rare and vulnerable breeding raptors (i.e., specially protected species listed on Schedule 1 of the Wildlife and Countryside Act 1981). The damage, destruction or disturbance of such species’ nests is likely to result in the loss of any nesting attempt or production of young in the year of the works, unless the birds initiate a second nesting attempt elsewhere. Although the number of nests which might be affected is likely to be small, the lower abundance and higher (National and Regional) conservation value of such species means that the effects of such impacts could be **Significant** and **adverse**. Potential for impact on each territory identified during surveys is assessed in **Table 7.7**.

Species	Feature Information	Potential Effect Significance
Golden eagle	There are two golden eagle territories within the Ornithology FSA. The prescribed disturbance distance ⁴⁹⁵⁰ for golden eagle is 750–1,000 m. There are no golden eagle territories within this distance. More specific information on the location of this confidential feature is provided in Technical Appendix 7.2 (EIAR Volume 5).	Not Significant
Hen harrier	Three hen harrier territories were identified within the Ornithology FSA. The recommended disturbance distance for hen harrier is between 500 and 750 m ⁵¹ . As the closest potential territory is within the limit of the disturbance distance, within 750 m of the Access Corridor, disturbance impacts on this territory are considered possible and significant effects for this feature of regional importance could occur. These effects would be caused by impacts that are adverse, medium magnitude, short term and reversible. However, as hen harriers are listed on Schedule 1 and are legally protected from disturbance, the likely predicted effects are considered to be Significant . More specific information on the location of this confidential feature is provided in Technical Appendix 7.2 (EIAR Volume 5).	Significant
Osprey	An osprey territory was identified within the Ornithology FSA. The recommended disturbance distance for osprey is between 350 and 750 m ⁵² . As the closest potential	Significant

⁴⁹ The maximum distance at which disturbance impacts can be expected on a species nest.

⁵⁰ Goodship, N.M. and Furness, R.W. (MacArthur Green) (2022) Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283.

⁵¹ Goodship, N.M. and Furness, R.W. (MacArthur Green) (2022) Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283.

⁵² Goodship, N.M. and Furness, R.W. (MacArthur Green) (2022) Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283.

Table 7.7: Assessment of Potential Disturbance Impacts on Protected Ornithological Features (Raptor Nests or Black Grouse Leks)

Species	Feature Information	Potential Effect Significance
	territory is within the limit of the disturbance distance, within 750 m of the Access Corridor, disturbance impacts on this territory are considered possible and significant effects for this feature of regional importance could occur. These effects would be caused by impacts that are adverse, medium magnitude, short term and reversible. However, as osprey are listed on Schedule 1 and are legally protected from disturbance, the likely predicted effects are considered to be Significant . More specific information on the location of this confidential feature is provided in Technical Appendix 7.2 (EIAR Volume 5).	
Black grouse lek	Two black grouse leks were identified 490 m and 640 m from the Wind Turbine Array. Prescribed disturbance distances for black grouse leks are between 500 and 750 m, so disturbance impacts are considered possible from the Proposed Development on black grouse leks. More specific information on the location of this confidential feature is provided in Technical Appendix 7.2 (EIAR Volume 5).	Significant

Disturbance to Roost Features

- 7.4.5 Two roosts for golden eagle and one for golden plover were identified during the field surveys. The two golden eagle roost features were recorded 100 m west of the Application Boundary in a rowan and a roost in conifers 90 m south of the Access Corridor. There is potential for birds using these to be disturbed during the construction of the Proposed Development. As per the Disturbance Guidance from NS⁵³, golden eagles are highly sensitive to human disturbance. The breeding season disturbance buffer is 750 – 1,000 m and the non-breeding buffer is 250 – 500 m. Both roosts are within both buffers, so disturbance impacts have potential to occur on these features. However, these impacts would be a low magnitude, short term, reversible impacts on features of national importance, and the resulting effect is considered to be **Not Significant**.
- 7.4.6 Golden plovers were recorded using a roost, a staging point on their migration, approximately 1 km west of the Wind Turbine Array. The highest number of birds recorded using the roost was approximately 500, recorded in a flight in March 2020. As per the Disturbance Guidance from NS⁵⁴, golden plovers have a medium sensitivity to human disturbance. The disturbance buffer for both seasons is 200 – 500 m. The roost is outside of the buffer zone and accordingly effects on the roost are considered to be **Not Significant**.

Disturbance to Kintyre Goose Roosts SPA

- 7.4.7 There are not considered to be any potential for direct impacts on Kintyre Goose Roosts SPA from the construction of the Proposed Development, however there is potential for there to be disturbance impacts on Lussa Loch, a constituent part of the SPA. The access track runs within the SPA, for approximately 100 m, adjacent to the northern end of Lussa Loch. Depending on the timing of these works, there is potential for disturbance to Greenland white-

⁵³ Goodship, N.M. and Furness, R.W. (MacArthur Green) (2022) Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283.

⁵⁴ Goodship, N.M. and Furness, R.W. (MacArthur Green) (2022) Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283.

fronted geese roosting at the loch. Greenland white-fronted geese have potential to be present on Loch Lussa from October to March. This impact would be a short-term, reversible, frequent impact of high magnitude, considered to be **Significant** in EIA terms.

7.4.8 Further assessment of impacts on the SPA is provided in **Technical Appendix 7.3** (EIAR Volume 4).

Potential Operational Effects

Collision Risk

7.4.9 Once the Proposed Development is constructed and operational it would pose a potential collision risk for birds. Birds are known to collide with wind turbines with most collisions resulting in the death of the bird. Collisions can occur for reasons including poor weather conditions resulting in low visibility, from strong wind pushing birds into the wind turbine or from birds not realising that the blades are spinning and being hit by a blade it may not have observed. It is assumed in calculations that any collision would result in the death of the bird.

7.4.10 Potential collision risk is assessed quantitatively for wind farms, with the methodology set out in **Technical Appendix 7.1** (EIAR Volume 4). For this assessment, any flight of a bird between 12.5 m and 150 m above ground level is considered to be at CRH. The collision risk assessment is set out in **Table 7.8**.

	Number of Flights (Individuals)	Total Time Spent Flying At CRH (seconds)	Likelihood of Turbine Impact ⁵⁵ (%)	Avoidance Factor (%)	Assessed Collision Risk (birds per year)	Geographic Scale Population (Scale in brackets)	Annual % Loss of population	Magnitude of Impact
Golden Eagle	3(4)	350	17.1	99	0.37	52 ⁵⁶ (Regional)	0.71	Low
Golden Plover	4(601)	33,110	8.2	98	25.45	400,000 ⁵⁷ (Regional)	0.006	Low
Hen Harrier	10(12)	1,244	18	99	0.53	80 ⁵⁸ (Regional)	0.66	Low
Merlin	1(1)	15	9.5	98	0.05	733 ^{59,60} (Regional)	0.007	Negligible
Peregrine	1(1)	10	13.5	98	0.01	76 ⁶¹ (Regional)	0.01	Negligible
Short-eared Owl	1(1)	45	27.1	98	0.05	24 ⁶² (Regional)	0.21	Negligible

⁵⁵ Assuming no avoidance action

⁵⁶ Challis, A., Wilson, M.W., Eaton, M.A., Stevenson, A., Stirling-Aird, P., Thornton, M. & Wilkinson, N.I. (2022). Scottish Raptor Monitoring Scheme Report 2020. BTO Scotland, Stirling.

⁵⁷ Musgrove, A., Aebischer, N., Eaton, M., Hearn, R., Newson, S., Noble, D., Parsons, M., Risely, K. & Stroud, D. (2013) Population Estimates of Birds in Great Britain and the United Kingdom. British Birds 106 • February 2013 • 64–100.

⁵⁸ Challis, A., Wilson, M.W., Eaton, M.A., Stevenson, A., Stirling-Aird, P., Thornton, M. & Wilkinson, N.I. (2022). Scottish Raptor Monitoring Scheme Report 2020. BTO Scotland, Stirling.

⁵⁹ No breeding pairs in Argyll, so Scotland population used.

⁶⁰ Challis, A., Wilson, M.W., Eaton, M.A., Stevenson, A., Stirling-Aird, P., Thornton, M. & Wilkinson, N.I. (2022). Scottish Raptor Monitoring Scheme Report 2020. BTO Scotland, Stirling.

⁶¹ Challis, A., Wilson, M.W., Eaton, M.A., Stevenson, A., Stirling-Aird, P., Thornton, M. & Wilkinson, N.I. (2022). Scottish Raptor Monitoring Scheme Report 2020. BTO Scotland, Stirling.

⁶² Challis, A., Wilson, M.W., Eaton, M.A., Stevenson, A., Stirling-Aird, P., Thornton, M. & Wilkinson, N.I. (2022). Scottish Raptor Monitoring Scheme Report 2020. BTO Scotland, Stirling.

GOLDEN EAGLE

- 7.4.11 Golden eagles are large birds with poor agility and manoeuvrability. The vast majority of golden eagle flights were recorded to the north, south and west of the Wind Turbine Array. Over the course of the two-year VP surveys, only three flights (of four individuals) were recorded at CRH within the Wind Turbine Array. The assessed collision risk of 0.37 birds per year is 0.71% of the estimated regional population. Over an assessed 35-year lifespan of the Proposed Development, this would lead to an estimated 12.95 golden eagle mortalities⁶³. This impact is discussed below as other factors would likely reduce the magnitude of this impact. This would present a permanent, adverse impact that is considered to be of low magnitude. The resulting effect is considered to be **Not Significant**.
- 7.4.12 The PAT model obtained from NS shows that predicted flight activity within the Wind Turbine Array is generally very low, except for around turbines T7 and T9. The GET model on **Figure 7.6** (EIAR Volume 5) also shows lower activity within the Wind Turbine Array except for around turbines T1 and T4. Both models show low levels of activity over the majority of the Wind Turbine Array. Studies have shown that golden eagles adapt their behaviour to avoid constructed wind farms, with reduced flight activity observed within Wind Turbine Arrays⁶⁴. The level of collision mortality of golden eagles associated with wind farms is not specifically known, however it is not considered to represent a significant limiting factor for golden eagle populations in Scotland. A programme of tagging golden eagles identified no deaths due to wind farm collisions, with avoidance the more likely observed behaviour⁶⁵. The activity level recorded during the Vantage Point surveys is already very low (three flights of four birds) so a reduction in activity level from golden eagle avoidance of the wind farm would reduce activity to a negligible level. This implies that the predicted collision risk is an over-estimate and that the actual collision risk impacts would be very low to negligible.

GOLDEN PLOVER

- 7.4.13 Golden plover is a small bird species with good agility and manoeuvrability, but they can fly in large flocks (up to 500 birds), potentially reducing their ability to avoid a collision. Flights were recorded to the north and west of the Wind Turbine Array, including flights associated with the roost identified to the west of the Wind Turbine Array. A total of 33,110 seconds were spent with golden plovers flying at CRH within the Wind Turbine Array. It should be noted that 30,000 of these seconds were recorded in one flight of approximately 500 birds that spent 60 seconds flying within the Application Boundary. The assessed collision risk is 25.45 birds per year, which represents 0.006% of the national wintering population (no population estimate for golden plover in Argyll could be sourced). Over an assessed 35-year lifespan of the Proposed Development, this would lead to an estimated 890.75 golden plover

⁶³ The estimated mortality figure is an output of the numerical and predictive collision risk model and does not account for any changes in bird behaviour within an operational wind farm. This output is used to assess the magnitude of impact and does not imply that this is the actual number of mortalities that would take place during the operational life of the Proposed Development. The actual collision risk figure is likely to be lower than this due to other factors including golden eagle avoidance of operational wind farms.

⁶⁴ : Fielding AH, Anderson D, Benn S, Dennis R, Geary M, Weston E, et al. (2021) Non-territorial GPS-tagged golden eagles *Aquila chrysaetos* at two Scottish wind farms: Avoidance influenced by preferred habitat distribution, wind speed and blade motion status. PLoS ONE 16(8): e0254159. <https://doi.org/10.1371/journal.pone.0254159>

⁶⁵ Whitfield, D.P. & Fielding, A.H. (2017). Analyses of the fates of satellite tracked golden eagles in Scotland. Scottish Natural Heritage Commissioned Report No. 982.

mortalities⁶⁶. This is considered to be an overestimate of potential collision risk as the numbers are likely inflated by one large flight (no other flights of more than 70 birds were recorded crossing the Wind Turbine Array). In addition, there is an existing wind farm, Beinn an Tuirc, lying adjacent to the roost which the birds have habituated to. This would present a permanent, adverse impact that is considered to be of low magnitude. The resulting effect is therefore considered to be **Not Significant**.

HEN HARRIER

7.4.14 When hunting, hen harriers typically fly slowly and very low to the ground with their heads facing downwards, known as quartering⁶⁷. This means they are typically recorded flying at less than CRH but are less able to avoid potential collisions. They are very agile, however during the early breeding season, males skydance⁶⁸ as a territorial display. This involves the birds flying up and down repeatedly and could put them at the risk of collision. No skydancing was recorded during the VP surveys. Over the course of the two-year VP survey ten flights (of 12 individuals) were recorded at CRH within the Wind Turbine Array. The assessed collision risk of 0.53 birds per year is 0.66% of the estimated regional population. Over an assessed 35-year lifespan of the Proposed Development, this would lead to an estimated 18.55 hen harrier mortalities⁶⁹. This is considered to present an overestimate as displacements impacts will also be occurring, as discussed in paragraph 7.4.22-24, which would reduce the magnitude of any collision impacts. This would present a permanent, adverse impact that is considered to be of low magnitude. The resulting effect is therefore considered to be **Not Significant**.

MERLIN

7.4.15 Merlin is a small raptor species that hunt by pursuing small avian prey. They are exceptionally agile/manoeuvrable. They are ambush predators which fly low and grab birds such as skylark or meadow pipit from on or close to the ground. Over the course of the two-year VP survey one flight (of one individual) was recorded at CRH within the Wind Turbine Array. The assessed collision risk of 0.05 birds per year is 0.007% of the estimated national population (regional population numbers could not be sourced as merlin are not recorded as breeding in Argyll). Over an assessed 35-year lifespan of the Proposed Development, this would lead to an estimated 1.75 merlin mortalities⁷⁰. This is a very low level of mortality over the course of the Proposed Development lifespan. This would present a permanent, adverse impact that

⁶⁶ The estimated mortality figure is an output of the numerical and predictive collision risk model and does not account for any changes in bird behaviour within an operational wind farm. This output is used to assess the magnitude of impact and does not imply that this is the actual number of mortalities that would take place during the operational life of the Proposed Development. The actual collision risk figure is likely to be lower than this due to other factors including golden plover avoidance of operational wind farms.

⁶⁷ Quartering describes the low hunting flights of owls and harriers where they fly low to the ground very slowly looking for prey.

⁶⁸ Skydancing describes hen harrier courtship behaviour, where the male and female fly in unison and mirror behaviours.

⁶⁹ The estimated mortality figure is an output of the numerical and predictive collision risk model and does not account for any changes in bird behaviour within an operational wind farm. This output is used to assess the magnitude of impact and does not imply that this is the actual number of mortalities that would take place during the operational life of the Proposed Development. The actual collision risk figure is likely to be lower than this due to other factors including hen harrier displacement by operational wind farms.

⁷⁰ The estimated mortality figure is an output of the numerical and predictive collision risk model and does not account for any changes in bird behaviour within an operational wind farm. This output is used to assess the magnitude of impact and does not imply that this is the actual number of mortalities that would take place during the operational life of the Proposed Development. The actual collision risk figure is likely to be lower than this due to other factors including merlin displacement by operational wind farms.

is considered to be of negligible magnitude. The resulting effect is therefore considered to be **Not Significant**.

PEREGRINE

7.4.16 Peregrine is a large raptor species that hunts by pursuing prey or ambushing them from above via steep dives unseen by the prey species flying below. They will also pursue flocking species such as small waders. They are agile and manoeuvrable and likely able to avoid potential collisions. Over the course of the two-year VP survey one flight (of one individual) was recorded at CRH within the Wind Turbine Array. The assessed collision risk of 0.01 bird per year is 0.01% of the estimated regional population. Over an assessed 35-year lifespan of the Proposed Development this would lead to an estimated 0.35 peregrine mortalities. This would present a permanent, adverse impact that is considered to be of negligible magnitude. The resulting effect is therefore considered to be **Not Significant**.

SHORT-EARED OWL

7.4.17 When hunting, short-eared owls typically fly slowly and very low to the ground with their heads facing downwards (quartering as hen harriers do). This means they are typically recorded flying at less than CRH but are less able to avoid potential collisions. Over the course of the two-year VP survey one flight (of one individual) was recorded at CRH within the Wind Turbine Array. The assessed collision risk of 0.05 birds per year is 0.21% of the estimated regional population. Over an assessed 35-year lifespan of the Proposed Development, this would lead to an estimated 1.75 short-eared owl mortalities⁷¹. This is a very low level of mortality over the course of the Proposed Development lifespan. This would present a permanent, adverse impact that is considered to be of negligible magnitude. The resulting effect is therefore considered to be **Not Significant**.

Displacement

7.4.18 Displacement is the process by which species adjust their behaviour to avoid using a location following the construction of a development. In this case it would involve species that have previously been recorded as active within the Wind Turbine Array choosing not to use the Wind Turbine Array following its construction. Displacement impacts have been assessed for species which were recorded using the Wind Turbine Array more than occasionally⁷² during the field surveys: golden eagle, hen harrier and golden plover. All other species were recorded using the Wind Turbine Array once or less annually and accordingly are not considered further. Displacement impacts on golden plover have however not been assessed as the flights recorded were associated with the roost to the west of the Proposed Development. The habitats (mainly coniferous plantation) within the Wind Turbine Array also have no value to golden plover for foraging or roosting.

⁷¹ The estimated mortality figure is an output of the numerical and predictive collision risk model and does not account for any changes in bird behaviour within an operational wind farm. This output is used to assess the magnitude of impact and does not imply that this is the actual number of mortalities that would take place during the operational life of the Proposed Development. The actual collision risk figure is likely to be lower than this due to other factors including short-eared owl displacement by operational wind farms.

⁷² Occasionally is defined as 2 or more flights per year, except for golden eagle which NS have highlighted as requiring assessment for displacement regardless of the survey results.

GOLDEN EAGLE

- 7.4.19 Golden eagle is a highly sensitive species, that is known to avoid activity within active wind farms⁷³. The impact from displacement would result in a reduced territory size for any bird potentially using the Wind Turbine Array and the habitats currently present. The baseline of current golden eagle activity within the Wind Turbine Array is very low. Over the course of two years of VP surveys only three flights, of four individuals, were recorded within the Wind Turbine Array, resulting in 350 seconds of flight at CRH. A golden eagle roost was identified in a rowan tree to the west of the Wind Turbine Array, which lies 350 m from the nearest turbine (T1). This may continue to be used as it lies outside the Wind Turbine Array.
- 7.4.20 The PAT model obtained from NS which shows that flight activity within the Wind Turbine Array is predicted to be very low, except for around turbines T7 and T9. These areas are higher due to open habitats being recorded to the north of both turbine locations, however observed flight activity in the area was low, one flight of two birds.
- 7.4.21 The GET Model output produced for the Proposed Development is shown on **Figure 7.6** (EIAR Volume 5). This predicts areas of golden eagle activity based on favouring the following parameters:
- Slopes of greater than 10°;
 - Altitude higher than 300 m; and
 - With 300 m of a ridge.
- 7.4.22 It should be noted that only approximately 25 % of land within the Wind Turbine Array is over 300 m in altitude, with proposed turbines T1, T2 and T4 situated on this land. The GET model shows that activity within the Wind Turbine Array is likely to be highest around proposed turbines T1 and T4, with GET Model Classes of 8 and 9 recorded. This area is currently a closed canopy of conifer plantation, a habitat which is shown to be associated with poor golden eagle production⁷⁴. Golden eagles prefer more open areas for foraging. This explains the low level of activity recorded within the Wind Turbine Array during the field surveys. As the existing activity level is low, the magnitude of impact of golden eagle displacement is also assessed to be low, long term and adverse. The resulting effect is considered to be **Not Significant**.

HEN HARRIER

- 7.4.23 Hen harrier is a moderately sensitive species. This impact would result in a reduced territory size for any bird potentially using the Wind Turbine Array as it currently exists. Over the course of two years of VP surveys, ten flights of 12 individuals, were recorded within the Wind Turbine Array, resulting in 1,244 seconds of flight at CRH.
- 7.4.24 Juvenile hen harrier were recorded landing in trees within the Wind Turbine Array, but flew off within a minute, suggesting the Wind Turbine Array is suitable for roosting hen harrier but has not been confirmed to be used as such from the field surveys undertaken. Hen harrier will use coniferous woodland habitats, but typically only while the plantation is less than 15

⁷³ Fielding AH, Anderson D, Benn S, Dennis R, Geary M, Weston E, et al. (2021) Non-territorial GPS-tagged golden eagles *Aquila chrysaetos* at two Scottish wind farms: Avoidance influenced by preferred habitat distribution, wind speed and blade motion status. PLoS ONE 16(8): e0254159. <https://doi.org/10.1371/journal.pone.0254159>

⁷⁴ Whitfield, D. P., David R. A. McLeod, Fielding, A. H., Broad, R. A., Evans, R. J., & Haworth, P. F. (2001). The Effects of Forestry on Golden Eagles on the Island of Mull, Western Scotland. *Journal of Applied Ecology*, 38(6), 1208–1220. <http://www.jstor.org/stable/827293>

years old. Coniferous woodland of this age and greater is typically not used⁷⁵. This means that the Wind Turbine Array would be a suitable habitat for hen harriers following felling to accommodate the Proposed Development and subsequent re-stocking with conifers. However construction disturbance would prevent hen harriers from accessing the area of the Wind Turbine Array during the construction phase due to noise and visual disturbance from people and construction vehicles.

- 7.4.25 Once the Proposed Development is operational, the habitats within the Wind Turbine Array would be suitable for hen harriers for the first 15 years of operation and evidence shows that hen harrier are not as dissuaded from activity within wind farms as golden eagle⁷⁶, suggesting a low magnitude, beneficial impact in the medium term (up to 15 years) that is considered to be **Not Significant**. Once the conifer trees reach 15 years old, the habitats within the Wind Turbine Array would reflect the habitats currently present (except for more open ground around turbine bases). The level of hen harrier activity at this point would be similar to that observed during the field surveys, but potentially slightly lower due to the presence of the turbines. This is predicted to be a long term (beyond 15 years), adverse impact of low magnitude. The resulting effect is considered to be **Not Significant**.

Potential Decommissioning Effects

- 7.4.26 Decommissioning impacts would involve personnel and machinery accessing locations across the study area to dismantle and remove infrastructure, including turbines, hardstanding and site buildings. The wind turbines would be removed to ground level, with the concrete turbine foundations left in-situ and broken down to approximately 1 m below ground level. The access tracks and electrical cables are likely to be left in-situ to minimise habitat disturbance, although this would be subject to a separate planning permission. These impacts would be short-term, intermittent and temporary and last for months at any given location. Existing access tracks would be used to access the infrastructure to be decommissioned. Birds would be extremely unlikely to be using any of the decommissioning work areas for breeding due to operational and early decommissioning phase disturbance, however smaller breeding birds (not including Schedule 1 raptor species) may use areas immediately adjacent. As a result, if decommissioning works occur during the bird breeding season or close to crossbill⁷⁷ territories, temporary disturbance impacts are possible, however these are considered to be **Not Significant** for the birds of local importance breeding on-site.
- 7.4.27 There is also the possibility that the decommissioning works could impact on the nests of rare and vulnerable breeding raptors or black grouse leks (i.e., specially protected species listed on Schedule 1 of the Wildlife and Countryside Act 1981). The damage, destruction or disturbance of such species' nests or leks is likely to result in the loss of any nesting attempt or production of young in the year of the works, unless the birds initiate a second nesting attempt elsewhere. Although the number of nests which might be affected is likely to be small, the lower abundance and higher (National and Regional) conservation value of such

⁷⁵ Goodship, N.M. and Furness, R.W. (MacArthur Green) (2022) Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283.

⁷⁶ Goodship, N.M. and Furness, R.W. (MacArthur Green) (2022) Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283.

⁷⁷ Crossbill are mentioned specifically as they can nest outside of the typical breeding bird season as they can breed at any time of year.

species means that the effects of such impacts could be **Significant** and **adverse**. There is potential for impacts on hen harrier, osprey and black grouse as discussed in **Table 7.7⁷⁸**.

Potential Cumulative Effects

7.4.28 Cumulative effects are considered to include both the total effects resulting from the Proposed Development in combination with other similar developments (present and reasonably foreseeable), and the additional contribution of the Proposed Development to the total cumulative effects taking account of other similar developments. As such, the aim is to identify any likely significant effects associated with the combination or addition of the Proposed Development with the cumulative baseline. EIA Reports for infrastructure projects within NHZ 14 were consulted and are presented in **Table 7.9**. Developments for which no data could be reviewed are also listed in **Table 7.9** but have been left out of the assessment. The absence of data for some cumulative developments is not considered to be a considerable limitation on this assessment. The key ornithological issues for development in Kintyre have been identified and are fully assessed in this Section. Based on professional judgement, specialist local knowledge of the area and the robust and precautionary approach taken in this assessment, we consider it to be unlikely that potentially significant cumulative effects have been overlooked.

Scheme	Description	Status	Relevant Cumulative Effects previously identified	Potential for Cumulative Effects with Proposed Development
A'Chruach	A 21 turbine wind farm located 62 km north of the Application Boundary.	Operational	No significant effects on relevant ornithological features.	No
Allt Dearg	12 turbine wind farm, 40 km north of the Application Boundary.	Operational	Information unavailable.	No
An Suidhe	24 turbine wind farm, 74 km north of the Application Boundary.	Operational	Information unavailable.	No
Auchadaduie	Three turbine wind farm, 6 km to the west of the Application Boundary.	Operational	No significant effects are predicted on ornithological features from Auchadaduie Wind Farm in isolation or from cumulative effects associated with Auchadaduie Wind Farm and others surrounding it.	No
Beinn An Tuirc	45 turbine wind farm, 1 km to the west of the Application Boundary.	Operational	Information unavailable. However given proximity to the Proposed Development and known mitigation provided for golden eagles, potential for cumulative impacts exists.	Yes
Beinn An Tuirc Extension	19 turbine extension to Beinn an Tuirc, 730 m	Operational	Information unavailable. However given proximity to the Proposed Development	Yes

⁷⁸ Table 7.7 shows construction impacts but as nests and leks are likely to move only slightly during the lifespan of the Proposed Development, this is a useful approximation of predicted disturbance during decommissioning works.

Table 7.9: Cumulative Schemes within NHZ 14				
Scheme	Description	Status	Relevant Cumulative Effects previously identified	Potential for Cumulative Effects with Proposed Development
	west of the Application Boundary.		and known mitigation provided for golden eagles, potential for cumulative impacts exists.	
Beinn An Tuirc Phase 3	17 turbine wind farm to the south of Beinn an Tuirc, 1.6 km southwest of the Application Boundary.	Operational	Residual effects from land take, disturbance (during construction and operation) and collision risk were all assessed to be negligible. Cumulative effects of disturbance and collision risk were assessed to be minor. No cumulative effects are predicted.	No
Beinn Ghlas	16 turbine wind farm, 91 km to the north of the Application Boundary.	Operational	Information unavailable.	No
Blary Hill	14 turbine wind farm, 4 km to the west of the Application Boundary.	Operational	All residual effects from Blary Hill Wind Farm on ornithological features have been assessed to be not significant. The predicted minor negative impacts from this wind farm are listed below: <ul style="list-style-type: none"> • construction disturbance of forestry passerines; • construction disturbance of black grouse. 	No
Carraig Gheal	20 turbine wind farm, 85 km to the north of the Application Boundary.	Operational	Information unavailable.	No
Clachan Flats (Ardkinglas)	A nine turbine wind farm, 87 km to the northeast of the Application Boundary.	Operational	Information unavailable.	No
Cour	A ten turbine development approximately 10 km to the north of the Application Boundary.	Operational	A minor collision risk impact on golden eagle	Yes
Cruach Mhor	35 turbine wind farm, 56 km to the northeast of the Application Boundary.	Operational	Information unavailable.	No
Deucheran Hill	A nine turbine wind farm near Carradale, approximately 7 km north of the Application Boundary.	Operational	A negligible collision risk impact on golden eagle.	No
Freasdail	An 11 turbine wind farm approximately	Operational	Minor adverse collision risk effect on hen harrier.	Yes

Table 7.9: Cumulative Schemes within NHZ 14				
Scheme	Description	Status	Relevant Cumulative Effects previously identified	Potential for Cumulative Effects with Proposed Development
	22 km north of the Application Boundary.			
Isle Of Gigha,	Four turbine wind farm, 16 km northwest of the Application Boundary.	Operational	Information unavailable.	No
Srondoire	Three turbine extension to Allt Dearg wind farm.	Operational	Minor residual adverse effects on golden eagle from collision risk and displacement.	Yes
Tangy I, II and III Wind Farms	Collectively have 37 turbines located 10 km southwest of the Application Boundary.	Operational	Potential to have significant impacts on merlin and hen harrier.	Yes
A'Chruach Extension	Three turbine wind farm located on moorland to the east of the installed A'Chruach wind farm.	Consented	No ornithological impact assessment was undertaken and therefore no significant residual effects have been identified.	No
Airigh Wind Farm	14 Turbine wind farm located 28 km north of the Application Boundary	Consented	No significant impacts following mitigation, minor adverse impacts on black grouse, merlin and golden eagle.	Yes
Blarghour	15 turbine wind farm, 82 km north of the Application Boundary.	Consented	Surveys for this wind farm identified potential negligible-minor impacts on golden eagle.	Yes
Clachaig Glen	14 turbine wind farm, 4 km northwest of the Application Boundary	Consented	Following mitigation residual effects are predicted for golden eagle (habitat loss, displacement and collision risk) and hen harrier (displacement and collision risk).	Yes
Rowan	13 turbine wind farm, 33 km north of the Application Boundary	Consented	Potential for significant cumulative effects on golden eagle and osprey.	Yes
Breackerie	7 turbine wind farm, 24 km south of the Application Boundary.	In Planning	Negligible impacts predicted on all ornithological features.	No
Car Dubh	21 turbine wind farm, 85 km north of the Application Boundary.	In Planning	Target species for this wind farm were golden eagle, peregrine falcon, merlin, hen harrier, osprey, goshawk, short-eared owl, divers, black grouse, breeding Schedule 1 and Annex 1 waders and all waders and waterfowl.	Yes

Table 7.9: Cumulative Schemes within NHZ 14				
Scheme	Description	Status	Relevant Cumulative Effects previously identified	Potential for Cumulative Effects with Proposed Development
Killean	9 turbine wind farm, 7 km north of the Application Boundary	In Planning	Negligible or low/negligible impacts predicted on all ornithological features.	No
Allt Domhain (formerly Arnicle)	12 turbine wind farm, 2 km west of the Application Boundary	In Scoping	The most commonly recorded species during field surveys were hen harrier and golden eagle.	Yes
Cnoc Breacam	18 turbine wind farm, 15 km north of the Application Boundary	In Scoping	No survey info is provided in the Scoping Report.	No
Deucheran Hill 2	23 turbine wind farm, 5 km north of the Application Boundary	In Scoping	The EIA for Deucheran Hill identified a negligible collision risk impact on golden eagle.	No
High Dalrioch	10 turbine wind farm, 19 km south of the Application Boundary	In Scoping	The EIA Scoping Report highlights potential impacts on black grouse, hen harrier and golden eagle.	Yes
Cnoc Buidhe	Current layout is 33 turbine wind farm, 5 km southwest of the Application Boundary.	In Scoping	Species identified to date during field surveys include breeding osprey and hen harrier, as well as black grouse, pink-footed goose, white-tailed eagle, golden eagle, golden plover.	Yes
Coalashee	19 turbine wind farm, 9 km northwest of the Application Boundary.	In Scoping	Sensitive receptors highlighted in the Scoping Report include black grouse, golden eagle, golden plover, Greenland white-fronted goose, hen harrier, merlin, pink-footed goose, red-throated diver, white-tailed eagle and whooper swan.	Yes
Cruach Nam Mult	Two turbine wind farm, 28 km north of the Application Boundary.	In Planning	While golden eagle, merlin and hen harrier were all recorded within the site, an impact assessment has not been undertaken which would allow for a comparison with the data collected for the Proposed Development. Species considered to be most at risk from collisions with Cruach nam Mult Wind Farm are buzzard, lesser black-backed gull, greater black-backed gull, raven and kestrel.	No

Table 7.9: Cumulative Schemes within NHZ 14				
Scheme	Description	Status	Relevant Cumulative Effects previously identified	Potential for Cumulative Effects with Proposed Development
Eascairt (Kintyre)	13 turbine wind farm, 19 km north of the Application Boundary.	In Planning	Eascairt windfarm is predicted to have minor disturbance impacts on red-throated diver and black grouse. Minor collision risk impacts are predicted for hen harrier, red-throated diver, golden eagle and black grouse. Displacement impacts are predicted on hen harrier (minor), red-throated diver (minor), golden eagle (moderate) and black grouse (minor).	Yes
High Constellation	10 turbine wind farm, 12 km north of the Application Boundary	Consented	Potential for significant cumulative effects on golden eagle, hen harrier and black grouse.	Yes
Tangy IV	16 turbine wind farm, 10 km southwest of the Application Boundary	Consented	Impacts on Greenland white-fronted goose are considered to be negligible and not significant.	No
Clachaig Glen	12 turbine wind farm, 4 km northwest of the Application Boundary	In Planning	Following mitigation residual effects are predicted for golden eagle (habitat loss, displacement and collision risk) and hen harrier (displacement and collision risk).	Yes
Earraghail	13 turbine wind farm, 27 km northeast of the Application Boundary	In Planning	Potential for significant cumulative effects on golden eagle, hen harrier and black grouse.	Yes
Ladyfield	18 turbine wind farm, 84 km north of the Application Boundary.	In Planning	Target species for this project include golden eagle, hen harrier, merlin and golden plover.	Yes
Narachan	11 turbine wind farm, 10 km north of the Application Boundary.	In Planning	Surveys for this wind farm identified golden eagle, red-throated diver, black grouse, osprey and goshawk as target species.	Yes
Sheirdrim	19 turbine wind farm, 20 km northeast of the Application Boundary	In Planning	Impacts on all ornithological receptors are considered to be negligible.	No
Inveraray to Crossaig 275 kV OHL	This development runs from Inveraray substation (83 km north of the Application Boundary) to Crossaig substation (16 km north of the Application Boundary).	Consented	Mitigation was required to prevent significant impacts on golden eagles from disturbance.	Yes

Scheme	Description	Status	Relevant Cumulative Effects previously identified	Potential for Cumulative Effects with Proposed Development
Creag Dhubh to Dalmally 275 kV OHL	This would run between the Proposed Creag Dhubh substation (88 km north of the Application Boundary) connecting into the Dalmally to Inverarnan 275 kV OHL at its northern end.	In Planning	The development could potentially result in non-significant impacts on golden eagle (and Glen Etive and Glen Fyne SPA), hen harrier and merlin.	Yes
Inveraray to Creag Dhubh 275 kV OHL	This would run between the Proposed Creag Dhubh substation (88 km north of the Application Boundary) connecting into the Inveraray to Crossaig 275 kV OHL at its southern end.	In Planning	The cumulative impact assessment includes impacts on golden eagle, hen harrier, black grouse, merlin and peregrine, with these species considered alongside the Proposed Development below.	Yes
Blarghour Wind Farm Connection Project	This would connect the consented Blarghour Wind Farm to the proposed Creag Dhubh substation.	Pre-planning	Potential exists for significant cumulative effects on golden eagle.	Yes

Cumulative Effect Summary

7.4.29 **Table 7.10** summarises the potential cumulative effects on each ornithological feature from the Proposed Development in combination with the cumulative developments scoped into the assessment.

Feature	Developments with Potential Significant Effects⁷⁹	Potential Effect Significance
Golden eagle	Allt Domhain, Airigh, Beinn an Tuirc I and II, Clachaig Glen, Cour, Srondoire, Blarghour, Car Dubh, Cnoc Buidhe, Coalashee, Eascairt, Earraghail, High Constellation, High Dalrioch, Ladyfield, Narachan, Rowan, Inveraray to Crossaig, Creag Dhubh to Dalmally 275 kV OHL.	<p>No potential for significant cumulative construction effects is considered to exist.</p> <p>The Proposed Development is predicted to have a low collision risk impact on golden eagle and a low displacement impact on golden eagle. The collision risk impact is likely to be an overestimate as birds are likely to avoid the Proposed Development once it is constructed. Displacement from the Proposed Development is not considered significant, with the main areas of activity for the golden eagle territories to the north and south of the Proposed Development remaining unhindered. Neither of these impacts are considered sufficiently large to increase the cumulative impact on golden eagle within NHZ 14 to significant levels. Cumulative operational effects on golden eagles are predicted to be Not Significant.</p>

⁷⁹ This includes developments yet to be submitted into planning that may provide significant impacts, based on review of scoping report.

Table 7.10: Cumulative Effect Assessment Summary		
Feature	Developments with Potential Significant Effects⁷⁹	Potential Effect Significance
Hen harrier	Allt Domhain, Clachaig Glen, Earraghail, Freasdail, High Dalrioch, Tangy, Car Dubh, Cnoc Buidhe, Coalashee, Eascairt, Ladyfield, Creag Dhubh to Dalmally 275 kV OHL.	No potential for significant cumulative construction effects is considered to exist. The Proposed Development is predicted to have a low collision risk impact on hen harrier but a potential significant disturbance impacts on hen harrier. The collision risk impact is not considered sufficiently large to increase the cumulative impact on hen harrier within NHZ 14 to significant levels. Significant cumulative operational effects are possible from disturbance on hen harrier.
Black grouse	A' Chruach, Airigh, Blary Hill, Car Dubh, Coalashee, Cnoc Buidhe, Eascairt, Earraghail, High Constellation, High Dalrioch, Narachan, Creag Dhubh to Dalmally 275 kV OHL.	Disturbance impacts on black grouse are possible from the Proposed Development so significant cumulative construction effects are possible. Black grouse impacts from disturbance and collision risk are possible on the cumulative developments listed. The Proposed Development is predicted to have no collision risk impact on black grouse. Therefore, cumulative operational effects for black grouse are predicted to be Not Significant.
Merlin	Airigh, Tangy, Car Dubh, Coalashee, Ladyfield, Creag Dhubh to Dalmally 275 kV OHL.	No potential for significant cumulative construction effects is considered to exist. The Proposed Development is predicted to have a low collision risk impact on merlin. This impact is not considered sufficiently large to increase the cumulative impact on merlin within NHZ 14 to significant levels. Cumulative operational effects on merlin are predicted to be Not Significant.
Peregrine	Car Dubh, Creag Dhubh to Dalmally 275 kV OHL.	No potential for significant cumulative construction effects is considered to exist. The Proposed Development is predicted to have a low collision risk impact on peregrine. This impact is not considered sufficiently large to increase the cumulative impact on peregrine within NHZ 14 to significant levels. Cumulative operational effects on peregrine are predicted to be Not Significant.
Osprey	Car Dubh, Cnoc Buidhe and Rowan.	The Proposed Development has potential to result in significant disturbance impacts on an osprey territory. Therefore significant cumulative construction impacts have potential to occur. No potential for significant cumulative operational effects is considered to exist.
Short-eared owl	Car Dubh	No potential for significant cumulative construction effects is considered to exist. The Proposed Development is predicted to have a low collision risk impact on short-eared owl. This impact is not considered sufficiently large to increase the cumulative impact on peregrine within NHZ 14 to significant levels. Cumulative operational effects on short-eared owl are predicted to be Not Significant.

7.5 Mitigation

7.5.1 As part of the CEMP a BPP will be prepared that will set out standardised measures to be taken to avoid potential impacts on bird species. The determination of the appropriate measures to use to address each likely effect considered the mitigation hierarchy in each instance. This is set out as follows⁸⁰:

- **Avoidance** - Seek options that avoid harm to ecological features (for example, by locating on an alternative site);
- **Mitigation** - Negative effects should be avoided or minimised through mitigation measures, either through the design of the Proposed Development or subsequent measures that can be guaranteed – for example, through a condition or planning obligation;
- **Compensation** - Where there are significant residual negative ornithological effects despite the mitigation proposed, these should be offset by appropriate compensatory measures; and
- **Enhancement** - Seek to provide net benefits for biodiversity over and above requirements for avoidance, mitigation or compensation.

Mitigation by Design

7.5.2 No Mitigation by Design was employed for any ornithological purposes.

Mitigation during Construction

Nesting Birds

7.5.3 The felling work is due to be undertaken over the first six months of the construction programme. This felling may occur during the breeding bird season (March to September) therefore, pre-construction surveys for nesting birds would be required to avoid destroying or disturbing nests. If felling is not undertaken during the breeding bird season checks should still be undertaken of coniferous areas as common crossbill can breed at any time of year. These surveys would seek to identify the locations of any active nests within, or immediately adjacent to the working and felling areas within the Application Boundary. All pre-construction bird surveys should extend a sufficient distance out from the Proposed Development to identify any nest sites which may be within the disturbance range of the species in question. For example, pre-construction checks for general nesting birds do not need to extend more 50 m beyond the development footprint, while surveys for rare and vulnerable raptors should extend out to between 500 m and 750 m. These buffers will be defined in the BPP.

7.5.4 Surveys for rare and vulnerable breeding raptors, including hen harrier and osprey, would be conducted in the year prior to works. The surveys should focus on confirmed or probable territories, identified in the survey work already undertaken and should be expanded to include other areas of potentially suitable habitat. Surveys should be discussed with those undertaking similar monitoring efforts for the adjacent Beinn an Tuirc Wind Farm, to avoid duplication of survey effort and unnecessary survey disturbance. The surveys should seek to locate any new nest sites and advise the Applicant and their Principal Contractor of required mitigation measures in line with the BPP. Surveys should be co-ordinated by the ECoW.

⁸⁰ CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.1. Available: <https://cieem.net/wp-content/uploads/2018/08/ECIA-Guidelines-2018-Terrestrial-Freshwater-Coastal-and-Marine-V1.1.pdf> [Accessed April 2023]

- 7.5.5 In the event that any confirmed, or suspected active nests are identified within range of potential disturbance, a works exclusion zone will be established around the nest site as stated in the Bird SPP and advised by the ECoW. Works will not be permitted to commence within the exclusion zone until nesting has been completed and the young have fledged, or the ECoW deems, through monitoring each stage of the breeding attempt, that the extent of the exclusion zone may be reduced.

Black Grouse Leks

- 7.5.6 Pre-construction surveys would be required in black grouse lekking areas shown on **Figure 7.5a** (EIAR Volume 5). Works required within 300 – 500 m⁸¹ of known lekking areas should be accompanied by a watching brief undertaken by an ornithologist. Locations where lekking black grouse have been recorded will be stated in the BPP, as well as buffer distances to be observed. Works in these areas should occur outside of the breeding season for grouse (late March to early May⁸²), this will be stated in the BPP.

Mitigation during Operation

- 7.5.7 No mitigation is considered to be required during operation.

Mitigation during Decommissioning

- 7.5.8 Surveys for rare and vulnerable breeding raptors, including hen harrier and osprey, would be conducted in the year prior to decommissioning works. The surveys should focus on confirmed or probable territories, identified in the survey work already undertaken and should be expanded to include other areas of potentially suitable habitat. Surveys should be discussed with those undertaking similar monitoring efforts for the adjacent Wind Farms, to avoid duplication of survey effort and unnecessary survey disturbance. The surveys should seek to locate any new nest sites and advise the Applicant and their Principal Contractor of required mitigation measures in line with the BPP. Surveys should be co-ordinated by the ECoW.
- 7.5.9 In the event that any confirmed, or suspected active nests are identified within range of potential disturbance, a works exclusion zone will be established around the nest site as stated in the Bird SPP and advised by the ECoW. Works will not be permitted to commence within the exclusion zone until nesting has been completed and the young have fledged, or the ECoW deems, through monitoring each stage of the breeding attempt, that the extent of the exclusion zone may be reduced.

Black Grouse Leks

- 7.5.10 Pre-decommissioning surveys would be required in black grouse lekking areas shown on **Figure 7.5a** (EIAR Volume 5). Works required within 300 – 500 m⁸³ of known lekking areas should be accompanied by a watching brief undertaken by an ornithologist. Locations where lekking black grouse have been recorded will be stated in the BPP, as well as buffer distances to be observed. Works in these areas should occur outside of the breeding season for grouse (late March to early May⁸⁴), this will be stated in the BPP.

⁸¹ Goodship, N.M. and Fumess, R.W. (MacArthur Green) (2022) Disturbance Distances Review: An updated literature review of disturbance distances of selected birdspecies. NatureScot Research Report 1283.

⁸² Forrester, R. W., Andrews, I.J., McInemy, C.J., Murray, R.D., McGowan, R.Y., Zonfrillo, B., Betts, M.W., Jardine, D.C., & Grundy, D.S., (eds) 2007. *The Birds of Scotland*. The Scottish Ornithologists' Club, Aberlady.

⁸³ Goodship, N.M. and Fumess, R.W. (MacArthur Green) (2022) Disturbance Distances Review: An updated literature review of disturbance distances of selected birdspecies. NatureScot Research Report 1283.

⁸⁴ Forrester, R. W., Andrews, I.J., McInemy, C.J., Murray, R.D., McGowan, R.Y., Zonfrillo, B., Betts, M.W., Jardine, D.C., & Grundy, D.S., (eds) 2007. *The Birds of Scotland*. The Scottish Ornithologists' Club, Aberlady.

7.6 Assessment of Residual Effects

Residual Construction Effects

7.6.1 Following the successful implementation of the proposed mitigation no significant residual construction effects are considered likely to occur.

Residual Operational Effects

7.6.2 No significant residual operation effects are considered likely to occur.

Residual Decommissioning Effects

7.6.3 No significant residual decommissioning effects are considered likely to occur.

Residual Cumulative Construction Effects

7.6.4 Following the successful implementation of the proposed mitigation no significant residual, cumulative construction effects are considered likely to occur.

Residual Cumulative Operational Effects

7.6.5 No significant residual, cumulative operational effects are considered likely to occur.

7.7 Monitoring

Construction Phase Monitoring

7.7.1 Construction phase monitoring would be carried out by the ECoW, to ensure compliance with environmental legislation and effective delivery of mitigation measures (and licence conditions) set out in the generic and works-specific BPP. This would include monitoring any potential breeding raptor nests that could be impacted by the Proposed Development, e.g. hen harrier and osprey. Monitoring shall also include surveys of the black grouse leks to ensure they remain functional through the construction phase. Additional mitigation measures would be enacted if deemed necessary as a result of monitoring.

Operation Phase Monitoring

7.7.2 No monitoring during the operation phase is considered to be required.

Decommissioning Phase Monitoring

7.7.3 No monitoring during the decommissioning phase is considered to be required.

Summary

7.7.4 A programme of desk studies and field surveys were undertaken between 2019 and 2021 to determine the baseline of the study area. Surveys were undertaken following best practice guidance and the assessment was undertaken following CIEEM guidelines. Surveys were undertaken by LEC ornithologists. One of the key ornithological constraints is the Kintyre Goose Roosts SPA which lies 5.5 km southwest of the Application Boundary at its closest point (although a section of the existing access track crosses the SPA for approximately 100 m when it passes Lussa Loch). Surveys only recorded one flight of potential Greenland white-fronted geese, flying to the east of the Wind Turbine Array. As such, no significant effects on the species or the SPA are predicted.

7.7.5 Field surveys recorded two black grouse leks within the Ornithology FSA and territories were identified of golden eagle, hen harrier and osprey. Potential significant effects could impact

the hen harrier and osprey territories, so pre-construction surveys are recommended to mitigate this. No significant residual effects or cumulative effects on ornithological features are predicted.

Table 7.11: Summary of Potential Significant Effects of the Proposed Development			
Likely Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/Residual Effect
Construction			
Destruction of Bird Nests	Timing of works and pre-construction surveys.	CEMP and BPP.	Not Significant
Disturbance of hen harrier nest	Timing of works and pre-construction surveys.	CEMP and BPP.	Not Significant
Disturbance of osprey nest	Timing of works and pre-construction surveys.	CEMP and BPP.	Not Significant
Disturbance of black grouse leks	Timing of works and pre-construction surveys.	CEMP and BPP.	Not Significant
Helicopter disturbance of Schedule 1 bird nests	Following NS guidance and avoiding nest locations.	CEMP and BPP.	Not Significant
Operation			
No significant effects predicted	None	N/A	Not Significant
Decommissioning			
No significant effects predicted	None	N/A	Not Significant
Cumulative Construction			
Cumulative disturbance of hen harrier, osprey and black grouse.	Timing of works and pre-construction surveys.	CEMP and BPP.	Not Significant
Cumulative Operation			
No significant effects predicted	None	N/A	Not Significant

8 Hydrology and Hydrogeology

8.1 Introduction

8.1.1 This Chapter considers the potential significant effects on Hydrology and Hydrogeology associated with the construction, operation and decommissioning of the Proposed Development. The specific objectives of the Chapter are to:

- describe the hydrological and hydrogeological baseline;
- describe the assessment methodology and significance criteria used in completing the impact assessment;
- describe the potential effects, including direct, indirect and cumulative effects;
- describe the mitigation measures proposed to address potential significant effects; and
- assess the residual effects remaining following the implementation of mitigation.

8.1.2 This assessment has been carried out by Jo Thorp and Christopher Day of Ramboll UK Limited (Ramboll). Jo Thorp has five years' experience of hydrological assessment for onshore wind farms and energy infrastructure. Christopher Day has over 14 years' experience of specialist hydrology, hydrogeology and geology Environmental Impact Assessment (EIA).

8.1.3 This Chapter is supported by the following figures and technical appendices:

- Volume 3a: Figures
 - **Figure 8.1: Surface Water Features;**
 - **Figure 8.2: Watercourse Crossing Locations;**
 - **Figure 8.3: Water Resources (Private Water Supply locations, SW drinking water protected areas);**
 - **Figure 8.4: Superficial Geology (BGS 1:50,000);**
 - **Figure 8.5: Bedrock Geology (BGS 1:50,000);**
 - **Figure 8.6: Hydrogeology (BGS 1:625K);**
 - **Figure 8.7: GWDTE National Vegetation Classification;** and
 - **Figure 8.8: GWDTE Ramboll Assessment.**
- Volume 4: Technical Appendices
 - **Technical Appendix 8.1: Groundwater Dependent Terrestrial Ecosystems;**
and
 - **Technical Appendix 8.2: Watercourse Crossing Assessment.**

8.1.4 Figures and technical appendices are referenced in the text where relevant.

8.1.5 This assessment uses the below terminology throughout:

- Proposed Development – All elements of the West Torrisdale Wind Farm development for which S36 consent and deemed planning permission are sought.
- Application Boundary – The red line boundary defining all elements of the Proposed Development for the purpose of the S36 application.
- Wind Turbine Array – the location of the wind turbines comprising the Proposed Development.
- Access Corridor – the land within the Application Boundary in which the access track connect the Wind Turbine Array with the A83 road.
- Study Area – the area in which the EIA is undertaken, defined for each technical topic as appropriate.

8.2 Assessment Methodology and Significance Criteria

Scope of Assessment

- 8.2.1 This Chapter considers the potential effects of the Proposed Development on the water environment taking account of the hydrological, hydrogeological, geological, and soil characteristics of the Wind Turbine Array.
- 8.2.2 This Chapter considers effects on:
- Water quality (including both surface water and groundwater bodies) and assessment of the impacts from pollution;
 - Flood risk; both risk to the Proposed Development and the potential for direct and indirect impacts of the Proposed Development on off-site flood risk;
 - Water resources, impacts on flow regimes and the geomorphological characteristics of watercourses as a result of proposed watercourse crossings;
 - Any alterations to regimes of water supplying Private Water Supplies (PWS), either in the locale of the Proposed Development or with potential hydrological connection to the Wind Turbine Array; and
 - The potential for impacts of the Proposed Development on hydrology or hydrogeology to lead to secondary effects on Groundwater Dependent Terrestrial Ecosystems (GWDTE). We note however, that the ecology or biodiversity effects (e.g., on sensitive habitats) are captured in **Chapter 6** (EIAR Volume 2).
- 8.2.3 This Chapter assesses cumulative effects as arising from the addition of the Proposed Development to other cumulative developments, which are the subject of a valid planning application. This includes consented developments which are not yet under construction and developments in planning. Current operational sites and developments under construction are considered as part of the baseline. Developments close to the end of their operational life will be included as part of the baseline to present a 'worst case scenario'.
- 8.2.4 This assessment is based on the Proposed Development as described in **Chapter 2** (EIAR Volume 2) and takes into account the Draft Outline Construction Environmental Management Plan (OCEMP) (**Technical Appendix 2.1**, EIAR Volume 4).
- 8.2.5 The scope of this assessment has been informed by consultation responses summarised in **Table 8.1** and the following guidelines/policies:

National Legislation and Policy

- Water Environment and Water Services (Scotland) Act 2003¹;
- Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) (CAR)²;
- The Water Environment (Miscellaneous) (Scotland) Regulations 2017³;
- Flood Risk Management (Scotland) Act 2009⁴;

¹ Scottish Government (2003). Water Environment and Water Services (Scotland) Act 2003. Available at: <http://www.legislation.gov.uk/asp/2003/3/contents>

² Scottish Government (2011, 2013, 2017) Water Environment (Controlled Activities) (Regulations) Scotland 2011 (CAR) and their further amendments of 2013 and 2017 Available at: <https://www.sepa.org.uk/regulations/water/>

³ Scottish Government (2017) The Water Environment (Miscellaneous) (Scotland) Regulations 2017. Available at: <http://www.legislation.gov.uk/ssi/2017/389/contents/made>

⁴ Scottish Government (2009) Flood Risk Management (Scotland) Act 2009. Available at: <http://www.legislation.gov.uk/asp/2009/6/contents>

- The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017⁵;
- The Public and Private Water Supplies (Miscellaneous Amendments) (Scotland) Regulations 2015⁶;
- The Public Water Supplies (Scotland) Regulations 2014 (as amended 2017)⁷; and
- The Water Environment (Drinking Water Protected Areas) (Scotland) Order 2013⁸

Guidance and Advice

- PPG 1⁹: Understanding your environmental responsibilities - good environmental practices (July 2013);
- GPP 2: Above ground oil storage tanks (January 2018);
- GPP 4: Treatment and disposal of wastewater where there is no connection to the public foul sewer (November 2017);
- GPP 5: Works and maintenance in or near water (January 2017);
- PPG 6: Working at construction and demolition sites (2012)¹⁰;
- GPP 13: Vehicle washing and cleaning (April 2017)
- GPP 21: Pollution incident response planning (July 2017)
- PPG 22: Incident response - dealing with spills (October 2018)
- PAN 79: Water and Drainage (September 2006);
- LUPS-GU4¹¹: Planning guidance on on-shore wind farm developments (2017);
- LUPS-DP-GU2a: Development Plan Guidance on Flood Risk (2018);
- LUPS-GU19: Planning advice on wastewater drainage (2011);
- LUPS-GU31: Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems, Version 3 (September 2017);
- WAT-SG-25: Good Practice Guide - River Crossings (November 2010) ¹²;
- WAT-SG-26: Good Practice Guide - Sediment Management (September 2010);
- WAT-SG-29: Good Practice Guide - Temporary Construction Methods (March 2009);
- WAT-SG-75: Sector Specific Guidance: Construction Sites;
- WAT-PS-06-02: Culverting of Watercourses (June 2015);

⁵ Scottish Government (2017) the Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017

Available at: <https://www.legislation.gov.uk/ssi/2017/282/note/made>

⁶ Scottish Government (2015) the Private and Public Water Supplies (Miscellaneous Amendments) (Scotland) Regulations 2015. Available at:

<https://www.legislation.gov.uk/ssi/2015/346/contents>

⁷ Scottish Government (2017) The Public Water Supplies (Scotland) Regulations 2014 (as amended). Available at:

<https://www.legislation.gov.uk/sdsi/2014/9780111024782/contents>

⁸ Scottish Government (2013) The Water Environment (Drinking Water Protected Areas) (Scotland) Order 2013 [Online] Available at:

<http://www.legislation.gov.uk/ssi/2013/29/introduction/made>

⁹ Currently, review and replacement of Pollution Prevention Guidelines (PPGs) with Guidance for Pollution Prevention (GPPs). Current PPGs and GPPs are available online: <https://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/>

¹⁰ Guidance provided in recent GPPs will be followed and take precedent over information provided in PPG 6, which was withdrawn on 14th December 2015, where there is overlap in the provision of advice. For example, guidance on the storage of handling of oils /fuels in GPP 2 will take precedent over guidance provided in Section 5 (Oil use, storage and refuelling) of PPG 6.

¹¹ SEPA Guidance and Advice Notes. Available at: <https://www.sepa.org.uk/environment/land/planning/guidance-and-advice-notes/>

¹² SEPA Engineering Guidance. Available at: <https://www.sepa.org.uk/regulations/water/engineering/engineering-guidance/#position>

- SEPA (2015), CAR - A Practical Guide, Version 9 (March 2022)¹³;
- Scottish Renewables, Scottish Natural Heritage, SEPA, Forestry Commission Scotland, Historic Environment Scotland, Marine Scotland Science and AEECoW (2019), Good Practice During Wind Farm Construction (4th Edition)¹⁴; and
- Scottish Government (2012) River Crossings and Migratory Fish¹⁵.

Consultation

8.2.6 **Table 8.1** summarises the consultation responses received regarding Hydrology and Hydrogeology and provides information on where and/or how they have been addressed in this assessment.

8.2.7 Full details on the consultation responses can be reviewed in **Technical Appendix 1.1** (EIAR Volume 4).

Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
Scottish Water, 22 nd February 2021	Scoping	<i>"No Scottish Water drinking water catchments or water abstraction sources in the area that may be affected by the proposed activity. Scottish Water will not accept any surface water connections into our combined sewer system."</i>	No further assessment of effects on public water supplies. No connection to public sewers proposed.
Argyll and Bute Council (ABC), 20 th April 2021	Scoping	<i>"Watercourse crossings are not able to be designed to pass the 1 in 200 year event (with climate change allowance). Consideration should be given to options such as bottomless culverts, and it is recommended that any changes to existing crossing should not reduce the existing capacity of the crossing. Control building and substation compound (including transformer and battery storage (of approximately 10 MW) and a temporary construction compound. Detailed requirements for drainage design are set out by ABC in a Flooding and Drainage Check list."</i>	Flow calculations and detailed design of watercourse crossings to accommodate the 1 in 200 (0.5%) annual probability flow shall be carried out by the appointed contractor at the detailed design stage. Where watercourse crossings span watercourses identified by 1:10,000 OS mapping consideration shall be given to the use of bottomless culverts. Capacity of existing culverts shall be maintained, and these will be retained where practicable. All infrastructure is located outside of SEPA flood zones, including surface water flood risk maps to take in to

¹³ SEPA The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended), A Practical Guide. Version 9, January 2022. Available online: <https://www.sepa.org.uk/regulations/water/> [Accessed March 2022]

¹⁴ Scottish Renewables, Scottish Natural Heritage, SEPA, Forestry Commission Scotland, Historic Environment Scotland, Marine Scotland Science and AEECoW (2019), Good Practice During Wind Farm Construction (4th Edition). Available online <https://www.nature.scot/doc/guidance-good-practice-during-wind-farm-construction> [Accessed March 2022]

¹⁵ <http://www.scotland.gov.uk/Topics/marine/science/Publications/publicationslatest/rivercrossings>

		<p><i>The Beinn an Tuirc Distillery is located approximately 900 m east of the application boundary and its power is supplied from a hydro-electric scheme using water from the Lephincorrach Burn.</i></p> <p><i>Where a private water supply is to be provided at the construction site (for drinking water, toilets etc.) details of the of the source of this supply and any proposed treatment should be outlined."</i></p>	<p>account small catchment sizes.</p> <p>A Drainage Impact Assessment and detailed drainage design shall be prepared by the Principal Contractor and such design shall be in accordance with SuDS requirements of CIRIA C753.</p> <p>Assessment of the potential for the Proposed Development to affect the Torrisdale Castle PWS (serving the Beinn an Tuirc Distillery) shows that the abstraction is not within an area that could be affected by the Proposed Development.</p> <p>No PWS is proposed for the Proposed Development.</p>
<p>Fisheries Management Scotland (FMS), 22nd February 2021</p>	<p>Post Scoping</p>	<p><i>"FMS identify that the proposed development falls within the catchment relating to the Argyll DSFB and Argyll Fisheries Trust and provide links and reference to standard recommendations for terrestrial wind farms."</i></p>	<p>While FMS guidance is designed to local boards to engage with the planning process, it is noted that recommendations are addressed in the proposed design: a buffer of 50 m to watercourses is maintained across the Wind Turbine Array (except at locations identified in Section 8.3 of this Chapter, and at which a suitable buffer to allow the implementation of standard best practice measures shall remain in place); the number of stream crossings has been minimised and where there is the potential for fish passage to be affected use of appropriately sized bottomless culverts shall be considered; no water abstraction from watercourses is proposed; and, the proposed development shall comply with CAR recommendation with respect to pollution prevention.</p>
<p>SEPA, 27th October 2021</p>	<p>Response to GWDTE assessment (Technical Appendix 8.1), submitted by Ramboll for comment post-scoping. No scoping response received from SEPA.</p>	<p><i>SEPA identify that they 'agree with the conclusions that the wetlands on site are unlikely to be dependent on groundwater'.</i></p>	<p>Principles for the maintenance of surface water flows and runoff rates are provided in Technical Appendix 2.1 (EIAR Volume 4) and detailed drainage plans</p>

		<p><i>"It is stated that measures to maintain surface water runoff and connection to surface waterbodies to minimise impact to the wetland habitats on site should be provided in the EIA and that the nature conservation value of the wetlands communities should inform any prioritisation of mitigation efforts."</i></p>	<p>shall be set out in a Drainage Impact Assessment and SuDS design to be implemented by the Principal Contractor, under condition were the application to be approved.</p> <p>Assessment of the nature conservation value of the wetlands communities is provided in Chapter 6 (EIAR Volume 2) and where appropriate additional mitigations measures for habitat protection are provided.</p>
--	--	---	---

Potential Effects Scoped Out

8.2.8 Detailed assessment of potential flow rates at proposed watercourse crossing locations would be carried out by a contractor at the detailed design stage such that all of the watercourse crossings identified for the Proposed Development would be designed in compliance with SEPA requirements¹⁶. The design of watercourse crossings would also take account of the future 'with climate change' baseline and (to avoid altering the flow regime) would be sized for a 1:200 year plus climate change flood event. Therefore, detailed flow rate calculations are not provided within the EIA assessment.

Method of Baseline Characterisation

Extent of the Study Area

8.2.9 The Study Area includes land within a 250 m radius of the Wind Turbine Array, and watercourses with downstream connectivity with the Wind Turbine Array (as well as their relevant 50 m buffer zones), including the catchments of the Burn of Findouran, the Burn of Succoth, the Burn of Guestloan, Linn Burn, Tammie's Burn, Chapel Burn and Keelholes Stripes and off-site downstream receptors in connection to the Charach water and the River Deveron (**Figure 8.1**, EIAR Volume 3a).

Desk Study

8.2.10 The methodology for baseline characterisation is set out as follows:

- describe surface water hydrology, including watercourses, springs and ponds;
- identify existing catchment pressures;
- identify private drinking water abstractions and PWS within the Study Area;
- identify any flood risks;
- describe the hydromorphological conditions of watercourses; and
- collect soil, geological and hydrogeological information.

8.2.11 Published information consulted to determine baseline conditions is outlined in **Table 8.2**.

¹⁶ The Water Environment (Controlled Activities) (Scotland) Regulations 2011 as amended.

Topic	Sources of Information
Topography	<ul style="list-style-type: none"> • Aerial Photography¹⁷ • 5 m contour data derived from Ordnance Survey (OS) Digital Terrain Model (DTM) data¹⁸ • 1:25,000 OS Raster Data¹⁸
Designated Nature Conservation Sites	<ul style="list-style-type: none"> • SNHi Sitelink website¹⁹
Solid and Superficial Geology	<ul style="list-style-type: none"> • British Geological Survey Digital Data provided at BGS online viewer²⁰ • BGS Borehole Records²⁰
Soils and Peat	<ul style="list-style-type: none"> • SNH Carbon and Peatland Map (2016)²¹ • BGS 1:50,000 and 1:625,000 geological maps (superficial and bedrock)²⁰
Surface Water Hydrology	<ul style="list-style-type: none"> • 1:10,000 OS Raster Data¹⁸ • 1:25,000 OS Raster Data¹⁸ • OS Open Rivers²²
Flooding	<ul style="list-style-type: none"> • Indicative River and Coastal Flood Map (SEPA)²³
Water Quality	<ul style="list-style-type: none"> • SEPA, Water Classification Hub²⁴ • SEPA, The River Basin Management Plan For The Scotland 2021 - 2027²⁵
Water Resources	<ul style="list-style-type: none"> • Private water supply information provided by Aberdeenshire and Moray Councils' Environmental Health Department • Drinking Water Protected Areas (DWPAs) in the Scotland River Basin District (RBD) maps²⁶. • 1:10,000 OS Raster Data¹⁸ • 1:25,000 OS Raster Data¹⁸
Hydrogeology	<ul style="list-style-type: none"> • BGS 1:50,000 and 1:625,000 geological maps (superficial and bedrock)²⁰ • BGS Groundwater Vulnerability Maps²⁰ • BGS 1:625,000 hydrogeological map of the UK²⁰ • The River Basin Management Plan For The Scotland 2021 – 2027²⁵

Field Survey

8.2.12 Site surveying was conducted by Ramboll in June 2021. The purpose of the site walkover was to:

- assess the general hydrological condition of the Wind Turbine Array;
- characterise watercourses within the Wind Turbine Array such that proposed watercourse crossing points could be assessed; and
- assess hydrological conditions at potential GWDTE locations.

¹⁷ Google Earth Imagery, Bing Maps

¹⁸ Under license acquired from Ordnance Survey

¹⁹ SNHi Sitelink. Available online: <http://www.snh.org.uk/snhi/> [Accessed February 2022]

²⁰ BGS Onshore GeolIndex. Available online: www.bgs.ac.uk [Accessed February 2022]

²¹ National Soil Map of Scotland. Available online: <https://soils.environment.gov.scot/maps/soil-maps/national-soil-map-of-scotland/> [Accessed February 2022]

²² OS Open Rivers. Available online: <https://osdatahub.os.uk/> [Accessed February 2022]

²³ SEPA Flood Maps. Available online: www.sepa.org.uk [Accessed February 2022]

²⁴ SEPA, Water Classification Hub. Available online: <https://www.sepa.org.uk/> [Last accessed February 2022]

²⁵ SEPA, The River Basin Management Plan For The Scotland 2021 – 2027. Available online: <https://www.sepa.org.uk/> [Accessed February 2022]

²⁶ Drinking Water Protected Areas (DWPAs) in the Scotland River Basin District (RBD) maps. Available online: <https://www.gov.scot/publications/drinking-water-protected-areas-scotland-river-basin-district-maps/> [Accessed February 2022].

8.2.13 The survey consisted of visual inspection and geolocated surveying of watercourses across the Wind Turbine Array. Where potentially groundwater dependent vegetation communities were identified by ecological surveying (see **Table 8.3**) site specific review was conducted to identify visual evidence of groundwater emergence, association of habitats to surface water features, evidence of connection to upslope surface water runoff and the presence of deep peat in association with habitats.

8.2.14 Ecological surveying in order to identify potential groundwater dependent vegetation communities was carried out by Ramboll in June 2021. Further details of the methodology for National Vegetation Classification (NVC) surveying of habitats are provided in **Chapter 6** (EIAR Volume 2).

Criteria for the Assessment of Effects

Criteria for Assessing the Sensitivity of Receptors

8.2.15 Effects on water resources are described as beneficial, neutral or adverse and are considered with reference to the value or sensitivity of the receptor, as described in **Table 8.3**.

Table 8.3: Sensitivity of Environmental Receptor		
Sensitivity of Receptor	Definition	Typical Criteria
High	International or national level importance. Receptor with a high quality and rarity, regional or national scale and limited potential for substitution/ replacement.	<ul style="list-style-type: none"> High likelihood of fluvial/ tidal flooding in the sub catchment – defined as 1:10 probability in a year. European Commission (EC) Designated Salmonid / Cyprinid fishery. Surface Water Framework Directive (WFD) class 'High'. Scottish Government Drinking Water Protected Areas. Aquifer providing regionally important resource such as abstraction for public water supply, abstraction for private water supply. Supporting a site protected under EC or UK habitat legislation/ species protected by EC legislation. Protected Bathing Water Area. Active floodplain. Highly GWDEs. Average peat depth >1 m within the sub-catchment.
Medium	Regional, county and district level importance. Receptor with a medium quality and rarity, regional scale and limited potential for substitution/ replacement.	<ul style="list-style-type: none"> Medium likelihood of fluvial/ tidal flooding in the sub catchment – defined as a 1:200 probability in a year. Surface water WFD class 'Good' or 'Moderate'. Aquifer providing water for agricultural or industrial use. Local or regional ecological status/ locally important fishery. Contains some flood alleviation features. Average peat depth >0.5 m within the sub catchment. Moderately GWDEs.
Low	Local importance Receptor is on-site or on a neighbouring site with a low quality and rarity, local scale. Environmental equilibrium is stable and is resilient to changes that are greater than	<ul style="list-style-type: none"> Surface water WFD class 'Poor'. Unproductive strata/ no abstractions for water supply. Sporadic fish present. No flood alleviation features. Sewer. Average peat depth <0.5 m within the sub catchment.

Table 8.3: Sensitivity of Environmental Receptor		
Sensitivity of Receptor	Definition	Typical Criteria
	natural fluctuations, without detriment to its present character.	

Criteria for Assessing the Magnitude of Change

8.2.16 The size or magnitude of each impact is determined as a predicted deviation from the baseline conditions during construction, operation and decommissioning of the Proposed Development, as described in **Table 8.4**.

Table 8.4: Magnitude of Impact on a Receptor	
Magnitude of Impact	Criteria
Large	Large alteration/ change in the quality or quantity of and/ or to the physical or biological characteristics of environmental resource.
Medium	Medium alteration/ change in the quality or quantity of and/ or to the physical or biological characteristics of environmental resource.
Small	Small alteration/ change in the quality or quantity of and/ or to the physical or biological characteristics of environmental resource.
None	No alteration/ change detectable in the quality or quantity of and/ or to the physical or biological characteristics of environmental resource.

Criteria for Assessing Cumulative Effects

8.2.17 The potential for cumulative effects to occur as a result of the Proposed Development is assessed based on:

- the potential hydrological connection of other similar developments, which are the subject of a valid planning application;
- the potential for concurrent phases of construction with other similar developments with the potential for hydrological connection to the Wind Turbine Array; and applicable planning conditions with regards to the potential impact of other similar developments on the water environment.

Criteria for Assessing Significance

8.2.18 **Table 8.5** illustrates how residual effects are determined by comparison of the sensitivity of receptors with the magnitude of impact (ie predicted change). For the purposes of this assessment significant effects are **Major** or **Moderate**.

		Magnitude of Impact			
		None	Small	Medium	Large
Sensitivity of Receptor	High	None	Minor	Major	Major
	Medium	None	Minor	Moderate	Moderate
	Low	None	Negligible	Minor	Minor

Limitations and Assumptions

- 8.2.19 This assessment refers to, and uses publicly available data sources, and relies upon the accuracy of these data.
- 8.2.20 This assessment also relies on an assumption that the schedule of good practice measures set out in this Chapter is implemented through the Construction Environmental Management Plan (CEMP) and Peat Management Plan (PMP). If significant effects are identified following the implementation of these good practice measures, then further mitigation will be identified.

8.3 Baseline Conditions

Current Baseline

Hydrology

- 8.3.1 The Wind Turbine Array is drained by a number of small tributaries. In the northwest corner of the Wind Turbine Array three unnamed burns flow north into the Torrisdale Water which flows east along the northern boundary of the Wind Turbine Array. Two unnamed tributaries in the east of the Wind Turbine Array flow south into the Lephincorrach Burn which bounds the Wind Turbine Array to the south and also flows east towards Torrisdale Bay. Additionally, the forestry plantations within the Wind Turbine Array are served by a small, cut drains and runnels. The main surface water features are shown in **Figure 8.1** (EIAR Volume 3a).
- 8.3.2 The Torrisdale Water is classified by SEPA as being of 'Good' condition in 2020 under the WFD classification scheme (according to the SEPA River Basin Management Plan²⁷) and was downgraded on the basis of water quality. The Lephincorrach Burn is a small watercourse and is not classified under the WFD.

Flood Risk

- 8.3.3 According to SEPA flood maps, no infrastructure associated with the Proposed Development, including temporary construction compounds, falls within areas assessed by SEPA to be at risk of flooding from rivers. Small areas of surface water flooding are indicated in the vicinity of watercourses on site but are localised and shall be addressed through suitable watercourse crossing design where applicable.
- 8.3.4 Due to the topography, hydrology and infrastructure location it is predicted by Ramboll that there is a low likelihood of groundwater emergence.

Private Water Supplies

- 8.3.5 Locations of PWS serving properties in the area of the Wind Turbine Array have been obtained by Ramboll from Argyll and Bute Council (ABC) (see **Figure 8.3**, EIAR Volume 3a). The nearest PWS (Torrisdale Castle) is located approximately 540 m east of the Wind Turbine

²⁷ <https://www.sepa.org.uk/data-visualisation/water-classification-hub/>

Array, according to the Drinking Water Quality Regulators (DWQR) of Scotland the PWS at this location is a Class A1 PWS and supplies 16 properties. Three Class B PWSs (Glenhead, Glen Croft and Auchanuilt) are located approximately 1 km, 1.3 km and 1.4 km northeast of the Wind Turbine Array respectively along the Torrisdale Water. There are no PWSs within the Wind Turbine Array.

- 8.3.6 The names and locations of PWS identified by ABC, within 2 km of the turbine array are presented in **Table 8.6**.

Table 8.6: PWS Locations					
Source Name	Easting	Northing	Class	Source Type*	Distance from Wind Turbine Array (m)
Torrisdale Castle	178584	635980	A1	GS	539
Barrmains Cottage	166499	634377	B	GS	653
Glenhead	178534	637078	B	Not provided	924
Glen Croft	178746	637078	B	SB	1056
Auchanuilt	179100	636673	B	Not Provided	1139
Torrisdale Square	179673	636467	B	SB	1660
Shore Cottage	179874	635624	B	GS	1863
Creag Lodge	179870	635365	B	SB	1926
Grianil Croft / Greenhill	179472	634611	B	GS	1948
Woodbine Cottage	179955	635574	B	GW	1953

*GS - spring; SB – watercourse; GW – well.

Public Water Supplies

- 8.3.7 Following a request for information from Ramboll, Scottish Water (SW) have confirmed that there are no SW drinking water catchments or water abstraction sources, which are designated as Drinking Water Protected Areas (DWPAs) under the WFD, in the area that may be affected by the Proposed Development.

Hydroelectric Generation

- 8.3.8 The Beinn an Tuirc Distillery is located approximately 900 m east of the Wind Turbine Array and power at the distillery is supplied from a small hydro-electric scheme using water from the Lephincorrach Burn. A dam and weir are located at the south easternmost boundary of the Wind Turbine Array on the Lephincorrach Burn (GR 177991, 635904), from where a portion of flow from the burn is piped via a screened inlet approximately 1 km downstream to a turbine building adjacent to the Beinn an Tuirc Distillery and from the turbine house back to the Lephincorrach Burn 20 m southeast of the turbine building (GR 178947, 635771).

Geology

SUPERFICIAL GEOLOGY

- 8.3.9 According to the BGS's 'Geology of Britain Viewer' website (1:50,000)²⁰, the superficial deposits underlying the Wind Turbine Array are not recorded by the BGS. Where no layers are shown on the mapping, no significant superficial deposits are assumed to be present. A very small area (<5 % of the Wind Turbine Array) at the eastern extent of the Wind Turbine Array is directly underlain by superficial deposits of till (diamicton).

BEDROCK GEOLOGY

- 8.3.10 The underlying bedrock (**Figure 8.5**, EIAR Volume 3a) across the Wind Turbine Array is of the Beinn Bheula Schist Formation (gritty psammite and pelite).

Hydrogeology

- 8.3.11 According to the 1:625,000 UK Digital Hydrogeological Data, the Wind Turbine Array is located over a low productivity aquifer comprising the Southern Highland Group (Psammite and Pelite) where flow is virtually all through fractures and other discontinuities.

Groundwater Dependent Terrestrial Ecosystems

- 8.3.12 A number of potential Highly and Moderately Groundwater Dependent Ecosystems (GWDTEs) were identified after National Vegetation Classification (NVC) surveys were undertaken across the Wind Turbine Array by Ramboll in June 2021. The initial assessment of the potential presence of these GWDTE was based on the identified NVC community presence only (**Figure 8.7**) (EIAR Volume 3a) and did not take account of hydrological, hydrogeological or land use characteristics. Findings of further hydrological assessment of GWDTE is provided in **Figure 8.8** (EIAR Volume 3a) and further details of the assessment of potential GWDTE habitats is provided in **Technical Appendix 8.1** (EIAR Volume 4). Based on site-specific hydrogeological and hydrological assessment the vast majority of these areas are shown to be associated with land use patterns (forest rides) or are features in direct connection to either surface water features or ombrogenous (rain-fed) habitats along surface water accumulation pathways. In consultation with Ramboll, SEPA has confirmed by email dated 27/10/2021 that the re-classification of these areas by Ramboll as not groundwater dependent is appropriate (as detailed in **Technical Appendix 8.1**, EIAR Volume 4). In their correspondence SEPA stated: *"We have reviewed the memo, in conjunction with our ecology specialists, and are satisfied with the assessment and appreciate the thorough evidence to back up the conceptual model of the water supply to wetlands on the site. We welcome the use of run-off model and topography to assess the potential impacts on GWDTEs and agree with the conclusions that the wetlands on site are unlikely to be dependent on groundwater... In relation to mitigation, we welcome the proposals to maintain surface water runoff and connection to surface waterbodies to minimise impact to the wetland habitats on site."*

Future Baseline

- 8.3.13 There is potential for climate change to impact on future baseline conditions. Climate change studies predict a decrease in summer precipitation and an increase in winter precipitation alongside slightly higher average temperatures. This suggests that there may be greater pressures on PWS in summer months in the future. However, summer storms are predicted to be of greater intensity. Therefore, peak fluvial flows associated with extreme storm events may also increase in volume and velocity. These climate change factors have been taken into account when considering the potential for significant effects.

Summary of Sensitive Receptors

Scoped Out Receptors

- 8.3.14 SW have stated that there are no SW drinking water catchments or water abstraction sources, which are designated as Drinking Water Protected Areas (DWPAs) under the WFD, in the area that may be affected by the Proposed Development. Therefore, potential impacts on public drinking water supplies are scoped out of further assessment.

- 8.3.15 None of the Proposed Development lies within an area classified by SEPA as being at risk of flooding from rivers or the sea, and the Wind Turbine Array is located within an area assessed by SEPA to be at very low risk of fluvial or tidal flooding (<1 in 1,000 (0.1%) annual probability). Additionally, SEPA mapping does not indicate the potential for significant surface water accumulation or surface water flows to occur within the Wind Turbine Array. There are very limited areas assessed by SEPA to be of a Medium (1 in 200 (0.5%) annual probability) or High (1 in 10 (10%) annual probability) Likelihood of surface water flooding and these locations are in direct connection to watercourses at the boundary of the Wind Turbine Array. Therefore, detailed assessment of the potential for flood risk to affect the Proposed Development is scoped out of further assessment.
- 8.3.16 Of the PWS identified none is within close enough proximity to the Proposed Development to require risk assessment of potential impacts on groundwater supplies, in line with SEPA Land Use Planning System, Guidance Note 31 (LUPS GN31), as they are outwith a 250 m buffer from the Wind Turbine Array, which is the maximum applied under SEPA guidance. The Torrisdale Castle PWS is the most sensitive PWS source identified by ABC as it reportedly serves 16 properties. This PWS is 340 m to the east of the Wind Turbine Array, at a lower elevation than the Proposed Development and could therefore have the potential to be affected by alterations in surface water runoff quality or quantity from the Wind Turbine Array. However, Ramboll's assessment of surface water flow paths across the Wind Turbine Array and an area including the location of the PWS header tank (carried out in connection with assessment of NVC GWDTE habitats), shows that surface water flows to the Torrisdale Castle PWS source are from the north and land unaffected by the Proposed Development. The Torrisdale Castle PWS is 1 km east of the Wind Turbine Array. It is therefore highly unlikely that the Torrisdale Castle PWS could be affected by the Proposed Development. Based on the very low probability of any impact to PWS sources, further assessment of potential impacts on PWS is scoped out.

Scoped In Receptors

- 8.3.17 **Table 8.7** outlines the receptors scoped into the assessment.

Table 8.7: Summary of Receptor Sensitivity		
Receptor	Sensitivity	Justification
Watercourses and surface water features	High	The surface water features (Torrisdale Water, to which the Lephincorrach Burn discharges) which are in connection to surface water flows from the Wind Turbine Array is assessed to be of 'Good' overall condition under the WFD classification scheme. The watercourses are therefore considered to be of high sensitivity based on the water quality and hydrological characteristics.
GWDTE	Medium	The underlying aquifer is assessed to be of Low Productivity and potential GWDTE vegetation communities are assessed in Technical Appendix 8.1 (EIAR Volume 4) as likely to be rain-fed habitats and as such are not considered sensitive to alterations in groundwater flows. While such habitats remain sensitive to potential alterations in surface water supplies, similar habitats are well distributed at the local and regional scale in similar or better condition.
Hydroelectric intake weir	High	The intake of piping leading to the Beinn an Tuirc Distillery hydroelectric plant could become obstructed were sediment laden surface water runoff released to the Lephincorrach Burn as a result of the Proposed Development, leading to a temporary cessation of power generation at the plant and potential remedial clearance works.

8.4 Assessment of Potential Effects

Potential Construction Effects

Watercourses and Surface Water Runoff

- 8.4.1 There is the potential to alter in-channel or overland flow regimes through excavations, disruption to artificial drains, exposure of bare earth or rock and the construction of new or upgraded watercourse crossings as well as the crossing of forestry or field drains. There is the potential for the Proposed Development to lead to a reduced response time to peak flows following heavy rainfall due to the presence of artificial land drainage and therefore this could lead to indirect effects on aquatic ecology, fluvial morphology upstream and downstream of the Proposed Development.
- 8.4.2 There are three locations, apart from track crossings of watercourses, identified in **Technical Appendix 8.2** (EIAR Volume 4), at which construction work is proposed within a 50 m buffer of watercourses:
- Approximately 190 m² of the proposed hardstanding associated with Turbine T3 is within the 50 m watercourse buffer. Torrisdale Water is situated approximately 35 m north of the proposed hardstanding area.
 - Approximately 1,050 m² of the proposed hardstanding associated with Turbine T7 is within the 50 m watercourse buffer. The headwaters of an unnamed tributary of Torrisdale Water are situated approximately 18 m west of the proposed hardstanding area.
 - Approximately 27 m of new track, which provides connection to existing access routes adjacent to the south of the Wind Turbine Array, is 25 m north of the Lephincorrach Burn at its nearest point.

Sedimentation and Increased Erosion Rates

- 8.4.3 There is the potential to increase erosion and transport of sediment to watercourses as a result of watercourse crossing construction, vegetation and soil stripping, excavations and dewatering activities. Potential effects include indirect effects on aquatic ecology, fluvial morphology and PWS downstream of the Wind Turbine Array.
- 8.4.4 Seven watercourse crossings within the Wind Turbine Array would be required as a result of the Proposed Development. Crossing locations are identified in **Technical Appendix 8.2** (EIAR Volume 4), which also sets out best practice design measures and likely licensing requirement under CAR for each crossing location.

Chemical Pollution

- 8.4.5 There is the potential to impact on receiving soils, groundwater and watercourse quality through the release of contaminated water and stored chemicals used on-site during construction works. Potential effects include effects on water quality and indirect effects on aquatic ecology.

Effects on GWDTE

- 8.4.6 Excavation of soil and bedrock during the construction phase of the Proposed Development could cause localised disruption and interruption to groundwater flows. Interruption of such groundwater flows could potentially reduce the supply of groundwater water to GWDTEs thereby causing an alteration/ change in the quality or quantity of and/ or the physical or biological characteristics of the GWDTE. Contamination of groundwater could also cause physical or chemical contamination to the GWDTE.

Potential Operational Effects

Alteration to Surface Water Flows and Runoff

8.4.7 There is the potential for hardstanding surfaces and compacted tracks and infrastructure to lead to increased rates of surface runoff, in turn leading to the potential for increased risk of surface erosion and downstream flood risk; however as described in **Chapter 2** (EIAR Volume 2) and **Technical Appendix 2.1** (EIAR Volume 4), the Proposed Development will incorporate a drainage design using SuDS principles in accordance with The SuDS Manual (C753) 2015²⁸.

Sedimentation and Increased Erosion Rates

8.4.8 On the basis that all watercourse crossings will be designed following best-practise, and the detailed drainage design will ensure pre-construction run-off rates are maintained (as set out in **Technical Appendix 2.1**) EIAR Volume 4) there are not considered to be any significant impacts on runoff volumes and rates or on fluvial morphology during the operational phase. The potential risk of the release of sediment from the activities relating to the operational phase of the Proposed Development is substantially lower than during construction because of the decreased levels of ground disturbance and the reinstatement of vegetation following the construction phase.

Chemical Pollution

8.4.9 Occasional turbine maintenance and repair would be required during the operational phase, which could involve the operation of plant at the Wind Turbine Array. There is the potential for the release of small volumes of fuel from plant or for the accidental release of contaminative materials transported on to the site for maintenance.

8.4.10 Battery Energy Storage Systems (BESS) and electrical substations incorporate potentially contaminative materials (battery electrolyte and insulating oils) that could present a potential risk to the water environment.

GWDTE

8.4.11 An assessment of the status of habitats identified as potentially groundwater dependent is provided in **Technical Appendix 8.1** (EIAR Volume 4). Correspondence with SEPA confirms Ramboll assessment which finds that vegetation communities in the Wind Turbine Array are rainwater fed or ombrogenous. While such habitats in the Wind Turbine Array are assessed not to be dependent on groundwater sources, there is the potential for potential indirect impacts on habitats downslope of proposed infrastructure due to alteration in the quality or quantity of surface water flows.

Potential Decommissioning Effects

8.4.12 While the risks to water resources are similar to those identified during the construction phase, decommissioning shall additionally require the breaking up and removal of concrete structures and reinforcement (e.g., turbine bases, transformers substations or buildings); the excavation and removal of crushed rock, geotextile or geogrid reinforcement materials; lifting and removal of cables and the dismantling and laying down of turbine components prior to removal.

²⁸ URL: https://www.susdrain.org/resources/SuDS_Manual.html [Accessed February 2022]

8.4.13 During the decommissioning phase there is the potential for construction activity to impair the condition of hydrological and hydrogeological resources on and downstream of the Wind Turbine Array. NatureScot commissioned research²⁹ identifies those potential risks to ground and surface water environment may include the potential for:

- bank instability and increased erosion leading to effects on the quality of aquatic habitats and ecology;
- establishing rapid drainage paths leading to the potential for increased pollution extent;
- the drainage of water dependent habitats;
- sedimentation and pollution from suspended materials leading to effects on fisheries and protected habitats/ species;
- spills of fuels and oils from vehicles, turbine gearboxes and transformers leading to effects on fisheries and protected habitats/ species; and
- soil compaction leading to increased runoff and erosion potential leading to effects on fisheries and protected habitats/ species.

Potential Cumulative Construction Effects

8.4.14 The following schemes have been taken in to account in assessing the potential for cumulative effects as a result of hydrological interaction with the proposed Development:

- Beinn an Tuirc;
- Beinn an Tuirc Extension;
- Beinn an Tuirc Phase 3;
- Arnicle;
- Blary Hill; and
- Auchadudie Wind farm.

8.4.15 The potential for cumulative effects to occur as a result of the Proposed Development are assessed based on:

- the potential hydrological connection of other developments, which are the subject of a valid planning application;
- the potential for concurrent phases of construction with other developments with the potential for hydrological connection to the Wind Turbine Array; and
- applicable planning conditions with regards to the potential impact of other developments on the water environment.

8.4.16 There are no proposed wind farm developments in hydrological connection to the Proposed Development, or planning applications for other developments that could lead to a cumulative impact on the water environment.

Potential Cumulative Operational Effects

8.4.17 The operational Beinn an Tuirc Wind Farm is situated approximately 700 m west of the Proposed Development. The five easternmost turbines, approximately 700 m of access track and a met mast of the Beinn an Tuirc Wind Farm are within the catchment of Torrisdale Water and could therefore lead to cumulative impacts on this watercourse. As the Beinn an Tuirc Wind Farm was subject to environmental assessment under the planning process, including

²⁹ Welstead, J., Hirst, R., Keogh, D., Robb G. and Bainsfair, R. 2013, Scottish Natural Heritage: Research and guidance on the restoration and decommissioning of onshore wind farms. Available via SNH. http://www.snh.org.uk/pdfs/publications/commissioned_reports/591.pdf. [Accessed February 2022]

demonstration that the scheme would not impact the water environment, no cumulative operational effects are anticipated as a result of that development. Furthermore, the Beinn an Tuirc Wind Farm has been operational since 2001 and therefore stabilising vegetation and surface water drainage network has been in-situ for a significant period.

- 8.4.18 Further operational wind farm developments in the surrounding area including: the majority of the Beinn an Tuirc Wind Farm (excluding those elements of the wind farm identified in paragraph 6); Beinn an Tuirc Extension; Beinn an Tuirc Phase 3; Blary Hill; and Auchadudie are not within the catchments of Torrisdale Water (including the Lephincorrach Burn) and are not in hydrological connection to the Proposed Development.
- 8.4.19 As such, there would be no cumulative impact on the water environment as a result of the potential interaction of the Proposed Development with operational wind farms.

8.5 Mitigation

Mitigation by Design

- 8.5.1 The Proposed Development has been subject to a number of design iterations and evolution in response to constraints identified as part of the baseline studies, intended to reduce environmental effects (see **Chapter 2** and **Chapter 3** (EIAR Volume 2)).
- 8.5.2 The design of the Proposed Development has been set out such that the number of watercourse crossings shall be minimised. Design of new watercourse crossings would maintain hydraulic connectivity and allow the free passage of fish and other wildlife beneath. Watercourse crossings would also be of sufficient size so as not to restrict or concentrate flows downstream and to convey flows during periods of heavy rainfall (e.g., 1 in 200-year event plus climate change allowance).

Mitigation during Construction

- 8.5.3 A schedule of good practice measures is set out below, which provides a summary of measures that would be implemented during construction through a CEMP and detailed assessment of further measures that would be implemented at hydrologically sensitive locations. Details of construction phase mitigation measures for the Proposed Development would be contained within the CEMP, an outline of which is provided in the Outline CEMP (OCEMP) (see **Technical Appendix 2.1**, EIAR Volume 4). The OCEMP includes information relating to all good practice construction measures, pollution prevention controls and monitoring to be implemented over the course of the construction and operation of the Proposed Development in line with current industry and statutory guidance.
- 8.5.4 A detailed CEMP would be prepared by the Principal Contractor prior to the commencement of construction, in line with applicable SEPA regulation as set out in **Section 8.2** of this Chapter and in accordance with conditions applied to the Proposed Development by ABC.

Alteration to Surface Water Flows and Runoff

- 8.5.5 Details of construction phase SuDS would be included in the Pollution Prevention Plan (PPP) and the final CEMP, as required, to provide a surface water management and treatment train that would mitigate potential adverse impacts on the hydrology of the site and surrounding areas during the construction phase of the Proposed Development. Measures would ensure that pre-development runoff rates are maintained and that rates of runoff to watercourses are not increased. A full SuDS solution would be developed prior to construction. Construction site

plans and proposed drainage measures would form a PPP that would be compiled by the Principal Contractor.

- 8.5.6 At the limited number of locations where a track is required to cross a watercourse, or where other infrastructure is necessary within 50 m of a surface watercourse, either as described in this Chapter or as identified by the Environmental Clerk of Works (ECoW), the installation of SuDS measures would be supervised by the ECoW during the construction phase of works. Any requirement for monitoring of water quality within watercourses downstream of the Proposed Development would be agreed with SEPA and Marine Scotland. Procedures for this would be detailed in the CEMP.
- 8.5.7 There are three locations at which, in addition to watercourse crossings that have been identified in **Technical Appendix 8.2** (EIAR Volume 4), construction work is proposed within a 50 m buffer of a watercourse. At these locations, a sufficient buffer (a minimum of 17 m) would be maintained between the proposed infrastructure and watercourses to allow the implementation of suitable SuDS measures such that runoff rates would be maintained at pre-development rates, in line with standard best practice measures.

Sedimentation and Erosion

- 8.5.8 The CEMP would include measures to minimise potential adverse effects related to surface water and groundwater discharge, including impacts associated with dewatering which may arise from the excavation of the borrow pit and turbine foundations. Therefore, the Principal Contractor would be required to meet regulatory requirements and implement best practice measures as set out in SEPA planning guidance.
- 8.5.9 Should the Proposed Development be granted Section 36 consent, detailed proposals for the management of surface water runoff at the site would be submitted to SEPA by the Principal Contractor under a Construction Runoff licence³⁰ to fulfil regulatory requirements.
- 8.5.10 Where required, interceptor ditches would divert waters to locations downstream of proposed excavation or soil disturbance works associated with the installation of turbine foundations, the development of construction compounds and batching plants, groundworks during the installation of the substation and the excavation of the borrow pit. These would be specified in a PPP that would be compiled by the Principal Contractor in accordance with SEPA guidance³¹.
- 8.5.11 Sediment capture methods to be implemented at the Site would be detailed in a Drainage Impact Assessment that would be prepared by the Principal Contractor were the Proposed Development approved and the CEMP. Such measures would ensure that sediment laden runoff would be directed to settlement ponds suitable for the containment of volumes of water and sediment as appropriate to the area of disturbed or excavated ground (taking in to account the potential for rainfall events). Water discharged from settlement ponds would be directed to vegetated areas and measures such as silt fences would ensure sediment loads are fully entrained.
- 8.5.12 At any locations where there are space restrictions such that there are limitations on the area over which potentially sediment laden surface water would runoff and disperse (the buffer strip of vegetation is less than 5-10 m³²), mechanical filtration of potentially sediment laden

³⁰ <https://www.sepa.org.uk/regulations/water/pollution-control/water-run-off-from-construction-sites/>

³¹ Supporting Guidance (WAT-SG-75), Sector Specific Guidance: Construction Sites February 2018, URL: <https://www.sepa.org.uk/media/340359/wat-sg-75.pdf> [Accessed 27 October 2021]

³² As specified in WAT-SG-29

runoff shall be carried out. Measures to mitigate the potential for the release of sediment laden water from this area during construction would be overseen by the ECoW, who would carry out and record daily inspections of the watercourse and sediment control measures during construction work to ensure no visible increase in sediment load occurs.

- 8.5.13 A detailed Borrow Pit Assessment would be prepared prior to commencement including details of the proposed drainage layout at each location and details of methods by which stockpiled materials would be separated from surface runoff as far as practicably possible.
- 8.5.14 Where drains would be installed, either temporarily during the construction phase or in association with the installation of site infrastructure, check dams would be installed at suitable intervals (as defined by the gradient of the drain) to reduce flow velocity and allow the settlement of sediment loads prior to discharge to watercourses. These would be detailed in the PPP.

Chemical Pollution

- 8.5.15 The potential for impacts on the water environment through the release of pollutants or sediments during the construction phase would be managed through the implementation of a CEMP (initial details are provided in **Technical Appendix 2.1**, EIAR Volume 4). The CEMP would incorporate measures to ensure that the release of sediments or pollutants to the surrounding environment is avoided.
- 8.5.16 The storage of potentially contaminative materials (oils, cements/ grouts) would be carried out at least 50 m from watercourses. Fuels, oils or chemicals stored on-site would be sited over an impervious base and according with the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) (CAR).
- 8.5.17 The CEMP would set out procedures that would be followed should the accidental release of any pollutants from site plant and machinery occur in proximity to a surface water feature. Immediately following appropriate on-site responses, SEPA would be notified and consulted on appropriate clean up or remediation were such measures required.

GWDTes

- 8.5.18 Hydrological and hydrogeological assessment of vegetation communities identified as potentially groundwater dependant (provided in **Technical Appendix 8.1**, EIAR Volume 4) finds that such vegetation communities on-site are either in direct connection to surface water features or are unlikely to be supported by groundwater supplies and as such are not considered sensitive to alterations in groundwater flows.
- 8.5.19 It is considered that the maintenance of quality and quantity in surface water distribution across habitats identified as potentially groundwater dependent would be important, as these areas are assessed to be predominantly supported by surface water supply. Suitable drainage and surface water measures would be implemented, utilising SuDS where possible, to maintain hydrological connectivity in peatland and wetland habitats and prevent deleterious impacts on surface water distribution, which would be addressed in a CEMP for the Proposed Development to be developed by the Principal Contractor.

Watercourse Crossings

- 8.5.20 Construction would be carried out in accordance with best SEPA practice³³ and SEPA Guidance for Pollution Prevention³⁴. Splash boards and runoff diversion measures, including silt fencing adjacent and parallel to watercourses beneath bridges and at culvert crossings, would be used at all crossings during construction to prevent direct siltation of watercourses.
- 8.5.21 To ensure that all drainage measures employed during the construction phase of the Proposed Development are maintained appropriately and remain effective, the performance of the drainage measures would be monitored. The drainage management works would, therefore, be supervised by the ECoW and would be in accordance with the CEMP.
- 8.5.22 The detailed design of each watercourse crossing would seek to ensure hydraulic conveyance is maintained to prevent any restriction of flows, as well as allowing the free passage of mammals and aquatic ecology. Therefore, it is proposed that each watercourse crossing would have sufficient capacity to pass the climate change-adjusted 1 in 200 year flood including an allowance for partial blockage.

Mitigation during Operation

- 8.5.23 A site maintenance programme with regard to site plant and infrastructure would be implemented by the successful contractor.
- 8.5.24 A maintenance schedule would be developed for all SuDS and drainage assets installed at construction stage to ensure that the function and benefit provided by the asset remains for the lifetime of the Proposed Development.

Mitigation during Decommissioning

- 8.5.25 It is anticipated that at the time of decommissioning, a CEMP would be implemented by an appointed contractor to the extent that infrastructure was fully or partially decommissioned. Should full decommissioning of the site be carried out following the lifespan of the Proposed Development, the Site would be returned to 'the same' or 'a better' condition such that natural drainage conditions would be replicated, as far as practicably possible based on the intended land use.

8.6 Assessment of Residual Effects

Residual Construction Effects

Watercourses and Surface Water Runoff

- 8.6.1 The potential for adverse impact on runoff volumes and rates and fluvial morphology through the alteration of drainage patterns would be mitigated through the implementation of best practice measures as outlined above and set out in the CEMP. The design of watercourse crossings and drainage features associated with infrastructure would be in line with CAR regulations and set out in a Construction Site License in consultation with SEPA and ABC. Where encroachment to within a 50 m buffer from watercourses has been identified additional mitigation and monitoring measures have been set out to further reduce the potential magnitude of alteration to surface water flows and runoff to none. Therefore, the residual effect would be **Negligible** and **Not Significant**.

³³ SEPA, 2010. Engineering in the Water Environment: Good Practice Guide, River Crossings.

³⁴ SEPA 2018. Works and Maintenance in or Near water: GPP5

Sedimentation and Increased Erosion Rates

8.6.2 The potential for adverse impact on water quality and fluvial morphology associated with sediment-laden runoff or impacts on bank integrity is taken in to account in the design of the Proposed Development and the maintenance of a suitable buffer to watercourses from areas on which infrastructure is proposed. Furthermore, SuDS design shall ensure the capture of any additional sediment load that could be released in the construction phase. Where a section of access track is proposed within a 50 m buffer of a watercourse, the implementation of additional sediment control measures would be overseen by the ECoW, who would also carry out daily inspection of sediment control measures and the watercourse. Therefore, the residual effect would be **Negligible** and **Not Significant**.

Chemical Pollution

8.6.3 The potential for impacts on the water environment through the release of pollutants or sediments during the construction phase shall be managed through the implementation of a CEMP as detailed in **Technical Appendix 2.1**. The CEMP would incorporate measures to ensure that the release of sediments or pollutants to the surrounding environment is avoided. Therefore, the residual effect would be **Negligible** and **Not Significant**.

GWDTE

8.6.4 The potential for adverse impact on GWDTE habitats (**Technical Appendix 8.1**, EAIR Volume 4) would be managed through the implementation of suitable cross drainage measures and SuDS measures incorporated with on-site infrastructure. Therefore, the residual effect would be **Negligible** and **Not Significant**.

Residual Operational Effects

8.6.5 The assessment has identified that there are no significant effects arising from the Proposed Development, taking in to account mitigation measures installed in the construction phase. Therefore, the residual effect would be **Negligible** and **Not Significant**.

Residual Decommissioning Effects

8.6.6 At the point of full or partial decommissioning of the Proposed Development, the CEMP developed during the construction phase shall provide guidance for the management of risk to the water environment. The CEMP would be reviewed (along with any changes in legislation, climate, designations, habitats or water use) and used to plan decommissioning activity. Assessment provided above sets out that no significant effects would occur as a result of decommissioning of the Proposed Development. Therefore, the residual effect would be **Negligible** and **Not Significant**.

Residual Cumulative Construction Effects

8.6.7 There are no proposed wind farm developments in hydrological connection to the Proposed Development, or planning applications for other developments that could lead to a cumulative impact on the water environment. Therefore, there would be no residual cumulative construction effects.

Residual Cumulative Operational Effects

8.6.8 Based on the assessment of potential residual effects of the Proposed Development during the operational phase to be **Negligible**, when considered in the context of the downstream catchments as a whole the potential for adverse cumulative effects would be further reduced. Therefore, no residual cumulative effects would occur.

8.7 Monitoring

Construction Phase Monitoring

8.7.1 The installation of mitigation measures set out in the assessment and further detailed in the CEMP shall be overseen and recorded by the ECoW. Visual inspection of sediment control measures would be carried out by the ECoW during the construction phase of works on a weekly basis to ensure no excess accumulation of sediment that could affect the operation of settlement ponds or check dams occurs. Due to the high sensitivity of the hydroelectric intake in the south east of the Wind Turbine Array, as a precautionary measure daily inspection of watercourse turbidity at the weir and intake would be carried out by the ECoW during the construction phase.

Operation Phase Monitoring

8.7.2 The implementation of a maintenance schedule for all SuDS and drainage assets installed at construction stage to ensure that the function and benefit provided by drainage assets remains for the lifetime of the Proposed Development. Therefore, no ongoing monitoring is considered necessary.

Decommissioning Phase Monitoring

8.7.3 At the point of decommissioning, the implementation of a revised CEMP shall be overseen and recorded by the ECoW.

8.8 Summary

8.8.1 **Table 8.8** provides a summary of the potential significant effects considered, proposed mitigation commitments and the residual effects.

Table 8.8: Summary of Potential Significant Effects of the Proposed Development			
Potential Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/Residual Effect
Construction			
Alteration to Surface Water Flows and Runoff	Drainage management proposals to ensure pre-construction rates/ volumes of run-off maintained. The drainage management works would be supervised by the ECoW.	CEMP, including detailed watercourse crossing proposals, to be submitted to and approved by the LPA/ SEPA to be secured by an appropriately worded planning condition and the application for a Construction Runoff Licence by the Principal Contractor.	Not Significant
Sedimentation and Increased Erosion	Drainage management proposals to ensure water quality is maintained through use of good practice silt mitigation. The drainage management works would be supervised by the Ecological Clerk of Works (ECoW).	CDEMP, including detailed watercourse crossing proposals, to be submitted to and approved by the LPA/ SEPA to be secured by an appropriately worded planning condition and the application for a Construction Runoff Licence by the Principal Contractor.	Not Significant

Table 8.8: Summary of Potential Significant Effects of the Proposed Development

Potential Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/Residual Effect
Chemical Pollution	Storage of potentially contaminative materials at least 50 m from watercourses. Fuels, oils or chemicals stored on-site would be sited over an impervious base and according with the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) (CAR). Petrol interceptors and spill kits will be utilised where chemical spillage is a possibility.	CEMP including a Pollution Prevention Plan to be submitted to and approved by the LPA/ SEPA to be secured by an appropriately worded planning condition.	Not Significant
Effects on GWDTE	Drainage management proposals to ensure groundwater flow, hydraulic continuity and water quality is maintained.	CEMP to be submitted to and approved by the LPA/ SEPA to be secured by an appropriately worded planning condition.	Not Significant
Operation			
Alteration to Surface Water Flows and Runoff	On-going maintenance for all proposed drainage measures on the site, particularly including water crossings and sustainable drainage features designed to manage water quality and runoff rate.	To be implemented and monitored by the site operator, through operational maintenance schedule.	Not Significant
Sedimentation and Increased Erosion	On-going maintenance for all proposed drainage measures on the site, particularly including water crossings and sustainable drainage features designed to manage water quality and runoff rate.	To be implemented and monitored by the site operator, through operational maintenance schedule.	Not Significant
Chemical Pollution	All ongoing maintenance to be carried out in accordance with pollution prevention guidance. No fuelling, storage of oils or laydown of plant to be carried out on-site.	Maintenance schedule to be implemented by the Principal Contractor.	Not Significant
Effects GWDTE	Infrastructure would incorporate measures to ensure the conveyance of shallow groundwater and surface water across the Wind Turbine Array, such as the use of suitably graded sub-base aggregate on tracks and cross drainage measures to ensure the continued	To be implemented as set out in construction phase mitigation above. Maintenance schedule to be implemented the Principal Contractor.	Not Significant

Table 8.8: Summary of Potential Significant Effects of the Proposed Development			
Potential Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/Residual Effect
	distribution of surface water runoff.		
Decommissioning			
Impacts due to construction activity assessed above).	A Decommissioning Plan would set out environmental protection measures and restoration principles which would be implemented. It is anticipated that similar mitigation as required during construction would be necessary.	Decommissioning measures to be approved with SEPA through CAR licensing.	Not Significant
Disturbance of established habitats or drainage pathways.	Minimisation of construction footprint during decommissioning. Excavated material re-used where possible, and potential for material to remain in situ where applicable assessed.	Decommissioning measures to be approved with SEPA through CAR licensing.	Not Significant
Cumulative Construction			
Potential cumulative impacts to receptors listed above	None required.	N/A	Not Significant
Cumulative Operation			
No additional cumulative effects over and above those detailed above.	None required.	N/A	Not Significant

9 Geology and Soils

9.1 Introduction

9.1.1 This Chapter considers the potential significant effects on the Geology and Soils environment (soils, peat and geology) associated with the construction, operation and decommissioning of the Proposed Development. The specific objectives of the Chapter are to:

- describe the Geology and Soils baseline;
- describe the assessment methodology and significance criteria used in completing the impact assessment;
- describe the potential effects, including direct, indirect and cumulative effects;
- describe the mitigation measures proposed to address potential significant effects; and
- assess the residual effects remaining following the implementation of mitigation.

9.1.1 The production of this Chapter has been overseen by Colin Duncan, a Technical Director for SLR Consulting with over 40 years' experience as a geologist, with a specialism in Engineering Geological Assessment for the renewables and transmission sectors. He has been involved in engineering and geological assessment on a number of EIA projects for proposed wind farms, transmission lines and substations, providing both pre and post consent services in geological and geotechnical services. He has experience in infrastructure design, geological assessment, borrow pit assessments, mining related studies and peat slide risk assessments.

9.1.2 This Chapter is supported by the following figures and technical appendices:

- Volume 3a: Figures
 - **Figure 9.1: Soil Mapping**
 - **Figure 9.2: Peatland Importance;**
 - **Figure 9.3: Superficial Geology;** and
 - **Figure 9.4: Bedrock Geology.**
- Volume 4: Technical Appendices
 - **Technical Appendix 9.1: Borrow Pit Assessment;**
 - **Technical Appendix 9.2: Peat Landslide Hazard and Risk Assessment;** and
 - **Technical Appendix 9.3: Peat Management Plan.**

9.1.3 Figures and Technical Appendices are referenced in the text where relevant.

9.1.4 This assessment uses the below terminology throughout:

- Proposed Development - All elements of the West Torrisdale Wind Farm development for which S36 consent and deemed planning permission are sought.
- Application Boundary - The red line boundary defining all elements of the Proposed Development for the purpose of the S36 application.
- Wind Turbine Array - the location of the wind turbines comprising the Proposed Development.
- Access Corridor - the land within the Application Boundary in which the access track connect the Wind Turbine Array with the A83 road.
- Study Area - the area in which the EIA is undertaken, defined for each technical topic as appropriate.

9.2 Assessment Methodology and Significance Criteria

Scope of Assessment

- 9.2.1 This assessment considers the effects of construction, operation, and decommissioning of the Proposed Development upon those receptors identified during the review of desk-based information and field surveys. This Chapter considers effects on the geology and soils environment, including peat.
- 9.2.2 This Chapter assesses cumulative effects as arising from the addition of the Proposed Development to other cumulative developments, which are the subject of a valid planning application. This includes consented developments which are not yet under construction and developments in planning. Current operational sites and developments under construction are considered as part of the baseline. Developments close to the end of their operational life will be included as part of the baseline to present 'worst case scenario'.
- 9.2.3 This assessment is based on the Proposed Development as described in **Chapter 2** (EIAR Volume 2).
- 9.2.4 The scope of the assessment has been informed by consultation responses summarised in **Table 9.1** and the following guidelines/policies:
- National Planning Framework 4 (NPF4)¹;
 - Argyll and Bute Council Local Development Plan (LDP)²;
 - Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments³;
 - Regulatory Position Statement – Development on Peat⁴;
 - Good Practice During Wind Farm Construction, 4th Edition⁵;
 - Developments on Peatland⁶;
 - Floating Roads on Peat⁷;
 - Managing Geotechnical Risk⁸;
 - CIRIA (Construction Industry Research and Information Association) Report 179⁹; and
 - Guidelines for the Risk Management of Peat Slips on the Construction of Low Volume/Low Cost Roads on Peat¹⁰.

¹ Scottish Government (2023). <https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2022/11/national-planning-framework-4-revised-draft/documents/national-planning-framework-4-revised-draft/national-planning-framework-4-revised-draft/govscot%3Adocument/national-planning-framework-4-revised-draft.pdf> [accessed March 2023]

² The Argyll and Bute Council Local Development Plan (LDP) https://www.argyll-bute.gov.uk/sites/default/files/written_statement_0_1_ac_0.pdf [accessed March 2023]

³ Scottish Government (SG), April 2017, Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments

⁴ Scottish Environment Protection Agency (SEPA), February 2010, SEPA Regulatory Position Statement – Development on Peat

⁵ Scottish Renewables, Scottish Natural Heritage (now NatureScot), SEPA, Forestry Commission Scotland, Historic Environment Scotland, Marine Scotland Science and AEECoW, 2019, Guidance - Good Practice During Wind Farm Construction, 4th Edition

⁶ Scottish Renewables & SEPA, January 2012, Developments on Peatland - Guidance on the assessment of peat volumes, re-use of excavated peat and the minimisation of waste

⁷ Forestry Commission Scotland & Scottish Natural Heritage, August 2010, Floating Roads on Peat - Report into Good Practice in Design, Construction and Use of Floating Roads on Peat with particular reference to Wind Farm Developments in Scotland

⁸ Institution of Civil Engineers, 2001, Managing Geotechnical Risk: Improving Productivity in UK Building and Construction

⁹ Ciria, January 1997, Ciria Report R179, Ground Engineering Spoil: Good Management Practice

¹⁰ Forestry Commission Scotland, January 2006, Guidelines for the Risk Management of Peat Slips on the Construction of Low Volume/Low Cost Roads on Peat

- Carbon and Peatland 2016 Map¹¹.

Consultation

9.2.5 **Table 9.1** summarises the consultation responses received regarding Geology and Soils and provides information on where and/or how they have been addressed in this assessment.

9.2.6 Full details on the consultation responses can be reviewed in **Technical Appendix 1.1** (EIAR Volume 4).

Table 9.1: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
Energy Consents Unit (ECU) 01/04/21	Scoping Opinion	Scottish Ministers consider that where there is a demonstrable requirement for peat landslide hazard risk assessment, the assessment should be clear understanding of whether the risks are acceptable and capable of being controlled by mitigation measures. The Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (Second Edition), published at http://www.gov.scot/Publications/2017/04/8868 , should be followed in the preparation of the EIA report, which should contain such assessment and details of mitigation measures. Scottish Ministers are aware that the majority of the peatland within site boundary is Class 5. However, the northeast corner of the site is located within a Class 2 peatland area. Additionally, if the access route approaches the site from the west through Beinn an Tuirc, then there is Class 1 peatland in this area. Class 1 peat comprises nationally important carbon-rich soils, deep peat and priority peatland habitat. Therefore, track design will be given careful consideration. Scottish Ministers recommend early engagement with SEPA and to take on board advice provided by Argyll and Bute Council and NatureScot.	See Technical Appendix 9.2 (EIAR Volume 4).
Argyll and Bute Council (ABC) 20/04/21	Scoping Response	The Local Biodiversity Officer (LBO) notes that 4 of the turbines - T03, T11, T12 and T05 (part of which straddles deep peat) are located on no peat; the other 8 turbines are located on various depths of deep peat more than 50 cm deep. The LBO recommends that relevant policy is referred to in this regard. The scoping layout indicates that 2 of the turbines (T11 and T12) will be located on Class 2 Peatland on the Carbon and Peatland Map (2016), which are nationally important carbon rich soils. In accordance with SPP, further consideration will be required to demonstrate that any significant effects on the qualities of these areas can be substantially overcome by siting, design or other mitigation. Prior to design freeze repositioning of these turbines should be a consideration. The Council understands that consultations will also be undertaken with Forestry and Land Scotland (FLS), NatureScot and RSPB Scotland regarding the proposed scope of surveys.	These issues are addressed in Technical Appendix 9.3 , Technical Appendix 9.2 and Technical Appendix 2.2 (EIAR Volume 4).

¹¹ <https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/>

		<p>It is noted from the Scoping Report that a Phase 1 Peat survey has been undertaken, and that peat depth greater than 1 m was only identified in a few locations, and consequently peat is not considered a major constraint. It is acknowledged that access for peat probing was limited in the densely forested part of the site and further work will be required including a Phase 2 Peat Assessment (to inform design freeze layout) and a Peat Landslide Hazard and Risk Assessment (Methodology to be agreed with Energy Consents Unit). It is noted that the Peat Landslide Hazard Risk Assessment will be included as a technical appendix to the EIAR.</p> <p>The Council notes that the EIAR will include the provision of a draft Peat management Plan (PMP), Borrow Pit Appraisal Report & Carbon Calculator</p> <p>The council is satisfied with the intended approach and notes that the advice of SEPA and NatureScot will be sought on peat.</p>	
<p>Scottish Environment Protection Agency (SEPA) 02/12/22</p>	<p>Gatecheck Consultation</p>	<p>We welcome early sight of the peat probe information (Figure 3.1) and are satisfied this shows that the turbines and infrastructure have been arranged to avoid the deeper areas of peat. However there still appears to be the potential for a lot of works on peat deeper than >50cm so we recommend floating roads remain under consideration as mitigation especially if the planned additional peat probing to supplement the existing Phase 2 data shows pockets of deep wet peat.</p>	<p>Section 9.3, provides details on peat survey undertaken and peat depths.</p> <p>The design avoids deep peat > 1 m and therefore floating tracks are not required.</p>
<p>NatureScot 26/03/21</p>	<p>Scoping Response</p>	<p>We note that Phase 1 peat probing surveys were undertaken of the majority of the site in 2019 to ascertain the extent of peat across the site with more detailed Phase 2 peat probing proposed to inform the final layout of the Proposal. These surveys should follow NatureScot guidance.</p> <p>The scoping layout indicates that 10 of the turbines will be located within commercial forestry with two turbines (T11 and T12) to be fully or partially located within the open moorland to the northeast of the site. This open moorland area is categorised as Class 2 Peatlands on the Carbon and Peatland Map (2016) which are nationally important carbon rich soils, deep peat and priority peatland habitat. It is also noted that nationally important Class 1 peatland is located to the west of the site where access may be required.</p> <p>Albeit that these classifications may change in light of detailed site specific surveys, we advise that efforts are made to avoid the siting of turbines and associated infrastructure on areas of nationally important peatland and areas of deep peat.</p> <p>The EIAR should demonstrate that any significant effects have been substantially overcome by siting, design or other mitigation.</p> <p>Details of all mitigation, including a peatland management plan and a habitat management plan should be included in the EIAR.</p>	<p>See Technical Appendix 9.3 (EIAR Volume 4).</p>

Potential Effects Scoped Out

9.2.7 An assessment of potential cumulative effects associated with the Proposed Development has been 'scoped out' of the assessment. Other developments would also be designed, developed and managed in accordance with best practice, industry standards and relevant legislation, planning policy and guidance regulated by statutory consultees. These standards ensure, with respect to the geology and soils environment, potential impacts are mitigated and controlled at source.

Method of Baseline Characterisation

Extent of the Study Area

9.2.8 The Study Area includes all elements of the Proposed Development, as described within **Chapter 2** (EIAR Volume 2). In addition, details of local geology and soil environments within a buffer of 250 m from the turbine array have been considered. The Study Area encompasses the Wind Turbine Array as well as geological features which could potentially be affected by the construction, operation and decommissioning of the Proposed Development. The access corridor is not included as part of this assessment.

Desk Study

9.2.9 A desk-based review of soil and geological maps, Ordnance Survey (OS) mapping and Digital Terrain Model (DTM) mapping has been undertaken as part of the **Technical Appendix 9.2** (EIAR Volume 4). Baseline data with respect to geology and soils environment have been collected from publicly available information and open-source data from a range of sources including:

- British Geological Survey (BGS) Geoindex mapping¹²;
- Carbon and Peatland 2016 Map¹³;
- NatureScot Environment Map Viewer¹⁴;
- SEPA Water Classification Hub¹⁵;
- The Coal Authority Interactive Map¹⁶;
- Zeteca UXO Risk Maps¹⁷; and
- A review of current and historical Ordnance Survey maps.

Field Survey

9.2.10 Detailed site visits and walkover surveys were undertaken by SLR on the following dates:

- November 2019 – reconnaissance and peat probing to collect peat depth and condition data; and
- April / October 2021 – peat probing to collect peat depth and condition data.

9.2.11 The field work described above has been undertaken in order to:

¹² British Geological Survey, https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.133433804.376188765.1646739904-1030004651.1646739904 [Accessed December 2022]

¹³ Nature Scot, <https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/soils/carbon-and-peatland-2016-map> [accessed December 2022]

¹⁴ Scotland's Environment, <https://map.environment.gov.scot/sewebmap/> [accessed December 2022]

¹⁵ SEPA, <https://www.sepa.org.uk/data-visualisation/water-classification-hub/> [accessed December 2022]

¹⁶ The Coal Authority, <https://mapapps2.bgs.ac.uk/coalauthority/home.html> [accessed December 2022]

¹⁷ Zeteica UXO, <https://zeteicauxo.com/downloads-and-resources/risk-maps/> [accessed December 2020]

- verify the information collected during the desk and baseline study;
- undertake a visual assessment of the turbine array and main geological features;
- inspect rock exposures and establish by probing, an estimate of overburden thicknesses, peat depth and stability;
- confirm underlying substrate, based on the type of refusal of a peat probe and by coring; and
- allow appreciation of the site, determine gradients, access routes, ground conditions, etc. and to assess the relative location of all the components of the Proposed Development;

9.2.12 The desk study and field surveys have been used to identify potential development constraints and have been used as part of the iterative design process.

Criteria for the Assessment of Effects

9.2.13 An assessment has been undertaken on the geology and soils environment during the construction, operational and decommissioning phases of the Proposed Development.

9.2.14 The significance of effects of the Proposed Development has been assessed by considering two factors: the sensitivity of the receiving environment and the potential magnitude of impact, should that effect occur.

9.2.15 This approach provides a mechanism for identifying the areas where mitigation measures are required and for identifying mitigation measures appropriate to the significance of potential effects presented by the Proposed Development.

9.2.16 Criteria for determining the significance of effect are provided in the following sections.

Criteria for Assessing the Sensitivity of Receptors

9.2.17 The sensitivity of the receiving environment (i.e., the baseline quality of the receiving environment) is defined as its ability to absorb an effect without a detectable change and can be considered through a combination of professional judgement and a set of pre-defined criteria set out in **Table 9.2**. Receptors in the receiving environment only need to meet one of the defined criteria to be categorised at the associated level of sensitivity.

9.2.18 It should be noted that the sensitivity criteria adopted for land quality relating to contamination is based on the tolerance of the site to change i.e. that known contaminated sites will be more sensitive to the ground-breaking aspects of development, during the construction phase, than those areas where no contamination is present.

Sensitivity	Definition
High	<ul style="list-style-type: none"> ▪ Special Area of Conservation (SAC) with important geomorphological or geological features. Sites of Special Scientific Interest (SSSI) with important geomorphological or geological features. ▪ ALC Classes 1, 2 - Excellent to Good Quality agricultural land. ▪ Peat Classes 1, 2 - Nationally important carbon-rich soils, deep peat and priority peatland habitat. ▪ Presence of regulatory determined contaminated land (Part 2A EPA designated).
Medium	<ul style="list-style-type: none"> ▪ Regionally Important Geological Site (RIGS) or Geological Conservation Review sites (GCR). ▪ Soils supporting non-statutory designated sites Local Nature Reserves (LNR). ▪ ALC Classes 3a and 3b - Moderate to Good Quality Land capable of producing a moderate range of crops. ▪ Peat Classes 3, 5 - Occasional peatland habitats can be found. Most soils area carbon-rich, with some areas of deep peat. ▪ Areas of potential concern identified by Local Authority under their statutory investigation of contaminated land (under Part 2A; EPA).
Low	<ul style="list-style-type: none"> ▪ Common geological features of limited use for knowledge/study ▪ ALC Classes 4 and 5 Poor to Very Poor Quality- Improved grassland and rough grazing. ▪ Peat Classes 4 - Areas unlikely to be associated with peat or carbon rich soils. Unlikely to include carbon-rich soils.
Not Sensitive	<ul style="list-style-type: none"> ▪ No areas of previously developed land with no areas of potential concern relating to contaminated land identified. ▪ Peat Class 0 - Mineral rich or no soils peatland habitats not recorded.

Criteria for Assessing the Magnitude of Change

9.2.19 The potential magnitude of change would depend upon whether the potential impact would cause a fundamental, material, or detectable impact. In addition, the timing, scale, size, and duration of the potential effect resulting from the Proposed Development are also determining factors. The criteria that have been used to assess the magnitude of impact are defined in **Table 9.3**.

Sensitivity	Criteria	Definition
High	Results in a loss of attribute	Fundamental (long term or permanent) loss of resource and/or quality and integrity of resource; potential to cause exceedance of statutory objectives and/or breaches of legislation; severe damage to key characteristics, features or elements.
Medium	Results in impact on integrity of attribute or loss of part of attribute	Loss of resource, but not adversely affecting the overall integrity; partial loss of/damage to key characteristics, features or elements with/without exceedance of statutory objectives or with/without breaches of legislation.
Low	Results in minor impact on attribute	Some measurable change in attributes, quality or vulnerability; reversible or minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
Not Sensitive	Results in an impact on attribute but of insufficient magnitude to affect the use / integrity	Very minor or no loss or detrimental alteration to one or more characteristics, features or elements; impact of insufficient magnitude to affect the overall use/integrity.

Criteria for Assessing Significance of Effects

- 9.2.20 The sensitivity of the receiving environment together with the magnitude of the impact determines the significance of the effect, which can be categorised into level of significance as identified in **Table 9.4**. This also considers good practice measures implemented and embedded as part of the design and construction of the Proposed Development and use of professional judgement where appropriate.
- 9.2.21 **Table 9.4** provides a guide to assist in decision making. However, it should not be considered as a substitute for professional judgment and interpretation. In some cases, the potential sensitivity of the receiving environment or the magnitude of potential impact cannot be quantified with certainty and, therefore, professional judgement remains the most robust method for identifying the predicted significance of a potential effect.

Magnitude of Impact	Sensitivity			
	High	Medium	Low	Negligible
High	Major	Major	Moderate	Negligible
Medium	Moderate	Moderate	Minor	Negligible
Low	Moderate	Minor	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

- 9.2.22 Effects of 'Major' and 'Moderate' significance are considered to be 'Significant' in terms of the EIA Regulations.
- 9.2.23 A statement of residual effects, following consideration of any further specific mitigation measures where identified, is then given.

Limitations and Assumptions

- 9.2.24 The assessment uses site investigation and survey data and publicly available data sources, including but not limited to SEPA, NatureScot, BGS, and commercial data supply companies, as well as additional information supplied from stakeholders during the scoping and consultation stages.
- 9.2.25 It is considered that the data and information used to complete this assessment are robust and that there are no significant data gaps or limitations.

9.3 Baseline Conditions

Current Baseline

- 9.3.1 This Section presents information gathered regarding the existing geological, conditions within the turbine array and its immediate surrounding.

Designated Sites

- 9.3.2 There are no sites designated for geological, soils or peat interests within 1 km of the Study Area.

Topography

- 9.3.3 The majority of the Wind Turbine Array is currently used for commercial forestry, with the exception of the north eastern corner, to the north of turbine T7 and T9, which comprises

open moorland. The Wind Turbine Array ranges from ~400 m AOD to 160 m AOD, with elevation decreasing to the east.

Soils

- 9.3.4 There are two types of soil present across the Wind Turbine Array as classified by Scotland's Soils. The dominant soil type is peaty gleys, characterised as 'Drifts derived from arenaceous schists and strongly metamorphosed argillaceous schists of the Dalradian Series'. Some brown soils are also present in the eastern edge of the Wind Turbine Array, which have the same characterisation. The extent of all soils is present in **Figure 9.1** (EIAR Volume 3a) which is a summary taken from the National Soil Map of Scotland.
- 9.3.5 There are also three different classes of peat present across the Wind Turbine Array as classified by the Carbon and Peatland 2016 map. Classes 1, 2 and 5 are present across the Wind Turbine Array, with Class 5 being the most prominent. The extent of peat mapping is present in **Figure 9.2** (EIAR Volume 3a).
- 9.3.6 A comprehensive peat probing programme has been conducted which has informed **Technical Appendix 9.2** and **Technical Appendix 9.3** (EIAR Volume 4). **Figure 9.2.5** of **Technical Appendix 9.2** (EIAR Volume 4) show peat depth plans and the results of the peat probing campaigns. Below is a summary of the findings of the peat probing programme:
- the presence and depth of peat was assessed at more than 1,900 locations;
 - 65 % of all probes confirmed peaty soils;
 - where recorded, the peat thickness varies from 0.5m to 5.9 m;
 - of the probe locations that intersected peat, approximately 80 % recorded peat less than 1 m thick; and
 - a hazard impact assessment has been completed which concludes that subject to the employment of appropriate mitigation measures, the presence of peat and potential peat slide instability are not development constraints.

Superficial Geology

- 9.3.7 The BGS Sheet 20 Sound of Gigha Solid and Drift (1996)¹⁸ indicates that there is a localised pocket of glacial till to the east of the Wind Turbine Array, within the Application Boundary. The areas at higher altitude have no recorded superficial deposits.
- 9.3.8 The extent of all superficial geology is present in **Figure 9.3** (EIAR Volume 3a), which is a summary taken from the available British Geological Survey (BGS) maps.

Bedrock Geology

- 9.3.9 The BGS Sheet 20 Sound of Gigha Solid and Drift (1996)¹⁸ indicates that the Wind Turbine Array is underlain by Dalradian age metasedimentary rocks of the Beinn Bheula Schist Formation. The unit shows a strong linear alignment trending southwest-northeast. The North Britain Palaeogene Dyke Suite is also present and is trending in a northwest – southeast direction.
- 9.3.10 The extent of all bedrock geology is present in **Figure 9.4** (EIAR Volume 3a), which is a summary taken from the available British Geological Survey (BGS) maps.
- 9.3.11 No faults are recorded within the footprint of the Wind Turbine Array.

¹⁸ Geological Survey of Scotland, 1:63,360/1:50,000 geological map series, 20 and part of 21W, Sound of Gigha, Solid and Drift, 1:50,000 1996

Land Capability for Agriculture

9.3.12 The Scotland Environment web map viewer¹⁹ for land capability for agriculture notes there is predominantly Class 6.3, described as land capable of use as rough grazing with low quality plants within the Wind Turbine Array. There are also areas of Class 6.1 present in the eastern edge of the Wind Turbine Array, described as land capable of use as rough grazing with a high proportion of palatable plants.

Mining and Quarrying

9.3.13 Following a review of publicly available records, there is no evidence of mining or quarrying within the Wind Turbine Array or immediate surrounds, except for small forestry borrow pits used for track construction for the surrounding forestry works.

9.3.14 There are no safeguarded mineral sites within the Study Area.

Radon

9.3.15 The UK Radon Plan²⁰ indicates that the majority of the Wind Turbine Array is located in an area where less than 1% of homes are at or above the National Radiological Protection Board (NRPB) action level therefore the risk of significant ingress of radon into structures on-site is considered low.

9.3.16 Given the anticipated ground conditions the risk associated with ground gas is considered generally low risk in accordance with BS8576. Current advice confirms that protection measures would not be required for any permanently enclosed structure. This is therefore not considered further in this assessment.

Unexploded Ordnance (UXO)

9.3.17 The Zetica UXO mapping²¹ indicates the potential for Unexploded Bombs (UXB) to be present as a result of World War Two (WWII) bombing. There is no evidence of any areas impacted by UXO within the Wind Turbine Array. The Study Area is identified as a Low Risk site. Therefore, this is not considered further within this assessment.

Historical Past Use and Contaminated Land

9.3.18 The 1:10,000 scale historical maps for the Study Area have been reviewed. In general, these show that the Wind Turbine Array has been predominantly forest or moorland to the present day.

9.3.19 The Study Area is not within a coal mining reporting area and there are no coal bearing bedrock units present.

9.3.20 There is no record of any mining or quarrying underlying the Study Area.

9.3.21 Contaminated soils are generally associated with historical or current industrial activities where localised or widespread contamination has occurred. In general, these former activities are concentrated in and around urban areas, or in rural areas which served specific industries or activities (e.g. mining).

9.3.22 Information on the status of the soils with regard to contamination within the Proposed Development was sought from ABC and SEPA. Consultation with ABC and site visits for the

¹⁹ <https://www.environment.gov.scot/>

²⁰ <https://www.ukradon.org/information/ukmaps>

²¹ <https://zeticauxo.com/downloads-and-resources/risk-maps/>

EIA Report has identified former land uses within the Study Area for the Proposed Development, where there is some minor potential for contaminated land to be encountered.

9.3.23 These may include:

- sites of limited agricultural activity; and
- sites associated with forestry plantation.

9.3.24 These are examples of typical current and previous land uses and given the predominantly rural nature of the Study Area, it is unlikely that a large number of such sites would be encountered during construction activities.

9.3.25 The SEPA website was consulted for the presence of landfills (authorised and historic), the search identified no authorised landfills within the Study Area.

9.3.26 Effects of contaminated land on construction workers and human receptors from pre-existing ground conditions has been scoped out of the assessment as no contamination sources have been identified as part of this assessment. Where potentially contaminated sites are encountered during project works, the Principal Contractor would undertake further assessment.

Hydrogeological Conditions

9.3.27 The hydrogeological setting of the Study Area and ground conditions are described in detail within **Chapter 8** (EIAR Volume 2).

Future Baseline

9.3.28 There are unlikely to be any significant effects to the geology and soils in the short term. However, climate change studies predict a decrease in summer precipitation and an increase in winter precipitation, alongside slightly higher average temperatures. These changes suggest that there could be greater pressures on the geology and soils, especially peat over an extended period of time.

Summary of Sensitive Receptors

9.3.29 **Table 9.5** outlines the receptors identified as part of the baseline study and their sensitivity along with a description of their sensitivity to potential impacts associated with the Proposed Development. These receptors form the basis of the assessment, and as per the previously introduced methodology, are used in conjunction with an estimate of the magnitude of an effect to determine significance.

Receptor	Sensitivity	Justification
Soils	Negligible	Soils are not of noted quality, with low agricultural value.
Peat	High	Peat Class 1, 2 and 5 are mapped as present within the Study Area. Confirmed with peat probing data as described in Technical Appendix 9.2 and Technical Appendix 9.3 (EIAR Volume 4).
Geology	Negligible	The geological units present within the Study Area are widespread across this part of Scotland.
Statutory Designated Sites	Negligible	No sites located within 1 km of the Proposed Development.
Mining or Quarrying	Negligible	Minimal sources within Study Area.
Contaminated Land	Negligible	Minimal sources within Study Area.

9.3.30 In summary, receptors identified as being sensitive to effects associated with the Proposed Development and which have been 'scoped-in' to the assessment include peat soils and areas of deep peat that have been recorded within the Wind Turbine Array and which are assessed as a High sensitivity receptor.

9.4 Assessment of Potential Effects

Potential Construction Effects

9.4.1 Site clearance and preparation works for installation of the Proposed Development has the potential to result in the following effects without appropriate controls or mitigation:

- over compaction of soils caused by the use of heavy machinery onsite;
- structural deterioration of soil materials during excavation, soil handling, storage and replacement;
- erosion and loss of soils during soil handling, storage and replacement;
- disturbance and loss of deposits of peat;
- drainage and dewatering - temporary drainage would be required to ensure construction areas are workable and not saturated. This could result in a short term moderate adverse impact on areas of deep peat, which are considered High sensitivity receptors;
- ground instability (including peat slide risk) and contamination; and
- an adverse effect on geological setting from pollution, fuel, oil, concrete or other hazardous substances.

9.4.2 An assessment of these potential construction effects is carried out in **Section 9.6** of this Chapter.

Potential Operational Effects

9.4.3 During the operational phase of the Proposed Development, it is anticipated that routine maintenance of infrastructure would be required. This may include work such as maintaining access tracks and drainage and carrying out maintenance of wind turbines. The scale of

potential works would be much less than the construction phase but includes effects resulting from localised and temporary erosion and sedimentation which would result in a Negligible adverse impact on peat soils and deep peat which are considered High sensitivity receptors.

9.4.4 No significant operational effects are therefore anticipated.

Potential Decommissioning Effects

9.4.5 Potential significant decommissioning effects would be the same as potential construction effects, namely a temporary moderate adverse impact that effects peat soils and deep peat as a consequence of erosion and sedimentation and drainage and dewatering.

Potential Cumulative Construction and Operational Effects

9.4.1 As outlined in **Section 9.2**, an assessment of potential cumulative effects associated with the Proposed Development has been 'scoped out' of the assessment.

9.5 Mitigation

Mitigation by Design

9.5.1 The Proposed Development has undergone design iterations and evolution in response to the geological constraints identified as part of the baseline studies and field studies so as to avoid and/or minimise potential effects on receptors where possible. This has included areas of deep peat and potential peat instability.

9.5.2 The Proposed Development design has considered geological constraints which include areas of deep peat and slope stability locations.

9.5.3 The Applicant is committed to implementing good practice measures and these are an integral part of the design, construction, operation and decommissioning of the Proposed Development.

Mitigation During Construction

9.5.4 The extent and depth of peat in the Wind Turbine Array has been subject to much investigation. Where practically possible, areas of deep peat have been avoided through design and a site specific peat landslide and hazard risk assessment has been prepared to inform the Proposed Development design (see **Technical Appendix 9.3**, EIAR Volume 4).

9.5.5 Good construction practices and methodologies to prevent peat instability within areas that contain peat deposits are identified in the **Technical Appendix 9.3** (EIAR Volume 4). These include:

- measures to ensure a well-maintained drainage system, to include the identification and demarcation of zones of sensitive drainage or hydrology in areas of construction;
- minimisation of 'undercutting' of peat slopes, but where this is necessary, a more detailed assessment of the area of concern would be required;
- careful micro-siting of wind turbine bases, crane hardstanding's hardstands and access track alignments to minimise effects on the prevailing surface and sub-surface hydrology;
- raising peat stability awareness for construction staff by incorporating the issue into the Proposed Development Induction (e.g., peat instability indicators and good practice);
- introducing a 'Peat Hazard Emergency Plan' to provide instructions for site staff in the event of a peat slide or discovery of peat instability indicators;

- developing methodologies to ensure that degradation and erosion of exposed peat deposits does not occur as the break-up of the peat top mat has significant implications for the morphology, and thus hydrology, of the peat (e.g., minimisation of off-track plant movements within areas of peat);
- developing robust drainage systems that would require minimal maintenance; and
- developing drainage systems that would not create areas of concentrated flow or cause over-, or under-saturation of peat habitats.

9.5.6 Notwithstanding any of the above good construction practices and methodologies, detailed design and construction practices would need to take into account the particular ground conditions and the specific works at each location throughout the construction period. An experienced and qualified engineering geologist/geotechnical engineer would be appointed to provide advice during the setting out, micro-siting and construction phases of the Proposed Development.

9.5.7 A site-specific Peat Management Plan (PMP) has been prepared (see **Technical Appendix 9.3**, EIAR Volume 4) which shows that peat disturbed by the Proposed Development can be readily re-used for restoration purposes.

Mitigation During Operation

9.5.8 No mitigation is required as there are no predicted significant effects as a result of the operation of the Proposed Development.

Mitigation During Decommissioning

9.5.9 Potential decommissioning effects would be the same as potential construction effects. Mitigation specified for the construction phase of the Proposed Development are therefore applicable for the decommissioning phase.

9.6 Assessment of Residual Effects

Residual Construction Effects

9.6.1 The magnitude of a pollution event, erosion or sedimentation, drainage and dewatering on peat soils and peat, is considered Negligible adverse following adherence to the good practice measures detailed in this Chapter. In addition, a Construction Environmental Management Plan (CEMP) will be developed to avoid, minimise or mitigate any construction effects on the environment from the construction phase of the proposed development. The potential effect of Negligible adverse magnitude event on High sensitivity receptors would be **Moderate/Minor** and **Not Significant**.

Residual Operational Effects

9.6.2 No significant effects are predicted during the operational phase of the Proposed Development.

Residual Decommissioning Effects

9.6.3 Potential residual decommissioning effects would be the same as potential residual construction effects. Mitigation specified for the construction phase of the project is applicable for the decommissioning phase.

Residual Cumulative Construction and Operation Effects

9.6.4 No significant cumulative effects are predicted during the construction and operation phase of the Proposed Development.

9.7 Monitoring

- 9.7.1 This Chapter has demonstrated that the effects of the Proposed Development would not have significant effects on geology and soils. The lack of significant effects relates primarily to the proposed 'Good Practice Measures' and the site design, which effectively act as 'embedded mitigation'.
- 9.7.2 As detailed in **Technical Appendix 9.2** (EIAR Volume 4) it is proposed a geotechnical risk register is maintained during the construction and post-construction phases of the Proposed Development. It is expected that this would be maintained by the Applicant, and again, secured by an appropriately worded planning condition.
- 9.7.3 No other further surveys or monitoring is considered necessary to complete this assessment.

9.8 Summary

- 9.8.1 This Chapter has demonstrated that the effects of the Proposed Development would not have significant effects on geology and soils. The lack of significant effects relates primarily to the proposed 'Good Practice Measures' and the site design, which effectively act as 'embedded' mitigation.
- 9.8.2 Existing ground conditions have been identified and used to assess the potential impacts the Proposed Development might have on the geology and soils environment. No significant effects are predicted on the geology or soils environment receptors during construction, operation or decommissioning of the Proposed Development.
- 9.8.3 Best practice construction techniques would safeguard the geology and soils environment and would be incorporated in the detailed design of the works.
- 9.8.4 **Table 9.6** presents a summary of residual effects with regard to geology (inc. soils and peat).

Table 9.6: Summary of Potential Significant Effects of the Proposed Development			
Potential Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/Residual Effect
Construction			
Peat	Good practice techniques listed in Technical Appendix 9.2 and Technical Appendix 9.3 (EIAR Volume 4).	Geotechnical Risk Register	Not Significant
Operation			
None			
Decommissioning			
None			
Cumulative Construction			
None			
Cumulative Operation			
None			

10 Traffic, Transport, and Access

10.1 Introduction

10.1.1 This Chapter considers the potential significant effects on Traffic, Transport and Access associated with the construction, operation and decommissioning of the Proposed Development as described in **Chapter 2** (EIAR Volume 2). The specific objectives of this Chapter are to:

- describe the existing access network and transport baseline;
- describe the assessment methodology and significance criteria used in completing the impact assessment;
- describe the potential effects, including direct, indirect and cumulative effects;
- describe the mitigation measures proposed to address potential significant effects; and
- assess the residual effects remaining following the implementation of mitigation.

10.1.2 This assessment has been carried out by Stephen Cochrane BSc (Hons), Chartered Member of the Chartered Institute of Logistics and Transport (CIMLT) and a Member of the Chartered Institution of Highways and Transportation (CIHT), of Pell Frischmann Consultants Limited. Stephen is an Associate Director within the Traffic and Transport team and has over 21 years' experience in the traffic and transportation industry and over 17 years' experience in the production of EIA transport chapters (and associated studies) for onshore wind farms and other energy generation and distribution projects in Scotland.

10.1.3 The technical reviewer of the traffic and transport assessment is Gordon Buchan BEng (Hons), MSc, CIMLT, CIHT, Divisional Director of Pell Frischmann. He has over 25 years' of undertaking transport assessment associated with new developments and has worked on renewable energy and energy distribution projects across the UK, Ireland and Northern Europe (refer to **Technical Appendix 1.1**).

10.1.4 This Chapter is supported by the following figures and technical appendices:

- Volume 3a: Figures
 - **Figure 10.1: Study Area;**
 - **Figure 10.2: Traffic Survey Locations;**
 - **Figure 10.3: Personal Injury Accident Plan;** and
 - **Figure 10.4: Abnormal Indivisible Load Route.**
- Volume 4: Technical Appendices
 - **Technical Appendix 10.1: Transport Assessment.**

10.1.5 Figures and the technical appendix are referenced in the text where relevant.

10.1.6 This Chapter uses the below terminology throughout:

- Proposed Development – All elements of the West Torrisdale Wind Farm development for which S36 consent and deemed planning permission are sought.
- Application Boundary – The red line boundary defining all elements of the Proposed Development for the purpose of the S36 application.

- Wind Turbine Array – the location of the wind turbines comprising the Proposed Development.
- Access Corridor – the land within the Application Boundary in which the access track connect the Wind Turbine Array with the A83 road.
- Study Area – the area in which the EIA is undertaken, defined for each technical topic as appropriate.

10.2 Assessment Methodology and Significance Criteria

Scope of Assessment

- 10.2.1 A high-level overview of the effects of the traffic movements has been considered in accordance with Institute of Environmental Assessment (now Institute of Environmental Management and Assessment (IEMA)) Environmental Assessment of Traffic and Movement ¹ and the Guidelines for the Environmental Assessment of Road Traffic ². The document is referred to as the IEMA Guidelines within this Chapter.
- 10.2.2 The methodology adopted in this assessment involved the following key stages:
- determine baseline and identify receptors;
 - review potential impacts of the Proposed Development;
 - evaluate significance of effects on receptors;
 - identify mitigation; and
 - assess residual effects.
- 10.2.3 This Chapter considers effects on the following:
- the existing baseline transport conditions of the Study Area (see **Figure 10.1**, EIAR Volume 3a) surrounding the Application Boundary;
 - the likely infrastructure requirements necessary to enable the construction of the Proposed Development;
 - the potential effects and changes associated with the imposition of construction traffic on the local road network;
 - what measures would be required to mitigate against any potential significant effects of the temporary construction traffic;
 - the likely traffic conditions during the operational phase of the Proposed Development; and
 - the likely traffic conditions during the decommissioning phase of the Proposed Development.
- 10.2.4 The assessment of cumulative effects has been undertaken in a similar manner to that of the potential effects of the Proposed Development but takes into consideration other consented developments in combination with the Proposed Development. Developments currently in the scoping stages of planning or without extant consent, have not been considered.

¹ Institute of Environmental Management and Assessment (2023), Environmental Assessment of Traffic and Movement

² Institute of Environmental Assessment (1993) Guidelines for the Environmental Assessment of Road Traffic

- 10.2.5 The use of Low National Road Traffic Forecast 97 (NRTF 97) traffic growth assumptions have provided a robust future year assessment scenario to account for the level of trip generation that can occur as a result of the types of local development that may occur within the Study Area and the effects of tourist traffic on the network.
- 10.2.6 This assessment is based on the Proposed Development as described in **Chapter 2** (EIAR Volume 2).
- 10.2.7 The scope of this assessment has been informed by consultation responses summarised in **Table 10.1** and the following guidelines/policies:
- Institute of Environmental Management and Assessment, Environmental Assessment of Traffic and Movement (2023)
 - Institute of Environmental Assessment, Guidelines for the Environmental Assessment of Road Traffic (1993);
 - Institution of Environmental Management and Assessment (IEMA) 'Guidelines for Environmental Impact Assessment' (2005)³;
 - National Planning Framework 4 (2023)⁴;
 - Transport Assessment Guidance (2012)⁵;
 - Planning Advice Note 75 – Planning for Transport (2005)⁶;
 - Argyll and Bute Council Local Development Plan (2015)⁷; and
 - Table 2.2 of Volume 11, Section 2, Part 5 of the Design Manual for Roads and Bridges (DMRB) (2008)⁸.

Consultation

- 10.2.8 **Table 10.1** summarises the consultation responses received regarding Traffic, Transport and Access and provides information on where and/or how they have been addressed in this assessment. The following organisations made comment on transport matters:
- Argyll and Bute Council (ABC) Transport Department (as local roads agency);
 - Transport Scotland (as trunk roads agency);
 - The British Horse Society; and
 - West Kintyre Community Council.
- 10.2.9 Full details on the consultation responses can be reviewed in **Technical Appendix 1.1** (EIAR Volume 4).

³ Institute of Environmental Management and Assessment (2005), Guidelines for Environmental Impact Assessment

⁴ Scottish Government (2023), National Planning Framework 4

⁵ Transport Scotland (2012), Transport Assessment Guidance

⁶ Scottish Government (2005), Planning Advice Note: PAN 75 – Planning for Transport

⁷ Argyll and Bute Council (2015), Adopted Local Development Plan

⁸ Highways Agency (2008), Table 2.2 of Volume 11, Section 2, Part 5 of the Design Manual for Roads and Bridges (DMRB)

Table 10.1: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
Argyll and Bute Council, April 2021	Scoping Opinion	"The Council's Area Roads Engineer advises that this site should be served by a direct access from the A83 Tarbert - Campbeltown Trunk Road and that Transport Scotland should be notified. Furthermore, that the B842 Cloanraig – Southend Road is unsuitable for accessing this site due to its geometry and construction."	No construction traffic is proposed to use the B842. All access will be via the A83 (T). Transport Scotland has been consulted as part of this assessment process.
Transport Scotland, March 2021	Scoping Opinion	"Section 3.2.6 of the Scoping Report (SR) presents the proposed methodology for the assessment of Transport and Access. This states that the Transport and Access Chapter of the EIAR will be based upon Transport Assessment Guidance (Transport Scotland, 2012) and the Guidelines for the Environmental Assessment of Road Traffic (Institute of Environmental Assessment (IEMA), 1993). Transport Scotland is satisfied with this approach."	This assessment has been undertaken in accordance with these thresholds.
	Scoping Opinion	"The SR states that it is proposed to use Automatic Traffic Counters (ATC), deployed over a seven-day period, collecting vehicle volumes, composition and speed per direction per hour at each of the above locations. Given the current COVID19 restrictions, Transport Scotland considers that any traffic surveys at this time would not be representative and would suggest that an alternative source of traffic data is Traffic Scotland's National Traffic Data System."	This assessment has been undertaken using the data as requested.
	Scoping Opinion	"The SR indicates that National Road Traffic Forecasts (NRTF) Low growth assumptions will be used to determine future year traffic flows, and that traffic flows associated with committed developments within the proximity of the site will be identified and included in the baseline traffic flows. Transport Scotland considers this appropriate."	This assessment has been undertaken in line with the Scoping Report.
	Scoping Opinion	"We also note that it will be necessary for areas of forestry to be removed to allow the various elements of the proposed development to be constructed. We would expect the number of loads required for timber removal to be included within the assessment."	This assessment has been undertaken, taking account of timber felling within the Application Boundary.
	Scoping Opinion	"Transport Scotland will require to be satisfied that the size of turbines proposed can negotiate the selected route and that their transportation will not have any detrimental effect on structures within the trunk road route path. Swept path analysis should be undertaken and details provided with regard to any required changes to street furniture or structures along the route."	The detailed Route Survey Report is provided in Annex A of Technical Appendix 10.1 (EIAR Volume 4).

Table 10.1: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
The British Horse Society, March 2021	Scoping Opinion	"Level crossings which are currently used by equestrians should not be replaced by alternatives which would preclude the use by equestrians, for example, a footbridge. Similarly, other infrastructure like gates, bridges, cattle grids and slippery surfaces should all be installed with equestrians in mind. Access control must always be the least restrictive option."	Noted. This will be taken into account during detailed design and following the Proposed Development obtaining Planning Permission.
West Kintyre Community Council, March 2021	Scoping Opinion	"The cumulative analysis appears to omit Clachaig Glen Windfarm which was consented in 2019 and is now the subject of a new application for a resizing of turbines."	The cumulative assessment within the Chapter has taken account of Clachaig Glen Wind Farm. Further information is provided in Section 10.4 .
West Kintyre Community Council, March 2021	Scoping Opinion	"We understand that the current proposal is to access the site via the current access route for Beinn an Tuirc Windfarm. Due to the A83 being the only access route into and out of the area ALL windfarm developments have to use the A83 for access alongside residents going about their day-to-day business, deliveries and buses etc. If this application does go ahead, it is likely to be under construction with other windfarms at the same time, it will therefore be vital that communication between all developers and the local community takes place to ensure a traffic management programme is agreed that ensures as little disruption as possible to the daily living arrangements for the local communities and businesses alike."	Noted. This will be addressed within the detailed Construction Traffic Management Plan (CTMP).

Potential Effects Scoped Out

- 10.2.10 The traffic effects during the operational phase of the Proposed Development are likely to be insignificant as expected traffic flows will be less than two vehicle movements per week, far below the recognised thresholds for triggering a formal transport assessment. There may be very occasional abnormal load movements to deliver replacement components in the unlikely event of a significant component failure, however any such delivery is unlikely to give rise to any significant effects. As such, the effects during the operational phase are scoped out of the assessment. Cumulative schemes would generate similar levels of operational traffic, and therefore there are unlikely to be any cumulative operational effects. These are therefore also scoped out of the assessment.
- 10.2.11 The traffic effects during the decommissioning phase can only be fully assessed closer to that period, 35 years on from the completion of the Proposed Development. As elements of the Proposed Development are likely to remain in-situ (such as cable trenches, access tracks, etc), the traffic flows associated with the decommissioning works will be lower than those associated with the construction phase. The construction phase therefore represents

a worst-case assessment and as such, no further assessment of the decommissioning phase has been considered at this point in time and has been scoped out of the assessment.

Method of Baseline Characterisation

Extent of the Study Area

- 10.2.12 The Study Area (**Figure 10.1**, EIA Volume 3a) has been based on those roads that are expected to experience increased traffic flows associated with the construction of the Proposed Development. The geographic scope was determined through a review of the other developments in the area, Ordnance Survey (OS) plans and an assessment of the potential origin locations of construction staff and supply locations for construction materials.
- 10.2.13 Access opportunities and routing options are limited given the road network available. Access for construction materials would be predominantly from the north and south on the A83 (T), through to the existing Beinn an Tuirc Wind Farm access junction (hereafter referred to as the site access junction). Materials would be sourced where available from local suppliers.
- 10.2.14 All abnormal load traffic will access the Application Boundary from the south, discharging at Campbeltown Harbour. A full description of the route is described in later sections of the Chapter and a detailed Route Survey Report (RSR) detailing the turbine components and the proposed access route is provided in Annex A of **Technical Appendix 10.1** (EIA Volume 4).
- 10.2.15 The Study Area for the assessment has therefore been assumed to be:
- the A83 (T) between Campbeltown and the Wind Turbine Array access junction; and
 - the A83 (T) between Tarbert and the Wind Turbine Array access junction.
- 10.2.16 This Study Area includes areas of material supply (quarries, etc), the site access junction, the trunk road network and the construction material and abnormal load delivery routes. It is also of sufficient size to include the main areas of workforce accommodation during the construction period.
- 10.2.17 Effects associated with construction traffic generated by the Proposed Development would be most pronounced in close proximity to the site access junction. As vehicles travel away from the site access junction, they would disperse across the wider road network, thus diluting any potential effects. It is therefore expected that the effects relating to construction traffic are unlikely to be significant beyond the Study Area identified above.
- 10.2.18 In addition to the above Study Area, which covers the public road network, consideration has also been given to the Core Path and Public Rights of Way networks that fall within the Application Boundary. As such, consideration has been given to the following within this assessment (**Figure 10.1**, EIA Volume 3a):
- C088(k) - Campbeltown to Cloanaig; and
 - C088(j) - Campbeltown to Cloanaig.

Desk Study

- 10.2.19 A desk study has been undertaken which includes reviews and identification of the following:
- relevant transport planning policy;
 - traffic data from UK Department for Transport (DfT) and Transport Scotland;

- accident data from crashmap.co.uk;
- sensitive locations;
- any other traffic sensitive receptors in the area (core paths, routes, communities, etc.);
- OS plans;
- potential origin locations of construction staff and supply locations for construction materials to inform extent of local area roads network to be included in the assessment; and
- constraints to the movement of Abnormal Indivisible Load (AIL) through a Route Survey Report (RSR) including swept path assessments.

Field Survey

- 10.2.20 Field surveys were also undertaken in November 2020 and comprised of the following:
- site visit; and
 - review of AIL route.
- 10.2.21 No project specific traffic surveys were undertaken as part of the field surveys for the Proposed Development, as detailed above, data from the DfT has been used to inform the assessment.

Criteria for the Assessment of Effects

- 10.2.22 The Institute of Environmental Management and Assessment (IEMA) 'Guidelines for Environmental Impact Assessment' (2005) notes that the separate IEMA Guidelines should be used for characterising the environmental traffic and transport effects (off-site effects) and the assessment of significance of major new developments. Recent guidance published by the IEMA, namely 'Environmental Assessment of Traffic and Movement' (2023) provides an update to the previously used guidance, 'Guidelines for the Environmental Assessment of Road Traffic' (1993) document, that should be used to characterise the environmental traffic and transport effects (off-site effects) and the assessment of significance of major new developments. The guidelines intend to complement professional judgement and the experience of trained assessors.
- 10.2.23 In terms of traffic and transport impacts, the receptors are the users of the roads within the Study Area and the locations through which those roads pass, in addition to Core Path users either in or in the vicinity of the Application Boundary.
- 10.2.24 The IEMA Guidelines includes guidance on how the sensitivity of receptors should be assessed. Using that as a base, professional judgement was used to develop a classification of sensitivity for users based on the characteristics of roads and locations. This is summarised in **Table 10.2**.

Receptor	Sensitivity			
	High	Medium	Low	Negligible
Users of Roads	Where the road is a minor rural road, not constructed to accommodate frequent use by HGVs. Includes roads with traffic control signals, waiting and loading restrictions, traffic calming measures.	Where the road is a local A or B class road, capable of regular use by HGV traffic. Includes roads where there is some traffic calming or traffic management measures.	Where the road is Trunk or A-class, constructed to accommodate significant HGV composition. Includes roads with little or no traffic calming or traffic management measures.	Where roads have no adjacent settlements. Includes new strategic trunk roads that would be little affected by additional traffic and suitable for Abnormal Loads and new strategic trunk road junctions capable of accommodating Abnormal Loads.
Users/ Residents of Locations	Where a location is a large rural settlement containing a high number of community and public services and facilities.	Where a location is an intermediate sized rural settlement, containing some community or public facilities and services.	Where a location is a small rural settlement, few community or public facilities or services.	Where a location includes individual dwellings or scattered settlements with no facilities.

10.2.25 Where a road passes through a location, road users (pedestrian, cyclists, drivers, etc) are considered subject to the highest level of sensitivity defined by either the road or location characteristics.

Criteria for Assessing the Magnitude of Change

10.2.26 The following rules, also taken from the IEMA Guidelines are used to determine which links within the Study Area should be considered for detailed assessment:

- Rule 1 – include highway links where traffic flows are predicted to increase by more than 30 % (or where the number of heavy goods vehicles (HGV) is predicted to increase by more than 30 %); and
- Rule 2 – include any other specifically sensitive areas where traffic flows are predicted to increase by 10 % or more.

10.2.27 The IEMA Guidelines identify the key impacts that are most important when assessing the magnitude of traffic impacts from an individual development. The impacts and levels of magnitude applied in the assessment are as follows:

- Severance – the IEMA Guidance advises that, *"The Department for Transport has historically set out a range of indicators for determining the significance of severance. Changes in traffic flow of 30 %, 60 % and 90 % are regarded as producing 'slight', 'moderate' and 'substantial' changes in severance respectively. Although these thresholds no longer appear in Department for Transport guidance, they have not been superseded by subsequent changes to guidance and are established through planning case law. However, caution needs to be observed when applying these thresholds as very low baseline flows are unlikely to experience severance impacts even with high percentage changes in traffic."* (Para 3.16). The Guidelines acknowledge that changes

in traffic flows should be used cautiously, stating that *"the assessment of severance should pay full regard to specific local conditions, e.g. sensitivity of adjacent land uses, prevalence of vulnerable people, whether or not crossing facilities are provided, traffic signal settings, etc."* (Para 3.17).

- Driver delay – the IEMA Guidelines note that these delays are only likely to be *"significant when the traffic on the network surrounding the development is already at, or close to, the capacity of the system"* (Para 3.20).
- Pedestrian delay (incorporating delay to all non-motorised users) – the IEMA Guidance advises that *"pedestrian delay and severance are closely related effects and can be grouped together. Changes in the volume, composition or speed of traffic may affect the ability of people to cross roads. In general, increases in traffic levels are likely to lead to greater increases in delay. Delays will also depend on the general level of pedestrian activity, visibility and general physical conditions of the development site."* (Para 3.24). Furthermore, the guidance advises that *"...it is not considered wise to set down definitive thresholds. Instead it is recommended that the competent traffic and movement expert use their judgement to determine whether pedestrian delay constitutes a significant effect."* (Para 3.26).
- Non-motorised user amenity - the IEMA Guidance advises that, *"The 1993 Guidelines suggest that a tentative threshold for judging the significance of changes in pedestrian amenity would be where the traffic flow (or HGV component) is halved or doubled. Although these thresholds no longer appear in Department for Transport guidance, they have not been superseded by subsequent changes to guidance and are established through planning case law."* (Para 3.30).
- Fear and intimidation – there are no commonly agreed thresholds for estimating levels of fear and intimidation, from known traffic and physical conditions. However, as the impact is considered to be sensitive to traffic flow, changes in traffic flow of 30 %, 60 % and 90 % are regarded as producing minor, moderate and substantial changes respectively in the guidelines. (Para 2.19). As such, this has been used to assess the potential impacts associated with construction activities around fear and intimidation on people in close proximity to the Proposed Development.
- Road safety – professional judgement would be used to assess the implications of local circumstances, or factors which may elevate or lessen risks of accidents. In line with the IEMA Guidance, those areas of collision clusters would be subject to detailed review.
- Road safety audits – It would be proposed to undertake any necessary Road Safety Audits (RSA) post consent and it is considered that this can be secured via a planning condition.
- Large loads – The movement of the AILs associated with the construction of the Proposed Development have been considered in full, within a separate route survey assessment, which identifies physical mitigation measures required to accommodate the predicted loads. Additional mitigation in terms of addressing potential impacts on sensitive receptors are included as standard within **Section 10.5**.

10.2.28 While not specifically identified, as a more vulnerable road user, cyclists are considered in similar terms to pedestrians.

Criteria for Assessing Cumulative Effects

- 10.2.29 A review of online planning applications was undertaken to identify any consented onshore wind farm developments within the vicinity of the Proposed Development, which are to be considered as cumulative developments. In transport terms, only developments that have been consented can be assumed to be committed developments and thus be included in any cumulative assessment.
- 10.2.30 The review identified the following developments for consideration within the cumulative assessment:
- Airigh Wind Farm is located to the northwest of the Proposed Development and accessed via the A83 (T), approximately 31 kilometres (km) to the north of the Proposed Development. The development comprises 14 wind turbines and associated infrastructure.
 - Clachaig Glen Wind Farm is located approximately 9.5 km to the northwest of the Proposed Development and accessed via the A83 (T), approximately 12 km to the north of the site access junction. The development comprises 14 wind turbines and associated infrastructure. The applicant for Clachaig Glen has, since receiving consent, decided to revise the scheme, to take account of changes in turbine technology and as such have submitted a new application for the site (March 2022). The revised scheme has yet to receive consent, and it has therefore been decided that the already consented scheme should be included within the cumulative assessment.
 - Eascairt Wind Farm is located approximately 21.5 km to the north of the Proposed Development and accessed via the B8002, which is accessed from the A83 (T), approximately 35 km to the north of the site access junction. The development comprises 10 wind turbines and associated infrastructure.
 - High Constellation Wind Farm is located approximately 15.5 km to the north of the Proposed Development and accessed via the A83 (T), approximately 33 km to the north of the site access junction. The development comprises 13 wind turbines and associated infrastructure.
 - Tangy IV Wind Farm is located approximately 10.5 km to the southwest of the Proposed Development and accessed via the A83 (T), approximately 9 km to the north of the Site access junction. The development comprises 16 wind turbines and associated infrastructure.
- 10.2.31 For each of the above schemes, information submitted as part of the transport element of their respective EIA Report, shows that the same access routes will be used as those identified for the Proposed Development. For the purposes of the assessment undertaken, a worst-case scenario was assumed whereby 100 % of construction trips was assigned to the A83 (T) on both the northern and southern links within the Study Area.

Criteria for Assessing Significance

- 10.2.32 To determine the overall significance of effects, the results from the receptor sensitivity and magnitude of impact (change) assessments are correlated and classified using a scale set out in Design Manual for Roads and Bridges (DMRB) LA 104 Environmental Assessment and Monitoring (Revision 1) Table 3.8.1 and summarised in **Table 10.3**.

Receptor Sensitivity	Magnitude of Impacts			
	Major	Moderate	Minor	Negligible
High	Large	Large/Moderate	Moderate/Slight	Slight
Medium	Large/Moderate	Moderate	Slight	Slight/Neutral
Low	Moderate/Slight	Slight	Slight	Slight/Neutral
Negligible	Slight	Slight	Slight/Neutral	Neutral

- 10.2.33 As set out within the aforementioned DMRB guidance, effects would be considered of significance where they are assessed to be **Large** or **Moderate**. Where an effect could be one of **Large/Moderate** or **Moderate/Slight**, professional judgement would be used to determine which significance option should be applicable.

Limitations and Assumptions

- 10.2.34 This assessment is based upon average traffic flows in one-month periods. During the month, activities at the Proposed Development site may fluctuate between one day and another and it is not possible to fully develop a day-by-day traffic flow estimate as no Balance of Plant (BoP) contractor has been appointed and external factors can impact upon activities on a day-by-day basis (weather conditions, availability of materials, time of year, etc).

10.3 Baseline Conditions

Current Baseline

Pedestrian and Cycle Network

- 10.3.1 There are limited pedestrian facilities in the immediate vicinity of the Proposed Development, reflecting the rural nature of the area.
- 10.3.2 Further away from the Proposed Development within the Study Area, including the A83 (T), there are pedestrian facilities within the larger settlements, including Campbeltown and Tarbert. These generally include footways either on one side or both sides of the carriageway.
- 10.3.3 The level of pedestrian infrastructure is commensurate with the scale of the local settlements and their rural setting.
- 10.3.4 A full review of the existing pedestrian facilities is included in **Technical Appendix 10.1** (EIAR Volume 4).
- 10.3.5 A review of ABC's Core Path network⁹ indicates that there are no Core Paths in the immediate vicinity of the site access junction. There are however other Core Paths in the Study Area and in the vicinity of the Proposed Development, on the Beinn an Tuirc Wind Farm internal access tracks.
- 10.3.6 The majority of the paths are recreational in nature and do not appear to provide significant commuter/school traffic linkages to the surrounding settlements. Where these paths meet

⁹ <https://argyll-bute.maps.arcgis.com/apps/webappviewer/>

the road network, there is potential for an interaction between construction movements and pedestrians. A full list of those applicable Core Paths is included in **Technical Appendix 10.1** (EIAR Volume 4).

- 10.3.7 A review of Sustrans' Map of the National Cycle Network¹⁰ indicates that the B842 forms part of National Cycle Route 78 (NCR 78). NCR 78 is forms part of the Caledonia Way, a long-distance route. The route starts in Campbeltown in the vicinity of the A83 (T) and heads in a northerly direction along the eastern edge of the peninsula, before joining the A83 (T) south of Tarbert. At Tarbert, it follows the B8024 in the first instance before heading north towards Inverness.

Road Access

- 10.3.8 The Proposed Development during both construction and operation will be accessed via the existing Beinn an Tuirc Wind Farm access junction on the A83 (T), located approximately 3 km to the south of Glenbarr.
- 10.3.9 The A83 (T) forms part of the trunk road network which runs from Campbeltown to Arrochar. The road is maintained by BEAR Scotland, on behalf of Transport Scotland. The A83 (T) is mainly subject to the national speed limit, which reduces when travelling through towns and villages. The A83 (T) is well-used by HGVs for the transportation of materials and goods to and from the Kintyre Peninsula.

Baseline Traffic Flows

- 10.3.10 In order to assess the impact of construction traffic within the Study Area, Annual Average Daily Traffic (AADT) flows were obtained from the UK DfT and Transport Scotland traffic databases. The traffic count sites used were as follows:
1. A83 (T) north of Campbeltown (DfT Count Point 91292);
 2. A83 (T) at Kennacraig (DfT Count Point 77107); and
 3. A83 (T) at West Tarbert (TS Count Point ATC08058).
- 10.3.11 A baseline year of 2019 has been adopted for the assessment, as these flows would be unaffected by Covid-related travel restrictions in the years immediately following the pandemic.
- 10.3.12 These traffic count sites were identified as being areas where sensitive receptors on the access route would be located.
- 10.3.13 The traffic counters allowed the traffic flows to be split into vehicle classes and the data have been summarised into cars / light goods vehicles (LGVs) and HGVs (all goods vehicles >3.5 tonnes gross maximum weight).
- 10.3.14 The locations of the traffic count sites are shown in **Figure 10.2** (EIAR Volume 3a), while **Table 10.4** summarises the AADT traffic data collected and used in the assessment.

¹⁰ <https://www.sustrans.org.uk/national-cycle-network>

Survey Location	Cars and LGVs	HGV	Total	% HGV
A83 (T) north of Campbeltown	2668	133	2801	4.7
A83 (T) at Kennacraig	2048	219	2267	9.7
A83 (T) at West Tarbert	1868	410	2278	18.0
Note: Minor variances due to rounding may occur.				

Accidents

- 10.3.15 Road traffic accident data for the five-year period commencing 01 January 2017 through to the 31 December 2021 was obtained from the online resource "crashmap.co.uk" which uses data collected by the police about road traffic crashes occurring on British roads where someone is injured.
- 10.3.16 A full review of the existing Personal Injury Accident data is included in **Technical Appendix 10.1** (EIAR Volume 4), while the location of said accidents, can be seen in **Figure 10.3** (EIAR Volume 3a).
- 10.3.17 A summary analysis of the accidents indicates that:
- A total of 29 PIAs were recorded within the Study Area within the last five-year period.
 - Of those 29 PIAs, 17 were "Slight" (58.6 %), 11 were "Serious" (37.9 %) and 1 was "Fatal" (3.4 %).
 - The single 'Fatal' PIA involved a single car, no other vehicles were involved.
 - 1 'Serious' PIA involved a pedestrian and a car, which occurred north of Campbeltown.
 - 5 PIAs involved a motorbike, 3 "Slight" and 2 "Serious", 4 were a collision with a car and 1 was a single vehicle accident.
 - 3 PIAs involved a pedal cycle, 2 "Slight" and 1 "Serious", 2 "Slight" accident were with an HGV, while the other was with a car.
 - 2 of the recorded PIAs involved child casualties. Both of these were "Slight", 1 involved a pedal cycle and 1 involved a car.
 - Young drivers (16-20) were involved in 6 accidents, 3 "Slight" and 3 "Serious".
 - No accidents were recorded on the immediate vicinity of the site access junction. The closest PIA occurred at Bellochantuy approximately 1.2 km to the south.
- 10.3.18 Based on the information available, it has been established that there are no specific road safety issues within the immediate vicinity of the site access that currently require addressing or would be exacerbated by the construction of the Proposed Development.

Future Baseline

- 10.3.19 Construction of the Proposed Development could commence in 2026 if consent is granted and is anticipated to take up to 22 months depending on weather conditions and other considerations. As detailed within **Technical Appendix 10.1** (EIAR Volume 4), month six is predicted to be the peak month for construction activities, and as such a future year of 2026 has been used within the assessment.

- 10.3.20 To assess the likely effects during the construction period, future baseline traffic flows were determined by applying a National Road Traffic Forecast (NRTF) low growth factor to the 2019 baseline traffic flows. The NRTF low growth factor for 2019 to 2026 is 1.043. This factor was applied to the 2019 data to estimate the 2026 future baseline traffic flows, shown in **Table 10.5**.
- 10.3.21 These future baseline traffic flows have been used in the assessment of peak construction traffic associated with the Proposed Development.

Table 10.5: Future Traffic Conditions (Weekday Average Two Way Flows)				
Survey Location	Cars & LGVs	HGV	Total	% HGV
A83 (T) north of Campbeltown	2783	139	2921	4.7
A83 (T) at Kennacraig	2136	228	2364	9.7
A83 (T) at West Tarbert	1948	428	2376	18.0
Note: Minor variances due to rounding may occur.				

- 10.3.22 Note, if the Proposed Development did not proceed, or proceeded later than currently predicted, traffic growth will occur and the links within the Study Area will experience increased traffic flows resulting from other development pressures, tourism traffic and population growth. Accordingly, the assessment represents a worst case as the contribution of the Proposed Development in relative terms would decrease in the future.

Summary of Sensitive Receptors

- 10.3.23 A review of sensitive receptors has been undertaken within the Study Area. **Table 10.6** details the receptors and their sensitivities for use within the following assessment. A justification for the sensitivity has been provided, based upon the details contained in **Table 10.2**.

Receptor	Sensitivity	Justification
A83 (T) Road Users	Low	A-class roads that can accommodate HGV traffic with no traffic calming facilities present.
Users/Residents of Campbeltown	High	Large rural settlement containing a high number of community and public services and facilities.
Users/Residents of settlements along the A83 (T)	Low	Small settlements with limited community facilities.
Users/Residents of Tarbert	High	large rural settlement containing a high number of community and public services and facilities.
Core Path Users	High	Short section of Core Path on the existing Beinn Tuirc Wind Farm internal access tracks to be used by construction traffic.

10.3.24 Based on the indicators set out within the IEMA Guidelines, the users/residents of Campbeltown, Tarbert and the Core Paths within the Application Boundary are identified as sensitive receptors in this assessment. These locations will therefore be subject to 'Rule 2' of the IEMA Guidelines which requires a full assessment of effects if the locations are subject to an increase in 10 % of traffic.

10.3.25 All other receptors within the Study Area are subject to 'Rule 1' and are assessed if traffic flows (or HGV flows) on the relevant highway links increase by more than 30 %.

10.4 Assessment of Potential Effects

10.4.1 In order to determine the potential construction effects that may occur within the Study Area, it is necessary to estimate the potential traffic generation associated with the Proposed Development.

10.4.2 During the 22 month construction period, the following traffic will require access to land within the Application Boundary:

- staff transport, either cars or staff minibuses;
- construction equipment and materials, deliveries of machinery and supplies such as concrete raw materials;
- AILs consisting of the wind turbine components and heavy lift crane(s); and
- escort vehicles for AIL deliveries.

10.4.3 Except for the wind turbine components, most traffic would be normal construction plant and would include grading tractors, excavators, high-capacity cranes, forklifts and dumper trucks. Most would arrive at the site access junction on low loaders.

10.4.4 The wind turbines are delivered in component sections for transport and would be assembled within the Application Boundary. The nacelle, hub, drive train, blade and tower sections are classified as AILs due to their weight and/or length, width and height when loaded.

10.4.5 The components can be delivered on a variety of transport platforms with typical examples illustrated in **Technical Appendix 10.1** (EIAR Volume 4).

- 10.4.6 In addition to the wind turbine deliveries, up to two high capacity erection cranes would be needed to offload components and erect the wind turbines. The cranes are likely to be mobile cranes with a capacity up to 1,000 tonnes that would be escorted by boom and ballast trucks to allow full mobilisation onsite. A smaller erector/assist crane would also be present to allow the assembly of the main cranes and to ease overall erection of the wind turbines.
- 10.4.7 Average monthly traffic flow data was used to establish the construction trips associated with the Proposed Development, based on the assumptions detailed in **Technical Appendix 10.1** (EIAR Volume 4).
- 10.4.8 With regards to site staff, they would arrive in non-HGV vehicles and where possible will be encouraged to car share. The workforce onsite will depend on the activities undertaken, but previous wind farm construction site experience for a project of this scale suggests four staff per turbine during the short peak period of construction is likely. The maximum number of staff expected onsite could therefore be around 36 per day (i.e. 4 staff x 9 turbines).
- 10.4.9 For the purposes of estimating traffic movements, it was assumed that 40 % of staff would be transported by minibus and 60 % would arrive by car (single car occupancy was assumed as the worst case at this stage with potentially fewer movements through car sharing).
- 10.4.10 Using the assumptions above (and provided in greater detail in **Technical Appendix 10.1** (EIAR Volume 4), a construction programme has been developed for the Proposed Development. This has been used to determine timescales for the various deliveries to and from the Proposed Development and is presented in **Table 10.7**.

Table 10.7: Construction Traffic Profile																						
Activity	Month																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Site Establishment & Remediation					50	50	50														50	50
General Site Deliveries	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Access Track Works						462	462	462	462	462	462	462	462	462	462	462						
Timber Extraction	352	352	352	352	352	352																
Reinforcement Deliveries						30		30														
Concrete Deliveries									92	92	92	92	92	92	92							
Cable and Ducting Deliveries															10	10						
Cabling Sand															89	89	89	89	89			
Geotextile Deliveries						14	14	14														
Substation Building								15	15	15	15							15	15	15	15	
BESS Deliveries															14	14	14	14	14	14		
Cranage														10							10	
Turbine Components & AIL Deliveries														34	34	34	34	34	34	34		

Table 10.7: Construction Traffic Profile

Activity	Month																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
AIL Escorts														26	26	26	26	26	26	26		
Commissioning & Demobilisation																				40	40	40
Staff	528	528	1056	1056	1056	1056	1056	1056	1056	1056	1056	1056	1056	1056	1056	1056	792	792	528	528	528	211
Total HGV	392	392	392	392	442	947	566	560	608	608	608	594	594	638	741	649	177	192	192	112	105	90
Total Cars / LGV	528	528	1056	1056	1056	1056	1056	1056	1056	1056	1056	1056	1056	1082	1082	1082	818	818	554	594	568	251
Total Movements	920	920	1448	1448	1498	2003	1622	1616	1664	1664	1664	1650	1650	1720	1823	1731	995	1010	746	707	673	341
Total HGV per Day	18	18	18	18	20	43	26	25	28	28	28	27	27	29	34	29	8	9	9	5	5	4
Total Cars / LGV per Day	24	24	48	48	48	48	48	48	48	48	48	48	48	49	49	49	37	37	25	27	26	11
Total per Day	42	42	66	66	68	91	74	73	76	76	76	75	75	78	83	79	45	46	34	32	31	16

Note: Minor variances due to rounding may occur.

- 10.4.11 The peak of construction occurs in month six with a total of 91 vehicle movements, comprising 48 Car / LGVs movements and 43 HGV movements. It should be noted that all AIL deliveries would likely occur in the latter stages of construction, from month 14 onwards.
- 10.4.12 These figures on average indicate approximately three additional HGV two-way movements per hour on the network at the peak of construction activities, during a typical 12 hour working day (0700 to 1900).
- 10.4.13 The distribution of traffic on the network pertaining to the Proposed Development, would vary depending on the types of loads being transported, however the vast majority of materials will route to the site access junction from the north on the A83 (T). The assumptions for the distribution of construction traffic during the peak months are presented in **Technical Appendix 10.1** (EIAR Volume 4). Using this distribution, the proposed traffic flows on the Study Area at the peak of construction are presented in **Table 10.8**.

Location	Cars & LGV	HGV	Total	%HGV
A83 (T) north of Campbeltown	20	8	28	28.6%
A83 (T) at Kennacraig	30	36	66	54.5%
A83 (T) at West Tarbert	30	36	66	54.5%

- 10.4.14 Loads relating to the wind turbine components would be delivered from the proposed Port of Entry (PoE) for the Proposed Development, which is Campbeltown Harbour. The port is the closest, suitable port to the site access junction and as such is in line with the Government's "Water Preferred" policy towards AIL movements.
- 10.4.15 The access route from the PoE to the site access junction would therefore be as follows:
- loads will depart the Campbeltown Harbour and continue north on the A83 (T) for approximately 16.5 km; and
 - at the existing Beinn an Tuirc Wind Farm access junction on the A83 (T) loads will make a right-hand turn manoeuvre and continue through to the Wind Turbine Array on existing and new access tracks.
- 10.4.16 The above AIL route can be seen in **Figure 10.4** (EIAR Volume 3).

Potential Construction Traffic Effects

- 10.4.17 To estimate the total trips through the Study Area during the peak of the construction phase, traffic was distributed through the network and combined with the 2026 future baseline traffic data. The resulting figures were compared with the weekday 2026 future baseline traffic to provide a percentage change in movements and are demonstrated in **Table 10.9**.

Location	Cars & LGV	HGV	Total	% Increase Cars & LGV	% Increase HGV	% Increase Total Traffic
A83 (T) north of Campbeltown	2803	147	2949	0.7%	5.8%	1.0%
A83 (T) at Kennacraig	2166	264	2430	1.4%	15.8%	2.8%
A83 (T) at West Tarbert	1978	464	2442	1.5%	8.4%	2.8%

Note: Minor variances due to rounding may occur.

- 10.4.18 The total traffic movements are not predicted to increase by more than 10 % on all of the Study Area, with the highest being on the A83 (T) at West Tarbert and Kennacraig, both with an increase of 2.8 %. With regards to total HGV traffic movements, the highest predicted increase is 15.8 % on the A83 (T) at Kennacraig.
- 10.4.19 It should also be noted the construction phase is transitory in nature and the peak of construction activities is short lived.
- 10.4.20 A review of existing theoretical road capacity has been undertaken using the DMRB, Volume 15, Part 5 “The NESAs Manual”¹¹. The theoretical road capacity has been estimated for each of the road links that make up the Study Area, for a 12 hour period. The results are summarised in **Table 10.10**.

Location	2026 Baseline Flow	2026 Base + Development Flows	Theoretical Road Capacity (12 hr)	Spare Road Capacity %
A83 (T) north of Campbeltown	2,921	2,949	21,600	86.3%
A83 (T) at Kennacraig	2,364	2,430	21,600	88.7%
A83 (T) at West Tarbert	2,376	2,442	21,600	88.7%

Note: Minor variances due to rounding may occur.

- 10.4.21 The results indicate there are no road capacity issues with the addition of construction traffic associated with the Proposed Development and substantial spare capacity exists within the road network to accommodate all construction phase traffic.
- 10.4.22 Based on the above and taking cognisance of the guidance set out within the IEMA Guidelines to determine which links within the Study Area should be considered for detailed assessment, the following locations have been taken forward:
- Users/Residents of Tarbert (High Sensitivity); and
 - Core Path Users (High Sensitivity).

¹¹ Highways Agency (2013) Table 5/3/1: NESAs Road Categories, Link Speeds and Link Capacities, Volume 15 Section 1 Part 5 Traffic Modelling in NESAs of the Design Manual for Roads and Bridges

- 10.4.23 The significance of the potential effects on the above receptors has been determined using the rules and thresholds previously outlined in the Criteria for Assessing Significance, under **Section 10.2**. **Table 10.11** summarises the significance of the effect on the receptors for the construction phase.

Receptors	Severance	Driver Delay	Pedestrian Delay	Non-motorised user Amenity	Fear & Intimidation	Road Safety	Large Loads
Users/ Residents of Tarbert	Slight	Slight	Slight	Slight	Slight	Slight	N/A
Core Path Users	Slight	Slight	Moderate / Slight	Moderate / Slight	Moderate / Slight	Moderate / Slight	N/A

- 10.4.24 Large Loads have been addressed separately as part of the Route Survey Report within **Technical Appendix 10.1**.
- 10.4.25 Following professional judgement, prior to the application of mitigation measures (detailed in **Section 10.5** of this **Chapter**), it is considered that the overall construction effects on Core Path users would be considered moderate/slight and **Significant**. However, it should be noted that this only relates to Core Path C088(j) and C088(k), where a short section of both of these, is shared with the Beinn an Tuirc Wind Farm internal access track which would be used by construction traffic to access the area of the Wind Turbine Array. This track was also previously used to access Beinn an Tuirc Wind Farm and its two extensions and is currently used for maintenance and operational works for these and for forestry uses.

Potential Cumulative Construction Traffic Effects

- 10.4.26 As previously detailed in **Section 10.2**, a number of cumulative developments have been given consideration as part of the cumulative assessment. **Table 10.12** below provides a summary of those developments, including the estimated construction traffic generation associated with each of them, which has been obtained from their respective traffic and transport submissions.

Table 10.12: Cumulative Development Schemes						
Reference	Name	Distance from the Application Boundary (Approx.)	Number of Wind Turbines	Current Status	Traffic Generation	
					Car and LGV	HGV
ECU00000471	Airigh Wind Farm	31 km	14	Consented – March 2020	-	73
16/01313/PP	Clachaig Glen Wind Farm	9.5 km	14	Consented – December 2019	60	140
15/00205/PP / PPA-130-2059	Eascairt Wind Farm	21.5 km	13	Consented – September 2018	50	62
ECU00001857	High Constellation Wind Farm	15.5 km	10	Consented – June 2020 / July 2022	52	39
ECU00000673	Tangy IV Wind Farm	10.5 km	16	Consented – December 2019	59	30

- 10.4.27 Information contained within the submitted transport studies for the cumulative developments identified above, has shown that all of them have undertaken a worst-case assessment, whereby 100 % of construction trips was assigned to the A83 (T) on both the northern and southern links within the Study Area.
- 10.4.28 This approach was not undertaken as part of the assessment for the Proposed Development, given that the location of the site access junction and likely location of materials etc. allowed for an accurate distribution of construction trips on to the road network within the Study Area.
- 10.4.29 Those trips associated with the cumulative developments have been assigned to the three highway links assessed, together with the construction trips associated with the Proposed Development. Error! Reference source not found. **Table 10.13** provides a summary of the total cumulative trips, while **Table 10.14** shows the combined cumulative development capacity review in terms of impact on the network capacity. It should be emphasised that total trip numbers presented represent a worst-case scenario as it is assumed that the peak construction periods for all six developments would overlap at the same point in time.

		Location		
		A83 (T) north of Campbeltown	A83 (T) at Kennacraig	A83 (T) at West Tarbert
Proposed Development	Cars & Lights	20	30	30
	HGV	8	36	36
Airigh Wind Farm	Cars & Lights	0	0	0
	HGV	73	73	73
Clachaig Glen Wind	Cars & Lights	60	60	60
	HGV	140	140	140
Eascairt Wind Farm	Cars & Lights	50	50	50
	HGV	62	62	62
High Constellation Wind Farm	Cars & Lights	52	52	52
	HGV	39	39	39
Tangy IV Wind Farm	Cars & Lights	59	59	59
	HGV	30	30	30
Total	Cars & Lights	189	199	199
	HGV	313	341	341

Location	2026 Baseline Flow	2026 Base + Cumulative Development + Proposed Development Flows	Theoretical Road Capacity (12 hr)	Spare Road Capacity %
A83 (T) north of Campbeltown	2921	3423	21600	84.2
A83 (T) at Kennacraig	2364	2904	21600	86.6
A83 (T) at West Tarbert	2376	2916	21600	86.5

10.4.30 The combined traffic flows for all six developments, show an increase in both Car/LGV traffic and HGV traffic within the Study Area, from that shown in **Table 10.9**. In a scenario whereby the Proposed Development and all the cumulative developments were being

constructed concurrently and the peak period of construction activity occurred at the same time, there would still be substantial spare capacity on all of the road links assessed. As such, it is considered that the temporary increase in traffic during the worst case scenario would not result in a change in the impacts on road capacity within the Study Area.

- 10.4.31 Furthermore, any effect of all six developments being constructed at the same time would be mitigated through the use of an overarching Traffic Management and Monitoring Plan for the developments and by introducing a phased delivery plan, which would be agreed with ABC, Transport Scotland and Police Scotland. This would ensure that the developments result in no significant detriment to the existing conditions and as such no significant cumulative effects are predicted.
- 10.4.32 It should also be noted that it is unlikely that the estimated traffic flow increases identified above would occur in the Study Area for the following reasons:
- it is highly unlikely that the peak traffic conditions for each development would occur at the same time due to differences in construction programmes, material supplies and developer resources;
 - worst case assessments have been undertaken on a number of the developments, whereby all materials would be sourced offsite, when in fact, this scenario is highly unlikely to occur; and
 - all abnormal load deliveries cannot occur at four separate developments on the same day due to restrictions on the numbers of loads moving on the network at the same time as set by Police Scotland.
- 10.4.33 Based on the above, it is considered that there would be no significant cumulative effects as a result of the Proposed Development and the five cumulative developments.

10.5 Mitigation

Mitigation during Construction

- 10.5.1 During the construction phase, total traffic levels are expected to exceed the IEMA Guidelines 'Rule 2', in that in that total traffic flows would exceed 10 % on the A83 (T) within Tarbert, which was classed as having High Sensitivity to the impact of construction traffic.
- 10.5.2 As such, it is proposed to implement specific mitigation measures, which would include the following:
- Construction Traffic Management Plan;
 - Abnormal Load Management Plan and Offsite Mitigation Works;
 - Public Information Distribution;
 - Path Management Plan; and
 - Staff Travel Plan
- 10.5.3 A full description of the proposed mitigation measures identifies above is included within **Technical Appendix 10.1** (EIAR Volume 4).

Mitigation during Operation

- 10.5.4 In terms of the IEMA Guidelines, such a small number of traffic movements and the associated percentage uplift over baseline traffic movements are considered **Not Significant** and therefore no mitigation is proposed.

Mitigation during Decommissioning

- 10.5.5 As decommissioning would result in fewer vehicle trips on the road network than the construction phase, the significance of any effects would not be greater. It can therefore be assumed that the assessment of the construction phase covers the worst case scenario.

10.6 Assessment of Residual Effects

Residual Construction Effects

- 10.6.1 This Section considers the assessment of traffic effects following the incorporation of the mitigation measures identified above. **Table 10.15** summarises the assessment of residual effects identified in the evaluation with mitigation in place.
- 10.6.2 Traffic impacts during the construction period are transitory in nature and all impacts would be short lived and temporary. No significant residual effects are predicted during construction of the Proposed Development.

Residual Operational Effects

- 10.6.3 No residual operational effects are predicted from the Proposed Development.

Residual Decommissioning Effects

- 10.6.4 No residual decommissioning effects are predicted from the Proposed Development.

Residual Cumulative Construction Effects

- 10.6.5 No residual cumulative construction effects are predicted from the Proposed Development.

Residual Cumulative Operational Effects

- 10.6.6 No residual cumulative operational effects are predicted from the Proposed Development.

10.7 Monitoring

Construction Phase Monitoring

- 10.7.1 Monitoring during the construction of the Proposed Development, if deemed necessary by the Local Authority, would be set out in a CTMP and agreed with ABC and Transport Scotland.

Operation Phase Monitoring

- 10.7.2 No monitoring during the operational phase is proposed as part of the Proposed Development.

Decommissioning Phase Monitoring

- 10.7.3 No monitoring during the decommissioning phase is proposed as part of the Proposed Development.

10.8 Summary

- 10.8.1 During the construction of the Proposed Development, an increase in traffic volumes on a number of roads in the vicinity of the Proposed Development would occur. Traffic volumes would fall off considerably outside the peak period of construction.
- 10.8.2 The maximum traffic impact associated with the construction of the Proposed Development is predicted to occur in month six, with 91 total vehicle movements per day of which 43 are HGV movements and 48 are Car/LGV movements. These figures on average indicate approximately 4 additional HGV two-way movements per hour on the network at the peak of construction activities.
- 10.8.3 No significant capacity issues are expected on any of the roads within the Study Area due to the additional construction traffic movements associated with the Proposed Development, as background traffic movements are low, the links are of reasonable standard and appropriate mitigation is proposed.
- 10.8.4 With the implementation of appropriate mitigation, no significant residual effects are anticipated in respect of traffic and transport issues on the public road network or Core Paths within the Application Boundary. The residual effects are assessed to be slight and not significant and they will occur during the construction phase only, and are temporary and reversible.
- 10.8.5 Traffic levels during the operational phase of the Proposed Development would be one or two vehicles per week for maintenance purposes. Traffic levels during the decommissioning of the Proposed Development are expected to be lower than during the construction phase as some elements may be left in situ and others broken up on site.
- 10.8.6 The movement of AIL traffic would require small scale and temporary remedial works at a number of locations along the identified delivery route.
- 10.8.7 The summary of potential significant effects of the Proposed Development is presented in **Table 10.15**.

Table 10.15: Summary of Potential Significant Effects of the Proposed Development			
Potential Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/Residual Effect
Construction			
Core Path Users			
Severance	CTMP – core path management plan	CTMP proposals and improved signage scheme.	Slight, Not Significant
Driver Delay	CTMP – core path management plan	CTMP proposals and improved signage scheme.	Slight, Not Significant
Pedestrian Delay	CTMP – core path management plan	CTMP proposals and improved signage scheme.	Slight, Not Significant
Non-motorised user Amenity	CTMP – core path management plan	CTMP proposals and improved signage scheme.	Slight, Not Significant
Fear & Intimidation	CTMP – core path management plan	CTMP proposals and improved signage scheme.	Slight, Not Significant
Road Safety	CTMP – core path management plan	CTMP proposals and improved signage scheme.	Slight, Not Significant
Large Loads	N/A	N/A	N/A
Operation			
None	None	None	None
Decommissioning			
None	None	None	None
Cumulative Construction			
As detailed above for Proposed Development Construction Phase if required	As detailed above for Proposed Development Construction Phase if required	As detailed above for Proposed Development Construction Phase if required	As detailed above for Proposed Development Construction Phase if required.
Cumulative Operation			
None	None	None	None

11 Noise

11.1 Introduction

11.1.1 This Chapter considers the potential significant effects on noise associated with the construction, operation and decommissioning of the Proposed Development. The specific objectives of this Chapter are to:

- describe the noise baseline;
- describe the assessment methodology and significance criteria used in completing the impact assessment;
- describe the potential effects, including direct, indirect and cumulative effects;
- describe the mitigation measures proposed to address potential significant effects; and
- assess the residual effects remaining following the implementation of mitigation.

11.1.2 This assessment has been carried out by Seth Roberts, Principal Acoustic Consultant, Hayes McKenzie Partnership Ltd. Seth Roberts has a BEng (Hons) degree in Acoustical Engineering from the University of Southampton and has been carrying out wind farm noise assessments for over 12 years.

11.1.3 This Chapter is supported by the following figures and technical appendices:

- EIAR Volume 3a: Figures
 - **Figure 11.1: Noise Contour Plot;** and
 - **Figure 11.2: Cumulative Noise Contour Plot.**
- EIAR Volume 4: Technical Appendices
 - **Technical Appendix 11.1: Baseline Noise Measurements;** and
 - **Technical Appendix 11.2: Noise Prediction Methodology.**

11.1.4 Figures and Technical Appendices are referenced in the text where relevant.

11.1.5 This assessment uses the below terminology throughout:

- Proposed Development – All elements of the West Torrisdale Wind Farm development for which S36 consent and deemed planning permission are sought.
- Application Boundary – The red line boundary defining all elements of the Proposed Development for the purpose of the S36 application.
- Wind Turbine Array – the location of the wind turbines comprising the Proposed Development.
- Access Corridor – the land within the Application Boundary in which the access track connect the Wind Turbine Array with the A83 road.
- Study Area – the area in which the EIA is undertaken, defined for each technical topic as appropriate.

11.2 Assessment Methodology and Significance Criteria

Scope of Assessment

11.2.1 This Chapter considers the effects of noise associated with the construction, operation and decommissioning of the Proposed Development on neighbouring noise sensitive receptors.

- 11.2.2 This Chapter assesses cumulative effects as arising from the Proposed Development in combination with other cumulative developments, which are the subject of a valid planning application. Operational, under construction and consented developments are also considered as part of the cumulative assessment. Sites which are currently operational are technically included within the baseline since there is no easy way of excluding noise from these sites as part of the baseline noise survey, however the significance of this contribution is considered to be low to negligible at all measurement locations.
- 11.2.3 This assessment follows guidance set out in ETSU-R-97 The Assessment and Rating of Noise from Wind Farms¹ which includes the following stages:
- Baseline noise survey conducted at noise sensitive receptors and correlated with standardised 10 m height wind speeds measured concurrently on site.
 - Plots of baseline L_{A90} noise levels against standardised 10 m height wind speed used to derive prevailing daytime and night-time background noise curves for a range of wind speeds up to 12 m/s.
 - Derived prevailing background noise curves used to define Daytime and night-time noise limits calculated in accordance with ETSU-R-97.
 - Predicted noise levels have been calculated / modelled using ISO 9613-2 methodology implemented using CadnaA noise modelling software.
 - Noise contour plots have been produced showing predicted L_{A90} at a height of 4 m above ground level (agl) assuming downwind conditions in all directions (not possible in practice but represents worst-case for all receptor locations).
 - Downwind (the worst-case in terms of wind direction) predicted noise levels have been compared to the noise limits.
- 11.2.4 This assessment is based on the Proposed Development as described in **Chapter 2** (EIAR Volume 2) and assumes the installation of 9 wind turbines up to 149.9 m tip height and 5 MW power output each. For the purposes of the Environmental Impact Assessment Report (EIAR) and this noise assessment, use of a Vestas V136 4.2 MW candidate wind turbine has been assumed. It should be noted that the actual wind turbine selection will depend on a lot of factors that would be taken into account during a commercial tender process and therefore, it cannot be guaranteed that this particular wind turbine would be installed on the Site.
- 11.2.5 The scope of this assessment has been informed by consultation responses summarised in **Table 11.2** and the following guidelines/policies:
- Planning Policy
 - Planning Advice Note PAN1/2011, Planning and Noise².
 - Scottish Government 2014, Web Based Planning Advice, Onshore Wind Turbines³.
 - The Scottish Government's Technical Advice Note, Assessment of Noise⁴.
 - Guidance
 - British Standard (BS) 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise⁵.

¹ Department of Trade and Industry (1996), ETSU-R-97, The Assessment and Rating of Noise from Wind Farms. ETSU/DTI

² <https://www.gov.scot/publications/planning-advice-note-1-2011-planning-noise/>

³ <https://www.gov.scot/publications/onshore-wind-turbines-planning-advice/>

⁴ <https://www.gov.scot/publications/technical-advice-note-assessment-noise/>

⁵ British Standards Institute (BSI) (2009 + 2014), BS 5228 + A1, Code of Practice for Noise and Vibration Control on Construction and Open Sites.

- BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Vibration.
- ETSU-R-97 The Assessment and Rating of Noise from Wind Farms.
- Institute of Acoustics (IOA), A Good Practice Guide (GPG) to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise⁶.

11.2.6 Operational noise predictions have been carried out for a candidate wind turbine under consideration for the Proposed Development in line with the methodology set out in the IOA GPG. Full details of the prediction methodology are set out in **Technical Appendix 11.2** (EIAR Volume 4), but the main assumptions are described as follows:

- Receiver height of 4 m;
- Ground effect ground coefficient $G=0.5$;
- Atmospheric attenuation corresponding to a temperature of 10°C and a relative humidity of 70 %;
- Topographical barriers and concave ground profile corrections have been applied according to the IOA GPG; and
- A margin of plus 2 dB has been added to manufacturer's sound power level data to account for uncertainty.

11.2.7 The source noise levels for the candidate wind turbine assumed for the Proposed Development are set out in **Table 11.1**. The candidate wind turbine used for the purposes of the predictions is a Vestas V136 4.2 MW with a hub height of 82 m. The octave band noise data taken from the manufacturer's technical specification document are also set out in **Table 11.1** and have been normalised to the overall sound power level at each integer wind speed.

Standardised 10 m height wind speed	Octave band centre frequency (Hz)								Broadband
	63	125	250	500	1000	2000	4000	8000	
4	77.6	85.3	90.0	91.8	90.7	86.6	79.7	69.6	96.6
5	82.5	90.2	94.9	96.7	95.6	91.5	84.6	74.5	101.5
6	86.7	94.4	99.1	100.9	99.8	95.7	88.8	78.7	105.7
7	86.8	94.5	99.2	101.0	99.9	95.8	88.9	78.8	105.9
8	86.8	94.5	99.2	101.0	99.9	95.8	88.9	78.8	105.9
9	86.8	94.5	99.2	101.0	99.9	95.8	88.9	78.8	105.9
10	86.8	94.5	99.2	101.0	99.9	95.8	88.9	78.8	105.9
11	86.8	94.5	99.2	101.0	99.9	95.8	88.9	78.8	105.9
12	86.8	94.5	99.2	101.0	99.9	95.8	88.9	78.8	105.9

Consultation

11.2.8 **Table 11.2** summarises the consultation responses received regarding noise and provides information on where and/or how they have been addressed in this assessment.

11.2.9 Full details on the consultation responses can be reviewed in **Technical Appendix 1.1** (EIAR Volume 4).

⁶ Institute of Acoustics, May 2013. A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise. IOA

Table 11.2: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
Energy Consents Unit (ECU) 01/04/2021	Scoping Opinion (Based on initial 12 turbine layout)	<i>'The noise assessment should be carried out in line with relevant legislation and standards as detailed in Chapter 3... ..of the scoping report. The noise assessment report should be formatted as per Table 6.1 of the IOA "A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise".'</i>	Noted, see Section 11.4 and Technical Appendix 11.2 (EIAR Volume 4).
Argyll and Bute Council (ABC) 20/04/2021	Scoping Response (Based on initial 12 turbine layout)	It is recommended that: <i>'Any Noise Impact Assessment (NIA) should consider the potential impact at any dwelling which is lawfully existing or a site which has planning permission for use as a dwelling; If it is anticipated that mitigation measures (e.g. operation of turbines in noise reduced mode) may be required to achieve prospective noise limits then details should be in the NIA; It is acceptable for turbine noise predictions to be undertaken using the characteristics of an appropriate candidate turbine. It should be expected that any recommendation for approval will include a condition which required the demonstration of compliance of the turbines to be installed with any noise limits; Where the occupiers of any properties are considered to have a financial interest in the development and a higher noise limit of 45dB LA90, 10 mins is proposed, details of the financial interest and properties concerned should be provided to the Council; Where calculations have been undertaken and corrections have been made as per the GPG (e.g. across a valley and topography screening) the NIA should include a table providing the details of factors at properties/ turbines.'</i>	Noted. Results of the noise monitoring are presented in Section 11.3 of this Chapter.
ABC 20/04/2021	Scoping Response (Based on initial 12 turbine layout)	<i>'The impact of any blasting, should blasting to be undertaken to allow the extraction of stone for wider construction activities should be considered within the Environmental Impact Assessment.'</i>	Noted. The potential for impacts associated with blasting and any associated mitigation/consultation requirements are discussed in Section 11.4 of this Chapter.

Table 11.2: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
ABC 09/03/2021	Post-Scoping Consultation on noise monitoring locations. (Based on initial 12 turbine layout)	<p>Mark Parry (ABC EHO) notes the three locations which that have been proposed for noise monitoring (Glen Croft, Lephincorrach Cottage and Ifferdale Cottage) will be fine for use and representative of the area. As suggested, if Glen Croft is anticipated to have more accurate than 'Glenhead', then this would be better to use.</p> <p>EHO confirmed he was happy with the approach that the noise consultant has proposed for the background noise measurements.</p>	<p>Noted. Results of noise monitoring are presented in Section 11.3 of this Chapter and Technical Appendix 11.1 (EIAR Volume 4).</p>
East Kintyre community Council (EKCC) 14/02/2021	Scoping Response (Based on initial 12 turbine layout)	<p><i>'The noise analysis and evaluation needs to be extended to all properties within 3 km. The analysis needs to incorporate the facts that a)- unlike light, sound waves refract and bend round the natural shapes of the land, b) that the Torrisdale valley act as sound funnels, c) the prevailing winds from the W and SW act as carrier waves over and round the landscape, and to include these non-linear effects in the analysis. For the avoidance of doubt, South and North Dippen, South Torrisdale through Greenhill and Whitestone all need to be included - these properties can and do regularly hear forestry operations and stalking from the Torrisdale hills.'</i></p>	<p>The noise impact assessment takes into account all relevant propagation effects, including for topographical factors.</p> <p>Figure 11.1 (EIAR Volume 3a) shows noise contours from which the levels of operational noise associated with the Proposed Development can be inferred at all relevant properties. Section 11.4 of this Chapter, provides an assessment of the properties that are closest to the Wind Turbine Array and/or most sensitive to operational noise.</p> <p>The co-ordinate locations of all dwellings within 3 km of the Wind Turbine Array have been reviewed as part of the scoping process and a list of the closest and/or most sensitive dwellings has been determined for the purposes of informing the EIAR and is provided in Section 11.3 of this Chapter.</p> <p>Consultation occurred with the ABC EHO and the proposed Noise Monitoring Locations (NMLs) were agreed prior to the commencement of noise monitoring.</p>
EKCC 14/02/2021	Scoping Response (Based on initial 12 turbine layout)	<p>Analysis needs to include construction noise as well as wind farm noise.</p>	<p>Construction noise is highly unlikely to exceed levels specified within typical planning conditions (Example noise limits are given in BS5228 as discussed in Section 11.1 of this Chapter). However, upgrades to local roads and provision of additional tracks relating to construction access</p>

Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
			requirements could occur in close proximity (anything closer than about 100 m) to certain dwellings, depending on the route taken. These impacts are reviewed and considered in Section 11.4 of this Chapter.

Potential Effects Scoped Out

11.2.10 The following potential effects have been scoped out of the noise assessment.

Construction and Decommissioning Noise

11.2.11 As discussed within the Scoping Report (ECU Ref: ECU00002224), without objection from ABC, a specific assessment of construction noise has not been provided.

11.2.12 Construction activities within the Wind Turbine Array that could give rise to the greatest levels of noise are:

- Track construction closest to residential properties; and
- Blasting, if required.

11.2.13 The nearest noise sensitive receptor to the nearest proposed location of these construction activities is Glenhead which is approximately 1130 m from the nearest wind turbine (T9).

11.2.14 BS 5228:2009 + A1:2014 provides example criteria for the assessment of the significance of construction noise effects and a method for the prediction of noise levels from construction activities. Two example methods are provided for assessing significance.

11.2.15 The first is based on the use of criteria defined in Department of the Environment Advisory Leaflet (AL) 72, Noise Control On Building Sites⁷, which sets a fixed limit of 70 dB(A) in rural suburban and urban areas away from main roads and traffic. Noise levels are generally taken as façade L_{Aeq} values with free-field levels taken to be 3 dB lower giving an equivalent noise criterion of 67 dB L_{Aeq} .

11.2.16 The second is based on noise change but applies minimum criteria of 45, 55 and 65 dB L_{Aeq} for night-time (23:00-07:00), evening and weekends (19:00-23:00 weekdays, 13:00-23:00 Saturdays and 07:00-23:00 Sundays), and daytime (07:00-19:00) including Saturdays (07:00-13:00) respectively. These limits are applicable irrespective of existing baseline noise levels, and where construction activities have a duration of one month or more. It should be noted that the time period to which each limit applies also defines the time averaging period for the calculated L_{Aeq} .

11.2.17 Standard best practice measures to minimise noise during construction will be implemented in accordance with a detailed Construction Environmental Management Plan (CEMP), which will be secured by means of an appropriately worded planning condition. A simplified daytime construction noise limit of 65 dB L_{Aeq} during normal working hours will be applied in accordance with the second method from BS5228 discussed above. Further information on noise mitigation during construction is provided in **Section 11.5** of this Chapter.

⁷ Department of the Environment (1976), Advisory Leaflet (AL) 72: Noise Control on Building Sites. DoE.

- 11.2.18 Any potential noise issues associated with the movement of construction vehicles to and from the Site would be sufficiently dealt with within the Construction Traffic Management Plan (CTMP) where considered necessary.
- 11.2.19 Noise arising from decommissioning activities will meet the relevant noise limits that apply to noise from construction, and decommissioning operations will be undertaken in line with the relevant standards and limits that apply at the time. Therefore, noise effects during decommissioning have been scoped out of further assessment.

Tonal Noise

- 11.2.20 ETSU-R-97 specifies that, in line with other noise guidance, a penalty should be added to measured or predicted wind turbine noise levels if there is tonal noise above a certain level which is audible at residential properties. In this assessment, as most modern wind turbines operate without significant tonal noise, it has been assumed that there would be no tonal noise associated with the operation of the Proposed Development which would give rise to such a penalty. It is anticipated that a penalty would be included in an appropriately worded planning condition such that a tonal penalty would need to be added to measured noise levels, where required, before comparing them with the noise limits. Warranty agreements with wind turbine suppliers ensure that any such penalties will not occur in practice.

Low Frequency and Infrasound

- 11.2.21 Low frequency sound is typically defined as sound in the audible hearing frequency range of 20 Hz up to about 200 Hz. Noise from wind turbines is not inherently low-frequency and it is typically broad-band in nature, and close to a wind turbine the dominant frequencies are usually in the 250 to 2000 Hz range. As the distance from a wind farm site increases the noise level decreases as a result of the spreading out of the sound energy and also due to air absorption which increases with increasing frequency. This means that, although the energy across the whole frequency range is reduced, higher frequencies are reduced more than lower frequencies with the effect that as distance from the site increases the ratio of low to high frequencies also increases. This effect may be observed with road traffic noise or natural sources, such as the sea, where higher frequency components are diminished relative to lower frequency components at long distances. At such distances, however, the overall noise level is so low, such that any bias in the frequency spectrum is insignificant.
- 11.2.22 Work carried out in 2006 by Hayes McKenzie for the UK Department of Trade and Industry to investigate the extent of low frequency and infrasonic noise from three UK wind farms concluded that *"the common cause of complaints associated with noise at all three wind farms is not associated with low frequency noise, but is the audible modulation of the aerodynamic noise, especially at night"*. Therefore, low frequency noise is scoped out of this assessment.
- 11.2.23 Infra-sound is noise occurring at frequencies below that at which sound is normally audible, i.e. at less than about 20 Hz, due to the significantly reduced sensitivity of the ear at such frequencies. In this frequency range, for sound to be perceptible, it has to be at very high amplitude, which is not the case for wind turbine noise. In November 2016 a study into low frequency and infrasound was published by the State Office for the Environment, Measurement and Nature Conservation of the Federal State of Baden-Wuerttemberg that contained a comprehensive review of low frequency and infrasound from wind turbines, and evaluated such noise in relation to other sources. The results state that *"the infrasound level in the vicinity of wind turbines is – at distances between 120 m and 300 m – well below the threshold of what humans perceive"* and that *"at a distance of 700 m from the wind turbines, it was observed by means of measurements that when the turbine is switched on, the*

measured infrasound level did not increase or only increased to a limited extent. The infrasound was generated mainly by the wind and not by the turbines”.

- 11.2.24 The report concludes that “Infrasound is caused by a large number of different natural and technical sources. It is an everyday part of our environment that can be found everywhere. Wind turbines make no considerable contribution to it. The infrasound level generated by them lie clearly below the limits of human perception. There is no scientifically proven evidence of adverse effects in this level range”. Therefore, infrasound has been scoped out of this assessment.

Amplitude Modulation

- 11.2.25 The variation in noise level associated with wind turbine operation, at the rate at which wind turbine blades pass any fixed point of their rotation (the blade passing frequency), is often referred to as blade swish or Amplitude/ Aerodynamic Modulation (AM). This effect is identified within ETSU-R-97 where it is envisaged that “... modulation of blade noise may result in variation of the overall A-Weighted noise level by as much as 3 dB(A) (peak to trough) when measured close to a wind turbine... ” and that at distances further from the wind turbine where there are “... more than two hard, reflective surfaces, then the increase in modulation depth may be as much as 6 dB(A) (peak to trough)”. There have been instances where level of AM rates is higher than this, which results in the noise being perceived as more intrusive (in the same way as tonal content makes the noise more intrusive).
- 11.2.26 The Department of Energy & Climate Change commissioned a Wind Turbine AM Review report that was published in two phases: Phase 1 in September 2015 and Phase 2 in October 2016 (although the Phase 2 report is dated August 2016). Phase 1 of the report sets out the approach and methodology to the review and research, and the Phase 2 report includes a literature review, research into human response to AM, and recommends how excessive AM might be controlled through the use of a planning condition. The report includes recommendations on how AM should be addressed when quantified according to the recommendations of a separate Institute of Acoustics (IOA) working group document, A Method for Rating Amplitude Modulation in Wind Turbine Noise (August 2016).
- 11.2.27 The AM Review reports recommend a two-tier approach whereby the first tier seeks a reduction in the depth and/or occurrence of AM with a rating level (according to the IOA Amplitude Modulation Working Group method) ≥ 3 dB. Whether remedial action is required depends on the prevalence of any complaints, and how often AM rating levels ≥ 3 dB occur. The second tier is that if AM is deemed to be a significant issue, and if nothing can be done to reduce the level of AM, then a penalty scheme is proposed whereby a penalty ranging from 3 dB (for a rating level of 3 dB) up to a maximum of 5 dB (for a rating level of 10 dB and above) could be added to the measured level before measured levels are compared with the relevant noise limits.
- 11.2.28 It should be noted that most wind farms operate without significant AM, and that it is not possible to predict the likely occurrence of AM. At the time of writing there has been no official response to those recommendations from the IOA Noise Working group or endorsement from any Scottish Government Minister or Department. The IOA GPG, states that “*the evidence in relation to “Excess” or “other” Amplitude Modulation (AM) is still developing. At the time of writing, current practice is not to assign a planning condition to deal with AM*”, although it is possible to control such noise with an appropriately worded planning condition if necessary.

Method of Baseline Characterisation

Extent of the Study Area

- 11.2.29 There is no specific defined Study Area for the operational noise assessment. Rather the Study Area includes all noise sensitive receptors and residential properties that have the potential to be affected by operational noise.
- 11.2.30 The lowest noise limit applicable to operational (and cumulative operational) noise impacts is between 35 and 40 dB L_{A90} as detailed as the range for the day-time lower limiting value within ETSU-R-97. Therefore, the Study Area includes noise sensitive receptor locations where predicted operational noise levels from the Proposed Development acting alone are 25 dB L_{A90} or greater. This is on the basis that if operational noise levels from the Proposed Development are 10 dB or more below the lowest applicable cumulative noise limit then its contribution on its own and cumulatively with other wind farm developments can be considered to be negligible (less than 0.5 dB increase cumulatively which is not measurable or perceptible). In addition, where the total cumulative operational noise levels including other wind farm developments is below 35 dB L_{A90} the overall impact can also be considered negligible.

Desk Study

- 11.2.31 The following data sources have been used to obtain baseline noise information to inform the assessment herein:
- Ordnance Survey (OS) and aerial mapping concerning the location of all noise-sensitive receptors in the vicinity of the Wind Turbine Array;
 - Wind turbine locations as defined in **Chapter 2** (EIAR Volume 2);
 - Cumulative developments are presented in **Figure 4.8** (EIAR Volume 3a) and **Table 4.6** of **Chapter 4** (EIAR Volume 2);
 - OS Terrain 50 data; and
 - Manufacturer data for the candidate wind turbine source noise levels.
- 11.2.32 This information has been used to determine the Study Area adopted for the assessment of noise effects associated with the Proposed Development.

Field Survey

- 11.2.33 Baseline noise measurements were carried out to characterise the existing noise environment and to allow for appropriate noise limits to be derived for the Proposed Development.
- 11.2.34 Noise measurements were undertaken at three locations deemed to be representative of the closest residential properties to the site between 23rd June and 14th July 2022 and ABC were informed of the intention to monitor at these locations. The approximate location of the noise monitoring equipment is detailed in **Table 11.3** and shown in **Figure 11.1**, EIAR Volume 3a.

Receptor	Grid Reference	Location Description
Lephincorrach Cottage	178919, 635889	Equipment location in corner of field ~ 5 m from curtilage in free-field location.
Ifferdale	177128, 633803	Equipment located on grassed turning area southeast of main residence in free-field location.
Glen Croft	178793, 637089	Equipment located in free-field location in front garden.

11.2.35 The survey was carried out in line with the methodology prescribed by ETSU-R-97 and accompanying IOA Good Practice Guide. Further details of the baseline noise survey methodology are included in **Technical Appendix 11.1** (EIAR Volume 4).

Criteria for the Assessment of Effects

Criteria for Assessing the Sensitivity of Receptors

11.2.36 For the purposes of the noise assessment all residential property locations are treated as noise sensitive receptors with a high receptor sensitivity for noise effects.

Criteria for Assessing the Magnitude of Change

11.2.37 ETSU-R-97 requires that overall wind turbine levels (including for the effect of other cumulative development) do not exceed derived noise limits, which take into account the balance of the need for renewable energy and the protection of the noise environment at neighbouring properties. Accordingly, no scale of magnitude is applied to the assessment, and whether or not an effect is significant depends solely on whether the derived noise limits are predicted to be met.

Criteria for Assessing Cumulative Effects

11.2.38 The criteria set out below would equally apply to the combined/cumulative operational noise impacts and for cumulative construction noise impacts.

Criteria for Assessing Significance

11.2.39 The specific night and daytime noise limits to be applied to the Proposed Development for operational noise were derived in line with ETSU-R-97 and agreed with ABC and are set out in **Table 11.4**.

11.2.40 If the relevant noise limits are met at a specific receptor location, then the noise effect at that location is considered to be **Not Significant**.

Table 11.4: Operational Noise Limits		
Time Period	Limit (dB LA90)	Significance of Effect
At all times if predicted operational noise levels are below this no significant effects are predicted and detailed cumulative assessment is not required	25	Not Significant
Night-time noise limit applicable to the Proposed Development acting alone	The greater of 43 dB LA90 or plus 5 dB above background	Not Significant (depending on cumulative noise effects)
Day-time noise limit applicable to Proposed Development acting alone	The greater of 35 - 40 dB LA90 or plus 5 dB above background	Not Significant (depending on cumulative noise effects)
Night-time noise limit applicable to cumulative noise from all wind turbine developments	The greater of 43 dB LA90 or plus 5 dB above background	Not Significant
Day-time noise limit applicable to cumulative noise from all wind turbine developments	The greater of 35 - 40 dB LA90 or plus 5 dB above background	Not Significant

Limitations and Assumptions

11.2.41 As discussed in **Paragraph 11.2.4**, the operational noise impact assessment is based on a candidate wind turbine which may not be the wind turbine that is installed in practice. However, operational noise limits will be set for the Proposed Development via planning conditions which will stipulate operational noise levels that cannot be exceeded at noise sensitive properties. Therefore, regardless of the model of wind turbine installed, these limits must be met.

11.3 Baseline Conditions

Current Baseline

11.3.1 The results of the baseline noise measurements are summarised in **Appendix 11.1** (EIAR Volume 4). The baseline noise data was reviewed to determine whether measured noise levels were affected by noise from the operational Beinn an Tuirc Wind Farms. It is considered that, although there are times when it is possible that operational noise from the existing wind farm could be audible at some of the assessment locations, it is unlikely to have a material influence on the results. Therefore, no specific corrections or exclusions were made in respect of noise from existing wind turbine developments.

Location	Time Period	Standardised 10 m height wind speed (m/s) ⁸										
		2	3	4	5	6	7	8	9	10	11	12
Lephincorrach Cottage	Night-time	30	30	31	32	33	34	35	37	39	41	43
	Quiet Day	30	31	32	33	34	36	38	39	41	42	43
Ifferdale	Night-time	32	34	35	37	38	39	40	41	42	44	45
	Quiet Day	33	34	35	37	39	40	42	43	44	45	46
Glen Croft	Night-time	27	27	29	30	32	34	37	40	42	45	48
	Quiet Day	27	28	29	32	34	37	39	42	44	45	45

Summary of Sensitive Receptors

- 11.3.2 As described above, only those receptor locations where predicted operational noise levels from the Proposed Development are above 25 dB LA90, and the predicted cumulative operational noise levels are above 35 dB LA90 have been scoped into the assessment. The receptor locations included in the assessment are shown in **Table 11.6** (below) and **Figure 11.1**, (EIAR Volume 3a). All receptors considered in the assessment are occupied residential properties.
- 11.3.3 All other noise sensitive receptors are unlikely to experience significant noise effects and accordingly are scoped out.

⁸ The standardised 10 m height wind speed is the hub height wind speed corrected to 10 m height using a logarithmic wind shear profile and a ground roughness length of 0.05 m.

Receptor	Grid Reference	Limit Location
Alderlea Cottage	178851, 636817	Glen Croft
Auchanuilt	179100, 636674	Glen Croft
Castle Flats	179352, 636144	Lephincorrach Cottage
Garden Cottage	179222, 636299	Lephincorrach Cottage
Glen Croft	178757, 637090	Glen Croft
Glen House	178964, 636800	Glen Croft
Glenhead	178535, 637078	Glen Croft
Ifferdale Cottage	176510, 633865	Ifferdale Cottage
Ifferdale Lodge	177404, 633630	Ifferdale Cottage
Lephincorrach Cottage	178932, 635889	Lephincorrach Cottage
Lephincorrach Farm	178924, 635839	Lephincorrach Cottage
Maneight	177114, 633825	Ifferdale Cottage
Meiklehill	179175, 635818	Lephincorrach Cottage
Street Record	179466, 636158	Lephincorrach Cottage
The Arch Cottage	179273, 636096	Lephincorrach Cottage
The Bothy Glen House	178959, 636785	Glen Croft
The Bunkhouse	177101, 633835	Ifferdale Cottage
Tigh Beag	179488, 636266	Lephincorrach Cottage
Torrisdale Castle	179350, 636139	Lephincorrach Cottage

11.4 Assessment of Potential Effects

Potential Operational Effects

11.4.1 Operational noise impacts have been assessed by comparing predicted operational noise levels with noise limits derived from the baseline noise measurements. The relevant noise limits are set out at **Table 11.7**.

Location	Time Period	Standardised 10 m height wind speed (m/s) ⁹											
		2	3	4	5	6	7	8	9	10	11	12	
Lephincorrach Cottage	Night-time	43	43	43	43	43	43	43	43	43	44	46	48
	Lower Day-time	35	36	37	38	39	41	43	44	46	47	48	
	Upper Day-time	40	40	40	40	40	41	43	44	46	47	48	
Ifferdale	Night-time	43	43	43	43	43	43	43	45	47	50	53	
	Lower Day-time	35	35	35	37	39	42	44	47	49	50	50	
	Upper Day-time	40	40	40	40	40	42	44	47	49	50	50	
Glen Croft	Night-time	43	43	43	43	43	44	45	46	47	49	50	
	Lower Day-time	38	39	40	42	44	45	47	48	49	50	51	
	Upper Day-time	40	40	40	42	44	45	47	48	49	50	51	

11.4.2 Operational noise prediction results are presented for all receptors scoped into the assessment.

11.4.3 The prediction results are presented at **Table 11.8**. It should be noted that the predictions assume that each receptor location is downwind of the Proposed Development to provide a worst case assessment. Under non-downwind conditions, operational noise levels will be lower. In addition noise contours for the maximum operational noise level of all wind turbines considered cumulatively as well as the noise sensitive receptor locations are shown at **Figure 11.1** (EIAR Volume 3a).

⁹ The standardised 10 m height wind speed is the hub height wind speed corrected to 10 m height using a logarithmic wind shear profile and a ground roughness length of 0.05 m.

Table 11.8: Operational Noise Prediction Results (dB LA90)									
Location	Standardised 10 m height wind speed (m/s)								
	4	5	6	7	8	9	10	11	12
Alderlea Cottage	22	27	31	31	31	31	31	31	31
Auchanuilt	20	25	29	30	30	30	30	30	30
Castle Flats	19	24	28	28	28	28	28	28	28
Garden Cottage	20	25	29	29	29	29	29	29	29
Glen Croft	26	31	35	35	35	35	35	35	35
Glen House	27	32	36	36	36	36	36	36	36
Glen Head	21	26	30	30	30	30	30	30	30
Ifferdale Cottage	18	23	27	27	27	27	27	27	27
Ifferdale Lodge	18	23	27	27	27	27	27	27	27
Lephincorrach Cottage	22	27	31	31	31	31	31	31	31
Lephincorrach Farm	22	27	31	31	31	31	31	31	31
Maneight	19	24	28	28	28	28	28	28	28
Meiklehill	21	26	30	30	30	30	30	30	30
Street Record	19	24	28	28	28	28	28	28	28
The Arch Cottage	19	24	28	28	28	28	28	28	28
The Bothy Glen House	21	26	30	30	30	30	30	30	30
The Bunkhouse	19	24	28	28	28	28	28	28	28
Tigh Beag	19	24	28	28	28	28	28	28	28
Torrisdale Castle	19	24	28	28	28	28	28	28	28

- 11.4.4 The relevant night and lower day-time noise limits are met at all noise sensitive receptor locations, which is illustrated by the margins below these two limits in **Table 11.9** and **Table 11.10**. Therefore, the noise impact of the Proposed Development operating in isolation is determined to be **Not Significant** at all receptor locations.

Table 11.9: Margin Between Predicted Operational Noise Level and Derived Night-Time Noise Limits (dB L_{A90})									
Location	Standardised 10 m height wind speed (m/s)								
	4	5	6	7	8	9	10	11	12
Alderlea Cottage	21	16	12	13	14	15	16	18	19
Auchanuilt	23	18	14	14	15	16	17	19	20
Castle Flats	24	19	15	15	15	15	16	18	20
Garden Cottage	23	18	14	14	14	14	15	17	19
Glen Croft	17	12	8	9	10	11	12	14	15
Glen House	16	11	7	8	9	10	11	13	14
Glen Head	22	17	13	14	15	16	17	19	20
Ifferdale Cottage	25	20	16	16	16	18	20	23	26
Ifferdale Lodge	25	20	16	16	16	18	20	23	26
Lephincorrach Cottage	21	16	12	12	12	12	13	15	17
Lephincorrach Farm	21	16	12	12	12	12	13	15	17
Maneight	24	19	15	15	15	17	19	22	25
Meiklehill	22	17	13	13	13	13	14	16	18
Street Record	24	19	15	15	15	15	16	18	20
The Arch Cottage	24	19	15	15	15	15	16	18	20
The Bothy Glen House	22	17	13	14	15	16	17	19	20
The Bunkhouse	24	19	15	15	15	17	19	22	25
Tigh Beag	24	19	15	15	15	15	16	18	20
Torrisdale Castle	24	19	15	15	15	15	16	18	20

Table 11.10: Margin Between Predicted Operational Noise Level and Derived Day-Time Noise Limits (dB LA90)

Location	Standardised 10 m height wind speed (m/s)								
	4	5	6	7	8	9	10	11	12
Alderlea Cottage	18	15	13	14	16	17	18	19	20
Auchanuilt	20	17	15	15	17	18	19	20	21
Castle Flats	18	14	11	13	15	17	18	19	20
Garden Cottage	17	13	10	12	14	16	17	18	19
Glen Croft	14	11	9	10	12	13	14	15	16
Glen House	13	10	8	9	11	12	13	14	15
Glen Head	19	16	14	15	17	18	19	20	21
Ifferdale Cottage	17	14	12	15	17	20	22	23	23
Ifferdale Lodge	17	14	12	15	17	20	22	23	23
Lephincorrach Cottage	15	11	8	10	12	14	15	16	17
Lephincorrach Farm	15	11	8	10	12	14	15	16	17
Maneight	16	13	11	14	16	19	21	22	22
Meiklehill	16	12	9	11	13	15	16	17	18
Street Record	18	14	11	13	15	17	18	19	20
The Arch Cottage	18	14	11	13	15	17	18	19	20
The Bothy Glen House	19	16	14	15	17	18	19	20	21
The Bunkhouse	16	13	11	14	16	19	21	22	22
Tigh Beag	18	14	11	13	15	17	18	19	20
Torrisdale Castle	18	14	11	13	15	17	18	19	20

Potential Cumulative Operational Effects

11.4.5 The ETSU-R-97 noise limits apply to cumulative noise from all wind farm developments in the vicinity of the Proposed Development. The operational wind farms that have been considered in the cumulative operational noise assessment are listed below:

- Beinn an Tuirc- 46 Vestas V47 660 kW wind turbines with a hub height of 50 m;
- Beinn an Tuirc Extension- 19 Siemens SWT 2.3-93 wind turbines with a hub height of 60 m; and
- Beinn an Tuirc Phase 3- 14 Vestas V112 3.6 MW wind turbines with a hub height of 70 m.

11.4.6 There are no other operational, under construction or consented wind farms that would give rise to cumulative operational effects in combination with the Proposed Development.

11.4.7 Predictions have been undertaken using the same methodology as set out in **Technical Appendix 11.2** (EIAR Volume 4) based on the source data for the wind turbines at each wind farm shown in **Table 11.11** and **Table 11.12**.

Wind Turbine Make	Model	Standardised 10 m height wind speed (m/s)								
		4	5	6	7	8	9	10	11	12
Vestas	V47 660 kW	93.5	101.6	106.1	107.4	107.4	107.4	107.4	107.4	107.4
Siemens	SWT 2.3- 93	90.2	98.0	103.1	105.1	105.4	105.4	105.4	105.4	105.4
Vestas	V112 3.6 MW	95.4	96.0	98.7	101.8	104.7	106.8	107.4	107.4	107.4

Wind Turbine Make	Model	Octave band centre frequency (Hz)								Broadband
		63	125	250	500	1000	2000	4000	8000	
Vestas	V47 660 kW	86.2	95.2	101.9	102.3	99.4	95.9	90.6	96.9	107.4
Siemens	SWT 2.3- 93	84.6	93.6	100.3	100.7	97.8	94.3	89.0	85.3	105.4
Vestas	V112 3.6 MW	87.2	95.5	99.8	101.4	102.4	98.9	94.0	80.0	107.4

- 11.4.8 The results of the cumulative operational predictions are shown in **Table 11.13**. As with the operational noise assessment, it is assumed that each receptor location is downwind of the Proposed Development to provide a worst case assessment.
- 11.4.9 The noise contours for the maximum operational noise level of all wind turbines considered cumulatively, and the noise sensitive receptor locations, are shown at **Figure 11.2** (EIAR Volume 3a).

Location	Standardised 10 m height wind speed (m/s)								
	4	5	6	7	8	9	10	11	12
Alderlea Cottage	23	29	33	34	34	34	34	34	34
Auchanuilt	22	28	32	33	33	33	33	33	33
Castle Flats	21	27	31	32	32	32	32	32	32
Garden Cottage	21	27	32	33	33	33	33	33	33
Glen Croft	27	32	36	37	37	37	37	37	37
Glen House	28	33	37	38	38	38	38	38	38
Glen Head	23	28	33	34	34	34	34	34	34
Ifferdale Cottage	25	32	36	38	38	38	38	38	38
Ifferdale Lodge	23	29	34	35	35	35	35	35	35
Lephincorrach Cottage	23	29	33	34	34	34	34	34	34
Lephincorrach Farm	23	29	33	34	34	34	34	34	34
Maneight	24	30	35	36	36	37	37	37	37
Meiklehill	22	28	33	33	33	33	33	33	33
Street Record	21	27	31	32	32	32	32	32	32
The Arch Cottage	21	27	31	32	32	33	33	33	33
The Bothy Glen House	23	28	33	34	34	34	34	34	34
The Bunkhouse	24	30	35	36	36	37	37	37	37
Tigh Beag	21	27	31	32	32	32	32	32	32
Torrisdale Castle	21	27	31	32	32	32	32	32	32

11.4.10 The results of the cumulative operational noise predictions show that operational noise levels at all receptor locations are below the derived night-time and day-time noise limits that apply to cumulative operational noise, which is illustrated by the margins below these two limits in **Table 11.14** and **Table 11.15**. The cumulative operational noise impact is therefore considered to be **Not Significant** at all receptor locations.

Table 11.14: Margin Between Predicted Cumulative Operational Noise Level and Derived Night-Time Noise Limits (dB LA90)									
Location	Standardised 10 m height wind speed (m/s)								
	4	5	6	7	8	9	10	11	12
Alderlea Cottage	20	14	10	10	11	12	13	15	16
Auchanuilt	21	15	11	11	12	13	14	16	17
Castle Flats	22	16	12	11	11	11	12	14	16
Garden Cottage	22	16	11	10	10	10	11	13	15
Glen Croft	16	11	7	7	8	9	10	12	13
Glen House	15	10	6	6	7	8	9	11	12
Glen Head	20	15	10	10	11	12	13	15	16
Ifferdale Cottage	18	11	7	5	5	7	9	12	15
Ifferdale Lodge	20	14	9	8	8	10	12	15	18
Lephincorrach Cottage	20	14	10	9	9	9	10	12	14
Lephincorrach Farm	20	14	10	9	9	9	10	12	14
Maneight	19	13	8	7	7	8	10	13	16
Meiklehill	21	15	10	10	10	10	11	13	15
Street Record	22	16	12	11	11	11	12	14	16
The Arch Cottage	22	16	12	11	11	10	11	13	15
The Bothy Glen House	20	15	10	10	11	12	13	15	16
The Bunkhouse	19	13	8	7	7	8	10	13	16
Tigh Beag	22	16	12	11	11	11	12	14	16
Torrisdale Castle	22	16	12	11	11	11	12	14	16

Table 11.15: Margin Between Predicted Cumulative Operational Noise Level and Derived Day-Time Noise Limits (dB LA90)

Location	Standardised 10 m height wind speed (m/s)								
	4	5	6	7	8	9	10	11	12
Alderlea Cottage	17	13	11	11	13	14	15	16	17
Auchanuilt	18	14	12	12	14	15	16	17	18
Castle Flats	16	11	8	9	11	13	14	15	16
Garden Cottage	16	11	7	8	10	12	13	14	15
Glen Croft	13	10	8	8	10	11	12	13	14
Glen House	12	9	7	7	9	10	11	12	13
Glen Head	17	14	11	11	13	14	15	16	17
Ifferdale Cottage	10	5	3	4	6	9	11	12	12
Ifferdale Lodge	12	8	5	7	9	12	14	15	15
Lephincorrach Cottage	14	9	6	7	9	11	12	13	14
Lephincorrach Farm	14	9	6	7	9	11	12	13	14
Maneight	11	7	4	6	8	10	12	13	13
Meiklehill	15	10	6	8	10	12	13	14	15
Street Record	16	11	8	9	11	13	14	15	16
The Arch Cottage	16	11	8	9	11	12	13	14	15
The Bothy Glen House	17	14	11	11	13	14	15	16	17
The Bunkhouse	11	7	4	6	8	10	12	13	13
Tigh Beag	16	11	8	9	11	13	14	15	16
Torrisdale Castle	16	11	8	9	11	13	14	15	16

11.5 Mitigation

Mitigation during Construction

- 11.5.1 Construction noise would be minimised through the use of standard 'best practicable means' to reduce the potential level of noise generated as part of the construction activities. This would include the restriction of certain activities to certain times, use of quiet working methods and ensuring construction plant is in good working order.
- 11.5.2 Any specific mitigation measures that may be required for certain activities would be detailed within the detailed CEMP, to be secured by means of a planning condition.
- 11.5.3 The relevant BS5228 noise limits that would apply to construction activities with a duration of greater than one month are set out at **Table 11.16**.

Table 11.16: Construction Noise Limits	
Time Period	Limit (dB LAeq,t)
Weekday day-time (07:00-19:00) and Saturday morning (07:00-13:00)	65
Evenings (19:00-23:00) and weekends (Saturday 13:00-19:00 and Sunday (07:00-19:00)	55
Night time (23:00-07:00)	45

- 11.5.4 Noise during construction works would be controlled by generally restricting works to standard working hours (07:00 to 19:00 Monday to Friday and 07:00 to 16:00 on Saturdays) and exclude Sundays, unless specifically agreed otherwise. Outside these hours, construction activities onsite would be limited to wind turbine erection, maintenance, emergency works, dust suppression, and the testing of plant and equipment, unless otherwise approved in advance in writing by A&BC. It is therefore expected that only the weekday day-time noise limit would be applicable, but this is dependent on the working hours required at the time of construction.
- 11.5.5 With regard to noise from construction traffic, a site management regime would be developed to control the movement of vehicles to and from site. This would be implemented through a Construction Traffic Management Plan (CTMP), as discussed further in **Chapter 10** (EIAR Volume 2).

Mitigation during Operation

- 11.5.6 The Proposed Development is located sufficiently far from receptors such that predicted operational and cumulative operational noise levels associated with its introduction would comfortably meet the limiting requirements of ETSU-R-97, without the need to impose additional mitigation or curtail the operation of the wind turbines.
- 11.5.7 Suitably worded planning conditions are a common means to ensure that operational compliance measurements may be undertaken in the event of complaints relating to noise and appropriate recourse can then be sought by the Local Planning Authority should operational noise levels exceed consented limits. Standard conditions often require that, should a complaint be received, appropriate monitoring takes place to determine whether specified noise limits are being adhered to and whether remedial measures are required to be put in place on that basis. However, in this instance, operational noise levels may be so low that it may be difficult or impossible to distinguish from other environmental noise sources via typical measurement practices.

Mitigation during Decommissioning

- 11.5.8 Decommissioning would be managed in a similar manner to construction and would be subject to similar mitigation and controls.

11.6 Assessment of Residual Effects

Residual Operational Effects

- 11.6.1 Noise associated with the operation of the Proposed Development is considered **Not Significant** and no specific mitigation measures are considered necessary.

Residual Cumulative Operational Effects

- 11.6.2 Noise associated with the cumulative operation of the Proposed Development in combination with other cumulative schemes is considered **Not Significant** and no specific mitigation measures are considered necessary.

11.7 Summary

- 11.7.1 The construction and operational noise effects associated with the Proposed Development operating in isolation and cumulatively with other potential development in the area are considered not significant.

Table 11.17: Summary of Potential Significant Effects of the Proposed Development			
Potential Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/Residual Effect
Operation			
No significant effects predicted.	No specific mitigation required.	N/A	Not Significant.
Cumulative Operation			
No significant effects predicted.	No specific mitigation required.	N/A	Not Significant.

12 Aviation and Telecommunications

12.1 Introduction

12.1.1 This Chapter considers the potential significant effects on aviation and telecommunication receptors associated with the construction, operation and decommissioning of the Proposed Development. The specific objectives of this Chapter are to:

- describe the aviation and telecommunications baseline;
- describe the assessment methodology and significance criteria used in completing the impact assessment;
- describe the potential effects, including direct, indirect and cumulative effects;
- describe the mitigation measures proposed to address potential significant effects; and
- assess the residual effects remaining following the implementation of mitigation.

12.1.2 This assessment has been carried out by Malcolm Spaven, Director of Aviatica, a specialist consultancy with 27 years' experience of providing aviation and telecommunications advice to the wind energy industry.

12.1.3 This assessment uses the below terminology throughout:

- Proposed Development – All elements of the West Torrisdale Wind Farm development for which S36 consent and deemed planning permission are sought.
- Application Boundary – The red line boundary defining all elements of the Proposed Development for the purpose of the S36 application.
- Wind Turbine Array – the location of the wind turbines comprising the Proposed Development.
- Access Corridor – the land within the Application Boundary in which the access track connect the Wind Turbine Array with the A83 road.
- Study Area – the area in which the EIA is undertaken, defined for each technical topic as appropriate.

12.2 Assessment Methodology and Significance Criteria

Scope of Assessment

12.2.1 This Chapter considers effects on:

- primary surveillance radars (PSRs) used for air traffic control, air defence and weather forecasting;
- aeronautical radio navigation aids;
- defence facilities;
- obstacle hazards to civil and military aircraft flying at low level; and
- fixed telecommunications links.

12.2.2 This Chapter assesses cumulative effects as arising from the Proposed Development in combination with other operational, consented or in planning developments.

12.2.3 This assessment is based on the Proposed Development as described in **Chapter 2** (EIAR Volume 2).

12.2.4 The scope of this assessment has been informed by consultation responses summarised in **Table 12.1** and the following guidelines/policies:

- Civil Aviation Authority (CAA), Safety Regulation Group, CAP 764: CAA Policy and Guidelines on Wind Turbines;
- CAA, Safety Regulation Group, CAP 670: Air Traffic Services Safety Requirements, Third Issue, Amendment 1/2019, 1 June 2019, Part B, Section 4;
- Scottish Government, Planning Circular 2/2003: Safeguarding of Aerodromes, Technical Sites and Military Explosive Storage Areas: The Town and Country Planning (Safeguarded Aerodromes, Technical Sites and Military Explosive Storage Areas) (Scotland) Direction 2003 (revised edition March 2016);
- CAA, Safety & Airspace Regulation Group, Policy Statement: Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150 m above ground level (agl), 1 June 2017; and
- D F Bacon, 'A proposed method for establishing an exclusion zone around a terrestrial fixed radio link outside of which a wind turbine will cause negligible degradation of the radio link performance', Version 1.1, 28 October 2002.

Consultation

12.2.5 **Table 12.1** summarises the consultation responses received regarding Aviation and Telecommunications and provides information on where and/or how they have been addressed in this assessment.

12.2.6 Full details on the consultation responses can be reviewed in **Technical Appendix 1.1** (EIAR Volume 4).

Table 12.1: Consultation Responses			
Consultee and Date	Scoping / Other Consultation	Consultee Response	Response / Action Taken
Highlands & Islands Airports Ltd (HIAL), 4 March 2021	Scoping	<i>"With reference to the above proposed development, it is confirmed that our calculations show that, at the current given position and height, this development would impact the safeguarding criteria for Campbeltown Airport. It should be noted that HIAL would work with the developer towards a resolution. However, HIAL are likely to object to any proposal which impacts the Instrument Flight Procedures."</i>	Impacts on Campbeltown Airport Instrument Flight Procedures (IFPs) are assessed in this Chapter.
Glasgow Airport, 3 March 2021	Scoping	<i>'The site is located outwith the radar safeguarding and obstacle limitation areas for Glasgow Airport; It is within the instrument flight procedures safeguarding area. It is unlikely that the proposed turbines will have an impact.'</i>	Impacts on Glasgow Airport IFPs are addressed in this Chapter.
Glasgow Prestwick Airport (GPA), 5 March 2021	Scoping	<i>'It is likely that all proposed turbines will be terrain shielded from our primary radars – so Glasgow Prestwick Airport (GPA) Ltd is unlikely to object from any concerns of turbine generated radar display clutter.' 'GPA may also require an assessment to be undertaken by the Developer of the proposed windfarm against our published Instrument Flight Procedures (IFPs)...This will only be undertaken on further discussion with the</i>	Effects on GPA PSRs and IFPs are addressed in this Chapter. GPA will be consulted at planning application stage.

		<i>developer if deemed necessary and appropriate.'</i> <i>'GPA request to be consulted should this proposed development reach formal planning application stage.'</i>	
Defence Infrastructure Organisation, 30 March 2021	Scoping	<i>'subject to the provision of appropriate lighting, the MoD has no concerns in relation to the proposal.'</i>	Ministry of Defence (MoD) approved infra-red lighting will be fitted to all wind turbines.
Argyll & Bute Council, 20 April 2021	Scoping	<i>'The Council is satisfied with [the proposed] approach, and understands that advice will also be sought from relevant consultees in this regard.'</i>	No further action required.
Arqiva, 16 July 2021	Post-scoping	<i>'We have considered whether this development is likely to have an adverse effect on our operations and have concluded that we have no objections to this development.'</i>	No further action required.
Joint Radio Company (JRC), 21 July 2021	Post-scoping	<i>'This proposal cleared with respect to radio link infrastructure operated by the local utility company'</i>	No further action required.
Vodafone, 27 July 2021	Post-scoping	<i>'Vodafone require 100m clearance from tip of any turbine blade to fixed link radio path. The closest turbines are 1 & 2 and look to be at approx 1/2 a KM away so shouldn't cause a problem.'</i>	Potential effects on the Vodafone link are assessed in this Chapter.
Atkins, 31 July 2021	Post-scoping	<i>'The above application has now been examined in relation to UHF [Ultra High Frequency] Radio Scanning Telemetry communications used by our Client in that region and we are happy to inform you that we have NO OBJECTION to your proposal.'</i>	No further action required.
Maritime & Coastguard Agency (MCA), 3 August 2021	Post-scoping	<i>'MCA colleagues and support partners involved in the microwave link installation work between Rhu Stafnish and South Knapdale have reviewed the information that you have provided, and have determined that your proposal, if approved, would not result in any adverse impacts on the MCA microwave link.'</i>	No further action required.

Potential Effects Scoped Out

- 12.2.7 There are no Meteorological Office radars; secondary surveillance radars; aeronautical radio navigation aids; or unlicensed aerodromes, airstrips and gliding sites within the Study Area. Consequently, all of those aviation facilities have been scoped out of further assessment.
- 12.2.8 On the basis of consultation responses, all potential effects on telecommunications other than the Vodafone link referred to in **Table 12.1** have been scoped out this assessment.

Method of Baseline Characterisation

Extent of the Study Area

- 12.2.9 The Study Areas for the aviation assessment were selected using the recommended distances set out in CAA guidance (CAP 764), modified to ensure that all radars with the range to detect wind turbines are included. The distances used are radii from the centre of the Wind Turbine Array, as follows:

- 150 km for air traffic control and air defence PSRs;
- 30 km for Meteorological Office rainfall radars;
- 20 km for secondary surveillance radars and aeronautical radio navigation aids;
- 30 km for licensed, certificated and Government aerodromes;
- 56 km (30 nautical miles) for airport instrument flight procedures; and
- 10 km for unlicensed aerodromes, airstrips and gliding sites.

12.2.10 The determination of the aviation baseline has also been informed by consultation responses from aviation stakeholders.

12.2.11 The Study Area for the telecommunications assessment was a 5 km radius around the Wind Turbine Array. This was selected in order to capture all fixed telecommunications links with the potential to be affected by wind turbines.

Desk Study

12.2.12 The aviation baseline assessment was carried out by consulting the UK Aeronautical Information Publication, the UK Military Aeronautical Information Publication, civil and military aeronautical charts and Aviatica in-house databases of aviation infrastructure and assets.

12.2.13 The telecommunications baseline assessment was carried out by accessing the Ofcom Spectrum Information Portal; carrying out a map search for licensed telecommunications links in the vicinity of the Proposed Development; searching the Ofcom Wireless Telegraphy Register by OS grid reference; and consulting telecommunications operators.

Criteria for the Assessment of Effects

12.2.14 Significance criteria for assessment of impacts on aviation and telecommunications, unlike those for environmental effects, are not based on the sensitivity of the receptor. Further, while magnitude of change can be determined in some circumstances, it typically does not provide a standardised metric on which to measure the significance of any effects. In this context, the significance of effects on aviation and telecommunications has been determined in this chapter by application of professional judgement, underpinned by consideration of the magnitude of change (where measurable), the regulations and procedures in place for ensuring that aviation and telecommunications infrastructure meets required performance standards, the safeguarding policies and practices in use by specific aviation and telecommunications stakeholders, and the consultation responses from those stakeholders.

12.2.15 Residual adverse effects of the Proposed Development on aviation and telecommunications are described as either **None**, **Negligible**, **Minor**, **Moderate** or **Major**. Moderate or Major effects are categorised as **significant**. Effects assessed as None, Negligible or Minor are categorised as **not significant**. The criteria applied to define each of the significance categories in this Chapter are set out in **Table 12.2**.

Significance of Effect	Description
Major	Regular, frequent or permanent effects which require changes to existing operational and/ or technical practice in order to mitigate adequately, or which are not capable of being mitigated adequately.
Moderate	Periodic effects experienced which may require alterations to existing operational practice.
Minor	Occasional effects experienced which do not require any alteration of existing operational and technical practice.
Negligible	Normally no measurable change from baseline conditions; occasional, fleeting or very short term effects experienced which do not require any alteration of existing operational and technical practice.
None	No measurable change from baseline conditions.

Limitations and Assumptions

12.2.16 The aviation and telecommunications baseline described in this Chapter is extant as at March 2023. This assessment assumes that there will be no significant changes to this baseline over the lifetime of the Proposed Development. This is a standard assumption for such assessments and is not considered to undermine its validity.

12.3 Baseline Conditions

Current Baseline

12.3.1 The Proposed Development is located in uncontrolled airspace extending from ground level to Flight Level (FL) 195 (approximately 19,500 feet above sea level). Above that level is Class C controlled airspace under the control of the NATS En Route (NERL) Scottish Area Control Centre at Prestwick. The uncontrolled airspace between ground level and FL 195 over the Wind Turbine Array may be used by any civil or military aircraft without clearance from or radio contact with any air traffic control agency. The users of this lower airspace include military aircraft, including those conducting low flying training, and occasional light civil aircraft.

12.3.2 Baseline review of the Wind Turbine Array identified four PSRs with the potential to be affected:

- NERL Tiree (130 km northwest of the Wind Turbine Array);
- NERL Lowther Hill, South Lanarkshire (115 km east, southeast of the Wind Turbine Array);
- MoD South Cletraval, North Uist (255 km north, northwest of the Wind Turbine Array); and
- QuinetiQ West Freugh, Stranraer (88 km south, southeast of the Wind Turbine Array).

12.3.3 Radar line of sight assessment has determined that wind turbines with blade tip heights of 149.9 m agl will not be within line of sight of the radars at Tiree and South Cletraval due to intervening terrain. The radar at West Freugh has some coverage of the Proposed Development at 149.9 m agl but this radar has an operationally safeguarded range limited to 40 km. Consequently, the Tiree, South Cletraval and West Freugh radars have been scoped out of EIA.

- 12.3.4 There are no aeronautical radio navigation aids within 10 km of the Wind Turbine Array - the statutory consultation zone for such facilities. Those facilities have therefore been scoped out of the EIA.
- 12.3.5 The Wind Turbine Array is not within 30 km of any licensed or certificated aerodrome nor within 10 km of any unlicensed aerodromes or other aviation sites. Instrument flight procedures for Campbelltown Airport pass within 10 km of the Wind Turbine Array. The Wind Turbine Array is also within the safeguarded area for Islay Airport, Glasgow Airport and Prestwick Airport IFPs.
- 12.3.6 The Wind Turbine Array is wholly located in an area classified by the MoD as a "*low priority military low flying area less likely to raise concerns*".
- 12.3.7 Since the proposed wind turbines will have blade tip heights of no more than 149.9 metres agl there will be no requirement for visible spectrum aviation lighting. Infra-red lighting requirements will be determined in consultation with the MoD.
- 12.3.8 The Ofcom Spectrum Information Portal identifies two fixed microwave telecommunications links passing within 1.5 km of the Application Boundary: a Vodafone link from Beinn an Tuirc to South Knapdale, which passes to the west of the Site; and an MCA link from Ru Stafnish to South Knapdale, which passes to the east of the Site. The MCA has confirmed that its link would not be adversely affected; therefore it is not considered further in this Chapter.

Future Baseline

- 12.3.9 Future changes to the structure of and operational rules for use of the airspace in the vicinity of the Site are likely to occur as a result of the CAA's Airspace Modernisation Strategy.
- 12.3.10 Future technical change, which is encompassed by the Airspace Modernisation Strategy, is expected to lead to the withdrawal of PSR for air traffic control purposes. It is also expected that a requirement for all aircraft to carry and operate electronic conspicuity equipment will be introduced. The detail of these possible changes and how they might affect the aviation baseline in the vicinity of the Proposed Development are currently unknown.

12.4 Assessment of Potential Effects

- 12.4.1 This section describes the potential significant effects on aviation and telecommunications which might occur as a result of the Proposed Development.

Potential Construction Effects

Primary Surveillance Radars

- 12.4.2 PSRs used for air traffic control and air defence purposes are designed to process out stationary objects. Since the wind turbine rotors would not be rotating during the construction phase, the effect of the Proposed Development on PSRs would be **None**.

Military Low Flying

- 12.4.3 Tall structures located in military low flying areas may pose an obstacle to low flying military aircraft. This is particularly the case where the structures are located in valleys where military aircraft seek to fly to make use of terrain masking to avoid detection by radar. The Proposed Development is located along an open hillside overlooking the coast in a part of

Low Flying Area (LFA) 16 which is classified by the MoD as "a low priority military low flying area less likely to raise concerns" in relation to wind farm development.

- 12.4.4 The MoD consultation response of 30th March 2021 states that the MoD has no concerns over the Proposed Development. It is concluded from the location of the Proposed Development, the MoD's declared status for the low flying area surrounding the Site and from its consultation response, that the effect of the Proposed Development on military low flying would be **Negligible**.

Instrument Flight Procedures

- 12.4.5 IFPs are designed to permit aircraft to fly without visual reference – in cloud or poor visibility – while maintaining safe vertical clearance from the terrain and obstacles. The Proposed Development is within 30 nautical miles (nm) of the Initial Approach Fixes for the instrument approach procedures (IAPs) for both Campbeltown and Islay Airports. IAPs specify flight paths and minimum altitudes for aircraft to fly to enable them to carry out approaches to land. The specified minimum altitudes are calculated from Minimum Obstacle Clearance standards set out in International Civil Aviation Organisation publications. Where new obstacles are constructed which are higher than existing obstacles in an area near an IAP, the specified minima in the published procedure may need to be revised upwards.
- 12.4.6 An assessment of the potential effects of the Proposed Development on Campbeltown Airport's IAPs has been completed. It found that the Proposed Development would not require any alteration of the current Minimum Safety Altitudes (MSAs) and Terminal Arrival Altitudes (TAAs) for Campbeltown Airport's IAPs and is horizontally clear of all other areas within which the height of obstacles must be assessed for their effects on Campbeltown Airport's IAPs. Therefore, the effect of the Proposed Development on Campbeltown Airport IFPs will be **None**.
- 12.4.7 The potential effects of the Proposed Development on the IAPs for Islay Airport have also been assessed. This found that the Proposed Development would require the south eastern quadrant MSA for Islay Airport and the 10 nm radius TAA for RNP approaches to runway 31 at Islay via GITVI to be raised from 2600 ft to 2700 ft. This is an effect of **Major** significance.
- 12.4.8 Potential effects on Glasgow Airport IFPs have been considered. The Proposed Development is within 56 km of the Glasgow Airport Standard Instrument Departure (SID) termination points at ROBBO, NORBO and TRN and part of the BLACA 1G Standard Terminal Arrival Route (STAR). No part of any of Glasgow's instrument approach procedures (IAPs) will be within 56 km of the Proposed Development. The maximum height of the Proposed Development will be 1630 ft above sea level; terrain on the island of Arran extends to a maximum height of 2868ft above sea level and is significantly closer to Glasgow's IFPs than the Proposed Development. It is concluded that the effect on Glasgow Airport IFPs will be **None**.
- 12.4.9 Potential effects on Prestwick Airport IFPs have been considered. The Proposed Development is within 56 km of Prestwick Airport SIDs from runway 30; STARs and Approach Transitions via TRN; and IAPs to runway 12. However the maximum height of the Proposed Development will be 1630 ft above sea level; terrain on the island of Arran extends to a maximum height of 2868 ft above sea level and is significantly closer to Prestwick's IFPs than the Proposed Development. It is concluded that the effect on Prestwick Airport IFPs will be **None**.

Vodafone Microwave Link

- 12.4.10 Any structures that infringe a specified zone around a fixed telecommunications link can degrade the performance of the link. Modelling of the Vodafone microwave link has determined that the blade tips of the closest turbine, T2, would be a minimum of 464 m from the path of the link. Since this is well in excess of the 100m clearance requested by Vodafone the effect would be **Negligible**.

Potential Operational Effects

Primary Surveillance Radars

- 12.4.11 The rotating blades of wind turbines can generate unwanted returns on PSR displays and may also reduce the sensitivity of the radar in the airspace overhead the Proposed Development. Modelling of the line of sight from the NATS Lowther Hill PSR determined that, while the radar has line of sight at 149.9 m agl above the summit area of Beinn an Tuirc, it has no line of sight to any of the wind turbines of the Proposed Development. The effect on the Lowther Hill PSR would therefore be **None**.

Military Low Flying

- 12.4.12 The potential effects on military low flying during the operational phase of the Proposed Development would be the same as during the construction phase and as such the effect would be **Negligible**.

Instrument Flight Procedures

- 12.4.13 The potential effects on IFPs during the operational phase of the Proposed Development would be the same as during the construction phase and as such the effects on Campbeltown Airport, Glasgow Airport and Prestwick Airport IFPs would be **None** and the effects on Islay Airport IFPs would be **Major**.

Vodafone Microwave Link

- 12.4.14 The potential effects on fixed telecommunications links during the operational phase of the Proposed Development would be the same as during the construction phase. As such the effect would be **None**.

Potential Decommissioning Effects

- 12.4.15 The potential effects of the Proposed Development on aviation and telecommunications during the decommissioning phase would be the same as during the construction phase.

Potential Cumulative Construction Effects

Primary Surveillance Radars

- 12.4.16 The wind turbine rotors would not be turning during the construction phase and the Proposed Development would in any case not be visible to any PSRs. Therefore the cumulative construction effects on PSRs are **None**.

Military Low Flying

- 12.4.17 Existing and consented wind farms within 8 km of the Proposed Development were considered in assessing the potential cumulative impact of the Proposed Development on military low flying. This was to ensure that all developments are captured where aircraft

carrying out avoidance manoeuvres around one wind farm might then be forced to avoid another wind farm. The developments considered in this cumulative assessment are:

- Beinn an Tuirc;
- Beinn an Tuirc Extension;
- Beinn an Tuirc 3;
- Auchadaduie;
- Blary Hill;
- Deucheran Hill; and
- Clachaig Glen.

12.4.18 The Proposed Development and the existing and consented wind farms in the area are all located on high ground above and horizontally separated from the coastal areas and main valleys through the area where the bulk of military low flying takes place. These developments are unlikely to have a cumulative impact on military low flying since they would not impinge on the normal low flying routes through the area. It is concluded from the above assessment that the cumulative effect of the Proposed Development on military low flying is **Minor**.

Instrument Flight Procedures

12.4.19 There are no other existing or consented wind farms in the area that would have effects on the Islay Airport IFPs. Consequently the cumulative effects on Islay Airport IFPs are the same as the stand-alone effect i.e. **Major**.

Vodafone Microwave Link

12.4.20 The Vodafone microwave link would not be affected by other wind farms in the area and has been assessed as having no effects from the Proposed Development. Therefore the cumulative construction effects on this microwave link are **None**.

Potential Cumulative Operational Effects

Primary Surveillance Radars

12.4.21 The Proposed Development would not be within line of sight of any PSR and would have no stand-alone effects on such facilities. Consequently it can have no cumulative operational effects on the Lowther Hill or any other PSR.

Military Low Flying

12.4.22 The cumulative operational effects of the Proposed Development on military low flying would be the same as in the construction phase because any effects on low flying are driven by the existence of tall structures, not whether they have rotating wind turbine blades. As such the effect would be **Minor**.

Instrument Flight Procedures

12.4.23 The cumulative operational effects of the Proposed Development on IFPs would be the same as in the construction phase because any effects on low flying are driven by the existence of tall structures, not whether they have rotating wind turbine blades. As such the effect on Islay IFPs would be **Major**.

Vodafone Microwave Link

- 12.4.24 The cumulative operational effects of the Proposed Development on the Airwave microwave link are the same as in the construction phase and as such the effect would be **None**.

12.5 Mitigation

- 12.5.1 While there would be no significant effects of the Proposed Development on military low flying, it is standard practice for the MoD to request a planning condition requiring the notification to the MoD of the positions and heights of all wind turbines in a development prior to the start of construction in order to ensure that all new obstacles are marked on aeronautical charts. Similarly, a planning condition will require the wind turbines to be fitted with infra-red lighting to assist military aircrew carrying out low flying at night to visually acquire and avoid the wind turbines. The Applicant fully supports this position.
- 12.5.2 The construction of the Proposed Development is required by law to be notified to the MoD and the Civil Aviation Authority (CAA) prior to the start of construction, in accordance with Article 225A of the ANO¹. This would ensure that the Proposed Development is marked on aeronautical charts and electronic aviation obstacle databases to enable aircrew to avoid the wind turbines.
- 12.5.3 No mitigation would be required for effects on PSRs or telecommunications links as there are no significant effects on these receptors as a result of the construction, operation and decommissioning of the Proposed Development.
- 12.5.4 The effects of the Proposed Development on Islay Airport IFPs would be mitigated by revision of the relevant IFP charts by HIAL's Approved Procedure Design Organisation (APDO) and their approval by the CAA.

12.6 Assessment of Residual Effects

Residual Construction Effects

- 12.6.1 During the construction phase, the residual effects on PSRs will be **None**.
- 12.6.2 During the construction phase, the residual effects on military low flying will be **Negligible** as a result of depiction of the Proposed Development on low flying charts and provision of infra-red lighting.
- 12.6.3 During the construction phase, the residual effects on Islay Airport IFPs will be **Minor** following the upward revision of the affected procedure minima.
- 12.6.4 During the construction phase, the residual effects on telecommunications will be **Negligible**.

Residual Operational Effects

- 12.6.5 The residual effects of the Proposed Development on aviation and telecommunications in the operational phase will be the same as in the construction phase.

¹ UK Government (2016). The Air Navigation Order 2016. Statutory Instrument 2016 No.765. Online. Available at: <https://publicapps.caa.co.uk/docs/33/Law%202016-765%2003%20Feb%202022%20Version.pdf>

Residual Decommissioning Effects

12.6.6 The residual effects of the Proposed Development on aviation and telecommunications in the decommissioning phase will be the same as in the construction and operational phases.

Residual Cumulative Construction Effects

12.6.7 The residual cumulative construction effects of the Proposed Development will be the same as those of the stand-alone development.

Residual Cumulative Operational Effects

12.6.8 The residual cumulative operational effects of the Proposed Development will be the same as those of the stand-alone development.

12.7 Summary

12.7.1 **Table 12.3** provides a summary of the potential significant effect in relation to aviation and telecommunications.

Table 12.3: Summary of Potential Significant Effects of the Proposed Development			
Potential Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/Residual Effect
Construction, Operation and Decommissioning			
Breaching of current minimum altitudes specified in Islay Airport IFPs	Procedure charts to be revised	Chart revision design by HIAL APDO; submission to CAA for approval	Not Significant

13 Forestry

13.1 Introduction

13.1.1 This Chapter considers the potential implications of the Proposed Development on the woodland resource within the Application Boundary and its long-term management. This Chapter was prepared by DGA Forestry LLP.

13.1.2 This Chapter uses the below terminology throughout:

- Proposed Development – All elements of the West Torrisdale Wind Farm development for which S36 consent and deemed planning permission are sought.
- Application Boundary – The red line boundary defining all elements of the Proposed Development for the purpose of the S36 application.
- Wind Turbine Array – the location of the wind turbines comprising the Proposed Development.
- Access Corridor – the land within the Application Boundary in which the access track connect the Wind Turbine Array with the A83 road.
- Study Area – the area in which the EIA is undertaken, defined for each technical topic as appropriate.

13.1.3 Forestry is not being regarded as a receptor for EIA purposes. Commercial forests are a dynamic environment and their structure continually undergoes change due to:

- normal felling and restocking by the landowner;
- natural events, such as storm damage, pests or diseases; and
- external factors, such as a wind farms or other development.

13.1.4 This Chapter therefore describes:

- the plans as a result of the Proposed Development for felling, restocking and forest management practices;
- the process by which these were derived; and
- the changes to the physical structure of the forestry within the Application Boundary.

13.1.5 It further discusses the issue of forestry waste arising from the Proposed Development. The forestry proposals are interrelated with environmental effects, which are assessed separately in other chapters of the EIAR. This chapter should therefore be read in conjunction with other chapters of EIAR Volume 2, notably: **Chapter 3; Chapter 4; Chapter 6; Chapter 7; Chapter 8;** and **Chapter 9** as they are interrelated to the proposed changes in the forest structure.

13.1.6 The responsibility for the management of the remainder of the forest outwith the Application Boundary lies with the landowners and therefore the wider felling operations, restocking, and aftercare operations within these areas do not form part of the Proposed Development for which consent is sought.

13.1.7 The majority of the proposed wind turbines and associated infrastructure of the Proposed Development are located within existing commercial forestry plantations (as shown on **Figure 13.1** (EIAR Volume 3a)) with areas of open hill to the west. These woodlands are privately owned and managed. The forestry proposals for the Proposed Development have been developed to:

- Identify areas of forest to be removed for the construction and operation of the Proposed Development;
- Identify those areas which may or may not be replanted as part of the Proposed Development; and
- Propose management practices for the forestry works required by the Proposed Development.

13.1.8 In general, throughout this Chapter, data labelled 'baseline' refer to the current crop composition and any existing plans without any modification as a result of the Proposed Development. Data labelled 'wind farm' or 'Proposed Development' refer to the forestry plans incorporating the Proposed Development.

13.1.9 This Chapter is structured as follows:

- Consultation;
- Legislation, Policy and Guidance;
- Forestry Study Area;
- Forest Plans;
- Development of the Wind Farm Forest Plan;
- Baseline Conditions;
- Wind Farm Forest Plan;
- Separate Access Requirements;
- Requirement for Compensatory Planting;
- Forestry Waste;
- Forestry Management Practices; and
- Summary.

13.1.10 This Chapter is supported by the following figures in EIAR Volume 3a:

- **Figure 13.1: Forestry Study Area;**
- **Figure 13.2: Baseline Age Class Composition;**
- **Figure 13.3: Baseline Species Composition;**
- **Figure 13.4: Baseline Felling Plan;**
- **Figure 13.5: Baseline Restocking Plan;**
- **Figure 13.6: Development Advanced Felling;**
- **Figure 13.7: Development Felling Plan;**
- **Figure 13.8: Development Restocking Plan;** and
- **Figure 13.9: Development Access Felling/Restocking Plan.**

13.1.11 Figures are referenced in the text where relevant.

13.2 Consultation

13.2.1 **Table 13.1** summarises the consultation responses received regarding Forestry and provides information on where and/or how they have been addressed in this Chapter.

13.2.2 Full details on the consultation responses can be reviewed in **Technical Appendix 1.1** (EIAR Volume 4).

Consultee and Date	Scoping / Other Consultation	Issue Raised	Response / Action Taken
Scottish Forestry	Scoping Response	Felling – Reduce scale of felling to facilitate development	Infrastructure will be keyholed into the crop where possible
		Reporting – EIA Report should include a stand-alone chapter on Forestry detailing out the baseline conditions, areas of felling, requirement for compensatory planting and restocking proposals	This Chapter and associated figures detail all the items requested by Scottish Forestry.
Transport Scotland	Scoping Response	Number of loads required for timber removal to be included in assessment	Detailed in Chapter 10 (EIAR Volume 2).

13.3 Legislation, Policy and Guidance

13.3.1 Relevant overarching planning policies for the Proposed Development are detailed within the Planning Statement that accompanies the Application. A desktop study was undertaken drawing upon published National, Regional and Local level publications, assessments and guidance to establish the broad planning and forestry context within which the Proposed Development is located.

13.3.2 Forestry related policies and documents listed below have been considered within this Chapter.

Forestry and Land Management (Scotland) Act, 2018

13.3.3 Until 1st April 2019, the Scottish Ministers owned the National Forest Estate (NFE), provided funding and had responsibility for forestry strategy and policy, but the management of the NFE and delivery of forestry functions had been the responsibility of the Forestry Commissioners.

13.3.4 The Forestry Commission was a cross-border public authority and a United Kingdom (UK) non-ministerial department with a statutory Board of Commissioners. The Commission was made up of a number of parts, including in Scotland:

- Forest Enterprise Scotland (FES), which carried out forestry operations and managed the NFE on Scottish Ministers' behalf; and
- Forestry Commission Scotland (FCS), which was responsible for the other forestry functions in Scotland.

13.3.5 When full devolution of forestry to the Scottish Government was completed on 1st April 2019, FCS and FES became two new agencies of the Scottish Government:

- Scottish Forestry (SF), responsible for regulatory, policy and support functions; and
- Forestry and Land Scotland (FLS), responsible for the management of the NFE and any other land managed for the purposes of the Forestry and Land Management (Scotland) Act 2018.

- 13.3.6 Forestry practices in Scotland are controlled under the Forestry and Land Management (Scotland) Act 2018¹ and its associated Regulations introduced on 1st April 2019.
- 13.3.7 Anyone wishing to fell trees in Scotland requires a Felling Permission issued by SF, unless an exemption applies or another form of felling approval such as a felling licence (including a forest plan) has previously been issued.
- 13.3.8 Under the 2019 Regulations, felling which is authorised by planning permission consent continues to be exempt from the Regulations and does not require a Felling Permission issued by SF.

Scotland's Forestry Strategy, 2019 - 2029

- 13.3.9 Scotland's Forestry Strategy 2019 – 2029 (SFS) ², was published in 2019 after a consultation period. The Strategy provides an overview of contemporary Scottish forestry; presents the Scottish Government's 50-year vision for Scotland's forests and woodlands; and sets out a 10-year framework for action.
- 13.3.10 The vision is that "...in 2070, Scotland will have more forests and woodlands, sustainably managed and better integrated with other land uses. These will provide a more resilient, adaptable resource, with greater natural capital value, that supports a strong economy, a thriving environment, and healthy and flourishing communities."
- 13.3.11 It lists a number of objectives summarised below:
- Increase the contribution of forests and woodlands to Scotland's sustainable and inclusive economic growth;
 - Improve the resilience of Scotland's forests and woodlands and increase their contribution to a healthy and high quality environment; and
 - Increase the use of Scotland's forest and woodland resources to enable more people to improve their health, well-being and life chances.
- 13.3.12 It further describes the priorities as:
- Ensuring forests and woodlands are sustainably managed;
 - Expanding the area of forests and woodlands, recognising wider land-use objectives;
 - Improving efficiency and productivity, and developing markets;
 - Increasing the adaptability and resilience of forests and woodlands;
 - Enhancing the environmental benefits provided by forests and woodlands; and
 - Engaging more people, communities and businesses in the creation, management and use of forests and woodlands.
- 13.3.13 There are ambitious targets included within the SFS for new woodland creation:
- 10,000 hectares (ha) per year in 2018;
 - 12,000 ha per year from 2020/21;
 - 14,000 ha per year from 2022/23; and
 - 15,000 ha per year from 2024/25.
- 13.3.14 The stated objective is to increase Scotland's woodland cover from the current 18.5% to 21% by 2032.

¹ The Scottish Government (2018). The Forestry and Land Management (Scotland) Act 2018, Edinburgh. Available at <http://www.legislation.gov.uk/asp/2018/8/contents/enacted> [accessed on 15.04.19].

² The Scottish Government (2019). Scotland's Forestry Strategy 2019 -2029, Edinburgh

Scotland's Third Land Use Strategy, 2021 - 2026

13.3.15 Scotland's Third Land Use Strategy 2021 – 2026³ stresses the importance of forestry in the balancing the demands on land use in Scotland and its transition to a net zero economy. It states: "...there will need to be a significant land use change from current uses to forestry and peatland restoration." This will involve rapidly increasing the pace of woodland and forest creation. To support this, the SFS emphasises the continued protection of Scotland's forest resource.

National Planning Framework 4, 2023

13.3.16 The Scottish Ministers adopted and published National Planning Framework 4 (NPF4)⁴ on 13 February 2023. NPF4 continues the theme of seeking to expand Scotland's woodland resource and the most relevant policy is Policy 6 'Forestry, Woodland and Trees', the intent of which is to "*protect and expand forests, woodland and trees*". It states that development proposals involving woodland removal will only be supported where they will achieve significant and clearly defined additional public benefits in accordance with relevant Scottish Government policy on woodland removal and, where woodland is removed, compensatory planting will most likely be expected to be delivered.

13.3.17 It further states that development proposals on sites which include an area of existing woodland or land identified in the relevant Forestry and Woodland Strategy as being suitable for woodland creation will only be supported where the enhancement and improvement of woodlands and the planting of new trees on the site (in accordance with the Forestry and Woodland Strategy) are integrated into the design.

Scottish Planning Policy, 2014

13.3.18 The Scottish Planning Policy (SPP)⁵ includes a section on woodlands (SPP Paragraphs 216 - 218). This refers to the Scottish Government's Control of Woodland Removal Policy (Forestry Commission Scotland, 2009) which is discussed in more detail below. The SPP states that woodland removal should only be permitted where it would achieve significant and clearly defined additional public benefits. It further states that where woodland is removed in association with development proposals, developers will generally be expected to provide compensatory planting and that the acceptability of woodland removal, in the context of the Control of Woodland Removal Policy, should be taken into account in determining applications.

Right Tree in the Right Place, 2010

13.3.19 'Right Tree in the Right Place - Planning for Forestry & Woodlands' 2010⁶ sets out detailed guidance to planning authorities when considering development proposals involving forestry and woodland. It advises that planning authorities should:

- Assess the current and likely future public benefits (social, economic and environmental) deriving from the existing woodland;

³ Scottish Government (2021): Scotland's Third Land Use Strategy 2021 - 2026 <https://www.gov.scot/publications/scotlands-third-land-use-strategy-2021-2026-getting-best-land/> [accessed 10/03/2021]

⁴ The Scottish Government (2023): National Planning Framework 4, Edinburgh

⁵ The Scottish Planning Policy (2014): Scottish Planning Policy, Edinburgh

⁶ Forestry Commission Scotland (2010): Right Tree in the Right Place - Planning for Forestry & Woodlands. Forestry Commission, Edinburgh

- Determine whether the development should be modified or the woodland redesigned to avoid or reduce woodland loss (e.g. by accommodating new development within 'open space' within woodlands);
- Where woodland loss cannot be avoided, assess the public benefit of the proposed development to see if it would justify the loss of the woodland;
- Consider whether any loss of woodland should be mitigated by compensatory planting; and
- Consider whether any felling consent needs to specify the timing of forestry operations to avoid disturbance to wildlife present on the Site.

13.3.20 If an authority decides that a development proposal involving woodland loss should receive planning permission, it should specify the precise area of felling permitted and ensure that planning conditions and/or agreements would ensure the provision of any compensatory planting which is required.

Control of Woodland Removal Policy, 2009

13.3.21 In parallel with the SFS and other national policies on woodland expansion, there is a strong presumption against permanent deforestation unless it addresses other environmental concerns. In Scotland, such deforestation is dealt with under the Scottish Government's 'Control of Woodland Removal Policy' 2009⁷. The guidance relating to the implementation of the policy was revised and updated in 2019⁸.

13.3.22 The purpose of the policy is to provide direction for decisions on woodland removal in Scotland. The policy document lays out the background to the policy, places it into the current policy and regulatory context, and discusses the principles, criteria and process for managing the policy implementation. The following paragraphs summarise the policy relevant to the Proposed Development.

13.3.23 The principal aims of the policy include:

- To provide a strategic framework for appropriate woodland removal; and
- To support climate change mitigation and adaptation in Scotland.

13.3.24 The guiding principles behind the policy include:

- There is a strong presumption in favour of protecting Scotland's woodland resources; and
- Woodland removal should be allowed only where it would achieve significant and clearly defined additional public benefits. In appropriate cases, a proposal for compensatory planting may form part of this balance.

13.3.25 Woodland removal, without a requirement for compensatory planting, is most likely to be appropriate where it would contribute significantly to:

- Enhancing priority habitats and their connectivity;
- Enhancing populations of priority species;
- Enhancing nationally important landscapes, designated historic environments and geological Sites of Special Scientific Interest (SSSI);
- Improving conservation of water or soil resources; or

⁷ Forestry Commission Scotland (2009). The Scottish Government's Policy on Control of Woodland Removal. Edinburgh

⁸ Forestry Commission Scotland (2019): Scottish Government's policy on control of woodland removal: implementation guidance. Available at <https://forestry.gov.scot/publications/349-scottish-government-s-policy-on-control-of-woodland-removal-implementation-guidance>

- Public safety.
- 13.3.26 Woodland removal, with compensatory planting, is most likely to be appropriate where it would contribute significantly to:
- Helping Scotland mitigate and adapt to climate change;
 - Enhancing sustainable economic growth or rural/community development;
 - Supporting Scotland as a tourist destination;
 - Encouraging recreational activities and public enjoyment of the outdoor environment;
 - Reducing natural threats to forests or other land; or
 - Increasing the social, economic or environmental quality of Scotland's woodland cover.
- 13.3.27 The consequences of the policy are stated as:
- Minimising the inappropriate loss of woodland cover in Scotland;
 - Enabling appropriate woodland removal to proceed with no net loss of woodland - related public benefits other than in those circumstances detailed in the policy; and
 - Facilitating achievement of the Scottish Government's woodland expansion ambition in a way that integrates with other policy drivers (such as increasing sustainable economic growth, tackling climate change, rural/community development, renewable energy and biodiversity objectives).
- 13.3.28 Addressing the policy requirements can be met through changes to forest design, increasing designed open space, changing the woodland type, changing the management intensity, or completing off site compensation planting.

Argyll and Bute Woodland and Forestry Strategy, 2011

- 13.3.29 The Argyll and Bute Woodland and Forestry Strategy ⁹ was published in 2011. The vision for the strategy was defined as:
- "The woodlands of Argyll and Bute will make a significant contribution to climate change mitigation and adaptation, have significant levels of economic value retained locally, enhance biodiversity and environmental quality and support the further development of recreation opportunities, for the benefit and well-being of local people and visitors alike. Sustainable and responsible stewardship of the resource will enable communities to play an active role in the ownership and management of woodlands in their area, developing business opportunities and helping to maintain the viability of rural living."*
- 13.3.30 The Strategy was developed as statutory supplementary planning guidance which will be adopted as part of the Argyll and Bute Local Development Plan¹⁰. The Strategy integrates with other local strategies and action plans, including the Council's Core Path Plan¹¹, Economic Development Action Plan¹² and the Argyll and Bute Renewable Energy Action Plan Strategy¹³. It will primarily be used to guide woodland expansion within the region.

⁹ Argyll and Bute Council and Forestry Commission Scotland (2011) The Argyll and Bute Council Woodland and Forestry Strategy [Online] Available at: <https://www.argyll-bute.gov.uk/woodland> (Accessed 04/03/2022)

¹⁰ Argyll and Bute Council (2015) Argyll and Bute Local Development Plan [Online] Available at: <https://www.argyll-bute.gov.uk/ldp> (Accessed 04/03/2022)

¹¹ Argyll and Bute Council (2011) Core Path Plan: Formalised Draft [Online] Available at: <https://www.argyll-bute.gov.uk/core-paths> (Accessed 04/03/2022)

¹² Argyll and Bute Council (2010) Argyll and Bute Council's Economic Development Action Plan [Online] Available at: <https://www.argyll-bute.gov.uk/business-and-trade/economic-development-action-plan#:~:text=Argyll%20and%20Bute%20Council%20has,and%20Scotland%20as%20a%20whole> (Accessed 04/03/2022)

¹³ Argyll and Bute Council (2010) Argyll and Bute Renewable Energy Action Plan Strategy [Online] Available at: <https://www.argyll-bute.gov.uk/planning-and-environment/renewable-energy-action-plan#:~:text=Our%20vision%20is%3A,of%20its%20communities%20and%20Scotland.%E2%80%9D> (Accessed 04/03/2022)

- 13.3.31 The Strategy is based on the following seven themes:
- Climate change;
 - Timber;
 - Business development;
 - Community development;
 - Access and health;
 - Environmental quality; and
 - Biodiversity.
- 13.3.32 Strategic priorities have been defined for each of the above themes which are translated into detailed priority actions.
- 13.3.33 Section 3.6 of the Strategy states that the net area of forest cover within the region is forecast to decrease due to forest restructuring as part of existing approved Forest Plans. The loss of woodland area is estimated at 7 - 8 %, equivalent to the removal of 15,000 ha of woodland. In Section 3.7, the Strategy refers to further woodland loss having arisen in recent years as a result of wind farm development in afforested areas and refers to the Scottish Government's Control of Woodland Removal Policy.
- 13.3.34 It noted that further wind energy development within the National Forest Estate may result in further woodland removal. Given the importance of maintaining and expanding total woodland cover, and in the light of the Control of Woodland Removal Policy, the Strategy states that any loss of woodland will require compensatory planting.
- 13.3.35 Where new wind farm development is proposed (particularly if woodland removal is required), the Strategy proposes that native woodland creation and habitat enhancement programmes could be delivered, at least in part, through developer contributions. Similarly, where important sites for timber production are likely to be lost or reduced in size in this way, appropriate provision for replanting should be secured to safeguard future timber resources.
- 13.3.36 Under the theme of Climate Change a key Strategic Priority is stated as:
"CC1: Encourage the net expansion of woodland cover in Argyll and Bute in order to further contribute to national targets for carbon sequestration."
- 13.3.37 Priority Actions to support this include:
*"CC1.1: Ensure that forest restructuring results in no net loss of woodland.
CC1.2: Ensure that woodland removal associated with developments such as windfarms is compensated for at a ratio of at least 1:1 in terms of area and quality of woodland."*
- 13.3.38 The Strategy therefore supports and reinforces the aims of the Scottish Government's Control of Woodland Removal Policy.

13.4 Forestry Study Area

- 13.4.1 The Forestry Study Area (FSA), as shown on **Figure 13.1** (EIAR Volume 3a), extends to approximately 202.7 ha and comprises of privately owned and managed woodlands in West Torrisdale Forest. These woodlands were previously covered by a Forest Plan, reference: 4882900. This Forest Plan expired in 2023 and is in the process of being renewed by the landowner. It is expected that this plan will be approved prior to consent being granted for the Proposed Development. It has therefore been decided to use the new plan for this

assessment. A further 11.5 ha of woodland in Guesdale Forest that fall within the Access Corridor are also included for analysis. These woodlands are on the National Forest Estate and are managed by Forestry and Land Scotland. They form part of the Lussa Land Management Plan which runs until 2027.

- 13.4.2 The forests contain a limited range of woodland types due to the original planting programme together with areas of unplanted land and open ground. The crops are comprised largely of commercial conifers with small areas of both mixed conifers and mixed broadleaves and open ground. The woodlands are currently within the felling and restocking phase. Further information on the composition of the woodlands in the FSA is provided in the baseline description below.

Forest Plan

- 13.4.3 One of the original key objectives of the Forestry Commission was forest expansion, in both state and private forests, to produce a strategic reserve of timber, and consequently, a limited range of species was planted. More recently, greater emphasis has been placed on developing multi-purpose forests, which require a restructuring of age and species in existing woodlands. Restructuring is achieved through the forest planning process.
- 13.4.4 A Forest Plan relates to individual forests or groups of woodlands. It describes the woodlands, places them in context with the surrounding area, and identifies issues that are relevant to the woodland or forest. Forest Plans describe how the long-term strategy would meet the management objectives of the owner, the criteria of the UK 'Forestry Standard' (UKFS)¹⁴ and the UK 'Woodland Assurance Standard 4th Edition' (UKWAS)¹⁵, under which the woodlands would be managed if certificated.
- 13.4.5 The development of a Forest Plan involves a scoping exercise whereby the views of Statutory Consultees, neighbours and stakeholders are sought, resulting in an agreed Scoping Report. The results of the scoping exercise are incorporated into the Forest Plan. A Forest Plan covers social and environment aspects, such as conservation, archaeology, landscape and the local community, in addition to forestry and silvicultural considerations.
- 13.4.6 Restructuring of age class and species are important factors in this process to ensure proposals meet the current standards. A Wind Farm Forest Plan is prepared along the same principles with the relevant information being provided by other members of the project team. A baseline Forest Plan (without wind farm) will typically contain felling and restocking proposals covering a 10 year period in detail, with outline proposals for the remainder of the forest.
- 13.4.7 Restructuring presents forest managers with many challenges and opportunities, particularly in relation to the management of potential catastrophic windblow due to storm damage. The forest planning process allows forest managers to review and revise proposals in a structured way to take account of such external factors. The inclusion of a wind farm within the forest is an example of one such external factor.
- 13.4.8 The current guidelines require diversification of species and woodland types as part of the forest planning process, specifically an increase in the proportion of broadleaf woodland, other conifers, and open ground. The incorporation of the Proposed Development into the forest would result in further restructuring of the forest.

¹⁴ Forestry Commission (2017). The UK Forestry Standard: The Government's Approach to Sustainable Forestry, Forestry Commission, Edinburgh

¹⁵ UKWAS (2018). The UK Woodland Assurance Standard Fourth Edition, UKWAS, Edinburgh.

13.5 Development of a Wind Farm Forest Plan

Introduction

- 13.5.1 This Section describes the process by which a typical Wind Farm Forest Plan is prepared. Existing crop information is collated from the landowner including current forestry information on species, planting year and felling and restocking plans where available. This is followed by field surveys, in this case instance undertaken in 2021, and further desk-based assessment as necessary.
- 13.5.2 Details of wind turbine locations, new tracks, storage compounds, borrow pits, substation compound and other infrastructure are provided by other disciplines within the project team. This data are then amalgamated with the forestry data to develop the forestry proposals for a development.
- 13.5.3 The location of wind turbines and infrastructure is heavily influenced by environmental constraints and technical considerations (e.g. sensitive habitats, wind resource capture, ground conditions, etc). The final location of wind turbines and infrastructure takes the various site constraints into consideration. Land management requirements associated with the construction of a proposed development are also be incorporated into the forestry proposals, where appropriate.
- 13.5.4 Within forests and woodlands, areas of crop may require to be felled to accommodate the construction and operation of a proposed development. The felling programme for a proposed development would largely be driven by technical constraints relating to both forestry and development.
- 13.5.5 In this case, taking into account the ecological constraints as mentioned in **Chapter 6** (EIAR Volume 2), a 3.1 ha (100 metre (m) radius) 'keyhole' was adopted around wind turbines. These keyholes are areas that require to be felled for construction, operation and environmental mitigation.
- 13.5.6 A 10 m buffer has been applied around each other item of temporary and permanent infrastructure, in addition to the area required for the infrastructure. An indicative 30 m corridor has been applied to all new access tracks and upgraded existing tracks to be used for wind turbine delivery and construction purposes. This would be reviewed at the detailed design stage post consent and prior to construction.

Wind Farm Felling Plan

- 13.5.7 Felling required for the Proposed Development can be divided into two categories:
- Firstly, that required during the construction phase of the Proposed Development, which for the purposes of this assessment, has been anticipated as commencing in 2026; and
 - Secondly, felling required during the operational period of the Proposed Development. In this case there is no felling required outwith that required for the construction phase.
- 13.5.8 The crops were assessed to identify those areas which would require to be felled for a number of reasons as described above. Due to the crop growth rates and current crop height, it has been assessed that the infrastructure within woodland areas would require a combination of keyholing into younger crops and in the mature crops, clear felling of entire coupes back to either a wind firm edge or management boundaries. Where entire coupes are to be felled, the infrastructure would be incorporated into the Wind Farm Species Restocking Plan as described below.

- 13.5.9 Additional minor felling would be required for forest management purposes, for example, to reduce the risk of subsequent windblow; to reduce coupe isolation and fragmentation; and to ensure access for future forest operations.
- 13.5.10 The resultant Wind Farm Felling Plan shows which woodlands within the FSA would be felled as a result of the Proposed Development and when this felling would take place.

Wind Farm Species Restocking Plan

- 13.5.11 The Wind Farm Species Restocking Plan shows which woodlands would be restocked and with which species. The majority of the areas to be felled for the Proposed Development would be restocked except for the areas detailed below:
- Land required for permanent infrastructure subject to the buffer zones described above; and
 - Land to be left unplanted for forest management or forest design purposes.
- 13.5.12 It has been assumed that, where possible, some temporary infrastructure such as edges of re-profiled borrow pits would be re-instated and available for restocking post construction. To ensure that the forestry establishes successfully, the soil should be restored to a depth of 1 m.
- 13.5.13 In preparing the Wind Farm Species Restocking Plan, a number of points were considered as detailed below:
- Fragmentation of coupes to be minimised as much as possible;
 - Coupe shapes would be modified to ensure that access for future forestry operations, principally harvesting, is maintained; and
 - Coupe shapes and edges would be modified to follow good practice.
- 13.5.14 Species composition was considered taking into account the Proposed Development operational requirements such as separation distances between wind turbines and forest edges, landowner objectives and forestry policies.
- 13.5.15 The wind farm forestry felling and restocking proposals have been assessed by each of the separate environmental disciplines as part of the EIA process where required, and the effects are reported in individual chapters of this EIA Report and their supporting appendices.

13.6 Baseline Conditions

Baseline Planting Year/Age Class Structure

- 13.6.1 Many woodlands established in the mid to late 1900's, were planted in large contiguous blocks, often over a limited number of years and with a limited range of species. Such woodlands develop poor structural diversity, especially on upland sites. Restructuring the age class and species of such forests is desirable and would yield both forest management and environmental benefits.
- 13.6.2 The woodlands within the FSA have just started going through restructuring by felling and restocking and as a result the structural diversity of the woodlands is starting to evolve. Their age class is detailed below in **Table 13.2** and shown in **Figure 13.2** (EIAR Volume 3a).

Age (Yrs)	Area (ha)	Area (%)
n/a	50.3	25
3	13.1	6
7	19.9	10
39	119.4	59
Totals	202.7	100

- 13.6.3 The current guidelines contained within the UKFS are that in forests characterised by a lack of diversity due to extensive areas of even-aged trees, stands adjoining felled areas should be retained until the restocking of the first coupe has reached a minimum height of 2 m. For planning purposes, this is likely to be between 5 and 15 years depending on establishment success and growth rates. It is recognised that in large even-aged plantations, especially in the uplands, restructuring age class structure to meet this target may take more than one rotation.

Species Composition

- 13.6.4 The current baseline species composition of the woodlands within the FSA is shown in **Figure 13.3** (EIAR Volume 3a) and illustrated in **Table 13.3**.
- 13.6.5 Please note there may be minor discrepancies in the totals within the tables contained in this Chapter. This is due to rounding of the individual values for the different parameters in the database.

Species	Area (ha)	Area (%)
Felled awaiting restock	21.2	10
Mixed conifer	2.6	1
Native broadleaves	3.5	2
Open ground	29.1	14
Sitka spruce	145.6	72
Sitka spruce/Larch	0.6	0
Totals	202.7	100

- 13.6.6 The main species are commercial conifers, principally Sitka spruce, which in pure or mixed stands, accounts for approximately 72 % of the total FSA. Other conifers account for 1% of the FSA and broadleaf woodland 2 %. Open ground accounts for approximately 14 %.
- 13.6.7 The species composition reflects the practice and guidance which prevailed at the time the woodlands were established. Restructuring as part of a long-term forest plan would aim to introduce an increased proportion of broadleaves and other conifers into the woodland composition.

Baseline Felling Plan

- 13.6.8 A Baseline Felling Plan forms part of the current Forest Plans prepared by the forest managers and considers the requirement to restructure the age class of even aged forests as described above.

- 13.6.9 The Baseline Felling Plan for West Torrisdale is illustrated in **Figure 13.4** (EIAR Volume 3a) and presented in **Table 13.4**. The data are summarised in 5-year bands as per standard practice.

Felling Phase	Area (ha)	Area (%)
No felling	32.6	16
Phase 1: 2023-2027	49.1	24
Phase 2: 2028-2032	38.0	19
Phase 3: 2033-2037	36.4	18
Outside Plan Period	40.9	20
Long Term Retention	3.5	2
Natural Reserves	2.2	1
Totals	202.7	100

- 13.6.10 A proportion of the FSA is designated as 'No Felling' due either to open ground, land awaiting restocking or crops with no felling year assigned.
- 13.6.11 A large area of the FSA is designated as 'Outside Plan Period'. These areas are generally immature crops whose prospective felling year lies outside of the current Forest Plan period, which covers 10 years of felling and restocking from time of approval. Woodlands not covered by a current Forest Plan have been assigned to Outside Plan Period unless they have been previously identified as 'Long Term Retentions' (LTR) or 'Natural Reserves' (NR).
- 13.6.12 Some areas of crop in the Baseline Felling Plan have been assigned a delayed felling age by the forest managers. These areas are Long Term Retentions, that is crops to be retained beyond their age of economic or silvicultural maturity for conservation and biodiversity purposes. These woodlands would otherwise be managed as normal and would in due course be felled and replanted. The identification of Long Term Retentions is part of the requirements of UKWAS and the UKFS.
- 13.6.13 Other areas within the FSA have been designated as Natural Reserves. These are areas which are considered of higher conservation interest than commercial species and are managed by minimum intervention unless alternative management has higher conservation or biodiversity value. The identification of Natural Reserves is part of the requirements of UKWAS and the UKFS.
- 13.6.14 The Baseline Felling Plan is designed to provide the required separation between felling coupes, where possible. This may take more than one rotation to achieve, especially in the uplands where wind firm boundaries between felling coupes are limited.

Baseline Restocking Species Composition

- 13.6.15 The baseline restocking species composition as detailed in the baseline Forest Plans is illustrated in **Figure 13.5** (EIAR Volume 3a) and outlined in **Table 13.5**.

Species	Area (ha)	Area (%)
Mixed conifer	20.7	10
Native broadleaves	10.2	5
Open ground	33.0	16
Sitka spruce	138.9	69
Totals	202.7	100

- 13.6.16 The Baseline Restocking proposals illustrate how the forest would be structured at the end of the Forest Plan period if the entire plans were implemented. **Table 13.6** compares the baseline current species composition and the baseline restocking species composition at the end of the Forest Plan period without the implementation of the Proposed Development.

Species	Baseline	Restock	Difference	
	Area (ha)	Area (ha)	Area (ha)	Area (%)
Felled awaiting restock	21.2	0.0	-21.2	-10
Mixed conifer	2.6	20.7	18.1	9
Native broadleaves	3.5	10.2	6.7	3
Open ground	29.1	33.0	3.9	2
Sitka spruce	145.6	138.9	-6.7	-3
Sitka spruce/Larch	0.6	0.0	-0.6	0
Totals	202.7	202.7		

- 13.6.17 The changes between the current baseline current species composition and that contained within the Baseline Restocking Plan are discussed below:
- The proportion of primary conifer crops (Sitka spruce, Sitka spruce/Larch) decreases by 7.2ha;
 - The area of mixed conifer increases by 18.1 ha; and
 - The area of broadleaf woodland increases by 6.7 ha.
- 13.6.18 The majority of these changes reflect the ongoing proposed restructuring of the first rotation crops to meet current guidelines and the restocking of land felled and awaiting restocking.

13.7 Proposed Development Forest Plan

Introduction

- 13.7.1 The effect of the Proposed Development on the structure of the woodlands within the FSA has been compared against the Baseline Forest Plan. This has concentrated on changes to the Baseline Felling Plan and Baseline Restocking Plan required to accommodate the Proposed Development.
- 13.7.2 Construction of the Proposed Development has been provisionally programmed for 2026, which falls within Phase 1: 2023-2027 of the Baseline Forest Plan.

Proposed Development Felling Plan

- 13.7.3 The Proposed Development Felling Plan is shown across two figures. **Figure 13.6** (EIAR Volume 3a) identifies the felling required for construction of the Proposed Development and the advanced felling as a result of the Proposed Development, summarised in **Table 13.7**. **Figure 13.7** (EIAR Volume 3a) shows how this felling relates to the associated Forest Plans on the various properties, these data are summarised in **Table 13.8**.

Felling Type	Area (ha)	Area (%)
No felling - open ground	40.2	20
No felling - woodland	74.7	37
Wind Farm Infrastructure Felling	37.3	18
Wind Farm Management Felling	50.6	25
Totals	202.7	100

- 13.7.4 The total felling required to accommodate construction of the Proposed Development, including infrastructure and advanced felling, totals 87.9 ha.

Felling Phase	Area (ha)	Area (%)
No felling	32.6	16%
Phase 1: 2023-2027	110.4	54%
Phase 2: 2028-2022	10.7	5%
Phase 3: 2033-2037	10.2	5%
Outside Plan Period	34.1	17%
Long Term Retention	2.5	1%
Natural Reserves	2.2	1%
Totals	202.7	100

- 13.7.5 The Baseline and Proposed Development Felling Plans are compared in **Table 13.9**.

Felling Phase	Baseline	Proposed Development	Difference	
	Area (ha)	Area (ha)	Area (ha)	Area (%)
No felling	32.6	32.6	0.0	0.0
Phase 1: 2023-2027	49.1	110.4	61.3	30.2
Phase 2: 2028-2032	38.0	10.7	-27.3	-13.5
Phase 3: 2033-2037	36.4	10.2	-26.2	-12.9
Outside Plan Period	40.9	34.1	-6.9	-3.4
Long Term Retention	3.5	2.5	-0.9	-0.5
Natural Reserves	2.2	2.2	0.0	0.0
Totals	202.7	202.7		

- 13.7.6 Of the 87.9 ha of felling required for construction of the Proposed Development, 26.6 ha would be scheduled to take place in Phase 1 in the Baseline Felling Plan and 61.3 ha would

be advanced from later phases. This is balanced out by reduced felling in other periods as detailed below;

- 13.5 ha advanced from Phase 2;
- 12.9 ha advanced from Phase 3; and
- 3.4 ha advanced from Outside plan period.

Proposed Development Restocking Plan

13.7.7 The Baseline Restocking Plan has been amended to integrate the Proposed Development infrastructure requirements into the forest design and to take account of the site conditions. The Proposed Development Restocking Plan is shown in **Figure 13.8** (EIAR Volume 3a) and summarised in **Table 13.10**. Wind farm open ground refers to the permanent loss of crop to permanent infrastructure only of the Proposed Development.

Species	Area (ha)	Area (%)
Mixed conifer	20.4	10
Native broadleaves	10.2	5
Open ground	33.0	16
Sitka spruce	101.3	50
Wind farm open ground	37.9	19
Totals	202.7	100

13.7.8 The Baseline and Wind Farm Restocking Plans have been compared to assess the changes that construction of the Proposed Development would have on the species composition of the forests. These data are presented in **Table 13.11**.

Species	Restock	Proposed Development	Difference	
	Area (ha)	Area (ha)	Area (ha)	Area (%)
Mixed conifer	20.7	20.4	-0.3	0
Native broadleaves	10.2	10.2	0.0	0
Open ground	33.0	33.0	0.0	0
Sitka spruce	138.9	101.3	-37.6	-19
Wind farm open ground	0.0	37.9	37.9	19
Totals	202.7	202.7		

13.7.9 The change in area of stocked woodland in the forests due to the Proposed Development is shown in **Table 13.12**.

Woodland Area	Baseline Restock	Proposed Development	Difference (ha)	Difference (%)
Stocked	169.8	131.8	-37.9	-19
Unstocked	33.0	70.9	37.9	19
Totals	202.7	202.7		

13.7.10 The changes in the structure of the woodlands due to the Proposed Development can be summarised as follows:

- there would be a net reduction in the area of sitka spruce of 37.6 ha;
- the area of broadleaf woodland would remain the same;
- there would be an decrease in the area mixed conifer woodland of 0.3 ha;
- Wind farm permanent open ground would total 37.9 ha; and
- the net reduction in stocked woodland area within the FSA would be 37.9 ha equivalent to 19 % of the FSA. This will require compensatory planting.

Separate Access Requirements

13.7.11 In addition to the felling and restocking required for the construction of the Proposed Development, the Access Corridor crosses through Guesdale Forest, via the existing access for the Beinn an' Tuirc Windfarm. Guesdale totals 709 ha and is part of the National Forest Estate and is managed by Forest and Land Scotland. It is part of the wider Lussa Land Management Plan which totals 7,999 ha. Felling has commenced within the woodlands and it is anticipated that the vast majority of the woodland along the access route will have been felled or recently restocked by the time of construction of the Proposed Development.

13.7.12 As the access for the Proposed Development follows the access for the existing Beinn an' Tuirc Windfarm, the works required to upgrade the track for delivery of the turbine components is minimal with only a short section within Guesdale identified as requiring any substantial works, as detailed in **Chapter 2**. As a result, an access track footprint of 11.6 ha was identified in which clearance of predominantly immature trees totalling 1.2 ha will be required. The extent and location of this felling plus the effect to the species composition of the forest are detailed in **Figure 13.9** (EIAR Volume 3a) and summarised in **Table 13.13**.

Access Track Footprint	Area (ha)	Area (%)
Open ground	9.7	83
No restocking of felled trees	0.7	6
Clearance of immature trees	0.7	6
Fell mature trees	0.2	2
Clearance of birch scrub	0.3	3
Totals	8.5	100

13.7.13 Of the 1.2 ha to be felled for the access, 0.7 ha is immature conifer crop, 0.3 ha is clearance of birch scrub and 0.2 ha is the felling of mature trees close to the access track edge.

13.7.14 A further 0.7 ha of planned restock will not be undertaken due to the access track works.

13.7.15 The nature of the trees to be removed suggest that no perceptible volume of timber will be produced by the access track works.

13.7.16 It may be necessary to clear self seeded trees from the roadside along the entirety of the access track within the National Forest Estate. It is envisaged that any planning permission granted for the Proposed Development will include permission to clear such roadside regeneration where required.

13.7.17 Therefore the total area of woodland lost to the Access Corridor will be 1.9 ha. This will result in a 1.9 ha increase in the compensatory planting requirement.

13.8 Requirement for Compensatory Planting

13.8.1 As a result of the construction of the Proposed Development, there would be a net loss of woodland area. The area of stocked woodland in the FSA and the Separate Access Requirements area combined would decrease by 39.8 ha.

13.8.2 In order to comply with the criteria of the Scottish Government's Control of Woodland Removal Policy, compensation planting would be required. The Applicant is committed to providing appropriate compensatory planting. The extent, location and composition of such planting are to be agreed with SF, taking into account any revision to the felling and restocking plans prior to the commencement of construction of the Proposed Development.

13.9 Forestry Waste

13.9.1 The Scottish Environment Protection Agency (SEPA) guidance document WST-G-027, 'Management of Forestry Waste' (SEPA, 2017)¹⁶ highlights that all waste producers have a statutory duty to adopt the waste hierarchy as per the Waste (Scotland) Regulations 2012 (the Scottish Government, 2012)¹⁷, which amended Section 34 of the Environmental Protection Act (EPA) 1990 (duty of care) (UK Government, 1990)¹⁸. This places a specific duty on any person who produces, keeps or manages (controlled) waste to take all such measures available to them to apply the waste hierarchy in Article 4 (1) of the revised Waste Framework Directive (rWFD)¹⁹, which is:

- Prevention;
- Preparing for re-use;
- Recycling;
- Other recovery, including energy recovery; and
- Disposal, in a way which delivers the best overall environmental outcome.

13.9.2 Further guidance is contained in the document LUPS-GU27, 'Use of Trees Clear Felled to Facilitate Proposed Development on Afforested Land'" (SEPA, 2014) ²⁰.

13.9.3 A hierarchy of uses for forestry materials is proposed, derived from the waste hierarchy contained within the Regulations, summarised as follows:

- Prevention via the production of timber products and associated materials for use in timber and other markets;
- The re-use of materials on-site for a valid purpose, where such a use exists e.g. track construction including floating tracks;
- There is no valid re-cycling use for forestry residues;

SEPA (2017): SEPA Guidance Notes WST-G-027 "Management of Forestry Waste". https://www.sepa.org.uk/media/28957/forestry_waste_guidance_note.pdf [accessed 04/03/2022]

¹⁷ The Scottish Government (2012): The Waste (Scotland) Regulations 2012 No. 148 available at <https://www.legislation.gov.uk/sdsi/2012/9780111016657> [accessed 20/01/2019]

¹⁸ UK Environmental Protection Act 1990 1990 c. 43 Part II Duty of care etc. as respects waste Section 34 available at <http://www.legislation.gov.uk/ukpga/1990/43/section/34> [accessed 20/01/2019]

¹⁹ EU Waste Legislation Waste Framework Directive <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32008L0098> [accessed 20/01/2019]

²⁰ SEPA (2014): LUPS-GU27 "Use of Trees Cleared to Facilitate Development of Afforested Land. https://www.sepa.org.uk/media/143799/use_of_trees_cleared_to_facilitate_development_on_afforested_land_sepa_snh_fcs_guidance-april_2014.pdf [accessed 20/01/2019]

- Other recovery via collection and use as biomass for energy recovery or other markets, where not included above; and
 - Where no valid on-site or off-site use can be found for the material, disposal would be in a way that is considered to deliver the best overall environmental outcome.
- 13.9.4 Where no valid on-site or off-site use, or other disposal method, can be found for the material, it should be regarded as waste and handled accordingly. Disposal of timber residues as waste in or on land requires a landfill permit or a waste exemption licence and should be considered the option of last resort.
- 13.9.5 As discussed above, the crops will be replanted except where the land is required for infrastructure associated with the Proposed Development. Brash would be left in situ to provide nutrients for the next rotation where the crops are being replanted as per standard forestry practice. Where crops are not being replanted brash would be removed and treated in line with the proposed hierarchy described above.
- 13.9.6 Stumps would be left in situ as per good practice guidance, except where excavated as part of the construction activities. Excavated stumps would be treated in line with the proposed hierarchy described above.
- 13.9.7 In areas of lower yielding crops, into which the Proposed Development infrastructure would be keyholed, the objective would be to recover as much merchantable timber as possible. Failing that to treat them in line with the hierarchy outlined above. Where suitable, whole trees would be extracted and used in the biomass market. As a result, it is anticipated the forestry waste arising from the works will be minimal.
- 13.9.8 It is proposed that full consideration and further clarification on this issue would be included in a Forestry Waste Management Plan to form part of the Construction Environmental Management Plan (CEMP) following receipt of planning consent and prior to commencement of construction.

13.10 Forestry Management Practices

Crop Clearance

- 13.10.1 Areas of crops of sufficient tree size and standing volume would be harvested conventionally. Timber operations would be undertaken with conventional harvesting and forwarding equipment utilising, as required, flotation tracks.
- 13.10.2 Stemwood down to 7 centimetres (cm) or below would be removed from site and sold into the timber markets. The harvester would maximise timber recovery wherever possible, this would result in the maximum timber volume being recovered to ensure the volume used in the brash mats is kept to a minimum. On wetter ground the harvester would build stronger brash mats to ensure there would be minimal damage to the peat and soil structure by the forwarder during extraction. On soft ground, the bottom layers of brash mats become embedded into the soil and removal could result in more environmental damage than leaving the material to naturally degrade.
- 13.10.3 In areas of young or lower yield class crops, where little or no merchantable timber would be recovered, a number of options could be utilised depending on the factors prevailing at the time of clearance. The methodology used would depend on tree size; site conditions; the availability of suitable equipment; and the markets prevailing at the time of the works

being carried out. Where there is suitable access and ground conditions the trees could be whole tree harvested and extracted to roadside for chipping as biomass.

- 13.10.4 Where trees are very small due to age or poor growth it may be more viable to fell the crop manually using scrub cutters or chainsaws. The end use of the material would depend on the factors mentioned above but in some cases there would be no recoverable material. Where material was recoverable it could potentially be used on-site in the base of floating roads; extracted and processed for biomass; or used for ecological enhancement if applicable.
- 13.10.5 Stumps would be left in situ as per the guidance contained in the Forestry Commission Research Note 'Environmental effects of stump and root harvesting' (Forestry Commission, 2011) ²¹ except where they would be removed for borrow pits, excavated tracks, wind turbine foundations and other infrastructure requiring excavation. Such material would be treated as described above.

Restocking/Planting Methodology

- 13.10.6 Wind Farm Restocking would be carried out to current standard practice, the forest manager's internal guidance and practices and in accordance with the guidelines contained in the UKFS and UKWAS as a minimum, where applicable. The methodology would vary depending on the type of restocking being carried out. The following information is provided for guidance as to the restocking methodology which may be adopted.
- 13.10.7 On commercial conifer areas the methodology would normally include:
- Site preparation by machine cultivation and drainage;
 - Manual planting;
 - Subsequent follow-up establishment operations such as the replacement of failures, weeding and protection measures until the crops are satisfactorily established; and
 - Replanting would be carried out with the conifer species identified in the restocking plan at the minimum density of 2,500 trees per ha.
- 13.10.8 Restocking within the broadleaf woodland areas would be carried out to the same specification with the following changes:
- A lower planting density of 1,600 trees per ha; and
 - The principal species would be mixed native broadleaves including, for example, downy and silver birch with small components of other species as appropriate to site such as oak, rowan, hazel, gean, grey willow, goat willow, alder and woody shrubs.

Aftercare Works

- 13.10.9 Aftercare establishment works would normally include, but are not limited to, the following:
- the woodlands would be beaten up (replacement of failures) to ensure satisfactory stocking levels by year 5, broadleaf woodlands by year 10;
 - the woodlands would be weeded as necessary to ensure satisfactory establishment by year 5 / year 10 for broadleaf woodlands;
 - the woodlands would be protected against pine weevils by management inspections and remedial treatment as necessary;

²¹ Forestry Commission Research Note "Environmental effects of stump and root harvesting" (Forestry Commission, 2011). [https://www.forestry.gov.uk/pdf/FCRN009.pdf/\\$FILE/FCRN009.pdf](https://www.forestry.gov.uk/pdf/FCRN009.pdf/$FILE/FCRN009.pdf) [accessed 20/01/2019]

- the woodlands would be protected against browsing damage from wild and domestic animals;
- the woodlands would be protected against fire;
- fertiliser would be applied as necessary to ensure satisfactory establishment and growth; and
- other works as reasonably required ensuring satisfactory establishment of the woodlands.

13.11 Standards and Guidelines

13.11.1 All forestry operations would be carried out in strict accordance with current good practice and guidelines. This would include, but not be limited to:

- UK Forestry Standard (Forestry Commission 2017) ²²;
- Forest Industry Safety Accord Guides (or equivalent) (FISA, 2014); and
- current relevant legislation including, but not limited to, Health and Safety at Work Act 1974 (UK Government, 2014) ²³.

13.12 Summary

13.12.1 The FSA extends to 202.7 ha and is comprised of privately owned and managed woodlands.

13.12.2 A further 11.5 ha of woodlands on the National Forest Estate are included for the Access Corridor.

13.12.3 Felling would be advanced on 61.3 ha for construction of the Proposed Development.

13.12.4 The species composition of the forest would change as a result of the Proposed Development forestry proposals. In particular, the area of Sitka spruce would decrease by 37.6 ha.

13.12.5 The area of unplanted ground would increase and, as a result, there would be a net loss of woodland area of 39.8 ha.

13.12.6 In order to comply with the Scottish Government's Control of Woodland Removal Policy, compensation planting would be required to mitigate for the loss of woodland area. The Applicant is committed to providing appropriate compensatory planting. The extent, location and composition of such planting to be agreed with SF, taking into account any revision to the felling and restocking plans prior to the commencement of construction.

²² Forest Industry Safety Accord (2014). FISA Safety Guides (various). Edinburgh.

²³ UK Government (1974): Health and Safety at Work etc. Act 1974 available at <http://www.legislation.gov.uk/ukpga/1974/37/contents> [access 20/01/2019]

14 Shadow Flicker

14.1 Introduction

14.1.1 This Chapter considers the potential significant effects of shadow flicker associated with the construction, operation and decommissioning of the Proposed Development. The specific objectives of this Chapter are to:

- describe the shadow flicker baseline;
- describe the assessment methodology and significance criteria used in completing the impact assessment;
- describe the potential effects, including direct, indirect and cumulative effects;
- describe the mitigation measures proposed to address potential significant effects; and
- assess the residual effects remaining following the implementation of mitigation.

14.1.2 The assessment has been carried out by Ramboll UK Limited (Ramboll). Lead author is Scott Jamieson, MSc BSc (Hons), EIA Consultant. Scott has over three years of experience in environmental consultancy, specialising in Impact Assessment for renewable energy developments and has completed numerous shadow flicker assessments. The assessment was supported by Cameron Orr, MSc GIS, who has been using ReSoft WindFarm software since 2006 for wind farm visualisation and analysis.

14.1.3 This Chapter is supported by the following figures and technical appendices:

- Volume 3a: Figures
 - **Figure 14.1: Shadow Flicker Study Area and Receptors.**
- Volume 4: Technical Appendices
 - **Technical Appendix 14.1: Shadow Flicker Model Outputs.**

14.1.4 Figures and Technical Appendices are referenced in the text where relevant.

14.1.5 This assessment uses the below terminology throughout:

- Proposed Development – All elements of the West Torrisdale Wind Farm development for which S36 consent and deemed planning permission are sought.
- Application Boundary – The red line boundary defining all elements of the Proposed Development for the purpose of the S36 application.
- Wind Turbine Array – the location of the wind turbines comprising the Proposed Development.
- Access Corridor – the land within the Application Boundary in which the access track connect the Wind Turbine Array with the A83 road.
- Study Area – the area in which the EIA is undertaken, defined for each technical topic as appropriate.

14.2 Assessment Methodology and Significance Criteria

Scope of Assessment

14.2.1 This Chapter considers potential shadow flicker effects on properties within 10 rotor diameters (RD) of the proposed turbine locations. The Scottish Government web-based

advice for onshore wind turbines recommends that a separation between turbines and dwellings beyond 10 RD should avoid nuisance issues and annoyance to nearby residents¹.
"In most cases however, where separation is provided between wind turbines and nearby dwellings (as a general rule 10 RD), 'shadow flicker' should not be a problem."

- 14.2.2 The assessment is based on the Proposed Development as described in **Chapter 2**, (EIAR Volume 2).
- 14.2.3 Using proprietary specialist modelling software 'Windfarm' (RESOFT Windfarm V5.0.2.1), an annual analysis of shadow flicker for the Proposed Development was carried out, taking into account the behaviour of the sun, local topography and the wind turbine layout and dimensions.
- 14.2.4 It should be noted that the modelling analysis was performed using the following assumptions:
- The sun will always be visible during daylight hours (conservative assumption).
 - The turbine blades are always turning at these times (conservative assumption).
 - The alignment of the turbine rotor blades with respect to the sun's position will always produce maximum shadow casting (conservative assumption; it is unlikely that the wind, and therefore the rotor blades, will track the sun in practice).
 - The analysis looks at the shadow casting over the building from all directions rather than over vertical oriented windows only (conservative assumption).
 - The intensity of the sun will be insufficient to cast strong shadows at elevations less than 2.0°.
 - Shielding due to features such as trees and other obstacles has not been taken into account.
 - Terrain shielding is modelled.
- 14.2.5 The significance of the shadow flicker effect to the surrounding properties has been assessed according to the Department of Energy and Climate Change (DECC) guidelines, stating:
*"It is recommended that shadow flicker at neighbouring offices and dwellings within 500 m should not exceed 30 hours per year or 30 minutes per day."*²

Consultation

- 14.2.6 **Table 14.1** summarises the consultation responses received regarding shadow flicker and provides information on where and/or how they have been addressed in this assessment.
- 14.2.7 Full details on the consultation responses can be reviewed in **Technical Appendix 1.1** (EIAR Volume 4).

¹ Scottish Government, Onshore Wind Turbines: Planning Advice, (2014). Available online from: <https://www.gov.scot/publications/onshore-wind-turbines-planning-advice/> [Accessed 05/03/2023]

² Department of Energy and Climate Change (2010). Update of UK Shadow Flicker Evidence Base. Available online from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/48052/1416-update-uk-shadow-flicker-evidence-base.pdf

Table 14.1: Consultation Responses			
Consultee and Date	Scoping/ Other Consultation	Consultee Response	Response/ Action Taken
Argyll and Bute Council (A&BC), 20/04/2021	Scoping	Based on the scoping layout there are a couple of properties that fall within 10-rotor diameters of T12. The final design layout will aim for a 10-rotor diameter separation from residential receptors, where possible. If this not possible an assessment will be undertaken of the potential for shadow flicker to occur at properties within the 10-rotor diameter separation distance. The Council is satisfied with the approach to Shadow Flicker.	Noted. The Proposed Development now consists of a nine turbine layout as shown in Figure 2.1 (EIAR Volume 3a), removing scoping layout turbine T12. Potential for shadow flicker associated with the Proposed Development is considered in this Chapter.

Potential Effects Scoped Out

- 14.2.8 As shadow flicker is a phenomenon caused by the moving shadow of the turbine rotor blades, created by the sun passing behind the turbine rotors, being cast over a narrow opening, such as a window or open door, no shadow flicker effects from the construction or decommissioning of the Proposed Development are anticipated. Assessments of potential shadow flicker effects resulting from the construction and decommissioning of the Proposed Development has therefore been scoped out of the shadow flicker assessment.
- 14.2.9 Based on turbine locations and shadow lengths, no cumulative assessment was deemed necessary for the shadow flicker assessment, therefore, cumulative effects have been scoped out of the shadow flicker assessment.
- 14.2.10 People with photosensitive epilepsy are usually sensitive to flickering light that is between 3 – 60 Hertz (Hz); according to the NSP EN-3: Renewable Energy Infrastructure (2011)³ 'the maximum frequency of the shadowing effect arising from commercial-scale wind turbines is less than 1 Hz'. Therefore, any potential shadow flicker effects arising from the Proposed Development are purely an effect on amenity, rather than having the potential to affect the health or wellbeing of occupants.
- 14.2.11 A related visual effect to shadow flicker is that of reflected sunlight. Theoretically, should the light be reflected off a rotating turbine blade onto an observer then a stroboscopic effect could be experienced. In practice, a number of factors limit the severity of the phenomenon. Firstly, wind turbines have a semi-matt surface finish which means that they do not reflect light as strongly as materials such as glass or polished vehicle bodies. Secondly, due to the convex surfaces found on a wind turbine, the light would generally be reflected in a divergent manner. Thirdly, the variability in flow within a wind farm results in slightly differing orientation of rotor directions. Therefore, it is unlikely that an observer would experience simultaneous reflections from a number of turbines. Fourthly, as with shadow flicker, certain weather conditions and solar positions are required before an observer would experience the phenomenon. Therefore, it is concluded that the Proposed Development

³ Scottish Government, (2011). Onshore Wind Turbines: Planning Advice. Available at: <https://www.gov.scot/publications/onshore-wind-turbines-planning-advice/> [Accessed: 07/03/2023].

would not cause a material reduction to amenity owing to the reflected light, and the reflected light has not been considered in the assessment.

Method of Baseline Characterisation

Extent of the Study Area

14.2.12 The shadow flicker Study Area is comprised of a 10 RD (1,360 m) assessment area surrounding each proposed wind turbine, in accordance with the Scottish Government advice⁴. The Study Area is shown in **Figure 14.1** (EIAR Volume 3a).

Desk Study

14.2.13 A desktop assessment was undertaken in February 2023 using Royal Mail address data and publicly available aerial and satellite images in order to identify all residential properties located within the Study Area. Computer modelling was used to present the extent of shadow flicker to those properties from the Proposed Development, assuming a worst-case scenario and providing a conservative (i.e. high) estimate.

Modelling Methodology

14.2.14 A modelling exercise was carried out for the Proposed Development using a 136 m rotor diameter⁵. The computer software 'ReSoft WindFarm 5' was used to identify potential areas susceptible to shadow flicker, and the extent of shadow flicker impact caused. The software identifies the Study Area for the assessment based on a candidate wind turbine's dimensions and orientations, as well as model periods of predicted shadow flicker. The following model parameters were used:

- a candidate wind turbine with hub height of 82 m, a rotor diameter of 136 m and a tip height of 149.9 m⁶;
- the maximum distance of shadow flicker influence considered is 10 times the rotor diameter (136 m x 10 = 1,360 m);
- the centre of the window (viewing height) is 7 m above ground level;
- each property has one window facing the Proposed Development;
- each window is 1 m by 1 m;
- the calculation year of 2023;
- the maximum sun height of 2° above the horizon; and
- topography has been considered using 5 m grid digital terrain model (DTM), resampled to 10m and the Earth's curvature has been accounted for.

Model Output

14.2.15 For each property within the Study Area, the model predicted the number of days per year, maximum hours per day, mean hours per day and total hours per year that the property would experience shadow flicker. The model output is presented in **Table 14.2**.

⁴ Scottish Government, Onshore Wind Turbines: Planning Advice, (2014). Available online from: <https://www.gov.scot/publications/onshore-wind-turbines-planning-advice/>

⁵ 136 m rotor diameter was used for EIA purposes only.

⁶ Parameters specified for the purposes of modelling potential shadow flicker only.

- 14.2.16 In addition, the model can produce a graph illustrating the time of day and time of year shadow flicker effects could potentially affect each property within the shadow flicker Study Area, as shown in **Technical Appendix: 14.1** (EIAR Volume 4).

Criteria for the Assessment of Effects

- 14.2.17 No formal guidance is available regarding what levels of shadow flicker may be considered acceptable in Scotland. In the absence of this, the significance of the shadow flicker effect to the surrounding properties has been assessed according to the Best Practice Guidance to Planning Policy Statement 18 'Renewable Energy', (Department of Environment Northern Ireland (DOE NI), 2009, pp 29)⁷, which recommends that shadow flicker at neighbouring offices and dwellings should not exceed 30 hours per year or 30 minutes per day.
- 14.2.18 For the purposes of this assessment, values greater than 30 hours per year or 30 minutes per day are considered **Significant**.

Limitations and Assumptions

- 14.2.19 A number of worst-case assumptions were made to generate the modelling output for the assessment. It should also be noted that even if shadow flicker impact does occur at a specific location, this does not imply that it would be experienced. Potential receptors may be occupying a room on the other side of the house, which is not impacted, or indeed absent from the location altogether (e.g. at work, on holiday etc.) during the times of the shadow flicker events.
- 14.2.20 The use of these assumptions is considered to provide a precautionary basis for the purpose of this assessment.
- 14.2.21 The instances of shadow flicker would always be less than that predicted by the model. The occurrence of shadow flicker is only possible during the operation of the wind turbine (i.e. when the rotor blades are turning) and when the sky is clear enough for the sun to cast shadows. It is important to consider the following facts when making an assessment:
- time of year and day, and weather conditions. Climatic conditions dictate that the sun is not always shining. Met Office data give average annual sunshine hours for the west of Scotland to be 28% of total daylight hours, based on climate data from 1981 -2010. Cloud cover during other times may obscure the sun and prevent shadow flicker occurrence. While some shadow may still be cast under slightly overcast conditions, no shadow at all would be cast when heavy cloud cover prevails;
 - objects such as trees or walls may surround windows and obscure the view of the wind turbines and hence prevent or limit shadow flicker;
 - direction and aspect of the property relative to the turbine(s). In the UK, only properties within 130 degrees either side of north, relative to the wind turbines, can be affected, as wind turbines do not cast long shadows on their southern side; and
 - orientation of the wind turbine rotors. During operation, the turbine rotors would automatically orientate themselves to face the prevailing wind direction. This means the turbine rotors would not always be facing the affected window and in fact would sometimes be 'side-on' to the window. Very little of the blade movement would be

⁷ Department of the Environment, (2009). Best Practice Guidance to Planning Policy Statement 18 'Renewable Energy' https://www.infrastructure-ni.gov.uk/sites/default/files/publications/infrastructure/Best%20Practice%20Guidance%20to%20PPS%2018%20-%20Renewable%20Energy_0.pdf, p29, 1.3.77

visible during such occurrences and therefore the potential for shadow flicker is reduced.

14.3 Baseline Conditions

Current Baseline

- 14.3.1 The desk study identified the following two properties across the shadow flicker Study Area from the Royal Mail address data:
- Glen Croft; and
 - Glen Head.
- 14.3.2 The properties included in the assessment are shown in **Figure 14.1** (EIAR Volume 3a).

Future Baseline

- 14.3.3 No consented or proposed residential developments have been identified within the shadow flicker Study Area on the ABC Planning Portal at present.
- 14.3.4 There would be no further changes to the shadow flicker baseline if the Proposed Development does not take place.

Summary of Sensitive Receptors

Scoped Out Receptors

- 14.3.5 Receptors located outwith the 10 RD Study Area have been scoped out of the assessment.

Scoped In Receptors

- 14.3.6 Receptors located within the 10 RD Study Area have been scoped into the assessment.

14.4 Assessment of Potential Effects

Potential Construction Effects

- 14.4.1 Effects from shadow flicker are limited to the operational phase of the Proposed Development. Therefore, potential effects during the construction phase are scoped out of this assessment.

Potential Operational Effects

- 14.4.2 The results of the shadow flicker model for the Proposed Development are detailed in **Table 14.2**.

Property	Description	Easting	Northing	Days per year	Max hours	Mean Hours per Day	Total Hours per Year
P1	Glen Croft	178749	637086	28	0.42	0.33	9.2
P2	Glen Head	178535	637075	29	0.48	0.39	11.2

- 14.4.3 The assessment indicates that both properties identified within the Study Area would be subject to shadow flicker.
- 14.4.4 For the purposes of this assessment a significant effect has been defined as more than 30 hours of shadow flicker per year or 30 minutes per day.

- 14.4.5 The total hours per year at P1: Glen Croft would be 9.32 hours per year. The maximum number of hours per day that P1: Glen Croft would experience is 0.42 hours. Therefore, the levels of shadow flicker experienced at P1: Glen Croft would be **Not Significant**.
- 14.4.6 The total hours per year at P2: Glen Head would be 11.2 hours per year. The maximum number of hours per day that P2: Glen Head would experience is 0.48 hours. Therefore, the levels of shadow flicker experienced at P2: Glen Head would be **Not Significant**.
- 14.4.7 The assessment concludes there are **no potential significant operational effects** from shadow flicker

Potential Decommissioning Effects

- 14.4.8 Effects from shadow flicker are limited to the operational phase of the Proposed Development. Therefore, no potential effects during the decommissioning phase of the Proposed Development are possible.

Potential Cumulative Construction Effects

- 14.4.9 Effects from shadow flicker are limited to the operational phase of the Proposed Development. Therefore, potential effects during the construction phase of the Proposed Development have been scoped out.

Potential Cumulative Operational Effects

- 14.4.10 Shadow Flicker from nearby sites is not known to affect the two properties with potential to be impacted by Shadow Flicker as a result of the Proposed Development.
- 14.4.11 Based on turbine locations and shadow length, it is anticipated there would be no cumulative effects from shadow flicker.

14.5 Mitigation

- 14.5.1 No mitigation is required as there would be no significant effects from shadow flicker as a result of the operation of the Proposed Development.

14.6 Assessment of Residual Effects

Residual Construction Effects

- 14.6.1 Effects from shadow flicker are limited to the operational phase of the Proposed Development. Therefore residual effects during the construction phase have been scoped out of this assessment.

Residual Operational Effects

- 14.6.2 No significant residual effects from shadow flicker are assessed during the operation of the Proposed Development.

Residual Decommissioning Effects

- 14.6.3 Effects from shadow flicker are limited to the operational phase of the Proposed Development. Therefore, residual effects during the decommissioning phase have been scoped out of this assessment.

Residual Cumulative Construction Effects

- 14.6.4 Effects from shadow flicker are limited to the operational phase of the Proposed Development. Therefore cumulative effects during the construction phase have been scoped out of the assessment.

Residual Cumulative Operational Effects

- 14.6.5 Based on wind turbine locations and shadow length, it is assessed that there would be no cumulative operational effects from shadow flicker.

14.7 Monitoring

Construction Phase Monitoring

- 14.7.1 No monitoring is required as effects from shadow flicker are limited to the operational phase of the Proposed Development. This has therefore been scoped out of this assessment.

Operational Phase Monitoring

- 14.7.2 No monitoring is required as no significant effects as a result of the operation of the Proposed Development have been assessed.

Decommissioning Phase Monitoring

- 14.7.3 No monitoring is required as effects from shadow flicker are limited to the operation of the Proposed Development. This has therefore been scoped out of this assessment.

14.8 Summary

- 14.8.1 This Chapter provides an assessment of the potential impacts on residential amenity resulting from shadow flicker from the Proposed Development. The shadow flicker assessment has been undertaken to consider the maximum tip height of 149.9 m and a typical rotor diameter of 136 m for the Proposed Development. A Study Area of 10 RD (1,360 m) around each wind turbine was considered, with two residential receptors found within the area potentially susceptible to shadow flicker within the Study Area.
- 14.8.2 There is no standard assessment of shadow flicker in Scotland, and there are no guidelines from which to quantify what exposure levels would represent a significant versus non-significant effect. In the absence of specific guidelines, the assessment has considered the 'Best Practice Guidance to Planning Policy Statement 18 'Renewable Energy', (DoE Northern Ireland, 2009, pp 29)⁸, which states that shadow flicker should not be allowed to exceed 30 hours per year or 30 minutes per day. As such, properties where shadow flicker would potentially exceed these thresholds would be subject to significant effects, in the absence of mitigation.
- 14.8.3 The assessment indicates that there would be shadow flicker at both properties identified within the Study Area, however, falling below the threshold to be considered significant.

⁸ Department of the Environment, (2009). Best Practice Guidance to Planning Policy Statement 18 'Renewable Energy

https://www.planningni.gov.uk/index/policy/planning_statements_and_supplementary_planning_guidance/planning_policy_statement_18_renewable_energy_best_practice_guidance.pdf, p29, 1.3.77

14.8.4 **Table 14.3** provides a summary of the effects. As highlighted, the Proposed Development would not require any mitigation measures, and the shadow flicker impact is predicted to be **Not Significant** for the Proposed Development.

Table 14.3: Summary of Potential Significant Effects of the Proposed Development			
Potential Significant Effect	Mitigation Proposed	Means of Implementation	Outcome/Residual Effect
Construction			
None	N/A	N/A	Not Significant
Operation			
Disturbance to properties within the shadow flicker Study Area	None	N/A	Not Significant
Decommissioning			
None	N/A	N/A	Not Significant
Cumulative Construction			
None	N/A	N/A	Not Significant
Cumulative Operation			
None	N/A	N/A	Not Significant

15 Schedule of Environmental Commitments

15.1 Introduction

- 15.1.1 The purpose of this Chapter is to summarise the environmental commitments proposed for mitigation in each of the Environmental Impact Assessment (EIA) Report (EIAR) technical chapters (**Chapters 4 – 14**)¹. Environmental commitments have been proposed to avoid, reduce or offset impacts which could otherwise give rise to significant residual environmental effects. In addition, some additional good practice environmental management measures have been proposed to further reduce environmental effects, which are not considered to give rise to significant effects with or without mitigation. It is anticipated that the environmental commitments outlined in **Table 15.1 and Table 15.2** would be secured through appropriately worded conditions, should Section 36 consent and deemed planning permission be granted.
- 15.1.2 The main aim of the design process for the Proposed Development was to maximise the energy generation potential, whilst having regard to the protection of sensitive environmental receptors. This Chapter does not summarise 'mitigation by design': **Chapter 3** (EIAR Volume 2) and in particular **Table 3.1** provides a detailed review of mitigation achieved through design.
- 15.1.3 Most of the construction phase mitigation would be delivered through a Construction Environmental Management Plan (CEMP). The outline content of the proposed CEMP is provided in **Technical Appendix 2.1** (EIAR Volume 4). Further details on specific measures to be included in the final CEMP are contained in each of the technical chapters of the EIAR, where relevant.
- 15.1.4 Throughout the EIAR, technical disciplines have considered the potential significant effects of the Proposed Development with consideration of embedded mitigation and commitments. Where significant effects have been identified, additional mitigation is proposed to minimise these effects, where possible.

¹ Excluding Chapter 13 Forestry as forestry is not regarded as a receptor for EIA purposes

Table 15.1: Summary of Environmental Commitments during Construction				
Topic	Potential Significant Effect	Environmental Commitment Proposed	Means of Implementation	Outcome/ Residual Effect
Seascape, Landscape and Visual	Localised changes to topography and changes to characteristic land cover.	All working areas would be restricted as far as practicable to the specified areas and demarcated to prevent incursion of site plant into non-construction locations. Material storage / temporary stockpiles would be retained for the shortest duration practicable and would be sited to avoid visual intrusion to neighbouring receptor locations. Peat materials would be placed wherever practicable to avoid double handling, reduce vehicle movements, and to reduce potential drying and oxidisation of the peat.	Through the CEMP.	Not Significant
	Localised effects on Landscape Character Types.			
	Localised indirect effects on designated/classified landscapes.			
	Visual effects on settlements, transport routes, ferry routes and recreational routes.			
Ecology	Loss and degradation of habitat (peatland and running water).	Habitat restoration and enhancement, as provided in Technical Appendix 6.3 (EIAR Volume 4). Standard pollution prevention measures outline in the CEMP.	Through the Habitat Management Plan (HMP) and CEMP.	Not Significant
	Spread of Invasive Non-Native Species.	Working methods outline in the Outline HMP and CEMP for work within 7 m of all rhododendron. Control of rhododendron in the field survey area as an enhancement measure in the Outline HMP.	Through the HMP and CEMP.	Not Significant
	Disturbance of otter.	Standard pollution prevention measures outlined in the CEMP.	Through the CEMP.	Not Significant
	Cumulative effects on loss of blanket bog.	Peatland restoration.	Through the HMP.	Not Significant

Table 15.1: Summary of Environmental Commitments during Construction				
Topic	Potential Significant Effect	Environmental Commitment Proposed	Means of Implementation	Outcome/ Residual Effect
	Cumulative effects on disturbance of otter.	Standard pollution prevention measures outlined in the CEMP.	Through the CEMP.	Not Significant
Ornithology	Destruction of bird nests.	Timing of works and pre-construction surveys.	Through the CEMP and Bird Protection Plan (BPP).	Not Significant
	Disturbance of hen harrier nest.			
	Disturbance of osprey nest.			
	Disturbance of black grouse leks.			
	Helicopter disturbance of Schedule 1 bird nests.			
	Cumulative effects on sedimentation and increased erosion.			
Hydrology and Hydrogeology	Alteration to surface water flows and runoff.	Drainage management proposals to ensure pre-construction rates/ volumes of run-off maintained. The drainage management works would be supervised by the Environmental Clerk of Works (ECoW).	Through the CEMP, including detailed watercourse crossing proposals, to be submitted to and approved by ABC and SEPA to be secured by an appropriately worded planning condition and the application for a Construction Runoff Licence by the Principal Contractor.	Not Significant
	Sedimentation and increased erosion.	Drainage management proposals to ensure water quality is maintained through use of good practice silt mitigation. The drainage management works would be supervised by the ECoW.		Not Significant
	Chemical Pollution.	Storage of potentially contaminative materials at least 50 m from watercourses. Fuels, oils or chemicals stored on-site would be sited over an impervious base and according with the Water Environment (Controlled		Through the CEMP including a Pollution Prevention Plan to be submitted to and approved by ABC and SEPA to be secured by an

Table 15.1: Summary of Environmental Commitments during Construction				
Topic	Potential Significant Effect	Environmental Commitment Proposed	Means of Implementation	Outcome/ Residual Effect
		Activities) (Scotland) Regulations 2011 (as amended) (CAR). Petrol interceptors and spill kits will be utilised where chemical spillage is a possibility.	appropriately worded planning condition.	
	Effects on Groundwater Dependent Terrestrial Ecosystems (GWDTE).	Drainage management proposals to ensure groundwater flow, hydraulic continuity and water quality is maintained.		Not Significant
	Decommissioning Impacts.	A Decommissioning Plan would set out environmental protection measures and restoration principles which would be implemented. It is anticipated that similar mitigation as required during construction would be necessary.	Decommissioning measures to be approved with SEPA through CAR licensing.	Not Significant
	Disturbance of established habitats or drainage pathways.	Minimisation of construction footprint during decommissioning. Excavated material re-used where possible, and potential for material to remain in situ where applicable assessed.	Decommissioning measures to be approved with SEPA through CAR licensing.	Not Significant
Geology and Soils	Disturbance and loss of peat.	Good practice techniques listed in the Peat Landslide Hazard and Risk Assessment (Technical Appendix 9.2 , EIAR Volume 4) and the Peat Management Plan (Technical Appendix 9.3 , EIAR Volume 4).	Through the Geotechnical Risk Register, as detailed in Technical Appendix 9.2 (EIAR Volume 4).	Not Significant
Traffic, Transport and Access	Driver Delay	Agree Abnormal Invisible Loads (AIL) route modifications and improvements with Argyll and Bute Council (ABC) and other relevant stakeholders.	Through the Construction Traffic Management Plan (CTMP) and Abnormal Load Transport Management Plan (ALTMP).	Not Significant
	Pedestrian Delay			
	Non-motorised user Amenity			

Table 15.1: Summary of Environmental Commitments during Construction				
Topic	Potential Significant Effect	Environmental Commitment Proposed	Means of Implementation	Outcome/ Residual Effect
	Fear & Intimidation	Appropriate traffic management measures would be put in place on the A83 (T) in Campbeltown and Tarbert to avoid conflict with general traffic, subject to the agreement of ABC. Provide construction updates on the project website and or a newsletter to be distributed to residents within an agreed distance of the site. Adoption of a voluntary reduced speed limits at locations to be agreed.		
	Road Safety			
Aviation and Telecommunications	Breaching of current minimum altitudes specified in Islay Airport Instrument Flight Procedures (IFPs).	Procedure charts to be revised.	Chart revision design by Highlands & Islands Airports Ltd (HIAL's) Approved Procedure Design Organisation (APDO) and their approval by the Civil Aviation Authority (CAA).	Not Significant

Table 15.2: Summary of Environmental Commitments during Operation				
Topic	Potential Significant Effect	Environmental Commitment Proposed	Means of Implementation	Outcome/ Residual Effect
Seascape, Landscape and Visual	Effects on Landscape Character Types.	Siting and design mitigation	None	Locally Significant effects.
	Effects on Landscape Designations.	Siting and design mitigation	None	Not Significant
	Visual effects on settlements, transport routes, ferry routes and recreational routes.	Siting and design mitigation	None	Not Significant effects on settlements, transport routes, ferry routes and recreational routes apart from Significant localised effects on the Kintyre Way.
	Cumulative effects on Landscape Character Types.	Siting and design mitigation	None	Not Significant. No significant in-addition effects, but Significant in-combination effects on; Upland Forest Moor Mosaic (LCT06); Knapdale Upland Forest Moor Mosaic (LCT06b) Bay Farmland (LCT14); Rocky Mosaic (LCT20); Coastal Parallel Ridges (LCT22); Raised Beach Coast and Cliffs (LCT59); Coastal Fringe with Agriculture (LCT61); Coastal Lowland Moor (LCT65);

Table 15.2: Summary of Environmental Commitments during Operation				
Topic	Potential Significant Effect	Environmental Commitment Proposed	Means of Implementation	Outcome/ Residual Effect
				Rugged Moorland Hills and Valleys (LCT80); Rugged Upland – Ayrshire (LCT83); Sounds, Narrows and Islands (SCT09).
	Cumulative effects on North Arran NSA	Siting and design mitigation	None	In-addition effects would be Not Significant, but Significant in-combination effects.
	Cumulative effects on North Arran SLA			
	Cumulative effects on East Kintyre (Coast) APQ	Siting and design mitigation	None	Not Significant
	Cumulative effects on North Arran WLA	Siting and design mitigation	None	In-addition effects would be Not Significant, but Significant in-combination effects.
	Cumulative effects on Achamore House GDL	Siting and design mitigation	None	Not Significant
	Cumulative effects on settlements, including Glenbarr, Carradale, and Torbeg	Siting and design mitigation	None	In-addition effects would be Not Significant, but Significant in-combination effects.
	Transport routes including the A83, B842, B879, the String Road,	Siting and design mitigation	None	In-addition effects would be Not Significant, but Significant in-combination effects are predicted on the A83, B842, and the String Road.
	Ferry Routes, including the Campbelltown to Ardrossan Ferry and Claonaig to Arran Ferry	Siting and design mitigation	None	In-addition effects would be Not Significant, but Significant in-combination effects are predicted.

Table 15.2: Summary of Environmental Commitments during Operation				
Topic	Potential Significant Effect	Environmental Commitment Proposed	Means of Implementation	Outcome/ Residual Effect
	Recreational Routes including the Kintyre way, National Cycle Route 78, and Core paths	Siting and design mitigation	None	In-addition effects would be Not Significant, but Significant in-combination effects on National Cycle Route 78; C304 Glenbarr school route; C088 (B) – (J) – Campbelltown to Claonaig
Cultural Heritage	Moderate adverse effect on the setting of Scheduled Monument, Saddell Abbey (SM 3645).	None proposed.	N/A	Significant
Ecology	Impacts on habitats (terrestrial and aquatic), pine marten, otter, and reptiles and amphibians through the accidental spillage of fuels, chemicals and lubricants during maintenance works, leading to habitat loss or degradation.	Active restoration of the peatland habitats and onsite habitat enhancement. Standard pollution prevention measures, including spill kits stored close to watercourse crossings and in vehicles.	Design and through the HMP and maintenance schedule to be implemented by the Principal Contractor.	Not Significant
	Indirect bat disturbance and direct mortality through collision.	Feathering during idle speed at all turbines, and bat friendly lighting. Low level curtailment strategy at Turbines T7 and T9, with post-construction monitoring. Bat-friendly lighting design would be used to minimise the spillage of artificial light from the proposed substation onto bat foraging habitat	Design and via blade pitch control system, plus suitably trained personnel for post-construction monitoring.	Not Significant

Table 15.2: Summary of Environmental Commitments during Operation				
Topic	Potential Significant Effect	Environmental Commitment Proposed	Means of Implementation	Outcome/ Residual Effect
	Cumulative bat mortality through collision	50 m protective buffer between linear habitat features and turbines.	Design	Not Significant
Hydrology and Hydrogeology	Alteration to Surface Water Flows and Runoff	On-going maintenance for all proposed drainage measures on the site, particularly including water crossings and sustainable drainage features designed to manage water quality and runoff rate.	To be implemented and monitored by the site operator, through operational maintenance schedule.	Not Significant
	Sedimentation and Increased Erosion			Not Significant
	Chemical Pollution	All ongoing maintenance to be carried out in accordance with pollution prevention guidance. No fuelling, storage of oils or laydown of plant to be carried out on-site	Maintenance schedule to be implemented by the Principal Contractor.	Not Significant
	Effects GWDTE	Infrastructure would incorporate measures to ensure the conveyance of shallow groundwater and surface water across the Wind Turbine Array, such as the use of suitably graded sub-base aggregate on tracks and cross drainage measures to ensure the continued distribution of surface water runoff.	To be implemented as set out in construction phase mitigation above. Maintenance schedule to be implemented by the Principal Contractor.	Not Significant
Aviation and Telecommunications	Breaching of current minimum altitudes specified in Islay Airport IFPs	Procedure charts to be revised	Chart revision design by HIAL APDO; submission to CAA for approval	Not Significant



Energy for
generations