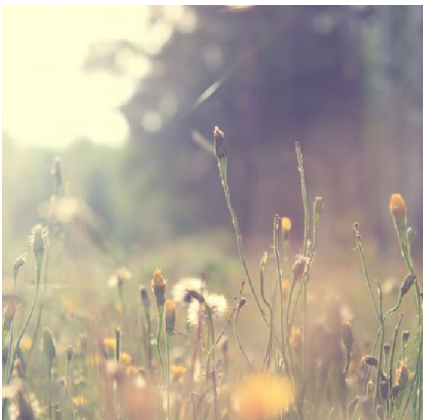




CNOC RAITHNÍ (KNOCKRANNY) WIND FARM



NTS

Non-Technical Summary

VOLUME I

Environmental Impact Assessment Report

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1. INTRODUCTION

1.1. Background

This Environmental Impact Assessment Report (EIAR) has been prepared on behalf of Western Power Developments Limited to consider the likely significant environmental effects of a proposed development comprising amendments to the permitted Cnoc Raithní (Knockranny) Wind Farm (as permitted under Galway County Council Reference 13/829 / An Bord Pleanála Reference PL07.243094), provision of underground cabling, and grid connection infrastructure at Ardderroo Substation to allow the project to be connected to the national grid. The application for consent is being made under Section 34 of the Planning and Development Act 2000 (as amended).

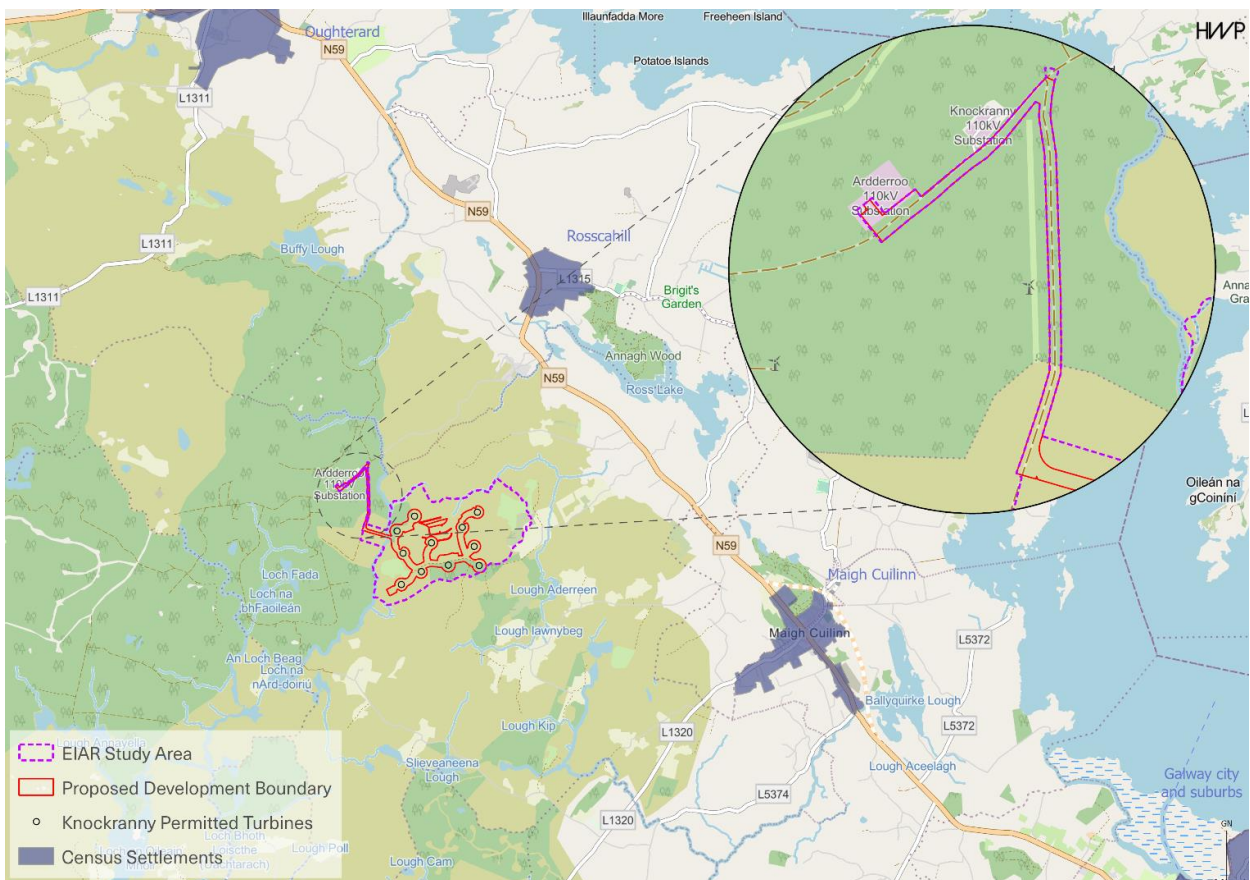


Figure 1.1 Site Context Map

Chapter 2 of this EIAR includes a detailed description of the project and proposed development, with the following summary key definitions applied to ensure consistency of referencing and assessment approach throughout this report.

- 'Permitted Development': The wind farm development granted planning permission under Galway County Council Reference No. 13/829 and An Bord Pleanála Reference No. 07.243094 (as described under Section 2.2 of this report).
- 'Proposed Development': The development for which planning permission is now being sought from Galway County Council comprising specified proposed alterations to the Permitted Development, including the proposed underground electrical and communications cabling connecting the 11 no. wind turbines to the Ardderroo substation, as

well as extension to substation control building and new step up transformer (as described under Section 2.3 of this report).

- 'Project': Where reference is made to the 'Project', this comprises the Permitted Development and Proposed Development as defined above. This is the collective Cnoc Raithní (Knockranny) Wind Farm project.

The Proposed Development, in combination with the Permitted Development (Project), will comprise a development area of 77.92 hectares in the townlands of Knockranny, Letter and Ardderroo. The EIAR study area comprises of 331 hectares and is located approximately 3km north-west of Roscahill Village, 4.5 kilometres north-west of the settlement of Moycullen and c.2.5 kilometres west of the N59 (Galway - Clifden) National Secondary Road. Ardderroo Wind Farm (currently under construction), the Galway Wind Park and a number of other wind farms exist to the west and south. The site's location within the wider context is illustrated in Figure 1.1 as shown.

1.2. Purpose of EIA

This EIAR has been completed in accordance with Directive 2011/92/EU (as amended by 2014/52/EU) and relevant Irish legislation¹ as well as in conformity with guidance in the European Commission's 'Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report' (2017) and EPA's 2022 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (EPA 2022 Guidelines).

The primary function of the EIA Directive is to ensure that projects that are likely to have significant effects on the environment are subjected to an assessment of their likely impacts. The objective of the EIA Directive is to ensure a high level of protection of the environment and human health, through the establishment of minimum requirements for EIA, prior to development consent being given, of developments that are likely to have significant effects on the environment

As per Article 5(1) of the 2014 Directive, an EIAR should provide the following information:

- Description of Project;
- Description of Baseline Scenario;
- Description of Likely Significant Effects;
- Description of Avoidance / Mitigation Measures;
- Description of Reasonable Alternatives (and rationale for chosen option); and
- A Non-Technical Summary.

Annex IV of the Directive sets out a more detailed outline of the information required in an EIAR. The subject EIAR has been prepared in full accordance with these stated requirements of Annex IV.

1.3. Need for the Project

As outlined, planning permission already exists for an 11 no. turbine windfarm at this location, with the principle of development firmly established. A pre-construction technical review of the Permitted Development identified the need for some focused design changes to the wind farm

¹ Part X of the Planning and Development Act 2000, as amended, and the Planning and Development Regulations, 2001, as amended.

itself, including a revised means of grid connection. Due to changes in grid infrastructure in the intervening years, it is now proposed to make the grid connection from the Permitted Development to the 110kV Ardderroo substation (as permitted under PA 07.303086). As a result of this, the permitted on-site substation at Cnoc Raithni (Knockranny) wind farm is no longer necessary and will be omitted.

Similarly, having regard to advances in turbine technology since 2013, revised turbine dimensions are also proposed in lieu of that previously assessed in the EIS for the Permitted Development. The specifications of the two proposed candidate turbines are detailed in Chapter 2. These more efficient proposed turbines will contribute towards increasing the generating capacity of Project and further reduce Ireland's reliance on fossil fuels.

1.4. EIA Screening & Scoping

Screening is the term used to describe the process for determining whether a proposed development requires an EIA by reference to mandatory legislative threshold requirements or by reference to the type and scale of the proposed development and the significance or the environmental sensitivity of the receiving baseline environment.

Article 93 of, and Schedule 5 to, the Planning and Development Regulations 2001 set out the classes of development for which a planning application must be accompanied by an environmental impact assessment report (EIAR). Part 1 and Part 2 Schedule 5 of the Planning and Development Regulations, 2001, as amended, prescribes the categories of, and thresholds for, prescribed development requiring EIA.

Schedule 5 Part 2 states that an EIA is required for:

"3. Energy Industry

Installations for the harnessing of wind power for energy production (wind farms) with more than 5 turbines or having a total output greater than 5 megawatts."

Accordingly, an Environmental Impact Statement (EIS) was prepared in relation to the Permitted Development. As detailed in Chapter 2 of this EIAR, the Proposed Development will result in an uplift in generating capacity of greater than 5 MW more than that of the Permitted Development. Therefore, in line the Planning and Development Regulations, 2001 the Proposed Development application is supported by this EIAR.

EIA Scoping is the process of determining the content and extent of the matters which should be considered in the environmental information contained in an EIAR. The content of this EIAR was informed by an informal scoping process carried out by the applicant, the design team and appointed EIAR consultants to identify the core issues likely to be most important during the Environmental Impact Assessment process.

In determining the extent and content of this EIAR, the authors have carefully considered the applicable EU and Irish legislative requirements, relevant EU and Irish guidance and pre-planning consultation meetings held with Galway County Council in accordance with Section 247 of the Planning and Development Act 2000 on the 25th of January 2023. In addition, the following prescribed bodies were notified of the extent of the Proposed Development and of the fact that an EIAR was being prepared:

- 1.** Department of for Housing, Local Government and Heritage

2. Department of Environment, Climate and Communications
3. Department of Transport
4. Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media
5. Department of Agriculture, Food and the Marine
6. National Transport Authority
7. Transport Infrastructure Ireland
8. Arts Council (Chomhairle Ealaíon)
9. The Heritage Council
10. Health Service Executive
11. Geological Survey of Ireland
12. Environmental Protection Agency
13. Northern and Western Regional Assembly
14. National Parks and Wildlife Service
15. An Taisce
16. Inland Fisheries Ireland
17. Office of Public Works
18. Fáilte Ireland
19. Irish Water
20. Waterways Ireland
21. Health and Safety Authority

The notifications to the above bodies are contained in Appendix 1-1 with any responses received contained in Appendix 1-2 of this EIAR (Volume III). A number of other bodies were consulted as part of the preparation of individual chapters of the EIAR. The preparation of the Proposed Development has also been subject to community engagement, with a summary report on same contained in Appendix 1-4.

1.5. EIAR Team & Qualifications

HW Planning have coordinated the subject EIAR. Environmental specialist consultants were also commissioned for the various technical chapters of the EIAR document which are mandatorily required as per the EIA Directive and Planning and Development Regulations 2018. Each environmental specialist was required to characterise the receiving baseline environment; evaluate its significance and sensitivity; predict how the receiving environment will interact with the Proposed Development and to work with the EIA project design team to devise measures to mitigate any adverse environmental impacts identified.

A full list of all consultants and the corresponding chapters that have been prepared is detailed below.

Planning Consultants: HW Planning

Address: 5 Joyce House, Barrack Square, Ballincollig, Co. Cork.

Chapters Prepared: Chapter 1 - Introduction, Chapter 2 - Project Description, Chapter 3 - Alternatives Considered, Chapter 14 - Population & Human Beings, Chapter 15 - Interaction of Impacts and Chapter 16 - Summary of Mitigation Measures

Personnel: Conor Frehill - BA HONS, Master of Regional and Urban Planning, MRTPI.

Landscape and Visual Impact Architects: Macroworks

Address: Cherrywood Business Park, Loughlinstown, Dublin 18

Chapters Prepared: Chapter 4 - Landscape & Visual Impact

Personnel: Richard Barker and Jordan Derecourt., Both have master's degrees in landscape architecture and are full members of the Irish Landscape Institute.

Civil Engineers/Traffic Consultants: JB Barry & Partners

Address: 3 Eastgate Road, Eastgate Business Park, Little Island, Co. Cor, T45 KH74

Chapters Prepared: Chapter 5 - Material Assets - Traffic & Transportation Services, Chapter 7 - Land and Soils), Chapter 8 - Water (Hydrology & Hydrogeology).

Personnel: Alan Moriarty (Chapter 5) is a Chartered Civil Engineer and a Design Engineer - Traffic. Niall O'Brien (Chapter 7) is a Chartered Geotechnical Engineer. Kieran O'Dwyer (Chapter 8) is a Director with J. B. Barry and Partners.

Environmental Engineers: Malachy Walsh & Partners Consulting Engineers

Address: Reen Point, Blennerville, Tralee, Co. Kerry, Ireland.

Chapters Prepared: Chapter 6 - Material Assets - Infrastructure & Utilities and Shadow Flicker Assessment (Appendix 14.1).

Personnel: Caitriona Fox - (Chapter 6 Reviewer and Shadow Flicker Assessment), (BA, MSc) is a Senior Environmental Consultant, Roman Puotkalis (Chapter 6) (BSc, MSc), is an Environmental Consultant and Jeremy King (Shadow Flicker Assessment) (Cert IA, Cert CAD, HDip) is the lead Civil, Environmental and GIS technician.

Project Ecologist: Greenleaf Ecology - Environmental Consultants

Address: Coolnacaheragh, Lissacresig, Macroom, Co. Cork, Ireland

Chapters Prepared: Chapter 9 - Biodiversity, Chapter - 10 Ornithology

Personnel: Karen Banks (Chapter 9 and Chapter 10) (BSc (Hons) in Environment and Development) is the principal ecologist with Greenleaf Ecology. Lauren Williams (Chapter 9) (BSc PGDip MCIEEM) is a qualified freshwater ecologist.

Technical Specialist - Air Quality and Climate and Noise and Vibration: AWN Consulting

Chapters Prepared: Chapter 12 Air Quality and Climate, 13 - Noise

Personnel: Dr. Avril Challoner (Chapter 12) (BEng (Hons) in Environmental Engineering, HDip in Statistics, PhD in Environmental Engineering (Air Quality), Chartered Scientist (CSci), Chartered Environmentalist (CEnv)) is a Principal Consultant in the Air Quality section.

Mike Simms (Chapter 13) (BE and M. Eng Sc in Mechanical Engineering and is a member of the Institute of Acoustics (MIOA) and of the Institution of Engineering and Technology (MIET).) is a Principal Acoustic Consultant in the Acoustic Section.

Built Heritage/Archaeology: Laurence Dunne Archaeology Ltd

Address: 3, Lios na Lohart, Ballyvelly, Tralee, Co. Kerry.

Chapters Prepared: Chapter 11 - Cultural Heritage

Personnel: Laurence Dunne has over twenty years' experience in an extensive and diverse range of terrestrial and underwater projects.

1.6. Cumulative Impacts

Each of the projects listed in tables 1.1, 1.2 and 1.3 have been assessed for potential cumulative impacts. These projects were identified by using Galway County Council's Planning Enquiry Systems, An Bord Pleanála's website and the Department of Housing, Local Government and Heritage's EIA Portal.

Projects	Proximity to Development Lands	Description	Status
The proposed N59 Maigh Cuilinn (Moycullen) Bypass Road Project	4km	Comprises the construction of a 4.3km standard single carriageway road bypass of Maigh Cuilinn (Moycullen) village and all ancillary works	Under construction
The Connemara Greenway	2km	<p>The Connemara Greenway comprises the development of the dismantled Galway to Clifden railway line into a walking/cycling track (Greenway) between Oughterard and Clifden, over an approximate distance of 52.4km. Permission for the proposed Greenway Development was granted by An Bord Pleanála on the 20th of February 2013.</p> <p>The 2022 Draft CycleConnects Plan makes provision for a continuation of this greenway from Oughterard to Galway City. This is supported in Galway County Development Plan Policy. The</p>	Proposed

CycleConnects plan is due to be finalised and adopted in March 2023 with implementation following on after April 2023.

Table 1.1 Cumulative Impacts - Nearby Transport Projects Considered

Projects	Owner	No. of Turbines	Proximity to Development Lands	Description	Status
Ardderroo Wind Farm	Ardderroo Windfarm Ltd	25	27m	PA07.303086/303086 - Construction of up to 25 number wind turbines, one permanent meteorological mast, one 110kV substation and all associated site development works (as amended by references ABP 308302 and 314439).	Under construction
Inverin	Fuinneamh Teoranta	5	10 km southwest	PI. Ref: 96/1684: Application to construct a windfarm comprising 5 wind turbines in Inverin. Permission was granted in January 1997.	Existing
Galway Wind Park (overall 69 consented and 60 constructed) Cloosh	Coillte Teoranta and SSE Renewables (Ireland)Ltd	22 Consented 20 Constructed	4.3km west	PI. Ref: 10/303: Construction of a wind farm comprising 22 no. wind turbines with a maximum tip of 140.5 metres and associated infrastructure in Finnaun. Permission was granted by the Planning Authority in June 2010. Of the 22 no. permitted wind turbines, 20 have been constructed and are now operational. Extension of duration granted on 2/4/2020. This wind farm forms part of the Galway Wind Park.	Existing
Galway Wind Park - Uggool	SSE Renewables (Ireland) Ltd	16 Constructed	2.6km northwest	PI. Ref. 11/1735, as amended by the subsequent permissions	Existing

				<p>under PI. Ref. 13/460 and PI. Ref. 14/1423.</p> <p>This wind farm forms part of the Galway Wind Park development</p>	
Galway Wind Park Seecon	Coillte Teoranta and SSE Renewables (Ireland) Ltd	23 Consented 16 Constructed	5.2km southwest	<p>PI. Ref: 11/429: Application by Coillte Teoranta and SSE Renewables Ltd. for the construction of 23 no. wind turbines in Seecon. Permission was granted by the Planning Authority in March 2011. This was appealed to An Bord Pleanála and granted in November 2011 under PI.07.239118. Of the 23 no. permitted turbines 16 no. have been constructed and are now operational.</p> <p>This wind farm forms part of the Galway Wind Park.</p>	Existing
Galway Wind Park Seecon and Cloosh	Coillte Teoranta and SSE Renewables (Ireland) Ltd	9	3km west	<p>PI. 19/1481: application for a 10 year permission for development at Derradda, Seecon, Shannapheasteen, Uggool, Letter, Finnaun consisting of a change to the dimensions of nine previously consented turbines (Galway County Council Planning Reference 10/303 and 11/429 and An Bord Pleanala Planning Reference PL07.239118) from a maximum hub height of 90m and rotor diameter of 101m with a maximum turbine tip height of 140.5m, to a maximum rotor diameter of 138m with a maximum turbine tip height of 156m; Adjust the locations of three turbines as follows: T9 moved 6m, T30 moved 16m & T40 moved 16m; Provision of 1.9km of new internal wind farm</p>	Permitted

				<p>access roads, localised upgrades to existing access roads.</p> <p>Underground cable route connecting proposed turbines to the Knockranny substation at Letter, on or adjacent to existing wind farm roads. Three new borrow pits located adjacent to proposed T19, T20 and T31 for rock excavation and peat deposition; Extension of two existing / permitted borrow pit for the excavation of rock and the deposition of surplus peat material. All on a site of approximately 76.07ha.</p> <p>Permission was granted by the Planning Authority in March 2020 and granted under appeal to An Bord Pleanála in December 2020.</p>	
Lettercraffroe	SSE Renewables (Ireland) Ltd	8 Constructed	7.3km northwest	<p>PI. Ref: 10/1454: Application by SSE Renewable Ltd to construct a windfarm comprising 8 no. wind turbine and associated infrastructure in Lettercraffroe. Permission was granted by the Planning Authority in December 2010. This wind farm is now operational.</p> <p>PI. Ref: 13/375: Application by SSE Renewables Ltd. for amendments to the permitted substation and access road granted under PI. Ref 10/1454. Permission was granted by the Planning Authority in July 2013</p> <p>This wind farm forms part of the Galway Wind Park.</p>	Existing
Knockalough Wind Farm	Knockalough Wind Farm Ltd	11	3km south	<p>PI. Ref. 14/1273: Application by Knockalough Wind Farm Ltd. to construct a wind farm comprising</p>	Existing

				<p>11 no. turbines and associated infrastructure in the townlands of Knockalough, Finisklin and Laughil. Permission was granted by the Planning Authority on the 5th October 2015.</p> <p>PI. Ref. 16/1211: Application by Knockalough Wind Farm Ltd. for the relocation of one turbine (Turbine no. 4) and associated infrastructure of the previously permitted Knockalough Wind Farm (PI. Ref. 14/1273) and the provision of additional internal access road. Permission was granted by the Planning Authority in October 2016, and granted following appeal by An Bord Pleanála, under PL07.247605 in October 2017.</p>	
Leitir Gungaid (Lettergunnet)	Coir na Gaoithe Teoranta	10	6.9km south - southeast	<p>PI. Ref: 03/4656: Application for 8 no. turbines in Lettergunnet and Derrycrigh granted in May 2004.</p> <p>PI. Ref: 09/1326: Application to amend permission Ref 03/4656 to change the proposed turbine and increase the hub height from 60 metres to 64 metres. Permission was granted by the Planning Authority in August 2009 and granted under appeal to An Bord Pleanála in March 2010.</p> <p>PI. Ref: 10/1214: Application to amend PI. Ref: 09/1326 to comprise 10 no. wind turbines and changes to associated site layout. Permission was granted by the Planning Authority in March 2011.</p>	Existing
Letterpeck (Shannagurran & Truskaunngappul)	Coir na Gaoithe Teoranta	7	5.3km south	<p>PI. Ref: 10/1225: Application to construct a windfarm comprising of 7 no. wind turbines in Shannagurran and</p>	Existing

				Truskaunnagappul. Granted by the Planning Authority in September 2010 and granted on appeal to An Bord Pleanála in October 2011.	
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Table 1.2 Cumulative Impacts - Nearby Wind Energy Projects Considered

Projects	Proximity to Development Lands	Description	Status
Tree Felling - Coilte Owenboliska Sub Catchment / Biodiversity Enhancement Area	27m	Coillte have a felling programme in operation in the area. Based on publicly available information (ref. Coillte website), the total area of forestry to be felled over the 9-year period from 2019-2027 is 697.82 hectares, 456.05 hectares of which has already been felled (as at February 2023).	Ongoing
		Coilte also propose to fell an additional 13.8 hectares of forestry within the Ardderroo Wind Farm boundary as part of a bog restoration plan, subject to licensing.	Proposed
Selected Domestic / Agricultural Projects ² within 2.5km	2.25km south	Planning permission for the erection of dwelling house and garage (Pl. Ref: 211486).	Proposed
	1.5km south	Planning permission for the construction of new storage shed and all associated ancillary concrete works (Pl. Ref: 212041).	Proposed
	1.44km southwest	Planning permission for a dwelling house and garage (Pl. 211811).	Proposed
	2.3km south	Planning Permission for a domestic shed (Pl. Ref: 181382)	Proposed

Table 1.3 Cumulative Impacts - Other Projects Considered

² Based on a review of Galway County Council's Planning Enquiry system, as accessed on 14th April 2023.

2. DEVELOPMENT DESCRIPTION

2.1. Introduction

This Chapter provides a description of the Proposed Development. The EIA Directive requires that an EIAR should provide an overview of:

- the location, site, design, size, etc.;
- the physical characteristics of Project (including any demolition or land-use requirements);
- the characteristics of the operational phase of the Project;
- any residues, emissions, or waste expected during either the construction or the operational phase.

This chapter describes the nature, location and specific characteristics of the Proposed Development during construction, operational and decommissioning phases in accordance with the 2014 Directive.

2.2. Site Context

The site of the Proposed Development is located in the townlands of Knockranny, Ardderroo and Letter, County Galway, c.4.5 kilometres north-west of the small town of Moycullen and c. 3km to the south-west of the village of Rosscahill.

The N59 (Galway - Clifden) National Secondary Road runs c. 2km to the east. The subject site is accessed via the L-53453 off the N59 which transitions to private roadway. This is the primary access route for the Ardderroo Wind Farm, the Galway Wind Park and local access.

The site is in a remote upland area, where hills are interspersed with rough grazing, pockets of commercial forestry, and lowland blanket bog, cutover bog and wet heath areas. Land uses within the site and in the general area, include forestry, agriculture and evident of previous turbary. There are two large tracts of commercial coniferous forestry on the site, a section to the south and also on the west. A small stand of broadleaf trees also existing to the east of the site. The grid connection underground cabling route is contained within and adjacent to the existing Coillte access tracks that provides access to Coillte commercial forestry, wind farms (including the Ardderroo Wind Farm) and local land use (agriculture & turbary). The route is bounded by peat banks and extensive areas of Coillte commercial forestry.

There is a notable presence of wind projects in the local area, with the 25 turbine Ardderroo Wind Farm under construction immediately to the west, and the Galway Wind Park (60 turbines in operation) to the west and north-west of the site. A number of other wind farms are located to the south.

Knocknalee Hill, to the north-west reaches an elevation of 288mOD, while to the south-east Newtown Hill is 198mOD. Within the subject site there are two distinct peaks, one to the west at 134mOD and Knockranny Hill to the east at 183mOD. The land slopes from these summits to relatively flat ground in the lower slopes. The site is underlain by granite rock and there is an abundance of exposed rock interspersed with shallow soils throughout the site.

A number of streams drain the site, one of which 'Sruthan Chnocan Raithni' traverses the subject lands. The 'Lough Adereen Stream', 'Abhainn na nArd Doiriú' and 'Sruthan Bui' occur along or near site boundaries.

The N59 is situated to the east of the EIAR boundary, beyond which the lands transition to predominantly flat terrain which slopes gently eastwards to the shore of Lough Corrib (SAC and SPA). Settlements and population clusters are aligned along the N59.

2.3. Statutory Development Description

Western Power Developments Ltd are seeking planning permission for development in the townlands at Cnoc Raithni (Knockranny), Na hArd-Doiriú (Ardderroo) and Leitir (Letter), Moycullen, Co. Galway. The development will consist of the following:

1. Alterations to the Cnoc Raithni (Knockranny) Wind Farm (Galway County Council Planning Ref. No. 13/829 and An Bord Pleanála Ref: 07.243094) comprising 11 no. wind turbines with an overall ground to blade tip height of 150m (an increase of 19.5m & 9.5m from 130.5m & 140.5m, as previously permitted), a rotor blade length of 68m or 69m and a hub height of 81m or 82m; associated increase in turbine foundations; and omission of permitted on-site 110kV substation and underground cabling;
2. Provision of underground electrical (33kV) and communications cabling connecting the 11 no. wind turbines to the Ardderroo wind farm substation for the purposes of connection to the national grid, including a new cable service track (with watercourse/culvert crossings) and widening of an existing access road; extension of the Ardderroo substation within the existing substation compound, including control building extension, new 110kV transformer and electrical plant & apparatus;
3. All associated site development and ancillary works above and below ground in support of the above, including site drainage and tree felling;
4. An operational period and planning permission duration to align with the existing permission (An Bord Pleanála Ref: 07.243094) is sought.

2.4. Turbine Delivery

The turbine delivery route remains largely unchanged from that of the Permitted Development, with the exception that the turbines will now be delivered from Galway Port as opposed to from Foynes. The proposed route was recently utilised for the delivery of the adjacent Ardderroo Wind Farm turbines.

The route incorporates:

- The N59 national road from Galway City
- The L53453
- Forestry Road

2.5. Description of Construction Phase

2.5.1 Construction Programme and Phasing

It is the Applicants intention to apply for planning permission of a duration that aligns with that of the Permitted Development. This will enable concurrent construction of the Proposed Development and the Permitted Development.

The Permitted Development programme of works outlined that the estimated total project duration would be of the order of 16-18 months. In the previous EIS it was envisaged that the delivery of the Permitted Development, including grid connection and underground cabling, would take this duration. It noted however that this was dependent on how effectively the works are scheduled to coincide with each other and relates directly to existing environmental and user constraints. It is expected that the Proposed Development will not significantly alter the original project programme, with the construction works carried out in the following phased manner:

- As the internal site access roads are constructed up to each turbine, hardstanding areas for the crane, turbine foundations and building foundations will be prepared.
- Once the roads are completed, the trenching and laying of underground cabling adjacent to the roads will begin.
- Construction of the extension to the Ardderroo sub-station and control building will commence so that they will be ready to export power as turbines are commissioned.

The development sequencing as set out in the previous EIS is considered to remain applicable for the Proposed Development. Some identified activities will overlap or be undertaken concurrently.

The site working hours are expected to be 07:00 to 19:00 Monday to Saturdays with no site work generally on Sundays and bank holidays, except in circumstances where contractors see suitable weather windows outside of these times for the construction of the wind turbines. Material deliveries may be taken outside these times on certain occasions.

Work outside these hours is not usual, though if it was required to meet specific short-term demands, the Local Authority would be informed, as required.

2.6 Construction Phase

2.6.1 General Construction Methodology

The Proposed Development will be constructed in accordance with documented ISO 14001 (2015)² environmental management procedures to ensure compliance with applicable environmental legislation and best practice. Effective communication underpins the whole system of environmental management, ensuring appropriate information passes between the Applicant and the consultants / contractors engaged. This ensures that environmental considerations are fully integrated into the management of the development throughout construction, the operation, and maintenance of the completed project and ultimately to decommissioning.

2.6.2 Construction Environment Management Plan

Standard construction working practices will be implemented during construction and any maintenance works, in order to ensure adherence to relevant guidance and other current best practice. The construction of the Proposed Development will occur as part of the wider construction of the Permitted Development. A Construction Environmental Management Plan (CEMP) has been prepared for the Project, inclusive of Permitted and Proposed Developments which will be implemented in full during the construction stage (ref. Appendix 2.1).

Prior to the commencement of construction works, the Applicant will submit to the planning authority a Traffic Management Plan (TMP). The delivery route for abnormal loads and general traffic is established based on the Permitted Development. A Framework TMP has been provided in the CEMP.

The Applicant will retain the services of specialist advisers, for example on archaeology, ecology, and peat restoration, to be called on, as required, to advise on specific issues, as identified in the relevant technical sections, where appropriate.

The CEMP sets out how the Project would be constructed and the mitigation commitments as included in the chapters of this EIA and the EIS for the Permitted Development. These commitments include both specific mitigation measures as well as proposals for monitoring and emergency procedures. Such emergency procedures include a site-specific Pollution Incident Response Plan in order to prevent and mitigate damage to the environment caused by accidents such as spillages and fires.

The CEMP has been produced to capture a diverse range of environmental management controls.

The CEMP requires pre-commencement agreement with the appropriate planning authorities and bodies, prior to construction. In order to ensure that the CEMP is being suitably adhered to by the appointed contractors, a qualified Environmental Clerk of Works (ECoW) would be employed during the construction phase of the project to monitor implementation of the CEMP and provide specialist advice. The ECoW would liaise with the various environmental, archaeological and other advisers who would have input into the project to ensure compliance is met in relation to any imposed planning conditions as well as the approved CEMP.

2.7 Operational Phase

It is considered that the operational effects of the Proposed Development will not be altered from those of the Permitted Development as outlined in the EIS.

2.7.1 Commissioning

As outlined in the EIS wind farm commissioning can take 4-6 months to complete after the erection of the final turbine. It involves commissioning engineers working through an entire schedule of SCADA (Supervisory Control and Data Acquisition) and electrical testing and control measures to ensure the wind farm will perform and export power to the national grid, as designed.

As the EIS noted all turbines have to be checked, commissioned and powered up for testing and final sign off. All underground electrical cabling and SCADA network cabling is also checked and tested. The connection to the Ardderroo substation facility in addition has to be tested. At the end of the commissioning stage the wind farm is then fully operational and exporting power onto the national grid via the underground grid connection route.

2.7.2 Turbine Maintenance

In line with the EIS for the Permitted Development, during the operation of the wind farm, the turbine manufacturer, the developer or a service company will carry out regular maintenance of the turbines. As noted in the EIS:

- During the life of the project, it is envisaged that at least two permanent jobs will be created locally in the form of an operator or maintenance personnel.
- In addition, operation and monitoring activities may be carried out remotely with the aid of computers connected via a telephone broadband link.
- Routine inspection and preventive maintenance visits will be necessary to ensure the smooth and efficient running of the wind farm.

- At the end of the 25 year lifespan of the project, the developers will make the decision whether to repower or decommission the turbines. Any operation of the wind farm beyond the 25 year lifespan will be subject to a new planning permission application.

2.8 Decommissioning

It is considered that the decommissioning effects of the Proposed Development will not be altered from those of the Permitted Development as outlined in the EIS.

As set out in Condition 4 of the planning permission grant relating to the Permitted Development, the permitted operational lifespan is up to 25 years from full and final commissioning of all the of the proposed turbines. This is also the intended operational lifespan of the Proposed Development. At the end of the 25 year operational period, the wind farm would be decommissioned and the turbines dismantled and removed in line with Condition 12. Any alternative to this action would require consent and is not considered in this EIA Report.

During decommissioning, the turbines and foundations would likely be dismantled to below ground level in reverse order to how they were erected. All above ground turbine components would be separated and removed off-site for recycling. The recycling of turbine blades is currently the subject of significant research focus and it is envisaged that at the end of the wind farm lifespan the recycling of all turbine parts will be commonplace. The below ground elements and the crane hardstandings will be left in situ, along with the site roads, for use by the landowner. This approach is considered to be less environmentally damaging than seeking to remove foundations, cables and roads entirely. The approach to decommissioning will be confirmed based on best practice at the time. A decommissioning plan will be agreed with Galway County Council three months prior to decommissioning the Proposed Development. A decommissioning plan is contained in the CEMP in Appendix 2.1.

3. ALTERNATIVES CONSIDERED

3.1. Introduction

Article 5(1) of the Directive 2011/92/EU, as amended by Directive 2014/52/EU states that.

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

f) any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected'.

Annex IV point 2 expands further.

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

Article 94 and Schedule 6, paragraph 1(d) of the Planning and Development Regulations 2001, as amended, requires the following information to be furnished in relation to alternatives:

'(d) A description of the reasonable alternatives studied by the person or persons who prepared the EIAR, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the proposed development on the environment.'

The purpose of this Chapter is to describe the reasonable alternatives considered by the developer, including alternatives considered through the design and consultation phases of the project, taking into account and comparing environmental effects and illustrating the manner in which, and reasons for, choosing the Proposed Development.

Regarding 'Reasonable Alternatives', the Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment' (2018) states that:

"The Directive requires that information provided by the developer in an EIAR shall include a description of the reasonable alternatives studied by the developer. These are reasonable alternatives which are relevant to the project and its specific characteristics. The developer must also indicate the main reasons for the option chosen taking into account the effects of the project on the environment.

Reasonable alternatives may relate to matters such as project design, technology, location, size and scale. The type of alternatives will depend on the nature of the project proposed and the characteristics of the receiving environment. For example, some projects may be site specific so the consideration of alternative

sites may not be relevant. It is generally sufficient for the developer to provide a broad description of each main alternative studied and the key environmental issues associated with each. A 'mini- EIA' is not required for each alternative studied."

Further the 2022 Guidelines are also instructive in stating:

'Analysis of high-level or sectoral strategic alternatives should not be expected within a project level EIAR ... It should be borne in mind that the amended Directive refers to 'reasonable alternatives... which are relevant to the proposed project and its specific characteristics'.

This chapter provides an outline of the main alternatives examined throughout the design and consultation process to indicate the primary reasons for choosing the Proposed Development, considering and providing a comparison of the environmental effects.

3.2 Alternative Locations

As stated above, regarding alternative locations, Section 3.4.1 of the 2022 EPA Guidelines, recognise that "in some instances some of the alternatives described below will not be applicable- e.g. there may be no relevant 'alternative location'...".

The subject lands are available to Western Power Developments Limited, with planning permission already extant for an 11 no. turbine windfarm at this location, therefore, the principle of wind energy development is firmly established at this location. The suitability of the subject lands is evident in the fact that they are principally located within a strategic wind energy area in the County Galway Local Authority Renewable Energy Strategy (LARES) Wind Development Potential Map and in the fact that they are adjacent to the largest onshore wind farm in Ireland (Galway Wind Park - 172MW) and immediately adjacent to Ardderroo Wind Farm.

The existing planning permission for an 11 no. turbine wind farm, (as permitted under Galway County Council Reference 13/829 / An Bord Pleanála Reference PL07.243094) also indicates that the environmental effects have already been assessed by the Council, consultees, and An Bord Pleanála (ABP) and considered to be acceptable. Western Power Developments Limited have not yet had an opportunity to construct the consented Wind Farm but are now taking steps to implement this planning permission.

A reasonable alternative would have been for Western Power Developments Limited to identify and assess a new wind farm site which could have resulted in significant environmental effects at the alternative location. However, as the existing planning permission indicates, the subject site has a proven capacity to accommodate a large-scale wind farm development.

Alongside that the subject lands have largely been identified in the Galway County Development Plan 2015 as well as the current CDP, as a strategic area for wind energy development. Both plans have been subject to Strategic Environmental Assessment which will have taken into account the environmental considerations associated, for example, with the cumulative impact of an area zoned for development on a sensitive landscape.

We note the 2022 EPA Guidelines, which state.

Analysis of high-level or sectoral strategic alternatives cannot reasonably be expected within a project level EIAR... It should be borne in mind that the amended Directive refers to 'reasonable alternatives... which are relevant to the proposed project and its specific characteristics.

3.3 Do-Nothing Alternative

In consideration of the 'do nothing' scenario on the site, the permitted turbines would proceed unamended and the opportunity to increase the generating potential of the site would be lost. The permitted on-site substation would have to be constructed instead of the more efficient extension to the Ardderroo Substation, and an alternative technical solution would be required to facilitate the underground cabling grid connection directly in the West Galway substation. Therefore, the 'do-nothing scenario' represents a significantly lower contribution to achieving the country's renewable energy targets and in reducing Ireland's dependency on fossil fuels.

A "do-nothing" scenario is considered to represent an inappropriate unsustainable and inefficient use of lands on which a wind farm project is permitted, broadly within a designated strategic wind area within County Galway, which is recognised in the County Development Plan 2022 (CDP) to have 'above average wind energy potential ...in both onshore and offshore'.

3.4 Alternative Layout and Design

As part of Western Power Developments Limited's technical review of the permitted wind farm, consideration was given to potentially redesigning the permitted wind farm turbine layout and increasing the turbine heights further than that proposed.

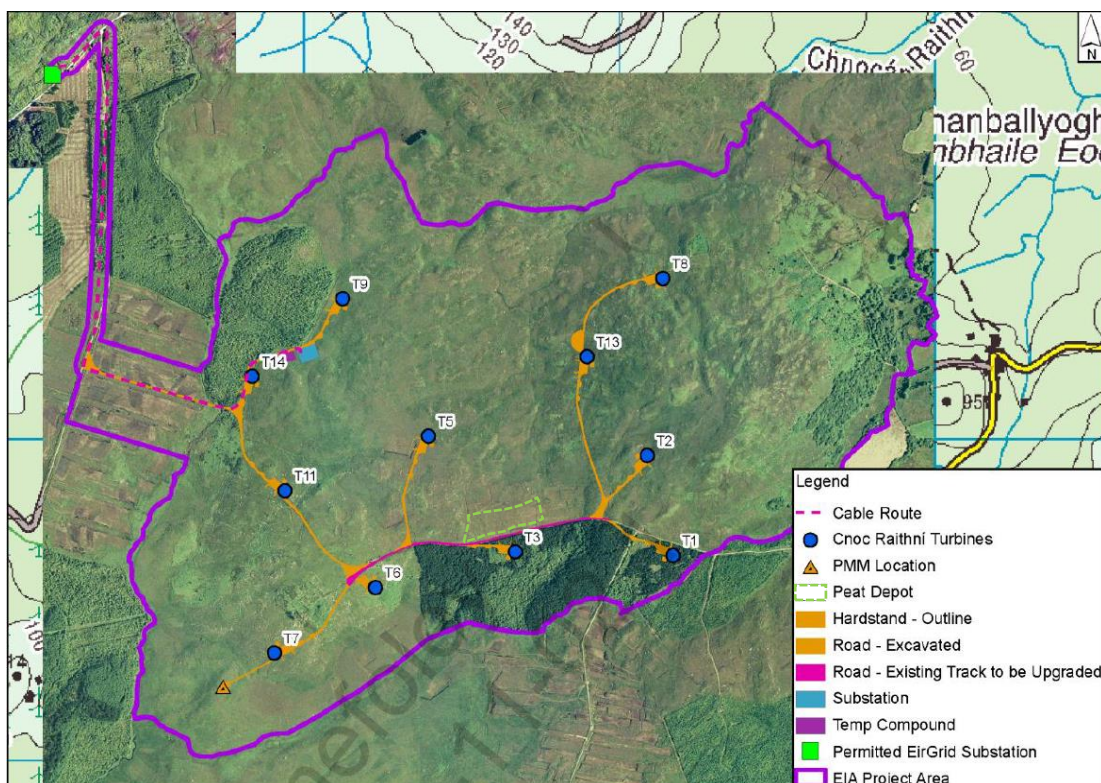


Figure 3.1 Summary Outline of Permitted Windfarm and associated EIA Study Area (based on Fig 2.4 Malachy Walsh EIA 2013)

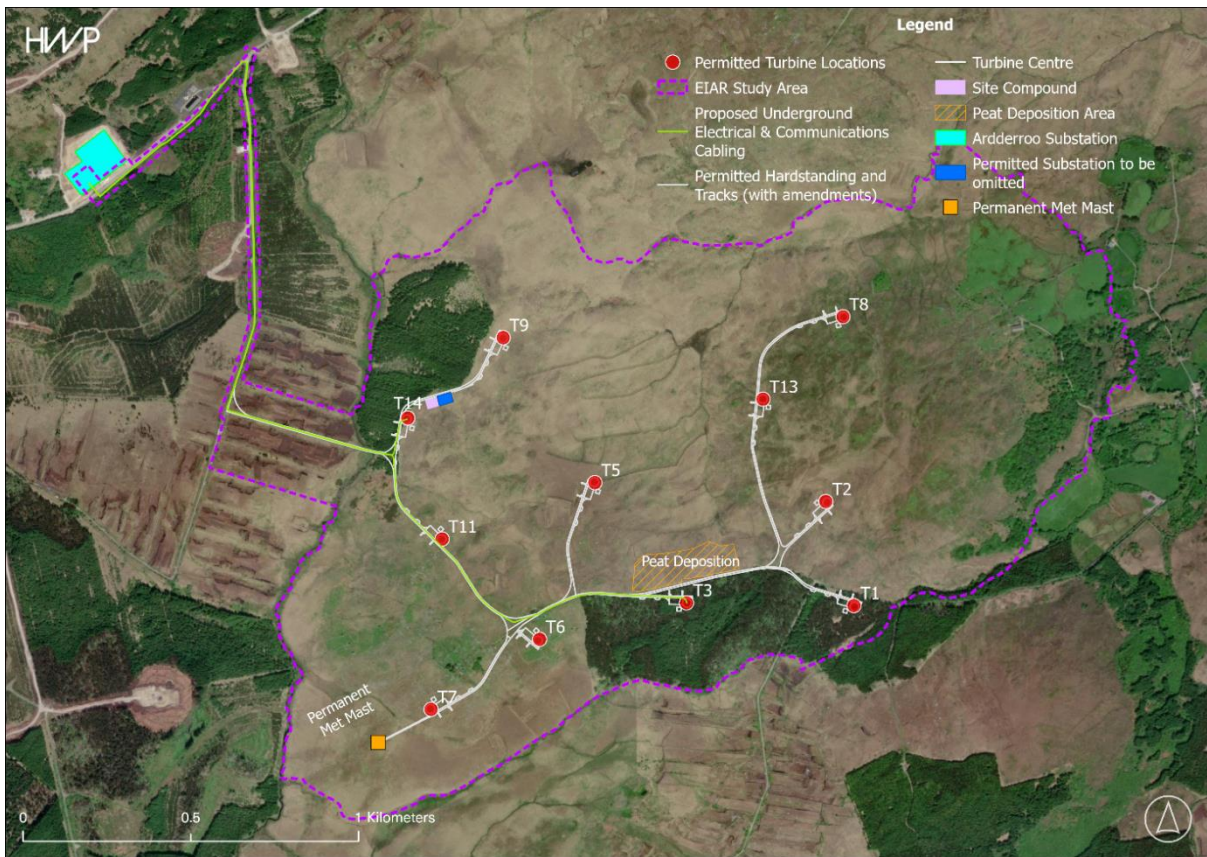


Figure 3.2 Proposed Alterations to Wind Farm

Following a review of the potential impacts that could arise from redesigning the permitted turbine layout; the Applicant has resolved to minimise the potential for any increased environmental effects by maintaining the same number of turbines in an unchanged turbine layout configuration from the Permitted Development.

The permitted tip height of up to 140.5m has been reconsidered having regard to turbine technology developments since the original layout design in 2013, with a standard tip height of 150m now being proposed. This will result in a significant uplift in generating capacity of c.14 - 16 MW. The proposed change will necessitate some revisions to the size of supporting foundations.

However, while in the original permitted layout, 6 no. turbines had a hub height of 90m and 5 no. turbines had a hub height of 80m, it is now proposed that all turbines will have a hub height of 81m or 82m depending on the chosen option of the two options assessed in this EIAR. The reduced visual impact resulting from the proposed reduction in hub height of the majority of turbines will contribute towards balancing any increased visual impact arising from the increased tip-height.

The rationale behind the permitted on-site substation was examined in the context of the recent construction of Ardderro substation in the vicinity. It was determined that the permitted 110kV on-site substation and connection to Galway West (Knockranny) Substation is no longer the optimal approach. This has therefore been omitted from the Permitted Development, which now includes amendments to the previously assessed underground cabling to provide a grid connection via an extension to the Ardderro substation.

3.5 Construction Stage

The proposed layout has been selected in order to minimise the changes to the processes which were deemed acceptable in the Permitted Development. However, the use of any additional resources will be managed by the employment of standard, good practice construction methods and construction management plans as outlined in the enclosed CEMP (ref. Appendix 2.1). In addition, the CEMP covers elements such as waste management practices. An alternative to this approach would be to deviate from the previously accepted and best practice construction methodologies and processes which was not the preferred option.

3.6 Operational Stage

The processes used during the operational phase of any wind farm, are relatively minimal i.e. there is no requirement for the use of natural resources, significant traffic volumes or the generation of waste. It is not envisaged, therefore, that the proposed amendment, will give rise to any significant additional operational processes.

The increased turbine dimensions could potentially result in increased operational impacts. These have been specifically assessed in the relevant chapters of this EIAR, with appropriate mitigation recommended where considered necessary to ensure no significant residual impact arises.

3.7 Alternative Mitigation

The original EIS fully assessed all environmental aspects and proposed suitable mitigation where required. These measures, in conjunction with the conditions attached by An Bord Pleanála (ABP) in their decision to grant permission (An Bord Pleanála Reference PL07.243094) form a comprehensive suite of mitigation measures which will ensure that potential risks are minimised.

The individual chapters of this EIAR contain analysis of the proposed amendments in comparison with the Permitted Development and further mitigation measures have been proposed where required to ensure any potential effects arising from the Proposed Development will not result in a significant impact. An alternative to this approach would be to deviate from the best practice mitigation and monitoring proposals that were set out in the original Permitted Development documentation and further supplemented where necessary in the EIAR, this was not the preferred option.

3.8 Conclusion

As required under Article 5(1) of the Directive 2011/92/EU, as amended by Directive 2014/52/EU the applicant has considered the various reasonable alternatives to the Proposed Development.

The primary consideration of the Applicant in so doing was to minimise environmental impacts while ensuring the optimal and most efficient use of these lands, which are broadly designated by Galway County Council as a strategic area for wind potential. The Proposed Development will positively contribute towards the achievement of Ireland's onshore wind capacity targets and support the transition to a low carbon society and economy. The principal elements of the design evolution were informed by advances in turbine technology and changes in the available electricity infrastructure provision in the immediate vicinity of the site. It is considered to be an appropriate balance between optimising the wind farm's renewable energy generation capacity, whilst avoiding or minimising the introduction of new and significant adverse environmental effects.

4. LANDSCAPE AND VISUAL IMPACT

4.1. Introduction

Chapter 4 presents the findings of a Landscape and Visual Impact Assessment (LVIA) undertaken to evaluate the effects of the Proposed Development relative to the Permitted Development at Cnoc Raithni (Knockranny), Wind Farm. In accordance with relevant guidance, landscape impacts and visual impacts are assessed separately.

Landscape Impact Assessment (LIA) relates to changes in the physical landscape brought about by a development, which may alter its character, and how this is experienced. Visual Impact Assessment (VIA) relates to assessing effects on specific views and on the general visual amenity experienced by people. This deals with how the surroundings of individuals or groups of people may be specifically affected by changes in the content and character of views as a result of the change or loss of existing elements of the landscape and/or introduction of new elements. Cumulative landscape and visual impact assessment is concerned with additional changes to the landscape or visual amenity caused by the Proposed Development in conjunction with other developments (associated or separate to it).

The LVIA uses methodology as prescribed in the following guidance documents:

- Environmental Protection Agency (EPA) publication 'Guidelines on the Information to be contained in Environmental Impact Statements (2022) and the accompanying Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (Draft 2015).
- Landscape Institute and the Institute of Environmental Management and Assessment publication entitled Guidelines for Landscape and Visual Impact Assessment – Third Addition (2013).
- NatureScot Guidance: Assessing the cumulative landscape and visual impact of onshore wind energy developments
- Department of the Environment, Heritage and Local Government Wind Energy Development Guidelines (2006) and reference to Preferred Draft Approach to revising the 2006 Guidance published 2017 and Draft Wind Energy Development Guidelines, published 2019.
- Scottish Natural Heritage (SNH) Visual representation of wind farms: Best Practice Guidelines (version 2.2 - 2017).

In accordance with the Department of the Environment, Heritage and Local Government Wind Energy Development Guidelines 2006³, the study area for the LVIA is 20km radius and the methodology consists of an initial desktop study followed by fieldwork and finally the appraisal, which weigh landscape / visual sensitivity against the magnitude of landscape / visual change to assess the overall significance of effects.

4.2. Baseline

The site is located to the north of a pair of summits which measure 134m and 183m, while the surrounding landform trends generally downhill towards Lough Corrib to the east, and upwards to the north/west. To the west, these areas are punctuated with evenly distributed, frequent small loughs and connecting waterways. To the northeast, continuous rolling bog is backed by upland areas, while the southwest transitions into coastal bog and marginal farmland with frequent small

³ Subsequently referred to as Wind Energy Development Guidelines (WEDG) in different sections of this EIAR.

loughs that blend seamlessly with the intricate inlets and islands of the Connemara coastline. Further south, a broad undulating area of hill country with numerous loughs and rivers, drains towards the northern coast of Galway Bay (Cois Fharraige) which runs in a uniform east/west manner across the southern section of the study area. The northeast of the study area is defined by the far shoreline of Lough Corrib, while the southeast features the lower sections of the lough as it narrows and flows to the head of Galway Bay.

The vegetation and land use follows the varied topography of the study area. Throughout the north-eastern Lake and farmland context, shoreline and peninsula farmland mixes with riparian scrub and woodland and is dotted with rural residences and holiday homes vying for lake views. The far north of the study area is the transition between Lough Corrib and the mountainous areas to the northwest, with a generally naturalistic land cover of blanket bog or exposed rock and scree slopes with occasional blocks of commercial conifer plantation on mid slopes then giving way to valley farmland. The southwest is predominantly contained in coastal peat bog with very occasional patches of forest plantation and farmland where drainage allows. Finally, the south of the site shares similar land cover characteristics to the site, is contained in a combination of naturalistic moorland and large conifer plantations before transitioning to sloping farmland and a dense cover of holiday homes and farm residences along the coast of Galway Bay/ Cois Fharraige. Of particular note is that the central west of the study area has also become synonymous with wind energy developments (Galway Wind Park) in recent decades and numerous turbines are contained within predominantly the forested areas.

The largest centre of population in the Study Area is Galway City, the periphery of which is located approximately 10km southeast of the site. Other notable settlements include Oughterard (8.5km from the nearest turbine), Moycullen (5km east/southeast), Spiddal (11km south), Bearna (12.6km southeast), and Headford (16.3km northeast). The densest concentration of transport routes is at the southeast edge of the study area, where numerous national and regional level roads intersect around Galway. The most important transport route to the LVIA is the N59, which runs in a general southeast/northwest direction along Lough Corrib from Galway, it is 2.5km to the south at its nearest point.

In terms of landscape / visual policy and designations, the site is considered to be most associated with the 'Transitional Marginal Landscapes' landscape character type from the Wind Energy Development Guidelines. Within the Galway County Development Plan, the Galway Landscape Character Assessment identifies that the site is contained within the 'Upland and Bog' landscape type and the more geographically specific character unit '3d - South Connemara'. This is described as an *"Extensive plateaux of blanket bog, small lakes and extensive forestry. Largely un-enclosed and unoccupied"*. There is also a series of designated scenic routes and views identified within the study area and those that are deemed relevant to the Proposed Development are outlined in Table 4.8 of Chapter 4 in the EIAR. The Galway Local Authority Renewable Energy Strategy (LARES) indicates that the majority of the site is contained within a Strategic Area for wind energy development, but that the eastern portion of the site is within an area identified as 'Not Normally Permissible'. It is noted that all of the site was previously in a defined Strategic Area, but this has changed under the Galway County Development Plan 2022-2028. Based on a review of this matter, and as set out in Chapter 4, there is no sound justification for the partial change in designation, which is not considered to be a material issue for the application.

4.3. Assessment

Landscape impacts were assessed in relation to the construction, operational and decommissioning stages of the project and these were assessed relative to a baseline condition of the Permitted

Development. There will be no material difference to the physical landscape of the site, so it is considered that construction and decommissioning stage effects will be 'Imperceptible'. However, during the operational stage, the taller turbines will result in a 'Slight-imperceptible' significance of impact that will be of a marginally negative (Neutral-Negative) quality relative to their permitted counterparts.

Visual impacts were assessed at a total of 21 viewpoint (VP) locations largely based on those that were used for the original LVIA for the permitted wind farm. The highest significance of visual impact is 'Slight' and this occurs at just one location (VP7 - Ross Demesne). The actual magnitude of change is no higher than at any of the other locations (Low-negligible), it is just that the High sensitivity of this receptor renders the significance marginally greater than the 'Slight-imperceptible' judgements attributed to five of the other locations (VP6, VP8, VP9, VP10, VP11 and VP21). These are all viewpoints within the Central Study Area, where the variation in scale between the permitted and proposed turbines is more discernible. At the remaining 14 VP locations, the scale variation may be discernible, but it is not considered to have any material bearing on visual amenity. Thus, the significance of visual impacts at these locations is deemed to be 'Imperceptible'.

There is not considered to be any material construction stage cumulative effects of an adverse quality because the adjacent Ardderroo Wind Farm and its associated substation will be fully completed before construction of the Knockranny development commences. The fact that the Proposed Development will now tie in to the existing Ardderroo substation rather than constructing a separate substation facility is likely to result in a beneficial cumulative impact relative to the Permitted Development.

Overall, there is not considered to be any significant Landscape Impacts, Visual Impacts or Cumulative Impacts arising from the Proposed Development.

5. MATERIAL ASSETS – TRAFFIC AND TRANSPORTATION

5.1. Introduction

This Traffic and Transport Assessment (“TTA”) examines all construction related traffic, including material and turbine deliveries, and staff traffic as well the impacts of the underground cabling and grid connection route (between the Proposed Development and Ardderroo Substation) on existing carriageways, with a view to assessing any additional effects, over and above those identified in the Permitted Development EIS.

5.2. Baseline

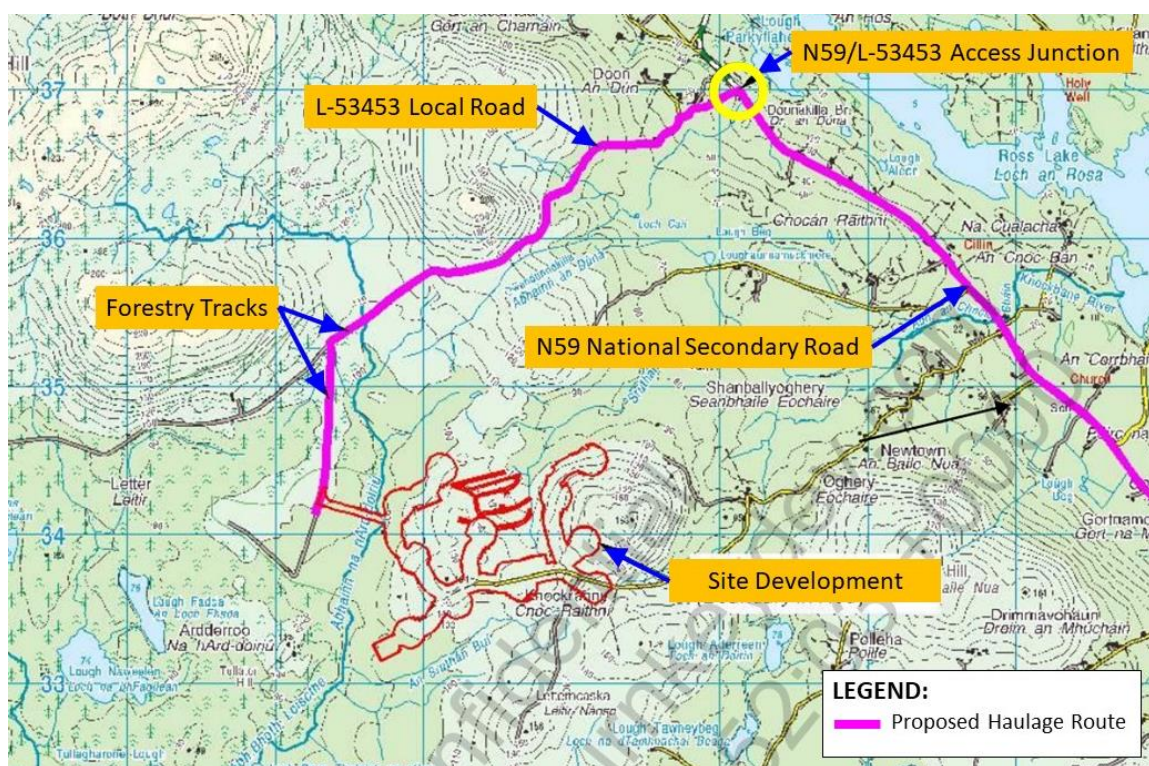


Figure 5.1 Local Traffic Access Context

The N59 National Secondary Road runs northwest to southeast approximately 2.5 kilometres east of the Site as shown above. The L-53453 intersects the N59 at Doon, forming a priority-controlled junction approximately 3 kilometres northeast of the Site. A network of minor agricultural, turbarry and forestry access roads (approximately 4 kilometres) connects the L-53453 with the Site. The roads are utilised by forestry operations, existing wind farms and local residents (including hauling turf and associated equipment).

5.3. Assessment

The TTA estimates the trip generation and examines the potential impact of the Proposed Development on the local road network.

Due to the nature of works, the different construction elements, including earthworks, road works, concreting to turbine foundations, backfilling, mechanical installations, electrical installation, etc., will be constructed sequentially. Based on the information provided by the design team, the peak construction traffic trips under the Proposed Development would occur during concrete pouring for turbine foundations and other construction works will be programmed to ensure that they do not coincide with the peak period related to the concrete pouring for turbine foundations. As a result of the proposed increase of the size of 11 wind turbines for the Proposed Development, it has been estimated that the concrete required for each turbine foundation would increase from 500 m³ to 675m³, and this would generate a maximum of 44 movements (22 inbound and 22 outbound) additional daily HGV trips during the peak construction period under the Proposed Development.

The projected 2025 background traffic flows have been calculated by factoring up the 2023 baseline year AADT flows in accordance with the TII Project Appraisal Guidelines for National Roads - Unit 5.3 Travel Demand Projections, Table 6.2: Link-Based Growth Rates: County Annual Growth Rates (excluding Metropolitan Area). The medium growth rate factors have been utilised. Additional traffic flows due to the Proposed Development have been then applied to 2025 background traffic flows and trip generation by the other wind farm developments (i.e. Ardderroo Wind Farm development and Galway Wind Park) to develop the 2025 "Assessment of Effects During Construction" scenario for the Proposed Development.

The analysis demonstrates that N59 - Northwest and L-53453 will operate within the normal design threshold for Level of Service D under 2025 "Assessment of Effects During Construction" scenario for the Proposed Development. However, N59 - Southeast will operate slightly over the normal design threshold under 2025 "Assessment of Effects During Construction" scenario for the Proposed Development. The proposed increase of the size of 11 wind turbines for the Proposed Development will generate an additional 44 two-way daily HGV trips during the peak construction period. This level of additional traffic to that of the Permitted Development will have only a minimal impact on the surrounding roads. As a conservative approach was adopted in this assessment and the maximum additional peak HGV traffic flows generated by the Cnoc Raithní (Knockranny) Wind Farm development under the Proposed Development would occur over an 11-day period, the traffic impacts on the surrounding roads during the construction phase would be considered as "Not Significant" and "Temporary Effects" as a result of the Proposed Development.

There will be no additional trips generated during the operation of the site as a result of the Proposed Development.

Chapter 5 of the EIAR recommends a number of best practice measures to mitigate the traffic impacts associated with the development during the construction, operational and decommissioning phases. To further minimize the traffic impacts to public, a Traffic Management Plan would be prepared in consultation and agreement with the relevant project developers to minimize peak construction traffic flows, in particular HGV traffic associated with concrete pouring for turbine foundations. No significant cumulative impacts have been identified with other projects.

6. MATERIAL ASSETS – SERVICES, INFRASTRUCTURE AND UTILITIES

6.1. Introduction

This assessment identifies Material Assets within the vicinity of proposed Wind Farm site or which will be utilised by the development. Material Assets provided within this Chapter are discussed in the context of built services and waste management. Built Services include electricity supply and infrastructure, aviation, television (TV) and telecommunications (Telecoms), water supply and wastewater infrastructure.

6.2. Baseline & Consultation

Existing electricity infrastructure in the vicinity of the Proposed Development includes the 110kV Connemara overhead line, the Knockranny (West Galway) 110kV substation and the recently constructed Ardderroo windfarm 110kV substation.

A review of the Digital Television service (known as Saorview) coverage map indicates that TV reception in the area is principally received from MAGHERA transmitter located 56km to the south east of the Proposed Development site. The Saorview coverage map also indicates that Saorview service coverage is currently a challenge in some areas surrounding the Proposed Development site.

Mobile network operators with masts and communication links in the area include eir Mobile, Vodafone, Three and Imagine Communications Ireland. The closest telecommunication masts are located approximately 2.3km north of the Proposed Development. There are five masts located at this location.

There is currently no public wastewater or water supply infrastructure within or in proximity to the Proposed Development site.

A desk study of available information from the EPA did not identify any waste facilities within a 2km radius of the wind farm site. There are suitable licensed facilities within 20km of the Proposed Development capable to accept waste associated with the Proposed Development.

The nearest airports to the Proposed Development are Galway Airport located approximately 18km to the southeast and Connemara airport located approximately 24km to the south west.

Consultations with TV, Telecoms and Air Navigation operators in the area were carried out to determine any potential impacts that they identified as a result of the Proposed Development. Table 6.1 provides a summary of the consultations completed. Full responses from correspondence with consultees is included EIAR Volume III - Appendix 6-1.

Table 6.1: Summary of Consultations

Consultee	Response date	Impact Identified by Consultee
Irish Aviation Authority (IAA)	03/03/2023	No Impact Identified

Broadcasting Authority of Ireland (BAI)	16/02/2023	No Impact Identified
Commission for Communications Regulation (ComReg)	03/04/2023	Provided a list of organisations and contacts relevant to telecommunications. No comments on impacts provided.
2rn (RTE Transmission Network)	17/02/2023	No Impact Identified, however there may be a risk of interference to broadcast services in the area. A signed protocol will be signed between the developer and 2rn.
ESB Telecoms	17/02/2023	No Impact Identified
Imagine Communications Ireland Ltd	20/02/2023	No Impact Identified
Tetra Ireland Communications Ltd	27/03/2023	No Impact Identified
Airspeed (now Magnet+)	No response received to date	Not applicable
BT Communications Ireland	No response received to date	Not applicable
Eir	No response received to date	Not applicable
Three Ireland	No response received to date	Not applicable
Virgin Media	17/02/2023	No Impact Identified
Vodafone	20/02/2023	No Impact Identified

6.3. Assessment

There is no evidence to suggest that the Proposed Development will have significant negative impacts on material assets in the area. The operational wind farm will not cause any material damage and does not pose any polluting or hazardous threat that would result in the devaluation or damage to valued material assets of the region.

Responses received from the telecommunications providers indicate that there would be no likely impact on their communication links. Correspondence from BAI has indicated that they are not aware of any issues from existing wind farms with existing Frequency Modulation (FM) networks. Furthermore, the Proposed Development is not located close to any existing or planned FM transmission sites. Any impacts on TV and Telecoms reception in areas can be suitably addressed under agreement between the applicant and any affected Telecommunication provider.

The Proposed Development does not pose a significant risk to the existing local electricity infrastructure, aviation, water, wastewater or waste infrastructure and will provide a positive effect on the electricity supply infrastructure.

No public water or wastewater utility infrastructure is required at the wind farm site. Water needs for construction activities will be low and limited to truck washing, wheel wash, dust suppression and sanitary facilities. Sanitary wastewater will be collected in portable toilets during construction. Disposal of sanitary wastes will be managed through a contract with a licensed waste contractor. No excavated soils, subsoils, or bedrock will require disposal outside the boundaries of the Proposed Development site and will be stockpiled at hardstand locations during construction and subsequently reused on site for regrading or revegetation. Excavated peat will be stored within a designated permitted peat deposition area. Other construction phase waste may consist of hardcore, concrete, spare steel reinforcement, cable wires, shuttering timber and building materials. This waste will be stored in the construction compound and collected at the end of the construction phase and taken off site to be reused, recycled and disposed of in accordance with best practice procedures at an approved facility. Waste volumes will not be significant as to require new permitted treatment, storage and disposal facilities as there is sufficient capacity at licensed disposal or recycling facilities in proximity to the Proposed Development.

Chapter 6 includes some focused mitigation measures. An agreed Protocol has been put in place by the Applicant with 2RN to remedy any issues of interference to TV reception if necessary. See EIAR Volume III - Appendix 6-2 for a copy of the signed protocol agreement.

Similarly any potential interference with telecommunication links can be suitably overcome. Suitable mitigation will be carried out in consultation with the operations provider.

Aviation warning lights will be agreed with the Irish Aviation Authority (IAA). Co-ordinates and elevation details of built turbines will be forwarded to IAA and 30 days notices prior to erection of the development will be given. No further mitigation measures are required for aviation.

Overall, no significant negative residual impacts are expected on material assets from the Proposed Development. No significant cumulative effects have been identified.

7. LAND AND SOILS

7.1. Introduction

The land and soil chapter (Chapter 7) examines the impacts to the land and soils of the with the view to assessing any alteration in the effects identified in the Permitted Development EIS arising from the Proposed Development. The construction phase examines the land and soils impact during construction.

7.2. Baseline Environment

The Proposed Development site is located in gentle hilly terrain, northwest of Moycullen and west of Ross Lake. Within the site, the height ranges from approximately 80m to 180m OD. The topography of the site is undulating with two peaks within the site, one to the west at 134m OD and one to the east at 183m OD (Knockranny Hill). The remaining land slopes at varying degrees from these summits to the relatively flat ground of the lower slopes. The regional topography is a combination of hills and low lying areas with lakes, rivers and streams.

7.3. Assessment

Importation of Construction Materials

As set out in Chapter 7, the Proposed development will require the additional importation of some construction materials. This includes upgrading/widening of the existing forestry road to the south (approximately 2,900m³), trenching thorough existing Ardderroo Wind Farm access road (approximately 300 m³) and the off road section of cabling track to the south of the existing Ardderroo Substation access road (approximately 2,000m³ of material). The Proposed Development will also require the additional importation of approximately 1,350m³ of structural fill material for the wind turbine foundations. This impact is considered to be of neutral quality, imperceptible significance and have a short-term duration.

Overburden & Bedrock Removal

There will be an additional 2,000m³ of non-peat material excavated due to the increase in wind turbine foundation size, it is considered that this material is suitable to be re-used on site. The removal of soil during excavation works is a direct and permanent impact on the overburden of the proposed development. The overall magnitude of this potential impact is negligible (TII, 2008) and would be classified under the EPA guidelines as having a neutral effect, of imperceptible significance and permanent duration.

The omission of the Substation will result in a reduction in excavation to the Permitted Development of approximately 400m³ of material.

Erosion, Storage & Stockpiles

Earthworks surfaces will be temporarily exposed during the excavation of foundation bases and at the access roads. These earthworks surfaces are subject to erosion if left exposed over a long period of time. The impact is classified as having a negative quality, moderate significance, and temporary duration.

There will be an additional 12,000m³ of material being placed within the peat deposition area, stockpiled materials will be subject to erosion if left exposed over a long period of time. As the surface of the peat deposition area will be treated, the impact is classified as having a negative quality, slight significance, and temporary duration. Refer to Section 6.4 of the Geotechnical and Peat Stability Assessment report (JBB, 2023) and the peat deposition area drawing (JBB, 2023a).

During construction, vehicles and plant will primarily use the access roads. Vehicle and plant movements have little potential to compact the subsoil outside of the designated access roads. The magnitude of this potential impact is classified as having a negative effect, of imperceptible significance and of permanent duration.

Soil Pollution

During the construction phase, potential localised accidental spillages of fuel or chemicals on the site have the potential to contaminate the underlying soils by exposure, dewatering, or construction related spillages resulting in a Permanent Negative Impact on soils. The magnitude of this impact is small adverse as it may result in the requirement to excavate/remediate a small proportion of contamination or result in a low risk of pollution to soils. As a result, its significance is moderate / slight for soil features.

No new impacts will arise on the soil and lands environment during the operations phase of the project.

Chapter 7 is supported by a geotechnical and peat stability assessment report. The detailed stability assessment carried out for the peat slopes confirmed that the site has an acceptable margin of safety. Subject to the recommendations and control measures in this report, there is a low risk of peat instability/failure at the Proposed Development site.

Mitigation is set out to include measures for the construction phase to manage erosion, storage and stockpiles of materials, soil pollution and peat instability. These measures will be implemented as part of the CEMP. An overall analysis of the impacts, in the light of the proposed mitigation measures, concludes that all of the potential impacts are predicted to be reduced to neutral quality and negligible magnitude under the Proposed Development.

The study concludes that from a land and soils perspective, the Proposed Development has a nearly identical land and soils impacts with the Permitted Development and does not pose any significant residual risks. No significant cumulative effects have been identified.

8. WATER (HYDROLOGY AND HYDROGEOLOGY)

8.1. Introduction

The Water (Hydrology and Hydrogeology) chapter (Chapter 8) examines the impacts to the both surface water and groundwater environments with the view to assessing any alteration in the effects identified in the Permitted Development EIS arising from the Proposed Development.

8.2. Baseline Environment

A number of streams drain the site, one of which 'Sruthan Chnocan Raithni' traverses the subject lands. The 'Lough Adereen Stream', 'Abhainn na nArd Doiriu' and 'Sruthan Bui' occur along or near site boundaries.

The Proposed Development straddles two EPA delineated sub catchments:

- Ballycuirke Lough Stream_SC_010(30_14) within the greater Corrib catchment which drains in an easterly direction
- Owenboliska_SC_010(31_6) within the greater Galway Bay North catchment. Which drains in south westerly direction.

The site is underlain by Porphyritic-Megacrystic Granite (Galway Granite) which is classified as a PI (Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones). The Galway Granites is a poor yielding low transmissivity geological unit and is therefore considered as Unproductive Rock. These aquifers have little throughput and are generally only capable of giving low yields to wells. The nearest well recorded on the GSI well database is at Shanballyoghery for domestic use approximately 1.5km east of the site. The next closest recorded well is located adjacent to the N59 and is over 2km from the site. There are no known large springs or large public water supply abstractions within 5 km of the development site.

Vulnerability of groundwater within the study area is considered extreme (E).

8.3. Assessment

8.3.1 Construction Phase

Impacts on Surface Water Quality

The main surface water quality concern is the potential for pollution of water that interacts with the proposed infrastructure (the source) and its consequent transport via overland flow and ephemeral streams / drains (the pathway) to sensitive watercourses such as the Abhainn na nArd-doiriu, Sruthan Bui Sruthan Chnocan Raithni and Lough Adereen stream (the receptors)

Overall, it is not envisaged that there is high risk to receiving rivers and streams or WFD Protected Areas. There are no potential discharges to surface waters apart from site runoff or the unlikely event of a minor fuel or chemical spill. As the potential water quality impact is expected to be locally confined to the immediate vicinity of the Proposed Development area, direct impact upon these sensitive receptors is not anticipated.

Impact of silt laden runoff: In the absence of mitigation and control measures is assessed to be Slight/Moderate adverse and temporary in duration.

Impact of accidental chemical/fuel spill : In the absence of mitigation and control measures is assessed to be temporary Slight/Moderate Adverse and Temporary in duration with a Possible likelihood of occurrence.

Impacts on Surface Water Flow

Increase in runoff contributing to flooding. The Proposed Development site is located in an area where the runoff component of annual effective rainfall is high (approximately 90%). There will be no discernible increase in the rate of runoff from heavy rainfall events during the construction stage.

The impact of the Proposed Development on flooding in the absence of mitigation is therefore considered to be an Imperceptible Adverse long- term impact.

Impacts on Groundwater Quality and Aquifer Resources

Fuel and chemical spills are a potential source of groundwater pollution if uncontrolled. Storage of large volumes of fuel and other contaminants are not anticipated. In the event of a spill the nearest recorded domestic dwelling is greater than 1 km from the site and if it has a groundwater supply from a well the impact on its water quality in the absence of mitigation will be imperceptible adverse and temporary.

There is very limited interaction between construction activity and the groundwater environment. The slight Increase in the development footprint resulting from the Proposed Development will constitute only a minute fraction of the recharge area to the aquifer and the reduction in the already low recharge will have no discernible impact on the groundwater resource available. The impact on the aquifer resource beneath the site will be Imperceptible.

8.3.2 Operational Phase

Impacts on Water Quality

While there may be a low risk of pollution during the early operation phase of the Project that is associated with drainage runoff and attenuation of suspended solids. The Proposed Development will not significantly alter the operational effects of the Permitted Development. Impacts to water quality are expected to be Slight Adverse and temporary in duration.

Impacts on Surface Water Flow

The slight increase in impermeable surfaces that will be created constitute a change to a tiny fraction of the runoff catchment. The increased surface water flow or potential for hydraulic loading is considered to be Adverse, Slight and long-term in duration.

Impacts on Groundwater Quality and Aquifer Resources

There is no change in the site operation of the Permitted Development. The runoff will comprise typical rainfall runoff of a similar quality to that which runs off at present.

A neutral impact on groundwater quality is predicted.

8.3.3 Mitigation, Residual and Cumulative Effects

A CEMP has been prepared and is enclosed with the planning application. Standard good practice guidelines will be enforced, as detailed in the CEMP. The CEMP includes a drainage management plan to prevent sediment or other polluting substances being released into watercourses. Identified

mitigation include, but are not limited to, the development of a water quality monitoring programme to include laboratory analysis, water quality monitoring instrumentation and visual inspections.

It is considered that the proposed Project design together with mitigation measures will ensure that no significant impact occurs to adversely affect surface water quality, surface water flows or groundwater resources. The overall impact on the hydrogeological and hydrological environments will be imperceptible/slight adverse.

The Proposed Development has an almost identical impact as the Permitted Development and does not pose any significant residual risks. No significant cumulative hydrological or hydrogeological impacts are anticipated.

9. BIODIVERSITY (FLORA AND FAUNA)

9.1. Introduction

An appraisal of the likely significant effects on biodiversity (flora and fauna) arising out of the Proposed Development was undertaken. Likely significant effects on birds are addressed separately in Chapter 10.

A Natura Impact Statement has been prepared and is included as a standalone report with the application. The NIS concluded that, with the implementation of best practice and the recommended mitigation measures, there will be no potential for direct, indirect or cumulative impacts arising from the Proposed Development, either alone or in combination with any other plans or projects. No reasonable scientific doubt remains as to the absence of such adverse effects.

9.2. Baseline

The Proposed Development site predominantly comprises wet heath and peatland habitats, with smaller areas of acid and improved agricultural grassland; conifer plantation is also present. The Knockaunranny and Ardderroo watercourses run through the study area and small streams are also present on the southern and western boundaries of the study area.

No bat roosts were recorded within the Proposed Development site, however seven species of bat commute to the site to forage; the highest level of activity recorded was of common pipistrelle in the vicinity of T1; it is likely that a roost for this species is present in the vicinity of the Proposed Development site. Common frog was also recorded during the site survey. Habitat suitable for marsh fritillary, badger, red squirrel, otter and pine marten is present at the Proposed Development site.

9.3. Assessment

The Proposed Development is not expected to result in significant adverse effects on habitats of conservation importance during the construction phase. Significant effects on species of conservation importance are limited to short-term effects on the local population of common frog during construction of the grid connection cabling. The proposed amendments will not involve any changes that could give rise to significant effects on habitats during the operational phase. There is potential for the increase in turbine dimensions to result in direct impacts on bats through collision with turbine blades and death through barotrauma; in the absence of mitigation, this would represent a long-term significant adverse impact at the local geographic scale. No potential significant effects on other species of conservation importance during the operational phase have been identified.

All construction phase environmental controls, mitigations and conditions in the area of surface water protection will be implemented as set out in the existing consent; Best Management Practice for prevention and control of sediment loss and forestry felling will also be implemented. Potential impacts on common frog will be avoided/ mitigated. A felling buffer zone will be established for T1, T3, T9 and T14 to minimize risk to bat populations and a bat monitoring programme will be prepared in accordance with Nature Scot (2021) guidelines.

No significant residual effects on biodiversity are anticipated during the construction phase. Potential significant adverse effects on bats have been identified as a result of collision with turbine

blades and death through barotrauma. Taking into consideration the proposed mitigation measures and the requirement for post construction bat surveys for the Permitted Development, significant residual effects on bats with regard to habitat loss/degradation, disturbance/displacement or mortality are not expected.

10. ORNITHOLOGY

10.1. Introduction

An appraisal of the likely significant effects on ornithology arising out of the Proposed Development was undertaken. A comprehensive description of the methodologies followed is provided in Chapter 10 and the potential effects of the Proposed Development are described for the construction, operational and decommissioning phases.

A Natura Impact Statement has been prepared and is included as a standalone report with the application. The NIS concluded that, with the implementation of best practice and the recommended mitigation measures, there will be no potential for direct, indirect or cumulative impacts arising from the Proposed Development, either alone or in combination with any other plans or projects. No reasonable scientific doubt remains as to the absence of such adverse effects.

10.2. Baseline

The establishment of the baseline environment was informed by:

- Desk study, including review of the Ornithology Chapter of the EIS completed for the Permitted Development.
- Field survey, including reconnaissance walkovers, vantage point surveys, and distribution and abundance survey.

The method for all survey work are described in Chapter 10.

10.3. Assessment

Based on detailed survey and assessment, it is considered that the potential effects of the Proposed Development on birds will not be significant. Effects associated with habitat loss and fragmentation, disturbance, displacement, collision risk and cumulative impacts have been assessed to be no greater than a long-term moderate effect locally. Magnitude of potential effects for key avian receptors has been assessed as negligible to medium significance; overall effect significance is assessed as very low to low (in accordance with Percival, 2003).

With the implementation of the prescribed mitigation measures and monitoring programme, it is considered that the Proposed Development will have a slight-to imperceptible residual impact on birds.

All construction phase mitigation for avifauna will be implemented as set out in the EIS for the Permitted Development. This will include Implementation of a Red Grouse Management Plan, restriction on felling to outside the bird breeding season, and implementation of an agreed monitoring survey. Similarly, all originally identified operational phase mitigation and monitoring for avifauna will be implemented, as detailed in Chapter 10.

11. CULTURAL HERITAGE

11.1. Introduction

This chapter presents the results of an archaeological and cultural heritage impact assessment of the Proposed Development comprising of amendments to the permitted Cnoc Raithní (Knockranny) Wind Farm Project.

11.2. Baseline

The Proposed Development occupies the townlands of Cnoc Raithní (Knockranny), Na hArd-Doiriú (Ardderroo), and Leitir (Letter), Moycullen, in the County of Galway. There is one National Monument within 10km radius study zone, four recorded monuments within the EIA study area (and Knockranny townland itself) including one within the planning boundary of the Proposed Development. In the wider c.5km study zone there are over eighty recorded monuments. Nineteen century farming landscape is well-preserved within the EIA study area with two farm clusters at Cloghally (West and Southwest limits) and second settlement at Northeast. These settlements are characteristic for this upland part of Connemara and at least 40 have been identified within the vicinity of the Project.

Under the Permitted Development, the layout of the wind farm was re-organised to avoid any material impact on identified physical elements of the heritage / cultural landscape. The recorded monuments include the possible presence of a Cillin (Children's Burial Ground east of Turbine 6. This was established based on unconfirmed local information and was a key consideration matter under the Permitted Development. There is no visible trace of the feature on the ground and the permitted design includes a 57 metre separation distance to this location. Having regard to this, the An Bord Pleanála inspector under reference 07.243094 confirmed their view *"that the principle of locating a proposed turbine within the vicinity of same, subject to appropriate setbacks, is not inappropriate"*.

11.3. Assessment

The Proposed Development includes a minor alteration to the foundation size of Turbine 6, but this will be contained within the footprint of the hardstand area for the Permitted Development. Considering that the turbine location is outside the indicative area of the possible burial ground and its Zone of Notification, the likely physical impact is classified as 'slight' to 'moderate'. Subject to the previously applied mitigation, in the form of appropriate archaeological supervision of works in relation to Turbine 6, no significant or additional impacts arise from the Proposed Development in respect of the Cillin.

Chapter 11 also concludes that the Proposed Development will not have a significant impact on any other recorded sites or identified features of heritage value. A walkover survey of the proposed underground cabling route was conducted in April 2023 to assess the potential for impacts arising from the proposed laying of cabling in existing, new and widened access tracks. There are no recorded monuments in the area of the proposed cabling route and no previously unrecorded archaeological features or finds were noted during the walkover survey.

There are no significant impacts requiring mitigation resulting from the Proposed Development, however the best practice measures which were outlined in the original Permitted Development EIS will be adopted and adhered to.

The works arising from the Proposed Development do not give rise to any significant increase in effects on that permitted and potential cumulative effects with other projects at construction, operational and decommissioning stages are not considered to be significant.

12. NOISE AND VIBRATION

12.1. Introduction

Chapter 12 of the EIAR describes the assessment undertaken of the potential noise and vibration impacts associated with the Proposed Development.

12.2. Baseline

An environmental noise survey to quantify the existing baseline noise environment at noise sensitive locations was previously conducted by Malachy Walsh and Partners as part of the planning assessment for the Permitted Development. The details of the environmental baseline noise survey are presented Section 12.4. Typical background noise levels for day and night periods at various wind speeds have been measured in accordance with best practice guidance contained in the Institute of Acoustics document 'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise' (IOA GPG). The results of the background noise survey have been used to derived appropriate noise criteria for the Proposed Development in line with the guidance contained in 'Wind Energy Development Guidelines for Planning Authorities' 2006 (WEDG).

When considering a development of this nature, the potential noise and vibration effects on the surroundings must be considered for two stages: the short-term construction phase and the long-term operational phase.

Existing, permitted and proposed wind farm developments have been identified in the wider EIAR Study Area and the cumulative impact of these developments has been considered in this assessment in line with guidance set out in the Institute of Acoustics (IOA) document A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise (2013) (IOA GPG).

The noise condition for the Permitted Development (See Section 12.2.1.2) are stated as "the greater of 43 dB LA90 or background + 5 dB".

12.3. Assessment

The construction phase noise impacts of the Permitted Development were assessed in the previously submitted EIS. The findings of the assessment and proposed mitigation measures will not be altered as a result of the Proposed Development.

Based on detailed information on the site layout, the likely turbine noise emissions and turbine hub height for the Proposed Development, set turbine noise prediction models have been prepared. The predicted turbine noise levels have been calculated at all NSLs in accordance with the IOA GPG guidance. There are two candidate turbines under consideration in the Proposed Development. In the case of the Enercon E138 there was a reduction in noise levels of between -0.1 and -0.6 decibels. For the Vestas V136 there was a very slight increase of between 0.0 and 0.2 decibels. In both cases the change in noise level is considered to be imperceptible. The effect of the Proposed Development, (regardless of candidate turbine selected) is therefore considered to be neutral, long-term and imperceptible.

The assessment has confirmed that the residual cumulative turbine noise levels associated with the Proposed Development will be within the best practice noise criteria curves recommended in WEDG. Therefore, it is not considered that a significant effect is associated with the Proposed Development.

Chapter 12 also confirms that the potential noise effects during construction activities remains unchanged from those identified under the Permitted Development. Overall, the effects of the construction phase were deemed to be negative, not significant and temporary.

No significant vibration effects are associated with the operation of the Proposed Development.

In summary, the noise and vibration impact of the Proposed Development is not significant considering national guidance for wind farm developments. No significant cumulative impacts with other developments are expected.

13. AIR QUALITY AND CLIMATE

13.1. Introduction

This section provides a non-technical summary of the likely air quality and climate impacts associated with the Proposed Development at the Cnoc Raithni (Knockranny) Wind Farm. The assessment of Air Quality & Climate is contained within Chapter 13.

13.2. Baseline

In terms of the existing air quality environment, baseline data and data available from similar environments indicates that levels of nitrogen dioxide, particulate matter less than 10 microns and less than 2.5 microns are generally well below the National and European Union (EU) ambient air quality standards.

Greenhouse Gas (GHG) emissions for 2019 are estimated to be 4.5% lower than those recorded in 2018. Emission reductions have been recorded in 6 of the last 10 years. However, compliance with the annual EU targets has not been met for four years in a row. Over the period 2013 – 2020 Ireland is projected to cumulatively exceed its compliance obligations with the EU’s Effort Sharing Decision (Decision No. 406/2009/EC) 2020 targets by approximately 13.4 Mt CO₂eq under the “With Existing Measures” scenario and 12.6 Mt CO₂eq under the “With Additional Measures” scenario (EPA, 2020c).

Data published in 2022 (EPA 2022d) predicts that Ireland exceeded (without the use of flexibilities) its 2021 annual limit set under EU’s Effort Sharing Decision (ESD) (EU 2018/842) by 2.71 million tonnes CO₂ equivalent (Mt CO₂eq). Energy Industries accounted for 16.5% of Ireland’s 2021 emissions. In December 2022, Climate Action Plan 2023 (CAP23) was published (Government of Ireland, 2022). This is the first CAP since the publication of the carbon budgets and sectoral emissions ceilings, and it aims to implement the required changes to achieve a 51% reduction in carbon emissions by 2030. CAP23 aims to bring 9 GW onshore wind, 8 GW solar, at least 7 GW of offshore wind and 2 GW green hydrogen into Irish energy production by 2030. In addition, the CAP aims to increase micro-generation and small-scale generation of renewables. CAP23 aims to phase out and end the use of coal and peat in electricity generation by 2030.

13.3. Assessment

Impacts to air quality and climate can occur during both the construction, operational and decommissioning phases of the Proposed Development. With regard to the construction stage the greatest potential for air quality impact is from fugitive dust emissions impacting nearby sensitive receptors. Impacts relating to climate are broken into two main areas the Greenhouse Gas Emissions Assessment (GHGA) which quantifies the GHG emissions and benefits from a project over its lifetime. The assessment compares these emissions to relevant carbon budgets, targets and policy to contextualise magnitude. The second part of the Climate assessment is the Climate Change Risk assessment (CCRA) which identifies the impact of a changing climate on a project and receiving environment. The assessment considers a project’s vulnerability to climate change and identifies adaptation measures to increase project resilience.

The Permitted Development is predicted to generate 98 GWh per annum (using a capacity factor of 34% from Eirgrid and installed capacity of 33 MW) of renewable, clean wind energy. The actual export capacity of the Proposed Development will vary depending on the final choice of turbine,

with the potential increased generating capacity for the two turbine options being 13.86MW and 16.5MW respectively, and the annual output range of between approximately 140 and 150 GWh per annum⁴. In the Do-Nothing scenario, between 42-52 GWh per annum of renewable energy will not be generated. This is considered significant, long-term and negative in terms of climate.

12.3.1 Construction Phase

Any potential dust impacts can be mitigated through the use of best practice and minimisation measures which are outlined in this report. Therefore, dust impacts will be short-term and imperceptible at all nearby sensitive receptors. It is not predicted that significant impacts to climate will occur during the construction stage due to the nature and scale of the Proposed Development.

The construction phase of the Proposed Development will result in a number of GHG emissions from various sources. Embodied carbon is carbon dioxide emitted during the manufacture and construction of materials, and the turbine. As part of the Proposed Development, construction stage and operational GHG emissions are considered through the use of the Scottish Carbon Calculator for wind farms on Scottish peatlands (Scottish Government 2023). The tool's purpose is to assess, in a comprehensive and consistent way, the carbon impact of wind farm developments. The tool considers the GHG emissions required for the construction and operation of the windfarm, including peat or forestry loss and compares this carbon costs of wind farm developments with the carbon savings attributable to the wind farm.

12.3.2 Operational Phase

Potential impacts to air quality and climate during the operational phase of the Proposed Development are as a result of increased traffic volumes on the local road network. The changes in traffic flows were assessed against the document Air Quality Assessment of Specified Infrastructure Projects - PE-ENV-01106 screening criteria for an air quality assessment. The changes in traffic did not meet the screening criteria for an air quality assessment. The changes in traffic did meet the scoping requirements for a climate assessment for one affected road link. When the dust mitigation measures are implemented, the residual effect of fugitive emissions of dust and particulate matter from the site will be imperceptible and short-term and will pose no nuisance, human health or ecology impacts at nearby receptors.

The supply of additional renewable electricity to the national grid will lead to a net saving in terms of NOX emissions which may have been emitted from fossil fuels to produce electricity. This is considered a slight positive, long-term impact to air quality.

There are no predicted likely adverse potential effects to climate during the operational phase of the Proposed Development. Considering the significance criteria for the impact of the construction and operational phase, the impact of GHG emissions from the proposed project aligns with Ireland's GHG trajectory to net zero by 2050 as per TII Guidance (TII), this is therefore considered a significant positive, long-term impact to climate.

It is considered that the decommissioning effects of the Proposed Development will not be altered from those of the Permitted Development as outlined in the EIS. The decommissioning effects for the Project will be in line with those of the construction phase. An outline decommissioning plan is contained in the CEMP in Appendix 2.1.

⁴ The assessment adopts a conservative approach utilising the lower range figure of 140 GWh.

12.3.3 Mitigation, Residual and Cumulative Effects

The pro-active control of fugitive dust will ensure the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released. A dust management plan will be implemented onsite. The main contractor will be responsible for the coordination and ongoing monitoring of the dust management plan.

The impact of the Proposed Development on air quality and climate is predicted to be beneficial with respect to the operational phase in the long term. Therefore, no additional site-specific mitigation measures are required.

The residual effect of the Proposed Development is considered slight positive, long-term impact to air quality and significant positive, long-term impact to climate. Cumulative dust impacts are predicted to be negative, short-term and imperceptible at nearby receptors once the dust mitigation measures are in place.

14. POPULATION & HUMAN HEALTH

14.1. Introduction

Chapter 14 of the EIAR provides an assessment of likely significant effects on Population and Human Health arising from the Proposed Development.

14.1. Baseline

The subject site is rural in nature and relatively sparsely populated with no dwellings within the EIAR study boundary and few in the general vicinity, as reflected in the fact that there are no houses within 1km of any of the turbines, the nearest being 1.033km from T8. There is a pattern of low-density, one-off dwellings along the L- 5348, L-5368 and L-5347 local roads to the east of the subject site, which increases in density closer to the N59, c. 2.6km from the site. The adopted study area comprises the Eds of Slieveaneen (Sliabh an Aonaigh) - 27062, Wormhole - 27162; Tullokyne (Tulaigh Mhic Aodháin) - 27065, Moycullen (Maigh Cuilinn) - 27059, and Oughterard - 27159. The study area has a population of 10,972 in 2022, with the population concentrated almost entirely within a 2km corridor of the N59.

14.2. Assessment

The potential likely and significant impact of the Proposed Development on human health have been assessed in other chapters of this report with regard to environmental factors such as air, water or soil through which contaminants could accumulate and have potential to cause harm through contact with human beings.

While the construction phase of the overall Project is not anticipated to have a significant effect on the population numbers in the area, it is envisaged to have a direct positive impact on local employment, which will contribute towards balancing the existing commuter outflow. Some potential indirect short-term positive impact on local shops and services may arise from the temporary daytime presence of this workforce. However the magnitude of change attributable to the Proposed Development alone will be negligible. Similarly, the impact on the land use of the area arising from the Proposed Development is considered to be neutral, imperceptible and short-term.

There is potential for direct impact on tourism and recreational users of the existing Galway Wind Park recreation routes, other walking and hiking and cycling routes in the vicinity and the permitted Ardderroo looped trails. Similarly, portions of the site may be visible from the N59, linking Galway City and the west, a popular tourist route part of which forms the Galway Clifden Scenic Route. However, Chapter 4 - Landscape and Visual Impact of this EIAR considers that these are very minor changes in the context of physical land disturbance in this already modified forestry and wind farm setting. It concludes that the magnitude of landscape impacts during construction are deemed Negligible and the quality of the effect will be Neutral. Furthermore, the magnitude of increase in the Peak Construction Traffic generated by the Proposed Development, in comparison to the Permitted Development is considered to be negligible. Overall the impacts arising purely from the Proposed Development on tourism and recreational amenity are considered to be negative, short-term and slight.

In the context of human health and residential amenity, the nuisance effect of the increased traffic from the Proposed Development on the surrounding roads during the construction phase is

considered in Chapter 5 to be negative, temporary and not significant. With regard to the potential noise effects during the construction activities, Chapter 12 assesses these to remain unchanged from those identified in relation to the Permitted Development.

Chapter 13 concludes that with the implementation of dust mitigation measures, fugitive emissions of dust from the site will remain imperceptible and temporary and will pose no nuisance or human health impacts at nearby receptors. The climate effect remains the same across the Permitted Development and the Proposed Development.

In the operational phase no alteration to the effects of the Permitted Development is envisaged in terms of population, employment, economic activity or land use. As the permitted and proposed community fund scheme is based on a percentage of the annual wind farm revenue, the proposed uplift in generated power output of the Proposed Development will result in a potential increase in the fund value. The types of projects and initiatives that could be supported by such a Community Gain proposal could include youth, sport and community facilities, schools, educational and training initiatives, and wider amenity, heritage, and environmental projects. Therefore, effects arising from the Proposed Development on services and community resources are considered to be positive, significant and long-term.

Chapter 12 of the EIA considers the potential noise impact of the two candidate turbines. When compared with the turbines considered in the EIS of the Permitted Development, there was either a very slight decrease or a very slight increase in decibels, depending on the candidate turbine. Overall the effect of the Proposed Development, (regardless of candidate turbine selected) is considered to be neutral, long-term and imperceptible.

The Shadow Flicker Analysis Report (ref. Appendix 14.1) notes that when average annual sunshine data is taken into account, the potential annual shadow flicker at all dwellings within 10 rotor diameters from a turbine falls well below the best practice threshold of 30 hours per day. In the event of any shadow flicker exceedances, screening measures will be discussed with the affected landowner. If it is not possible to mitigate with screening measures, wind turbine control measures will be implemented. The report concludes that with the implementation of these mitigation measures the effect of the Proposed Development will be negative, long-term and imperceptible.

A suite of mitigation and monitoring measures will be required to ensure the prevention of impacts on population and human health. These measures are incorporated into the Construction Environmental Management Plan (CEMP) prepared in respect of the Project which will be updated and finalised by the Contractor prior to construction commencing.

Once the mitigation measures as proposed are implemented no residual significant impacts are expected to arise as a result of the construction, operation or decommissioning phases of the Proposed Development.

It is considered that the Proposed Development does not have the potential to result in cumulative impacts with regards to Population and Human Health.

15. INTERACTIONS

15.1. Introduction

Article 3(1) of the EIA Directive states.

"The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:

(a) population and human health;

(b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;

(c) land, soil, water, air and climate;

(d) material assets, cultural heritage and the landscape;

(e) the interaction between the factors referred to in points (a) to (d)."

Annex IV of the amended Directive states that a description of impacts should include:

"...the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the project".

As the Project includes both the Permitted Development and the Proposed Development the matrix of interactions from the Permitted Development EIS is included in Figure 15.1, in addition to the matrix of interactions for the Proposed Development, which is included as Figure 15.2.

	Major Interaction/Impact		Human Beings		Ecology		Water		Soils and Geology		Air Quality & Climate		Noise & Vibration		Shadow Flicker		Landscape & Visual		Archaeology & Cultural Heritage		Traffic		Material Assets	
	Minor Interaction/Impact		Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation
	Neutral or No Interaction /Impact																							
Human Beings																								
Ecology																								
Water																								
Soils and Geology																								
Air Quality and Climate																								
Noise and Vibration																								
Shadow Flicker																								
Landscape and Visual																								
Archaeology & Cultural Heritage																								
Traffic																								
Material Assets																								

Table 12.1. Matrix of Impacts from Permitted Development EIS

	Major Interaction/Impact		Population and Human Health (inc. Shadow Flicker)		Biodiversity		Ornithology		Water (Hydrology and Hydrogeology)		Land and Soils		Air Quality and Climate		Noise and Vibration		Landscape and Visual		Archaeology & Cultural Heritage		Material Assets - Traffic and Transportation		Material Assets - Service, Infrastructure and Utilities	
	Minor Interaction/Impact		Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation
	Neutral or No Interaction /Impact																							
Population and Human Health (inc. Shadow Flicker)																								
Biodiversity																								
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Land and Soils																								
Air Quality and Climate																								
Noise and Vibration																								
Landscape and Visual																								
Archaeology & Cultural Heritage																								
Material Assets - Traffic and Transportation																								
Material Assets - Service, Infrastructure and Utilities																								

Table 12.2. Matrix of Impacts from Proposed Development EIAR

16. SUMMARY OF MITIGATION MEASURES

The 2022 EPA Guidelines regarding information to be contained in EIAR's identifies the following strategies for the mitigation of effects.

Mitigation by Avoidance: Avoidance usually refers to strategic issues - such as site selection, site configuration or selection of process technology- is generally the fastest, cheapest and most effective form of effect mitigation. In many situations, mitigation by avoidance may be viewed as part of the 'consideration of alternatives'.

Mitigation by Prevention: This usually refers to technical measures. Where a potential exists for unacceptable significant effects to occur (such as noise or emissions) then measures are put in place to limit the source of effects to a permissible and acceptable level.

Mitigation by Reduction: This is a very common strategy for dealing with effects which cannot be avoided. It tends to concentrate on the emissions and effects and seeks to limit the exposure of the receptor. It is generally regarded as the 'end of pipe' approach because it tends not to affect the source of the problems. As such this is regarded as a less sustainable, though still effective, approach.

Offsetting: This is a strategy used for dealing with significant adverse effects which cannot be avoided, prevented or reduced. It includes measures to compensate for adverse effects. Examples include restoration of buildings, walls or features to compensate for loss of similar features, planting of new vegetation elsewhere to replace unavoidable loss of similar vegetation, provision of a new amenity area to replace amenity lost as a result of a project.

For a comprehensive list of all proposed mitigation measures, refer to the individual chapters and corresponding appendices of this EIAR (Volumes II and III).

The accompanying CEMP (Appendix 2-1 of this EIAR) also provides details of all construction related mitigation and monitoring measures to be adopted during the construction phase of the Project. Mitigation specifically relating to the decommissioning phase is outlined in the decommission plan which is appended to the CEMP.