Planning and Environmental Consultants

Non-Technical Summary

Cleanrath Wind Farm, Co. Cork

Remedial Environmental Impact Assessment Report

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NON-TECHNICAL SUMMARY

Introduction

This remedial Environmental Impact Assessment Report (rEIAR) has been prepared by MKO on behalf of Cleanrath Windfarm Ltd. and accompanies an application made to An Bord Pleanála (the Board) for substitute consent under Section 177E of the Planning and Development Act, 2000. The development which is the subject of the application for substitute consent comprises a 9 turbine wind farm and associated works including the grid connection used to export electricity to the national grid and access works into the site to accommodate delivery of turbine components.

The wind farm development has been constructed, has been operational for a short-term period (December 2019 to the end of April 2020) and is now currently operating in Sleep Mode where the turbines are in a controlled mode which is maintained by the turbine manufacturer and are generally not producing electricity pending the outcome of the Substitute Consent process.

This rEIAR assesses the potential environmental impacts arising from all phases of the Cleanrath wind farm development and includes the construction, operational (including the short term operation, current Sleep Mode operation and full operation) and decommissioning phases.

The application is also accompanied by an Environmental Impact Assessment Report (EIAR). There is a significant overlap in terms of the information contained within both the EIAR and the rEIAR as it is not always possible or desirable to separate the assessment of effects between the documents.

The development and all associated works is hereafter referred to as the Cleanrath wind farm development and is located in the townlands listed in Table 1. The site location is outlined in Figure 1-1 of this rEIAR.

Table 0-1 Townlands within which the Cleanrath wind farm development is located

Townland	
Reananerree	Cloontycarthy
Cleanrath North	Derrineanig
Cleanrath South	Milmorane
Coombilane	Rathgaskig
Augeris	Gorteenakilla
Carrignadoura	Gurteenowen
Gurteenflugh	Lyrenageeha
Lackabaun	

The applicant for substitute consent for the Cleanrath wind farm development is Cleanrath Windfarm Ltd., Lissarda Industrial Estate, Lissarda, County Cork, which is a subsidiary company of Enerco Energy Ltd. (Enerco). Enerco is an Irish-owned, Cork-based company with extensive experience in the design, construction and operation of wind energy developments throughout Ireland, with projects currently operating in Counties Cork, Kerry, Limerick, Clare, Galway & Mayo.

For the purposes of the substitute consent application to be submitted to An Bord Pleanála, the full description of the Cleanrath wind farm development is as follows:

1. *9 No. wind turbines with a ground to blade tip height of 150 metres and all associated foundations and hard-standing areas.*
2. *All associated underground electrical (33kV & 38kV) and communications cabling connecting the turbines to the national electricity grid.*
3. *Upgrade of existing access junctions and roads.*
4. *Upgrade of existing and provision of new site access roads.*
5. *Borrow pit.*
6. *Temporary construction compound.*
7. *Accommodation works along the turbine delivery route*
8. *Temporary roadway to facilitate turbine delivery.*
9. *Forestry Felling*
10. *Site Drainage;*
11. *The operation of the wind farm for a period of 25 years.*
12. *The decommissioning of the wind farm, removal of turbines and restoration of the site.*
13. *All associated site development and ancillary works.*

The application for substitute consent for the Cleanrath wind farm development includes the connection to the national electricity grid. All elements of the Cleanrath wind farm development, including grid connection and any works completed on public roads to accommodate turbine delivery, have been assessed as part of this rEIAR.

This application seeks substitute consent for 25-year operational life from the date of commissioning of the entire wind farm.

Planning Background and Supreme Court Order

There is a significant planning history associated with the Cleanrath wind farm development which is summarised in Chapter 2 of this rEIAR. By way of introduction, it is sufficient to state that, in May 2017, An Bord Pleanála granted permission (on appeal from a decision made by Cork County Council) for a wind energy development comprising 11 no. turbines and associated works (including substation and all grid connection works) at the site of the Cleanrath wind farm development (ABP Ref. PL04.246742) (hereafter referred to as the 2017 Permission). An Environmental Impact Assessment (EIA) and Appropriate Assessment (AA) was completed by the Board as part of its consideration of the appeal. The decision to grant permission was made on the 19th May 2017 and subject to 22 no. conditions.

Judicial review proceedings were instituted in July 2017 challenging the decision of the Board to grant permission. In May 2018, the High Court refused the application for judicial review and leave for appeal. However, the Supreme Court allowed an appeal and in a judgement, dated the 12th December 2019, it stated (at paragraph 57 of its judgment): "*it is necessary to quash the decision of the Board granting permission".*

In the period between the permission being granted by the Board (on 19 May 2017) and the date of this application for substitute consent, development authorised by the 2017 Permission has been carried out to the extent that 9 of the 11 turbines that were granted permission have been completed along with their ancillary infrastructure.

The Judicial Review proceedings referred to above culminated in an Order of the Supreme Court dated the 19th June 2020 whereby the order quashing the decision to grant the 2017 permission was stayed pending the decision of the Board on this application for substitute consent, on the undertaking of Cleanrath Windfarm Ltd. not to operate the wind farm development other than in accordance with the terms of the letter from its solicitor dated the 30th day of April 2020.

Purpose and Scope of rEIAR and EIAR

The purpose of the rEIAR prepared as part of the substitute consent application is to document the likely significant effects, if any, on the environment, which have occurred, or which are occurring or which can reasonably be expected to occur because the development was carried out. To this end it includes an assessment of all phases of the development - construction, operational and decommissioning.

The monitoring results and reporting completed during the construction and operational phases of the Cleanrath wind farm development have informed the assessment of the impacts and effects in the rEIAR and in the accompanying remedial Natura Impact Statement [rNIS]. As set out in the rEIAR, the Cleanrath wind farm development did not cause any significant environmental effects. Moreover, and as set out in the rNIS, the Cleanrath wind farm development did not cause any adverse effect on the integrity of any European sites during the construction or the operational phase.

The EIAR provides a statement of the likely significant effects associated with the Cleanrath wind farm development from the date upon which the application for substitute consent is submitted to the Board (i.e., August 2020). Although elements of this prospective assessment overlaps with elements of the retrospective assessment provided in the rEIAR, for completeness and the avoidance of doubt, this separate EIAR for future phases of the development has been prepared in order to allow An Bord Pleanála to complete an EIA for the prospective elements of the Cleanrath wind farm development.

The Environmental Protection Agency (EPA) published its *'Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports'* (EPA, August 2017), which is intended to guide practitioners preparing an EIAR in line with the requirements set out in the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018).

The relevant considerations under the '*Wind Energy Development Guidelines for Planning Authorities*' (Department of the Environment, Heritage and Local Government (DOEHLG), 2006) have also been taken into account during the preparation of this EIAR. In the event that revised Wind Energy Guidelines are adopted in advance of a decision being made on the application for substitute consent in respect of the Cleanrath wind farm development, with any concomitant change in respect of either noise and shadow flicker thresholds, if necessary, the Cleanrath wind farm development is capable of being operated in a manner which complies with any revised requirements. In addition, the currently proposed set-back distances from dwellings has being achieved. Further detail on this is provided in the relevant chapters.

Overview of the Cleanrath wind farm development

The development permitted development under the decision to grant permission made in May 2017 (under ref. no. PL 04.246742) comprised:

- Up to Eleven no. turbines with a maximum ground to blade tip height of up to 150m;
- Upgrading of existing and provision of new internal access roads;
- Wind anemometry mast (up to 100m height);
- Two no. borrow pits;
- Underground electrical cabling;
- Underground grid connection electrical cabling and all associated infrastructure;
- Junction accommodation works and temporary roadway to facilitate the turbine delivery route;
- Electricity Substation;
- Construction compound;
- Upgrading of site access junctions,
- Permanent signage, and
- All ancillary works.

The development which was actually completed and/or commenced pursuant to the 2017 permission comprised;

- 9 No. wind turbines with a ground to blade tip height of 150 metres and all associated foundations and hard-standing areas.
- All associated underground electrical (33kV & 38kV) and communications cabling connecting the turbines to the national electricity grid.
- Upgrade of existing access junctions and roads.
- Upgrade of existing and provision of new site access roads.
- Borrow pit.
- Temporary construction compound.
- Accommodation works along the turbine delivery route
- Temporary roadway to facilitate turbine delivery.
- Forestry Felling
- Site Drainage;
- All associated site development and ancillary works.

The future development components, which comprise the focus of the EIAR (but are also set out in this rEIAR) comprise,

- The current 'Sleep Mode' operations
- Future full operation of the wind farm
- Ongoing Maintenance
- Peatland Habitat Restoration
- Monitoring
- Decommissioning (early or post full operational period)

The Cleanrath wind farm development is connected to the national grid via an underground cable connection running from the Cleanrath wind farm development to the existing Coomataggart Substation, located approximately 10 kilometres to the west of the Cleanrath wind farm development, in the townland of Grousemount, Kilgarvan, Co. Kerry.

Need for the Cleanrath wind energy development

It has now evident Ireland will not meet its 2020 target for renewable energy with the Sustainable Energy Authority of Ireland (SEAI) reporting in May 2019 that 13 per cent of Ireland's energy will come from renewable sources by 2020, three per cent short of our European target of 16 per cent (SEAI, May 2019). Indeed, Ireland faces significant challenges to meet EU targets for renewable energy by 2030 and its commitment to transition to a low carbon economy by 2050.

In March 2019, the Government announced a renewable electricity target of 70% by 2030 as part of the governments Climate Action Plan. In circumstances where substitute consent is granted, the Cleanrath wind farm development would be operational after 2020 and would therefore contribute to attaining this 2030 target. More recently, the EPA reported that Ireland is set to fall far short of all of its carbon emissions reduction targets for 2030, despite climate action measures in the National Development Plan (EPA, June 2019). The Cleanrath wind farm development, if consented, will contribute to addressing these challenges as well as addressing the country's over-dependence on imported fossil fuels.

The need for the Cleanrath wind farm development is driven by the following factors:

1. *A legal commitment from Ireland to limit greenhouse gas emissions under the Kyoto protocol to reduce global warming;*
2. *A requirement to increase Ireland's national energy security as set out in the Energy White Paper;*

3. *A requirement to diversify Irelands energy sources, with a view to achievement of national renewable energy targets and an avoidance of significant fines from the EU (the EU Renewables Directive);*
4. *Provision of cost-effective power production for Ireland which would deliver local benefits; and*
5. *Increasing energy price stability in Ireland through reducing an over reliance on imported gas.*

Economic Benefits

The Cleanrath wind farm development will be capable of providing power to over 19,272 households every year, as presented in the calculations in Section 4.3.1 of this rEIAR.

The Cleanrath wind farm development has had and will continue to have several significant long-term and short-term benefits for the local economy including job creation, landowner payments, local authority commercial rate payments and a Community Benefit Scheme. The Cleanrath wind farm development created in excess of 80 jobs during the construction, operational and maintenance phases. In addition to this, there will also have been income generated by local employment from the purchase of local services i.e. travel and lodgings.

The annual commercial rate payments from the Cleanrath wind farm development to Cork County Council, will be redirected to the provision of public services within Co. Cork. These services include provisions such as road upkeep, fire services, environmental protection, street lighting, footpath maintenance etc. along with other community and cultural support initiatives.

There are substantial opportunities available for areas where wind farms and other types of renewable energy developments are located, in the form of Community Gain Funds. An initial contribution of c€150,000 has been made available to the local community and as this project has been constructed and did operate for a short period over €100,000 in funds have already been distributed to the community. The annual contribution to the community is estimated at c€30,000 each year for the lifetime of the project, when it is in full operational mode. Based on the current proposal, the Community Gain Fund in the region of €1 million will be made available over the lifetime of the Cleanrath wind farm development.

Purpose and Structure of this rEIAR

This rEIAR uses the grouped structure method to describe the existing environment, the potential impacts of the Cleanrath wind farm development thereon and the proposed mitigation measures. Background information relating to the Cleanrath wind farm development, scoping and consultation undertaken and a description of the Cleanrath wind farm development are presented in separate sections. The grouped format sections describe the impacts of the Cleanrath wind farm development in terms of human beings and population, flora and fauna, soils and geology, hydrology and hydrogeology, air and climate, noise and vibration, landscape and visual, cultural heritage and material assets such as traffic and transportation, together with the interaction of the foregoing.

The chapters of this rEIAR are as follows:

- Introduction
- Background to the Cleanrath wind farm development
- Consideration of Reasonable Alternatives by the developer
- Description of the Cleanrath wind farm development
- Population & Human Health
- Biodiversity (excluding Birds)
- Ornithology
- Land, Soils and Geology

- Hydrology and Hydrogeology
- Air and Climate
- Noise and Vibration
- Landscape and Visual
- Cultural Heritage
- Material Assets (including Roads and Traffic, Telecommunications and Aviation)
- Interactions of the Foregoing
- Schedule of Mitigation and Monitoring Measures

The photomontage booklet pertaining to Chapter 13: Landscape and Visual is included as Volume 2. Appendices to the chapters listed above are included in Volume 3 of this rEIAR.

Background

This Chapter of the remedial Environmental Impact Assessment Report (rEIAR) presents information on the planning policy context of the Cleanrath Wind Farm development with regard to European and National climate change and renewable energy policy and targets. This has been undertaken by setting out and assessing the national, regional and local planning policies and objectives, relevant planning history and the scoping, consultation and cumulative impact assessment process. This Chapter also provides a review of the relevant planning history, scoping process and cumulative assessment methodology.

Energy and Climate Change Targets

The Climate Action Plan 2019 (CAP) was published on the 1st of August 2019 by the Department of Communications, Climate Action and Environment. The CAP sets out an ambitious course of action over the coming years to address the impacts which climate may have on Ireland's environment, society, economic and natural resources. The overall aim of the CAP is to deliver a significant step-change in Ireland's emissions performance over the coming decade such that EU targets for 2030, as set out under the 2030 Climate and Energy Framework (2014), are met and the country will in a position to successfully achieve its 2050 decarbonisation objectives.

The Sustainable Energy Authority of Ireland (SEAI)'s National Energy Projections 2019 (May 2019), acknowledges the significant increase in renewable energy share in Ireland over the past number of years. Notwithstanding, current progress is still below the required 16% target, and compared to other European countries, Ireland was 26th out of the EU-28 for progress towards overall 2020 renewable energy target.

As Ireland will likely miss its 2020 targets, the continued decarbonisation of the energy network remains an essential component of this strategy in the context of 2030 and 2050 targets. Relevant to the Cleanrath Wind Farm development, the CAP details the Plan's views on renewable energy generation:

> *"It is important that we decarbonise the electricity that we consume by harnessing our significant renewable energy resources by doing this we will also become less dependent on imported fossil fuels."*

As indicated by the CAP, the generation and use of renewable energy development is recognised as a vital component of Ireland's strategy to tackle the challenges of climate change and ensuring a secure supply of energy. The CAP identifies a need for 8.2GW of onshore wind generation in order to achieve an increase electricity generated from renewable sources to 70%, a key benchmark in securing the 2030 targets. The addition of the Cleanrath Wind Farm development to Ireland's deployable onshore wind farm fleet would result in a direct positive impacts on current output, and furthermore, the continued progression towards future targets.

National Planning Framework (2018)

The National Planning Framework (NPF), published in February of 2018, aims to shape and guide the future growth and development of Ireland up to 2040. Relevant to the Cleanrath Wind Farm development, the **National Strategic Outcome 8** (*Transition to Sustainable Energy*), notes that in creating Ireland's future energy landscape, new energy systems and transmission grids will be necessary to enable a more distributed energy generation which connects established and emerging energy sources, i.e. renewables, to major sources of demand. The national government recognises that they must reduce greenhouse gas emissions which come from the energy sector by at least 80% by 2050 when compared to 1990 levels while ensuring a secure supply of energy, which the operation of the Cleanrath Wind Farm development will contribute towards. Specifically, Ireland's national energy policy under **Objective 55** aims to '*promote renewable energy use and generation at appropriate locations within the built and natural environment to meet national objectives towards achieving a low carbon economy by 2050*'.

In relation to energy production, the NPF emphasises that rural areas, such as the region of West Cork, have an important role to play in securing a sustainable renewable energy supply for the country, acknowledging that *"rural areas have significantly contributed to the energy needs of the country and continue to do so".*

Southern Regional Assembly Regional Spatial & Economic Strategy (2020)

The Southern Regional Assembly has a recognised leadership role in setting out regional policies and coordinating initiatives which support the delivery and implementation of the NPF. The primary vehicle for this is the preparation and implementation of the Regional Spatial and Economic Strategy (RSES). The RSES notes that there is significant potential to use renewable energy across the Southern Region to achieve climate change emission reduction targets. The RSES sets out a number of Regional Policy Objectives (RPOs) designed to facilitate greater integration of renewables into the National Grid.

- **RPO 87 (Low Carbon Energy Future)**: The RSES is committed to the implementation of the Government's policy under Ireland's Transition to a Low Carbon Energy Future 2015-30 and Climate Action Plan 2019. It is an objective to promote change across business, public and residential sectors to achieve reduced GHG emissions in accordance with current and future national targets, improve energy efficiency and increase the use of renewable energy sources across the key sectors of electricity supply, heating, transport and agriculture.
- **RPO 99 (Renewable Wind Energy)**: It is an objective to support the sustainable development of renewable wind energy (on shore and offshore) at appropriate locations and related grid infrastructure in the Region in compliance with national Wind Energy Guidelines.
- **RPO 100 (Indigenous Renewable Energy Production and Grid Injection)**: It is an objective to support the integration of indigenous renewable energy production and grid injection.

The Southern Regional Assembly strongly supports renewable wind energy development such as the Cleanrath wind farm development in order to ensure a *'safe, secure and reliable supply of electricity'* for the region. The successful operation of Cleanrath Wind Farm development will contribute to the successful transition to a low carbon economy.

Cork County Council Development Plan 2014 (as varied)

The Cork County Development Plan 2014 (as varied), hereafter referred to as the CCDP, sets out an overall strategy for the proper planning and sustainable development of Cork County over a 6 year period. The CCDP has been designed to ensure that sufficient energy and related infrastructure is available to meet the existing and future needs of County Cork, recognising the importance of exploiting the renewable energy resources of the County in order to reduce dependence on fossil fuels, improve security of supply, reduce greenhouse gas emissions and creating environmental benefits while taking full advantage of the opportunities that will arise from the emerging renewable energy sector.

The CCDP acknowledges the key strategic role Cork plays in energy provision in Ireland and recognises that energy generation and energy related activity in Cork is likely to change significantly over the coming years as the move to a low carbon economy increases. The CCDP further emphasises that the development of renewable energy sources is central to overall energy policy in Ireland and a key aim of the Plan is to support the sustainable development of renewable energy sources.

The Cleanrath Wind Farm development is supportive of the objectives within the CCDP and will directly contribute to the achievement of a sustainable, secure and resilient energy supply through a diverse renewable energy portfolio. It is acknowledged by the CCDP that there is considerable potential for additional wind energy capacity within the County. The Plan identifies, in broad strategic terms, three categories of 'Wind Deployment Area' for large scale commercial wind energy developments.

The Cleanrath Wind Farm development is located in an area designated as 'Open to Consideration' for wind energy development in the CCDP. The Plan states that this category has been applied to areas with some capacity to absorb wind development, but which are sensitive enough to require a site-by-site appraisal to ascertain the suitability of the area for development.

The CCDP emphasises the significance of the County's landscape as a key green infrastructure asset due to its intrinsic value as places of natural beauty in addition to its importance with regard to recreation, tourism and other uses.

Kerry County Development Plan 2015-2021 (as varied)

A c. 2km section of underground cabling and associated infrastructure in the townland of Grousemount, Kilgarvan, Co. Kerry was required as part of the Cleanrath Wind Farm development, to connect to the 110 kV Coomataggart Substation. This infrastructure was granted by Kerry County Council in July 2016. Although this section of the national grid connection is not subject to this substitute consent application as it enjoys the benefit of planning permission, it is an element of the project which is considered as part of the Cleanrath Wind Farm development for the purposes of this rEIAR, and accordingly, it is pertinent to consider the provisions of the Kerry County Development Plan 2015-2021 (KCDP).

The KCDP sets out the following key objectives in relation to renewable energy relevant to the Cleanrath Wind Farm development.

- **EP-1:** Support and facilitate the sustainable provision of a reliable energy supply in the County, with emphasis on increasing energy supplies derived from renewable resources whilst seeking to protect and maintain biodiversity, archaeological and built heritage, the landscape and residential amenity.
- **EP-3:** Facilitate sustainable energy infrastructure provision, so as to provide for the further physical and economic development of the County.
- **EP-7:** Facilitate the sustainable development of additional electricity generation capacity throughout the region/county and to support the sustainable expansion of the network. National grid expansion is important in terms of ensuring adequacy of regional connectivity as well as facilitating the development and connectivity of sustainable renewable energy resources.

To facilitate the sustainable growth of renewable energies, Kerry County Council prepared and adopted a Renewable Energy Strategy in 2012. The following is a key objective in the RES is of particular relevance to the Cleanrath Wind Farm development:

- **NR 7-27 - Powerlines** - Ensure that in sensitive landscapes powerlines connecting windfarms to the national grid will be required to be laid underground, as considered appropriate by the Planning Authority, insofar as such infrastructure will not significantly affect European sites and is in compliance with the objectives of this plan and relevant legislation.

The overall acceptability of this project component, as evident by its grant of permission from Kerry County Council, is supportive of the Cleanrath Wind Farm development and its wider benefits to the region.

Planning History

The relevant planning history of the Cleanrath Wind Farm development, the planning applications in the vicinity of the site along with other wind energy applications within the wider area are provided under Section 2.3 within this rEIAR.

Scoping and Consultation

A comprehensive scoping and consultation exercise was undertaken during the preparation of this rEIAR. This included: circulation of a detailed Scoping Document, providing details of the subject site, the Cleanrath Wind Farm development and the proposed scope of the rEIAR.

Engagement with Cork County Council (the 'Planning Authority') in the form of a pre-application consultations were undertaken for the 2011 application (Pl Ref. 11/5245), and again prior to the lodgement of Pl Ref. 15/6966. The last pre-planning meeting in this regard being held in December 2015. While the design team advised the Planning Authority of the pending substitute consent process and advised that site inspections could be facilitated as required, no further discussions or pre-planning meetings were carried out with the Planning Authority prior to lodging the substitute consent application.

Engagement with the public, adjacent residents and local public representatives was undertaken as part of the preparation of the EIS submitted to Cork County Council under Pl Ref. 15/6966 (a full public information event was held in the Mills Inn, Ballyvourney, Cork on the 16th of December 2015). A Community Liaison Officer (CLO) was appointed to the project through construction and into the operational phase of the Cleanrath Wind Farm development. The CLO continues to engage with residents to provide information on the current status of the site and throughout the operational lifetime of the Cleanrath Wind Farm development.

Cumulative Impact Assessment

To gather a comprehensive view of cumulative impacts on environmental media and to inform the rEIAR process being undertaken by the consenting authority, each relevant chapter within this document addresses the potential for cumulative effects to arise, where appropriate. The potential cumulative impacts with other relevant development has been carried out with the purpose of identifying what influence the development has had, or potentially could have, on the surrounding environment when considered cumulatively and in combination with relevant permitted, proposed and constructed projects and other land-uses in the vicinity of the site. Assessment material for this cumulative impact assessment was compiled on the relevant developments within the vicinity of the Cleanrath Wind Farm development. The material was gathered through a search of relevant online Planning Registers, reviews of relevant EIAR/EIS documents, planning application details and planning drawings and served to identify past and future projects, their activities and their environmental impacts.

Consideration of Reasonable Alternatives

Article IV of the EIA Directive as amended by Directive 2014/52/EU states that the information provided in an Environmental Impact Assessment Report (EIAR) should include 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 environmental effects. The consideration of alternatives typically refers to alternative design, technology, location, size and scale.

In order to provide context in terms of the reasonable alternatives considered when choosing and designing this project this section of the rEIAR contains a description of the reasonable alternatives that were considered originally for the wind farm development in terms of site selection, other land-use options for the site as well as site layout and transport route options to the site. This section also outlines the design considerations in relation to the Cleanrath wind farm development and indicates the main reasons for selecting the chosen option with regards to its environmental impacts. Given the Cleanrath wind farm development has been constructed, it also considers the alternative scenarios which may arise depending on the outcome of the Substitute Consent process.

The monitoring results and reporting completed during the construction and operational phases of the Cleanrath wind farm development have been used to inform the assessment of the actual impacts and effects in the rEIAR, EIAR and in the accompanying rNIS, NIS. As predicted in the EIS and NIS submitted in respect of the process that culminated in the decision to grant the 2017 Permission, the Cleanrath wind farm development has not had any significant environmental impacts nor has it had any adverse effects on the integrity of any European site during either the construction or the operational phase up to the end of April 2020 or indeed in the period from May to August 2020 during which the development operated in Sleep Mode.

The chosen option, based on the evaluation of potentially negative environmental effects is for the Cleanrath wind farm development to remain in place and recommence full operation, supplying renewable electricity to the national grid and contributing to Ireland achieving its climate change targets. In the event that full operation of the Cleanrath wind farm development does not recommence, it may be necessary to implement the decommissioning plan early, which would involve further construction works to be carried out which would in themselves require further mitigation measures to offset potential environmental impact.

Early Decommissioning is considered the least environmentally sustainable option and leads to the potential for new and/or additional environmental impacts as well as the potential loss of renewable electricity with the associated negative effects on air and climate.

Description of the Cleanrath Wind Farm Development

This section of the remedial rEIAR describes, in detail, the Cleanrath wind farm development, including the construction methodologies employed during the construction phase.

The layout of the Cleanrath wind farm development was designed to minimise the potential environmental impacts while at the same time maximising the energy yield of the wind resource passing over the site. A detailed constraints study, as described in Chapter 2 of the submitted rEIAR, was carried out in order to ensure that no turbines or ancillary infrastructure are located in the more environmentally sensitive areas of the site. The layout of the Cleanrath wind farm development makes maximum use of the existing access road and tracks within the site.

The overall layout of the Cleanrath wind farm development is shown on Figure 4-1. Detailed layout drawings of the Cleanrath wind farm development are included as Appendix 4-1 to this report.

The installed wind turbines have a ground to blade tip height of approximately 150 metres. The turbine model installed on site is the Nordex N117 which has a hub height of 91m and a rotor diameter of 117m. The wind turbines are conventional three-blade turbines and are all geared to ensure the rotors of all turbines rotate in the same direction at all times. The turbines are light grey matt colour.

The Cleanrath wind farm development site is accessed via an existing commercial forestry entrance off the local road in the townland of Cloontycarthy. From this site entrance, a network of forestry tracks and a local public road traverse the northern half of the site. Maximum use was made of the existing road and tracks in accessing the turbine locations which minimised the requirement for new roadways

within the site. The existing roadways through the site have been upgraded and widened where required for providing access to the turbine locations. The road upgrade involved the widening of 1.3 kilometres of existing on-site roadways to as part of the Cleanrath wind farm development to a total running width of approximately six metres, with wider section at corners and on the approaches to turbine locations, and the laying of a new surface dressing on the existing section of roadway where necessary. New roadways have been installed for access to turbine locations in areas where existing roads were not already present. A total of 4.8 kilometres of new roadway was installed as part of the Cleanrath wind farm development.

One on-site borrow pit was developed as part of the Cleanrath wind farm development. The rock and hardcore material that was required during the construction of the Cleanrath wind farm development was sourced from the on-site borrow pit and areas where stone material was won on site as part of the cut and fill of turbine areas and roads. A limited amount of hardcore and other aggregate materials were imported that may not be possible to source from the on-site borrow pit, such as bedding sand for duct laying, and hardcore for initial site enabling works required before the borrow pit was accessed and developed. Post-construction, the borrow pit area has been secured and made safe by reinstatement of the area with overburden and peat from site excavations and therefore, the provision of a perimeter stock-proof fence around the borrow pit area to prevent access to this area is not necessary. Hardcore materials were extracted from the borrow pit by means of rock breaking and blasting. Blasting was considered to be a more effective rock extraction method producing significant volumes of rock in a matter of milliseconds.

The majority of overburden and peat was stored temporarily adjacent to the works areas for reinstatement of temporary works areas after the main construction activities had been completed. For example, the working area required around each turbine foundation was backfilled on completion of the turbine foundation. Similarly, the roadways were graded back to the level of the adjacent ground and embankments were covered with a layer of suitable material to encourage re-vegetation of the site. This approach of using temporary storage areas was considered more sustainable than hauling the material to the borrow pit and transporting it back from there again to where it is needed for the reinstatement works.

The grid connection cabling from the Cleanrath wind farm development connects to the existing 38kV Derragh Wind Farm Substation constructed as part of the Derragh Wind Farm development and is located approximately 3km west of Cleanrath Wind Farm in the townland of Rathgaskig. The cabling loops back out of this substation and runs mainly within the public road corridor on to the 110kV Coomataggart substation located in the townland of Grousemount, Co. Kerry. which includes a wind farm control building and the electrical components necessary to consolidate the electrical energy generated on Cleanrath wind farm development site and export that electricity to the national grid.

A Site Office/Canteen and storage container was temporarily located along the access road west of Turbine no. 7 at the outset of construction works. As the works progressed into the site, these facilities were relocated to the access road South West of Turbine no. 8 as outlined in Figure 4-1. These were the only facilities required at this stage the construction. As the works progressed, a temporary construction compound measuring approximately 80 metres by 40 metres was installed in the north of the site adjacent to Turbine No. 1 and located along a section of new road. An additional area of temporary construction compound was also provided on the south side of the access road adjacent to Turbine no. 1 which was used mainly by the turbine supplier as their compound during turbine installation.

The construction of the Cleanrath wind farm development has resulted in the permanent loss of 4.13ha of the peatland habitat mosaic within the site. The development was specifically designed to avoid the larger areas of blanket bog that are mapped separately from the overall peatland mosaic (see Figure 6-6, Habitat Map, Chapter 6 of this rEIAR). It has also led to the temporary physical disturbance of peatland habitats adjacent to the development footprint during the construction of the wind farm. A habitat restoration and enhancement plan has been prepared to mitigate for this habitat loss and is included as Appendix 6-8 of this rEIAR.

A total of 8.14 hectares of forestry was felled within and around the development footprint. An additional 4.18 hectares of trees were temporary felled around the turbine locations. The total amount of tree felling completed as part of the Cleanrath wind farm development was 12.32 hectares. Tree felling licences were obtained for the area of trees that was felled for the construction of the Cleanrath wind farm development. An additional hectare of immature forestry will be removed to provide an area of enhanced peatland which is intended to offset the permanent loss of Peatland Habitat due to the permanent footprint of the Cleanrath wind farm development.

In line with the Forest Service's published policy on granting felling licences for wind farm developments, areas cleared of forestry for turbine bases, access roads, and any other wind farm-related uses are to be replaced by replanting at an alternative location. A total of 12.32 hectares of new forestry will therefore be replanted as a condition of the felling licences that have been issued in respect of the Cleanrath wind farm development. The replacement replanting of forestry can occur anywhere in the State subject to licence. Some replanting will take place on the site of the Cleanrath wind farm development. In addition, two replanting area were identified and assessed as part of the replacement of permanent felling located in the townlands of Glantane Beg and Claraghatlea, Co. Cork respectively. The lands proposed as part of the replacement of permanent felling required for the areas of Peatland Habitat Restoration are located in the townland of Sheehaun in Co. Roscommon.

The site of the Cleanrath wind farm development has one main site entrance via an existing forestry road which was used during the construction phase. This forestry road is located in the townland of Cloontycarthy and accessed off the local public road. The entrance is located to the north of the site serving the entire footprint of the Cleanrath wind farm development. There is a secondary entrance which was the subject of a separate planning permission to facilitate a more efficient cable route exiting the site and operational access.

The turbine transport route to the Cleanrath wind farm development saw turbine components transported from the port at Ringaskiddy via the N40 National Primary Road and N22 National Primary Road to the townland of Lackaneen, east of the village of Lissacressig, before travelling onwards toward the site via a network of local roads to the existing site entrance in the townland of Cloontycarthy. The route had been the subject of a full route survey and swept path analysis survey prior to construction. Road widening was required along 1.6km of the turbine transport route to accommodate the large vehicles used to transport turbine components to the wind farm site. Junction accommodation works, to facilitate the delivery of the turbine components, were completed at the exiting junction between the L3402 and the local road in the townland of Cloontycarthy adjacent to an existing sawmill operational.

The protection of the watercourses within and surrounding the site, and downstream catchments that they feed was of utmost importance in considering the most appropriate drainage proposals for the site of the Cleanrath wind farm development. The drainage design proposed prior to construction was prepared with the intention of having no negative impact on the water quality of the site and its associated natural watercourses, and consequently no impact on downstream catchments and ecological ecosystems. No routes of any natural drainage features were altered as part of the Cleanrath wind farm development. Turbine locations and associated roadways were originally selected to avoid natural watercourses as much as possible, and existing roads were used where possible. There was no direct discharges to any natural watercourses, with all drainage waters being dispersed as overland flows or directly into artificial drainage ditches following the installation of silt traps, check dams and/or stilling ponds to these ditches as well as an extensive network of silt fencing. All discharges, over land, from the works areas were made over vegetation filters or through silt fencing at a minimum of 50 metres distance from natural watercourses. Buffer zones around the existing natural drainage features informed, wherever possible, the layout of the Cleanrath wind farm development. Where infrastructure existed within 50 metres of a natural watercourse, appropriate buffer were maintained between the watercourse and the works area where possible to ensure the protection of the water quality of the natural watercourse.

A Construction and Environmental Management Plan (CEMP) was prepared in advance of any construction works commencing on the Cleanrath wind farm development and submitted for agreement to the Planning Authority. The CEMP is included in Appendix 4-4 of this rEIAR The procedures for the implementation of the mitigation measures are outlined in the CEMP and their effectiveness and completion was typically monitored by the Environmental Clerk of Works.

On the 12th December 2019, the first turbine began to generate electricity from the Cleanrath wind farm development with the commencement of testing and commissioning of the turbines. The remaining turbines began to come on to the network on a phased basis until 28th February 2020 when all nine turbines were capable of generating electricity and continued to operate until 1st May 2020 (142 days). By agreement with the Supreme Court, the turbines were put into "Sleep Mode" from that date. This controlled mode is maintained by the turbine manufacturer. When the turbines are in this mode generally electricity is not produced however on various occasions checks and tests are carried out by the turbine manufacturer as required by Eirgrid which will necessitate the generation of electricity. In normal circumstances however, the blades are allowed to rotate facing the wind without generation of electricity.

The wind turbines installed as part of the Cleanrath wind farm development are expected to have a lifespan of approximately 25 years. Following the end of their useful life, the wind turbines may be replaced with new turbines, subject to planning permission being obtained, or the site may be decommissioned, with the exception of the 38kV grid connection cabling which will be an ESB networks asset and will be part of the national electricity grid. A Decommissioning Plan has been prepared (Appendix 4-9) for an early decommission of the Cleanrath wind farm development the detail of which will be agreed with the local authority prior to any decommissioning. Should the Cleanrath wind farm development continue operation for the intended lifespan of approximately 25 years, the Decommissioning Plan will be updated prior to the end of the operational period in line with decommissioning methodologies that may exist at the time and will agreed with the competent authority at that time.

Population & Human Health

One of the principal concerns in the development process is that individuals or communities, should experience no significant diminution in their quality of life from the direct or indirect effects arising from the construction, operation and decommissioning of a development. Ultimately, all the impacts of a development impinge on human health, directly and indirectly, positively and negatively. The key issues examined in this chapter of the rEIAR include population, human health, employment and economic activity, land-use, residential amenity, community facilities and services, tourism, property values, shadow flicker, noise and health and safety.

The village of Inchigeelagh is located approximately 2.5 kilometres to the south of the site of the Clearath wind far development and the nearest town is Macroom, located approximately 12 kilometres north east of the Cleanrath Wind Farm Development.

In order to make inferences about the population and other statistics in the vicinity of the Cleanrath Wind Farm Development, the Study Area for the Population and Human Health section of this rEIAR was defined in terms of the District Electoral Divisions (DEDs) where the Cleanrath wind farm development is located. The Cleanrath wind farm development lies principally within the Cleanrath DED however, the study area overlaps the Ceann Droma, Inchigeelagh and Doire Fhínín DEDs, as shown in Figure 5-1. The total Study Area has a combined population of 1,335 persons and comprises a total land area of 87.1 square kilometres. (Source: CSO Census of the Population 2016).

The design and construction of the wind farm provided employment for technical consultants, contractors and maintenance staff. Up to approximately 80 jobs were created during the various phases of construction of the Cleanrath Wind Farm Development. The construction phase lasted for approximately 16 months. Many construction workers and materials were sourced locally, thereby

helping to sustain employment in the construction trade. This had a short-term significant positive impact. On a long-term scale, the Cleanrath wind farm development has created approximately 3 jobs which will continue during the operational phase relating to the maintenance and control of the Cleanrath wind farm development should Substitute Consent be granted. This is a long-term slight positive effect.

There is currently no published credible scientific evidence to positively link wind turbines with adverse health effects. The main publications supporting the view that there is no evidence of any direct link between wind turbines and health are summarised in Chapter 5 of this rEIAR. Although there have been no empirical studies carried out in Ireland on the impacts of wind farms on property prices, the literature described above demonstrates that at an international level, wind farms have not impacted property values in the local areas. It is a reasonable assumption based on the available international literature, that the provision of a wind farm at this location would not impact on the property values in the area.

Shadow flicker is an effect that occurs when rotating wind turbine blades cast shadows over a window in a nearby property. An indoor phenomenon, it may be experienced by an occupant sitting in an enclosed room when sunlight reaching the window is momentarily interrupted by a shadow of a wind turbine's blade. Shadow flicker effect lasts only for a short period of time and happens only in certain specific combined circumstances. Current guidelines recommend that shadow flicker at neighbouring dwellings within 500 metres of a turbine location should not exceed a total of 30 hours per year or 30 minutes per day.

There is a total of 18 no. sensitive receptors located within 10 rotor diameters (1.17km) of the installed turbine locations. The closest residential property is located 613 metres from the nearest turbine location therefore a 4 times turbine tip height setback distance of 600m from each turbine to occupied dwellings. This a measure outlined in the 2019 Draft Revised Wind Energy Guidelines and has been achieved should these guidelines come into force while the Cleanrath wind farm development is in the planning system.

The WindPRO computer software was used to model the predicted daily and annual shadow flicker levels in significant detail, identifying the predicted daily start and end times, maximum daily duration and the individual turbines predicted to give rise to shadow flicker. The maximum daily shadow flicker model assumes that daylight hours consist of 100% sunshine. This is a conservative assumption which represents a worst-case scenario. During the operational phase, of the 18 No. residential properties modelled; it is predicted that 16 properties may experience daily shadow flicker. Based on the 2006 DoEHLG guidelines, the daily threshold for shadow flicker is exceeded at these 14 properties, however, the annual threshold for shadow flicker, once the regional sunshine average factor (32.5%) has been considered, is not exceeded at any property.

The operators of the Cleanrath wind farm development have completed an assessment of the properties that were predicted to potentially exceed the daily shadow flicker threshold to determine whether either or both of the factors outlined above relate to any of the properties and therefore eliminate or reduce any shadow flicker below the acceptable threshold. The assessment found that of the 14 properties predicted to exceed the daily threshold for shadow flicker, 7 properties had a clear line of sight between the turbine and the relevant section of the dwelling with no obstruction and therefore may require the mitigation strategy to be implemented. The prediction model will still require verification on resumption of operation due. Where an exceedance of the daily threshold is experienced, the appropriate mitigation will be implemented, so as to ensure that the relevant guidance limits are not exceeded.

Impacts on human beings during the construction, operational and decommissioning phases of the Cleanrath wind farm development are described in Chapter 5 in terms of health and safety, employment and investment, population, land-use, noise, dust, traffic, tourism, residential amenity, renewable energy production and reduction in greenhouse gas emissions, shadow flicker and interference with communication systems. Where a negative impact was identified, the appropriate

mitigation measures were undertaken or will be undertaken to ensure that there will be no adverse impacts on human beings due to the Cleanrath wind farm development.

Biodiversity

This chapter assesses the potential for the Cleanrath wind farm development to result or have resulted in significant effects on Biodiversity, Flora and Fauna during construction, during the short-term operational phase, during the current Sleep Mode period pending the outcome of the Substitute Consent process and during its potential operational lifetime (subject to consent of planning permission). A comprehensive desk study was undertaken to inform this ecological impact assessment. This study included a thorough review of available information that is relevant to the ecology of the site of the Cleanrath wind farm development. Comprehensive field surveys of the biodiversity of the entire study area were undertaken on various dates between 2010 and 2020 by Dixon Brosnan Environmental Consultants and by MKO ecologists. No significant limitations in the scope, scale or context of the assessment have been identified.

The desk study revealed that there is one site designated for nature conservation located within the development footprint, i.e. Sillahertane Bog NHA. This is located along a small linear section of the western end of the grid connection route. Surface water connectivity was identified between the development and The Gearagh cSAC and The Gearagh pSPA. The desk study identified that a variety of protected faunal species are known to occur within the general area, including bats, marsh fritillary, otter, freshwater pearl mussel, badger and red squirrel. The mammal species recorded during the desk study informed the survey methodologies undertaken during the site visits.

The wind farm site (excluding the grid conneciton route) is located in an area that is dominated by upland coniferous forestry and a mosaic of exposed siliceous rock and degraded peatland habitats. The northern section of the wind farm site consists predominantly of of conifer plantation (WD4) with a range of other associated habitats located within the plantation. The southern half of the wind farm site consists predominantly of a mosaic of peatland habitats including Wet Heath (HH3), Exposed siliceous rock (ER1), Dry Heath (HH1) and small areas of Upland blanket bog (PB2), where deeper peat occurs between bands of rock. In addition, a number of small areas of conifer plantation (WD4) and agricultural grassland occur in this area. The constructed development footprint comprises mainly of Buildings and artificial surfaces (BL3) as the turbine hardstands, foundations, access roads and blade set down areas comprise of recently constructed infrastructure. The grid connection route then follows a series of local roads through a largely improved agricultural landscape before reaching an upland landscape at Lackabaun. The road margins comprise largely of Dry meadows and grassy verges (GS2) and Dry-humid acid grassland (GS3). It then follows a steep upland track from the termination of the public road to the boundary with Co. Cork and continuing until it reaches the infrastructure associated with the Grousemount Wind Farm and associated Coomataggart Substation.

Following the extensive suite of ecological surveys including bat surveys, mammal surveys, watercourse surveys and general ecological walkover surveys, the following conclusions were reached:

There is no potential for the Cleanrath windfarm development to result or have resulted in any significant residual effect on any of the identified key ecological receptors following the implementation of mitigation.

The Cleanrath wind farm development (including all its elements: the turbine delivery route, the Derragh Substation and the grid connection route), individually or in combination with other plans or projects, has not and will not adversely affect the integrity of any European Site.

There is no potential for effects on any Nationally designated site (NHA, pNHA) to occur or have occurred during as a result of the Cleanrath wind farm development.

The full suite of measures that are in place to protect and enhance water quality, peatland habitats, bats, otter along with other identified ecological receptors are provided within the main body of the rEIAR

The development was considered in combination with other plans and projects in the area that could result in cumulative impacts on the Key Ecological Receptors (KERs) Assessment of Plans. The review focused on policies and objectives that relate to biodiversity, Nationally designated sites and European Sites. Policies and objectives relating to the conservation of peatlands, sustainable land use were also reviewed, particularly where the policies relate to the preservation of surface water quality. The Cleanrath wind farm development has not and will not result in any significant residual effects on biodiversity and has not contributed and will not contribute to any cumulative effect when considered in combination with other plans and projects. In the review of the projects and plans that was undertaken, no connection that could potentially result or have resulted in additional or cumulative impacts was identified. Neither was any potential for different (new) impacts resulting from the combination of the various projects and plans in association with the Cleanrath wind farm development identified.

The wind farm development was constructed and operated in strict accordance with the design, best practice and mitigation that is described within this rEIAR and as such, significant residual effects on ecology were not identified at any geographical scale on any of the identified KERs. Similar measures and methodologies are prescribed for any future operation or decommissioning of the wind farm and will be effective in avoiding any significant residual effects during these phases.

Ornithology

This chapter assesses the likely significant effects that the Cleanrath wind farm development may have had on bird species. Firstly, a brief description of the Cleanrath wind farm development is provided. This is followed by a comprehensive description of the methodologies that were followed in order to obtain the information necessary to complete a thorough assessment of the potential effects of the Cleanrath wind farm development on bird species. The survey data is presented in full in the rEIAR Appendices, with a summary of the information presented within this chapter. An analysis of the results is then provided, which discusses the ecological significance of the birds recorded within the study area. The potential effects of the Cleanrath wind farm development are then described in terms of the construction, operation and decommissioning phases of the development. An accurate prediction of the effects is derived following a thorough understanding of the nature of the Cleanrath wind farm development along with a comprehensive knowledge of bird activity within the study area. The identification of Key Ornithological Receptors and the assessment of effects followed a precautionary approach.

The potential for effects to occur or have occurred on designated sites is fully described in the Natura Impact Statement that accompanies this application. The findings presented in the NIS are as follows: it can be objectively concluded that the Cleanrath wind farm development, individually or in combination with other plans or projects, has not and will not adversely affect the integrity of any European Site.

Based on the detailed assessment, no significant effects resulting from the Cleanrath wind farm development upon birds are predicted to occur or have occurred. Effects associated with habitat loss, disturbance displacement, collision risk and cumulative effects have been assessed to be no greater than Long-term slight negative effect (EPA, 2017) and low effect significance (Percival, 2003).

The implementation of the prescribed mitigation measures has further or will further render any potential effects on avian receptors to low significance. In conclusion, no significant effects as a result of the Cleanrath wind farm development are foreseen to occur or have occurred on key ornithological receptors of the study area at any stage of construction, operation or decommissioning, either in isolation or cumulatively with other surrounding windfarms.

Land, Soils and Geology

The geology of the site predominately comprises thin peat or peaty topsoil over the underlying rock. The average peat / peaty topsoil depth was found to be 0.2m by a peat depth probing investigation. Deeper pockets of peat are found in valleys and low-lying area. Rock is visible at the ground surface on the more elevated western section of the site.

Bedrock outcrops are numerous across the Cleanrath wind farm development site. In general, the structural geology in the vicinity of the Cleanrath wind farm development site is characterised by rocky ridgelines which have a general southwest / northeast orientation. Many of the installed access roads intercept these rocky ridgelines. A significant amount of bedrock was generated for wind farm construction purposes where access road cuts were required along these ridgelines.

Construction of the Cleanrath wind farm development infrastructure required the removal of peat, soil and rock to competent foundation. Excavation of bedrock from 1 no. on-site borrow pit and from footprint cut locations provided material for access road, turbine bases and general hard-standing areas construction. Removal of soil, peat and bedrock represents a permanent direct non-significant impact on the geology of the Cleanrath wind farm development site which is considered to be an acceptable part of economic progression and development.

During the construction phase sources of contaminants (such as oil based substances or other hazardous chemicals) were not stored at the Cleanrath wind farm development site except where this was done within bunded areas that safely contained all spillages and prevented the migration of contaminants into soil, peat and bedrock. Refuelling was undertaken at the wind farm at designated refuelling areas using a fuel truck which came to site and in more remote areas of the site using a double skinned bowser with spill kits on the ready for accidental leakages or spillages. There were no records/reports of soil contamination incidences during the construction phase or operational phase of the development to date. There were no soil contamination issues observed during any of the site inspections/audits completed.

The peat stability assessment undertaken at the development showed that the Cleanrath wind farm development site has a low risk of slope failure or mass movement and that the site is suitable for a wind farm. A number of control measures were given in the peat stability assessment to manage all risks associated with peat instability that made the site acceptable for wind farm development.

A Peat Management Plan was prepared for the development which detailed management of peat during construction works and long term storage thereafter. Peat removed during the excavation works was used to restore the on-site borrow pit and also used for landscaping around the Cleanrath wind farm development site. These methods reduced the requirement for stock piling and prevented potential slope failure and erosion. Drainage and erosion prevention measures were put in place at the peat storage areas. Excess overburden excavated along the grid connection route was removed off-site and sent to an appropriately licenced disposal facility.

During the operational phase of the Cleanrath wind farm development, there was and will be no significant impacts on the land, soils and geological environment subject to the substitute consent being granted, it is proposed to restore an area of 4.3 Ha within the Cleanrath wind farm development site to a peatland habitat. This is considered to have a net positive impact on the soils and geology of the site.

During the decommissioning phase of the Cleanrath wind farm development, the above ground site infrastructure and underground cables will be removed from the development. The decommissioning phase will essentially involve the reverse procedures implemented during construction to a lesser extent.

No significant impacts on the land, soil and geology will occur. Impacts on land soil and geology did not extend beyond the immediate vicinity of the Cleanrath wind farm development site, therefore, no cumulative impacts occurred or will occur

Water

In terms of regional surface water catchments the wind farm site is located within the River Lee catchment. The majority of the grid connection cable route is also located in River Lee catchment (12.6km) with a smaller section (2.4km) being located in the Roughty River catchment.

In terms of local hydrology the western section of the wind farm site drains into Lough Allua which exists on the River Lee. The eastern section of the site drains into the Toon River which is also tributary of the River Lee. The turbine delivery route entrance exists within the Sullane River surface water catchment which is another tributary of the River Lee.

Along with the local stream network, there are numerous flushes and manmade drains that are in place, with the latter predominately to drain the forestry plantations. The integration of the wind farm infrastructure with the existing drainage in a manner that avoids alteration of flow regime in downstream water bodies is a key component of the wind farm design. This was confirmed by the analysis of hydrographs for the Toon River and River Lee shows that the development has no traceable/measurable impact on river flows or levels in either of the rivers.

Runoff control and drainage management are key elements in terms of mitigation against impacts on surface water bodies. Two distinct methods were employed to manage drainage water within the Cleanrath wind farm development. The first method involves 'keeping clean water clean' by avoiding disturbance to natural drainage features, minimising any works in or around artificial drainage features, and diverting clean surface water flow around excavations, construction areas and temporary storage areas. The second method involves collecting any drainage waters from works areas within the site that might carry silt or sediment, and nutrients, to route them towards attenuation areas prior to controlled diffuse release over vegetated surfaces. There were no direct discharges to surface waters. During the construction phase all runoff from works areas (i.e. dirty water) were attenuated and treated to a high quality prior to being released.

Extensive surface water quality monitoring carried out during the construction and operational phase show that the drainage measures are effective as there were no observed significant effects on the downstream receiving waters. This is backed up by numerous site inspections/visual checks which showed that 99% of the time the waters inspected on-site were visually clean with no trace of contaminants. The 1% were all minor, localised, temporary turbidity effects which were resolved by undertaking minor drainage adjustments. Numerous rounds of surface water sampling were taken at 13 no. downstream monitoring locations during the construction and operational phase and there was no exceedance of suspended solids with respect the relevant EU surface water regulation value. The automated turbidity monitoring shows that levels were typically very low during both the construction phase and operational phase with the vast majority of readings been within the expected background range for surface waters. There is no requirement to carry out any remedial mitigation measures as a result of the Cleanrath wind farm development.

The sandstone bedrock underlying the site is classified as a Locally Important Aquifer in the northern section of the site, while the southern section is underlain by a Poor Aquifer. The bedrock generally has no inter-granular permeability and groundwater flow occurs in fractures and cracks. Groundwater at the site can be classed as sensitive in terms of potential impacts from the Cleanrath wind farm development. In these rocks groundwater flow paths are expected to be relatively short, typically from 30-300m, with groundwater discharging locally to small springs, or to streams. There were no impacts on groundwater quality or flows as a result of the development.

Designated sites that receive surface water runoff from the wind farm development or grid connection route include the Gearagh cSAC, Lough Allua pNHA and the Roughty River pNHA. These designated sites can be considered very sensitive in terms of potential impacts. No hydrological or hydrogeological effects on designated sites have occurred or are likely to occur as demonstrated by the surface water flow and water quality monitoring.

During the decommissioning phase of the Cleanrath wind farm development, the majority of the site infrastructure will be removed from the wind farm site. The decommissioning phase will essentially involve the reverse procedures implemented during construction. No significant effects on the water environment will occur.

Subject to the substitute consent being granted, it is proposed to restore an area of 4.3 Ha within the wind farm site to a peatland habitat, typical of a native Irish upland environment. This is considered to have a net positive impact on the local hydrology.

In summary, no significant effects on the water environmental occurred during the construction or operational phase of the wind farm.

No cumulative impacts on the water environmental occurred nor were there are health effects reported.

Air and Climate

Air Quality

Due to the non-industrial nature of the Cleanrath wind farm development and the general character of the surrounding environment, air quality sampling was deemed to be unnecessary for this rEIAR.

The production of energy from wind turbines has no direct emissions as is expected from fossil fuel-based power stations. Harnessing more energy by means of wind farms will reduce dependency on fossil fuels, thereby resulting in a reduction in harmful emissions that can be damaging to human health and the environment. Some minor short term or temporary indirect emissions associated with the construction of the Cleanrath wind farm development include vehicular and dust emissions. Emissions from the construction, short-term operation, sleep mode operation, future normal operation and decommissioning (including early decommissioning) of the Cleanrath wind farm development are addressed in Section 10.1.5.

The Cleanrath wind farm development, by providing an alternative to electricity derived from coal, oil or gas-fired power stations, will result in emission savings of carbon dioxide (CO2), oxides of nitrogen (NOx), and sulphur dioxide SO2. The production of renewable energy from the Cleanrath wind farm development will have a long-term slight positive impact on air quality.

Long-term exposure to chemicals such as SO2 and NOx are harmful to human health. The production of clean, renewable energy from the Cleanrath wind farm development will offset the emission of these harmful chemicals by fossil fuel powered sources of electricity and, therefore, will have a long-term slight positive impact on human health.

In the event that substitute consent is not granted, the potential early decommissioning of the project would result in a renewable energy facility not being provided at this location and the Cleanrath wind farm development being decommissioned and therefore eliminate potential benefits for air quality from being realised.

Climate Change and Carbon Balance Calculations

Although variation in climate is thought to be a natural process, the rate at which the climate is changing has been accelerated rapidly by human activities. Climate change is one of the most challenging global issues facing us today and is primarily the result of increased levels of greenhouse gases in the atmosphere. These greenhouse gases come primarily from the combustion of fossil fuels in energy use. Changing climate patterns are thought to increase the frequency of extreme weather conditions such as storms, floods and droughts. In addition, warmer weather trends can place pressure on animals and plants that cannot adapt to a rapidly changing environment. Moving away from our

reliance on coal, oil and other fossil fuel-driven power plants is essential to reduce emissions of greenhouse gases and combat climate change.

This chapter of the rEIAR provides a detailed overview of climate change policy relevant to the Cleanrath wind energy development.

The carbon balance of wind farm developments in peatland habitats has attracted significant attention in recent years. When developments such as wind farms are proposed for peatland areas, there will be direct effects and loss of peat in the area of the development footprint. There may also be indirect effects where it is necessary to install drainage in certain areas to facilitate construction. The works can either directly or indirectly allow the peat to dry out, which permits the full decomposition of the stored organic material with the associated release of the stored carbon as CO2. It is essential therefore that any wind farm development in a peatland area saves more CO2 than is released.

A methodology was published in June 2008 by scientists at the University of Aberdeen and the Macauley Institute with support from the Rural and Environment Research and Analysis Directorate of the Scottish Government, Science Policy and Co-ordination Division. This methodology was refined and updated in 2011 based on feedback from users of the initial methodology and further research in the area. This provides a transparent and easy to follow method for estimating the impacts of wind farms on the carbon dynamics of peatlands. The Macauley Institute method for calculating carbon losses from wind farm projects was used to assess the impacts of the Cleanrath wind farm development in terms of potential carbon losses and savings taking into account peat removal, drainage, habitat improvement and site restoration.

The worksheet made available as part of the 'Calculating carbon savings from wind farms on Scottish peat lands' report, was downloaded and used to input the necessary data. A copy of this worksheet is provided as Appendix 10-1 of this rEIAR. Where available and relevant, site-specific information was inserted into the worksheet. Otherwise, default values were used.

The worksheet model calculates that the Cleanrath wind farm development will give rise to 27,551 tonnes of CO2 equivalent losses over its 25-year life. Of this total figure, the wind turbines directly account for 20,431 tonnes. Losses from soil organic matter and reduced carbon fixing potential and the felling of forestry accounting for the remaining 7,119 tonnes. The worksheet model has also been used to estimate the carbon losses associated with early decommissioning should it occur. The potential carbon loss is similar to the continued operation of the development as the majority of the losses have been incurred at this stage.

Approximately 35,339 tonnes of carbon dioxide will be displaced per annum from the largely carbon-based traditional energy mix by the Cleanrath wind farm development. Over the proposed 25-year lifetime of the development, therefore, 883,475 tonnes of carbon dioxide will be displaced from traditional carbon-based electricity generation. The 27,551 tonnes of CO2 that were lost to the atmosphere due to changes in the peat environment and due to the construction and operation of the Cleanrath wind farm development will be offset by the Cleanrath wind farm development after approximately 9.4 months of operation.

The construction phase of the Clenarath wind farm development would have had a Short-term Imperceptible Negative Impact on climate as a result of greenhouse gas emissions. The operational phase of the Cleanrath wind farm development will have direct long-term moderate, positive effect on climate.

Noise and Vibration

AWN Consulting Limited has been commissioned to conduct an assessment into the likely environmental noise and vibration impacts of the Cleanrath wind farm development (

The background noise environment in the absence of the constructed wind farm has been established through noise monitoring surveys undertaken at several noise sensitive locations (NSL's) surrounding the Cleanrath wind farm development. 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 Cleanrath wind farm development in line with the guidance contained in 'Wind Energy Development Guidelines for Planning Authorities 2006 and considering planning conditions previously applied to the Cleanrath wind farm development site.

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.

The assessment of construction noise and vibration and has been conducted in accordance with best practice guidance contained in BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise and BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Vibration. Subject to good working practice as recommended in the rEIAR Chapter, it is not expected that there will be any significant noise and vibration impacts associated with the construction phase and the likely noise from construction activity at the nearest Noise Sensitive Locations (NSL's) is expected to be well below recommended threshold values. The associated construction noise and vibration impacts are not expected to cause any significant effects.

Based on detailed information on the site layout, the likely turbine noise emissions and turbine hub height for the Cleanrath wind farm development, a series of 'worst-case' turbine noise prediction models have been prepared for review. The predicted turbine noise levels have been calculated at all NSL's in accordance with the IOA GPG recommendations. The assessment has confirmed that the turbine noise levels associated with the Cleanrath wind farm development and existing wind farm development are within the best practice noise criteria curves derived from Irish guidance document 'Wind Energy Development Guidelines for Planning Authorities 2006. Therefore, it is not considered that a significant effect is associated with the Cleanrath wind farm development. This conclusion has been confirmed with the presentation of compliance noise monitoring results that were obtained at sample locations in the vicinity of the Cleanrath wind farm development during a period when it was operating normally.

No significant vibration effects are associated with the operation of the Cleanrath wind farm development.

The assessment of decommissioning noise and vibration and has been conducted, again, in accordance with best practice guidance contained in BS 5228-1:2009+A1:2014 and BS 5228-2:2009+A1:2014. Subject to good working practice as recommended in the rEIAR Chapter, it is not expected that there will be any significant noise and vibration impacts associated with the decommissioning phase and the likely noise from decommissioning activity at the nearest NSL's is expected to be well below recommended threshold values. The associated decommissioning noise and vibration impacts are not expected to cause any significant effects.

In summary, the noise and vibration impact of the Cleanrath wind farm development is not significant considering national guidance for wind farm developments.

Landscape and Visual

Turbines of the Cleanrath wind farm development are constructed and are visible within the landscape, therefore the assessment of visual and landscape effects was informed by the reality on the ground at and in the vicinity of the site. However, the assessment uses all of the traditional tools to compile a landscape and visual impact assessment (ZTV Mapping and Photomontages) as these still have relevance to the assessment process by providing context and illustrating the points that are being explained by text.

The Zone of Theoretical Visibility (ZTV) mapping for the Cleanrath wind farm development generally shows that areas of full theoretical visibility are limited to areas in close proximity (<5km) to the Cleanrath wind farm development, as well as pockets of visibility to the north and east of the wider 20 km LVIA study area. The ZTV shows that there is no visibility in County Kerry and therefore no landscape or visual effect.

Seven County Cork Landscape Character Types (LCTs) have any significant visibility of the Cleanrath wind farm development and screened in for assessment in this rEIAR. The assessments determined that the Cleanrath wind farm development induces only Slight, Not Significant or Moderate effects on the landscapes of these LCTs. No significant landscape effects occur in these LCTs as a result of the Cleanrath wind farm development.

In terms of landscape character, only LCT *12a Rolling Marginal Middleground* and *15a Ridged and Peaked Upland*, in which the Cleanrath wind farm development turbines are located, experience direct effects on landscape character as a result of the Cleanrath wind farm development. Any other effects on other LCTs are indirect, as the Cleanrath wind farm development is visible from within these LCTs but located outside them. The site is not located within or close to any High Value Landscape areas designated with the CCDP and has not had any significant effect on these areas.

The seven designated County Cork Scenic Routes with visibility of the Cleanrath wind farm development were assessed based on site visits and using the photomontage methodology that follows best practice guidance for LVIA. Residual visual effects were recorded as Slight, Moderate and Imperceptible for these sensitive visual receptors. No significant visual effects were recorded for any designated Scenic Route as a result of the Cleanrath wind farm development.

11 viewpoints photomontages were prepared to assess the visual effects of the Cleanrath wind farm development. The visual assessment concluded that residual visual effects of "Moderate" was deemed to arise at six of the 11 viewpoint locations. All other viewpoints were assessed as resulting in Slight (3), No impact (1) or Imperceptible (1) residual visual effects.

Furthermore, it was shown that visibility is greatly restricted by the surrounding topography and actual visibility is further restricted by the effects of localised screening and changes in local topography. Therefore, the turbine locations and heights are considered appropriate for the Cleanrath wind farm development site.

Within the 20km study area existing, permitted and recently proposed wind turbines were identified and mapped in order to assess the cumulative landscape and visual effects. A comparative ZTV shows that the cumulative visibility over that of the existing and permitted turbines within the 20 km LVIA study area only increased in a small number of tiny pockets due to the addition of the Cleanrath wind farm development, therefore it is considered that the Cleanrath wind farm development has not had a significant impact on the extent of cumulative visibility within the LVIA study area.

Although, it was found that the Cleanrath wind farm development slightly adds to the cumulative landscape status, it would not change the cumulative landscape status of the individual LCTs in terms of wind energy development, therefore the cumulative landscape effects are considered low.

Cumulative visual effects were assessed from each photomontage viewpoint. The Derragh wind farm is located in close proximity to the Cleanrath wind farm development, as such, the Derragh turbines contributed to the Moderate and Slight/Moderate cumulative visual effects. Cumulative visual effects arising from the view of both the Derragh wind farm and the Cleanrath wind farm development together are mitigated by similar scaling, turbine design and strategic siting. Cumulative visual effects from other wind farm developments are significantly mitigated by distance from the Cleanrath wind farm development. Overall, cumulative visual effects are deemed to be Slight.

Cultural Heritage

This chapter comprises an assessment of the potential impact of the as-built Cleanrath wind farm and associated grid connection on the Cultural Heritage resource. Cultural heritage includes archaeology, architectural heritage and any other tangible assets. The assessment was based on GIS based mapping, ZTV and Viewshed analysis to assist with the assessment of impacts on setting followed by a desktop analysis of all baseline data. Previous field survey and other forms of assessment including pre-development testing and construction phase monitoring of ground works associated with the development also fed into this assessment.

National Monuments are those recorded monuments which are in the ownership / guardianship of the Minister for Culture, Heritage and the Gaeltacht (DCHG). No monuments subject to a Preservation Order are located within 10km of the as built turbines while four National Monuments in State Care are located within 10km of the turbines.

No National Monuments in State Ownership/Guardianship are located within or adjacent to the rEIAR Study Area and therefore no direct impacts to these aspects of the archaeological resource occurred as a result of ground works associated with the as-built development.

Four recorded monuments (CO069-094 – Enclosure, CO069-095001 and 002 – hut sites, CO069-096 – field boundary) subject to statutory protection as defined in the Record of Monuments and Places or Sites and Monument Record are located to the north-west of T6. The monuments are situated between 85-100m from the turbine base. Ground works associated with the construction of this turbine, the associated hard stand and access road were subject to archaeological monitoring. No direct impacts to the recorded monuments occurred as a result of the ground works, and no potential features associated with same were uncovered during monitoring of the work. Seven recorded monuments are located within 100m of the grid connection route, although none are located immediately on the cable route. Archaeological monitoring of ground works associated with the underground grid connection (i.e. the excavation of the cable trench) was carried out over several months in 2018 and 2019 by Tobar Archaeological Services. No direct impacts to any of the recorded monuments located along the grid connection route occurred as a result of the ground works.

No previously unrecorded archaeological features were uncovered along the grid connection route during archaeological monitoring of ground works associated with same (Appendix 12-3 and 12-4). No direct impacts to this resource were therefore identified.

No Protected Structures or structures/items listed in the National Inventory of Architectural Heritage (NIAH) are located within the Cleanrath wind farm development site boundary. No direct impacts to this resource therefore occurred as a result of the as built wind farm.

No features of cultural heritage merit as indicated on the available historic OS mapping for the area were noted within the Cleanrath wind farm development site boundary. No such features were noted during archaeological monitoring of ground works associated with the as-built wind farm. No direct impacts to such features therefore occurred. Twenty-one items of local cultural heritage merit were noted along the gird connection route as a result of a review of the available historic mapping for the area (1st edition). The features mainly comprised roadside lime kilns, structures (e.g. houses and

associated buildings) and two bridges. No direct impacts to any items of cultural heritage merit occurred along the grid connection route.

In terms of archaeology, architecture and cultural heritage, no direct effects will occur at the operational stage of the development.

Effects on the wider setting of National Monuments, recorded monuments, Protected Structures and NIAH structures within 5km of the nearest turbine was assessed using Viewshed analysis and ZTV and is Not Significant-Slight.

An assessment of cumulative impacts was also undertaken taking into consideration projects within 20km of the as-built development. This included all permitted, proposed and existing turbines. When considered cumulatively effects on the wider setting of cultural heritage assets is Slight.

Material Assets

Traffic and Transport

The purpose of this section is to assess the effects on roads and traffic of the additional traffic movements that were generated during the construction and are forecast to be generated during the operational and decommissioning phases of the Cleanrath wind farm development. For developments of this nature, the construction phase is the critical period with respect to the traffic effects experienced on the surrounding road network, in terms of both the additional traffic volumes that will be generated on the road network, and the geometric requirements of the abnormally large loads associated with the wind turbine plant.

The point of arrival for the wind farm plant was the port at Ringaskiddy in Cork. A detailed assessment of the transport route is provided in, Section 14.1 of this rEIAR, from a point at which the route turns off the N22 national secondary road at Lynch's Cross roads while an assessment of the route between the port at Ringaskiddy to the N22 is also included

The need to transport a wind turbine blade measuring up to 58.5 metres on the public roads is not an everyday occurrence in the vicinity of the site of the Cleanrath wind farm development. However, the procedures for transporting abnormal size loads on the country's roads are well established and were implemented in full to ensuring all the required turbine components were successfully delivered to site.

A Traffic Management Plan was prepared in accordance with the findings of the traffic impact assessment set out in Chapter 14 and is included in the CEMP (Appendix 4-4). The plan included:

- A delivery schedule.
- Details of temporary works or any other minor alteration identified.
- A dry run of the route using vehicles with similar dimensions.

An updated Traffic Management Plan has been prepared for the decommissioning phase and is included in the Decommissioning Plan (Appendix 4-9).

In terms of daily traffic flows the impact of the Cleanrath wind farm development, during the construction phase, on the delivery routes will be as follows:

- During the 9 days when the concrete foundations were poured the effects on the surrounding road network were moderate but were temporary.
- During the 191 days when the concrete was delivered to the cable route the effects on the surrounding road network were imperceptible and were temporary.
- During the remaining 103 days for the site preparation and ground works stage, the delivery of construction materials had a slight impact and was temporary.

- During the 9 days of the turbine construction stage when general materials are delivered to the site, the delivery of construction materials had a slight impact and was temporary.
- During the 28 nights when the various components of wind turbine plant were delivered to the site by extended articulated vehicles, the impact of the delivery vehicles on these days was slight to moderate and occurred on 28 nights only.

The effects set out in this section relate to the operational phase of the Cleanrath wind farm development should Substitute Consent be granted. This includes the previous period of short-term operation and the current period of Sleep Mode and also assesses future operation.

- During the initial first 3 month period of operation from January to March 2020 there were up to 10 cars / vans visiting the site per day. Following that initial period during the operation of the Cleanrath wind farm development, there has been and it is estimated that there will continue to be a maximum of three maintenance staff members employed on site with a similar number of vehicle trips to and from the site.
- During the operation phase also, there will be 2 days when plant required for the restoration of peatland habitat will be delivered to and from the site. For the remaining days during the operational stage a maximum of 3 car trips for maintenance staff will occur during any one day.
- There is the potential requirement for a blade swap on a turbine as part of turbine maintenance should a blade be found to be defective. In the unlikely event this occurs it is not anticipated that a significant number of blade swaps will be required. It is therefore considered that the impact on the surrounding local highway network will be imperceptible during the operational phase of the development.

For both the potential early decommissioning or the intended decommissioning phase after the operational life time of the project, the potential traffic effects will be similar.

- During the 5 days when the foundations will be backfilled the effects will be slight to moderate and will be temporary.
- During the 15 days when the cables will be removed from ducts on the cable route the effects on the surrounding road network will be imperceptible and temporary.
- During the 9 days of the turbine removal when smaller component parts will be removed using standard HGVs the impact will be slight and temporary.
- During the 28 nights when the large components of wind turbine plant are removed from the site using extended articulated vehicles, the impact of the delivery vehicles on these days will be slight to moderate and will be temporary occurring on 28 nights only.

Telecommunications and Aviation

Wind turbines, like all large structures, have the potential to interfere with television or radio signals by acting as a physical barrier to microwave links. The alternating current electrical generating and transformer equipment associated with wind turbines, like all electrical equipment, also generates its own electromagnetic fields, and this can interfere with broadcast communications, i.e. television and radio signals. The most significant effect however, at a domestic level, relates to a possible flicker effect caused by the moving rotor, particularly on television signals. The most significant potential effect occurs where the wind turbine(s) is directly in line with the transmitter radio path.

Both the adopted 2006 and the Draft Revised 2019 '*Wind Energy Development Guidelines for Planning Authorities'* produced by the Department of the Environment, Heritage and Local Government (DOEHLG) state that interference with broadcast communications can be overcome by the installation of deflectors or repeaters where required. Developers are advised to contact individual local and national broadcasters and mobile phone operators to inform them of proposals to develop wind farms.

This consultation has been carried out by MKO as part of the assessment of the Cleanrath wind farm development as summarised below; full details are provided in Section 2.4 of this rEIAR.

RTE Television Network Radio Telefís Éireann Transmission Network Ltd., now 2RN, responded by email on the 11th May 2020. Having previously reviewed the location of the Cleanrath wind farm development, 2rn noted the protocol agreement previously has not changed considering there has been a reduction of turbines and that the signed agreement still stands and can be found in Appendix 14-2. There were no responses received from any telephone or broadband operators.

The scoping response of the Irish Aviation Authority and Department of Defence has requested that standard lighting requirements be used at the Cleanrath wind farm development, in line with policy on tall structures. This lighting has been installed.

The potential for electromagnetic interference from wind turbines occurs only during the operational phase of the development. As with the construction phase, there will be no electromagnetic interference impacts associated with the decommissioning phase of the Cleanrath wind farm development. Prior to decommissioning of turbines, IAA will be notified 30 days prior to commencement. Following the same procedure during construction phase, details on all cranes and associated lighting will be provided to and agreed with IAA. There will be no direct or indirect effects on telecommunications or aviation during decommissioning.

Interactions of the Foregoing

Chapters 5 to 14 identify the likely significant environmental effects that may have occurred or may occur in terms of Population and Human Health, Biodiversity (Flora and Fauna) Ornithology (Birds), Land, Soils and Geology, Hydrology and Hydrogeology (Water), Air and Climate, Noise and Vibration, Landscape and Visual, Cultural Heritage (Archaeological, Architectural and Cultural Heritage) and Material Assets (Roads and Traffic, Telecommunications and Aviation), as a result of the Cleanrath wind farm development as described in Chapter 4. All of the potential significant effects of the Cleanrath wind farm development and the measures implemented and proposed to mitigate them have been outlined in the preceding chapters. However, for any development with the potential for significant environmental effects there is also the potential for interaction between these effects. The result of interactive effects may exacerbate the magnitude of the effects or ameliorate them, or have a neutral effect.

A matrix is presented in Chapter 15 of the rEIAR to identify potential interactions between the various aspects of the environment already assessed in previous chapters. The matrix highlights the occurrence of potential positive or negative effects during the construction, operational and decommissioning phases. Where any potential interactive impacts have been identified, appropriate mitigation is included in the relevant sections (Chapters 5–14) of the rEIAR.