TULLAGHMORE WINDFARM LIMITED

TULLAGHMORE WINDFARM

CO. GALWAY

VOLUME I

NON-TECHNICAL SUMMARY (NTS)

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TULLAGHMORE WIND LIMITED
TULLAGHMORE WINDFARM, CO. GALWAY

VOLUME I NON-TECHNICAL SUMMARY REPORT

CONTENTS

1 NTS.1 INTRODUCTION

This Non-Technical Summary (NTS) summarises the Environmental Impact Assessment Report (EIAR) which accompanies the application for planning permission for Tullaghmore Windfarm, which is situated in the townlands of Tullaghmore, Tawnaghbeg, and Tullaghaboy, Oughterard, Co. Galway. The Site is located approximately 30km northwest of Galway City, and 9km west of Oughterard, Co. Galway. The location of the Development is shown in **Figure NTS-1**.

Figure NTS-1: Site Location

Tullaghmore Windfarm Limited (referred to as 'the Applicant'), is a subsidiary of Emerging Markets Power Limited (EMPower Ltd.). The parent company, EMPower Ltd. is an Irish based renewable energy developer with a multi-national portfolio. EMPower was established in 2015 to serve the growing renewable energy sector internationally.

Permission is being sought by the applicant for the construction of 6 No. wind turbines, turbine hardstands, site access tracks, a meteorological mast, an on-site 38kV substation and all ancillary works. The EIAR also assesses works along the turbine delivery route and the construction of an underground Grid Connection to Screebe110kV GIS substation, Co. Galway. The entire Development is located within the county of Galway and will have an installed capacity of 40.8MW. The Site is identified in **Figure NTS-2**.

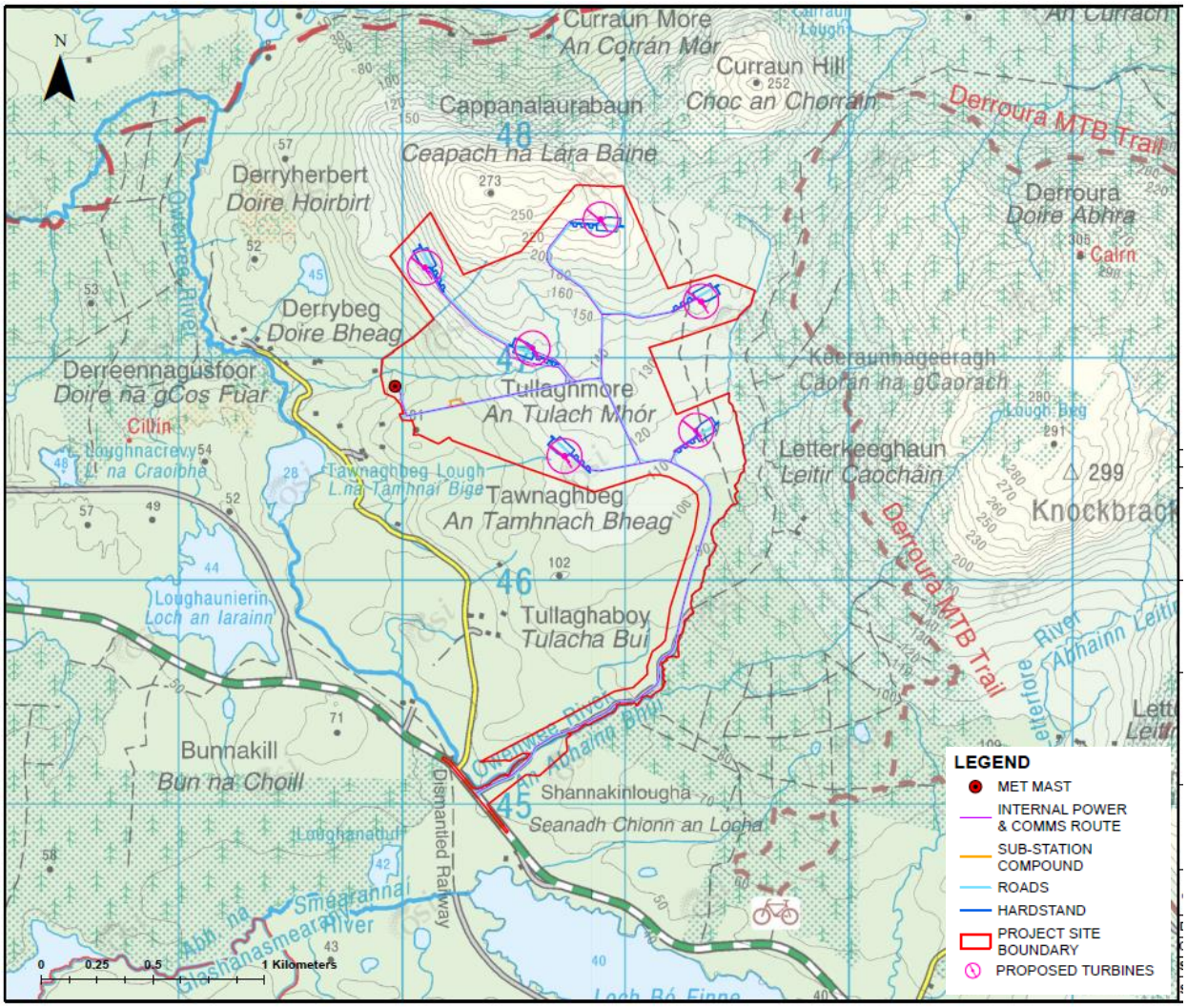

Figure NTS-2(a): Site Layout (Main Site)

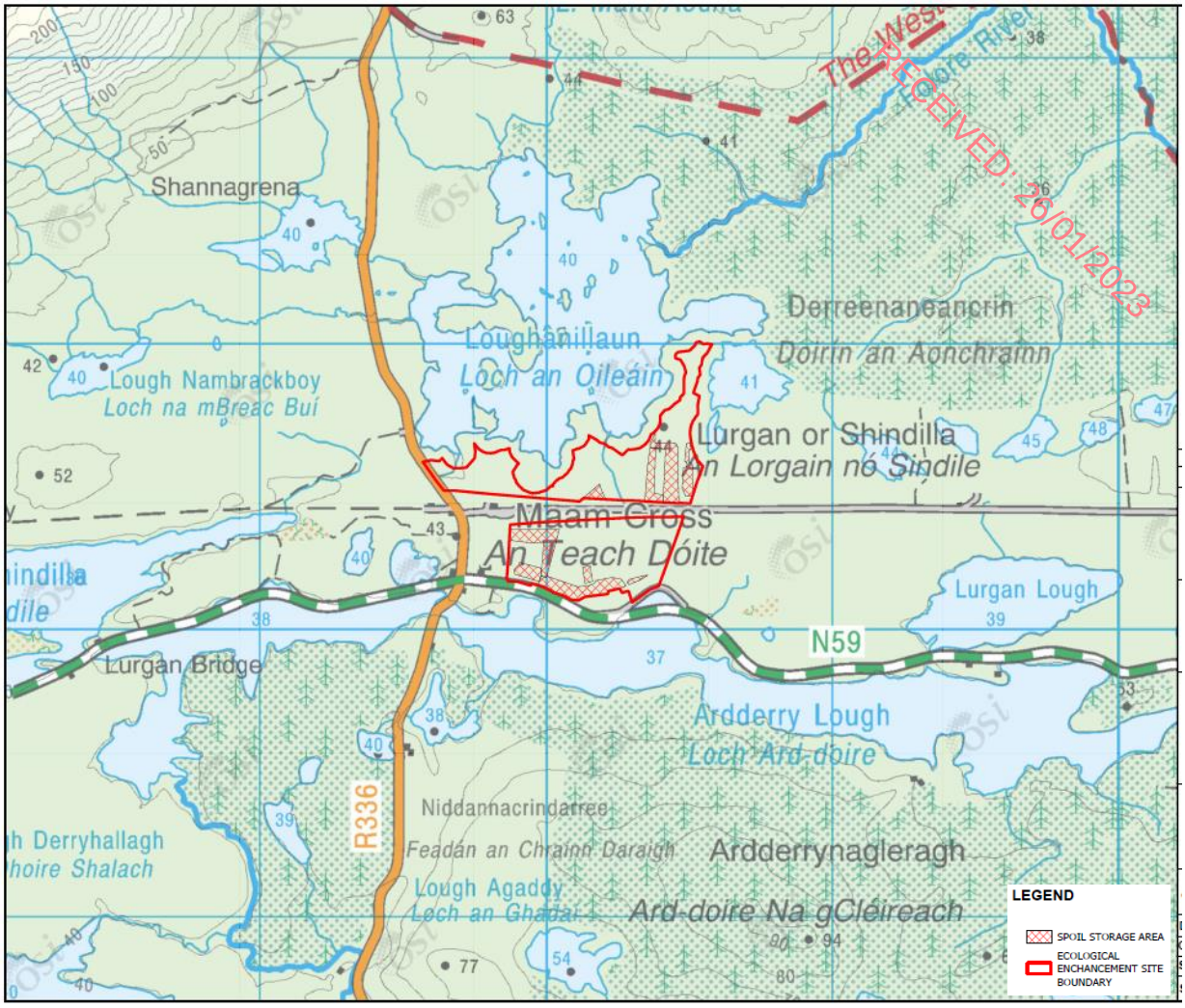

Figure NTS-2(b): Site Layout (peat storage and restoration (habiat enhancement) area)

The EIAR presents information on the identification and assessment of the potential significant environmental effects of the Development and reports the findings of the Environmental Impact Assessment (EIA) which has been undertaken in accordance with the Planning and Development Act 2000, as amended and the Planning and Development Regulations 2001, as amended. The EIAR comprises the following documents:

- This Non-Technical Summary (Volume I)
- The Main EIAR Report (Volume II)
- Supporting Figures and Drawings (Volume III)
- Supporting Technical Appendices (Volume IV)

These documents inform readers of the nature of the Development, likely environmental effects and measures proposed to protect the environment during each phase of the Development.

The Development will comprise the following phases:

- Construction of the Development
- Operation of the Development
- Decommissioning of the Development

2 NTS.2 ENVIRONMENTAL IMPACT ASSESSMENT

EIA is required where there are likely to be significant effects on the environment due to the nature, size or location of a new development. Windfarms of the scale of the Development typically legally require an EIA to be carried out.

This EIAR has been prepared following a systematic approach to an EIA and project design, with knowledge of the potential effects being used to change the design so as to reduce those effects. The main EIA stages are:

- Scoping consultation (process of asking relevant organisations what they think should be included in the EIA) and how these topics are addressed
- Technical environmental assessments - baseline studies (understanding what the existing environmental conditions are), asking what potential significant environmental effects might occur, informing the design evolution and identification of measures to reduce undesirable effects
- Writing up the findings to include in the EIAR
- Submission of the planning application and EIAR

Scoping and pre-application consultation is important to the development of a comprehensive and balanced EIAR. Requests for Scoping Opinions were submitted to the prescribed bodies and key consultees in September 2021. The request was accompanied by a Description of the Project, a Site Location Map, an Overall Masterplan Drawing and a Scoping Letter. Scoping Opinions received are included as **Appendix 1.3 of Volume IV**. This included agreement on excluding from the EIAR, assessment of effects on certain receptors or features, where it was agreed there was no potential for significant effects.

The Applicant undertook a number of public consultation events. Public consultation took place in 7 stages as follows:

1. Stage 1
    - Dedicated Project Website Goes Live
    - First Project Information Newsletter distributed to Immediate consultation zone (29 Eircodes)

- First Project Community Letter distributed to Immediate consultation zone (29 Eircodes)
- First Project Design Online Webinar – All interested Stakeholders

2. Stage 2
   - Project Information Letters – Response to Website Queries

3. Stage 3
   - Project information Letter – Project Name Update

4. Stage 4
   - Project Information Letter – Potential Turbine Delivery Route and Potential Grid Route

5. Stage 5
   - Second Project Information Newsletter distributed to immediate consultation zone (46 Eircodes)
   - Second Project Community Letter distributed to Immediate consultation zone (46 Eircodes)
   - Second Project Design Online Webinar – All interested Stakeholders

6. Stage 6
   - Third Project Information Newsletter distributed to Immediate consultation zone (71 Eircodes)
   - Third Project Community Letter distributed to Immediate consultation zone (71 Eircodes)
   - In Person Project Information Event – All interested Stakeholders
   - Projects Online Virtual Exhibition Room Enacted
   - Project email Correspondence
   - Project communication letter sent to clubs and societies

7. Stage 7
   - Fourth Project Information Newsletter distributed to immediate consultation zone (71 Eircodes)
   - Fourth Project Community Letter distributed to Immediate consultation zone (71 Eircodes)
   - Fourth Project Design Online Webinar – All interested Stakeholders

A report on the public consultation process has been prepared and can be found in **Technical Appendix 1.3** in **Volume IV**. Public consultation was generally supportive of the project with the main concern raised being about impacts on the road network during construction.

Environmental effects have been assessed in chapters of the EIAR, broadly with one chapter per technical discipline, generally representing a type of receptor of potential effects (e.g., birds). The assessments in each chapter follow a similar, systematic approach, to identify any effects that may be significant in the context of the EIA Regulations. The approach includes establishing the "baseline", this being the current state of the environment, to which the Development will be added. This identifies the key receptors, including how sensitive they are to the sort of change that might be caused by the Development. The potential size (or magnitude) of change caused by the Development is then assessed, and the sensitivity and magnitude are considered together to form a conclusion on significance. Effects can be desirable (or "positive", or "beneficial"), or undesirable (or "negative", or "adverse"). Mitigation is proposed where possible to prevent significant undesirable effects. The final proposed effects are those after mitigation has been applied and are the "residual effects".

In accordance with the EIA Regulations, the assessment has considered 'cumulative effects'. These are effects that result from cumulative changes caused by past, present or reasonably foreseeable actions together with the Development.

3 NTS.3 PROPOSAL FOR THE TULLAGHMORE WINDFARM

The layout of the Development is shown on **Figure NTS-29(a & b)**. The Development will be comprised of the following main components:

- Erection of 6 no. wind turbines with an overall ground to blade tip height of 185m. The candidate wind turbine will have a rotor diameter of 162m and a hub height of 104m.
- Construction of site access roads, crane hardstand areas and turbine foundations.
- Improvement of existing site entrance with access onto the N59.
- Construction of one no. temporary construction compound with associated temporary site offices, parking areas and security fencing.
- Installation of 1 no. permanent meteorological mast with a height of 104m.

- Construction of new internal site access tracks and upgrade of existing Site track, to include all associated drainage.
- Development of a site drainage network.
- Construction of one no. permanent 38kV substation.
- All associated underground electrical and communications cabling connecting the wind turbines to the wind farm substation.
- All works associated with the connection of the wind farm to the national electricity grid, which will be via 38kV underground cable connection approximately 18.65km in length to the existing ESB Screebe 110kV GIS Substation.
- Biodiversity enhancement measures.
- Peat storage and restoration areas.

A 10-year planning permission and 30-year operational life from the date of commissioning of the entire wind farm is being sought.

The EIA also assesses the Works at 4 no. locations along the proposed turbine delivery haul route from Galway Port and the proposed underground grid connection from the Site to Screebe 110kV Substation.

3.1 Wind Turbines

The 6 turbines will have a height from base to tip of 185m consisting of a blade diameter of 162m and a hub height of 104m. The turbines will be of a typical modern, three blade, horizontal axis design, light grey in colour and the finish of the tower and blades will be semi-gloss and semi-matt respectively.

The final choice of turbines will be guided by an assessment of the wind conditions and will take account of the available technology at the time of construction. . The final choice of turbine model is unknown at this stage, but the candidate turbine model used for assessments at this stage is a Vestas V162 has been identified for the purposes of EIA and planning approval. This reflects a machine that would have the worst-case environmental effects, i.e. tallest/loudest (for that model)/longest blades etc. This precautionary approach provides that the effects are likely only to be as predicted or less.

Turbines are typically of a variable speed type, so that turbine rotor speed will vary according to the energy available in the wind. Due to the location in the west of Ireland, and elevation, the Site experiences high average annual wind speeds. The Irish Wind Atlas produced by Sustainable Energy Ireland shows average wind speeds for the country and it

shows that wind speeds on the Site are consistent with a windfarm development (7.1m/sec at 30m, 8.3m/sec at 75m, 8.8m/sec at 100m and 9.1m/sec at 150m). At wind speeds greater than c. 25m/s, which are very unusual, the turbines will temporarily turn off to prevent any damage occurring.

The turbines are computer controlled to see that at all times, the turbine faces directly into the wind to provide for optimum efficiency. The rotors of all turbines will rotate in the same direction relative to the wind direction.

Each wind turbine needs an area of compacted stone adjacent to the turbine base, known as a hardstanding. This is used principally by the crane when erecting the turbine.

3.2 Access to the Development

The Development will be accessed via the existing site access track which adjoins the site to the N59. Where possible, the existing site access track will be kept, utilised and upgraded as necessary to access the proposed turbine locations. The existing site access track will connect to the proposed new site access tracks, which will be retained throughout the operational life of the Development to enable maintenance of the turbines and replacement of any turbine components.

It is currently proposed that the turbine nacelles, tower hubs and rotor blades will be landed at Galway Port, in Galway City. From there, they will be transported to the Site via the R336 to Maam Crosss and then the N59 east to the upgraded site entrance. The proposed turbine component delivery route is shown in **Figure NTS-3**. The final delivery route for the turbines will be confirmed by the turbine supplier and subject to their detailed route assessments. The potential effects of transporting them and other materials is set out in section **NTS-14** and **Chapter 14: Traffic and Transport** of the EIAR. Works will be required at 4 no. locations along the haul route but will involve minor works such as temporary, surface level civil works to create load bearing surfaces.

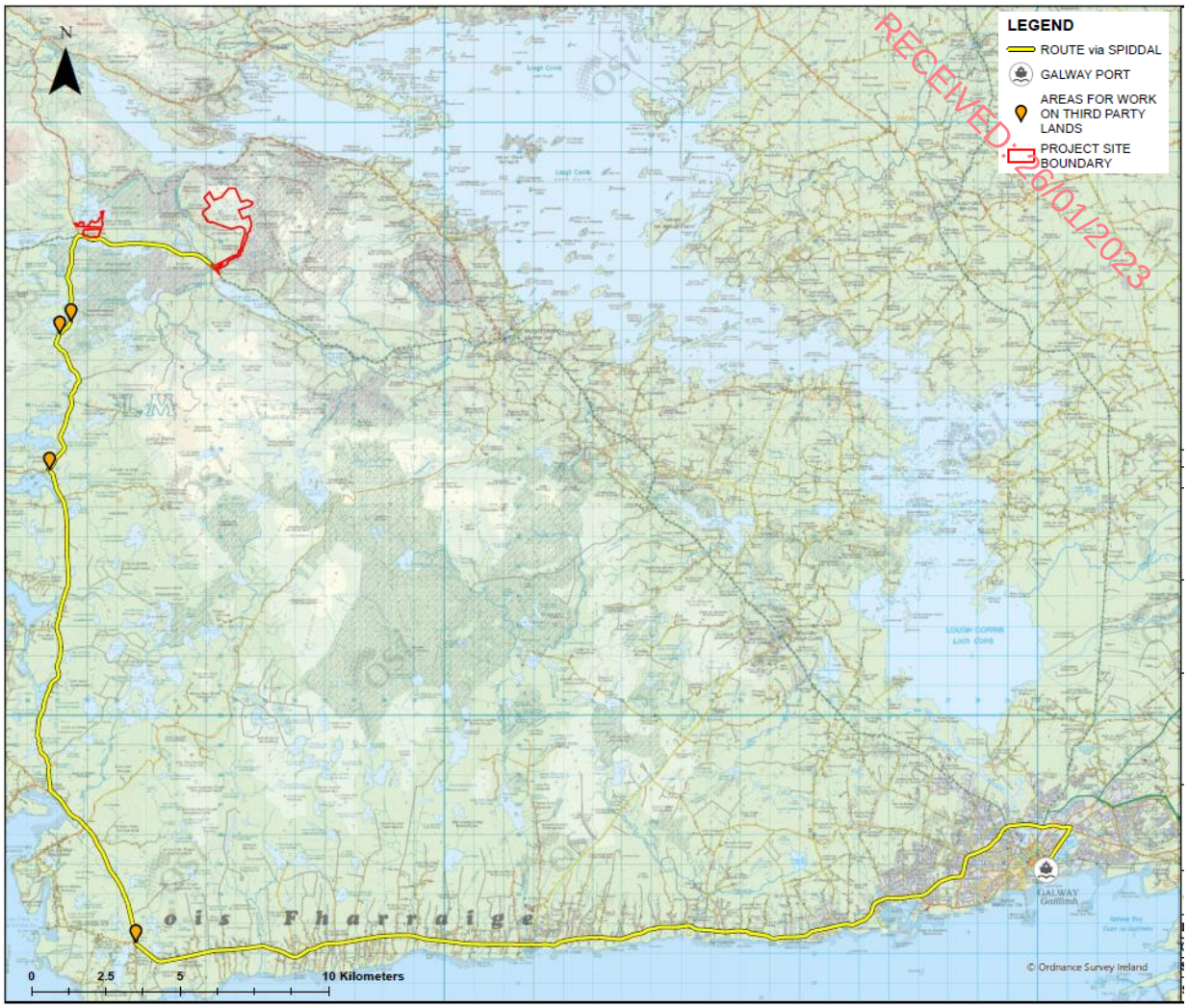

Figure NTS-3: Proposed Turbine Component Haul Route

3.3 Grid Connection

Underground cabling will link the turbine transformers to the onsite substation building. This will provide a connection point between the wind farm and the grid connection point at the existing Screebe 110kV Substation. The overall length of the underground grid connection between the onsite substation and the existing ESB Screebe 110kV Substation is 18.65km. This will be located along public roads from the site to Screebe 110kV Substation. The grid connection route can be seen in **Figure NTS-4**.

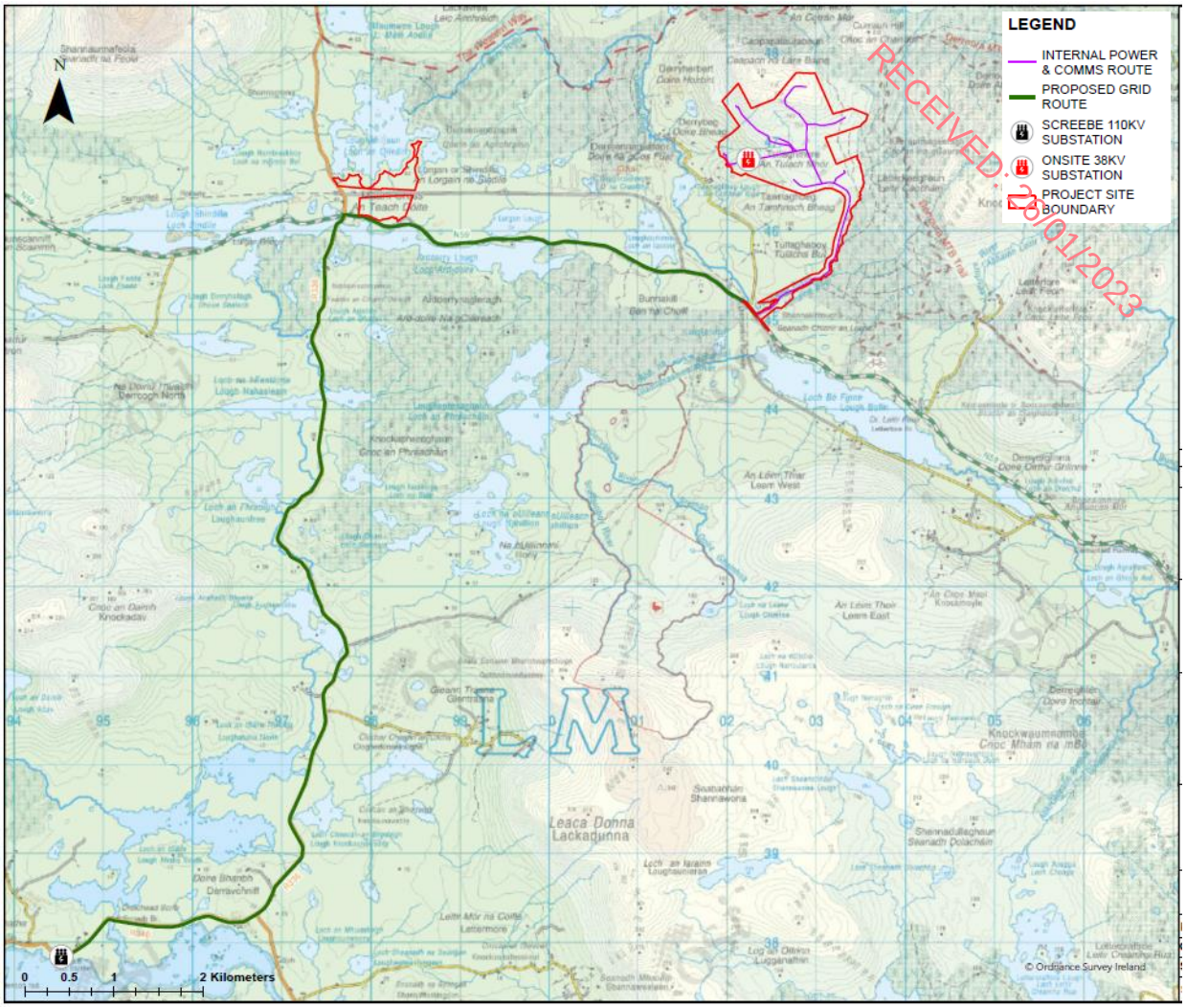

Figure NTS-4: Proposed Grid Connection Route

3.4 Construction Phase

The construction phase of the Development will take approximately 15 months in total. In general, working hours for construction activity will be from 07:00 to 19:00 throughout the week, with reduced working hours at weekends.

The turbines will be located across a wide area of hillside, however the land taken by the turbines and other infrastructure is a very small proportion of this, and efforts have been made to use existing infrastructure rather than using new land. The main Site extends to 161.88ha, the majority of which is bogland used for grazing sheep and is in the ownership of three local landowners. The area designated for spoil storage and enhancement extends to 29.6ha. Therefore, the total site area is 191.74ha. During the construction phase, the total land-take required for the development will be 5.9 ha.

The applicant will appoint a Civil Contractor who will have overall responsibility for management, including environmental management on the construction site. The Civil Contractor will ensure that construction activities are carried out in accordance with the mitigation measures outlined in the EIAR and as required by the planning permission, such as the Construction Environmental Management Plan (CEMP) included in **EIAR Appendix 2.1.** The services of specialist advisors will be retained as appropriate, such as an archaeologist and ecologist, to be called on as required to advise on specific environmental issues.

3.5 Site Restoration

A Habitat Management Plan, included in the EIAR as **Technical Appendix 6.5**, has been prepared to mitigate for the ecological effect of habitat loss as a result of the project. The plan sets out measures for peat management and restoration. Site restoration will involve the restoration of Site Access Track and Turbine Hardstanding verges and the temporary decommissioning and construction compound to provide a natural ground profile. Restoration will be undertaken at the earliest opportunity to minimise storage of turf and other materials.

Figure NTS-2(b) shows the areas designated for peat storage and restoration (habitat enhancement) to the west of the main wind farm site.

3.6 Operational Phase

The operational lifespan for the development is 35-years. During the operational phase of the development, turbine and infrastructure maintenance will be ongoing and regular. This is expected to continue to employ approximately 1 or 2 people on a permanent basis for regular operational and maintenance activities.

4 NTS.4 SITE SELECTION AND DESIGN

The Site layout design has evolved through a series of iterations, to avoid or minimise potential effects, including effects on views, hydrology, peat, ecology and fisheries, ornithology and noise. Technical criteria such as wind speed, prevailing wind direction, existing infrastructure, topography and ground conditions were considered during the design process, in response to guidance documents, survey findings and responses from consultees. Overall, it is considered that the proposal represents an optimum fit within the technical and environmental parameters of the project.

5 NTS.5 LEGAL AND POLICY FRAMEWORK

Chapter 4 of the EIAR sets out the relevant planning policy and legislative background to the planning application. The Development has had regard to The National Planning Framework, The Regional Spatial and Economic Strategy (RSES) for The Northern and Western Regional Assembly Area and the Galway County Development Plan 2022-2028. These documents are relevant to the determination of the planning application by the planning authority.

The Climate Action Plan 2021 set outs ambitious and legally binding targets for Ireland. The goal is that Ireland will achieve net-zero greenhouse gas emissions no later than 2050 and a reduction of 51% by 2030. The Development will contribute towards meeting those targets.

6 NTS.6 POPULATION AND HUMAN HEALTH

The potential effects of the construction, operational and decommissioning phases of the Development on socioeconomics, tourism and recreation and land use were identified and assessed in **Chapter 5** of the EIAR following desk-based collection of data and consultation with local stakeholders. Four geographical Study Areas were outlined for this assessment, namely, the area of the Development and environs (District Electoral Divisions (DEDs) Letterfore, Cill Chuimin, Camas, An Turlach and Kilcummin (292.5km^2)), Galway County (6,151km^2), the North and West region (25,799km^2) and the Republic of Ireland (70,275km^2).

The majority of the Site is bogland used for grazing sheep and is in the ownership of three local landowners. The land use will not be altered significantly by the construction, operation and decommissioning of the development as current activities can continue alongside the development on the lands that have not been taken by the Development.

In advance of the construction phase, the applicant will hold a series of 'Meet the developer / Contractor' events as early as possible, allowing local contractors to learn about opportunities to bid for contracts, time to upskill, and time to prepare prior to bidding. The applicant has significant experience in organising these events.

Effects on the economy during both the construction and operational phases would be minor, both direct and indirect, and positive, due to the creation of job opportunities and subsequent spending of income in the local area and within Ireland as a whole.

The overall impact is predicted to be a **moderate, positive, short-term** impact during the construction and decommissioning phases and **moderate, positive** and **long-term** during the operational phase.

Cumulatively, together with other proposed wind farm developments in the region, if these are progressed, the effects would be positive and of minor significance. There is predicted to be a short-term, positive impact in terms of employment from the development, if construction periods overlap.

The Development will contribute to the offset of the burning of fossil fuels which has the potential to positively impact human health.

Overall effects of the development with regards to tourism are considered to be short-term, slight, negative during both construction and decommissioning phases.

7 NTS.7 BIODIVERSITY

The likely impacts on biodiversity associated with the Development have been assessed in **Chapter 6** of the EIAR. A detailed understanding of the baseline conditions at the proposed development site has been gained following the collation of desktop information and data sources and ecological field surveys. The ecological field surveys completed at the proposed development site include habitat surveys, terrestrial mammals, bats and freshwater aquatic surveys.

Examples of Annex 1 habitats occurring within the proposed development site include blanket bog, wet heath, dry heath and transition mires. These examples of Annex 1 habitat do not form part of the current resource of Annex 1 habitats as mapped by the NPWS for the latest Article 17 assessment of Annex 1 habitats in Ireland.

No breeding or resting sites for protected ground dwelling mammals are supported by the proposed development site. The site is used by low numbers of commonly occurring bats. The results of bat monitoring completed at the proposed wind farm site indicate that these species of bats do not rely on the Site as a key foraging resource.

The watercourses occurring within and bounding the proposed development site have not been identified as important fisheries habitat. However, the Owenwee River downstream of the proposed development site has been identified as an important salmonid river. Atlantic

salmon were not found in the vicinity of the proposed development site during fisheries surveys, with this species only being recorded in the lower section of the Owenwee River, near Lough Corrib.

The principal potential impacts that could arise during the Construction, Operation and Decommissioning Phases relate to:
Indirect impacts to designated conservation areas occurring downstream of the proposed development site. These impacts are set out in detail in the Natura Impact Statement provided under separate cover with the planning application documentation:

- Direct loss of habitat
- Disturbance and degradation of terrestrial habitats
- Degradation of aquatic habitats and associated fauna supported by watercourses and lake habitats occurring downstream of the Development; and
- Disturbance to protected species

Detailed mitigation measures are outlined in the biodiversity chapter that aim to avoid or minimise to an insignificant effect the potential for the Development to result in the various impacts identified. These mitigation measures include:

- The management and design measures to avoid the discharge of contaminated surface water from the site. The Construction and Environmental Management Plan (CEMP) and the Surface Water Management Plan (SWMP) that accompany the EIAR are identified as key documents that will in-combination with these mitigation measures protect the surrounding aquatic environment.
- The timing of works to minimise disturbance to fauna;
- The implementation of measures to minimise the footprint of the works associated with the Construction and Decommissioning Phase; and
- Habitat Management Plan (HMP) which sets out commitments for the restoration of habitats within the proposed development site.

It has been found that with the implementation of mitigation measures described for biodiversity along with other measures detailed elsewhere for instance in the Chapter 8 Soils and Geology; Chapter 9 Hydrology, the CEMP, SWMP and HMP, the majority of impacts to biodiversity will be mitigated in full.

The location of the footprint of the proposed wind farm within a peatland and heathland environment will result in the permanent loss of habitat which include habitats that are representative of Annex 1 habitat. This will represent a residual impact of the Development.

The HMP (**Appendix 6.5**) for the Development sets out commitments for the restoration of existing degraded peatland and heathland habitats. The successful implementation of the restoration and enhancement described in the HMP will, over the longer term, provide compensation for the loss of habitats to the footprint of the Development, with an overall net gain in peatland and heathland habitats at favourable conservation condition.

8 NTS.8 ORNITHOLOGY

Chapter 8 of the EIAR assesses the potential effects of the development on ornithology. The construction, operational and decommissioning phases of the development, have the potential to result in three main effects on birds:

- Habitat loss
- Collision with turbines
- Displacement

Qualified ornithologists undertook bird surveys to record data to establish the site baseline, the distribution, and abundance of bird populations around the site, including review of any surrounding designated sites for the wider hinterland. These surveys followed widely recognised best practice guidance on the methods, timings and species that are recorded. This information was used to inform the design of the wind farm layout and the assessment of potential effects. This design is predicted to limit the potential for direct effects for most bird species from habitat loss and collision.

The proposed project is not located within any European site. There are two key considerations when identifying ecological pathways - the first is the distance from which potential sources for effects can radiate known as the zone of influence (ZoI) and the second is the potential for sensitive receptors (QIs/SCIs) to interact with the ZoI which is a further pathway consideration zone (PCZ). It is understood that sites designated for vagile species are known to utilise isolated resources across the landscape could intersect with the localised zone of influence; however, beyond 15km potential effects to such species at this scale are not identified to be significant due to the broad home range available to these species and the availability of alternate resources. Therefore, a radius of 27km has been adopted as the ZoI and a 15km radius was adopted as the PCZ.

The potential for effects on designated sites is fully described in the Natura Impact Statement that accompanies this application. The findings presented in the NIS are as follows:

- During the evaluation of potential impacts associated with the proposed development it was found that the project will not have the potential to undermine the conservation objectives of the four SPAs and their relevant special conservation interests occurring within the zone of influence of the development.
- The proposed development has been identified as having the potential to result in adverse effects to the relevant qualifying features of interest of the four SACs occurring within the zone of influence of the development (see Table 5.1 and Table 6.2 of the NIS).
- A range of mitigation measures have been prescribed that once implemented in full will remove the risk of adverse effects posed by the proposed development to these qualifying features of interest.

With mitigation measures as presented in the report implemented in full, and specifically construction phase mitigation for breeding birds of peatland habitats, as well as measures for target species such as golden plover (as required) during operation phase, it is considered that the significance of the predicted effect on birds as a result of the development will be slight.

It can be objectively concluded that the Tullaghmore 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.

The implementation of a Decommissioning/Construction Environmental Management Plan and a Habitat Management Plan is considered sufficient to reduce the level of any potential effects to levels that are considered to be not significant, while providing wide ranging benefits to species found on the site. There are considered to be no specific cumulative operational effects on individual species or territories as a result of the development. The ornithological assessment is based upon the observed field data and findings, published information and research and best practice guidance. Overall, It is considered that with the implementation of mitigation, the proposed wind farm development will have a *Slight-Imperceptible Reversible Residual Effect and in the local context* on birds.

9 NTS.9 HYDROLOGY, GEOLOGY AND THE WATER ENVIRONMENT

Chapters 8 and 9 of the EIAR evaluates the effects of the Development arising from the construction/decommissioning and operational phases on the soils and geology and hydrology, hydrogeology resource within and surrounding the Site. Both assessments for

the Development were based on desk studies and Site surveys. The desk study assessment included consultation with the following organisations via online map viewers websites and databases:

- Environmental Protection Agency (EPA)
- Geological Survey of Ireland (GSI)
- Met Éireann (MET)
- National Parks & Wildlife Services (NPWS)
- Office of Public Works (OPW)
- Water Framework Directive (WFD)
- Galway County Council
- The Local Authority Waters Programme (LAWPRO)
- Inland Fisheries Ireland (IFI)

There are statutory designated sites located near to the study area that are hydrologically connected to the Development, including Lough Corrib SAC, SPA and pNHA, Connemara Bog Complex SAC and pNHA, and the Maumturk Mountains SAC and pNHA. Furthermore, the WFD status of the surface water network associated with the Site ranges from Good to High and is considered highly sensitive in general.

A Flood Risk Assessment (Stage 1) was carried out and indicates that the estimated net increase of surface water runoff during the average wettest month of December (0.38% relative to the area of the Site) is imperceptible, in turn the risk of increased flood risk arising as a product of the Development is imperceptible.

There are no mapped wells, springs or boreholes within 10km of the Site. It has been conservatively assumed that all dwellings located in close proximity to the EIAR Site boundary have the potential to maintain a groundwater well for abstraction However, the potential for such wells to be impacted by the Development is low considering the groundwater aquifer in the region is classified as Poor, and productive only at a local scale.

Peat depths on site were measured by peat probing at a total of 389 locations, and ranged in depth between 0.1m and 5.5m. Peat depth classification within the study area is predominantly shallow (0.6 - 2.0m deep at 190 locations).

A Slope Stability Risk Assessment was carried out by Garne Geotechnical Services which concluded that the risk of a significant movement of peat soils occurring within the footprint of the Development Infrastructure is Low to Negligible.

Standard, good-practice measures will be implemented to minimise the potential for effects such as pollution, erosion or changes to groundwater and surface water flows at the Development to occur. These established and effective measures are described in **Chapter 8: Lands, Soils and Geology – Section 8.5 Mitigation Measures and Residual Effects** and **Chapter 9: Hydrology and Hydrogeology – Section 9.5 Mitigation Measures and Residual Effects**.

With mitigation measures in place, the Development has been assessed as having the potential to result in effects of varying significance, however many are considered avoidable with the exception of the following unavoidable effects:

- There will be a change in ground conditions at the Site with the replacement of natural materials such as peat, subsoil and bedrock by concrete, subgrade and surfacing materials. This is a localised, negative, moderate significance at a local scale, moderate weighted significance at the Site, direct permanent change to the materials composition at the Site.
- The potential loading of suspended solids in surface water runoff at the Site particularly in relation to excavation works during the construction phase of the Development. While the loading of suspended solids in runoff is unavoidable, if precautionary and mitigation measures, as described are implemented, concentrations of suspended solids can be reduced to acceptable levels prior to runoff being intercepted by the surface water network associated with the Site. Achieving this implies minimal effects on surface water features, this is considered a likely, neutral to negative, imperceptible to slight significance, Imperceptible weighted significance, impact of the Development which conforms to baseline.
- There will be some local changes to how water flows at the Site, this is considered a likely, neutral to negative, slight to moderate significance, localised impact of the development which conforms to baseline.

Other potential effects have the potential to be significantly adverse, for example, a significant fuel spill, however applying the precautionary principal, mitigation measures, and proper planning, the likelihood and significance of such potential effects can be dramatically reduced. During the construction/Initial Decommissioning and operational phases of the Development, a number of established good practice measures will be put in place to minimise peat disturbance, peat stability, and loss and compaction of soils. With effective and well managed mitigation measures in place, no significant residual effects on geology and peat are predicted as a result of the Development.

10 NTS.10 NOISE

Chapter 10 of the EIAR presents an assessment of the noise effects of the Development.

Noise will be emitted temporarily by plant and equipment and vehicles used during the construction phase. The main noise sources will be associated with the construction of the turbine foundations, turbine hardstands, grid connection, with lesser sources being site access tracks and construction of a 110kV substation. Decommissioning noise levels are assumed to be in the same order as construction levels and will be of temporary duration. Construction and decommissioning works will typically be more than 740m from the nearest property (noise receptor), making the potential for noise and vibration impacts considered to be not significant.

The main sound heard from wind turbines is the 'swish' from the movement of the blades through the air. Modern turbines are designed to minimise noise and planning conditions are used to ensure compliance with specified noise limits. The assessment of operational noise has been undertaken in accordance with best practice and following the latest guidelines. It has been shown that noise due to the Development, including cumulative effects with operational and consented wind farms will meet all current guidelines at all local properties.

11 NTS.11 LANDSCAPE AND VISUAL

Chapter 12 of the EIAR presents a Landscape and Visual Impact Assessment for the Development. This has been carried out by a qualified and experienced landscape architect to identify significant effects predicted to arise as a result of the Development. It considers separately the effects on landscape and visual receptors, as well as the cumulative effect of the Development in combination with other windfarm developments.

The site is contained along a broad, but modest scale ridge which serves as a transition between the intricate coastline to the southwest and the more dramatic lake and upland areas to the north and west. These areas are punctuated with evenly distributed, frequent small loughs and connecting waterways. The landscape of the Study Area can be best described as a series of four distinct quadrants centred around the cross-roads settlement of Maam Cross. The north-eastern quadrant of the Study Area is dominated by large loughs (Lough Mask and Lough Corrib) backed by upland areas to the west and dissipating into gently undulating farmland and peat bogs to the east. The north-western quadrant is dominated by the Maumturk Mountains and Twelve Bens, which are steep, rugged and naturalistic mountain ranges interspersed with farmed valleys and narrow glacial loughs. The southwestern quarter of the Study Area is

contained in coastal bog and marginal farmland with frequent small loughs that blend seamlessly with the intricate inlets and islands of the Connemara coastline. Finally, the south-eastern quadrant of the Study Area is a broad undulating area of hill country with numerous loughs and rivers that drain towards the northern coast of Galway Bay.

The broad and rugged ridge of the site and its immediate context serves as the dividing feature between Lough Corrib to the north and the hill country described as dominating the south-eastern quadrant of the Study Area. The transition to the Lakelands quadrant is more abrupt than the subtle transition to the rugged hill country with which the site has more in common in landscape character terms.

The Study Area for the Development covers a radius of 20 km in accordance with the Wind Energy Development Guidelines (2006 – Draft Revised 2019). The landscape assessment considers potential effects on the receiving and surrounding landscape with reference to a range of landscape character areas (LCAs) and criteria published in various technical documents. The visual assessment considers effects upon visual receptors (as agreed with consultees through the EIA Scoping process) including scenic amenity designations, centres of population, transport routes and local community views using 29 viewpoints from representative / sensitive visual receptor locations. Photomontages have been prepared for the viewpoints and the figures also include a wireline of the Development on its own and a wireline with all other cumulative developments.

In respect of landscape sensitivity designations within the Galway County Development Plan (2022-2028), the Site lies close to the boundary between the 'Special' West Connemara landscape unit and the 'Unique' Upper Corrib Environs unit, which are the second highest and highest categories. The Site and surrounding area is shown to be 'Not Normally Permissible' for wind energy development within the Local Authority Renewable Energy Strategy (LARES).

In terms of landscape effects, there will be physical impacts on the land cover of the site and cable route as result of the proposed Development during the operational phase, but these will be relatively minor in the context of this productive rural landscape that comprises of existing wind energy developments and extensive areas of commercial conifer forest. The scale of the proposed development will be well assimilated within its landscape context without undue conflicts of scale with underlying land form and land use patterns. For these reasons the significance of the landscape impact is deemed to be Moderate within the site and its immediate environs. Beyond the central study area, the magnitude of landscape impact is deemed to reduce to Moderate-slight and Slight at increasing distances as the wind farm becomes a

proportionately smaller and integrated component of the overall landscape fabric. Consequently, significant landscape impacts are not considered to occur.

The visual impact assessments for each of the 29 selected Viewpoint locations are contained in Appendix 12.1 and are summarised within Chapter 12 in accordance with which quadrant of the study they are contained in. This is on the basis that the site lies at the confluence of four quite distinctive landscape areas / visual settings.

Six viewpoints were selected within the highly scenic and iconic Connemara mountains that occupy the northwest quadrant of the Study Area with several others skirting the fringes of both the Lakelands context to the northeast and the Connemara coastal bog to the southwest. Four of the six were assigned high sensitivity (VP1, VP2, VP10 and VP29) with the other two judged to be of High-medium sensitivity (VP3 and VP4). All of these are associated with scenic designations within the Galway and Mayo County Development Plans. The highest significance (Moderate) was assigned to VP2 where the turbines appear in the context of broad panoramic views across the north-western arm of Lough Corrib in a slightly disjointed and cluttered fashion.

The north-eastern quadrant of the Study Area contains 10 representative viewpoints, which include close and mid distance views from the north of the site and tend to increase in distance as they wrap around Lough Corrib to the east. Due to the scenic nature of these Lakeland views which often corresponds with scenic designations in the Galway County Development Plan, all but VP13 were deemed to be of either High or High-medium sensitivity. VP13 was judged to be of Medium sensitivity related to contained uphill views away from the lough across a less remarkable farmed and forested context. VP11 and VP12 are the closest of this set of views, representing receptors on the near and far side of the north-western arm of Lough Corrib in the vicinity of Doon Hill. The significance of effect is deemed Moderate in both instances, albeit for differing reasons. The significance of impact from all other viewpoints to the northeast is judged to be lower.

Five viewpoints have been selected within the south-western part of the Study Area, covering two distinct viewing scenarios. VP15, VP16 and VP17 are all from the N59 getting progressively closer to the site for east bound road users. Whereas the N59 hugs the base of the Connemara mountains at the northern edge of the coastal boglands, VP27 and VP28 are from within the heart of the latter landscape unit further to the southwest. The significance of visual effect ranges between Moderate and Slight for this set of views with VP17 being the sole Moderate effect.

The south-eastern quadrant of the Study Area includes seven closely spaced viewpoints (VP18 to VP24) that hug the base of the valley within which the N59 runs between Maam Cross and Oughterard and includes local community views from local roads in the immediate vicinity of the site. VP18 is the closest such view to the site and affords close clear views of the proposed turbines on the slopes above a local road that provides access to around a dozen residences. The significance of visual effects is in the mid to high range for all of the close viewpoints in this quadrant with VP23 from the Quiet Man Bridge recording the highest overall effect for the project of Substantial-moderate.

Notwithstanding that many of the assessed viewpoints are in the mid to high range in terms of sensitivity and there are also impacts recorded in the mid to high range of magnitude, the proposed development is not considered to result in any significant visual effect.

The cumulative scenario with regard to other existing and permitted wind farms in the Study Area is a very simple one. That is, all of the other wind farms, which consist of 78 turbines, are clustered together to form the Galway Wind Park in the outer southeastern quarter of the Study Area at distances in excess of 10km from the Tullaghmore Wind Farm site. Whilst they are contained within a similar landscape context to the Site, intervisibility is limited to 36.8% of the overall Study Area. In terms of combined visibility within the photomontage set, cumulative turbines appear in the broader 90° wireframes for only 9 out of the 29 views and not in a context where material cumulative impacts might occur.

12 NTS.12 MATERIAL ASSETS AND OTHER ISSUES

Chapter 12 of the EIAR considers a number of other issues associated with the windfarm development, including potential effects on Land Use, Telecommunications and Electromagnetic Interference, Grid Connection and Grid Network, Air Navigation, Waste Management and Shadow Flicker

12.1 Land Use

The Site is predominantly utilised for sheep grazing. The area surrounding the windfarm is not used for intensive agriculture, as the lands are dominated by blanket bog, a small number of sheep may graze on the uplands surrounding the windfarm. The Development, given its nature, is unlikely to result in indirect effects within its immediate footprint, and therefore effects on agriculture are considered imperceptible and not considered any further.

12.2 Telecommunications

Operators of microwave communication links were contacted during the EIA. Mitigation measures were adopted during the layout design to avoid impacting communication links. Disruption to television reception is considered unlikely following the switchover to digital broadcasting, as the signals are less susceptible to interference from turbines.

The implementation of mitigation measures will result in no interference with communication links. Therefore, no effects are predicted on telecommunications or radio reception as a result of the Development. The potential effects of the Development with regard to telecommunications and electromagnetic interference are therefore considered **not significant**.

12.3 Electricity Networks

The grid connection will be 18.65km in length and will be along the N59 and R336 public roads. It is proposed to connect to the national grid via a 38kV underground cable, to the ESB 110kV Screebe substation. Further details of the grid connection route can be found in EIAR **Appendix 2.2.**

Due to the fact that all on-site internal cabling will be underground as will the grid connection from the onsite substation to Screebe 110kV substation, there will be no impact on the overhead electricity network.

The Development will contribute directly and in the long term to the electricity network by strengthening it through additional renewable energy generation.

At the existing Screebe 110kV substation, the works required to facilitate the grid connection will be facilitated within the confines of the substation and its compound and thus will have a **slight, short-term effect**.

12.4 Air Navigation

Operating wind farms have the potential to cause a variety of effects on aviation. Rotating wind turbine blades may impact on radar operations, although it is not likely at Tullaghmore. The physical height of turbines can cause obstruction to aviation and the overall performance of communications, navigation and surveillance equipment. All structures over 150m in height are required to have lighting to warn aviation traffic.

Consultation with aviation operators was undertaken and the Irish Aviation Authority responded. They requested an obstacle warning light system for the Development, the provision of coordinates of each turbine and tip height, and to notify them 30 days prior to any crane operations commencing.

The turbine locations will be added to aviation maps prior to construction, and all requests from the Aviation Authority carried out to see that aviation safety protocols are followed. Therefore, effects on aviation as a result of the development will be **negligible**.

12.5 Waste Management

It is likely that waste will be generated onsite during the construction and decommissioning phases of the Development. All rubbish and waste/excess materials will be removed from Site to an appropriate licenced facility from where it will be reused/recycled, where possible, or disposed of accordingly.

There are no EPA-licensed or local authority-authorised waste facilities or activities located within the Site Boundary. The closest, authorised municipal waste facility is located approximately 34.9km southeast of the Development in Galway City, Co. Galway.

Mitigation measures will be implemented during each phase of the Development. Therefore, the residual effects of waste produced as a result of the construction, operational and decommissioning phases of the Development are considered to be **not significant**.

12.6 Shadow Flicker

Flicker is the effect of light levels in a sunlit room noticeably varying as a result of the shadow of a turbine blade passing a window, causing a nuisance. Industry standard software was used to model the potential for shadow flicker to occur, based on the proposed turbine locations and dimensions and the locations of residential properties. The defined study area was based on the 2006 Guidelines which is for properties within 10 Rotor Diameters (1,620m). However, for completeness, the study area was extended to 2km which resulted in 30 properties being included in the assessment.

19 of the 30 identified receptors are predicted to experience some degree of shadow flicker and the remaining 11 receptors are predicted to experience no shadow flicker, even in the worst-case scenario which assumes the sun is always shining, there is no cloud cover or vegetative screening and the dwelling is always occupied.

A more realistic assessment of shadow flicker predictions was carried out suing predicted sunshine levels. Although the predicted levels of shadow flicker were substantially reduced for each of the 19 receptors, they were not entirely eliminated. Therefore, in line with the Draft 2019 Wind Energy Guidelines, each turbine will be fitted with a shadow detection system which will shut down the turbine when the conditions for shadow flicker to occur are present and this will eliminate the occurrence of shadow flicker at the 19 properties.

The assessment has not identified any likely significant effects from the development on population and human health.

13 NTS.13 CULTURAL HERITAGE

Chapter 13 of the EIAR presents a baseline study of and impact assessment on, the cultural heritage of the Site and the surrounding region. The assessment was based on a series of site inspections and a programme of desktop research which were carried out to identify and record any archaeological, architectural and cultural heritage assets that may be affected by the Development. The significance of effect on an asset is considered by establishing the asset's value/sensitivity, and how (and to what extent) it may be impacted based on the proposed design of the Development.

There are no known archaeological, architectural or cultural heritage remains within the footprint of the Development, and as such there will be no direct physical effects on any known archaeological or other heritage features during any phase of the Development.

Should the presence of sub-surface archaeological features be revealed during the initial Construction and Decommissioning phases, the remains would be likely to suffer high magnitudes of impact. As such, mitigation is proposed for potential effects on unknown archaeological remains, in the form of a qualified archaeologist providing onsite monitoring of all infrastructural works that require ground reduction/topsoil stripping. This archaeological monitoring programme shall facilitate identification of any remains that may be present at the earliest opportunity and allow for their avoidance or recording by archaeological excavation, under licence by the National Monument Service, prior to any occurrence of damage.

There are no extant archaeological monuments within 1.53km of the proposed turbine locations. While the turbines will be visible from archaeological monuments located in private properties within the wider landscape during the operational phase, given their

distances from the Site and the absence of examples with sensitive visual alignment or amenity attributes, this will result in likely low magnitudes of impact on their settings.

There are two Protected Structures located within 2km of the Site and these comprise a cottage (PS 3363) 2km to the east and a road bridge (PS 3359) located 280m to the southwest. The National Inventory of Architectural Heritage lists two other structures within 2km of the Site and these comprise a railway bridge (NIAH ref. 30405301) located 420m to the south of the Site and the Maam Cross railway station (NIAH ref. 30405902) located between the spoil storage area and ecological enhancement areas. The grid connection route crosses two masonry road bridges that are listed as Protected Structures (PS 3959 and PS 3359). The use of horizontal directional drilling at their locations will avoid any interventions to these Protected Structures and their associated watercourses.

The operation phase of the Development will result in slight to moderate, indirect, long term, negative impacts on the wider settings of the known cultural heritage assets located within the surrounding landscape. These range of indirect impacts will be reversed following the decommissioning phase.

The assessment does not predict any likely cumulative effects on cultural heritage resources that are significant in terms of the EIA Regulations.

14 NTS.14 ACCESS, TRAFFIC AND TRANSPORT

Chapter 14 of the EIAR sets out the effect that construction traffic would have on the road network, and the consequent effects that that could have on people and communities nearby.

Potential effects associated with windfarm development are presented in two key forms: those from the transport of wind turbine components, and those as a result of the import of construction material, equipment and personnel and the transport of excavated spoil from the main wind farm site to the designated Spoil Storage Areas.

Technical Appendix 14.1: A computer model of the turbine delivery vehicles is used to identify locations along the Turbine Component Haul Route where road improvements will be required to facilitate delivery of the largest turbine components from the Galway Port to the Site. This is considered suitable, subject to minor, upgrade works at 4 no. locations in third party lands and alterations to street furniture (such as signs, bollards, etc.). These

components would be transported with an escort vehicle as standard practice, to help ensure safe passage.

The haul route is proposed as:

- Loads would exit the harbour and join Lough Atalia Rd northbound before merging with the R339 northbound;
- Loads would then turn left onto the R338 westbound and merge with the N6;
- Loads would continue on the R338 southbound before turning right to join the R337 westbound;
- Loads would merge with the R336 westbound and continue west and north to Maam Cross; and
- Loads would turn right onto the N59 eastbound to the site access junction.

For the civils works during construction, it is envisaged that hardcore materials for Site Access Track and Turbine Hardstand construction will be sourced from a local quarry subject to quantity and quality of rock being available. It is also envisaged that ready-mix concrete for Turbine Foundation construction and Substation foundations will be sourced from a local authorised quarry.

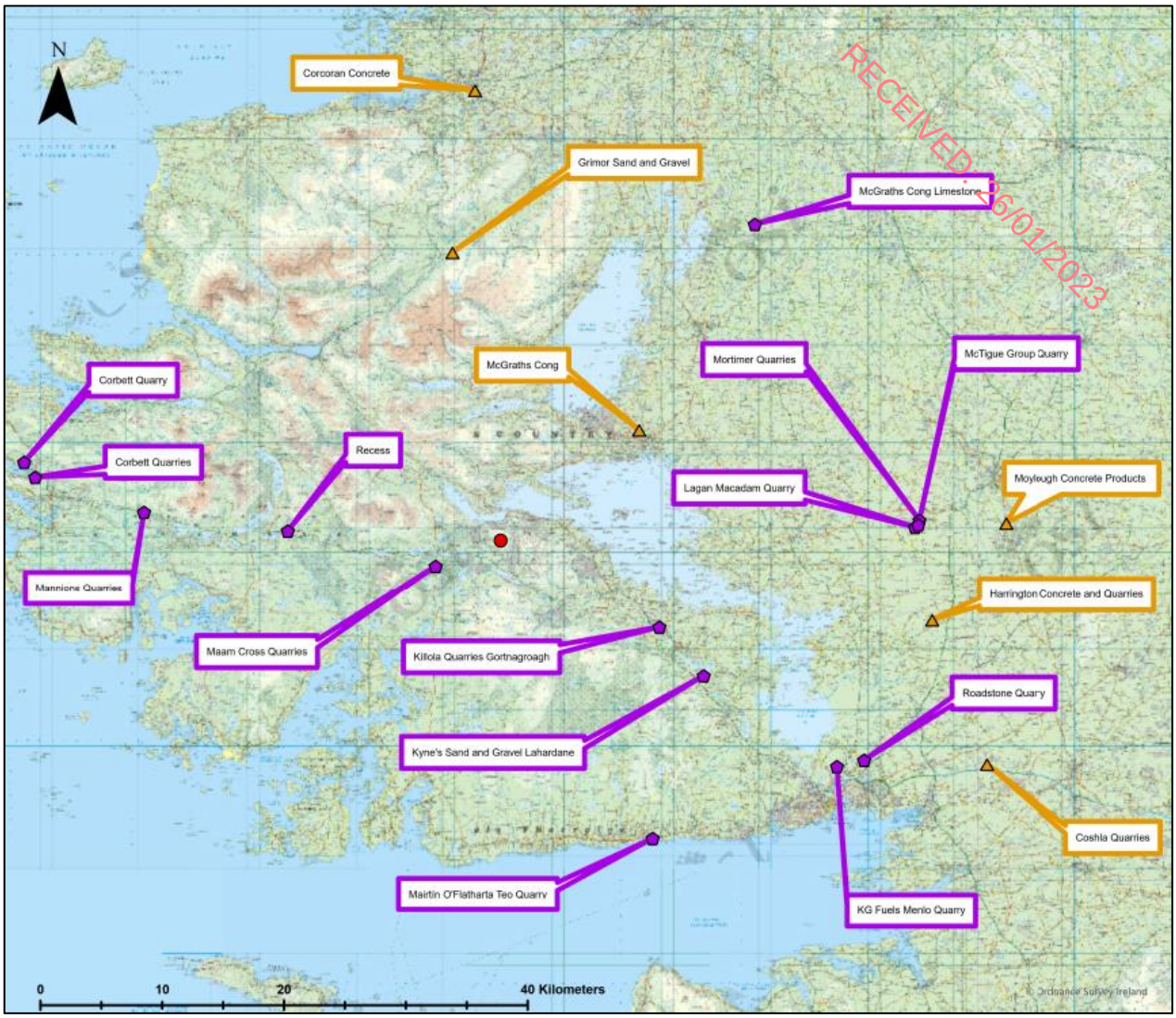

Figure NTS-5 – Civil Construction Haul Route

The haul route for wind farm construction traffic will use the national and regional road network to access the site. The use of local roads for construction traffic will be prohibited unless the local road provides access to a quarry or concrete batching plant. It is envisaged that granular materials for Site Access Track and Turbine Hardstand construction will be sourced from excavations within the Site or from local suppliers. It is also envisaged that ready-mix concrete for Turbine Foundation construction and Substation foundations will be sourced from a local authorised quarry located along the N59 national secondary route and the R336 regional road corridors. The location of aggregate and concrete suppliers in the vicinity of the proposed are shown in **Figure NTS-5**.

Construction workers will use the Site entrance on the N59 to access the site but will need to have flexibility in the roads they use to reach the Site.

It is estimated that during the wind farm construction, an approximate total of 9,014 loads of material and building supplies will be delivered and removed from the Site. The majority of granular materials for access road and turbine hardstand construction will be sourced from site excavations and processed on site. The majority of HGV movements to and from site will occur during the first seven months of the construction period and will be associated with the removal of unsuitable material arising from site excavations, site road construction and turbine foundation construction.

Increased volumes of traffic will be generated by the proposed development during the construction period. The Development will generate a maximum of 152 HGV trips (304 HGV movements) and 30 LGV (60 traffic movements) at the N59 site entrance. Peak traffic generated by the development will correspond to the construction of turbine foundations and will occur during six days within the 10 month construction period. Outside these times, construction traffic will typically consist of 77 HGV trips (158 HGV movements) and 30 LGV (60 traffic movements) at the N59 site entrance. Development traffic will be distributed throughout the day with morning, afternoon and evening peaks.

The Development has generally been assessed as having the potential to result in effects of a negative, slight/moderate, direct, short-term, high probability effect or lower during the construction and Decommissioning phase only. After mitigation, the residual effects have been assessed as imperceptible/slight, negative and short-term in nature. There will be a slight positive residual effect from road strengthening, widening and surfacing works along the Haul Route if Galway County Council require these improvement works to be left in-situ following construction.

A detailed Traffic Management Plan (**Appendix 14.2**) will be agreed with the relevant authorities and will detail the measures to be implemented during the construction phase. No significant effects related to operational phase traffic will occur due to the minimal traffic that would be generated during that phase of the Development.

15 NTS. 15 AIR AND CLIMATE

This section assessed the effect of the Development on air quality, given the potential for dust emissions, and the likely carbon dioxide reduction effects of the Development in operation. Mitigation measures for the reduction of dust are outlined in the EIAR **Chapter 15: Air and Climate**. All turbines are situated greater than 740m away from inhabited dwelling houses. After mitigation, the residual effects were assessed as having the potential

to result in a short-term imperceptible, negative impact on climate during construction. There will be long-term moderate, positive impact on climate as a result of reduced greenhouse gas emission during the operational phase.

The layout of the Development has been designed to minimise the potential environmental effects of the wind farm while utilising the maximum energy yield from the site's wind resource. The selection of breaking new ground and impacting on natural habitat has been kept to a minimum.

The Development does not contain any element, which will produce GHG emissions or odorous emissions in operation. Indeed, the Development will contribute to a net national reduction in the emissions of greenhouse and other gases resulting from the combustion of fossil fuels.

Savings of carbon dioxide arise principally from the generation of electricity from the Development, such that generation from other sources (which emit carbon dioxide|) are offset. The Development would result in a total installed capacity of 40.8 Megawatts (MW), with an estimated generation capacity of 125,092,800kWh / year[1]. Therefore, the Development will have a carbon footprint of approximately 1,876.4 tCO_2eq/year or 75,056 tCO_2eq over a 40-year period (40 years taken as the proposed lifetime of the windfarm; 40.8MW = 75,056 tCO_2eq/ 40 years).

Ireland has set a target to achieve a 51% reduction in overall greenhouse gas emissions by 2030, setting a path to reach net-zero emissions by no later than 2050. The target for 2030 is to generate 80% of the country's electricity from renewable sources. The Development will contribute 40.8 MW of installed capacity. The cumulative effect with other Irish renewable generation is considered to be a fundamental change in the climate effects of Ireland's energy supply, which is a major, positive effect, that is significant under the EIA Regulations and will contribute to Ireland's binding emission reduction targets.

In isolation, the Development will have a significant positive effect on carbon savings and cumulatively, a significant positive effect when considered with Ireland's renewable energy deployment.

[1] 40.8MW x 35% assumed maximum energy output (https://www.croaghwindfarm.ie/media/2020/07/Ch.-10-Air-and-Climate-F-2020.07.06-180511.pdf) = 14.28MW or 14280kW. 14280kW x 8760 hours per year = 125,092,800kWh/year.

16 NTS.16 SUMMARY

Chapter 16 of the EIAR provides a summary of the significant effects from each EIAR chapter and also summarises the mitigation measures proposed to reduce either the likelihood or magnitude of these effects to an acceptable level, for ease of reference.