



Appendix 6 Wind Zoning Methodology

Table of Contents

Glossary of Terms	A-35
Introduction.....	A-36
Methodology	A-36
Step 1 – Wind Speeds / National Grid	A-39
Step 2 – Constraints	A-43
<i>Natura 2000.....</i>	<i>A-43</i>
<i>Natural Heritage Areas.....</i>	<i>A-44</i>
<i>Practical Resource Constraints.....</i>	<i>A-45</i>
<i>Accessible Resource Constraints</i>	<i>A-47</i>
<i>Constraints Conclusion.....</i>	<i>A-56</i>
Step 3 – Cumulative Impact of Wind Energy	A-59
<i>Zones of Theoretical Visibility (ZTV).....</i>	<i>A-59</i>
<i>Cumulative Impact Conclusion.....</i>	<i>A-62</i>
Step 4 – Areas for Further Assessment.....	A-64
<i>Area 1.....</i>	<i>A-66</i>
<i>Area 2.....</i>	<i>A-70</i>
<i>Area 3.....</i>	<i>A-74</i>
<i>Area 4.....</i>	<i>A-78</i>
<i>Area 5.....</i>	<i>A-81</i>
<i>Area 6.....</i>	<i>A-85</i>
<i>Area 7.....</i>	<i>A-88</i>
<i>Area 8.....</i>	<i>A-91</i>
<i>Area 9.....</i>	<i>A-95</i>
<i>Area 10.....</i>	<i>A-99</i>
<i>Area 11.....</i>	<i>A-103</i>
<i>Area 12.....</i>	<i>A-106</i>
<i>Area 13.....</i>	<i>A-109</i>
<i>Area 14.....</i>	<i>A-113</i>
<i>Area 15.....</i>	<i>A-116</i>
<i>Area 16.....</i>	<i>A-119</i>
<i>Area 17.....</i>	<i>A-122</i>
<i>Area 18.....</i>	<i>A-125</i>
<i>Area 19.....</i>	<i>A-128</i>
<i>Area 20.....</i>	<i>A-132</i>
<i>Area 21.....</i>	<i>A-136</i>
<i>Area 22.....</i>	<i>A-139</i>
<i>Area 23.....</i>	<i>A-142</i>
<i>Area 24.....</i>	<i>A-146</i>
<i>Area 25.....</i>	<i>A-149</i>



Areas for Further Assessment Conclusion.....A-153

Step 5 – Wind Energy Policy Review..... A-154

Reference Documents A-156

Addendum - Kerry County Development Plan Wind Farm Development Policy Review and the Stacks to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA Environmental Assessment Unit Strategic Policy Recommendation..... A-158



Glossary of Terms

DEM – Digital Elevation Model
DHPLG – Department of Housing, Planning & Local Government
DoECC – Department of Environment, Climate & Communications
EIP – European Innovation Partnership
EU – European Union
FPM – Freshwater Pearl Mussel
GHG – Greenhouse Gas
GIS – Geographical Information System
GLAS – Green Low-carbon, Agri0envrionmental Scheme
GSI – Geological Survey of Ireland
GW – Gigawatt
KCC – Kerry County Council
KV - Kilovolt
LARES – Local Authority Renewable Energy Strategy
LCA – Landscape Character Assessment
MW - Megawatt
NHA – Natural Heritage Area
pNHA – proposed Natural Heritage area
RE – Renewable Energy
RES – Renewable Energy Strategy
SAC – Special Area of Conservation
SEAI – Sustainable Energy Authority of Ireland
SPA – Special Protection Area
UCU – Unique Condition Units
UNESCO - United Nations Educational, Scientific and Cultural Organisation
WFD – Water Framework Directive
ZTV – Zone of Theoretical Visibility



Introduction

Over the last 20 years the county has seen the construction of a significant number of commercial renewable energy (RE) developments. The first wind farm developments were granted planning permission in 1997 (4 turbines in Beal and 23 turbines in the Stack's Mountains). As of July 2021, 362 wind turbines had been constructed across the county. There is also permission for 12 additional turbines which are yet to be constructed or are currently under construction. The locations of these turbines are shown on Map 6.1. The county of Kerry is therefore a significant contributor to the generation of renewable energy in the country as those constructed are currently contributing over 740MW of RE to the National Grid.

Kerry County Council recognises the importance of exploiting renewable energy sources in order to contribute to achieving national targets in relation to reductions in fossil fuel dependency and curbing greenhouse gas emissions. Kerry County Council also recognises its role in responding to climate change and the goal of achieving a low carbon, climate resilient and environmentally sustainable economy.

The number of wind turbines constructed in the county demonstrates how Kerry County Council has been successful to date in facilitating the development of renewable energy and it will ensure that the County continues to contribute significantly to the achievement of national targets. It should also be noted that other forms of renewable energy also exist in the County.

Each type of renewable energy and the related technologies for harvesting that energy has the potential to impact on the County's landscape, its ecological, recreational and/or cultural and built heritage resources.

Therefore, any review of renewable energy policy must carefully balance the need to achieve national targets in relation to climate change, while at the same time protecting the landscape of the county as a major economic asset and its areas of ecological, archaeological and cultural importance.

This document identifies areas open to consideration or unsuitable for wind energy developments. The methodology followed takes cognisance of Section 3.6 of the *Draft Revised Wind Energy Development Guidelines* (DHPLG, 2019) and the *Methodology for Local Authority Renewable Energy Strategies* (SEAI, 2013). This approach involves a sieve mapping analysis of key Ecological, Environmental, Archaeological, Landscape and technical areas. The results of this analysis are subsequently overlapped by the outputs of a comprehensive Landscape Character Assessment. Finally, the cumulative effects of constructed and permitted but not yet constructed wind energy developments are taken into consideration.

This document does not contain policy in respect of renewable energy. This document outlines the methodology used to zone (a) Areas Open to Consideration for Wind Energy Developments and (b) Areas Unsuitable for Wind Energy Developments. Policy in respect of these two areas and renewable energy is contained in Chapter 12 of the Draft Kerry County Development Plan 2022-2028.

Methodology

In order to assist planning authorities to identify key areas where there are wind energy resources capable of exploitation in a manner consistent with proper planning and sustainable development, a step-by-step approach is outlined in the *Draft Revised Wind Energy Development Guidelines* (DHPLG, 2019). This ordered approach involves a sieve mapping analysis of the key environmental, landscape and technical criteria which must be balanced in order to identify the most suitable location for wind energy development.

The wind zoning methodology is informed by these guidelines and is also informed by the *Methodology for Local Authority Renewable Energy Strategies* (SEAI, 2013).



Viewshed analysis and GIS, which are particularly useful when identifying the suitability of areas for the deployment of wind energy, given the amount of information and considerations involved in such an analysis, also informed policy formulation.

Step 1	Areas of wind potential having regard to wind speeds and the national grid.
Step 2	<p>Overlay mapping of wind energy constraints:</p> <ul style="list-style-type: none"> • Settlements • Lakes • Elevated Areas • Kerry Airport • Areas of Prime Special Amenity • Archaeology • UNESCO World Heritage Site • Hen Harrier Areas • Other Ecologically Important Areas • Catchments & Water Framework Directive • Soils & Geology
Step 3	Undertake an analysis of cumulative impact of wind energy developments include a zone of theoretic visibility analysis.
Step 4	Analyse the areas not subject to constraints, including the sensitivity of the landscapes in these areas to wind energy development.
Step 5	Overlay Steps 1-4 to ascertain areas open to consideration for wind energy development.

Table 6.1 Steps undertaken to identify areas suitable for wind development

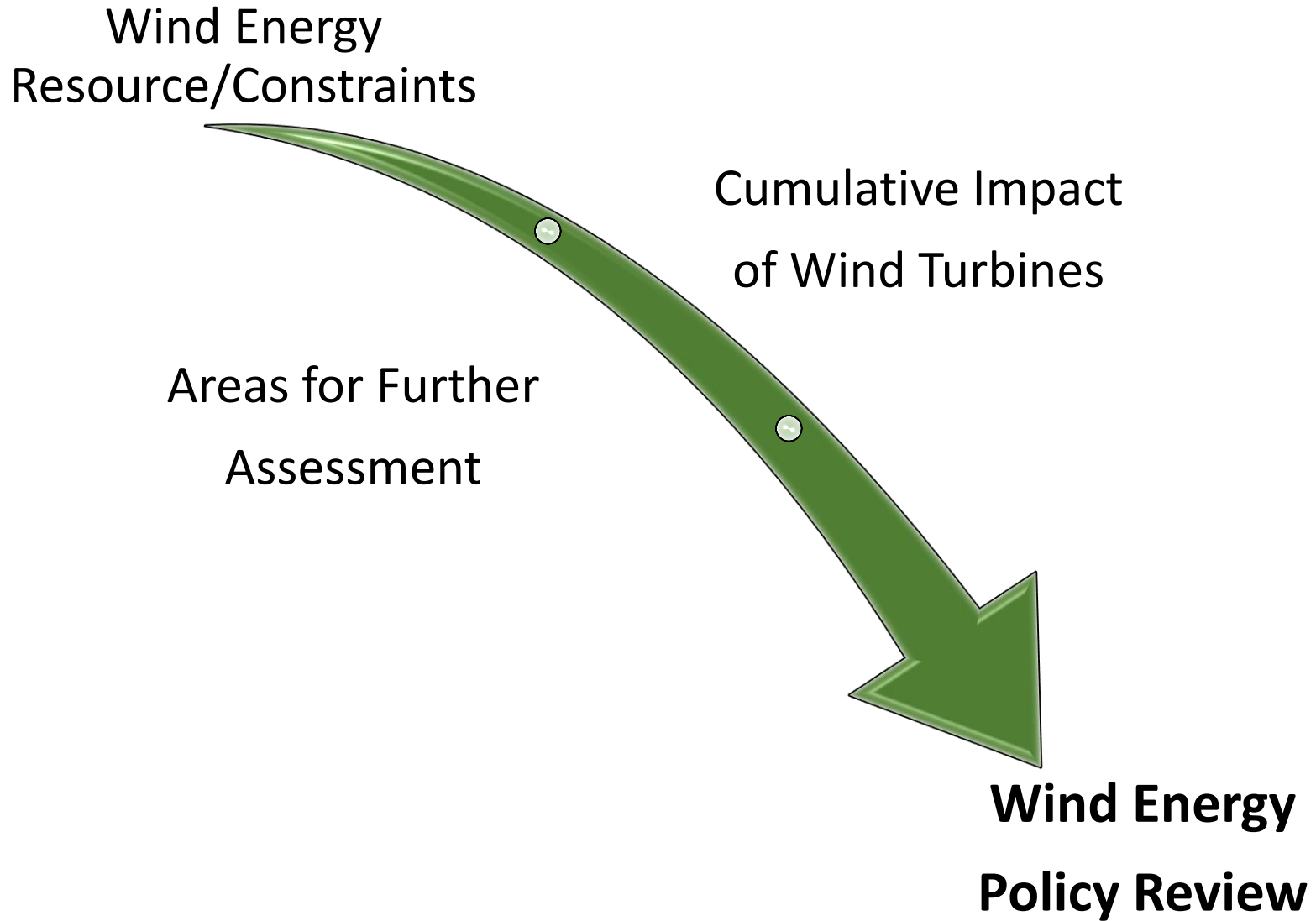


Figure 6.1: How the assessment informs wind energy policy



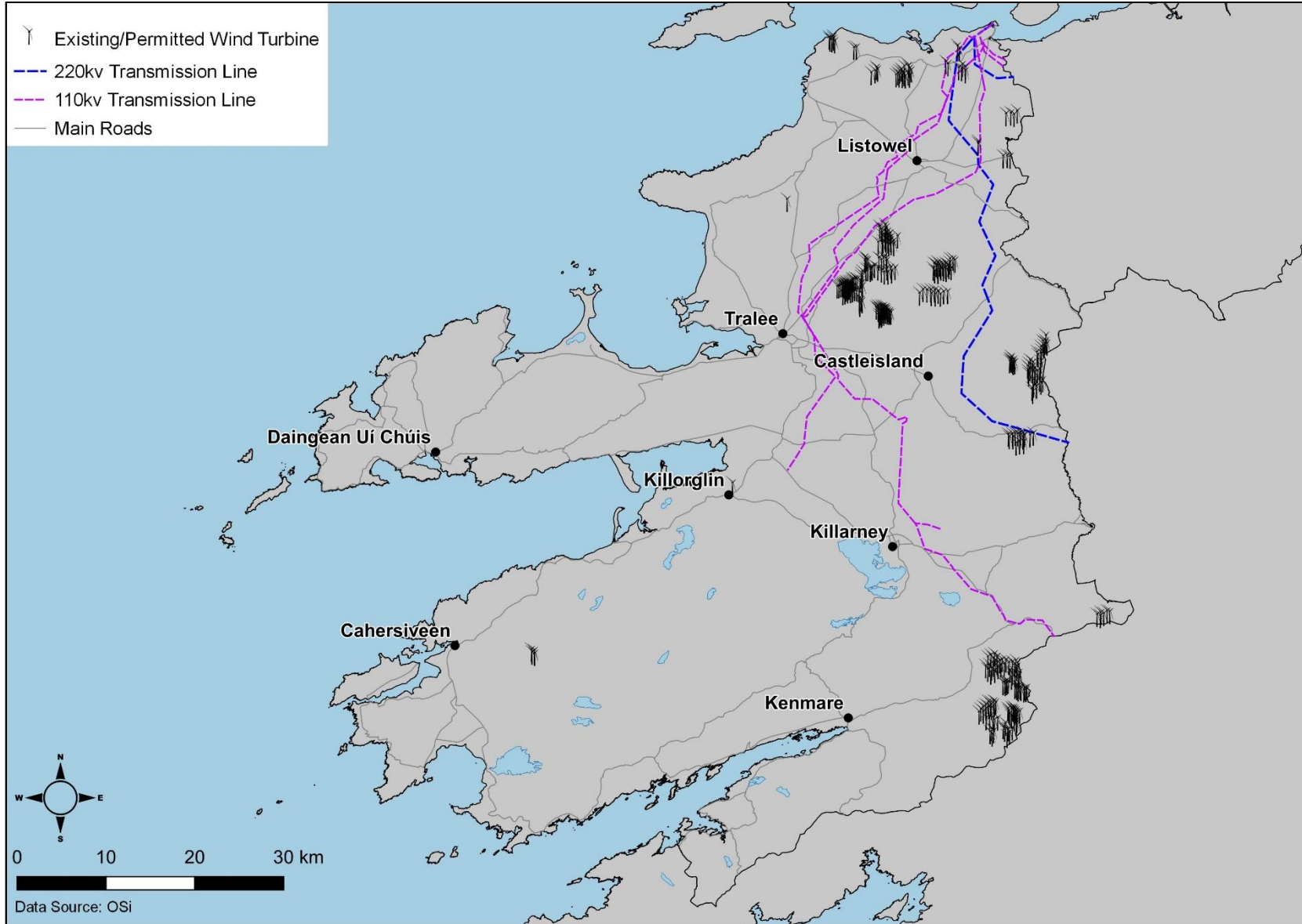
Step 1 – Wind Speeds / National Grid

Wind Speeds

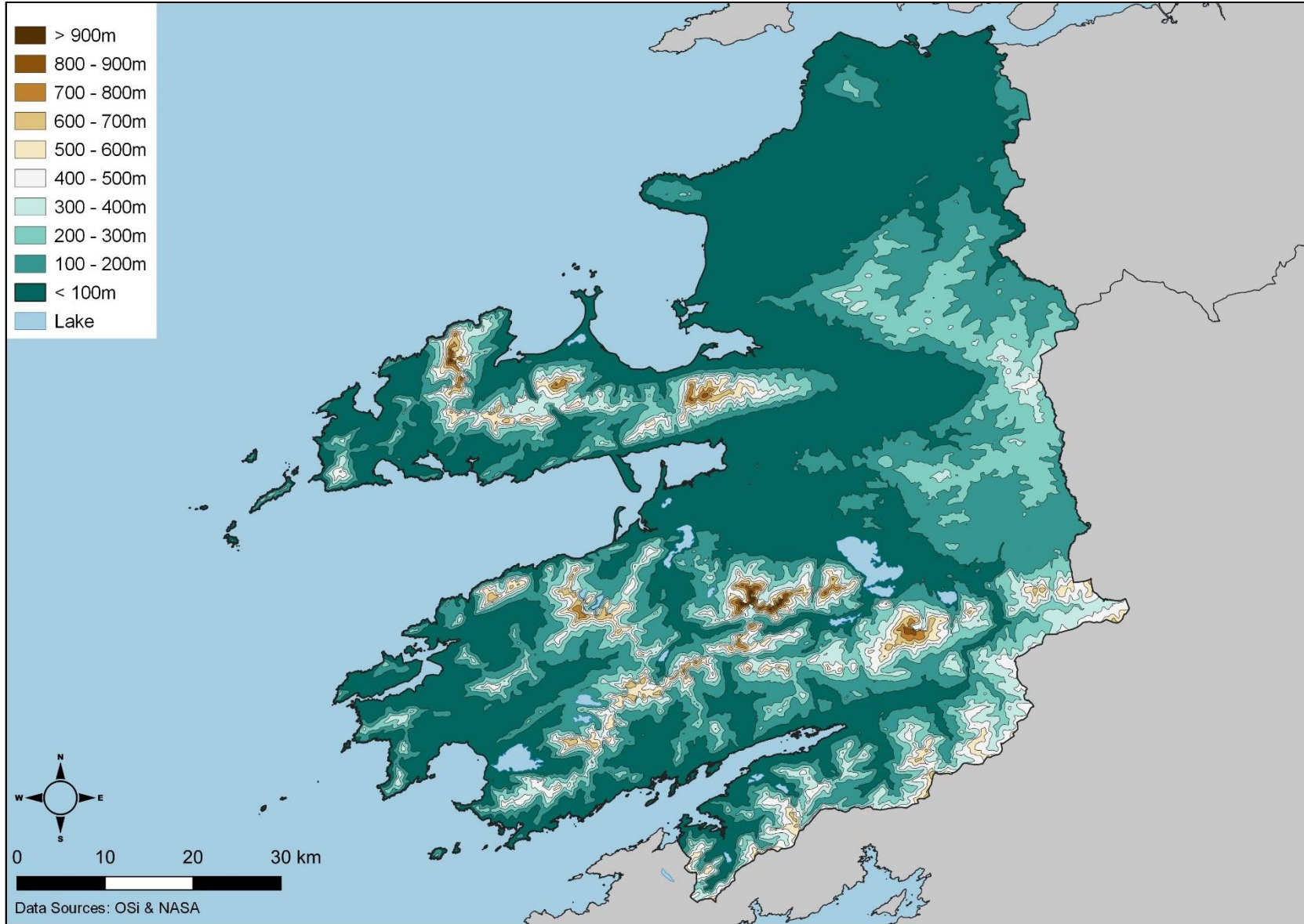
Sustainable Energy Authority of Ireland (SEAI) published a Wind Atlas in 2003 and updated it in 2013. It presents measured wind speeds across the country at 20m, 30m, 40m, 50m, 75m, 100m, 125m and 150m above ground level. Map 6.3 shows wind speeds at heights of 75m, 100m, 125m and 150m. Available wind speed is a key factor in determining the economic viability of potential wind energy locations. A site with wind speeds over 8 metres per second is ideal, although improvements in turbine technology is making lower wind speeds (potentially from 6.5 metres per second) more technically viable to exploit. Due to Kerry's geographic location wind speeds are generally favourable for wind energy development. For this reason, no areas have been deemed to be unsuitable for wind development on the grounds that wind speeds are inadequate.

Transmission Infrastructure

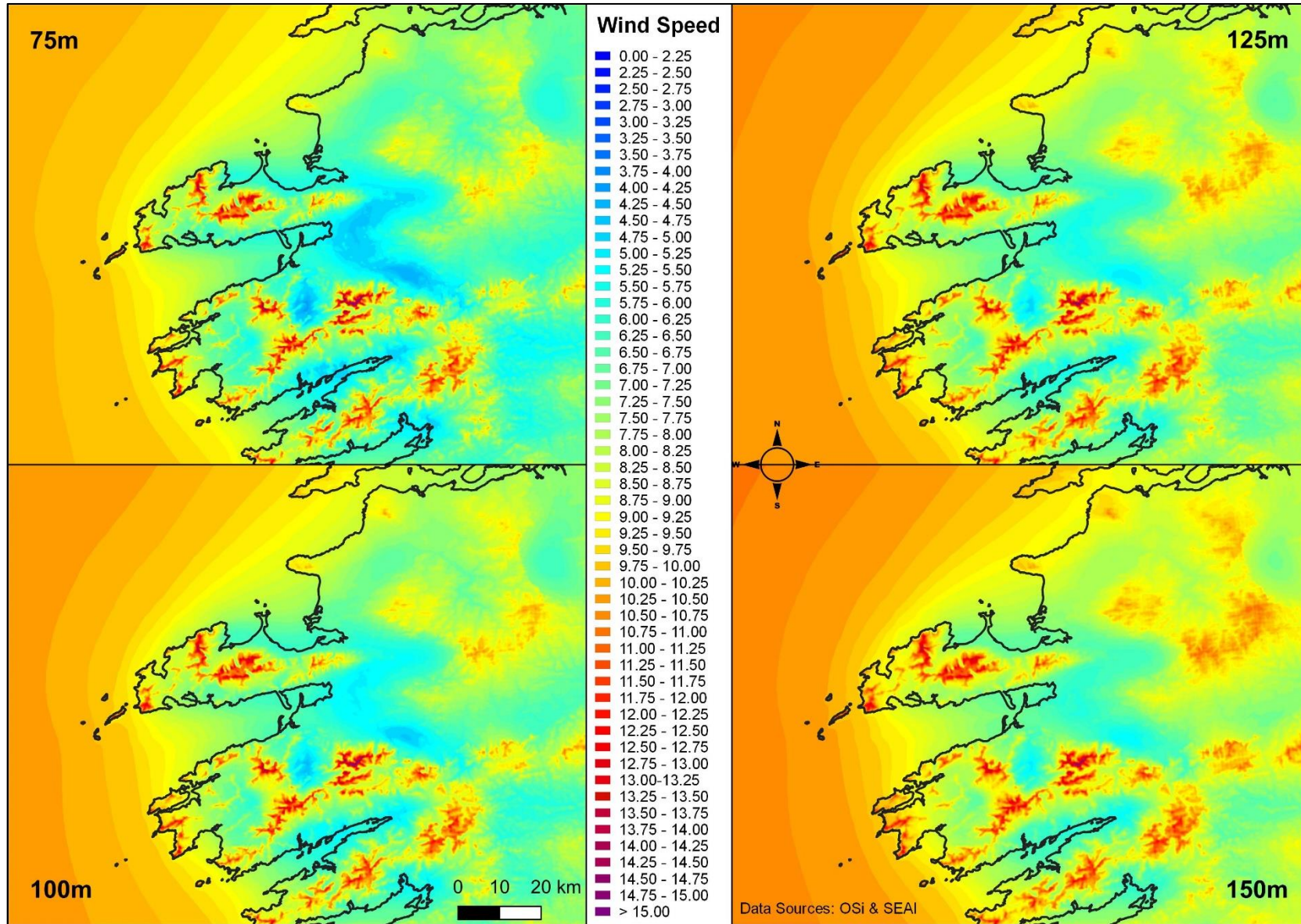
The grid infrastructure is concentrated in north and east Kerry with 220kv and 110kv transmission lines and associated substations (Map 6.1). The peninsulas of Dingle, Iveragh and Beara are not served by such infrastructure which is usually required to facilitate a proposed large-scale wind energy development.



Map 6.1: Permitted Wind Turbines (July 2021)



Map 6.2: Kerry Topography



Map 6.3: Wind Speeds



Step 2 – Constraints

Natura 2000

The Birds and Habitats Directives are the cornerstones of the EU's nature and biodiversity policy. They enable all EU Member States to work together, under a common legislative framework, to conserve Europe's most endangered, vulnerable and valuable species and habitats throughout their natural range within the EU, irrespective of political or administrative boundaries. They apply equally to European land and marine territory in the Member States.

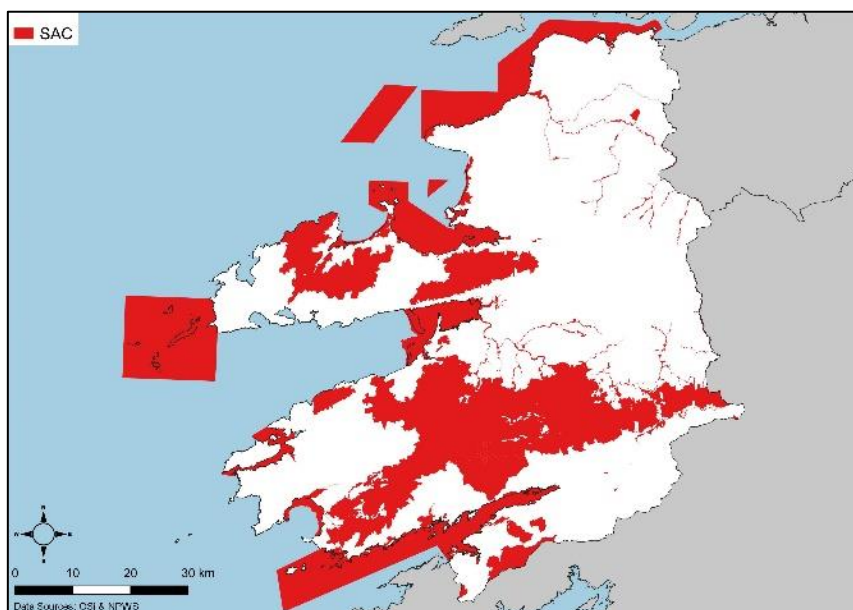
The overall objective of the two Directives is to ensure that the species and habitat types they protect are maintained or restored at a favourable conservation status throughout their natural range within the EU. To achieve this objective, the Directives set out two main types of measures:

- designating and conserving core sites for the protection of habitat types and habitats of species listed respectively in Annex I and II to the Habitats Directive and habitats of bird species listed in Annex I to the Birds Directive and of migratory birds. These sites make up the EU-wide Natura 2000 network.
- creating a strict protection regime for all European bird species and for species listed in Annex IV to the Habitats Directive. These measures apply across the entire natural range of the species within the EU, i.e. both within and outside protected sites.

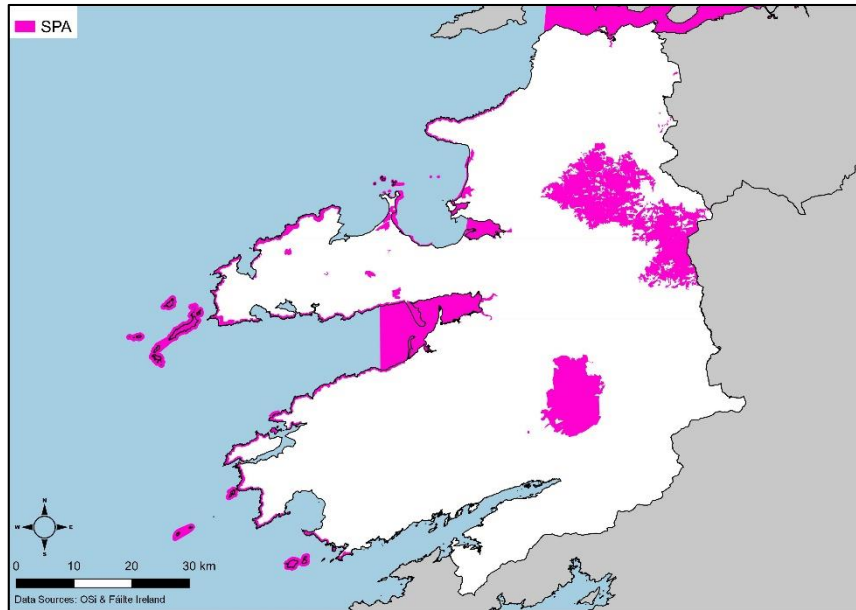
Special Areas of Conservation (SACs) are designated under the EU Habitats Directive (92/43/EEC) and Special Protection Areas (SPAs) under the EU Birds Directive (79/409/EEC). Member states are required to ensure that appropriate steps be taken to avoid the deterioration of these sites and their associated habitats and species.

SACs and SPAs are known collectively as Natura 2000 sites. SACs are designed to protect, conserve and, where possible and necessary, to enable the restoration of certain habitats and/or species. The purpose of SPAs is to protect rare or endangered birds and their habitats. Consideration of any wind energy development in, or near these areas, must be subject to Ireland's obligations under the Habitats Directive (92/43/EEC), the EU (Birds) Directive (79/409/EEC) and the Environmental Impact Assessment Directive (85/337/EEC).

The scale, dimensions and characteristics of wind farm projects can significantly affect the quality and integrity of natural heritage areas. Typically, Kerry's SPAs are concentrated in upland and coastal areas while SACs often occur on peatlands, along waterways and coastal areas.



Map 6.4: Special Areas of Conservation (SAC)

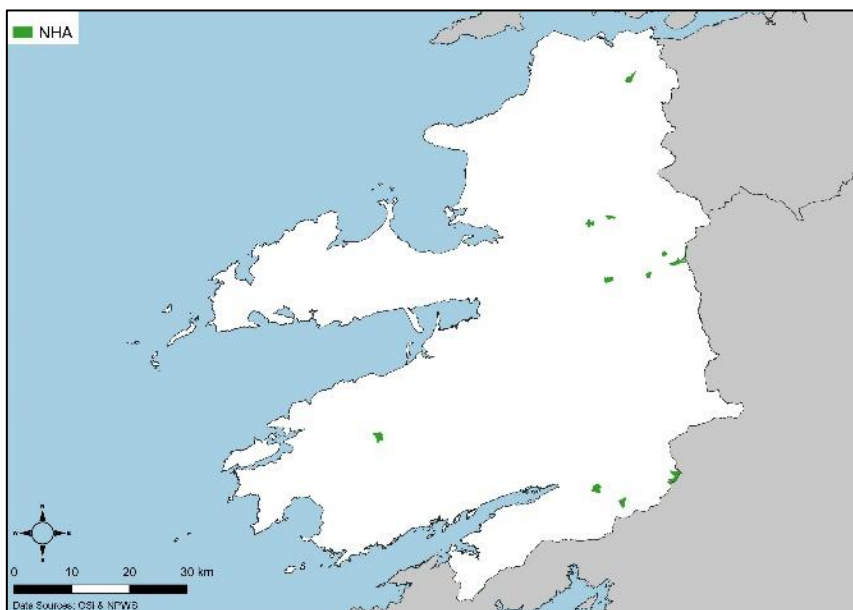


Map 6.5: Special Protection Areas (SPA)

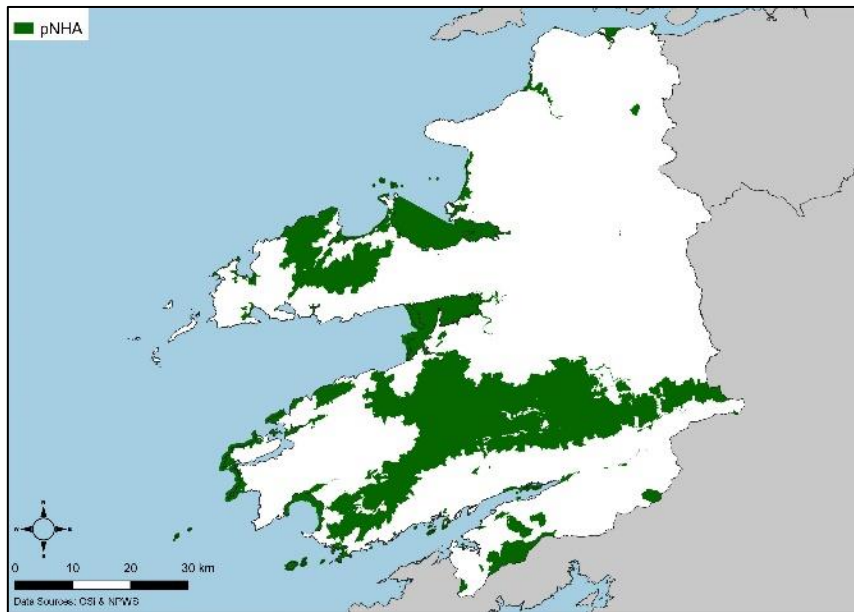
Kerry County Council recognises that the Habitats and Birds Directives do not, a priori, exclude wind farm developments in or adjacent to Natura 2000 sites. These need to be assessed on a case-by-case basis. Within this context an assessment of the Stacks to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA, has been undertaken which has resulted in it being included as an Accessible Resource Constraint.

Natural Heritage Areas

Natural Heritage Areas (NHA) are a national designation introduced by the Wildlife (Amendment) Act 2000 to protect natural heritage of national importance. Proposed Natural Heritage Areas (pNHA) were published on a non-statutory basis in 1995, but have not since been statutorily proposed or designated. These sites are of significance to wildlife and habitats and are therefore considered to be a constraint for windfarm development.



Map 6.6: Natural Heritage Areas (NHA)



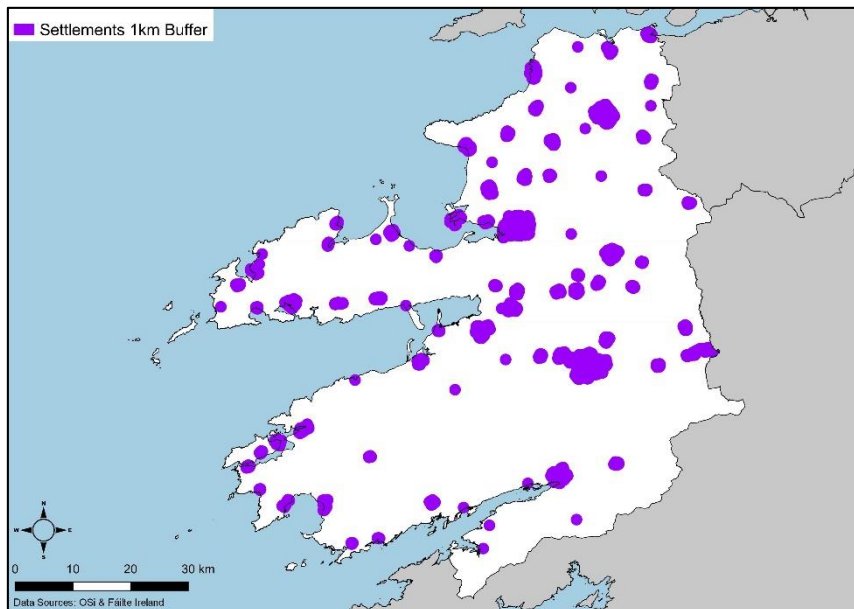
Map 6.7: Proposed Natural Heritage Areas (pNHA)

Both Natura 2000 sites and Natural Heritage areas may be a constraint for wind energy development, this will be required to be assessed in detail at project level. As part of this detailed ecological surveys would be required.

Practical Resource Constraints

Settlements

Urban areas are densely populated, and the development of wind turbines would have an unacceptable impact on residential amenity by way of noise and shadow flicker. A buffer zone of 1km has been identified from each settlement.

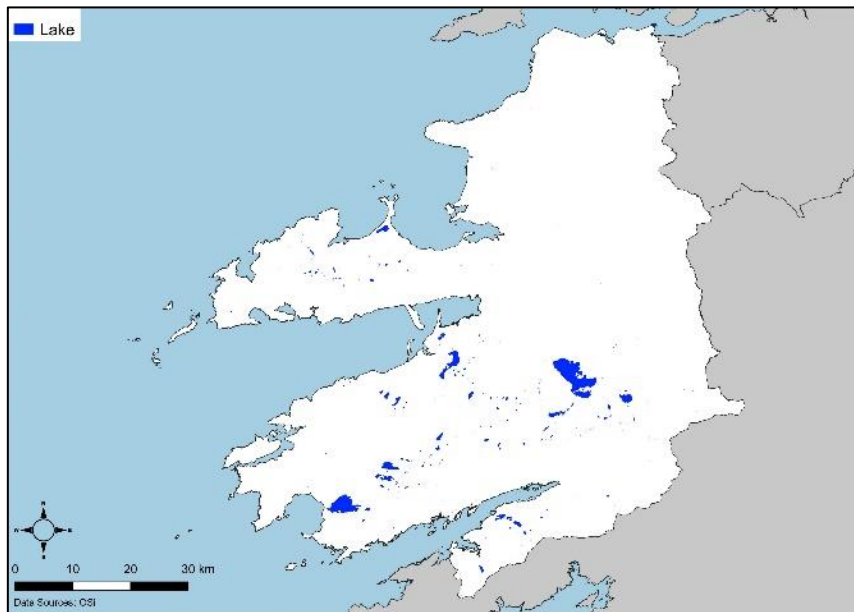


Map 6.8: Settlements with 1km buffer



Lakes

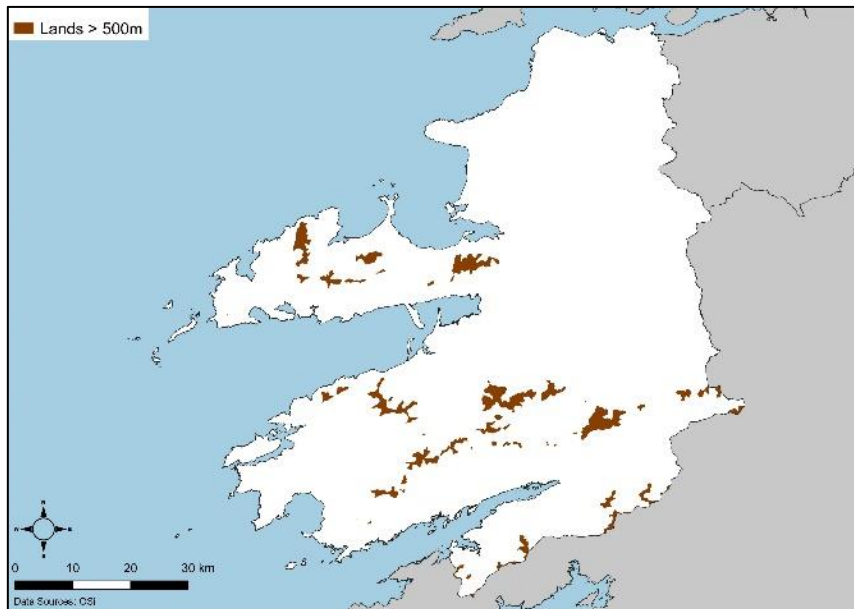
Development of wind turbines on lakes is not feasible having regard to their form as a water body.



Map 6.9: Lakes

Elevated Areas

Development at elevated areas, over 500m above sea level, would have a significant visual impact. In addition, there are technical challenges in relation to access. These areas are therefore being excluded. Approximately 3.2% of the county is over 500m above sea level.



Map 6.10: Lands over 500m

Practical Resource Constrains Conclusion

Development of a wind energy development in these areas (Maps 6.8 - 6.10) is not practical. The wind resource in this case would be areas outside of settlements, not being lakes and on lower elevations.

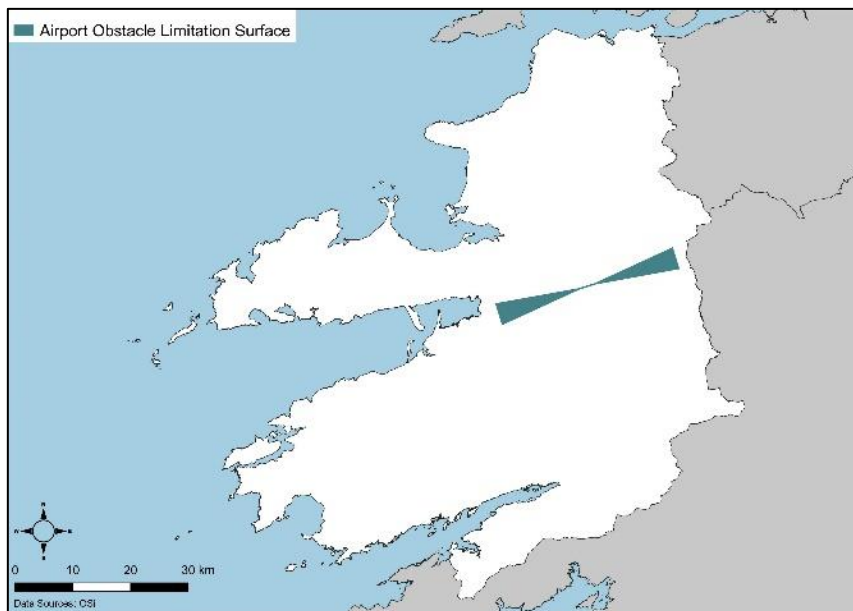


Accessible Resource Constraints

- Kerry Airport
- Areas of Prime Special Amenity
- Archaeology
- UNESCO World Heritage Site
- Hen Harrier Areas
- Other Ecologically Important Areas
- Catchments & Water Framework Directive
- Soils & Geology

Kerry Airport

Wind energy developments may have an impact on communication infrastructure through electromagnetic interference. An exclusion zone for wind turbines within flight paths is therefore necessary on the flight path associated with Kerry Airport, a distance of approximately 15 kilometres in both directions from the ends of the runway.

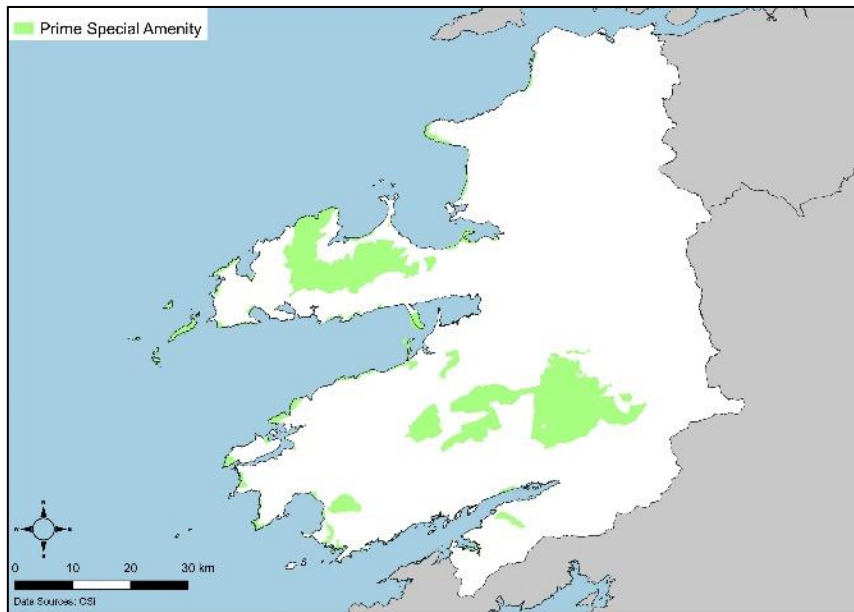


Map 6.11: Kerry Airport Obstacle Limitation Surface

Areas of Rural Prime Special Amenity Kerry County Development Plan 2015-2021

The Kerry County Development Plan 2015-2021 contains amenity zoning designations to protect the landscape from inappropriate development. In the preparation of amenity zoning designations for the County, the Planning Authority considered not only the quality of the landscape itself, but also the level of existing development and the ability of the landscape to absorb further development without altering its character to an unacceptable degree. Zoning designations are not wholly dependent on a hierarchy of quality landscapes. Amenity zonings also reflect the importance of a landscape to the overall amenity of a locality and its importance to communities within these areas.

Rural Prime Special Amenity Areas are those landscapes which are very sensitive and have little or no capacity to accommodate development. As wind turbines are a development of considerable scale, areas of rural prime special amenity are therefore considered to be a constraint for wind energy development.

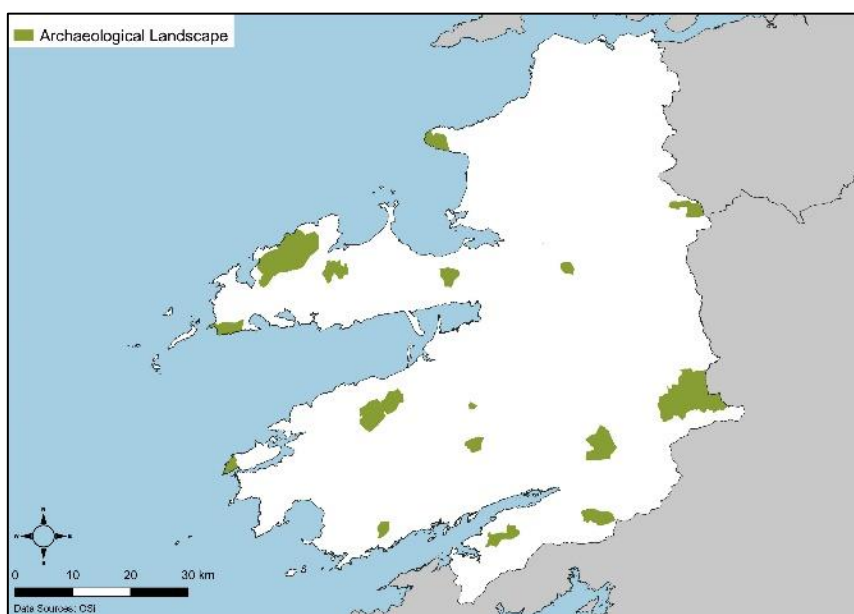


Map 6.12: Areas of Rural Prime Special Amenity

Archaeological Landscapes – Kerry County Development Plan 2015-2021

Kerry’s archaeological heritage is a rich and extensive resource and like all non-renewable resources, it needs to be protected and preserved for future generations. Proposals can have adverse impacts of a physical and/or visual nature. In many instances, adverse impacts may be mitigated following a detailed assessment of the impacts. Nonetheless, there are significant numbers of archaeological monuments recorded in the county, and the heritage values and landscape settings of these monuments must be preserved.

The Council’s Archaeology Department has identified a number of archeologically significant landscapes which have been included for protection in the Kerry County Development Plan 2015-2021. These areas contain a significant number and range of associated archaeological monuments indicative of extended, coherent archaeological landscapes which are of local, regional, national and in some cases international significance. It is considered that the scale and nature of wind development would have a significant and adverse impact on these archeologically important landscapes. For this reason, these areas are considered unsuitable for wind development.

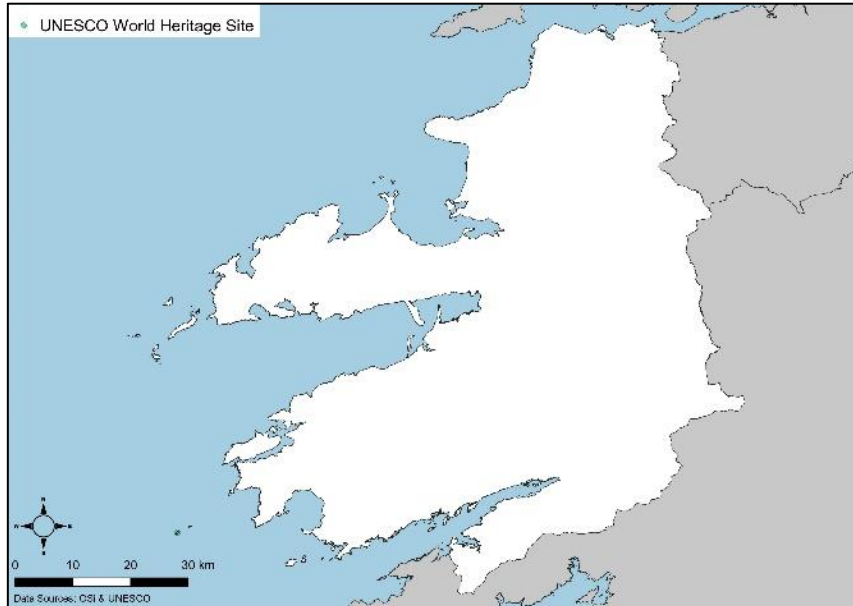


Map 6.13: Archaeological Landscapes



UNESCO World Heritage Site

Sceilg Mhichíl, also known as Skellig Michael, was inscribed on the World Heritage List in 1996, and is one of only two UNESCO World Heritage Sites in the Republic of Ireland. The United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Sites are places of importance to cultural or natural heritage as described in the UNESCO World Heritage Convention, established in 1972. For this reason, this site is considered unsuitable for wind development.



Map 6.14: UNESCO World Heritage Site

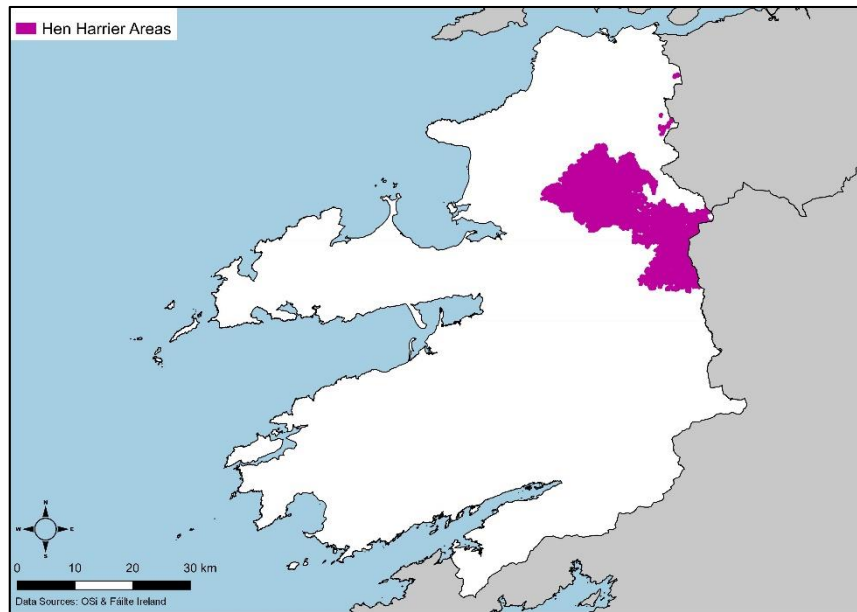
Hen Harrier Areas

The Stacks to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA is partly located within the County of Kerry, the remainder located within Limerick and Cork. The special conservation interest of this SPA is the Hen Harrier.

The latest Hen Programme Hen Harrier Monitoring Report (November 2020) provides an overview of the breeding Hen Harrier population in the Country's SPA Network to 2020. The report outlines that the Stack's to Mullagherierk Mountains, West Limerick Hills and Mount Eagle SPA has undergone a serious population decline since designation, however the population appears to have stabilised, albeit at a lower level.

There is scientific understanding which indicates a disturbance displacement for hen harriers of 250m from operating wind turbines. A buffer of 250m has there been extended from the Stack's to Mullaghareirk Mountains, West Limerick and Mount Eagle SPA boundary to allow for disturbance displacement. This buffer has been included on Map 6.15.

Having regard to the Hen Harrier population decline within the SPA (and nationally) since designation and to the substantial number of existing and permitted Wind Turbines in the SPA, the SPA is excluded from consideration for additional wind farm development, save for repowering proposals. Areas within 250m of the SPA are similarly excluded given the potential for Hen Harrier displacement and other impacts.

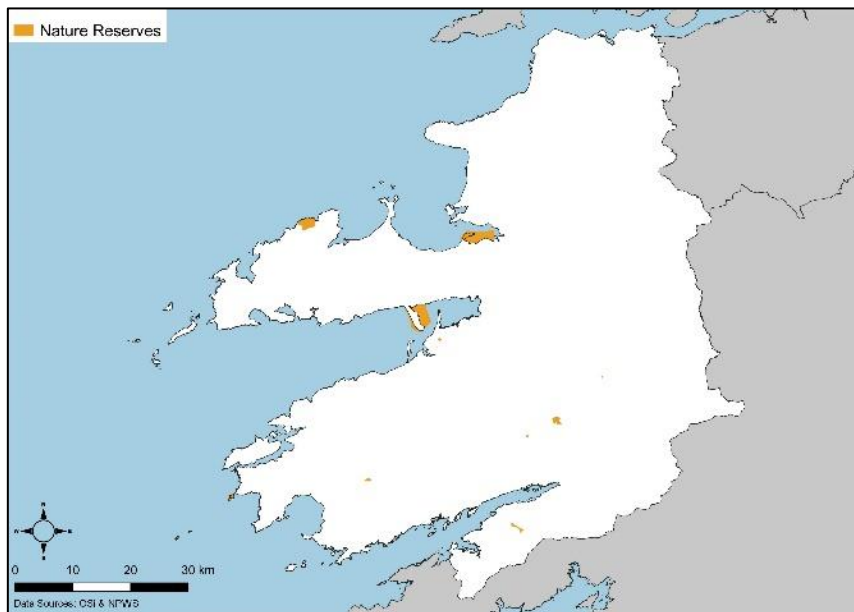


Map 6.15: Hen Harrier Areas (incl. 250m buffer)

Other Ecologically Important Areas

Nature Reserves

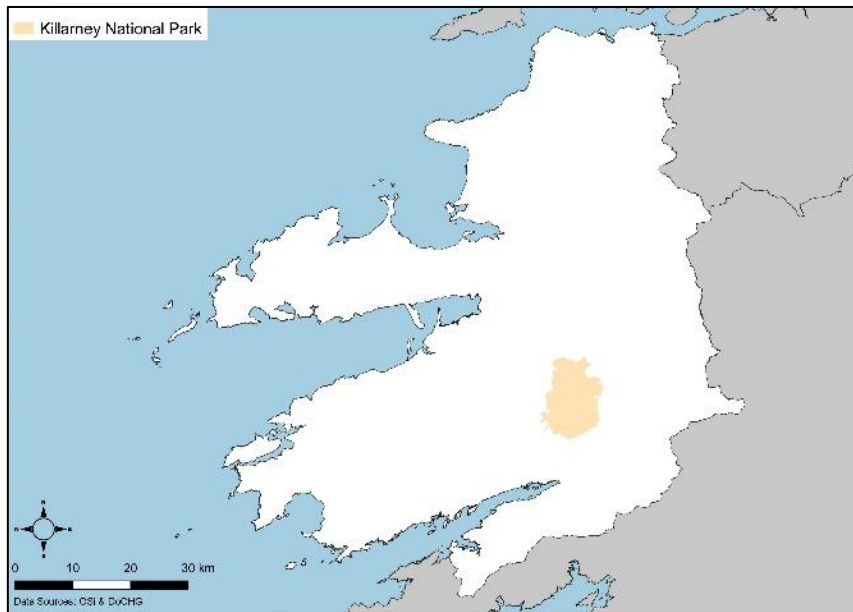
A Nature Reserve is an area of importance to wildlife, which is protected under Ministerial order. Excluding windfarms from these types of area is therefore prudent.



Map 6.16: Nature Reserves

Killarney National Park

Killarney National Park contains many features of national and international importance such as the native oakwoods and yew woods together with an abundance of evergreen trees and shrubs and a profusion of bryophytes and lichens which thrive in the mild Killarney climate. The native red deer are unique in Ireland with a presence in the country since the last Ice Age. Killarney National Park also forms the core of the UNESCO Kerry Biosphere Reserve. The Park is subject to other designations covered in this document but due to its importance it is being included separately as a constraint to windfarm development.



Map 6.17: Killarney National Park

Sensitive Catchments & Water Framework Directive

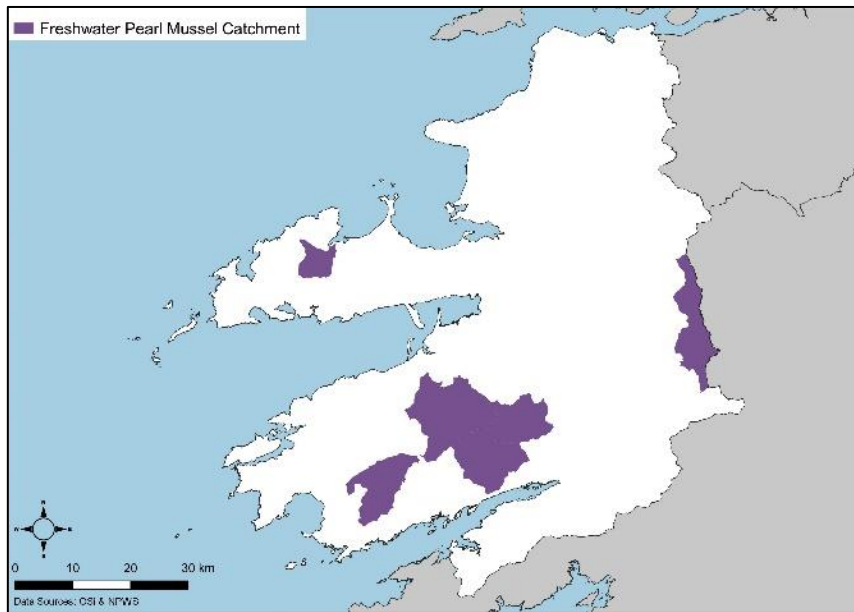
The EU Council Directive 2000/60/EC (Water Framework Directive) sets out a comprehensive framework for the management of water resources in the European Community.

Freshwater Pearl Mussel Catchments

There are 6 catchments designated under the European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations, 2009, in response to the presence of significant pearl mussel populations:

- Currane
- Gearhameen
- Kerry Blackwater
- Caragh
- Munster Blackwater
- Owenmore

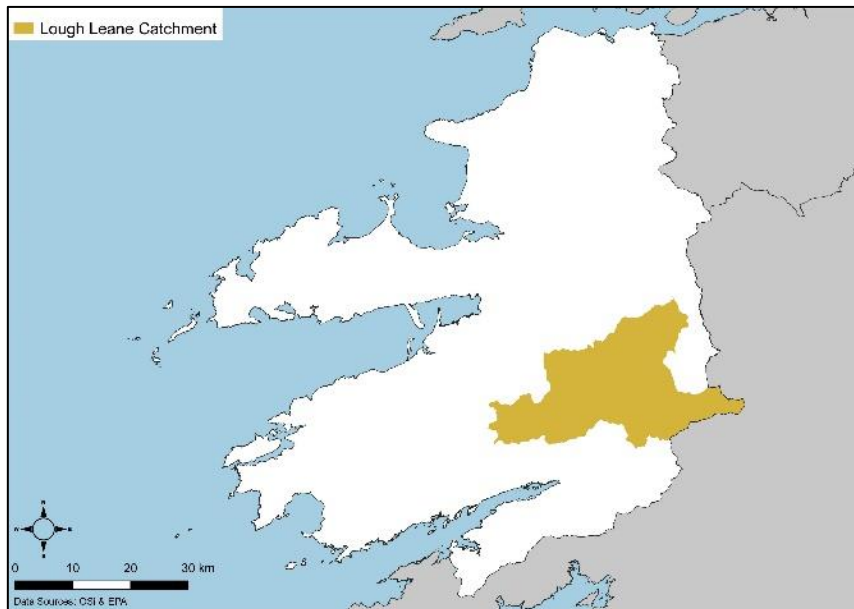
The Conservation Status of the populations in question is poor and it is important that measures are taken to rectify this situation. The pressures which the pearl mussel populations are currently experiencing have been linked primarily to sedimentation. The generation of sediment therefore needs to be limited. In this context, given the risk of sediment generation associated with wind development, it is considered that ecologically these catchments are not suitable for wind development.



Map 6.18: Freshwater Pearl Mussel Catchments

Lough Leane Catchment

The Lough Leane Catchment is of significant importance to the county’s tourism industry, and to tourism angling in particular. Water quality in this catchment was subject to an algae bloom in the late 1990’s on foot of which a study of the catchment and of phosphorus loadings to the lake was undertaken. This study highlighted the need to reduce the annual total phosphorus load entering the lake. Given the potential for the release of sedimentary phosphorus arising from wind development this catchment is considered to be unsuitable for wind development.



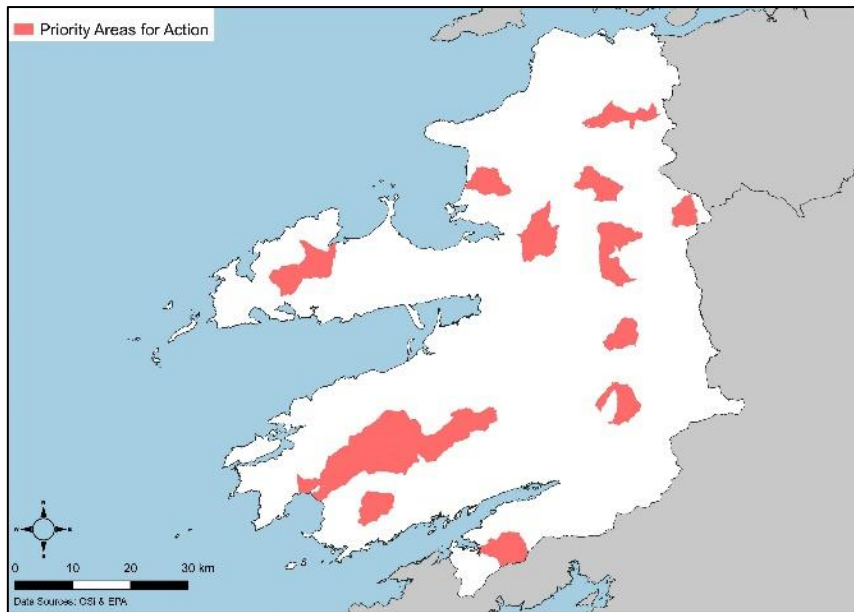
Map 6.19: Lough Leane Catchment

Water Framework Directive (WFD) and Water Quality

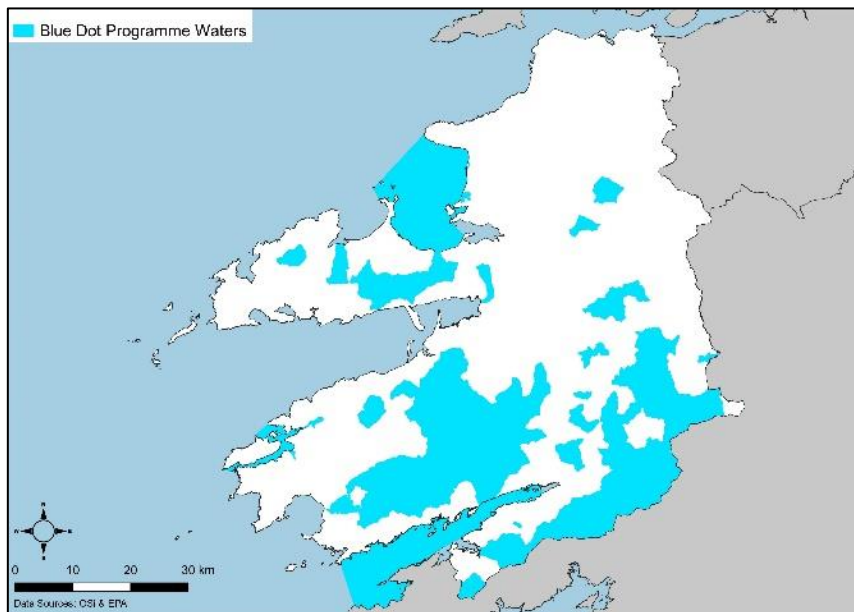
The River Basin Management Plan 2018-2021 was published by the Department of Housing, Planning and Local Government in April 2018. The Plan identifies 190 Areas for Action across the country, with a total of 726 water bodies within these Areas. The Areas for Action were selected based on the priorities in the River Basin Management Plan, the evidence from the Water Framework Directive characterisation process, and the expertise, data and knowledge of public body staff with responsibilities for water and the different pressure types. The Plan seeks to improve water quality in these areas.



In addition, the WFD Blue Dot Programme aims to protect and restore high-status waters. The scale and associated works with wind energy development pose a risk to the implementation of the River Basin Management Plans and restoration of high status waters. In order to avoid this risk, such waters are considered to be a constraint to wind energy development.



Map 6.20: River Basin Management Plan 2018-2021 Priority Areas for Action



Map 6.21: River Basin Management Plan 2018-2021 Blue Dot Programme Waters

Soils & Geology

Peat Soils

Habitat loss and fragmentation can have consequences for peatland biodiversity conservation. The changes come about when one habitat type is removed and replaced by another or when land use activities cause degradation of the quality of the habitat and species composition. Development of most peatland sites (including upland and lowland bog types, fens and heaths) can lead to impacts on natural heritage.

In addition, peatlands act as carbon sinks holding the bulk of Ireland’s carbon store, which is locked up in the peat soil. The construction of wind turbines on peatlands can result in the desiccation of the peat soil thereby upsetting the carbon accumulation process, leading to an increase in the amount of carbon dioxide released to the atmosphere.



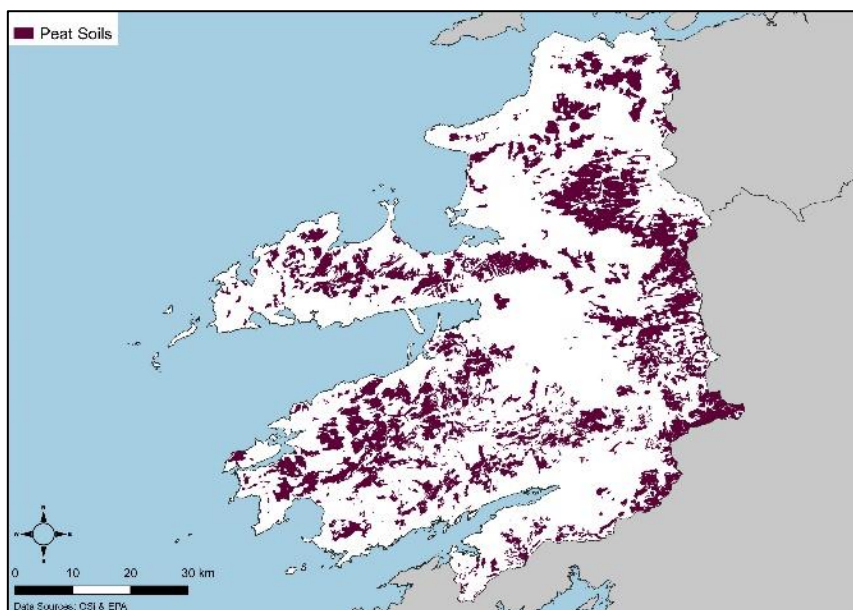
The *Climate Action Plan 2019* (DoECC) identifies peat as being the largest store of carbon in the Irish landscape, with this store being very vulnerable.

47% of peat soils in the county are subject to a Natura 2000 or Natural Heritage Area designation. These are a mix of raised and blanket bogs and heaths many of which have not been subject to detailed survey. These include:

- Glanmore Bog SAC / pNHA
- Maulagowna Bog SAC / pNHA
- Moanveanlagh Bog SAC / pNHA
- Sheheree (Ardagh) Bog SAC / pNHA
- Anna More Bog NHA
- Bunnaruddee Bog NHA
- Doughill Bog NHA
- Hungry Hill Bog NHA
- Knockatarriv/Knockariddera Bogs NHA
- Knockroe Bog NHA
- Mount Eagle Bogs NHA
- Sillahertane Bog NHA
- Slaheny River Bog NHA
- Ballagh Bog pNHA
- Dromlusk Bog pNHA
- Mullaghanish Bog pNHA

The conservation of raised bogs in Kerry is especially important in ensuring that the range of the habitat is conserved. Many of the lands with peat soils and which are outside of designations are 'wetlands' and are of biodiversity and flood risk management value.

Having regard to the increased risk associated with peat desiccation and the resultant loss of carbon sinks, it is considered that these types of soils are not considered suitable for wind energy development in Kerry. It is considered appropriate to rule out such areas at this the planning policy stage, so as to strategically guide development to more appropriate lands.



Map 6.22: Peat Soils¹

¹ National Soils Database, Environmental Protection Agency



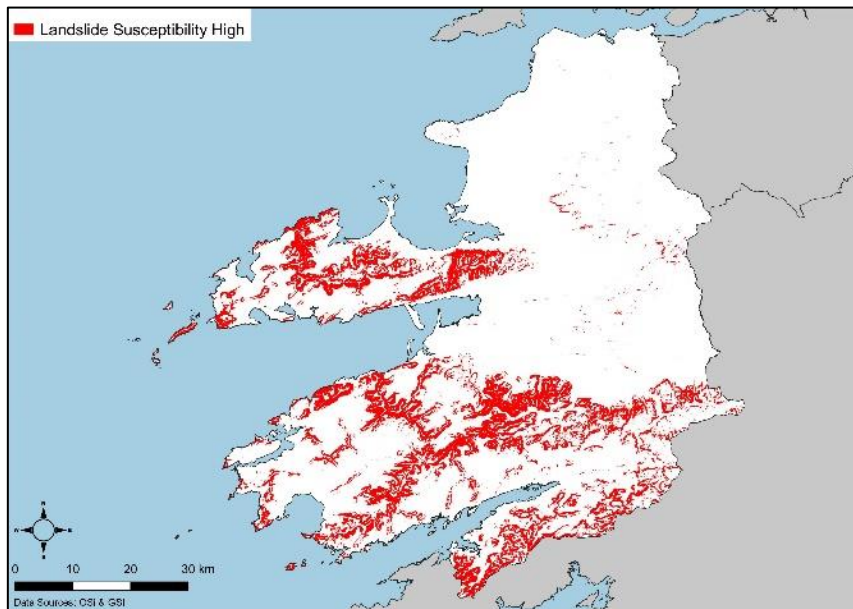
Landslide Susceptibility

A landslide susceptibility map identifies areas which are subject to landslides and is measured from low to high. It takes into account where the landslides occur and what causes them (slope, soil type and the impact of the flow of water in an area). The Geological Survey of Ireland (GSI) have carried out such a mapping project which was published in 2016. The aim of this mapping is to identify areas predisposed to landslides.

The methodology to create a landslide susceptibility map used Unique Condition Units (UCU). The concept is that if a landslide has occurred in a particular set of conditions, then if those conditions occur elsewhere those locations would also be susceptible to landslides. UCUs are parcels of terrain where a set of attributes are combined in a unique way. In the context of landslide susceptibility mapping the attributes considered include slope, soil type and an index measuring overland flow concentration from intense rainfall events.

The approach taken to categorisation of landslide susceptibility is through a four band scale ranging from 'Low' to 'High'. This uses the relatively simple concept of doubling the number of landslides within each band, such that the upper band has just over half of all known events.

Areas that have a high susceptibility of landslides are considered to be unsuitable for wind energy development.



Map 6.23: Landslide Susceptibility²

Geological Heritage Sites

Ireland has a long and interesting geological history which has given us a great diversity of rock types and land forms for a country of its size. The GSI has identified sites as County Geological Sites to ensure their conservation.

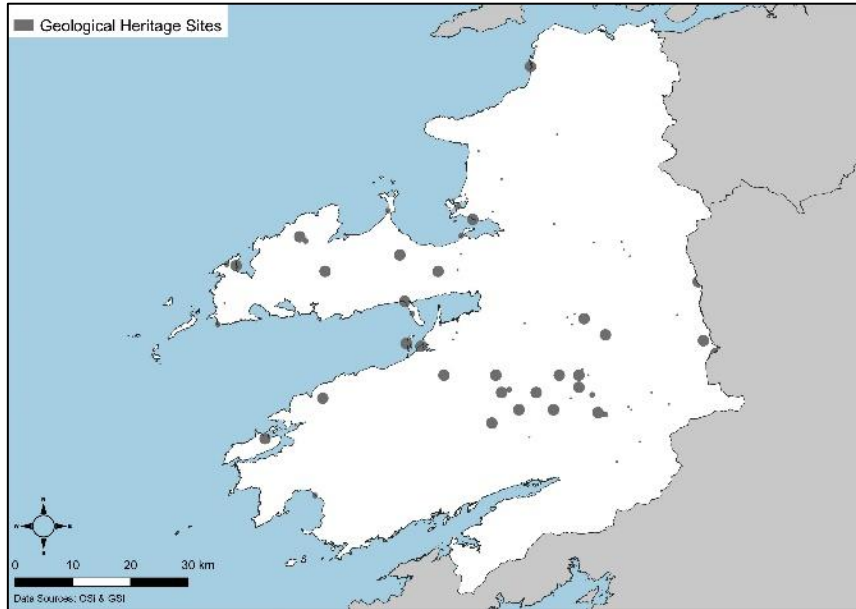
The sites of geological heritage are assessed under 16 geological themes. Each theme considers specific aspects, such as stratigraphy, sedimentology, structural geology, volcanic rocks, etc and addresses all aspects of the particular geology involved, but some sites may be considered within two or more themes. Of the 16 themes, 15 are present in Kerry.

Kerry's geological heritage sites have not yet been audited. Buffer zones have been applied to potential sites of interest by the GSI.

² GSI National Land Susceptibility Map, Geological Survey of Ireland



County Geological Sites have no statutory protection but may be included within County Development Plans. Geological sites in the county are listed in Appendix (iv), Table 10.6 of the Kerry County Development Plan 2015-2021. It is an objective of the development plan to seek the preservation of important features of geological interest and to maintain the conservation value of those features of geological interest and protect them from inappropriate development. Wind farm development may affect these sites and they have, therefore been included as a constraint to wind energy development.



Map 6.24: Geological Heritage Sites

Access Resource Constraints Conclusion

Development of a wind energy development in the areas (Maps 6.11 - 6.24) covered in this section is not acceptable.

Constraints Conclusion

Figure 6.2 outlines all the areas that have been deemed unsuitable for wind energy developments. These areas have been mapped in a sieve overlay manner. The results are shown on Map 6.25.

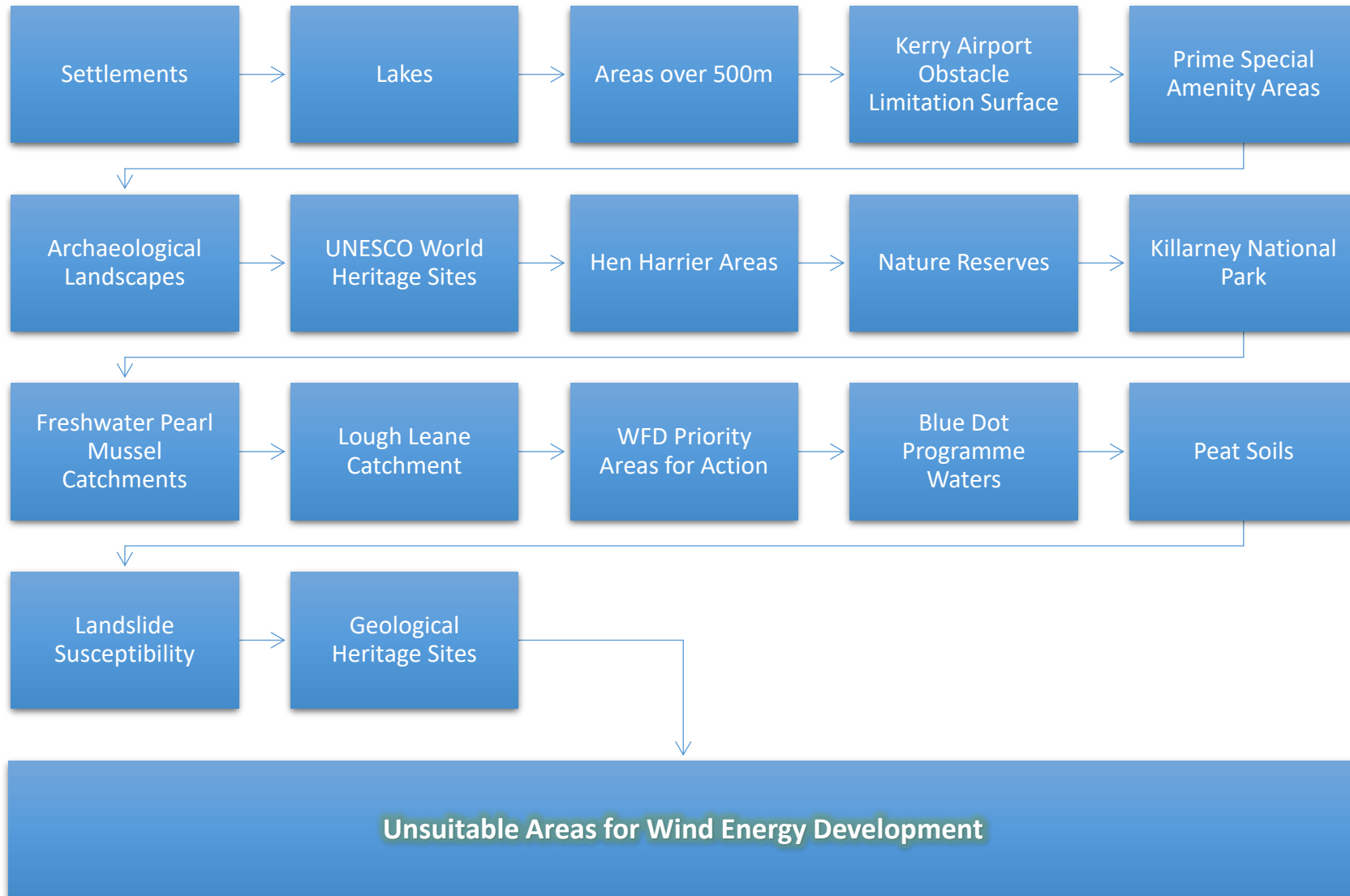
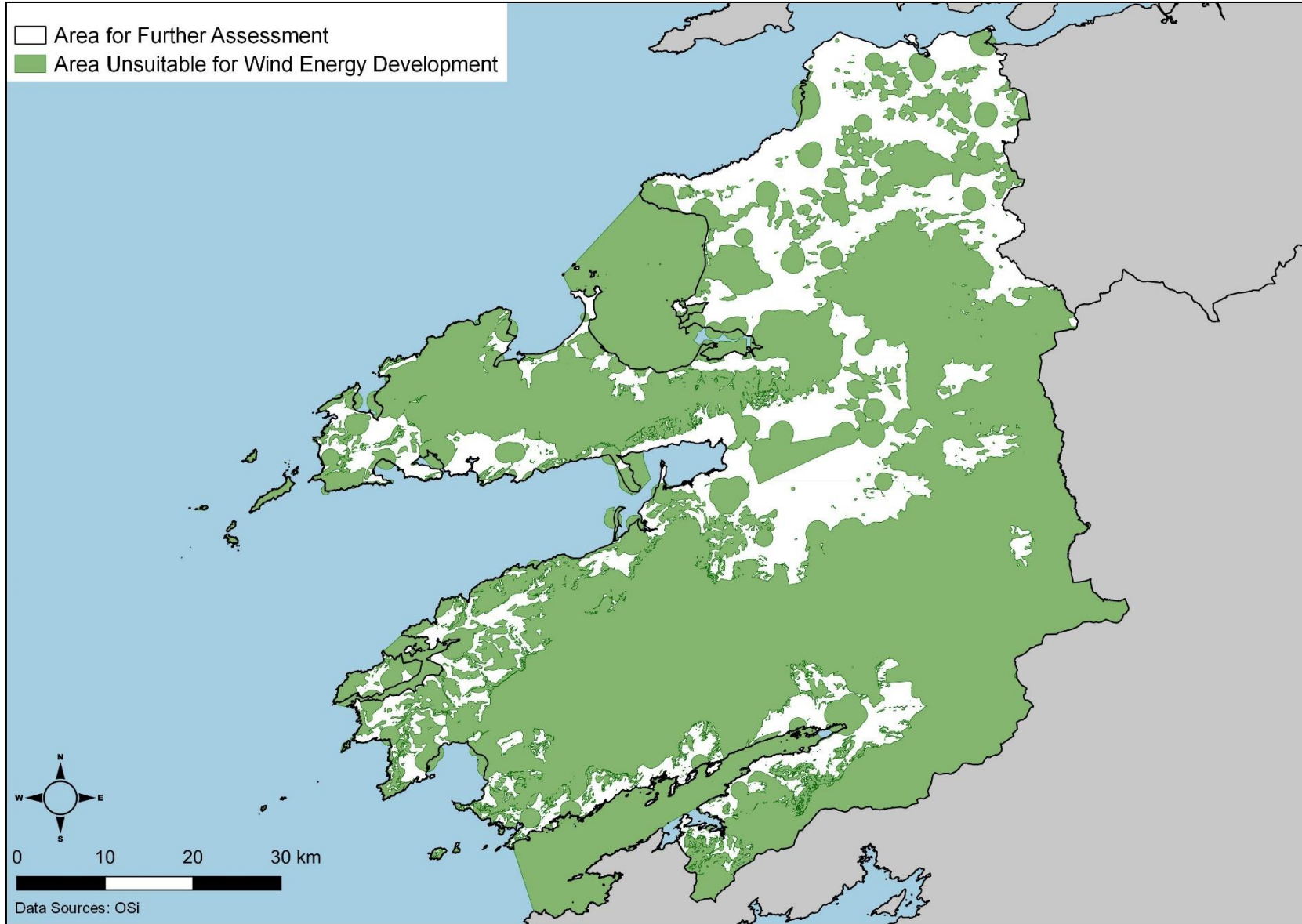


Figure 6.2: Wind Energy Resource Model



Map 6.25: Unsuitable Areas for Wind Energy Development



Step 3 – Cumulative Impact of Wind Energy

Cumulative Impacts are additional changes caused by a proposed development in conjunction with other similar developments, or as the combined effect of a set of developments, taken together.

Cumulative impact is a critical consideration in the case of landscape and visual impacts of windfarms due to the current number of existing and consented developments in the landscape, proposed developments in the planning system and the long-term implications of national policy that encourages the development of onshore wind energy generation.

The characteristics of wind turbines that lead to cumulative impacts include:

- The large scale and striking visual appearance of wind turbines and windfarms in most landscapes.
- The great extent of their visibility and the potential for intervisibility between wind turbine developments and as seen by receptors.

Large modern turbines are prominent, large scale, man-made features and there are few other precedents in terms of scale, height and appearance in most landscapes. They are much taller than any natural features such as trees or most buildings and other structures. Of similar built structures in rural landscapes, electricity pylons are significantly smaller than the largest turbines and although broadcasting masts are often taller they are usually singular and infrequent. Furthermore, most landscape features are static whereas wind turbines rotate. Smaller turbines may also present issues of scale and appearance in more localised contexts, as well as visual confusion when seen together with larger turbines.

Key factors that affect the perception of cumulative change include:

- the distance between individual windfarms and/or turbines
- the distance over which they are visible
- the overall character of the landscape and its sensitivity to windfarms
- the siting and design of the windfarms themselves (particularly turbine height and windfarm size)
- the way in which the landscape is experienced

Zones of Theoretical Visibility (ZTV)

'Zone of Theoretical Visibility' (ZTV) analysis is the process of determining the visibility of an object in the surrounding landscape, using computer modelling and digital terrain mapping (SNH Guidelines, 2012).

In order to create these zones of theoretical visibility data is needed, and for this assessment elevation is required along with details of the objects being assessed, i.e. wind turbines. As this is a theoretical exercise all permitted wind turbines are included in the assessment.

Digital Elevation Model (DEM)

A DEM is a representation of elevation values over a topographic surface. The DEM used was sourced from the EU DEM³. The EU-DEM has a 25-metre resolution.

Turbines

The location and heights of turbines, in Kerry and in adjoining counties, are based on co-ordinates and drawings submitted in their respective planning applications, with locations cross checked against satellite imagery. The heights above sea level of the turbine bases was also determined⁴.

Using the DEM and the location of wind turbines, ZTV maps were then created in QGIS (GIS software) using its Viewshed Visibility Analysis plugin/tool. As these are 'theoretical' maps, they only show land from which

³ <https://www.eea.europa.eu/data-and-maps/data/copernicus-land-monitoring-service-eu-dem>

⁴ <https://www.daftlogic.com/sandbox-google-maps-find-altitude.htm>



the proposal may theoretically be visible. That is, it treats the world as 'bare earth and does not take account of potential screening by vegetation or buildings (Guidelines for LVIA, 3rd edition).

This assessment is **theoretical**, and it should be noted that there are extensive areas of forestry in parts of the county where wind turbines are existing/permitted. There are extensive areas of forestry in the Stack's Mountains which would screen the potential visibility of the turbines in those areas. This forestry is coniferous in nature, so in theory its potential to screen turbines is limited over time as felling will occur once the forests reach commercial maturity, however, limited screening exists and may continue to exist as forestry continues to grow and is replanted.

The following parameters were used in the ZTV analysis:

- Turbines used in the study are those permitted in Kerry and adjoining counties
- The ZTV is measured to the blade tip
- The target height is 1.6m, average eye level
- Measured to a distance of 20km from the turbine

Turbines are concentrated in north, east and southeast Kerry. The prevalence of turbines in these areas are also reflected in the location of turbines in the adjoining counties of Cork and Limerick.

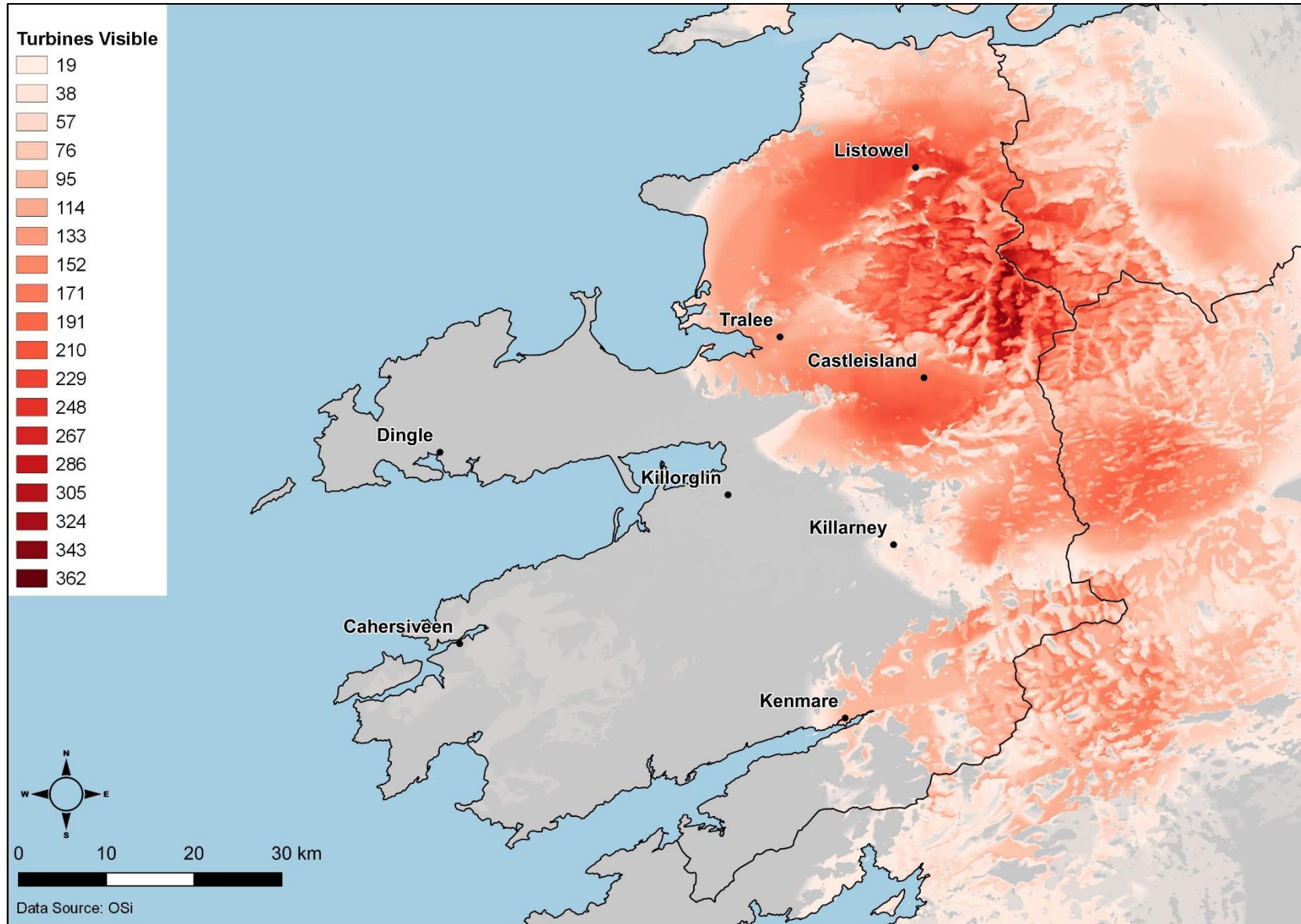
In addition to the 374 permitted wind turbines in Kerry⁵, wind turbines within 20km of the county were included in this analysis. These included 20 wind turbines in County Clare, 96 in County Limerick, and 187 in County Cork.

Assessing the scale of impact

Map 6.26 shows where turbines are visible at a distance of 20km and the number of turbines that can theoretically be seen. Approximately 39% (187,314 hectares) of the county is outside of this area. These are therefore areas of the county where no turbines are theoretically visible at a distance of 20km. Turbines may well be visible from a distance of greater than 20km, but this would have a negligible effect on the calculation of cumulative impact.

When the ZTV map (Map 6.26) is examined it is clear that turbines have a significant impact, and that a need therefore exists to calculate the extent of this impact. The darker the shade of red on the map, the greater the number of turbines that are theoretically visible from that point. Areas in green are those from where no turbines are theoretically visible.

⁵ July 2021



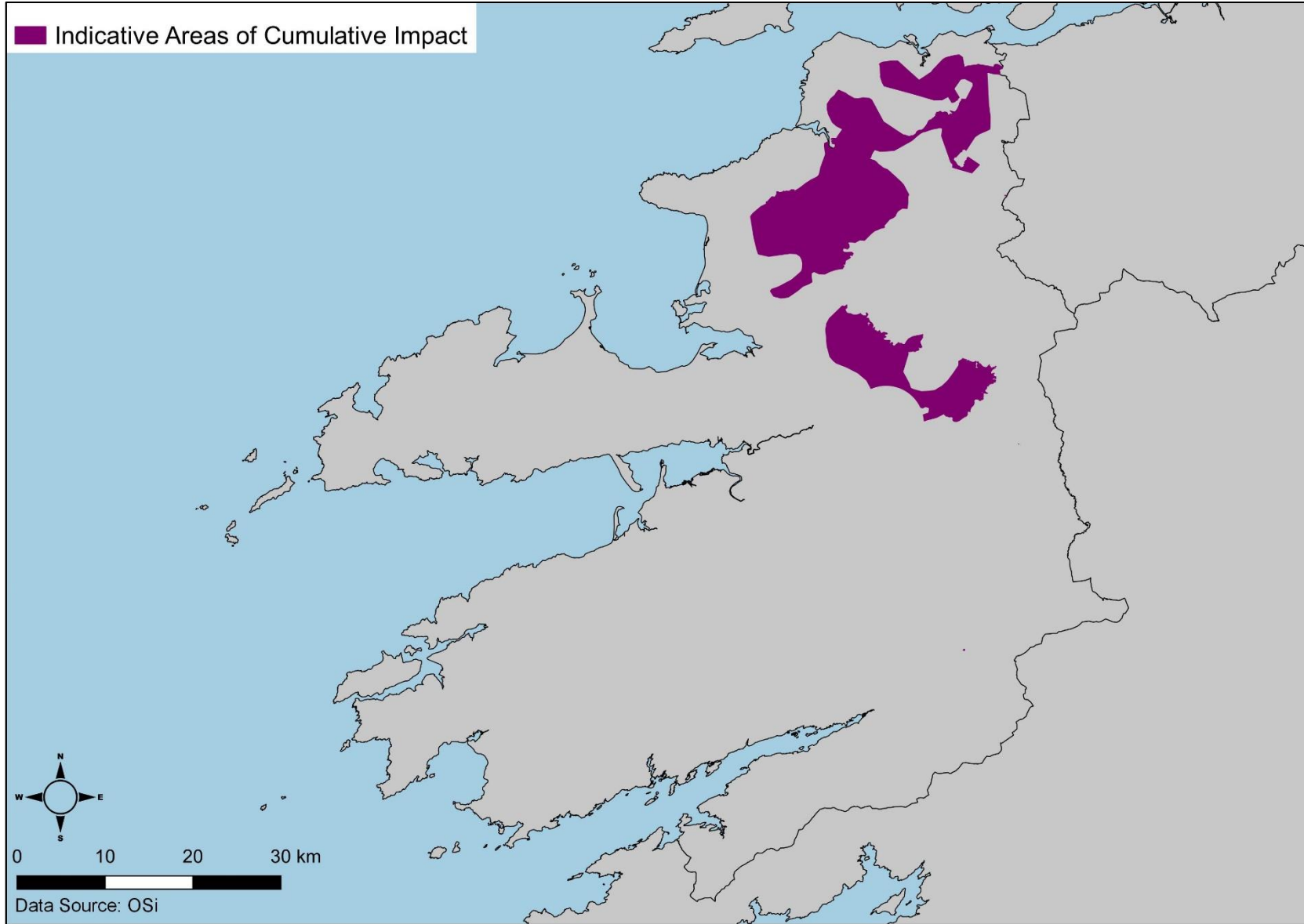
Map 6.26: Permitted Wind Turbine Zones of Theoretical Visibility



Cumulative Impact Conclusion

Given the distribution of wind turbines and their cumulative impact as demonstrated on Map 6.26, it is clear that new wind farms will continue to have a cumulative effect on large parts of the county.

Having regard to the extent of completed and permitted developments to date and to the zone of theoretical visibility analysis, it is considered that the following areas as shown on Map 6.27 have reached their capacity to absorb additional wind energy development.



Map 6.27: Areas of Cumulative Impact



Step 4 – Areas for Further Assessment

Following the identification of constraints in Step 2, the remaining areas of the county can be assessed with regards to their visual sensitivity to wind energy development.

The individual parts not subject to constraints have been grouped into 25 areas for assessment, and these are shown on Map 6.28.

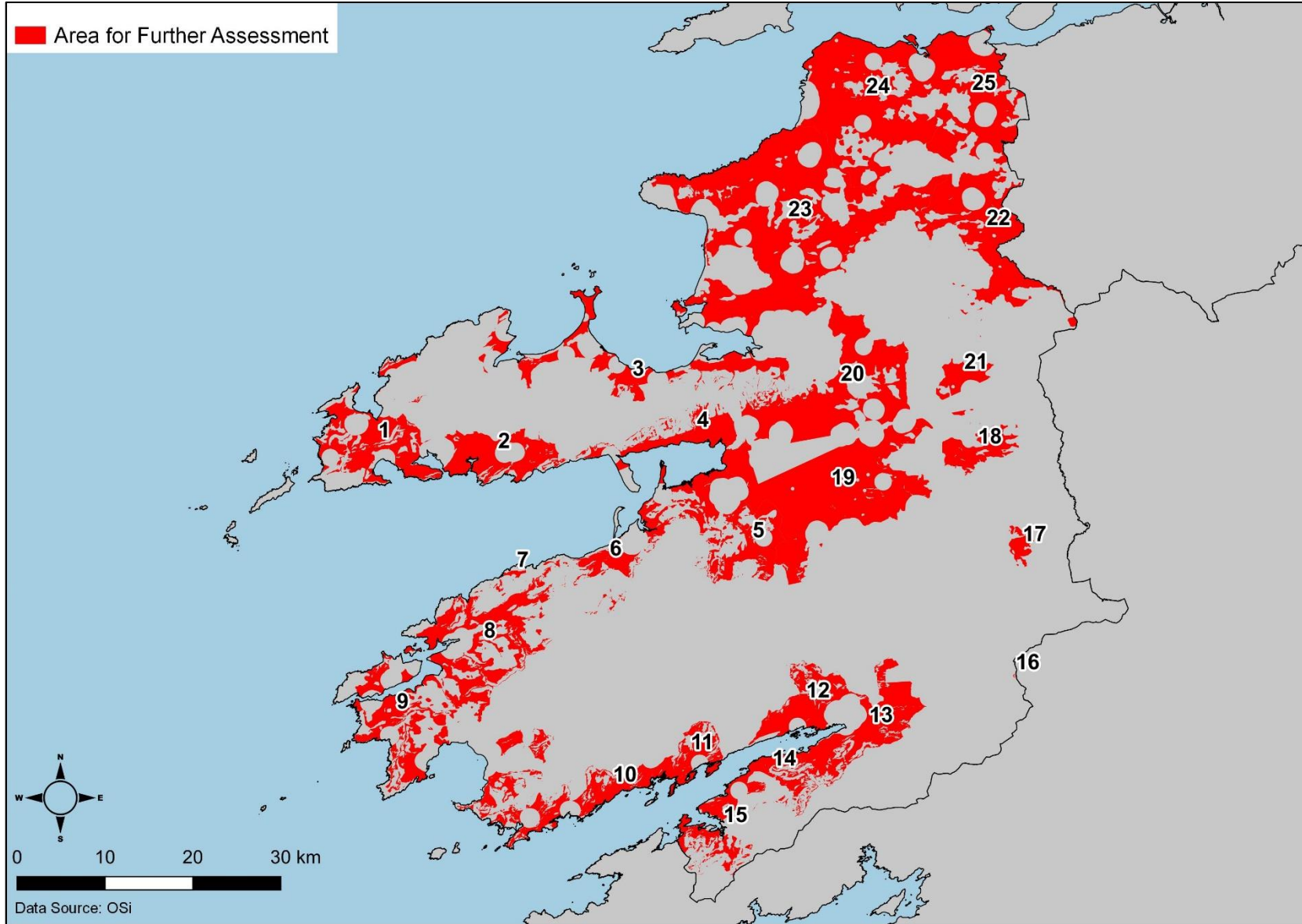
Photographs used as examples for the areas date from the first quarter of 2019 and February 2019.

Methodology

Each area is assessed using the following criteria:

- Size of Area
- Infrastructure
- Population
- Landscape Sensitivity

Following the assessment of the area a conclusion is reached as to whether the area is sensitive to wind energy development or has wind energy potential.



Map 6.28: Areas for Further Assessment



Area 1

Size of Area

This area is made up of a number of parts of varying size, measuring a total of 53.5km². The size of some of these parts would be impractical in terms of zoning.

Infrastructure

This area is located on the Dingle Peninsula and is not served by the existing 110/220kv transmission network.

Population

There is high level of residential development in the area, a density of 18 houses per km².

Landscape Sensitivity

This area includes lands on the western part of the Dingle Peninsula, including areas around Dingle, Ventry and Smerwick Harbours.

The headlands of Ceann Sibéal, Ballydavid and Sleá Head are prominent features in this area.

Views & prospects as contained in the Kerry County Development are found on numerous roads in the area, with there being views to Brandon, across the harbours, towards the prominent headlands, and the coast.

The Sleá Head drive runs through the area. This forms part of the Wild Atlantic Way, which has a number of discovery points on Sleá Head.

Due to the scenic coastal nature of this area, wind turbines would be difficult to integrate.

Conclusion

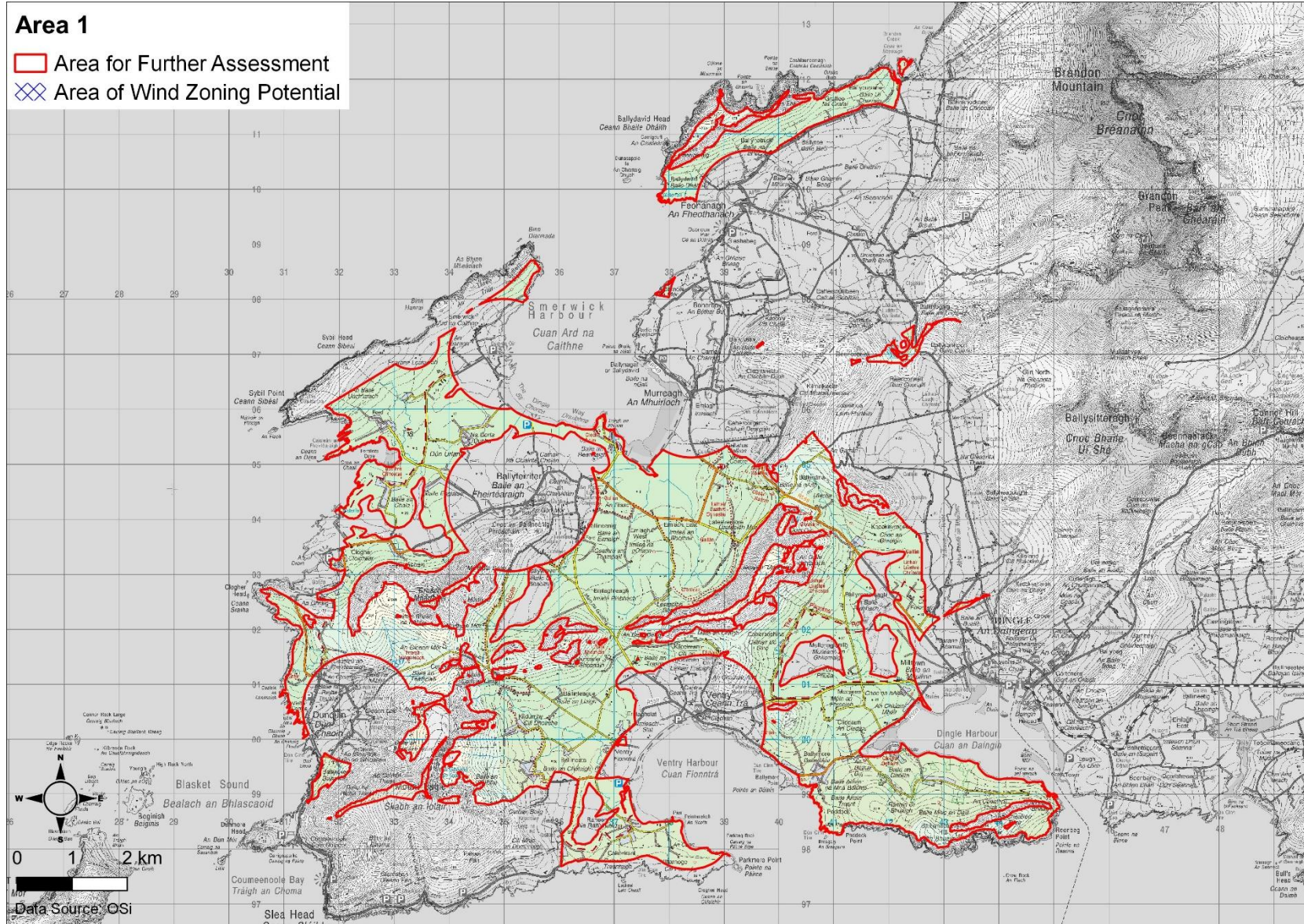
This landscape would be sensitive to wind energy development.



Landscapes in Area 1









Area 2

Size of Area

This area is made up of a number of parts of varying size, measuring a total of 45.1km². The size of some of these parts, particularly in the eastern part of the area would be impractical in terms of zoning.

Infrastructure

This area is located on the Dingle Peninsula and is not served by the existing 110/220kv transmission network.

Population

Housing density in this area is 12 houses per km².

Landscape Sensitivity

This area is located between Daingean Uí Chúis and Inch on the Dingle Peninsula. It is enclosed by the coastline of Dingle Bay on its southern side and the ridge of mountains that runs along the spine of the peninsula on its northern side.

There are views & prospects in the Kerry County Development Plan from the N86. Due to the narrow width of the area, wind energy development would impact negatively on these views. The Wild Atlantic Way runs through the area, following the N86, which is an important tourist route between Tralee and Daingean Uí Chúis, and has a Discovery Point at Inch Beach to the east.

Due to the coastal and mountainous nature of this landscape, wind turbines would be difficult to integrate.

Conclusion

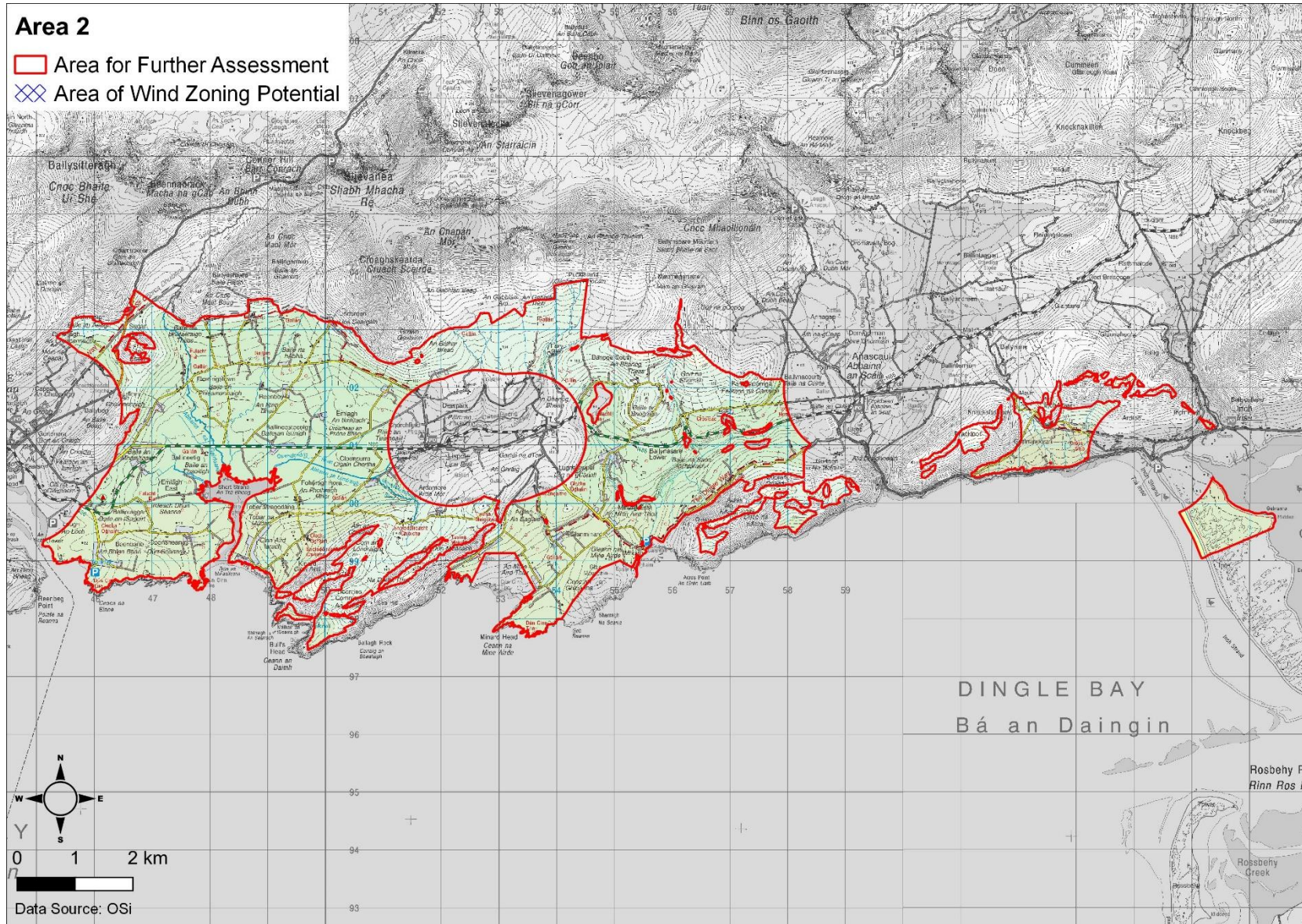
This landscape would be sensitive to wind energy development.



Landscapes in Area 2







Map 6.30: Area 2 for Further Assessment



Area 3

Size of Area

This area is made up of a number of parts of varying size, measuring a total of 33.2km². The size of some of these parts would be impractical in terms of zoning.

Infrastructure

This area is located on the Dingle Peninsula and is not served by the existing 110/220kv transmission network.

Population

The pattern of housing in the area would follow the coast, with a density of 21 houses per km² in the area.

Landscape Sensitivity

This area stretches along the north coast of the Dingle Peninsula from Cé Bhréanainn in the west to Camp in the east. Part of the area is located on the northern tip of the Maharees Peninsula, which is a flat coastal area defined by extensive sand dune systems. The remainder is on a narrow strip of lands between the mountains which run along the spine of the peninsula, or in glacial valleys in the mountains.

There are views from the main road through the area, the N86 in the eastern part, towards the coast and the mountains, and from the Castlegregory Road, and the R560. These would be affected by wind energy development due to the narrow width of the area.

Large sections of road in the vicinity are designated views & prospects in the Kerry County Development Plan. The R560 on the northern side of the Dingle Peninsula forms part of the Wild Atlantic Way, and has a Discovery Point at Castlegregory Beach to the south. The N86, Tralee-Dingle Road, is an important tourist route.

Wind turbines would be difficult to integrate in this scenic coastal and mountainous landscape.

Conclusion

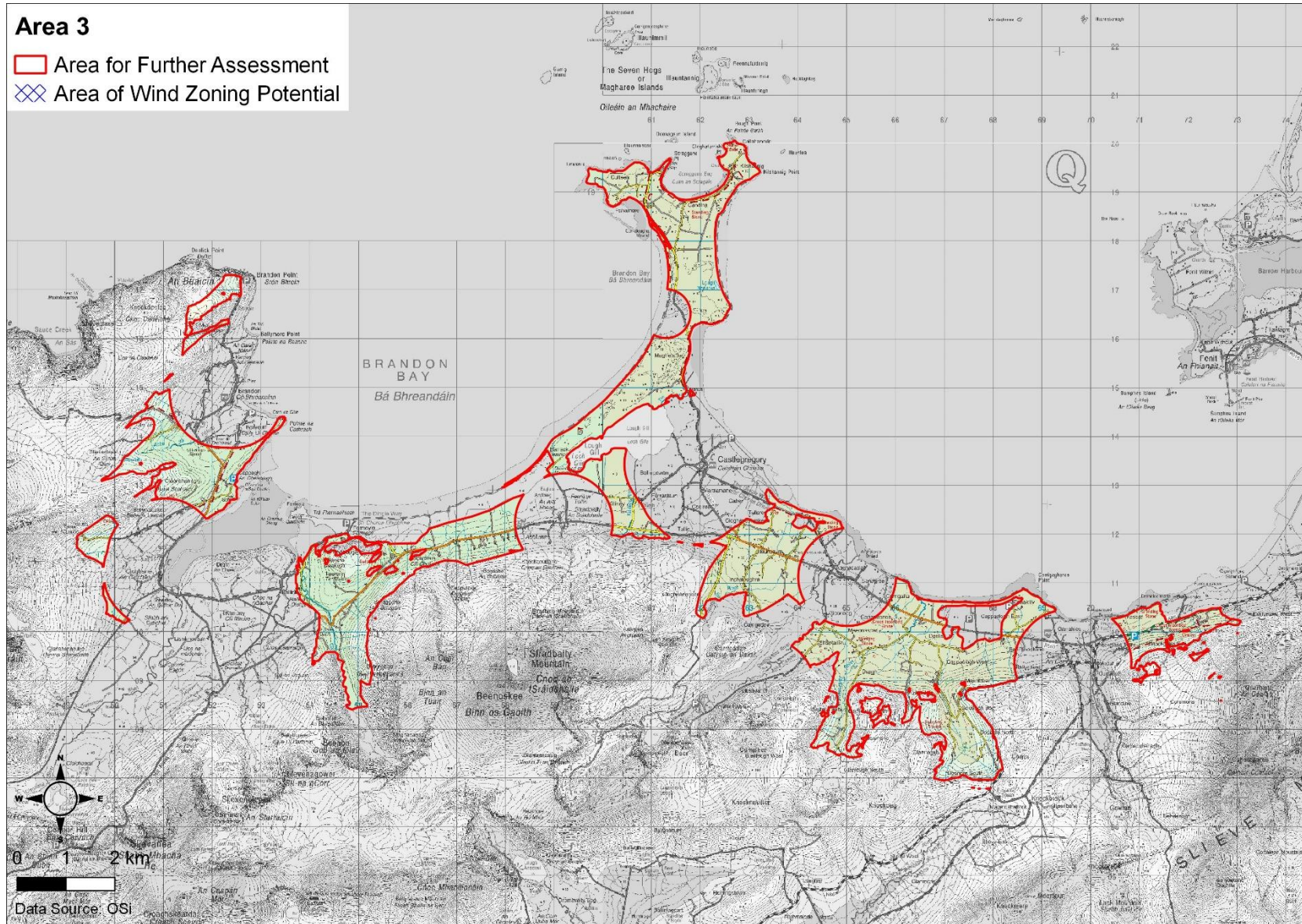
This landscape would be sensitive to wind energy development.



Landscapes in Area 3







Map 6.31: Area 3 for Further Assessment



Area 4

Size of Area

This area is made up of a narrow area, measuring a total of 26.1km².

Infrastructure

This area is located on the Dingle Peninsula and is not served by the existing 110/220kv transmission network. The eastern side of the area would be approx. 7km from the Oughtragh substation on the 110kv transmission network.

Population

A high level of residential development is found in the area, a density of 17 houses per km².

Landscape Sensitivity

This area is located between Inch and Castlemaine on the southern side of the Dingle Peninsula, between the Slieve Mish Mountains and Castlemaine Harbour.

This area is the lower slopes of the Slieve Mish Mountains, which slope down to the coast.

There are views & prospects in the Kerry County Development Plan from the R561 in this direction, and from the R561 on the other side of the Harbour in this direction.

It is a coastal and mountainous landscape, within which wind turbines would be difficult to integrate.

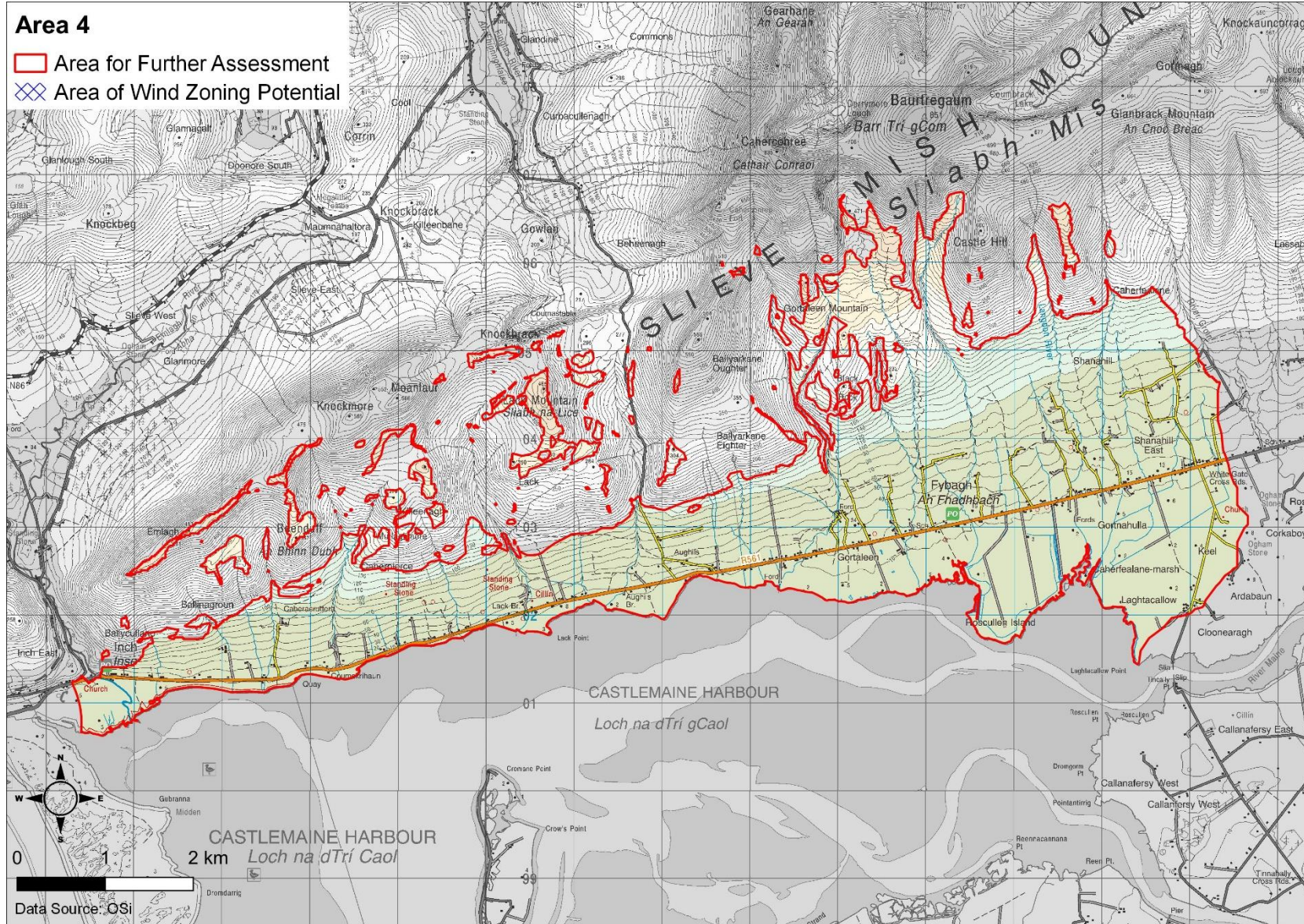
Conclusion

This landscape would be sensitive to wind energy development.



Landscape in Area 4





Map 6.32: Area 4 for Further Assessment



Area 5

Size of Area

This area is made up of a number of parts of varying size, measuring a total of 61.1km². The size of some of these parts would be impractical in terms of zoning.

Infrastructure

This area is close to Killorglin where there is a 110kv substation at Oughtragh.

Population

A high level of residential development is found in the area, a density of 24 houses per km².

Landscape Sensitivity

This area is located to the west and south of Killorglin. The western part borders Castlemaine Harbour and the southern part is located on the lower slopes of MacGillycuddy's Reeks. The central part of the area would be in close proximity to the scenic Caragh Lake. The eastern part of the area would be along the River Laune.

There would be extensive views of this area from the north and from across Castlemaine Harbour.

There are views & prospects in the Kerry County Development Plan from the N70 and from the N72. The N70 is part of the Ring of Kerry and Wild Atlantic Way.

This area has various scenic qualities, with coastal, lake and mountainous areas. Wind turbines in this area would detract from the quality of this landscape.

Conclusion

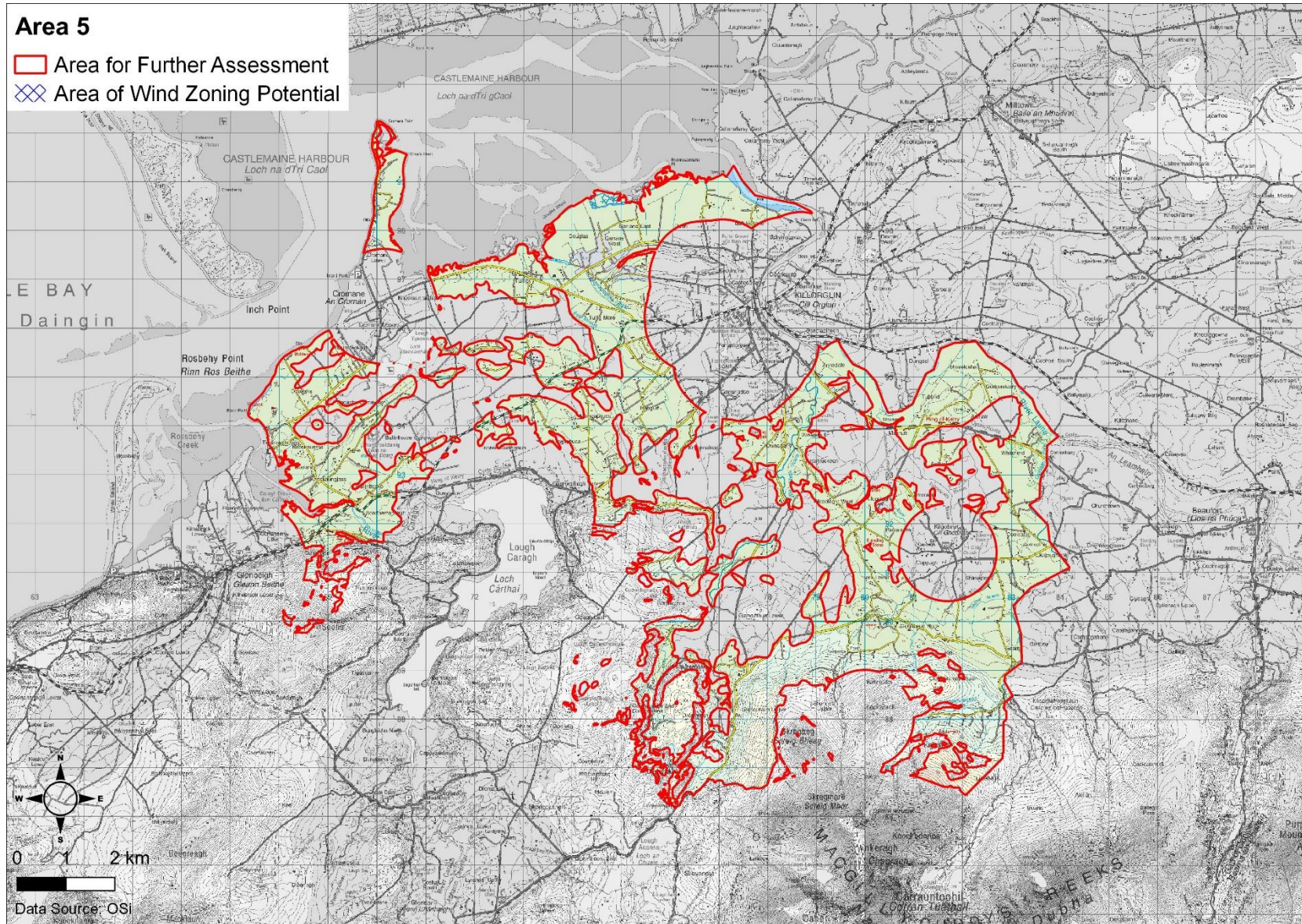
This landscape would be sensitive to wind energy development.



Landscapes in Area 5







Map 6.33: Area 5 for Further Assessment



Area 6

Size of Area

This area is made up of a number of parts of varying size, measuring a total of 13.7km². The size of some of these parts would be impractical in terms of zoning.

Infrastructure

This area is located on the Iveragh Peninsula and is not served by the existing 110/220kv transmission network.

Population

A high level of residential development is found in the area, a density of 21 houses per km².

Landscape Sensitivity

This area is located on both sides of the N70 between Glenbeigh and Mountain Stage, extending southwards to areas in the vicinity of Coomasharn Lake. The northern part of the area is close to Rossbeigh Beach. The area is enclosed by mountains.

There are views from the N70 up the valley towards Coomasaharn Lake, with views & prospects on the N70 in the Kerry County Development Plan, and also from the N70 towards Dingle Bay. This road also forms part of the Ring of Kerry and Wild Atlantic Way.

This is a scenic mountainous area of limited size, within which it would be difficult to integrate wind turbines.

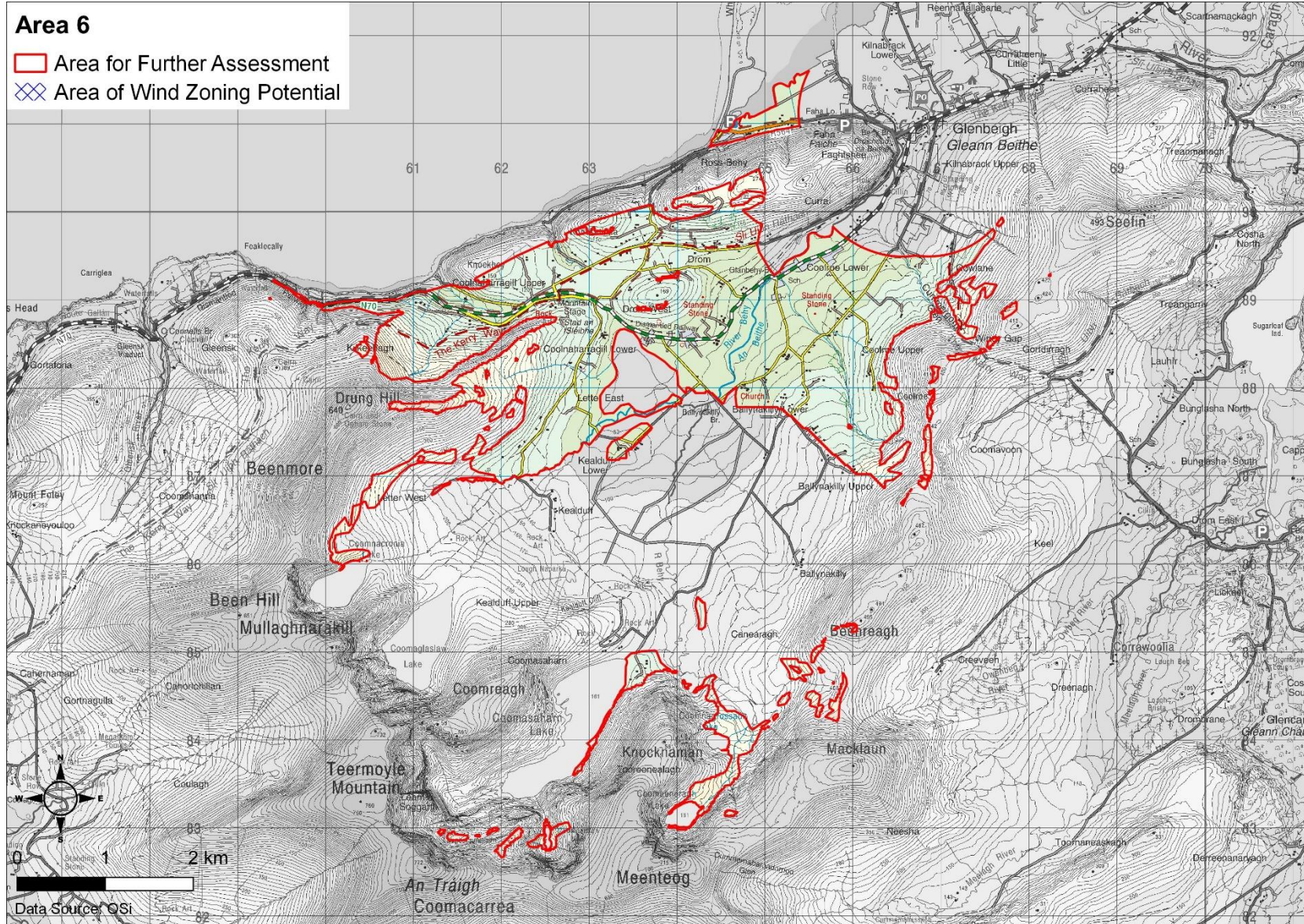
Conclusion

This landscape would be sensitive to wind energy development.



Landscapes in Area 6







Area 7

Size of Area

This area is made up of a number of small parts of varying size, measuring a total of 3.5km². The size of these parts would be impractical in terms of zoning.

Infrastructure

This area is located on the Iveragh Peninsula and is not served by the existing 110/220kv transmission network.

Population

Housing density is 15 houses per km².

Landscape Sensitivity

This area is located around Kells, on the slopes of mountains that border the southern coast of Dingle Bay.

The eastern part of the area includes the Gleensk Viaduct.

There are views & prospects in the Kerry County Development Plan from the N70. The N70 forms part of the Ring of Kerry and the Wild Atlantic Way.

This is a highly scenic coastal landscape, with recognised views across Dingle Bay. Wind turbines in this area would affect its scenic qualities.

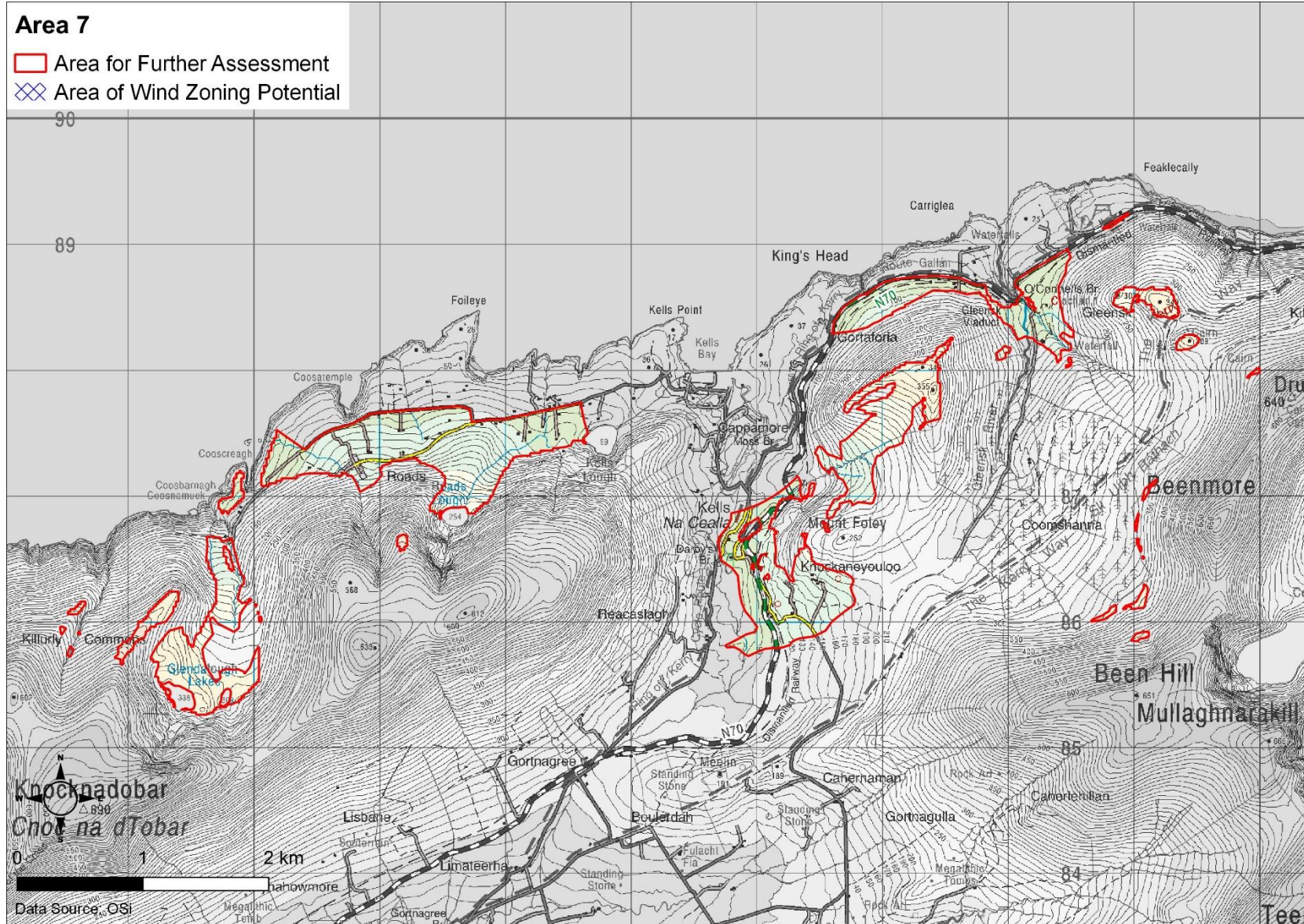
Conclusion

This landscape would be sensitive to wind energy development.



Landscape in Area 7





Map 6.35: Area 7 for Further Assessment



Area 8

Size of Area

This area is made up of a number of parts of varying size, measuring a total of 67.7km². The size of some of these parts would be impractical in terms of zoning.

Infrastructure

It is close to the existing Knockaneden Wind Farm which is served by the 38kv transmission network. The Iveragh Peninsula is not served by the 110/220kv transmission network.

Population

Housing density is lower in this area relative to other areas, at a density of 12 houses per km².

Landscape Sensitivity

This area surrounds the town of Cahersiveen, on the slopes of Cnoc na dTobar to the north, and around Benteen to the south.

The area borders the existing Knockaneden Wind Farm (4 x 105m turbines).

This is considered to be a scenic landscape surrounded by high mountains.

There are views & prospects in the Kerry County Development Plan from the N70. The N70 forms part of the Ring of Kerry and the Wild Atlantic Way.

Development of wind turbines in this area would affect the naturalness of this scenic area. There are important views of Valentia Island from the area.

Conclusion

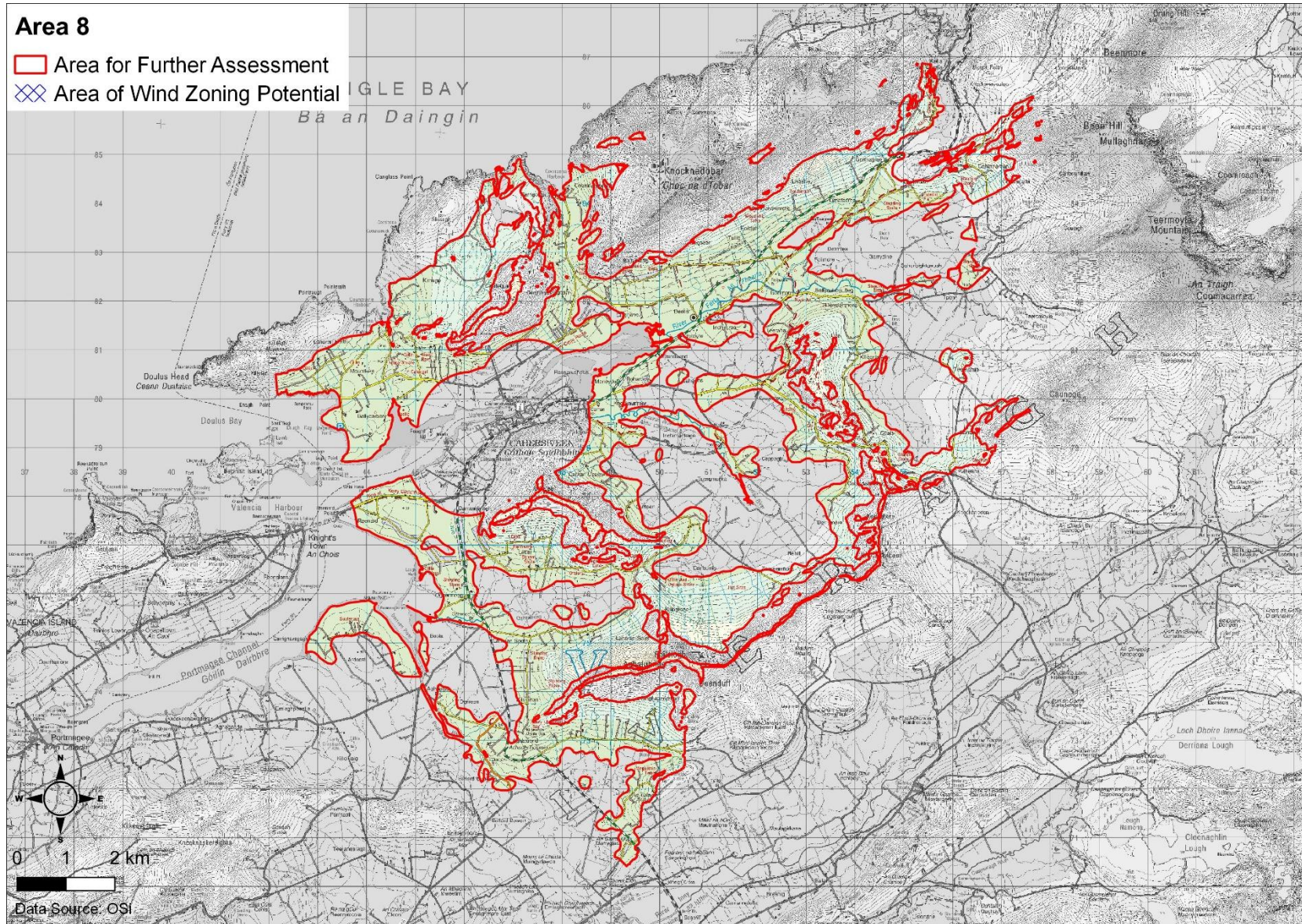
This landscape would be sensitive to wind energy development.



Landscapes in Area 8







Map 6.36: Area 8 for Further Assessment



Area 9

Size of Area

This area is made up of a number of small parts, measuring a total of 46.0km². The size of some of these areas would be impractical in terms of zoning.

Infrastructure

This area is located on the Iveragh Peninsula and is not served by the existing 110/220kv transmission network.

Population

Housing density is lower in this area relative to other areas, at a density of 13 houses per km².

Landscape Sensitivity

This area is located on Valentia Island, and in the scenic valleys between Portmagee and Baile an Sceilg.

This is a scenic coastal landscape, with views across Saint Finan's Bay towards the Skelligs, and across Ballinskellig's Bay.

There are views & prospects in the Kerry County Development Plan along extensive stretches of the roads along the coast. The Wild Atlantic Way is found on Valentia Island and follows the coast in this area. There are a number of Discovery Points on the Wild Atlantic Way in the area.

Due to the scenic coastal nature of this landscape, wind turbines would be difficult to integrate.

Conclusion

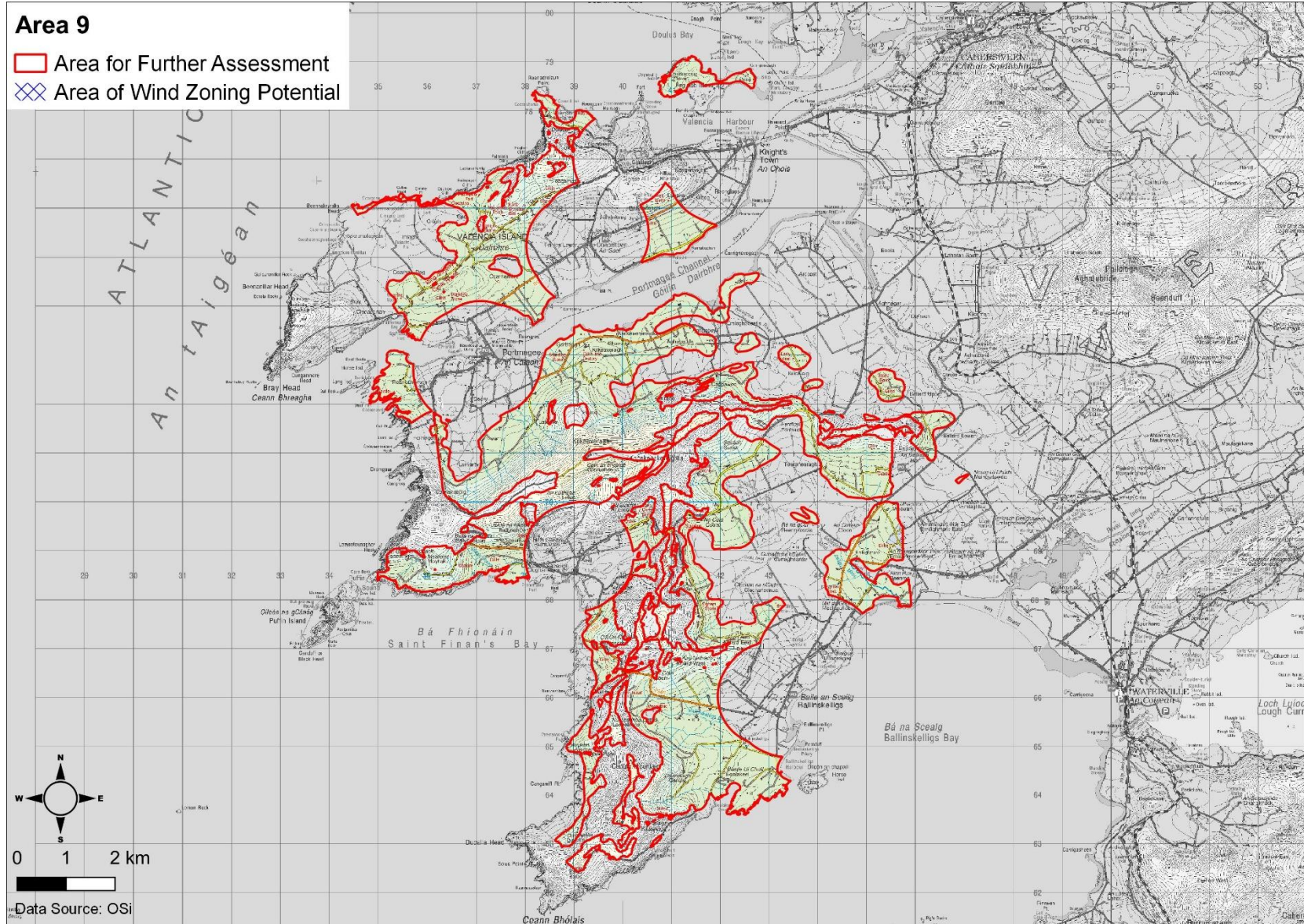
This landscape would be sensitive to wind energy development.



Landscapes in Area 9







Map 6.37: Area 9 for Further Assessment



Area 10

Size of Area

This area is made up of a number of small parts, measuring a total of 50.7km². The size of some of these areas would be impractical in terms of zoning.

Infrastructure

This area is located on the Iveragh Peninsula and is not served by the existing 110/220kv transmission network.

Population

Housing density is 14 houses per km².

Landscape Sensitivity

This area is located on the eastern side of Lough Currane, and on along the coastline between Waterville and Sneem. The area in general borders the coast.

Lough Currane is a renowned fishing lake.

Derrynane House is located in the area. The area around Derrynane, together with Derrynane House, make up Derrynane National Historic Park.

There are views & prospects in the Kerry County Development Plan from the N70. The Wild Atlantic Way driving route and Ring of Kerry pass through the area. Discovery Points on the Wild Atlantic Way are found in this area.

This is a very scenic part of the county's coastline where it would be difficult to integrate wind turbines.

Conclusion

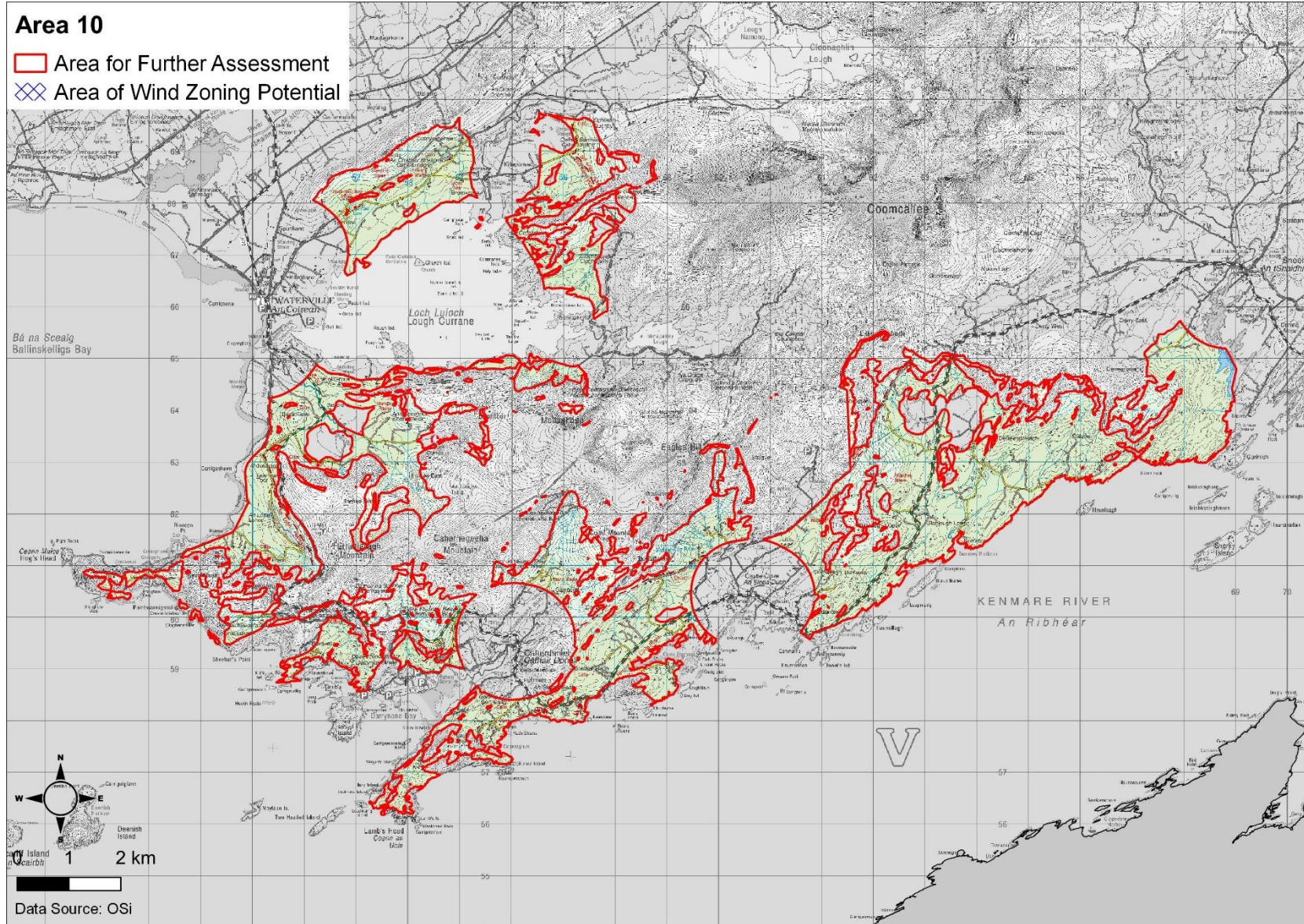
This landscape would be sensitive to wind energy development.



Landscapes in Area 10







Map 6.38: Area 10 for Further Assessment



Area 11

Size of Area

This area measures 23.5km², with a number of smaller parts. The size of some parts would be impractical in terms of zoning.

Infrastructure

This area is located on the Iveragh Peninsula and is not served by the existing 110/220kv transmission network.

Population

Housing density is low in this area relative to other areas, a density of 11 houses per km².

Landscape Sensitivity

This area is located between Sneem and Blackwater on both sides of the N70 which passes through the area and is bordered on its northern side by the R568.

This is a remote landscape with many natural elements.

There are views & prospects in the Kerry County Development Plan from the R568 in both directions and on the N70. The R568 road between Sneem and Molls Gap is an important tourist route linking Sneem to Molls Gap. The N70 forms part of the Ring of Kerry and Wild Atlantic Way.

Due to the scenic coastal nature of this area, it would be difficult to integrate wind turbines.

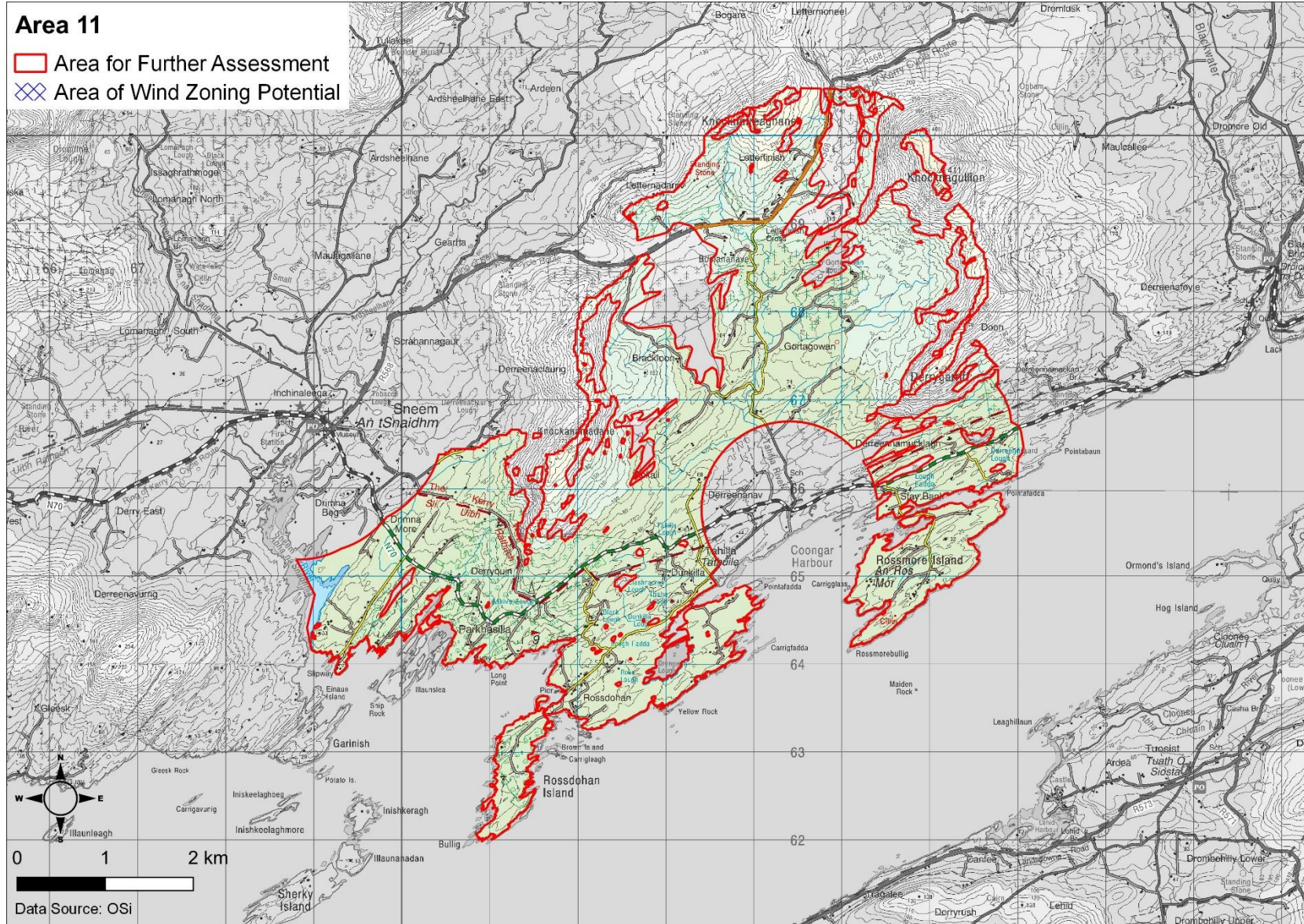
Conclusion

This landscape would be sensitive to wind energy development.



Landscape in Area 11





Map 6.39: Area 11 for Further Assessment



Area 12

Size of Area

This area measures a total of 34.8km².

Infrastructure

This area is located on the Iveragh Peninsula and is not served by the existing 110/220kv transmission network.

Population

Housing density is low in this area relative to other areas, a density of 12 houses per km².

Landscape Sensitivity

The area is located between Blackwater and Kenmare, extending north towards Molls Gap.

It is located on the northern side of the N70 Ring of Kerry and it is located on both sides of the N71, the Kenmare to Molls Gap/Killarney Road, one of the most important tourist routes in the country. Wind energy development would affect views towards Molls Gap and from Molls Gap towards Kenmare.

Mountains on the northern side, Peakeen Mountain (555m), do provide height from which to measure scale. Area is enclosed by high ground surrounding Kenmare Bay. Higher ground and the bay provide a scenic setting for Kenmare.

There are views & prospects in the Kerry County Development Plan from the, N70, N71 and R568. The N71 also forms part of the Wild Atlantic Way.

Due to the scenic nature of this landscape, with many natural features, it would be difficult to integrate wind turbines.

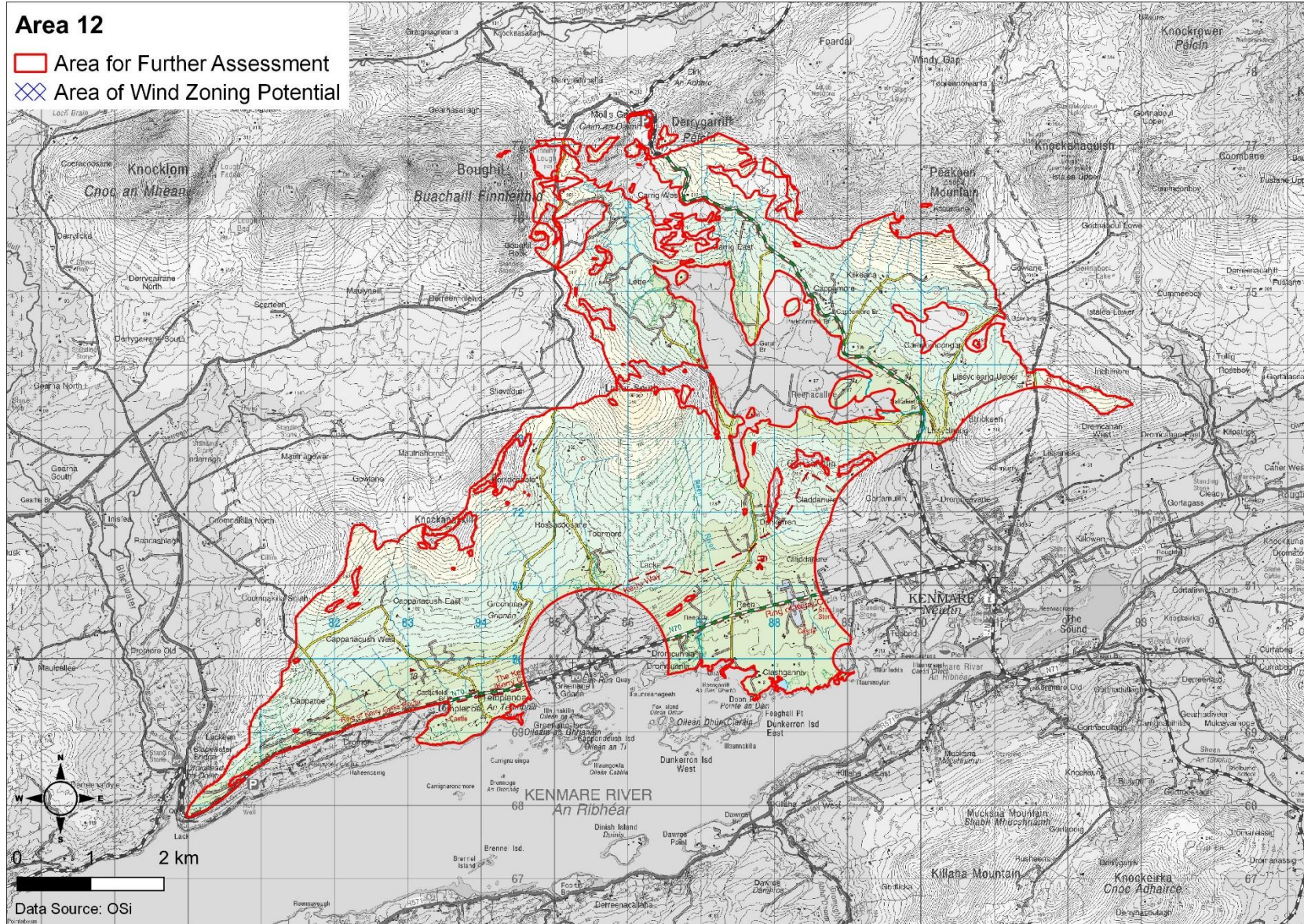
Conclusion

This landscape would be sensitive to wind energy development.



Landscapes in Area 12





Map 6.40: Area 12 for Further Assessment



Area 13

Size of Area

This area measures 56.7km².

Infrastructure

Parts of the area are located on the Beara Peninsula and is not served by the existing 110/220kv transmission network. Kenmare is not served by the 110kv transmission network.

Population

Housing density is low in this area relative to other areas, a density of 10 houses per km².

Landscape Sensitivity

This area is located to the east and south of Kenmare. It is an elevated area on its northern and southern sides that has many natural features. With the lower part of the area a farming landscape along the Roughty River to the east of Kenmare and along the Sheen River to the south of Kenmare.

Mountains on the northern side, and mountains of similar height on the southern side, do provide height from which to measure scale, but this scale is also affected by the proximity of the bay and the town of Kenmare.

There are views to and from the mountains with Kenmare Bay being the main focus for views from the higher ground. There are views from the R569 towards the mountains on both sides of the Roughty River Valley. The N70 and the R571 are part of the Wild Atlantic Way.

The Roughty and Slaheny valleys are scenic in nature, as is the area along Kenmare Bay. It would be difficult to integrate wind turbines into this area.

Conclusion

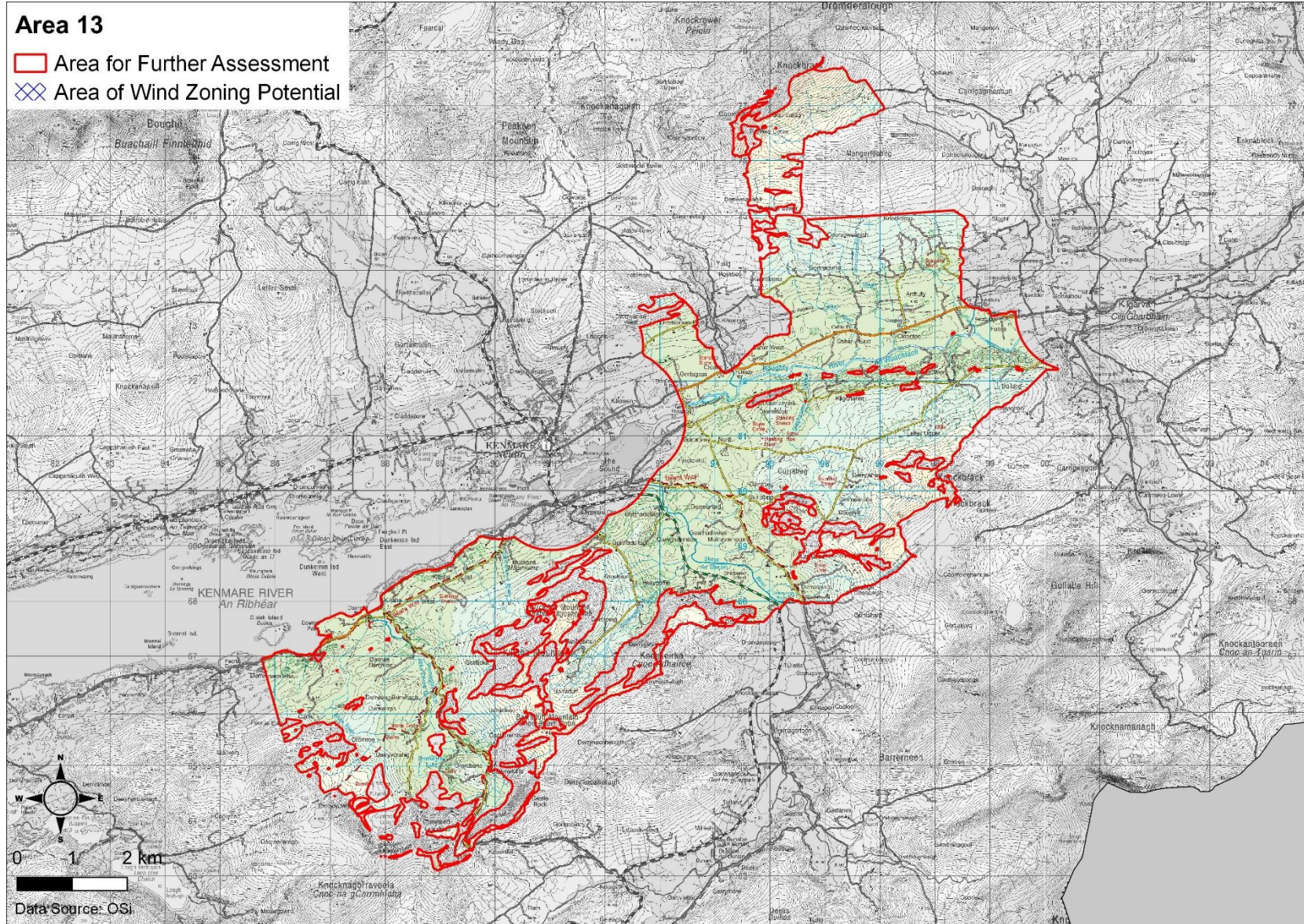
This landscape would be sensitive to wind energy development.



Landscapes in Area 13







Map 6.41: Area 13 for Further Assessment



Area 14

Size of Area

This area is made up of a number of parts, measuring a total of 19.5km². The size of some of these parts would be impractical in terms of zoning.

Infrastructure

This area is located on the Beara Peninsula and is not served by the existing 110/220kv transmission network.

Population

Housing density is low in this area relative to other areas, a density of 7 houses per km².

Landscape Sensitivity

This area is located to the west of Kenmare, bordering Kenmare Bay and on the sides of Gleninchaquin.

This is a very scenic landscape with many natural features. The area includes parts on the slopes of Gleninchaquin which has a park with a number of marked walks and a waterfall. Mountains such as Coomnadiha (644m) provide a measure of height. A high ridge of mountains encloses this glacial valley with a number of lakes.

There are views & prospects in the Kerry County Development Plan from the R571 into the valley. The R571 which follows the coast is part of the Wild Atlantic Way.

Due to the coastal and mountainous nature of this scenic area, it would be difficult to integrate wind turbines.

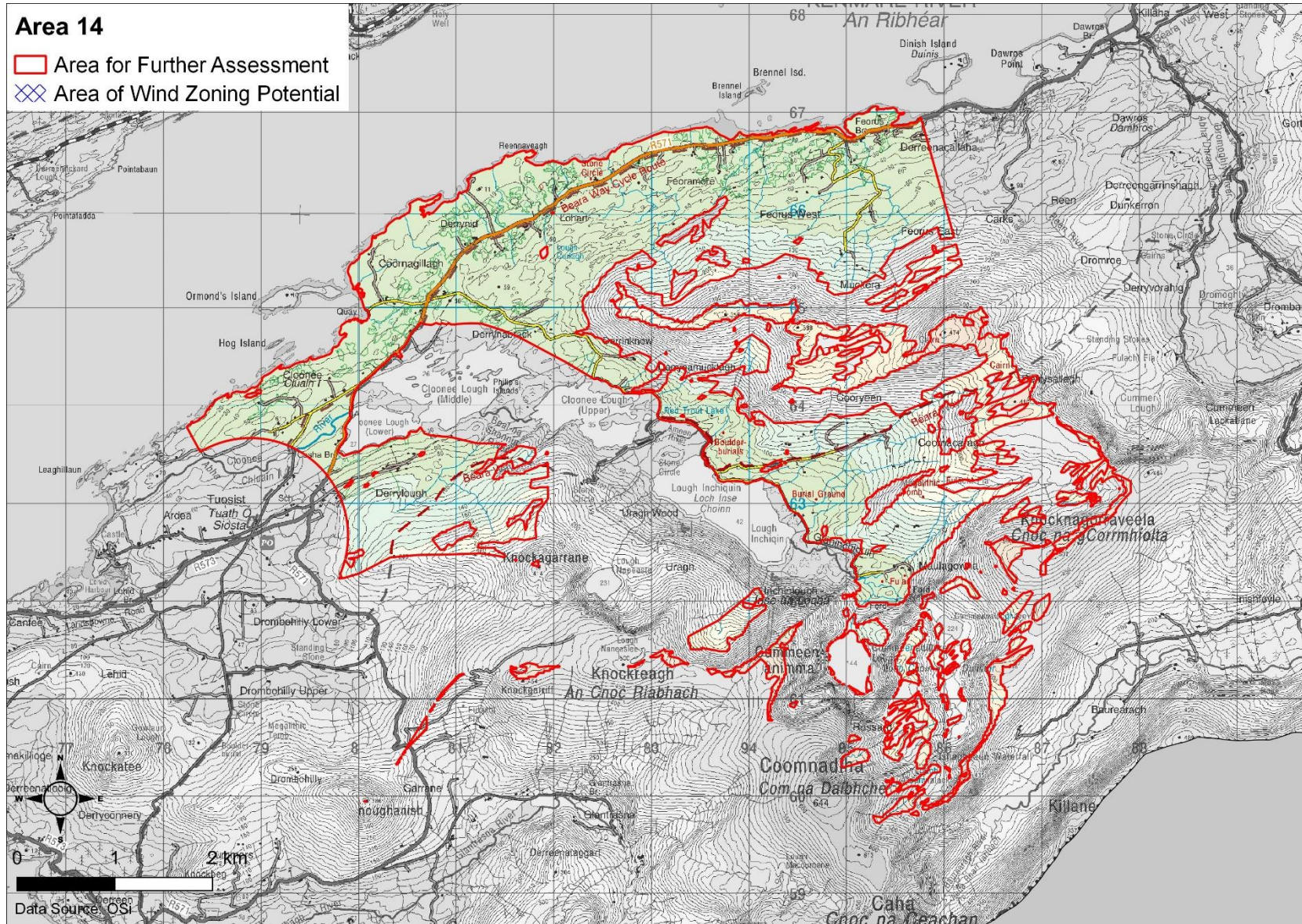
Conclusion

This landscape would be sensitive to wind energy development.



Landscape in Area 14





Map 6.42: Area 14 for Further Assessment



Area 15

Size of Area

This area is made up of a number of parts, measuring a total of 22.1km². The size of the smaller parts of this area would be impractical in terms of zoning.

Infrastructure

This area is located on the Beara Peninsula and is not served by the existing 110/220kv transmission network.

Population

Housing density is low in this area relative to other areas, a density of 10 houses per km².

Landscape Sensitivity

This area is located around Lauragh, with the northern part bordering Kilmakilloge Harbour and Kenmare Bay. The southern part is located around Glanmore Lake.

A high ridge of mountains encloses this glacial valley which contains Glanmore Lake. This is a very scenic landscape with many natural features which contributes to the setting of Kenmare Bay. The area borders the scenic Glanmore Lake which is located underneath the Healy Pass Road.

The northern part borders Kenmare Bay which is a scenic coastal landscape.

There are views & prospects in the Kerry County Development Plan on the Healy Pass Road (R574) in this direction. The R571 which follows the coast is part of the Wild Atlantic Way.

Due to the scenic nature of this area, it would be difficult to integrate wind turbines.

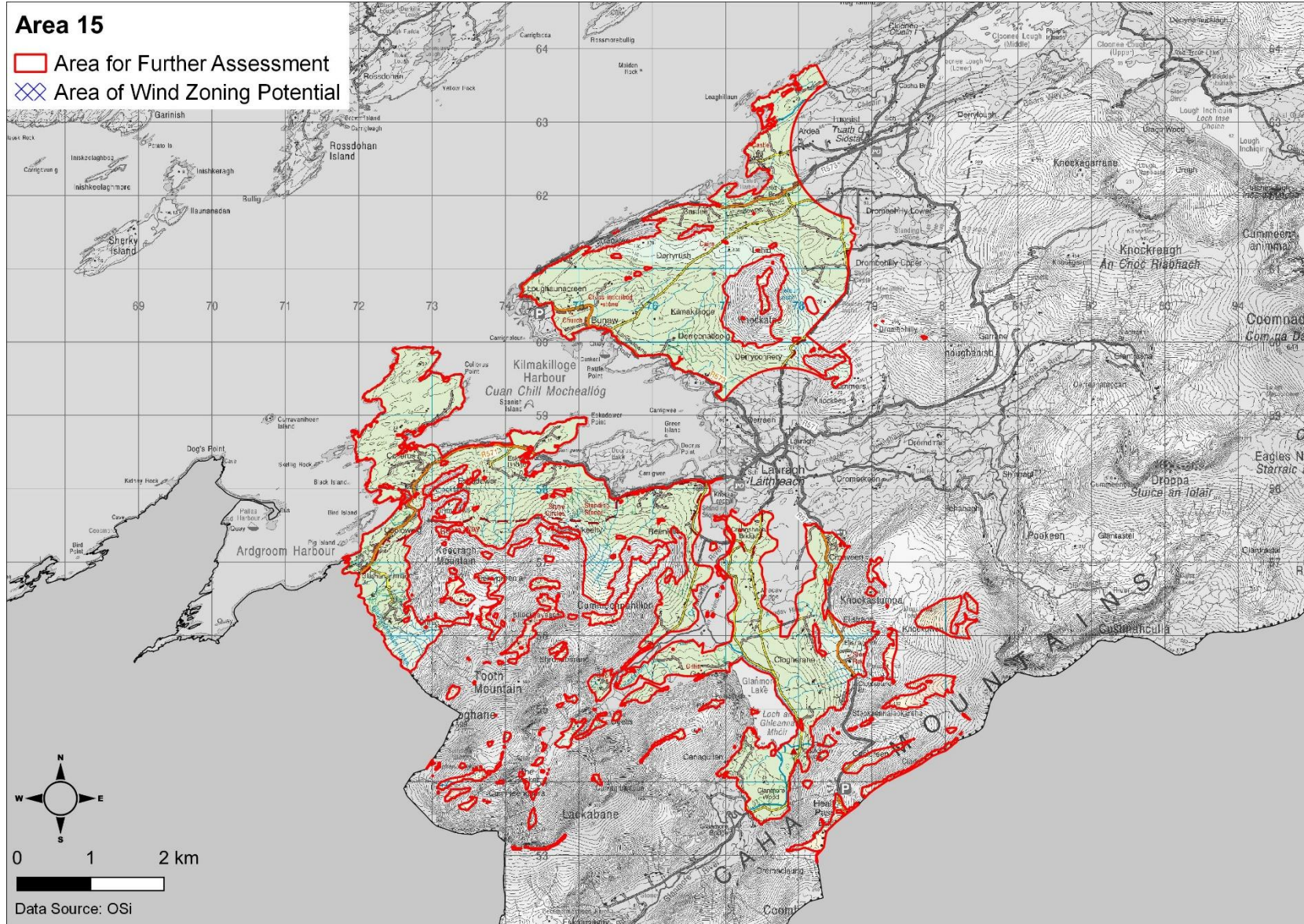
Conclusion

This landscape would be sensitive to wind energy development.



Landscapes in Area 15





Map 6.43: Area 15 for Further Assessment



Area 16

Size of Area

The parts of this area are all small in size, measuring a total 0.1km², but they are adjacent to an existing windfarm so potentially could facilitate an extension of this wind farms on lands that would not be subject to constraints.

Infrastructure

Served by an existing substation, Glanlee, which is part of the 110kv transmission network.

Population

There is no housing in the vicinity of this area.

Landscape Sensitivity

This area is located in an elevated area east of Kilgarvan. This is an elevated landscape that has many natural features. This naturalness has been lessened with the construction of wind farms and with the planting of forestry.

There are a significant number of wind turbines in this area, but the size of this area would only allow for a very limited increase to this number.

Views & prospects in the Kerry County Development Plan are found on the R569 in this direction.

As the area contains existing wind farms, this area which is on the eastern side of existing wind energy development could accommodate some additional development.

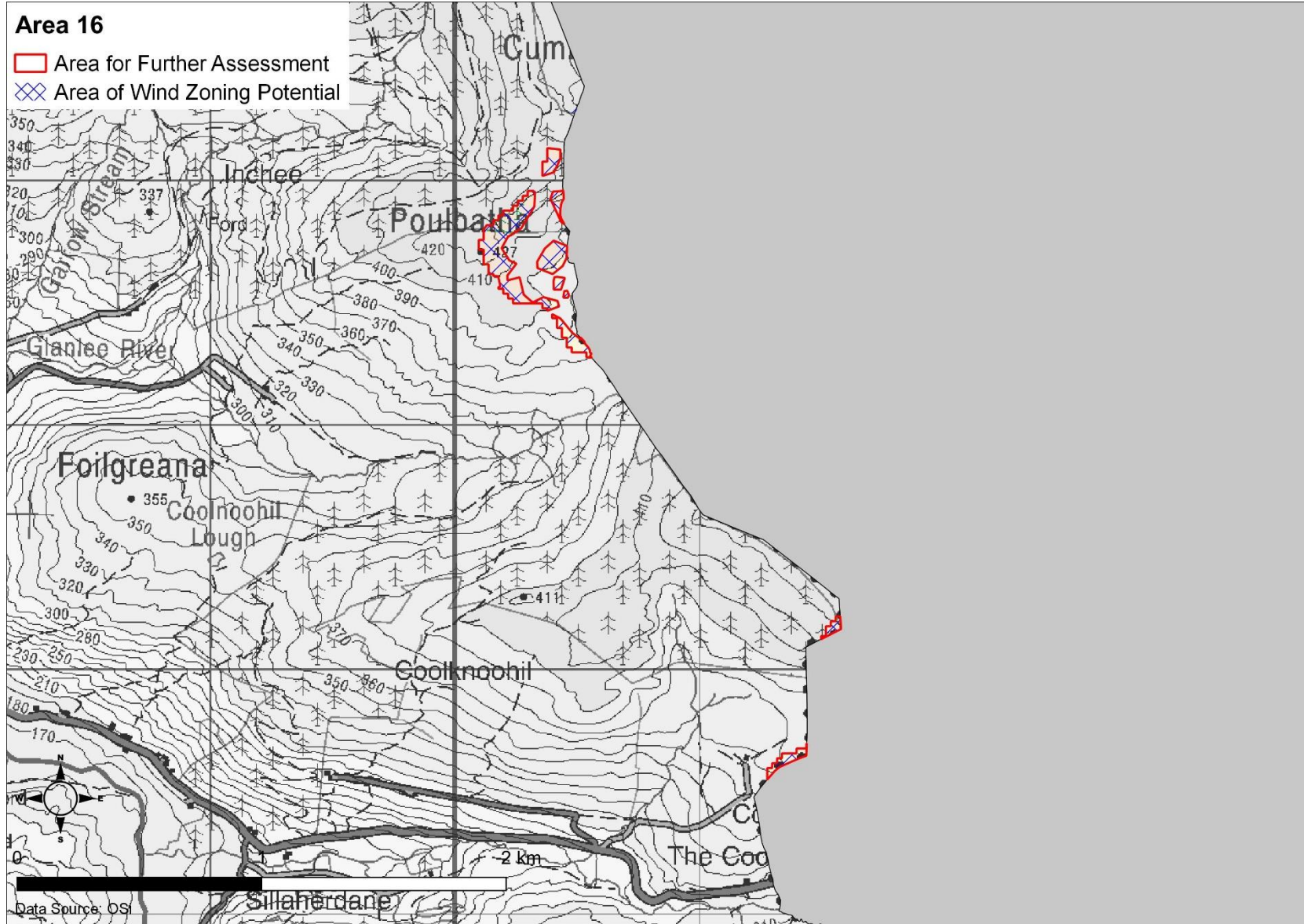
Conclusion

This area is considered to have potential for wind energy development.



Landscape in Area 16





Map 6.44: Area 16 for Further Assessment



Area 17

Size of Area

Is small relative to some of the other areas, 6.7km², but would be of sufficient size to be considered for wind energy zoning.

Infrastructure

The 110kv transmission network is approx. 5km from the area.

Population

Housing density is 17 houses per km².

Landscape Sensitivity

This area is located between Barraduff and Rathmore with the N72 Killarney/Mallow Road dissecting the area along with the rail line.

This area has a number of river valleys.

Due to the level of human intervention, housing, and forestry, this area's perception has been lowered. The Paps Mountains to the south are visible from large parts of the area. The Paps which are a dramatic landscape feature have cultural associations. The protection of this landscape is therefore required due to the proximity of the area to The Paps.

There are views & prospects from the R570 in the Kerry County Development Plan in this direction.

Due to the setting that this area provides to the Paps mountains, it would be difficult to integrate wind turbines.

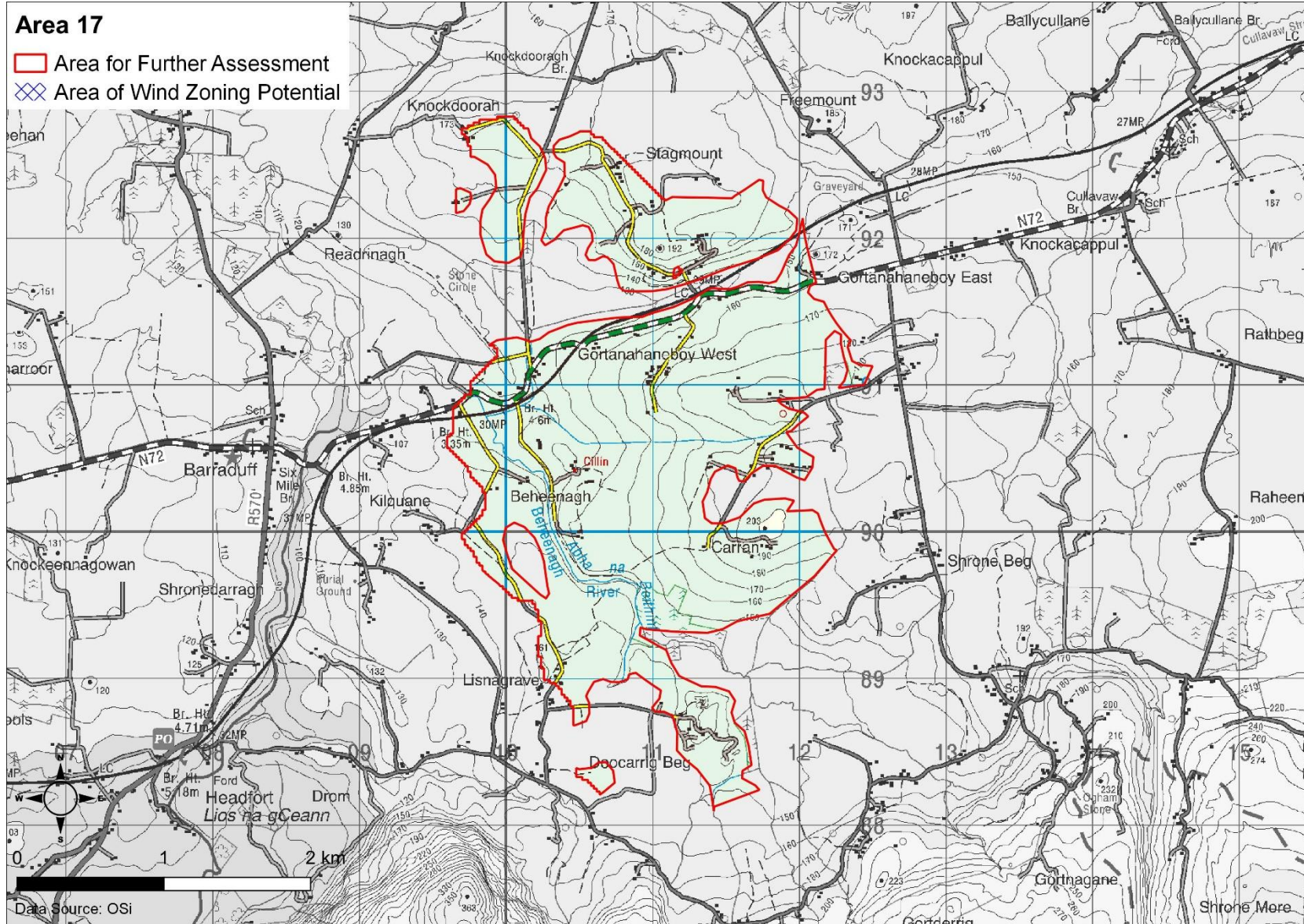
Conclusion

This landscape would be sensitive to wind energy development.



Landscape in Area 17





Map 6.45: Area 17 for Further Assessment



Area 18

Size of Area

Is of sufficient size, 21.3km² to be considered for wind energy zoning.

Infrastructure

The 220kv transmission line is adjacent to the area and a 110kv transmission line can be found to the east. Ballynahulla substation is approx. 5km east of the area.

Population

Housing density is 11 houses per km², this would be low relative to other areas.

Landscape Sensitivity

This area is located to the east and south of Scartaglin. The steeply sided river valleys create a sense of scale combined with the more elevated parts of the area. The ridges that dissect the river valleys separate the various parts of the area.

To the east of this area is a windfarm of 12 turbines (+1 not constructed).

This is a remote area, more so to the east, characterised by farming in the southern part of the area and by coniferous forestry plantations in the east.

The changes in elevation across the area this leads to the creation of views.

There is an existing wind farm in the eastern part of this area, with this part of the area having the capacity to accommodate further wind turbines. The western part of the area is more open where it would be harder to integrate wind turbines.

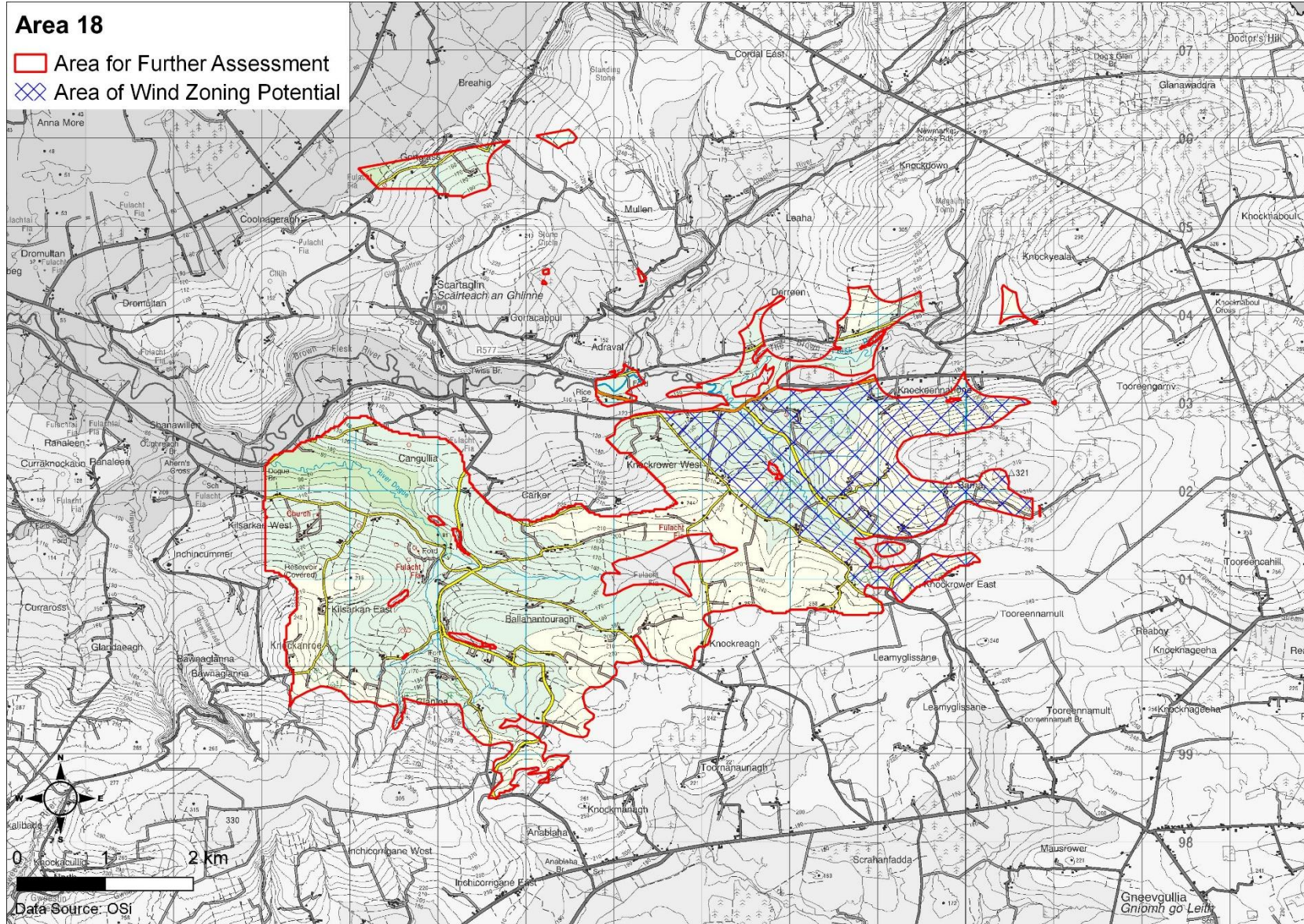
Conclusion

This landscape in the western part of the area would be sensitive to wind energy development with the landscape in the eastern part of the area having potential for wind energy development.



Landscapes in Area 18





Map 6.46: Area 18 for Further Assessment



Area 19

Size of Area

Is of sufficient size to be considered for wind energy zoning, 157.4km².

Infrastructure

The 110kv transmission network passes through the area with substations at Oughtragh and Knockearagh.

Population

Housing density is 17 houses per km².

Landscape Sensitivity

The western part of the area provides a setting for MacGillycuddy's Reeks. The Reeks on the southern side of the area provide scale to what is a large area. The eastern part of the area is elevated but to a lesser extent. The central part of the area contains a low undulating landscape as there are a number of river valleys and small hills in the area. The area also extends to the start of Castlemaine Harbour between Killorglin and Milltown.

As the area is large and mostly flat, it results in the landscape having a greater ability to relate to larger turbines.

The Reeks give the area a dramatic backdrop. The area is a farming landscape interspersed with housing, it therefore shows signs of human modification.

There are views from the N72 and N22 southwards to the Reeks, with views of the Reeks from large parts of the area.

There are views & prospects in the Kerry County Development Plan from the N72 in a southerly direction across the River Laune to MacGillycuddy's Reeks, with views & prospects also found on the N22, and on the N70 outside Killorglin in this direction. The R561 from Inch to Castlemaine and the N70 also forms part of the Wild Atlantic Way.

The southern part of the area provides a setting for MacGillycuddy's Reeks and Killarney where it would be difficult to integrate wind turbines. The undulating nature of the remainder of the nature, and areas close to the coastal, would also be areas where it would be difficult to accommodate wind energy development.

Conclusion

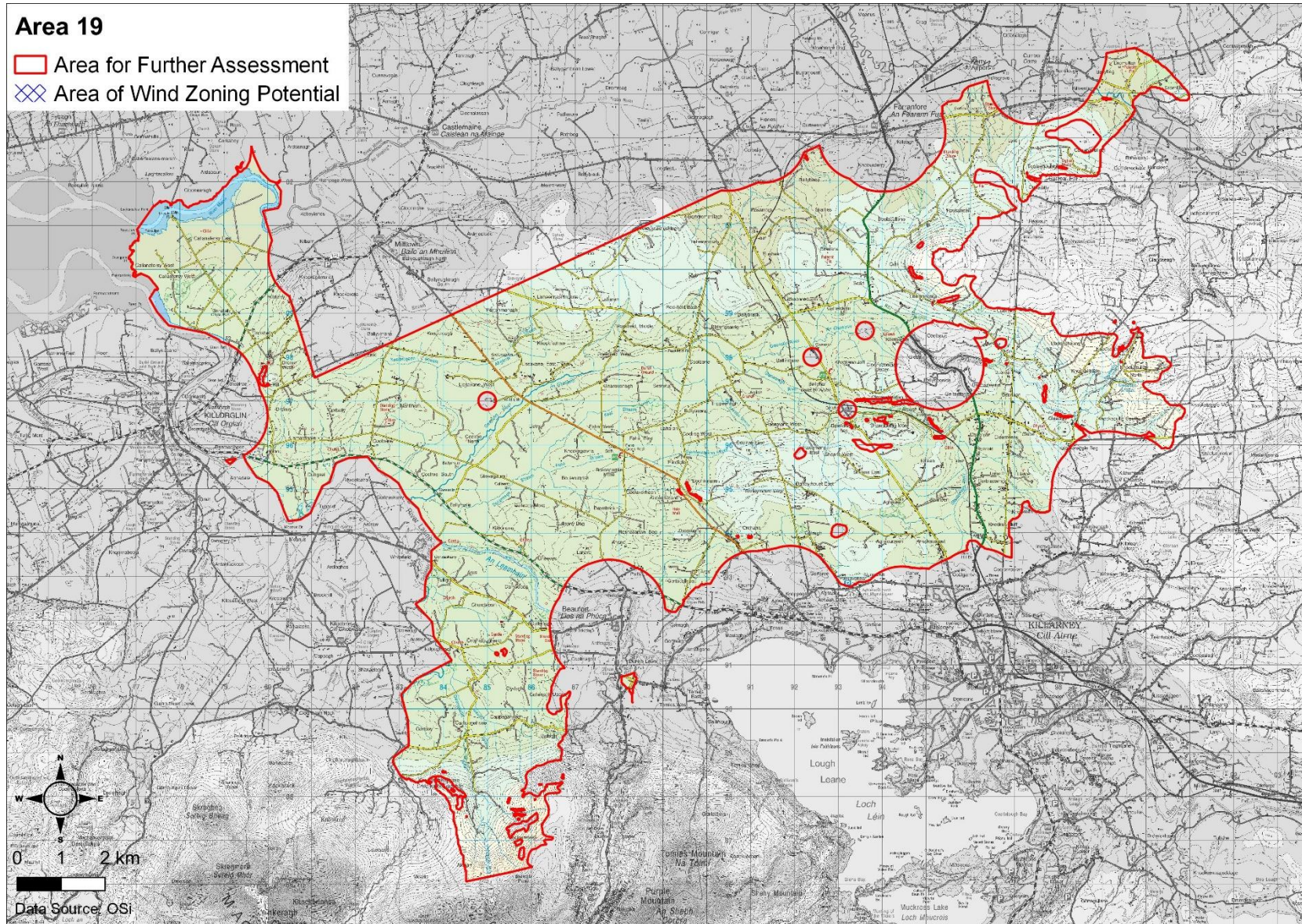
This landscape would be sensitive to wind energy development.



Landscapes in Area 19







Map 6.47: Area 19 for Further Assessment



Area 20

Size of Area

Is of sufficient size to be considered for zoning, 118.1km². Does contain some smaller parts, particularly in the area of the Slieve Mish Mountains.

Infrastructure

The 110kv transmission network is found in the area, with substations at Tralee, Reamore and Oughtragh.

Population

Housing density is 14 houses per km².

Landscape Sensitivity

This area is located between Tralee and Castleisland including an area between Farranfore and Castlemaine, and on the northern side of the Dingle Peninsula between Tralee and Camp. This area is surrounded by a ridge of hills to the north and west, with the area being in general the floor of very wide river valley. The landscape therefore is open as a result. As the area is large and mostly flat, it results in the landscape having a greater ability to relate to larger turbines. The area west of Tralee would be a coastal landscape on the slopes of the Slieve Mish Mountains.

The Slieve Mish Mountains are a distinctive landmark in close proximity to Tralee Bay.

This is a farming landscape which has been subject to long term modification. It is a settled landscape with Tralee to the west, and a number of other villages and towns in the area.

From the N70 there are views to the south as far as MacGillycuddy's Reeks and westwards to the sea. There are views of the Slieve Mish mountains from the Fieries-Castlemaine road (R561). The Wild Atlantic Way passes through Tralee and on to the Dingle Peninsula.

There are views & prospects in the Kerry County Development Plan on the N86 to the west of Tralee.

Having regard to the extent of completed and permitted developments to the north of this area in the Stack's Mountains, as per Step 3, it is considered that the northern part of this area has reached its capacity to absorb additional wind energy development.

Due to the setting that this area provides for Tralee and Tralee Bay, it would be difficult to integrate wind turbines.

Conclusion

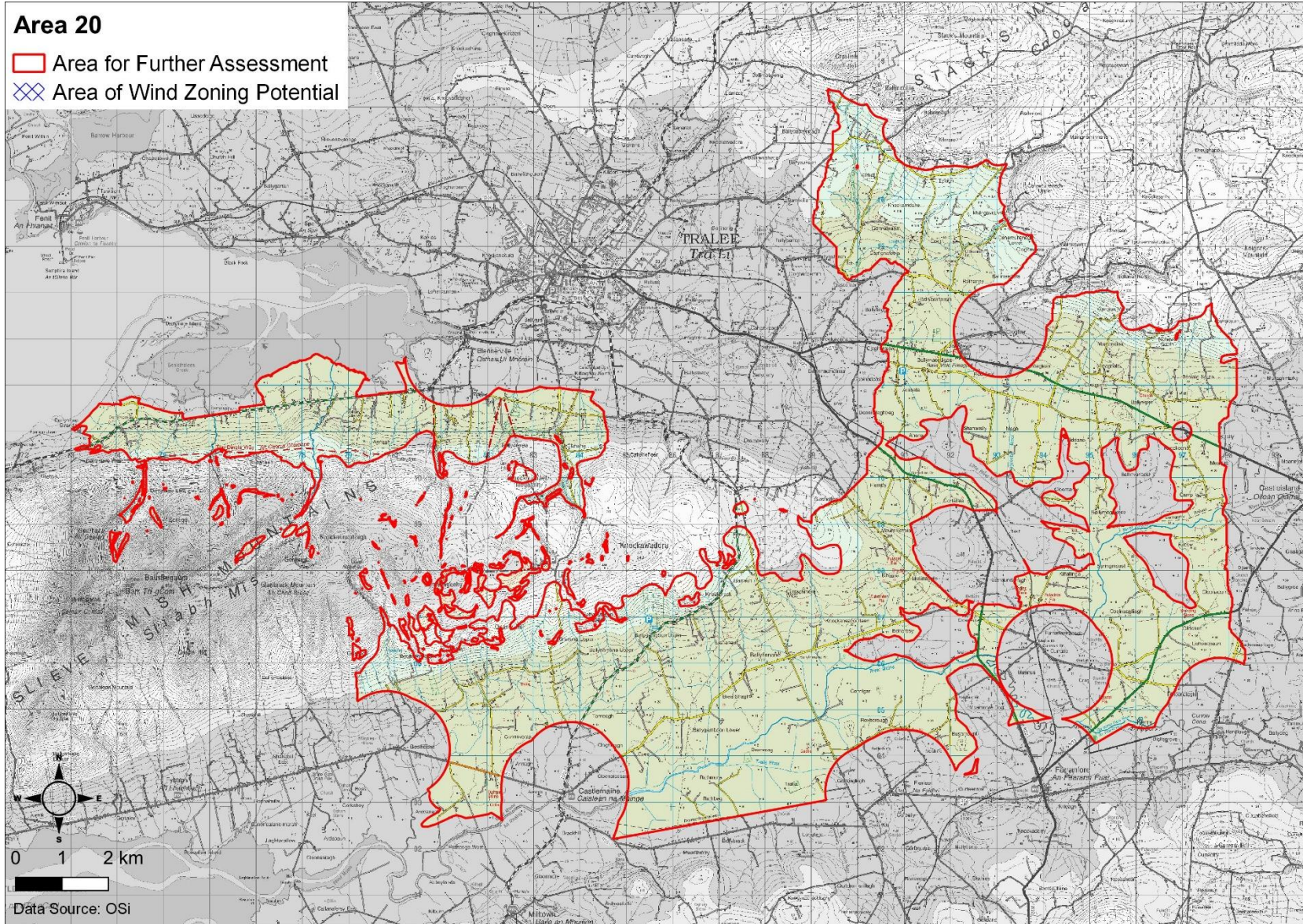
This landscape would be sensitive to wind energy development.



Landscapes in Area 20







Map 6.48: Area 20 for Further Assessment



Area 21

Size of Area

Relative to some areas it is small but could be considered for wind energy zoning, it measures 12.9km².

Infrastructure

The 220kv transmission line passes through the area.

Population

The town of Castleisland borders the western side of this area. Housing density is 14 houses per km².

Landscape Sensitivity

This area is surrounded by a ridge of hills, enclosing the Shanowen/Maine rivers to the east of Castleisland. This is a farming landscape which has been subject to long term modification.

Surrounding most of the area is high ground from which there are views down into the area and across it. Similarly, from the lower parts of the area there are views upwards.

Views & prospects in the Kerry County Development Plan are found at Mount Eagle in this direction.

Due to the setting that this area provides to Castleisland, and views afforded from the viewing point at Crag, it would be difficult to integrate wind turbines.

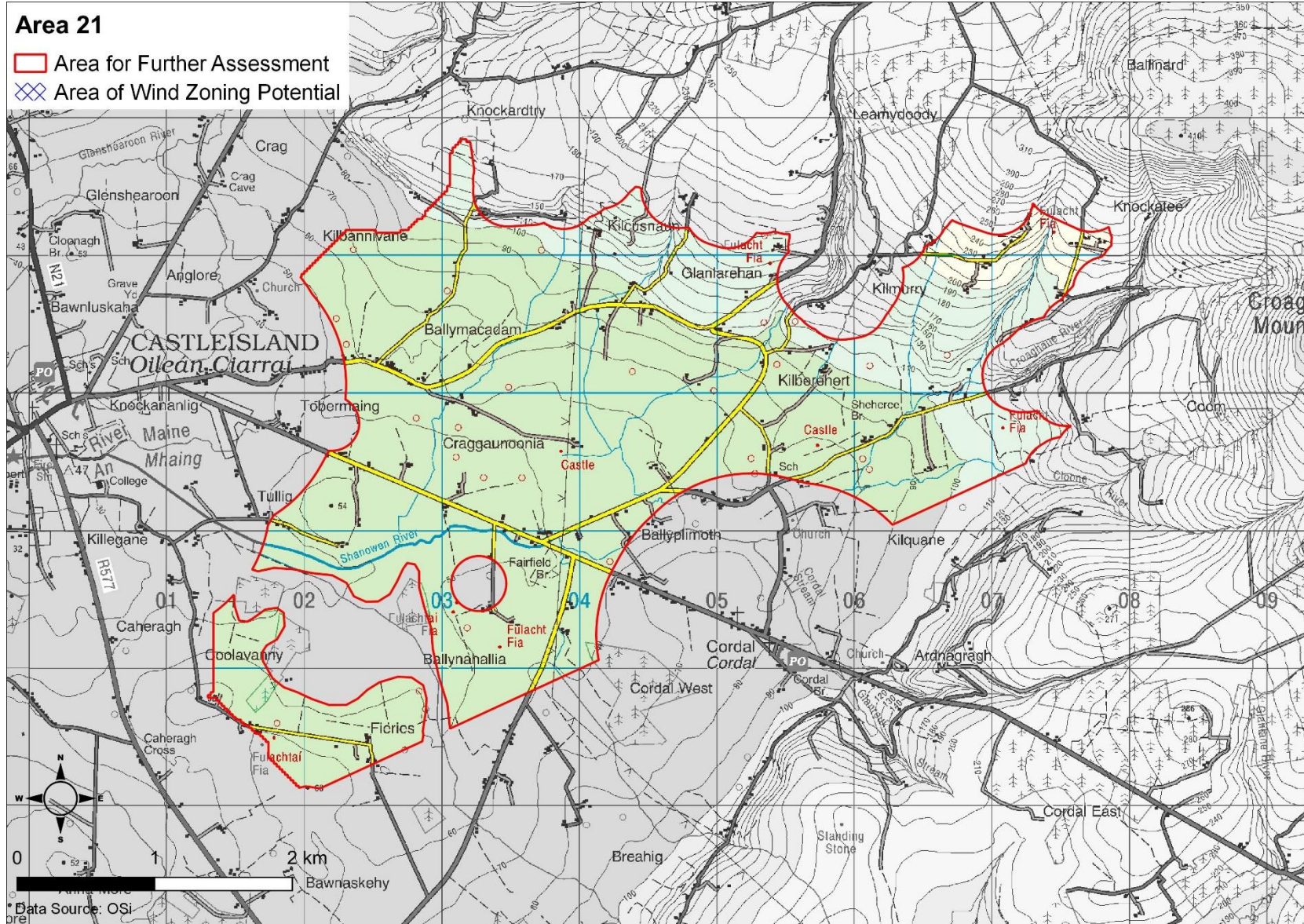
Conclusion

This landscape would be sensitive to wind energy development.



Landscape in Area 21







Area 22

Size of Area

Is of sufficient size to be considered for zoning, 79.0km². Does contain some smaller parts.

Infrastructure

The 110kv and 220kv transmission networks pass through the area with substations at Trien and Knockanure.

Population

Housing density is 11 houses per km².

Landscape Sensitivity

This area is located to the southeast of Listowel, between the Stack's Mountains and the border with Limerick.

The River Feale Valley is a distinctive landform and it would be a unique feature as there would not be a similar one elsewhere in the county. The river valleys in the area would create a sense of enclosure. The landscape is characterised by river valleys that are orientated north/south flowing in the direction of the River Feale. These valleys are separated by higher ground which is c.200m in height.

Human intervention exists in a number of ways, roads, housing, wind turbines, and the use of the land, be it for agriculture or coniferous forestry impacting higher parts of the landscape. The area is remote in terms of its distance from the main settlements in the county and in the manner in which it is cut off from the rest of the county by high ground. The north eastern part of the area would be close to the town of Listowel, with the central part of the area close to Abbeyfeale in Co. Limerick. With the constructed elements found in the landscape it does affect its naturalness. The large areas of forestry found in the area are also planted.

There are views & prospects in the Kerry County Development Plan on the N21, on both sides of the River Feale., and on the eastern side of the Smearlagh Valley with the elevated nature of these roads contributing to the views.

The Stack's Mountains screen this area from wider views which would allow for wind turbines to be accommodated in part of the area. The River Feale and its scenic qualities would not allow for wind turbines to integrate successfully.

Conclusion

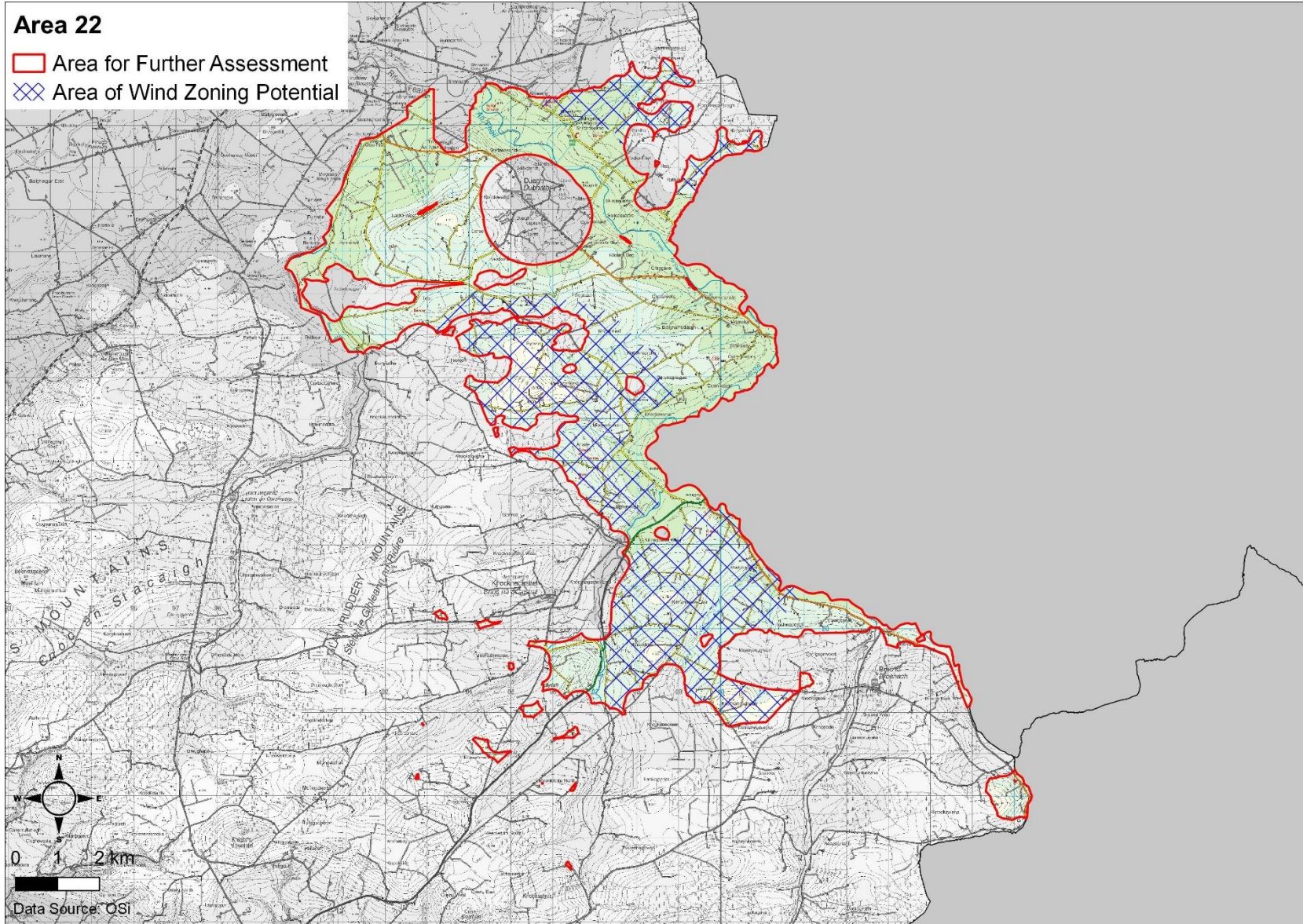
This landscape in the northern part of the area along the River Feale would be sensitive to wind energy development. The area around Knocknagoshel would also be sensitive to wind energy development.

The landscape in the southern part of the area, and north of Kilmorna, is considered to have potential for wind energy development.



Landscapes in Area 22





Map 6.50: Area 22 for Further Assessment



Area 23

Size of Area

Is of sufficient size to be considered for zoning, 250.6km².

Infrastructure

The 110kv transmission network passes through the area with substations at Clahane and Tralee.

Population

Housing density is 16 houses per km².

Landscape Sensitivity

This area is located between Tralee and Listowel, to the west of the N69. It extends as far as the coastline between Ballyheigue and Ballyduff, and includes parts of Kerry Head. The eastern part of the area also borders the coast. The area is large and contained by the Stack's Mountains to the southeast. These hills therefore provide a measure of scale in the southern part of the area, but the remainder of the area is generally flat. As the central part of the area is large and mostly flat, it results in the landscape having a greater ability to relate to larger turbines.

The landscape has been modified by the number of constructed elements found within it. With the number of houses, and other elements such as forestry, farming, and wind turbines to the south, this area shows signs of modification. It is an open landscape with wide vistas across the area influenced by its topography. Landcover also contributes to its openness.

With areas of high ground to the south, with the N69 national secondary road linking Tralee to Listowel in the area, it allows for wide ranging views to the north.

Views & prospects in the Kerry County Development Plan on the eastern side of the Smearlagh valley in a westerly direction, and extensive stretches along the coast. The coast road is part of the Wild Atlantic Way. Discovery points can be found in Ballyheigue, Banna, and Fenit.

Having regard to the extent of completed and permitted developments to the east of this area in the Stack's Mountains and to the norther, as per Step 3, it is considered that the majority of this area has reached its capacity to absorb additional wind energy development.

This is an open landscape with wide ranging views, also including scenic coastal areas, which would not allow for the successful integration of wind turbines.

Conclusion

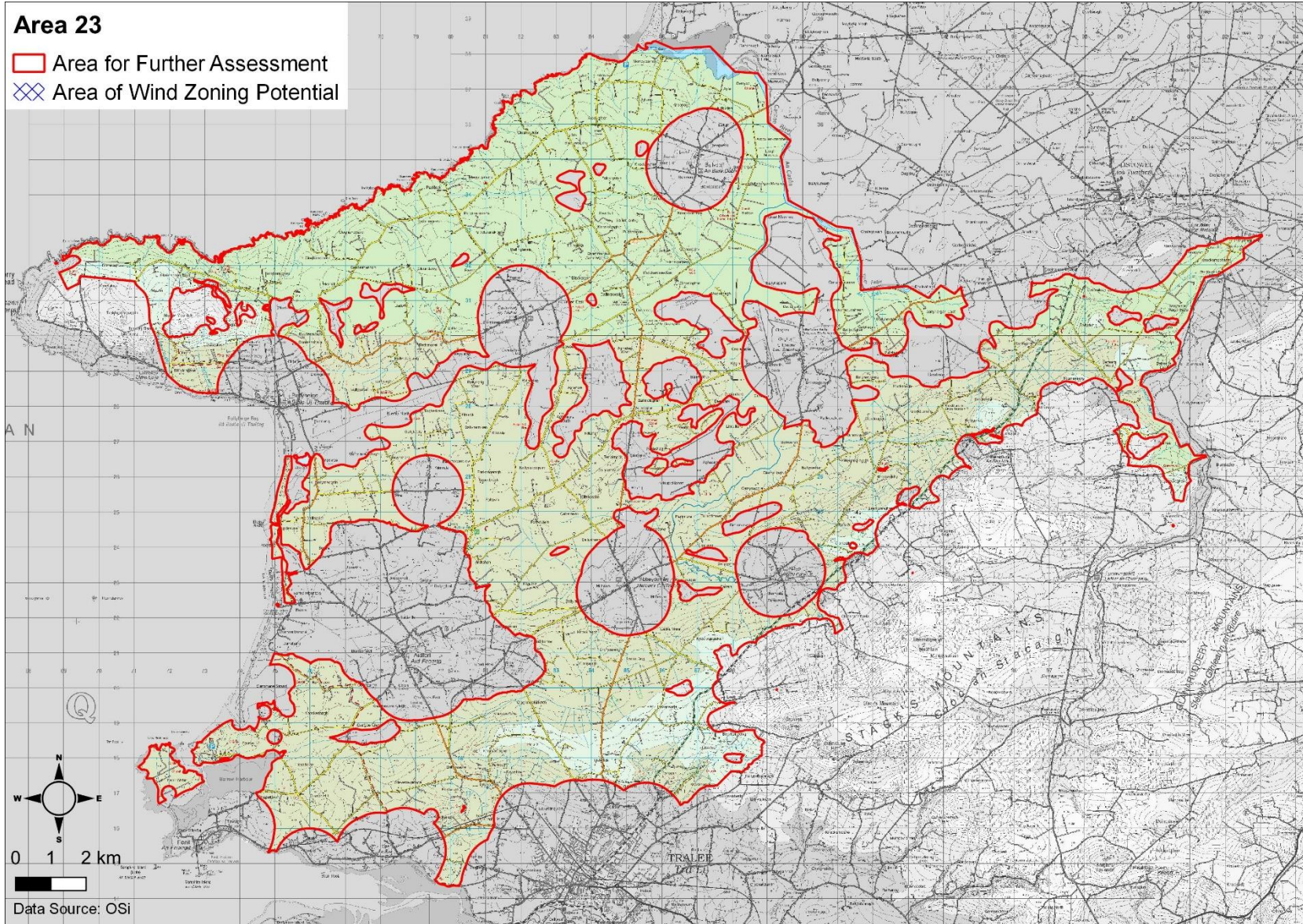
This landscape would be sensitive to wind energy development.



Landscapes in Area 23







Map 6.51: Area 23 for Further Assessment



Area 24

Size of Area

Is of sufficient size to be considered for zoning, 127.0km². Does contain some smaller parts.

Infrastructure

The 110kv transmission network runs along the eastern edge of the area.

Population

Housing density is 13 houses per km².

Landscape Sensitivity

This area is located on the northern side of the Listowel to Ballybunion Road, extending from there to the Shannon Estuary including Knockanore and Beal. Knockanore (267m) is a very distinctive feature in the northwestern part of the area, with the remainder of the area being flat in nature.

The landscape has been modified by the number of constructed elements found within it.

With the number of houses, and other elements such as forestry, farming, and wind turbines, this area shows signs of modification.

It is an open landscape with wide vistas across the area influenced by its topography. Landcover also contributes to its openness.

There are views & prospects in the Kerry County Development Plan eastwards from a local road on the western side of Knockanore, and along the coast. The R551 to the west of the area is part of the Wild Atlantic Way, with Discovery Points located at Carrigafoyle Castle, Beal Strand, and Ballybunion Beach.

Having regard to the extent of completed and permitted developments to the southeast of this area and to the north, as per Step 3, it is considered that this area has reached its capacity to absorb additional wind energy development.

Due to the open nature of this area, and its scenic coastline, it would be difficult to integrate wind turbines in part of the area.

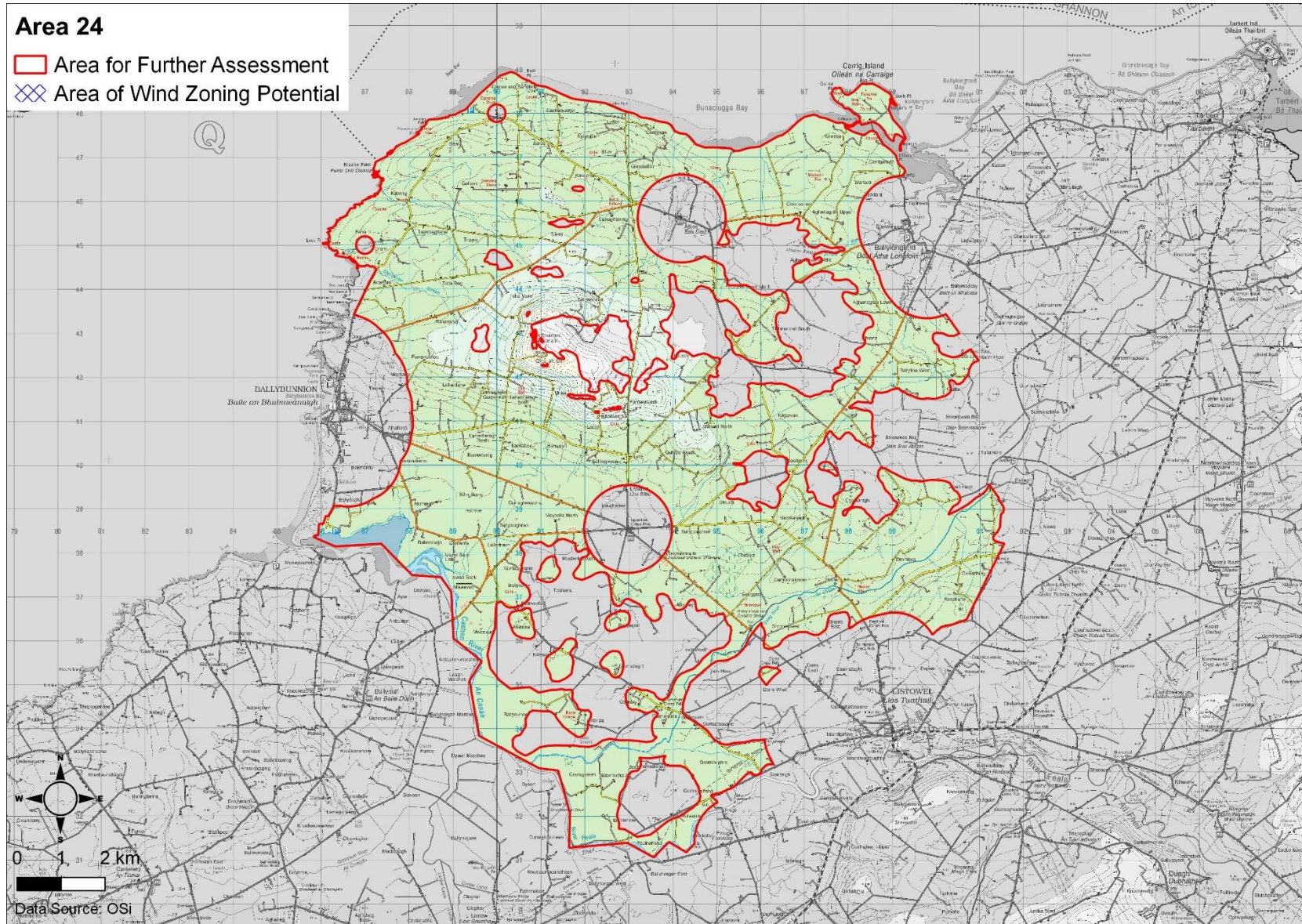
Conclusion

This landscape would be sensitive to wind energy development.



Landscapes in Area 24





Map 6.52: Area 24 for Further Assessment



Area 25

Size of Area

Is of sufficient size to be considered for zoning, 81.0km².

Infrastructure

The 110kv and 220kv transmission network passes through the area. The area is located between the Kilpaddoge and Knockanure substations.

Population

Housing density is 12 houses per km².

Landscape Sensitivity

This area is located to the north of Listowel and extends northwards from Listowel to the Shannon Estuary on both sides of the N69. The western part of the area is flat in nature with little change in relief. Lands rise on the eastern boundary of the area. In between there are a number of rivers, the Galey River being the most significant, but these rivers have minimal impact on the landform.

The landscape has been modified by the number of constructed elements found within it, including Tarbert Power Station to the north. Some natural areas still exist, for example Bunnaruddee Bog. It is an open landscape with wide vistas across the area influenced by its topography. Landcover also contributes to its openness. Part of the area borders the Shannon Estuary, and is therefore sensitive to development.

There are views & prospects in the Kerry County Development near Ballylongford. The R551 is part of the Wild Atlantic Way. The Tarbert to Killimer Ferry to the east and Carrigafoyle Castle to the west are Discovery Points on the Wild Atlantic Way.

Having regard to the extent of completed and permitted developments to the west of this area, as per Step 3, it is considered that the western part of this area has reached its capacity to absorb additional wind energy development.

Part of this area provides a setting to Listowel, with part of the area bordering the scenic Shannon Estuary, it would be difficult to integrate wind turbines in these areas. The hills on the eastern side of the provide a measure of scale that would allow for some wind energy development.

Conclusion

This landscape in the western part of the area would be sensitive to wind energy development with the landscape in the eastern part of the area having potential for wind energy development.

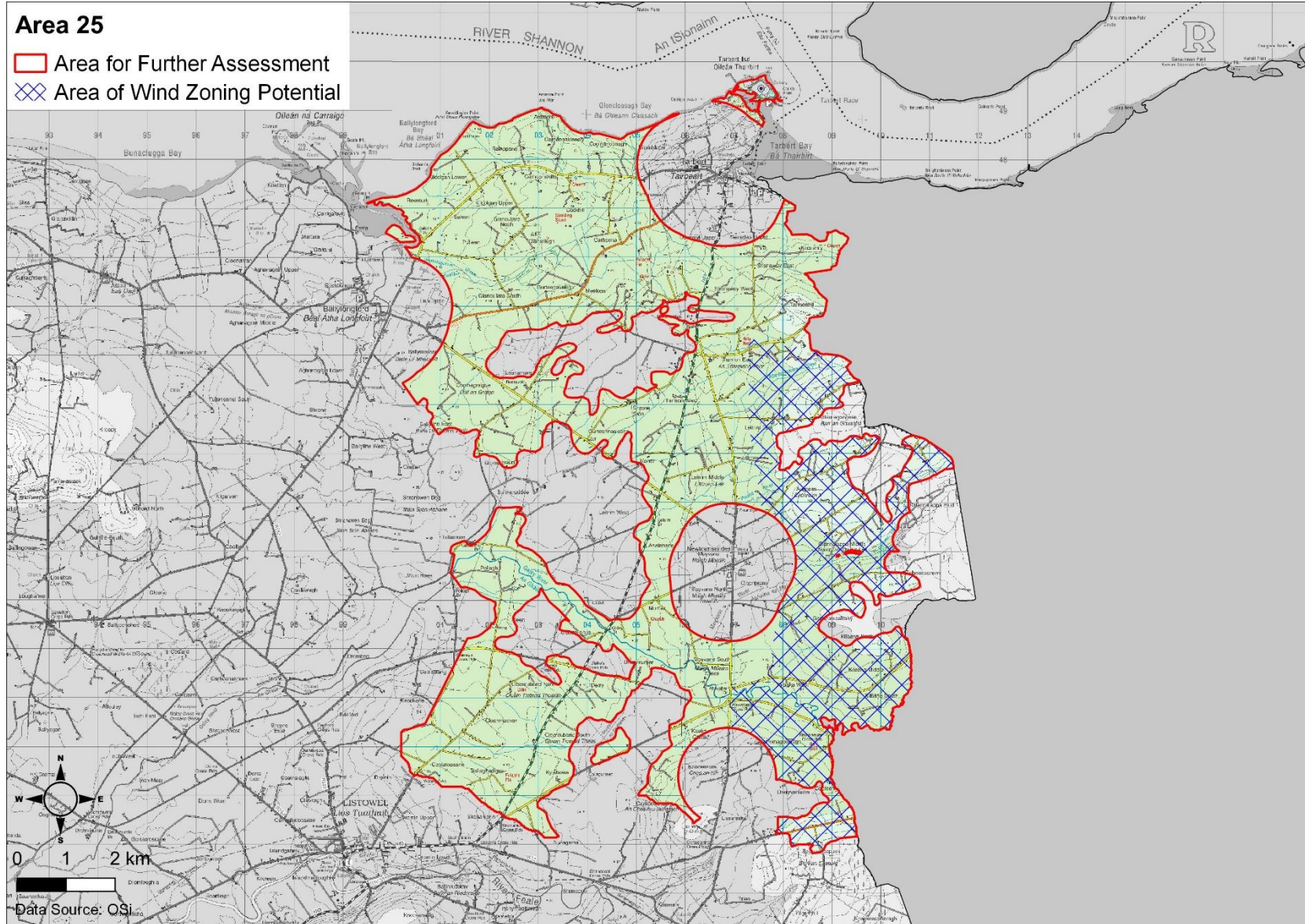
Part of this area forms part of the Tarbert / Ballylongford Land Bank. This area is zoned for marine related industry, compatible or complimentary industries and enterprises which require deep water access. This part would therefore not be suitable for wind energy development. It is the policy of the Council to facilitate, where appropriate, small scale wind energy development to serve a single use development such as a manufacturing plant or other commercial use.



Landscapes in Area 25









Areas for Further Assessment Conclusion

Each of the 25 areas have been analysed comprehensively with potential for wind energy identified in 4 of the areas.

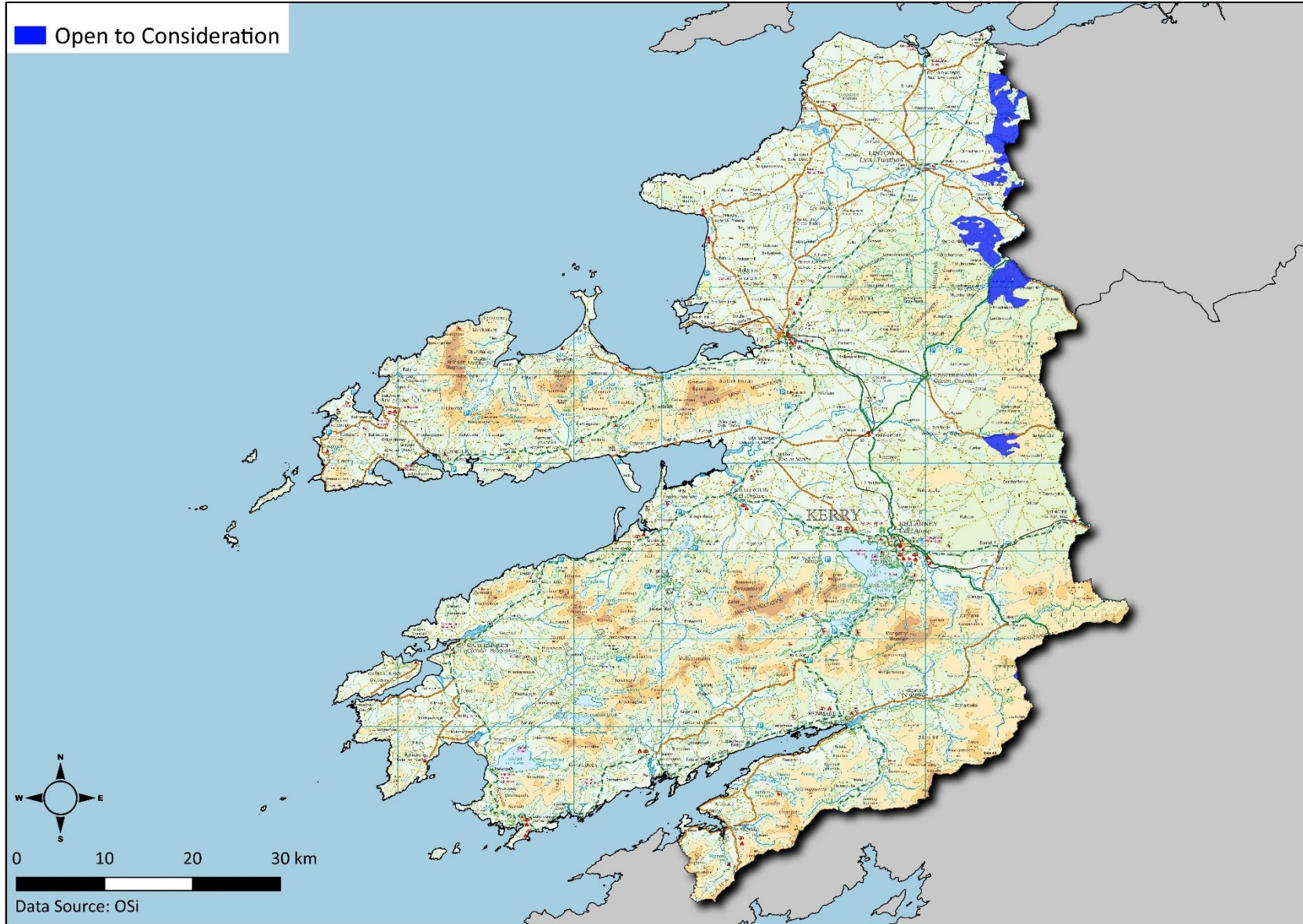


Step 5 – Wind Energy Policy Review

The combination of the wind resource assessment, landscape sensitivity and the cumulative impact assessment of wind turbines in the county can be used to inform changes to wind energy policy contained in the Kerry County Development Plan 2022-2028. It can be used to review the existing wind energy zonings.

Areas that are subject to constraints are excluded from consideration for wind energy along with areas of high visual sensitivity. The cumulative impact of existing and permitted wind turbines is also included.

Following the analysis carried out in Steps 1-4, areas open to consideration for wind energy are shown on Map 6.54.



Map 6.54: Proposed Wind Energy Zoning



Reference Documents

These documents are referenced in this document or have informed its preparation.

A Guide to Commissioning a Landscape Capacity Study

Scottish Natural Heritage

An Approach to Landscape Character Assessment

October 2015

Christine Tudor, Natural England

Argyll and Bute Landscape Wind Energy Capacity Study

August 2017

Carol Anderson Landscape Associates

Assessing the Cumulative Impact of Onshore Wind Energy Developments

March 2012

Scottish Natural Heritage

Climate Action Plan 2019

June 2019

Department of Environment, Climate and Communications

Cornwall Renewable Energy

Planning Advice

Annex 1: An assessment of the landscape sensitivity to on-shore wind energy & large-scale photovoltaic development in Cornwall

March 2016

Cornwall Council

Devon Landscape Policy Group Advice Note No.2: Accommodating Wind and Solar PV Developments in Devon's Landscape

June 2013

LUC Environmental Planning Design & Management

Draft Revised Wind Energy Development Guidelines

December 2019

Department of Housing, Planning and Local Government

Electoral Areas of Dingle, Killarney, Killorglin, Listowel and Tralee Landscape Character Assessments

May 2004 (unpublished)

Colin Buchanan & Partners and Wardell Armstrong

**European Landscape Convention**

2004

Council of Europe

Guidance document on wind energy developments and EU nature legislation

2020

European Commission

Guidelines for Landscape and Visual Impact Assessment3rd Edition 2013

Landscape Institute and Institute of Environmental Management & Assessment

Landscape and Landscape Assessment**Consultation Draft of Guidelines for Planning Authorities**

June 2000

Department of the Environment and Local Government

Landscape Capacity Studies in Scotland – a review and guide to good practice

2009

Scottish Natural Heritage

Landscape Character Assessment**Guidance for England and Scotland**

2002

The Countryside Agency / Scottish Natural Heritage

Landscape Character Assessment**Guidance for England and Scotland****Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity**

The Countryside Agency / Scottish Natural Heritage

Methodology for Local Authority Renewable Energy**Strategies**

2013

Sustainable Energy Authority of Ireland

National Landscape Strategy for Ireland 2015-2025

2015

Department of Arts, Heritage and the Gaeltacht

River Basin Management Plan 2018-2021

2018

Department of Housing, Planning and Local Government



Addendum - Kerry County Development Plan Wind Farm Development Policy Review and the Stacks to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA Environmental Assessment Unit Strategic Policy Recommendation

Existing land use policy and context

The Stacks to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA is partly located within the County of Kerry, the remainder located within Limerick and Cork. Existing Kerry County Council land use policies and objectives prohibit the consideration Wind Farms within the Stacks to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA. No turbines have been permitted within by the KCC in this SPA since 2014. The current Cork County Development Plan outlines that wind developments are ‘normally discouraged’ while the current Limerick County Development Plan outlines that wind developments are ‘open to consideration’ within the SPA. In all cases, project level Article 6 Habitats Directive Assessments are required, where necessary.

The other main land uses in the SPA are forestry, which is largely coniferous in nature and agriculture predominantly consisting of cattle grazing on semi-natural wet. In this regard the following are of relevance:

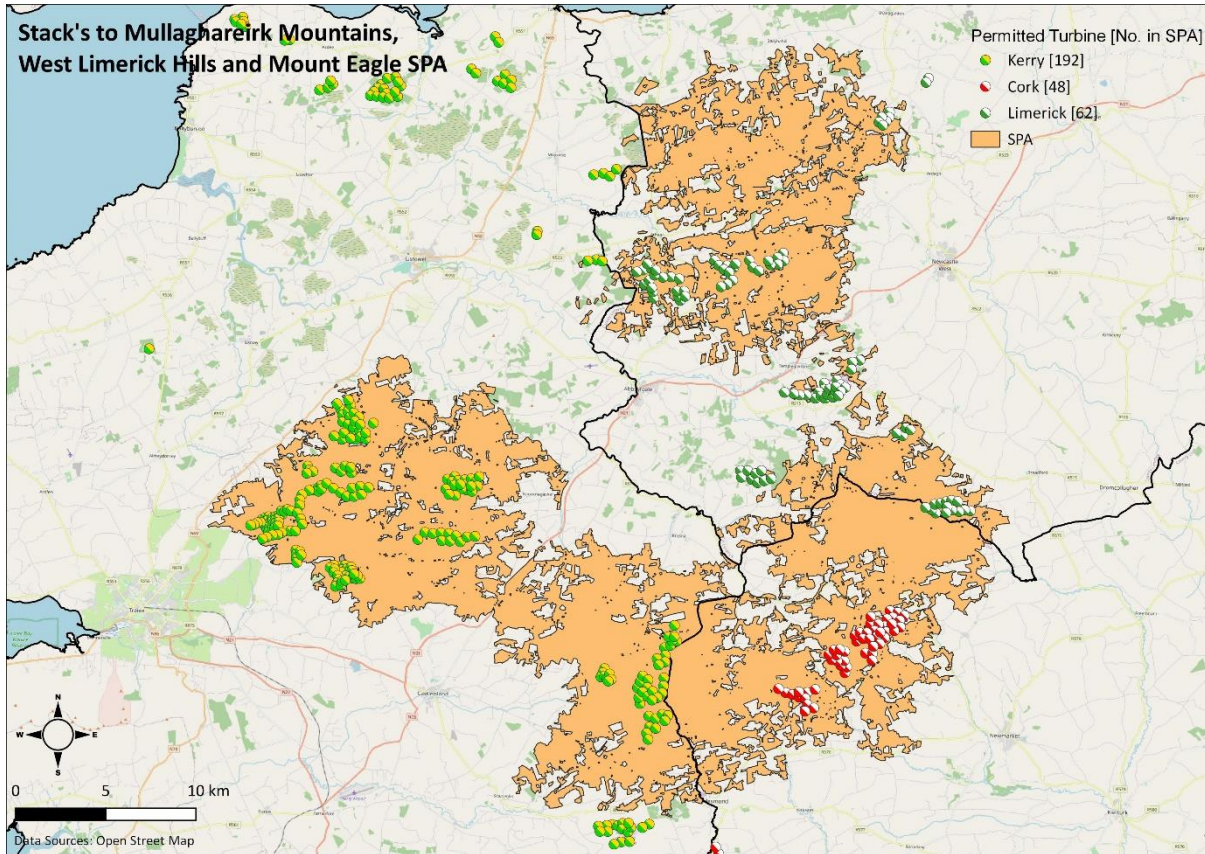
Hen Harrier Threat Response Plan (under preparation)	To tackle the decline in Hen Harrier populations in Ireland, a process has been underway since 2015 to develop a ‘Threat Response Plan’. This process is led by the Department of Culture, Heritage and the Gaeltacht and focuses on the key land uses of agriculture, forestry and wind farm development. The plan seeks to address pressures facing populations within those SPAs designate for breeding Hen Harrier, and also issues facing the species within the wider countryside.
Hen Harrier (Farm) Project⁶	The Hen Harrier Project is a 5-year EIP (European Innovation Partnership) Locally Led Project. This is a results and action based project, which incentivises farmers to improve the SPA’s management and conservation condition for the Hen Harrier. The Project is co-funded by the EU and Dept. of Agriculture, Food and the Marine as part of Ireland's Rural Development Programme 2014-2020. To date this program has produced monitoring reports for 2016 to 2020 inclusive.
GLAS Agricultural Scheme	Conservation of the Hen Harrier is a priority action under GLAS (Green Low-carbon, Arge-environmental Scheme) and farmers in the SPA have priority access to Glass. Farmers with Hen Harrier habitat qualified automatically for GLAS under Tier one, with some of the highest per hectare payments - €370 per hectare capped at €5,000 per annum and with automatic qualification for GLAS plus should they manage sufficient habitat. GLAS plus brings potential payment up to €7,000 per annum. There are currently 2,674 farmers covering 42,216 hectares of habitat in GLAS taking the Hen Harrier action. This represents nearly 70% of all farmers with Hen Harrier land.
Forests, products and people Ireland’s forest policy – a renewed vision (2014)	<p>The Strategic Goal of this document is outlined to be ‘to develop an internationally competitive and sustainable forest sector that provides a full range of economic, environmental and social benefits to society and which accords with the Forest Europe definition of sustainable forest management’. It includes a number of policies and actions including environmental commitments.</p> <p>The document outlines that the Forest Service is currently engaged in specific initiatives regarding Freshwater Pearl Mussel (FPM) and Hen Harrier, both of which are species of high conservation value and under significant threat. Further details are set out in the document entitled Environmental Report on the Forest Policy Review.</p>

⁶ <http://www.henharrierproject.ie/>



Existing Wind Development in the SPA

Within the functional area of Kerry County Council (KCC) 192 turbines are permitted within the SPA of which 190 are constructed. The majority of those permitted by Cork and Limerick County Councils in the SPA have similarly being constructed. In total there are approx. 302 turbines permitted in the SPA – the vast majority of which are constructed. No wind turbine has been permitted by KCC in the SPA since 2014.



Map 6.55: Permitted wind turbines in the vicinity of the Hen Harrier SPA

Hen Harrier Population Data

The latest Hen Programme Hen Harrier Monitoring Report (November 2020) provides an overview of the breeding Hen Harrier population in the Country’s SPA Network to 2020. The report outlines that the Stack’s to Mullagherierk Mountains, West Limerick Hills and Mount Eagle SPA has undergone a serious population decline since designation, however the population appears to have stabilised, albeit at a lower level.

In 2020 there were a total of 58 confirmed territories and 4 possible breeding pairs of Hen Harrier within the SPAs (a population range of 58 – 62 pairs). This is slightly less than the total numbers of territorial pairs recorded within the SPAs in 2017 (70 pairs); 2018 (68 pairs); and 2019 (63 pairs).

The relationship between types of impacts on birds and the project lifecycle for onshore wind energy developments.

The following table is published in the European Commission notice (November 2020) Guidance document on wind energy developments and EU nature legislation. It provides an overview of the relationship between types of impacts on birds and the project lifecycle for onshore wind energy developments.



Types of impacts	Project phase				
	Pre-construction	Construction	Operation	Decommissioning	Repowering
Habitat loss and degradation		X	X	X	X
Disturbance and displacement	X	X	X	X	X
Habitat fragmentation		X	X	X	
Collision			X	X	
Barrier effect		X	X	X	
Indirect effects	X	X	X	X	X

Table 6.2: Relationship between types of impacts on birds and the project lifecycle for onshore wind energy developments

The main impact types on birds as identified above (Habitat loss and degradation, Disturbance and displacement, Habitat fragmentation, Collision, Barrier effect and Indirect effects are summarised in Box 5-11 of the EU guidance document.

Policy Review recommendation

Having regard to the Hen Harrier population decline within the SPA (and nationally) since designation and to the substantial number of existing and permitted Wind Turbines in the SPA, it is recommended that the SPA should continue to be excluded from consideration for additional wind farm development, save for repowering proposals. Areas within 250m of the SPA should be similarly be excluded given the potential for displacement and other impacts.

It is considered that it would be unreasonable to exclude consideration of repowering proposals within the SPA. Repowering proposals are likely to differ from new applications in so far as they may be able to avail of the existing infrastructure and accordingly may not result in direct habitat loss of value within Hen Harrier SPAs. While the impact of repowering proposals will depend on the local context, the overall Hen Harrier population health within the SPA, in relation to ‘Favourable Conservation Status’, is likely to be an underlying consideration at impact assessment stage. Such proposals should therefore be assessed on a case-by-case basis.

Repowering proposals may require grid upgrade works and / or transport upgrade works if taller turbines with greater capacity are proposed. In addition, displacement effects resulting from the unavailability of otherwise suitable habitat may still arise, as may disturbance risks (particularly during the construction stage) and collision risks (at the operational stage). In certain instances, wind farms have a requirement for pre and post construction monitoring of their effects upon adjacent protected habitats or species. In other cases, proactive habitat and species management measures were required. Data from same may further improve scientific understanding of potential impacts of wind farms on Hen Harriers and may provide evidence of use in assessing repowering planning applications.