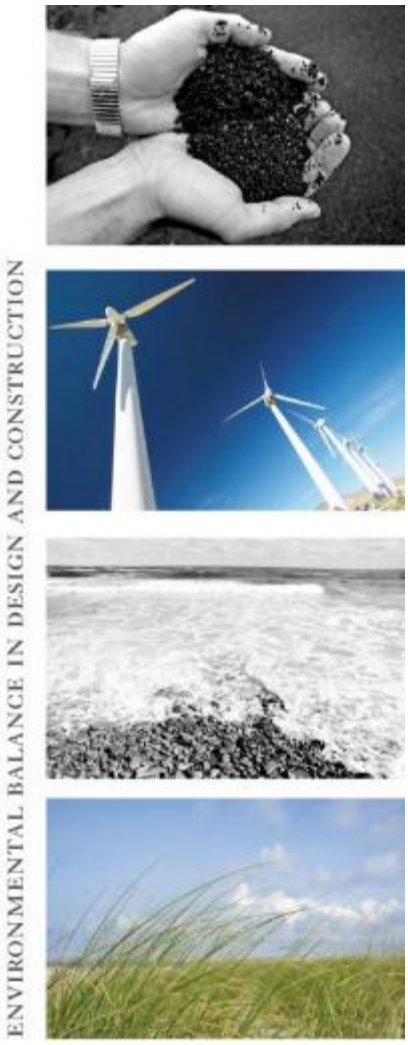

ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED MAIGHNE WIND FARM IN COUNTY KILDARE AND COUNTY MEATH

CHAPTER 15 - LANDSCAPE AND VISUAL EIS CHAPTER

MARCH 2015

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15 LANDSCAPE AND VISUAL

15.1 Executive Summary

Although the initial impression of this extensive wind energy development proposal is that a broad area of the North Kildare lowlands would be covered with tall wind turbines, which would dominate the landscape and surround its inhabitant, this landscape and visual appraisal reveals quite a different reality. That is, due to the dispersed nature of the proposal and the high degree of screening provided within the lowland landscape, the Maighne wind energy development will be perceived as a series of small to medium sized developments rather than a sprawling singular one. Rather than dominate the underlying landscape it is considered to integrate with it reflecting the organic and meandering pattern of the peatland areas that it occupies and abuts. The dispersed arrangement of the various clusters results in equally dispersed impacts. The magnitude of these impacts reflects the robustness of the receiving landscape and visual setting as well as the discretely portioned views of the scheme.

Only from occasional elevated vantage points that rise out of the lowland landscape is the overall scale of the development apparent. The most sensitive of these locations are contained at significant distances from the proposal (20km+) where it will be perceived as another element within a vast, productive landscape pattern.

15.2 Introduction

This chapter describes the landscape context of the proposed Maighne Wind Farm and assesses the likely landscape and visual effects of the scheme on the receiving environment. Although closely linked, landscape and visual impacts are assessed separately.

Landscape Impact Assessment (LIA) relates to changes in the physical landscape, brought about by the proposed development, which may alter its character and how this is experienced. This requires a detailed analysis of the individual elements and characteristics of a landscape that go together to make up the overall landscape character of that area. By understanding the aspects that contribute to landscape character it is possible to make judgements in relation to its quality (integrity) and to identify key sensitivities. This, in turn, provides a measure of the ability of the landscape in question to accommodate the type and scale of change associated with the proposed development, without causing unacceptable adverse changes to its character.

Visual Impact Assessment (VIA) relates to changes in the composition of views as a result of changes to the landscape, how these are perceived and the effects on visual amenity. Such impacts are population-based rather than resource-based as in the case of landscape impacts. Visual impacts are measured on the basis of:

- Visual Obstruction (blocking of a view, be it full, partial or intermittent) or;
- Visual Intrusion (interruption of a view without blocking).

This landscape and visual impact assessment is based on:

- Environmental Protection Agency (EPA) publication 'Guidelines on the Information to be contained in Environmental Impact Statements (2002) and the accompanying Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (2003)
- Landscape Institute and the Institute of Environmental Management and Assessment publication entitled Guidelines for Landscape and Visual Impact Assessment – Third Addition (2013).
- Scottish Natural Heritage (SNH) Environmental Assessment Handbook –Guidance on the Environmental Impact Assessment Process Appendix 1: Landscape and Visual Impact Assessment (2011)
- Scottish Natural Heritage (SNH) Guidance Note: Cumulative Effect of Wind Farms (2005)
- Scottish Natural Heritage (SNH) Siting and Designing Wind Farms in the Landscape Version 2 (2014)
- Department of the Environment, Heritage and Local Government Wind Energy Development Guidelines (2006)

This assessment report was prepared by Richard Barker, Principal Landscape Architect at Macro Works ltd. landscape and visualisation consultants. Relevant experience includes assessment of over 80 on-shore wind farm proposals throughout Ireland, including four Strategic Infrastructure Development (SID) projects.

15.3 Description of the Proposed Development

The developer proposes to locate a 47 turbine wind energy development on predominantly peatland sites throughout northwest County Kildare between the settlements of Edenderry (County Offaly) to the west, Rathangan to the south, Prosperous to the east and Longwood (County Meath) to the north. The proposed development is described in full in Chapter 2 of the EIS – Description of the Proposed Development in Volume 2 of this EIS.

15.4 Definition of the Study Area

The Wind Energy Development Guidelines published by the Department of the Environment, Heritage and Local Government (2006) specify different radii for examining the zone of theoretical visibility of proposed wind farm projects (ZTV). The extent of this search area is influenced by turbine height, on the basis that taller turbines would be visible at greater distances, as follows:

- 15 km radius for blade tips up to 100m;
- 20 km radius for blade tips greater than 100m and;
- 25 km radius where landscapes of national and international importance exist.

In the case of this project, the blade tips are 169m high and, thus, the minimum ZTV radius recommended is 20 km from the outermost turbines of the scheme. However, given the degree to which the proposed turbines exceed the 100m threshold for a 20km radius and the fact that there are several landscape heritage sites of international importance beyond 20km, the study area for this project is extended to 30km radius. This is beyond the recommendations of the Wind Energy Development Guidelines, even in respect of highly sensitive receptor locations.

15.5 Assessment Methodology

Production of this Landscape and Visual Impact Assessment involved baseline work in the form of desktop studies and fieldwork comprising professional evaluation by qualified and experienced Landscape Architects. This entailed the following:

15.5.1 Desktop Study

- Establishing an appropriate Study Area from which to study the landscape and visual impacts of the proposed wind farm;
- Review of a Zone of Theoretical Visibility (ZTV) map, which indicates areas from which the development is potentially visible in relation to terrain within the Study Area;
- Review of relevant County Development Plans, particularly with regard to sensitive landscape and scenic view/route designations;
- Selection of potential Viewshed Reference Points (VRPs) from key visual receptors to be investigated during fieldwork for actual visibility and sensitivity;
- Consultation with the local community and the Local Authority in respect of sensitive VRP locations to be included in the assessment.

15.5.2 Fieldwork

- Recording of a description of the landscape elements and characteristics within the Study Area.
- Selection of a refined set of VRP's for assessment. This includes the capture of reference images and grid reference coordinates for each VRP location for the visualisation specialist to prepare photomontages;

15.5.3 Appraisal

- Consideration of the receiving landscape with regard to overall landscape character as well as the salient features of the study area including landform, drainage, vegetation, land use and landscape designations.
- Consideration of the visual environment including receptor locations such as centres of population and houses; transport routes; public amenities and facilities and; designated and recognised views of scenic value.
- Consideration of design guidance and planning policies.
- Consideration of potentially significant effects and the mitigation measures that could be employed to reduce such effects.
- Estimation of the significance of residual landscape impacts.
- Estimation of the significance of residual visual impacts aided by photomontages prepared at all of the selected VRP locations.
- Estimation of cumulative landscape and visual effects in combination with other surrounding developments that are either existing or permitted.

15.6 Assessment Criteria for Landscape Impacts

The classification system used by Macro Works to determine the significance of landscape and visual impacts is based on the Guidelines for Landscape and Visual Impact Assessment (2013). When assessing the potential impacts on the landscape resulting from a wind farm development, the following criteria are considered:

- Landscape character, value and sensitivity
- Magnitude of likely impacts; and
- Significance of landscape effects

The sensitivity of the landscape to change is the degree to which a particular landscape receptor (Landscape Character Area (LCA) or feature) can accommodate changes or new features without unacceptable detrimental effects to its essential characteristics. Landscape Value and Sensitivity is classified using the following criteria:

Table 15.1: Landscape Value and Sensitivity

Sensitivity	Description
Very High	Areas where the landscape character exhibits a very low capacity for change in the form of development. Examples of which are high value landscapes, protected at an international or national level (World Heritage Site/National Park), where the principal management objectives are likely to be protection of the existing character.
High	Areas where the landscape character exhibits a low capacity for change in the form of development. Examples of which are high value landscapes, protected at a national or regional level (Area of Outstanding Natural Beauty), where the principal management objectives are likely to be considered conservation of the existing character
Medium	Areas where the landscape character exhibits some capacity and scope for development. Examples of which are landscapes which have a designation of protection at a county level or at non-designated local level where there is evidence of local value and use.

Sensitivity	Description
Low	Areas where the landscape character exhibits a higher capacity for change from development. Typically this would include lower value, non-designated landscapes that may also have some elements or features of recognisable quality, where landscape management objectives include, enhancement, repair and restoration.
Negligible	Areas of landscape character that include derelict, mining, industrial land or are part of the urban fringe where there would be a reasonable capacity to embrace change or the capacity to include the development proposals. Management objectives in such areas could be focused on change, creation of landscape improvements and/or restoration to realise a higher landscape value.

The magnitude of a predicted landscape impact is a product of the scale, extent or degree of change that is likely to be experienced as a result of the proposed development. The magnitude takes into account whether there is a direct physical impact resulting from the loss of landscape components and/or a change that extends beyond the proposal site boundary that may have an effect on the landscape character of the area.

Table 15.2: Magnitude of Landscape Impacts

Magnitude of Impact	Description
Very High	Change that would be large in extent and scale with the loss of critically important landscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to an overall change of the landscape in terms of character, value and quality.
High	Change that would be more limited in extent and scale with the loss of important landscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to an overall change of the landscape in terms of character, value and quality.
Medium	Changes that are modest in extent and scale involving the loss of landscape characteristics or elements that may also involve the introduction of new uncharacteristic elements or features that would lead to changes in landscape character, and quality.
Low	Changes affecting small areas of landscape character and quality, together with the loss of some less characteristic landscape elements or the addition of new features or elements.
Negligible	Changes affecting small or very restricted areas of landscape character. This may include the limited loss of some elements or the addition of some new features or elements that are characteristic of the existing landscape or are hardly perceivable.

The significance of a landscape impact is based on a balance between the sensitivity of the landscape receptor and the magnitude of the impact. The significance of landscape impacts is arrived at using the following matrix:

Table 15.3: Landscape Impact Significance Matrix

	Sensitivity of Receptor				
Scale / Magnitude	*Very High*	*High*	*Medium*	*Low*	*Negligible*
Very High	Profound	Profound-substantial	Substantial	Moderate	Slight
High	Profound-substantial	Substantial	Substantial - moderate	Moderate-slight	Slight-imperceptible
Medium	Substantial	Substantial - moderate	Moderate	Slight	Imperceptible
Low	Moderate	Moderate-slight	Slight	Slight-imperceptible	Imperceptible
Negligible	Slight	Slight-imperceptible	Imperceptible	Imperceptible	Imperceptible

Note that potential beneficial landscape impacts are not accounted for in the tables and matrix above. This is on the basis that commercial scale wind energy projects are very unlikely to generate beneficial landscape impacts. In the rare instances that this might occur, perhaps by facilitating the rehabilitation of a degraded landscape, the benefits are considered in the overall appraisal and the significance of impact would default to the lowest end of the range (Imperceptible).

15.7 Assessment Criteria for Visual Impacts

As with the landscape impact, the visual impact of the proposed wind farm will be assessed as a function of sensitivity versus magnitude. In this instance the sensitivity of visual receptors, weighed against the magnitude of visual effects.

15.7.1 Visual Sensitivity

Unlike landscape sensitivity, visual sensitivity has an anthropocentric basis. Visual sensitivity is a two-sided analysis of receptor susceptibility (people or groups of people) versus the value of the view on offer at a particular location.

To assess the susceptibility of viewers and the amenity value of views, the assessors use a range of criteria and provide a four point weighting scale to indicate how strongly the viewer/view is associated with each of the criterion. Susceptibility criteria is extracted directly from the IEMA Guidelines for Landscape and Visual Assessment (2013), whilst the value criteria relate to various aspects of a view that might typically be related to high amenity including, but not limited to, scenic designations. These are set out below:

1. **Susceptibility of receptor group to changes in view**. This is one of the most important criteria to consider in determining overall visual sensitivity because it is the single category dealing with viewer susceptibility.

In accordance with the IEMA Guidelines for Landscape and Visual Assessment (3rd edition 2013) visual receptors most susceptible to changes in views and visual amenity are:

- *Residents at home;*
- *People, whether residents or visitors, who are engaged in outdoor recreation, including use of public rights of way, whose attention or interest is likely to be focussed on the landscape and on particular views;*
- *Visitors to heritage assets, or to other attractions, where views of the surroundings are an important contributor to the experience;*
- *Communities where views contribute to the landscape setting enjoyed by residents in the area; and*
- *Travellers on road rail or other transport routes where such travel involves recognised scenic routes and awareness of views is likely to be heightened.*

Visual receptors that are less susceptible to changes in views and visual amenity include:

- *People engaged in outdoor sport or recreation, which does not involve or depend upon appreciation of views of the landscape; and*
- *People at their place of work whose attention may be focussed on their work or activity, not their surroundings and where the setting is not important to the quality of working life.*

2. **Recognised scenic value of the view** (County Development Plan designations, guidebooks, touring maps, postcards etc.). These represent a consensus in terms of which scenic views and routes within an area are strongly valued by the population because in the case of County Development Plans, at least, a public consultation process is required;

3. **Views from within highly sensitive landscape areas**. Again, highly sensitive landscape designations are usually part of a county's Landscape Character Assessment, which is then incorporated with the County Development Plan and is therefore subject to the public consultation process. Viewers within such areas are likely to be highly attuned to the landscape around them;

4. **Intensity of use, popularity**. Whilst not reflective of the amenity value of a view, this criterion relates to the number of viewers likely to experience a view on a regular basis and whether this is significant at county or regional scale;

5. **Provision of elevated panoramic views**. This relates to the extent of the view on offer and the tendency for receptors to become more attuned to the surrounding landscape at locations that afford broad vistas.

6. **Sense of remoteness and/or tranquillity**. Remote and tranquil viewing locations are more likely to heighten the amenity value of a view and have a lower intensity of development in comparison to dynamic viewing locations such as a busy street scene, for example;

7. **Degree of perceived naturalness**. Where a view is valued for the sense of naturalness of the surrounding landscape it is likely to be highly sensitive to visual intrusion by obvious human interventions;

8. **Presence of striking or noteworthy features**. A view might be strongly valued because it contains a distinctive and memorable landscape feature such as a promontory headland, lough or castle;

9. **Historical, cultural or spiritual value**. Such attributes may be evident or sensed at certain viewing locations that attract visitors for the purposes of contemplation or reflection heightening the sense of their surroundings;

10. **Rarity or uniqueness of the view**. This might include the noteworthy representativeness of a certain landscape type and considers whether other similar views might be afforded in the local or the national context;

11. **Integrity of the landscape character in view**. This criterion considers the condition and intactness of the landscape in view and whether the landscape pattern is a regular one of few strongly related components or an irregular one containing a variety of disparate components;

12. **Sense of place**. This criterion considers whether there is special sense of wholeness and harmony at the viewing location; and

13. **Sense of awe**. This criterion considers whether the view inspires an overwhelming sense of scale or the power of nature.

Those locations where highly susceptible receptors or receptor groups are present and which are deemed to satisfy many of the view value criteria above are likely to be judged to have a high visual sensitivity and vice versa.

15.7.2 Visual Impact Magnitude

The magnitude of visual effects is determined on the basis of two factors; the visual presence of the proposal and its effect on visual amenity.

Visual presence is a somewhat quantitative measure relating to how noticeable or visually dominant the proposal is within a particular view. This is based on a number of aspects beyond simply scale in relation to distance. Some of these include the extent of the view as well as its complexity and the degree of existing contextual movement experienced such as might occur where turbines are viewed as part of / beyond a busy street scene. The backdrop against which the development is presented and its relationship with other focal points or prominent features within the view is also considered. Visual presence is essentially a measure of the relative visual dominance of the proposal within the available vista and is expressed as such i.e. minimal, sub-dominant, co-dominant, dominant, highly dominant.

For wind energy developments, a strong visual presence is not necessarily synonymous with adverse impact. Instead, the 2003 SEI funded survey of 'Attitudes towards the Development of Wind Farms in Ireland' found that *"wind farms are seen in a positive light compared to other utility-type structures that could be built on the landscape"*. A subsequent tourism study commissioned by Bord Failte in 2008 found that; *"Almost three quarters of respondents claim that potentially greater numbers of wind farms would either have no impact on their likelihood to visit or have a strong or fairly strong positive impact on future visits to the island of Ireland*." The purpose here is not to suggest that turbines are either inherently liked or disliked, but rather to highlight that the assessment of visual impact magnitude for wind turbines is more complex than just the degree to which turbines occupy a view. Furthermore, a clear and comprehensive view of a wind farm might be preferable in many instances to a partial, cluttered view of turbine components that are not so noticeable within a view. On the basis of these reasons, the visual amenity aspect of assessing impact magnitude is qualitative and considers such factors as the spatial arrangement of turbines both within the scheme and in relation to surrounding terrain and land cover. It also examines whether the development contributes positively to the existing qualities of the vista or results in distracting visual effects and disharmony.

It should be noted that as a result of this two-sided analysis, a high order visual presence can be moderated by a low level of effect on visual amenity and vice versa. Given that wind turbines do not represent significant bulk, visual impacts result almost entirely from visual 'intrusion' rather than visual 'obstruction' (the blocking of a view). The magnitude of visual impacts is classified in the table over.

Table 15.4: Magnitude Value and Sensitivity

Criteria	Description
Very High	The proposal intrudes into a large proportion or critical part of the available vista and is without question the most noticeable element. A high degree of visual disorder or disharmony is also generated, strongly reducing the visual amenity of the scene
High	The proposal intrudes into a significant proportion or important part of the available vista and is one of the most noticeable elements. A considerable degree of visual disorder or disharmony is also likely to be generated, appreciably reducing the visual amenity of the scene
Medium	The proposal represents a moderate intrusion into the available vista, is a readily noticeable element and/or it may generate a degree of visual disorder or disharmony, thereby reducing the visual amenity of the scene. Alternatively, it may represent a balance of higher and lower order estimates in relation to visual presence and visual amenity
Low	The proposal intrudes to a minor extent into the available vista and may not be noticed by a casual observer and/or the proposal would not have a marked effect on the visual amenity of the scene
Negligible	The proposal would be barely discernible within the available vista and/or it would not detract from, and may even enhance, the visual amenity of the scene

15.7.3 Visual Impact Significance Matrix

	Sensitivity of Receptor				
Scale / Magnitude	*Very High*	*High*	*Medium*	*Low*	*Negligible*
Very High	Profound	Profound-substantial	Substantial	Moderate	Slight
High	Profound-substantial	Substantial	Substantial - moderate	Moderate-slight	Slight-imperceptible
Medium	Substantial	Substantial - moderate	Moderate	Slight	Imperceptible
Low	Moderate	Moderate-slight	Slight	Slight-imperceptible	Imperceptible
Negligible	Slight	Slight-imperceptible	Imperceptible	Imperceptible	Imperceptible

**Note: The significance matrices provided above at table 15.3 and table 15.5 provide an indicative framework from which the significance of impact is derived. The significance judgement is ultimately determined by the assessor using professional judgement. Due to nuances within the constituent sensitivity and magnitude judgements, this may be up to one category higher or lower than indicated by the matrix.*

15.8 Existing Environment

15.8.1 Landscape Baseline

The landscape baseline represents the existing landscape context and is the scenario against which any changes to the landscape brought about by the proposal will be assessed. This also includes reference to any relevant landscape character appraisals and the current landscape policy context (both are generally contained within County Development Plans).

A general description of the landscape context of the proposed wind farm site and wider study area is provided below. Additional descriptions of the landscape as viewed from each of the selected viewpoints are provided under the detailed assessments later.

15.8.2 Landform and Drainage

The landscape of the study is predominantly flat to mildly undulating with occasional isolated hills and crests of low hills scattered throughout. The foothills of the Wicklow Mountains emerge in the south-eastern extents of the study area and along with the foothills of the Slieve Bloom Mountains to the south-west these provide the only noticeable sense of containment. There is a distinctive crest of low hills in the south-central study area which include the Hill of Allen, Red Hill and Dunmurray Hill. A subtle elevated area also emerges in the north-central study area and fans out to the north east of the study area. This band of hills notably includes the Hill of Tara and Scryne Hill and continues towards the east coast. Another slightly elevated zone occupies the outer north-western quarter of the study area and is interspersed with a series of elongated, northwest by southeast oriented, water bodies that include Lough Ennell, Lough Owel and Lough Derravaragh.

Due to the flat and boggy nature of the central study area, watercourses are not distinctive and drainage is more of a dendritic pattern of meandering small streams, drains and canal feeders. Aside from the series of Loughs at the north-western fringe of the study area, there is the man-made Poulaphouca Reservoir in the south-eastern perimeter of the study area at the base of the Wicklow Mountains. This feeds the River Liffey, which skirts the eastern periphery of the study area as it makes its way towards Dublin. The other major watercourse is the River Boyne which has its headwaters in the East Central study area and makes its way in a north-easterly direction towards the East Coast. It is a relatively small watercourse near its headwaters and increases in volume and has a more distinctive corridor as it makes its way out of the study area eventually forming a broad valley through the elevated terrain to the north-east of the study area.

15.8.3 Land Use and Land Cover

The landscape of the study area is almost entirely rural in nature. The predominant land uses consist of pastoral farming and some tillage on sloping, fertile and well drained ground. In flat and poorly drained lowland areas the predominant land use is rough grazing interspersed with commercial conifer plantations and some areas of unmanaged scrubland particularly around bog fringes. There are extensive areas of peatland much of which has been harvested for fuel at commercial and domestic scale. The array of sites comprising this wind energy proposal is principally contained within these flat peatland and wet farmland areas.

As something of an anomaly within the south-central study area is an extensive area known as The Curragh, which is a well-drained planar landscape popularly used for the racing and training of horses. At the northern end of the Curragh is Pollardstown Fen, which is a large naturalistic marshy area that attracts a variety of bird species.

The western outskirts of Dublin city are contained within the eastern periphery of the study area. The comprehensive urban land cover dissipates in a westerly direction (towards the central study area) as a series of satellite commuter settlements, major transport routes and industrial/business parks interspersed with fragmented peri-urban farmland. Though there are a number of other sizeable settlements within the study area, none contributes to urban land cover to the same degree as the outskirts of the major European city that is Dublin.

In this slightly elevated area at the periphery of the study area pastoral farming remains the predominant land use but gives way to rough grazing and commercial conifer plantations on higher slopes and ridges.

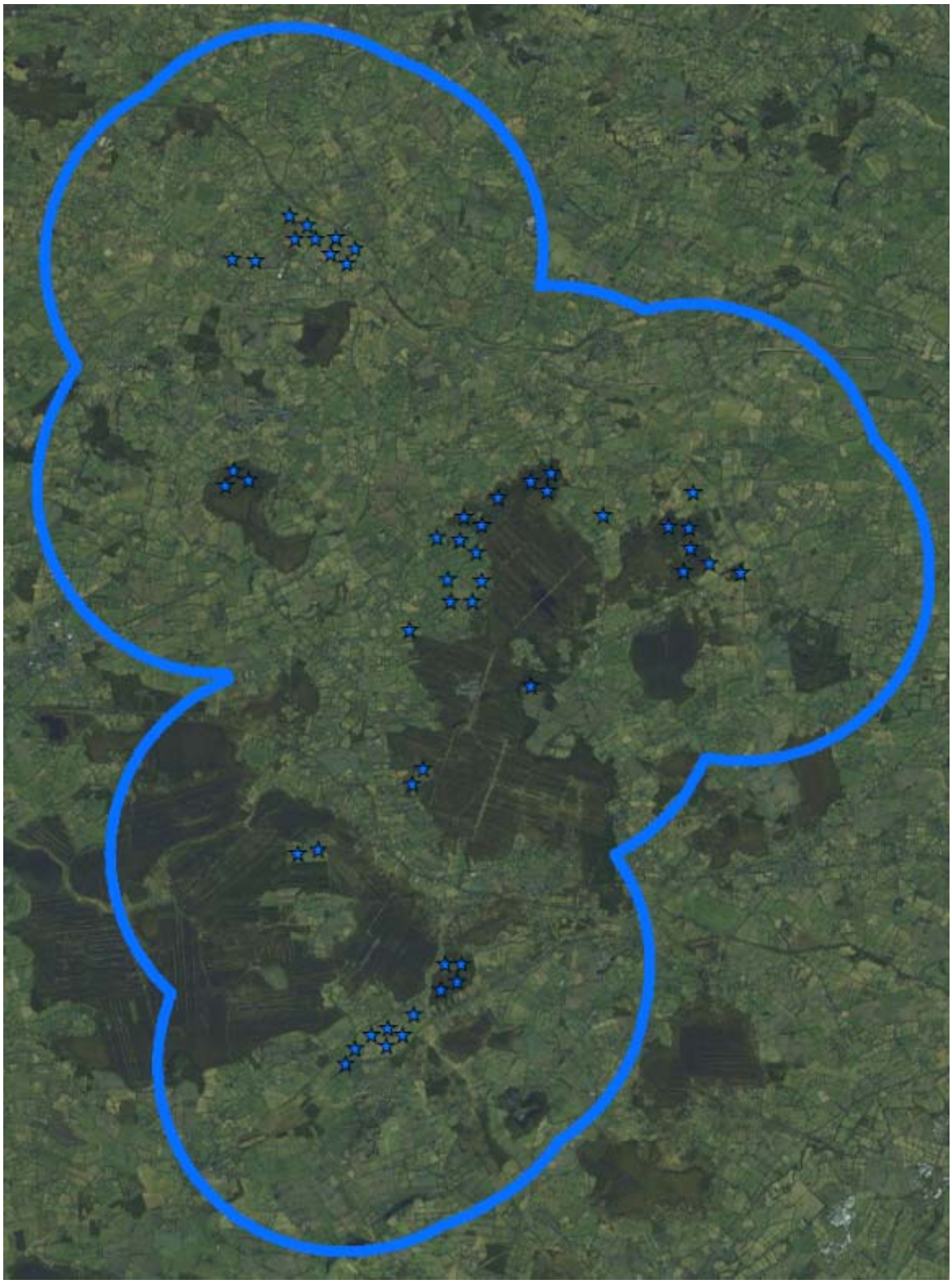


Figure 15.1: Land cover Pattern of cutaway bogs and farmland within the central study area

Figure 15.2: Typical flat lowland farmed landscape within the central study area

Figure 15.3: Typical flat Peatland landscape within the central study area

Figure 15.4: A crest of low hills rising out of the planar landscape of the central study area

15.8.4 Landscape Policy Context and Designations

Department of Environment, Heritage and Local Government Wind Energy Development Guidelines (2006)

The Wind Energy Development Guidelines (2006) provide guidance on wind farm siting and design criteria for a number of different landscapes types. The sites of the proposed development are considered to be located within a landscape that is generally consistent with the 'Flat Peatland' landscape type, but with some elements of the 'Hilly and Flat Farmland' landscape type from the Guidelines. Siting and design recommendations for these landscape types include the following:

Table 15.5: Guidance for Wind Farms in the 'Flat Peatland' landscape type (DoEHLG Wind Energy Development Guidelines – 2006)

Criteria	Guidance
Location	Wind energy developments can be placed almost anywhere in these landscapes from an aesthetic point of view. They are probably best located away from roadsides allowing a reasonable sense of separation. However, the possibility of driving through a wind energy development closely straddling a road could prove an exciting experience.
Spatial Extent	The vast scale of this landscape type allows for a correspondingly large spatial extent for wind energy developments.
Spacing	Regular spacing is generally preferred, especially in areas of mechanically harvested peat ridges.
Layout	In open expanses, a wind energy development layout with depth, preferably comprising a grid, is more appropriate than a simple linear layout. However, where a wind energy development is located close to feature such as a river, road or escarpment, a linear or staggered linear layout would also be appropriate.
Height	Aesthetically, tall turbines would be most appropriate. In any case, in terms of viability they are likely to be necessary given the relatively low wind speeds available. An even profile would be preferred.

Table 15.6: Guidance for Wind Farms in the 'Hilly and Flat Farmland' landscape type

Criteria	Guidance
Location	Location on ridges and plateaux is preferred, not only to maximise exposure, but also to ensure a reasonable distance from dwellings. Sufficient distance should be maintained from farmsteads, houses and centres of population in order to ensure that wind energy developments do not visually dominate them. Elevated locations are also more likely to achieve optimum aesthetic effect. Turbines perceived as being in close proximity to, or overlapping other landscape elements, such as buildings, roads and power or telegraph poles and lines may result in visual clutter and confusion. While in practice this can be tolerated, in highly sensitive landscapes every attempt should be made to avoid it.
Spatial Extent	This can be expected to be quite limited in response to the scale of fields and such topographic features as hills and knolls. Sufficient distance from buildings, most likely to be critical at lower elevations, must be established in order to avoid dominance by the wind energy development.
Spacing	The optimum spacing pattern is likely to be regular, responding to the underlying field pattern. The fields comprising the site might provide the structure for spacing of turbines. However, this may not always be the case and a balance will have to be struck between adequate spacing to achieve operability and a correspondence to field pattern.
Layout	The optimum layout is linear, and staggered linear on ridges (which are elongated) and hilltops (which are peaked), but a clustered layout would also be appropriate on a

Criteria	Guidance
	hilltop. Where a wind energy development is functionally possible on a flat landscape a grid layout would be aesthetically acceptable.
Height	Turbines should relate in terms of scale to landscape elements and will therefore tend not to be tall. However, an exception to this would be where they are on a high ridge or hilltop of relatively large scale. The more undulating the topography the greater the acceptability of an uneven profile, provided it does not result in significant visual confusion and conflict.

As can be seen from Tables 15.5 and 15.6 above, the guidance in respect of wind energy development in 'Hilly and Flat Farmland' is somewhat contradictory to that in 'Flat Peatland' areas, especially in regards to spatial extent and height. This is a regular occurrence when interpreting the Guidelines as most wind farm sites traverse, or contain elements of more than one landscape type. In such instances it is necessary to understand the characteristics of the landscape types and how this has informed the particular guidance. For example, the degree of openness or enclosure from terrain and vegetation as well as the scale of prevailing landscape patterns are the main reasons for the disparate guidance in the two landscape types applicable to this site. The design approach for the proposed wind farm is most consistent with the guidance relating to 'flat peatland' landscapes as this is the predominant character type. This is manifest in the proposed turbine height and the extent of some of the larger clusters of the development.

15.8.5 County Development Plans

Whilst the proposed wind farm is predominantly located in north-western County Kildare, there are two turbines located just inside the southern boundary of County Meath. The proposal is also located in relatively close proximity to western County Offaly. The proposed development could potentially influence the landscape character of the nearest parts of these counties. Thus, the landscape and wind energy related policies of the relevant parts of these counties will also be taken into consideration in this section.

15.8.6 Kildare County Development Plan (2011 – 2017)

A Landscape Character Assessment was prepared for County Kildare in 2004 and is incorporated into the Development Plan as Appendix 3. Landscape policy is dealt with in Chapter 14 of the main document entitled Landscape, Recreation and Amenities. There are considered to be four major landscape character types; Uplands; Lowland Plains and Boglands; Transitional Lands; and, River Valleys and Water Corridors. Nearly all of the proposed turbines are contained within the Lowland Plains and Boglands landscape type but with some skirting the edges of water corridors associated with the Grand Canal and Royal Canal. There are also proposed turbine clusters in close proximity to the 'upland' areas known as the Northern Hills (Newtown Hills) and the 'Chair of Kildare' Hills (Red Hill, Dunmurry Hill, Allen Hill). These are the Drehid-Hortland and Cloncumber clusters respectively.

Fifteen geographically distinct landscape character areas are derived from the main landscape character types. All of the proposed turbines (except the two in Meath) are spread between two of these, which include the 'North-western Lowlands' and the 'Western Boglands'. The 'Grand Canal', 'Northern Hills' and 'Chair of Kildare' hills are each considered to be distinct landscape character areas in their own right and, as described above, there are proposed turbines in relatively close proximity to each of these LCA's.

Figure 15.5: Excerpt from Map 14.1 of the Kildare CDP showing the Maighne Wind Farm sites in the context of Landscape Character Areas

LCA9 – Western Boglands

Key Characteristics derived directly from the LCA Description;

- *Flat topography and smooth terrain.*
- *Unstable and unproductive land.*
- *Highly distinctive due to the existing large areas of bogland vegetation. The commonly large sized open lands are often bordered by unmaintained hedgerows, which contain scattered trees, and have the potential to partially screen adjacent lands.*
- *The generally low vegetation and the even ground provide extensive long-distance visibility.*
- *The skyline to the south of this unit is defined by the Chair of Kildare Hills and the Northern Uplands define the skyline to the northeast*
- *The major landuse in the area is peat extraction*
- *Significant areas of pastureland can also be found, together with patches of tillage*
- *A complementary significant landuse in the area is represented by the large coniferous forests planted in cutaway bogs and the natural revegetation occurring in set-aside cutaway areas*
- *The area is thinly populated.*

Critical Landscape Factors:

- **Smooth Terrain** – Long distance vistas, inability to visually absorb development
- **Low Vegetation -** Long distance vistas, inability to visually absorb development
- **Shelter Vegetation** - Large coniferous plantations, natural visual barrier, visual complexity and containment

Landscape Sensitivity - ***Medium***

LCA7 – North-western Lowlands

Key Characteristics derived directly from the LCA Description;

- *Generally flat topography and smooth terrain, gently undulating around Carbury.*
- *Medium to large field patterns are bordered by well-maintained and low hedgerows, which contain scattered trees along some sections of the field boundaries*
- *Distant views include the skylines of Newtown Hills to the east and Allen Hill to the south-east*
- *The predominant landuse in this area is pasture, with large areas of non-irrigated arable lands (mainly tillage). A relatively large area of mixed forest, combined with some coniferous plantations, can also be found.*
- *Extensive areas of bogland also occur, combined with peat extraction sites, as well as gravel extraction sites west of Cadamstown*
- *Relatively low population density.*

Critical Landscape Factors:

- **Smooth Terrain** – Long distance vistas, inability to visually absorb development
- **Undulating Topography** - Physical shielding and visual enclosure,
- **Low Vegetation -** Long distance vistas, inability to visually absorb development
- **Shelter Vegetation** - Large coniferous plantations, natural visual barrier, visual complexity and containment

Landscape Sensitivity - ***Low***

LCA3 – Northern Hills

Key Characteristics derived directly from the LCA Description:

- *Small upland area on the central-northern part of the County boundary*
- *Hills to the north and south of Newtown (with 145m O.D. and 135m O.D. respectively) that locally define the skyline in this area*
- *Scenic views over the northern and north-western plains of Kildare as well as to the Royal Canal corridor*
- *Potential for development to penetrate the ridgelines when viewed from local roads and villages in the area*
- *The area is largely dominated by pastureland*
- *Land parcels are of medium to large size, with generally well-maintained low hedgerows.*

Critical Landscape Factors:

- **Elevated Vistas** - long distance views towards the Northern and North-western Lowlands.
- **Slopes** - often provides an area with its character, intensifies the visual prominence of any feature, defines the visual boundary of the adjacent lowland areas.
- **Prominent Ridgelines** - ridgelines of this upland area of Newtown Hills are not of major order, locally appear as primary ridgelines, provide adjacent areas with a sense of visual identity and containment.
- **Undulating Topography** - Physical shielding and visual enclosure.
- **Low Vegetation -** Long distance vistas, inability to visually absorb development
- **Shelter Vegetation** - Large coniferous plantations, natural visual barrier, visual complexity and containment

Landscape Sensitivity - ***High***

LCA4 – Chair of Kildare Hills

Key Characteristics derived directly from the LCA Description;

- *Consists of a number of hills that interrupt the continuity of the Kildare plains; Red Hill, Dunmurry Hill, Allen Hill.*
- *The elevated nature of this area provides highly scenic views over the central plains and boglands of Kildare*
- *The Hill of Allen is of mythological significance, with the legendary Fionn MacCumhaill and the Fianna*
- *Large fields within this area are generally used as pasture lands*
- *Coniferous forestry represents another significant landuse in the area, with some patches of naturally occurring vegetation, mainly at Allen and Dunmurry Hills*
- *Allen Hill is characterised by the mineral extraction and quarrying activities on its north-western part. Similarly, Boston Hill has a large area of gravel extraction activities. A visually dominant feature of Red Hill is the telecommunication mast located on the hilltop*
- *Land parcels within this unit are of medium to large size, with generally well-maintained low hedgerows.*

Critical Landscape Factors:

- **Elevated Vistas** - long distance views towards the Northern and North-western Lowlands
- **Slopes** - often provides an area with its character, intensifies the visual prominence of any feature, defines the visual boundary of the adjacent lowland areas
- **Prominent Ridgelines** - nearly all ridgelines are primary when viewed from the surrounding lowland areas, provide adjacent areas with a sense of visual identity and containment
- **Undulating Topography** - Physical shielding and visual enclosure,
- **Low Vegetation -** Long distance vistas, inability to visually absorb development
- **Shelter Vegetation** - Large coniferous plantations, natural visual barrier, visual complexity and containment

Landscape Sensitivity - ***High***

LCA13 - Grand Canal and LCA14 – Royal Canal

Key Characteristics derived directly from the LCA Description:

- *Smooth terrain and even topography characterise the canal corridor which generally progress into pasturelands and boglands.*
- *Although natural vegetation occurs at some of the sections. The corridor and its adjacent lands have been landscaped and enhanced along the sections where the canal crosses urban areas.*
- *Long-distance views of the canal corridors can be obtained from existing bridges and distant views of the County uplands (such as Red Hill and Allen Hill) can also be gained from certain vantage points.*
- *The canal provides drainage to adjacent lands, rendering them a higher potential for mixed use. Large tillage fields also occur at some areas, as well as coniferous plantations and mixed forests.*

- *Small settlements such as Allenwood and Robertstown, together with a significant number, however dispersed pattern, of scattered houses on the canal shores, are indicative of a relatively low population density.*

Critical Landscape Factors:

- **Smooth Terrain** – Development can have a disproportionate visual impact along this water corridor, due to an inherent inability to be visually absorbed by the existing topography.
- **Low Vegetation** - Failing to break up vistas, inability to visually absorb development.
- **Shelter Vegetation** - Natural vegetation that grows along the shores of the canal, as well as by coniferous and mixed plantations adjacent to the water corridor.
- **Localised Canal Views** - Views of the canal are available, both from the local roads and from viewing points on bridges located along the canal corridor. Highly localised areas of very distinctive character and a high degree of visual consistency.

Landscape Sensitivity - ***High***

The Landscape Character Areas are assigned to 3 classes of landscape sensitivity in Map 14.2 (Landscape Sensitivity Areas). This indicates that the Western Boglands LCA is considered to be of medium sensitivity and the North-western Lowlands are of low sensitivity. Both of the surrounding LCAs 'Northern Hills' and the 'Chair of Kildare Hills' are deemed to be of high sensitivity. It should be noted that County Kildare does not yet have an adopted Wind Energy strategy. This would usually be driven by the Landscape Character Assessment and in particular the landscape sensitivity ratings assigned to each of the LCAs. Relevant landscape policies in relation to the 'Lowland Plains and Boglands' areas are found at 14.8.2 of the County Development Plan and include;

> ***LL 1****: To recognise that the lowlands are made up of a variety of working landscapes, which are critical resources for sustaining the economic and social well-being of the county.*
>
> ***LL 2****: To continue to permit development that can utilise existing structures, settlement areas and infrastructure, whilst taking account of the visual absorption opportunities provided by existing topography and vegetation.*
>
> ***LL 3****: To recognise that this lowland landscape character area includes areas of significant landscape and ecological value, which are worthy of protection.*
>
> ***LL 4****: To recognise that intact boglands are critical natural resources for ecological and environmental reasons.*
>
> ***LL 5****: To recognise that cutaway and cut-over boglands represent degraded landscapes and/ or brownfield sites and thus are potentially robust to absorb a variety of appropriate developments.*

These lowland landscape polices clearly indicate a pragmatic approach to development within these robust landscape areas, but with a measured degree of caution with respect to habitat value.

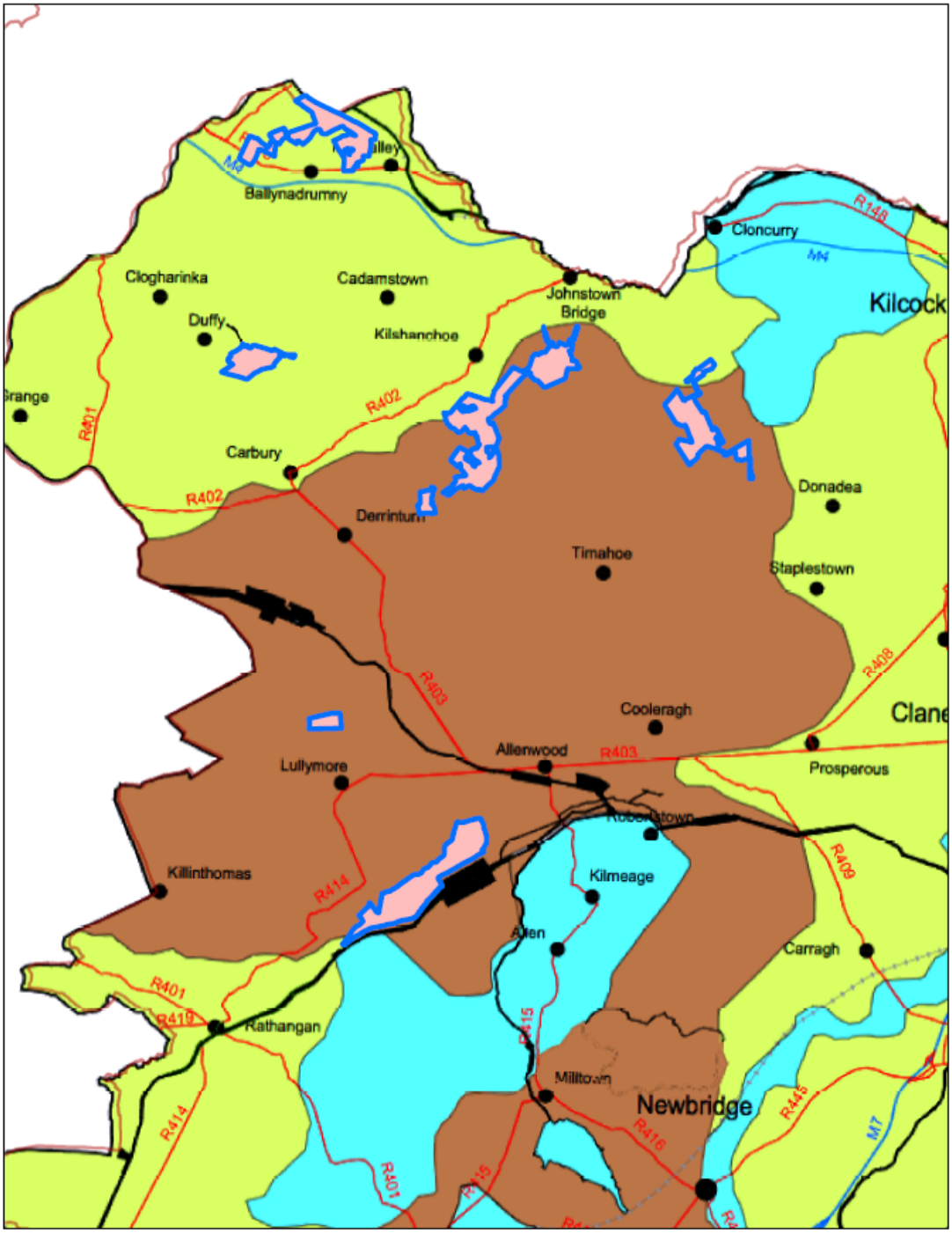


Figure 15.6: Excerpt from Map 14.2 of the Kildare CDP showing relevant Landscape Sensitivity Areas

15.8.7 Meath County Development Plan (2013 – 2019)

A Landscape Character Assessment was prepared for county Meath in 2007 and this is incorporated into the County Development Plan 2013–2019 as Appendix 7. The Landscape Character Assessment identifies four generic Landscape Character Types (LCT's) for the county including; Hills and Upland Areas; Lowland Areas; River Corridors and Estuaries and; Coastal Areas. The two turbines straddling the Meath/Kildare border at Longwood are fully contained within the 'Lowland Areas' Landscape Type and LCA6 – Central Lowlands.

LCA6 – Central Lowlands

Key Characteristics derived directly from the LCA Description:

- *Rolling drumlins interspersed with numerous large estates and associated parkland. Thick wooded hedgerows, with some conifer plantations, and shelterbelts*
- *Medium to large fields*
- *Less populated and the built fabric consists of scattered dwellings, with concentrations of residential dwellings present adjacent to arterial routes within the vicinity of larger villages such as Longwood and Ballivor*
- *Well-managed patchwork of small pastoral fields, dense hedgerows and small areas of broadleaved woodland*
- *Estate landscapes with large mature parkland trees*
- *rolling pastureland*
- *Large conifer plantations and birch woodland around the Boyne river corridor*
- *Views within this area are generally limited by the complex topography and mature vegetation except at the tops of drumlins where panoramic views are available particularly of the Hill of Tara uplands and Skryne Church.*

Landscape Value;
High

Landscape Sensitivity;
Medium

Landscape Importance;
Regional

Capacity for Wind Energy:
Low *– "This LCA would have low potential capacity to accommodate wind farms due to the high number of receptors but medium potential capacity to accommodate single turbines because extensive views could be more easily limited by vegetation and through careful location".*

Note: Notwithstanding that the two proposed turbines within County Meath are contained within LCA6 - 'Central Lowlands', they are contained within a small section of this LCA that lies to the south of the elevated Royal Canal corridor, which acts as something of a landscape character divide. In terms of landscape descriptions this southerly portion of LCA6 is more akin to the adjacent LCA9 – 'Western Boglands' LCA within County Kildare in which the majority of the associated Ballynakill turbine cluster is contained.

15.8.8 Offaly County Development Plan (2014 – 2020)

Offaly does not have a Landscape Character Assessment. Instead, landscape areas or features are classified as being of high, medium or low sensitivity. The nearest of the proposed turbine clusters to County Offaly are contained within a shared bogland area (Western Bogland – Kildare CDP). The two development plans are consistent with their classification of this shared bogland with Offaly County Council also determining it to have a 'moderate' degree of sensitivity. Under the Offaly County development plan this area is identified as being within one of the few broad areas suitable for wind energy development.

15.8.9 Ecological Designations

Ecological designations such as candidate Special Areas of Conservation (cSAC's), Special Protection Areas (SPA's) and Natural Heritage Areas (NHA's) are relevant to the landscape and visual assessment as they can identify areas that are likely to exhibit naturalistic character and low levels of built development. They also highlight areas to which landscape conservation values are attached and they are commonly associated with outdoor amenity facilities where people go to enjoy the landscape setting.

In this instance there are four cSACs in central County Kildare which include; Mouds Bog; Pollardstown Fen; Ballynafagh Bog and Ballynafagh Lake. None of these are within 5km of the nearest proposed turbines and they are all lowland sites. Consequently, the proposed wind farm will have very little potential to significantly influence the landscape setting of these naturalistic habitat areas.

15.9 Visual Baseline

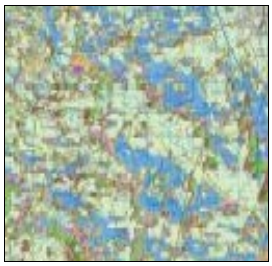
The visual baseline for this wind farm proposal establishes both the nature of visibility within the study area and the important receptor locations from which the development might be viewed.

Only those parts of the study area that potentially afford views of the proposed wind farm are of interest to this part of the assessment. Therefore, the first part of the visual baseline is establishing a 'Zone of Theoretical Visibility' (ZTV). This is usually the single form of computer generated visibility analysis used in establishing the visual baseline for wind farm developments, however, ZTV maps provide only a basic level of information. That is, they show from where in the landscape of the study area the proposed development will, or will not, be visible due to terrain screening. Basic ZTV analysis does not account for the scale in relation to distance of turbines as a ZTV map would, for example, indicate the same level of visibility at 1km as at 100km. Thus, they are often misunderstood or assigned too much importance in the context of considering proposed wind farm developments. For this reason, a more advanced form of ZTV analysis has also been utilised for this baseline study and this has been coined Theoretical Visual Intensity (TVI) mapping. It uses the same basis as ZTV mapping, but also takes into account a number of other factors relating to the perceived visual presence of turbines (see Appendix M.2 for a detailed methodology).

The value of visual intensity mapping is that it highlights where in the study area the proposed turbines are likely to be a prominent visual feature and therefore have the potential to give rise to higher order visual impacts. It must be reiterated that Visual Intensity Mapping is still a part of baseline analysis as it does not take account of the nature of change to views or the sensitivity of visual receptors, which remain the subject of professional judgment by the landscape assessor. As with standard ZTV analysis, Visual Intensity Mapping also does not account for screening of views by the likes of vegetation and buildings, which can be a key factor in bogland and rural lowland landscapes. For this reason yet another layer of analysis is provided and this is termed Route Screening Analysis (RSA).

Route Screening Analysis, as its name suggests, considers actual visibility of the proposed wind farm from surrounding roads using current imagery captured in the field then subsequently reviewed in the context of a digital model of the development. Route Screening Analysis bridges the gap for the assessor between the computer-generated, theoretical visibility modelling (expressed on the earlier ZTV and TVI maps) and the actual nature of visibility in the central study area.

The apparently complex relationship between the elements of the visual baseline study is expressed in-short over.

Baseline study element	Value	Limitations
Zone of Theoretical Visibility (ZTV) Map 	• Basic understanding of where the development could be seen from within the terrain of the study area • Can differentiate numbers of turbines visible • Can be generated from any point on the turbine (blade tip, hub etc.) • Can be run in reverse as a design tool to avoid visibility at highly sensitive receptors	• Does not differentiate beyond visible / not visible • Theoretical as it does not account for terrestrial screening by vegetation and buildings • Visual exposure can be heavily overestimated in certain landscape types causing confusion • Often misconstrued as part of the assessment rather than the baseline
Theoretical Visual Intensity (TVI) Map 	• Essentially a weighted ZTV map • Takes account of several visibility factors in one map • Aids selection of viewpoints for the visual impact assessment	• Theoretical as it does not account for terrestrial screening by vegetation and buildings • Visual exposure can be heavily overestimated in certain landscape types causing confusion • Could be misconstrued as part of the assessment rather than the baseline
Route Screening Analysis (RSA) 	• Provides an actual, rather than theoretical, estimate of visibility • Can be compared with ZTV data to highlight if there is a strong discrepancy between actual and theoretical visibility • Can provide local residents with an understanding of visibility from close to their property • Collects a database of imagery and visibility that can used by other disciplines • Can highlight a distance threshold beyond which turbines become screened by prevailing vegetation	• Relies on a degree of human judgement • Will provide varying results across different seasons • Only undertaken for central study area • Could be misconstrued as part of the assessment rather than the baseline

15.9.1 Zone of Theoretical Visibility (ZTV)

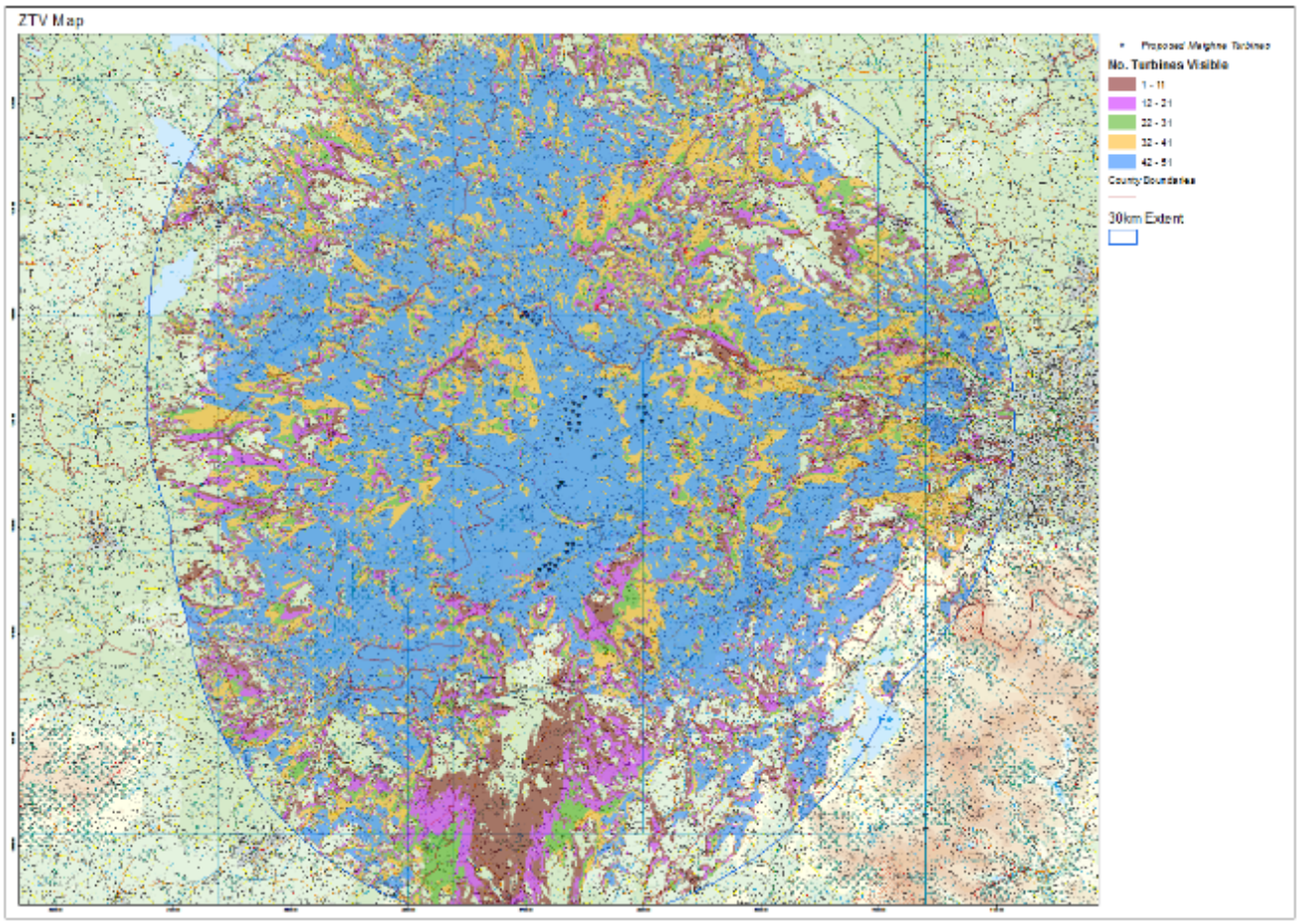


Table 15.7: ZTV map for Maighne Wind Farm (See Volume 4 for full scale annotated ZTV maps generated from hub height and blade tip)

The following key points should be noted from the ZTV maps (Volume 4):

- There is relatively consistent ZTV coverage within 5 km of all turbines although around the two northern clusters of 'Ballynakill' and 'Windmill' this does not include all turbines. The comparative visual isolation of these two clusters is caused by the hills around Carbury, which lie between them and the clusters further to the south and east.

- ZTV coverage remains relatively consistent out to the edge of the study area in an easterly, westerly and northerly direction. Whereas, to the northeast and south it becomes sporadic beyond 5 km due to elevated ground associated with the Northern Hills of County Kildare and the chair of Kildare to the south.

- The gradual petering out of ZTV coverage in all directions highlights that the mildly undulating ground is an increasingly effective screen as distance increases from the proposed turbines and the relative scale diminishes.

- Whilst over 90% of the study area is shown to have some level of theoretical visibility, significant areas (30%+) are shown to have only partial views of this dispersed wind farm. Partial views still include the majority of turbines, but the pattern indicates that the isolated crescents of hills that surround the basin in which the wind farm is located, provide some degree of terrain screening over wider distances. The radial pattern of the ZTV colours in a westerly direction indicates that the turbines are generally visible between isolated hills.

- Whereas, the more sporadic and concentric pattern to the north and east indicates that turbines are becoming increasingly less visible above the intervening terrain with increased distance. In such areas it also indicates that views of the turbines are likely to be limited to blade tips only above intervening terrain.

- The most important point when considering the ZTV map in a flat to mildly undulating area such as this is that it is not a true representation of visibility as it takes no account of the screening provided by vegetation. This can be considerable and may limit views of even tall turbines within very short distances. The main benefit of the ZTV map in this instance is to indicate where views of the turbines are definitely not available.

15.9.2 Theoretical Visual Intensity (TVI) Map

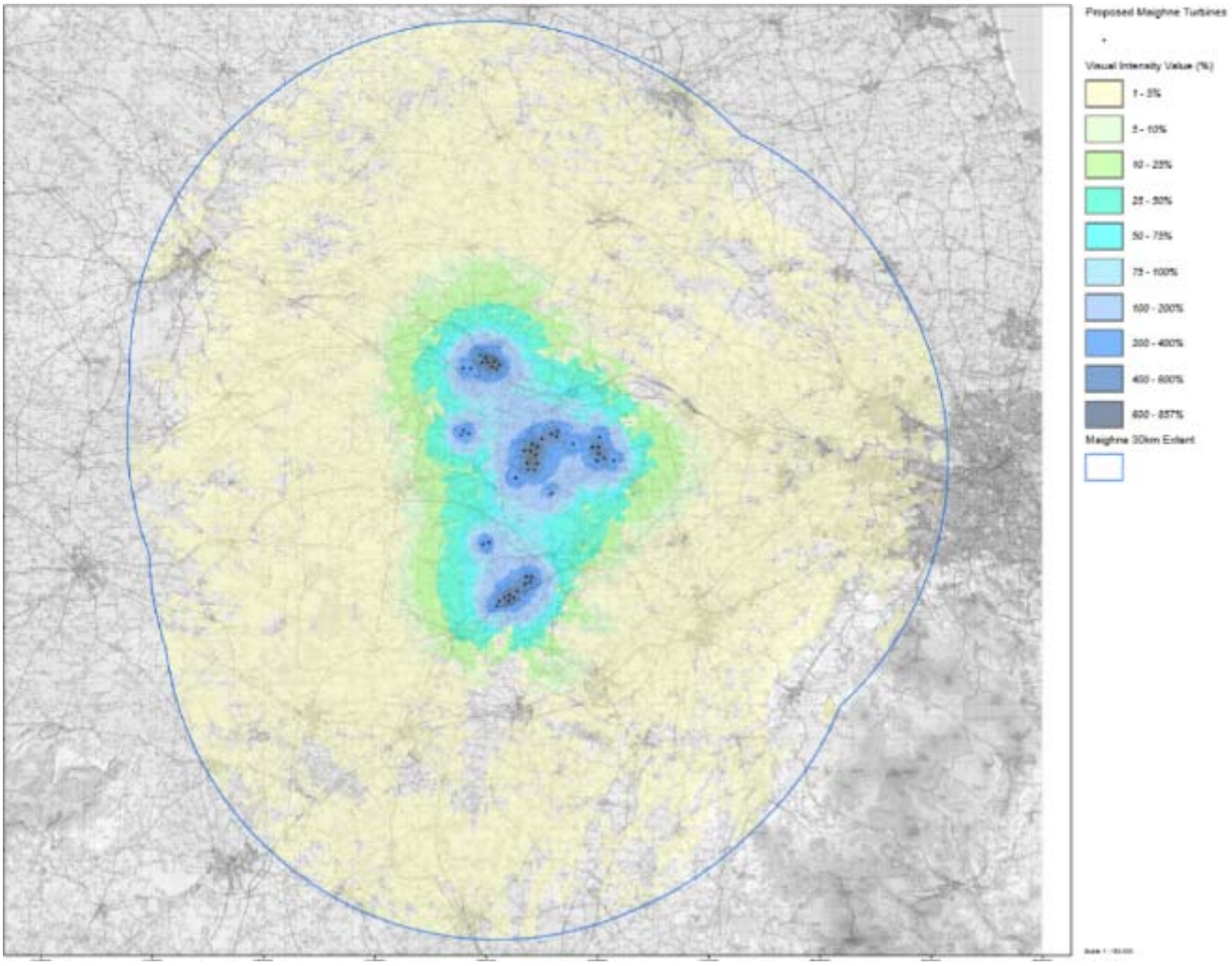


Figure 15.7: TVI map for Maighne Wind Farm (See Volume 4.A.2 for large scale map)

A simple description of the Theoretical Visual Intensity map is that it is a measure of the proportion of a 360° viewshed that would be occupied by turbines within the context of the surrounding terrain. For ease of comprehension it is calibrated so that a value of 100% is placed on the view of one full turbine at 1km distance. This is not intended as a limit of acceptability or a key threshold. (See Appendix M.2 for a detailed methodology for TVI mapping).

The following key points are apparent from the TVI map:

- The highest category of TVI (600 – 860%) occurs in the very core of only the largest turbine clusters were at least 5 to 6 turbines are located within 2 km. These areas are surrounded on all sides by turbines and are generally contained within bog areas well away from the nearest residential receptors.

- The next highest category of TVI (400 – 600%) also occurs only within the largest turbine clusters. Whilst these areas all have numerous turbines within the first 2 km they are not necessarily surrounded by turbines as is the case with the previous category. These areas tend to skirt the nearest local roads and residential receptors and are the highest level of TVI that is likely to be experienced by local residents. A typical scenario would include 1 to 2 turbines within a kilometre with several others between 1 and 2 km.

- The next category of TVI (200 – 400%) occurs within a kilometre of all turbines regardless of how many are contained within the cluster. However, these zones tend to be wider and incorporate a greater area of landscape when located in close proximity to a number of turbines. Whereas, it surrounds clusters of 1 to 3 turbines, the zones are almost perfectly concentric. The typical scenario being the nearest turbine at around 1 km distance and several others within 2 to 3 km. Around larger clusters this level of TVI might also occur where there are a number of turbines between 1 and 3 km. Local roads and houses as well as small villages are commonly contained within this zone of TVI.

- The 100 – 200% TVI category envelops all of the proposed clusters that form part of this scheme and links between them. The only exception being the windmill cluster that is comparatively isolated to the West of the Drehid Hortland cluster. In this instance the comparative isolation indicated by the TVI map is partly to do distance and also slightly elevated terrain that lies between the windmill and surrounding clusters. This zone of TVI will typically not contain any turbines within 1 km, but will have several within 3 km. There is also a minor degree of separation in the TVI pattern for this category between the northern and southern clusters (Derrybrennan and Cloncumber).

From experience, it is considered that receptors experiencing levels of TVI greater than 500% with a clear view of the nearest turbines will almost always be attributed a visual presence judgement of Highly Dominant or Dominant (visual presence being the more objective side of determining visual impact magnitude). For this project this could include receptors within either of the first two categories of TVI. It is within the next two categories (100 - 400% TVI) that experience shows visual presence judgements in the order of Dominant to Co-dominant are likely to be attributed. The potential for significant visual effects to be experienced below 100% TVI tends to become much more related to the sensitivity of the receptor than the magnitude of the impact. Whereas, in the first four zones the magnitude of the impact is usually the stronger influence on the overall significance of effects.

15.9.3 Route Screening Analysis (RSA)

In a flat landscape, such as that of the central study area which incorporates a network of hedgerows, scrubby bog fringe woodlands and forest plantations, a standard ZTV map is of little value in understanding actual visibility. That is, it grossly overestimates visibility compared to an open peatland or mountain moorland landscape for example. In order to get a clearer understanding of visibility within the central study area, Route Screening Analysis (RSA) was undertaken for every road and canal within a 5km radius of proposed turbines (See Appendix M.2 for detailed RSA methodology).

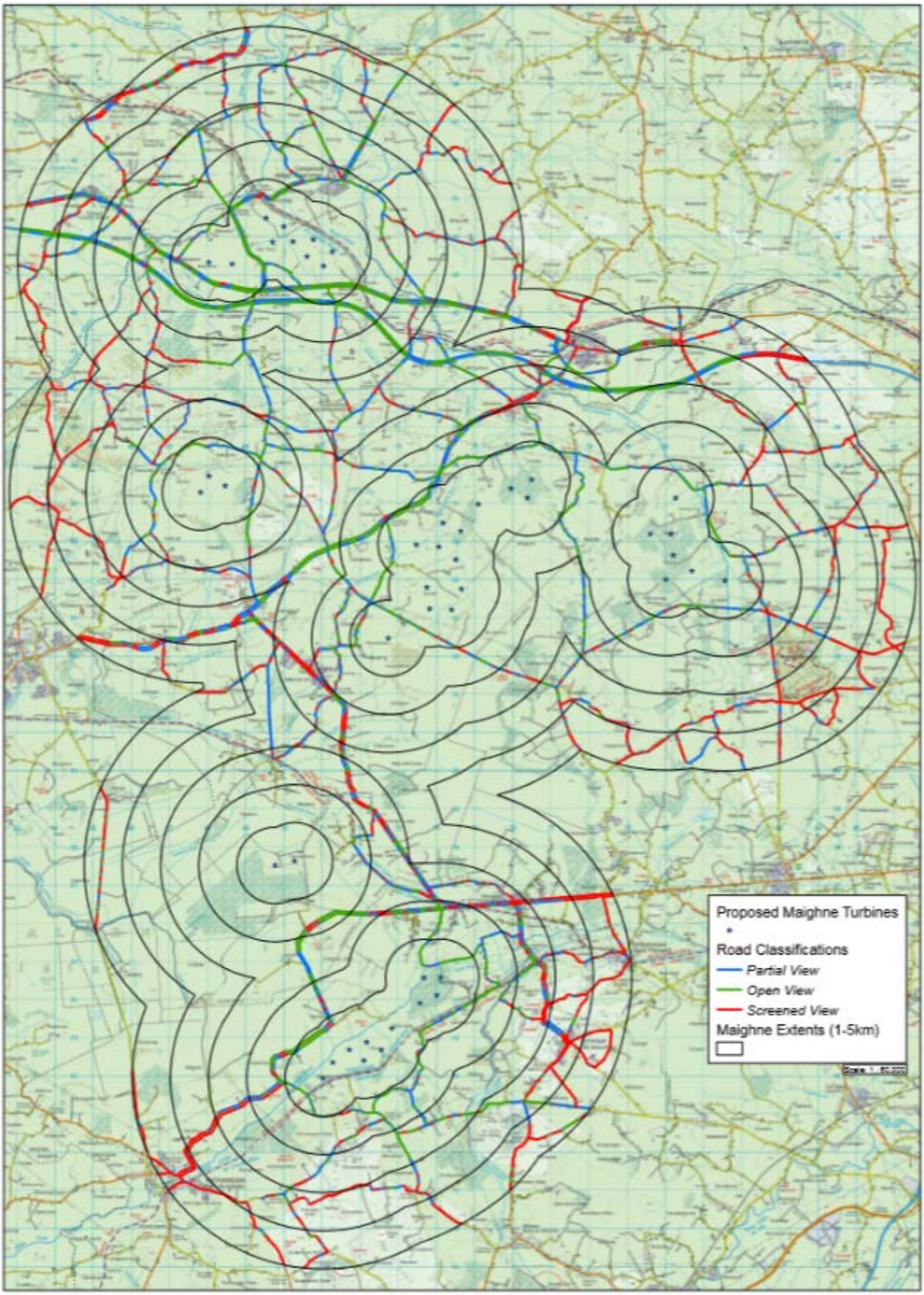
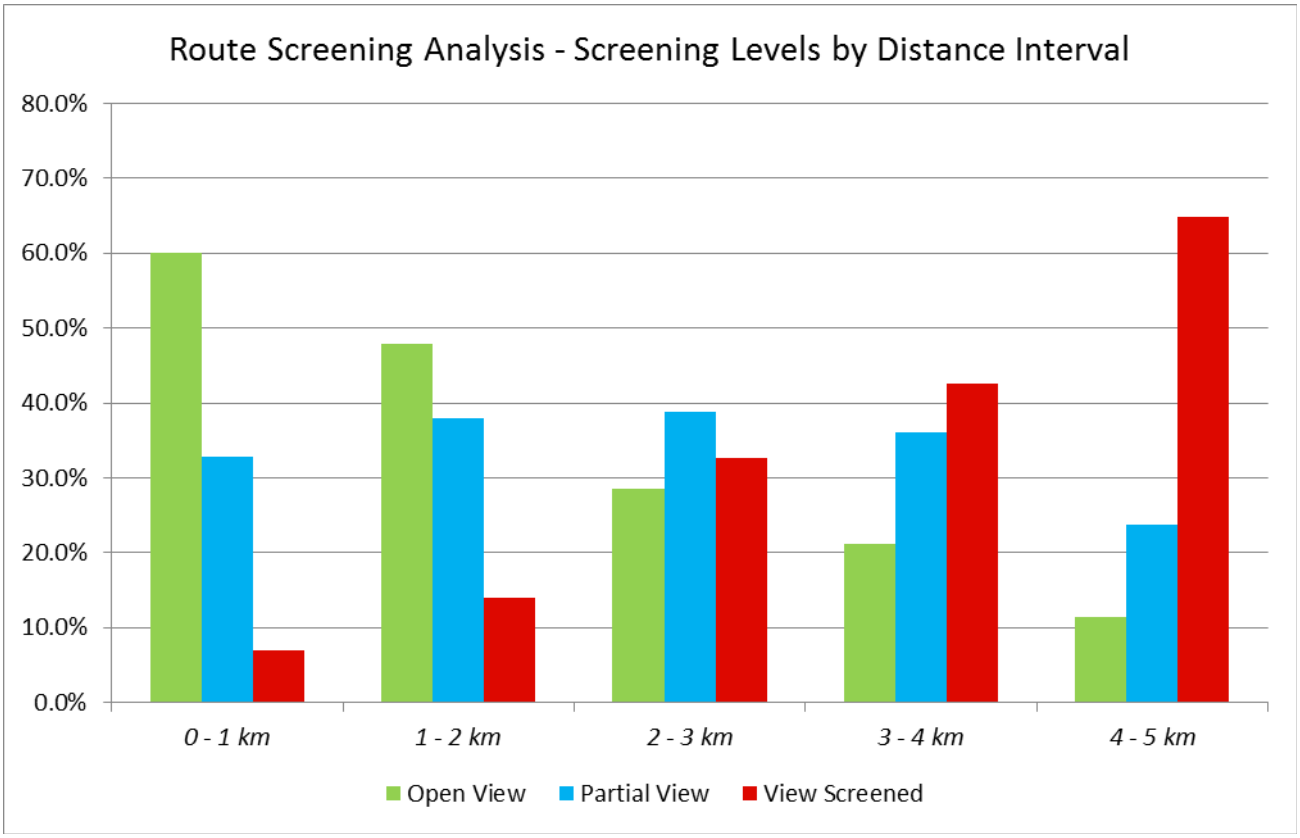


Figure 15.8: Map of Route Screening Analysis (See Volume 4 for large scale map)



Results of Route Screening Analysis

Only within the first two distance bands of 0-1km and 1-2km is there a higher proportion of open visibility compared to partial visibility or fully screened sections of road. The ratio between the three visibility classes is also seen to be reducing rapidly until they become roughly even in the 2-3km distance band. Thereafter the visibility trend reverses with an increasingly higher proportion of roads being afforded no view of the proposed turbines due to intervening screening.

The higher proportion of open visibility in the nearest two distance categories is likely to be because the full blade sets of turbines will tend to rise above any foreground screening elements at these shorter viewing distances. The roughly even split between the three visibility classes in the 2-3km distance band indicates a threshold of visibility has been reached where turbines are beginning to be seen at a similar height as intervening vegetation structures and thus, they are becoming screened. This is confirmed by the trend in all of the remaining distance bands, where the proportion of fully screened sections of road increases steadily to 65% in the 4-5km distance band. As a consequence, the proportion of open visibility gets progressively lower, down to only 7% in the 4-5km distance band. Partial visibility remains at a similar proportion throughout the distance bands, but is slightly lower in both the nearest and furthest bands where there tends to be less ambiguity as to whether turbines are fully screened or openly visible.

- The strong inverse linear relationship over distance between ‘open visibility’ and the ‘fully screened’ categories and the fact that these graphs meet in the 2-3km band is an important factor in terms of understanding the visual absorptive capacity of this area. For example, it is reasonable to extrapolate from these findings that there will rarely be a clear view of more than 5-10 turbines from dwellings in the lowland central study area, given the spatial distribution of the turbine clusters and individual turbines throughout the central study area. This theory is tested at 15.9.3.2 below.

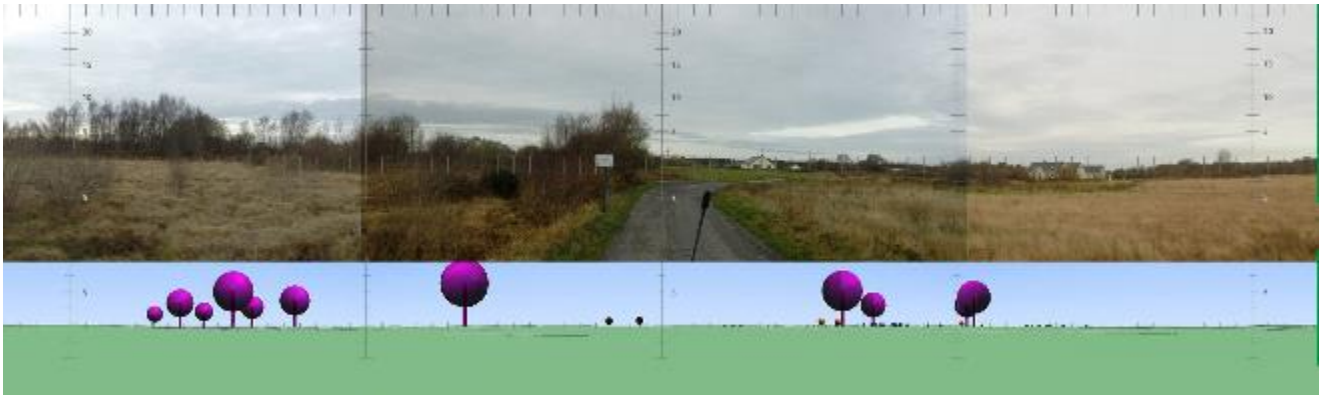


Figure 15.9: Image extracted from the Route Screening Assessment indicating a typical 'Open view' scenario

The visibility pattern (as seen in the RSA map at Figure 15.9) is relatively concentric as would be expected from the RSA graph (Figure 15.11). That is, it shows that the majority of routes in the outer distance bands (3-4km and 4-5km) will not be afforded views of the proposed turbines and that the highest proportion of open visibility occurs in the two nearest distance bands (0-1km and 1-2km). However, the RSA map also highlights several interesting trends that may not be so readily apparent from the associated graph. Firstly, major routes including the M4 motorway, the R148 (old N4) the R402 and the R414 tend to have a higher proportion of open visibility than local roads. This open visibility also tends to extend to greater distances than within the local road network. Furthermore, within the local road network there is less of a sense of a concentric pattern between openly visible (red) and partially visible (blue) in the nearest distance bands (0-1km and 1-2km). Instead, this pattern tends to be more sporadic. Taking all of these factors into account, it would appear that although the RSA graph indicates an average visibility threshold (screening distance) of 2-3km this is likely to be greater for the major routes and lower for local roads and, by implication, the local population. Three reasons why proportionally higher visibility may occur on major routes is that;

- They have a broader corridor with a greater relative distance to roadside screening than local roads
- A number of these routes are slightly elevated above the prevailing ground level as they pass through the study area
- Several of these routes have been relatively recently upgraded and widened with a temporary reduction in levels of roadside screening

The RSA map also highlights how devoid of even local roads some parts of the central study area are. The most notable of these areas being a band that runs through the south-central study area between the Cloncumber cluster and all of the other clusters further to the north. The only significant road to link through this area is the R403 and this shows a very low proportion of open visibility of turbines.

In order to understand the degree of discrepancy between the ZTV map (Figure 15.10) and actual visibility of turbines represented by the RSA map, the two have been compared by overlaying the ZTV pattern on the same local road network using the process illustrated in Figure 15.11 below. The graph at Figure 15.12 then indicates the results so that they can be directly compared to the RSA results shown at Figure 15.9 above.

Figure 15.10: Process of overlaying ZTV map on RSA map for comparison purposes

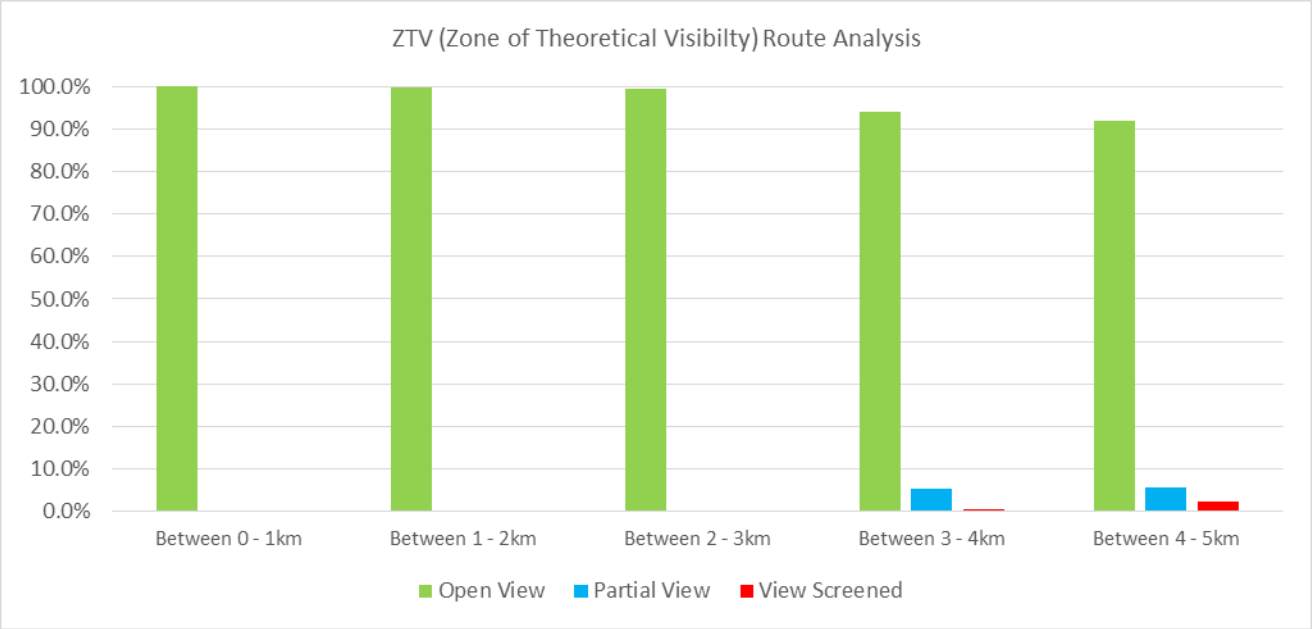


Figure 15.11: Graph showing the level of visibility from surveyed roads as determined by the ZTV pattern

When compared to Figure 15.10, Figure 15.13 above provides a clear indication of how vastly overestimated the degree of theoretical visibility is in the central study area compared to the actual visibility recorded as part of the Route Screening Analysis. For example, in the first three distance classes (covering 0-3km from nearest turbines) the ZTV map indicates 100% visibility from all roads. Even out to 5km the ZTV map indicates over 90% visibility from roads. By comparison the RSA shows that in reality only 60% of roads within 1km would have an open view of turbines with this figure falling consistently to only 12% beyond 4km. The main variable is vegetative screening from the hedgerows that occur throughout the rural landscape of the central study area. Thus, it can be concluded that the central study area has a very high degree of screening due to its vegetation patterns.

Further Evaluation of RSA 'Open Visibility' Class

For the primary RSA 'open visibility' was conservatively deemed to be a clear view of at least the full blade set of a single turbine. Based on the findings of the primary RSA, that vegetative screening within the central study area tends to screen the view of turbines beyond a distance of 2-3km, it was considered necessary to undertake additional analysis of the 'open view' category (see detailed methodology in Appendix M.2).

This would determine how many turbines are likely to be clearly visible from any location already determined to have an 'open view'. This analysis was divided into three classes being; 1-5 turbines, 5-10 turbines and 10+ turbines. The results are shown in Figures 15.12 and 15.13 below.

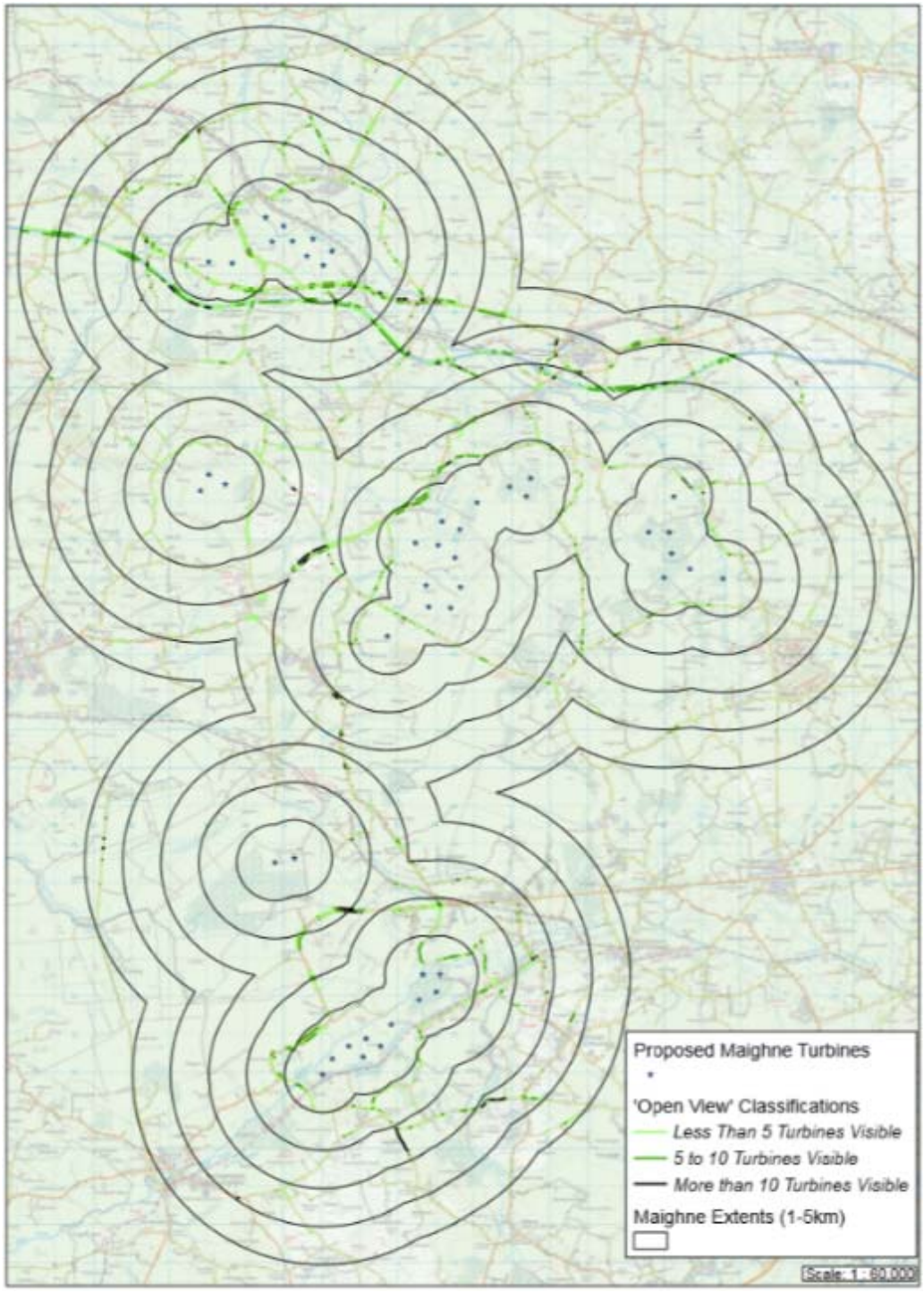


Figure 15.12: Map indicating additional analysis of RSA 'open view' category to determine numbers of turbines visible (See Volume 4 for large scale map)

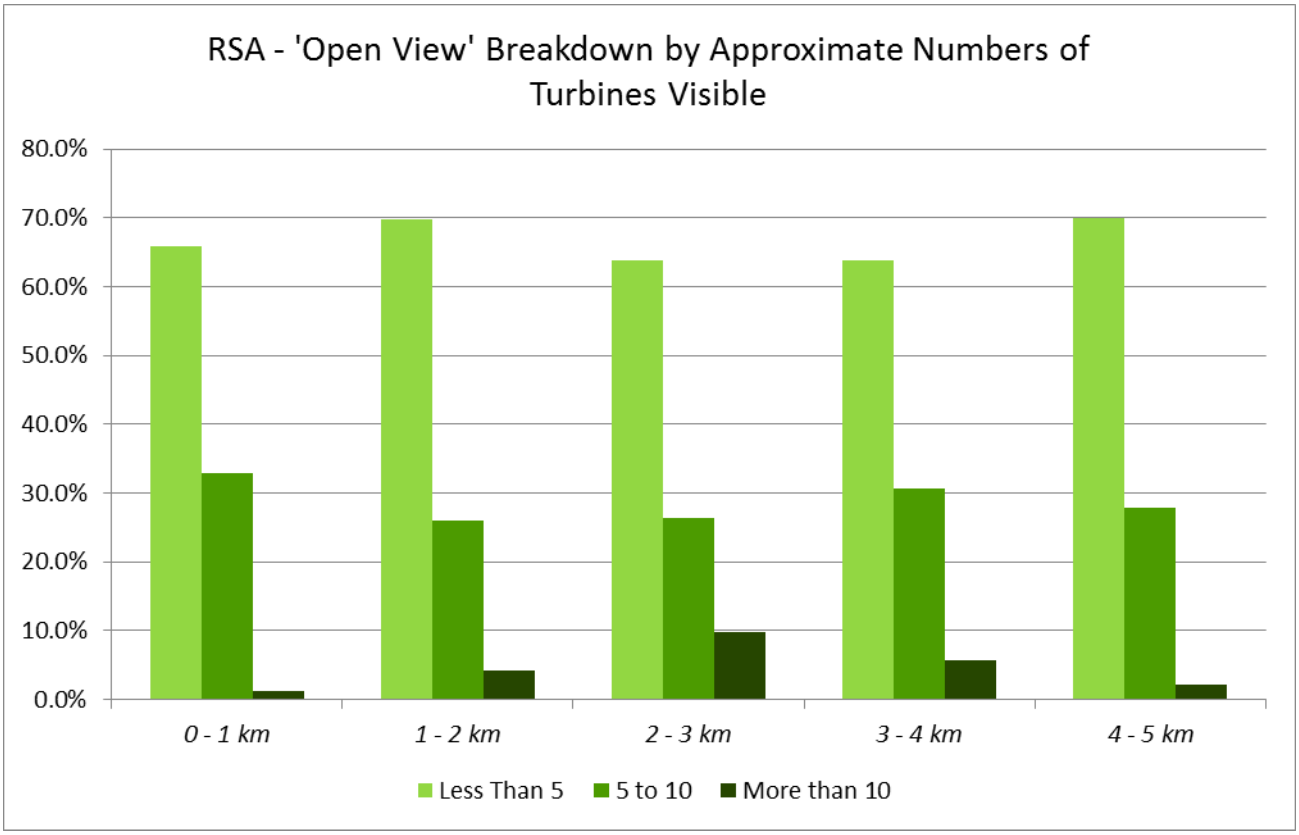


Figure 15.13: Graph indicating additional analysis of RSA 'open view' category to determine numbers of turbines visible

The graph at Figure 15.13 indicates that, by far, the most common scenario is that less than five turbines will be fully visible (blade rotation) from any section of the surveyed road network. This is consistently the case across all of the distance bands with results only ranging between 64% and 70%. A considerably lower proportion of the road network affords views of between 5 and 10 turbines. Again, this only ranges from 33% in the 0-1km distance band down to a low of only 26% across all of the remaining distance bands. The least common scenario is views of more than 10 turbines and this ranges from 10% down to 1%. The most notable aspect of this trend is that it is the closest band (0-1km) that registers the lowest figure. That means receptors in closest proximity to turbines are the least likely to have a view of numerous (>10) turbines. The most likely explanation for these results is that where open views of turbines exist in the nearest band (0-1km) it is because full blade sets of several turbines are likely to be appearing above intervening vegetation. Whereas in the more distant bands open visibility occurs in open areas or between sections of screen vegetation.

The map at Figure 15.14 indicates that the sections of road with views of over 10 turbines occupy relatively short sections of road throughout the study area. As with the main RSA these higher levels of visibility are concentrated on the major road network rather than the local road network. Indeed, the vast majority of views of more than 5 turbines occur from either the M4 motorway or its adjacent, parallel, predecessor the old N4 in the northern portion of the central study area. The other brief instances of multiple turbine visibility only tend to occur due to the elevated nature of the section of road in question or due to open views across a vast bog landscape.

15.9.4 Canal Screening Analysis

A similar study of visibility from the canals that run through the central study area was undertaken to that carried out in respect of roads as part of the Route Screening Analysis (RSA) outlined above. The main difference was that due to practical reasons of accessibility and tow path quality, the canal visibility analysis was undertaken in the field using bicycles and wire frame images of the wind farm. The results of the canal visibility study are illustrated in Figure 15.14 and 15.15 over.

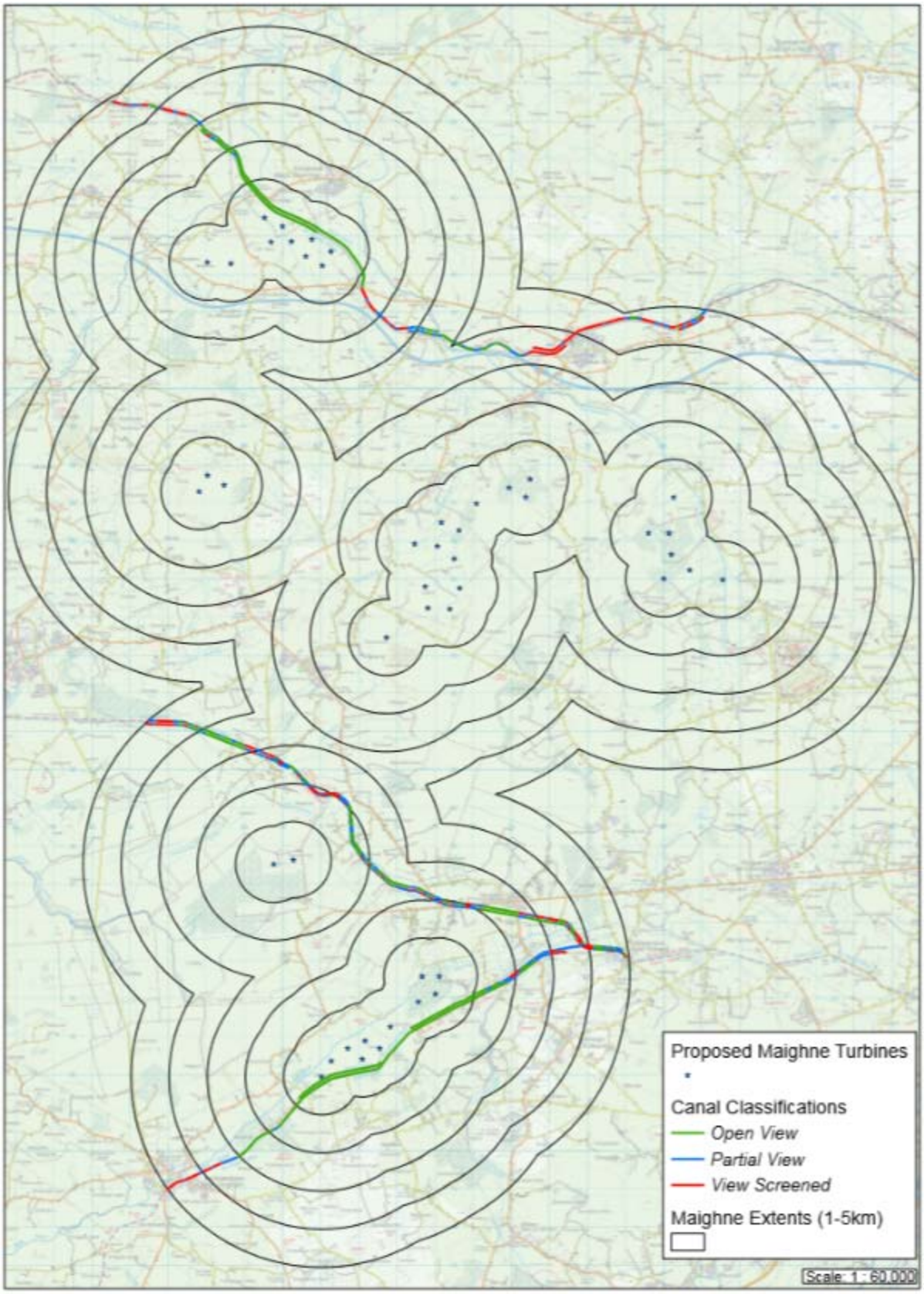


Figure 15.14: Map of Canal Screening Analysis (See Volume 4 for large scale map)

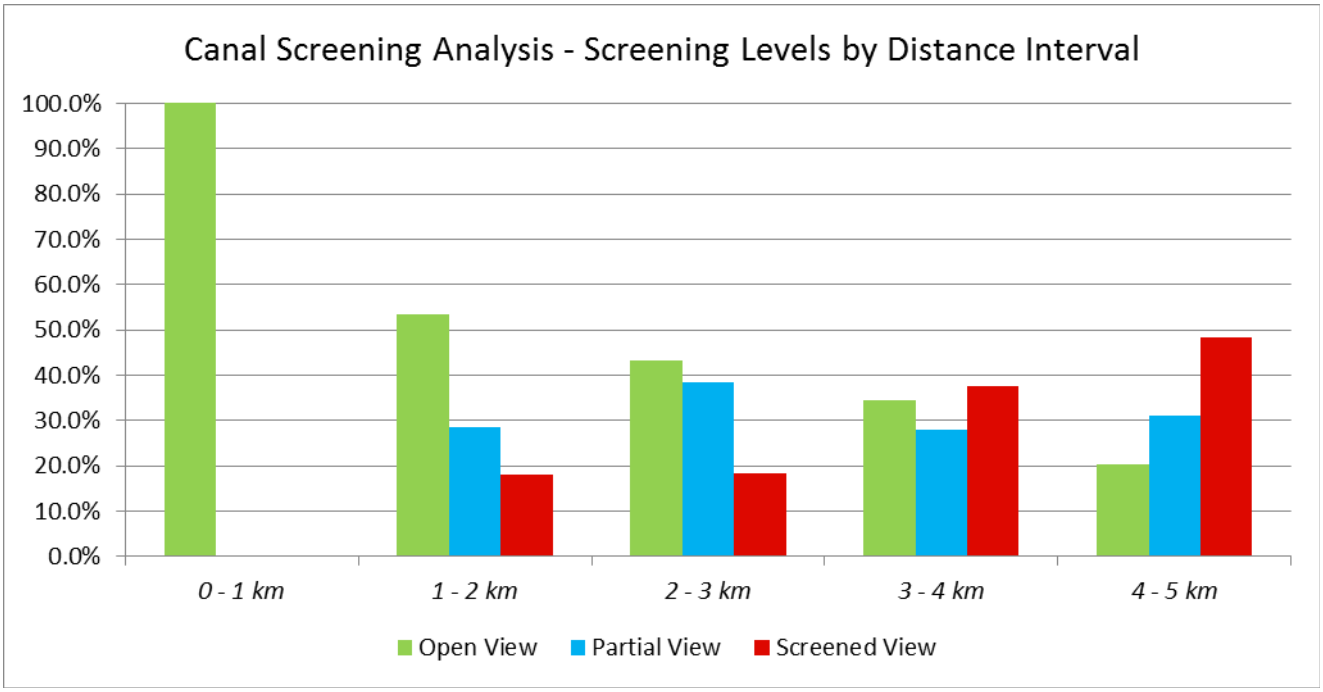


Figure 15.15: Graph of Canal Screening Analysis

Whilst the trends indicated in the canal visibility study are similar to the RSA, in that open visibility diminishes steadily across the distance bands and the proportion of screened views does the reverse, the thresholds are quite different. Most notably, all canal routes within 1km of turbines have an open view of at least one turbine. Whilst the proportion of open visibility falls away quickly thereafter (53% between 1-2km), it is not until the 3-4km band that there is a comparative balance between the three visibility classes indicating that the 'threshold of visibility' has been reached. This is the point beyond which, the turbines are more likely to be fully screened by intervening vegetation than being either openly or partially visible. This occurs in the 2-3km range for the RSA.

There are several likely reasons that open visibility of turbines occurs for a higher proportion of the canal network than for the road network particularly in the nearest distance bands. The main one being, that two of the turbine clusters (Ballynakill and Cloncumber) run parallel and in close proximity (<500m) to the Royal Canal and Barrow Branch of the Grand Canal respectively. Other than for these relatively short sections, which total about 13km out of over 150km of canal network within the study area, there are no other instances of turbines being within 1km of canals. Indeed, the nearest of the remaining clusters are over 3km away and are oblique (not aligned) to the orientation of the canal network. These have very little influence on the visibility of turbines from canals compared to the Ballynakill and Cloncumber clusters. Instead, it is these two clusters and their proximity to the canal that are also likely to strongly influence the trend towards open visibility in the 1-2km and 2-3km distance bands.

As well as rising above canal side vegetation when seen from short distances, the two adjacent turbine clusters are often aligned with the canal and seen along the corridor on approach. Another aspect noted by the fieldwork team was, that unlike roadside and field boundary hedgerows, which tend to be maintained and managed, canal-side vegetation is more sporadic. Thus, clumps of mature trees are often flanked by open sections in the canal-side vegetation, resulting in at least some turbines from the adjacent clusters being visible from any particular point. A refinement of the open visibility class was not carried out for the canals as it was for the RSA to determine likely numbers of turbines visible. However, it is reasonable to suggest that there are few instances where all of the turbines in the nearest cluster would be visible at once given the sporadic nature of screen planting.

15.9.5 Visual Receptors

Centres of Population and Houses

The largest settlement within the study area by far is Dublin City, which has its western outskirts contained within the Eastern periphery of the study area. Several of the settlements that surround the city within its commuter belt are also of a significant size. These include; Leixslip, Maynooth and Kilcock which are 16km, 12km and 8km to the east of the nearest turbines respectively. In the south-eastern quadrant of the study area are the significant settlements of Naas (14km to nearest turbines), Newbridge (10km) and Kildare (8km). In the north-eastern quadrant are the settlements of Dunboyne, Dunshaughlin, Ratoath and the outskirts of Navan, which are all beyond 20km away from the nearest turbines. Overall, the Dublin commuter belt, which occupies much of the eastern half of the study area and contains numerous other smaller settlements is considered to be a densely populated peri-urban area.

In the western half of the study area the most significant settlements include; Monasterevin (13km SW); Portarlington (19km SW); Edenderry (5km W); and Kinnegad (8km NW). Although there are a number of other reasonable sized settlements in the western half of the study area, by comparison to the eastern half it is much more sparsely populated.

The closest settlements to any of the proposed wind farm clusters include Longwood, which is just over 1km to the north of the Ballynakill 2 cluster. Allenwood, Robertstown and Kilmeage are closely associated to each other and have turbines within 5km to the west. Enfield is a sizeable settlement that is not particularly close to any single cluster of turbines, but has turbines from three different clusters within 5km to the south and west. Rathangan has turbines from the 'Drehid Hortland' cluster approximately 4km to the northeast and the small village of Derrinturn has four separate clusters of turbines within 5km throughout its eastern quarters.

There is a relatively dense concentration of rural dwellings and farmsteads lining the local roads that criss-cross the farmed landscape of the study area. By contrast, bog areas tend to be very sparsely populated and bog fringes are only lightly populated.

Transport Routes

The most significant transport route within the study area is the M50 orbital motorway around Dublin City, which is the most heavily trafficked road in the country. Emanating from this in an outwardly radial pattern are the M3, M4 and M7 motorways which travel in a north-westerly, westerly and south-westerly direction respectively. The M3 does not fall within 20 km of the proposed development. The M4 motorway passes within 1km to the south of the Ballynakill 2 turbine cluster before it splits at Kinnegad to form the M5, which heads in a north-westerly direction towards Sligo and the M6, which continues west towards Galway. The M7 remains beyond 10km from the nearest turbines as it weaves between the settlements of Naas, Kildare and Monasterevin to the south of the development. The M9 motorway splits from the M7 at Newbridge and veers south out of the study area. Because of these radial motorways there are few national primary and secondary roads remaining within the study area. Instead, the motorways and settlements between them tend to be connected by a web of regional roads. A number of these regional roads pass within 1 km of proposed turbine clusters.

The national rail network also diverges from Dublin. One branch follows the Royal Canal towards Mullingar before splitting northwest towards Sligo and westward towards Galway. Before the split this branch passes immediately to the north of the Ballynakill 2 turbine cluster. A more southerly branch of the rail network hugs the Grand Canal towards Portarlington before splitting northwest and southwest out of the study area. This is approximately 10km from the nearest turbines as it passes through Newbridge and Kildare.

Amenity and Heritage Locations

The key public recreational facilities within the central study area are the network of canals and tow path walks. These historic transport routes also link many of the towns and villages within the study area. The Grand Canal travels west from Dublin and passes through Robertstown, Allenwood and Edenderry on its way to the River Shannon. Its associated walking path is known as the 'Grand Canal Way'. The Royal Canal also passes through the centre of the study area on its slightly more northerly journey from Dublin through Dunboyne, Enfield and Mullingar.

It is closely aligned with the national railway line from Dublin to the northwest, which runs adjacent to its southern bank for much of its journey through this study area. The towpath on the northern bank is known as the Royal Canal Way. A second arm of the Grand Canal, 'the Barrow Line' diverges southwest near Robertstown and passes through Rathangan, in the south central portion of the study area. Its associated walking path is known as the 'Barrow Way'. All of these main canal branches pass within 2km of proposed turbine clusters at some point on their journey.

There are some local walking loops within the study area, however, most of these are contained within conifer plantations and woodlands and none are within close proximity of proposed turbines. Somewhat surprisingly, the isolated hilltops within the central study area such as the hills associated with the 'Chair of Kildare' tend not to have publicly accessible walking tracks as they are contained in private ownership. This is despite being identified as important landscape features in the County Development Plans and being assigned designated hilltop views (to and from). In almost all other counties, designated scenic views are only contained within the public domain.

The Lullymore Heritage and Discovery Park is located in bogland between the proposed Drehid-Hortland and Derrybrennan turbine clusters. It is a tourist facility focussed on heritage, biodiversity and bog rejuvenation with play areas for children and regular events organised.

In the outer northeast of the study area is the Hill of Tara and it's less notable, but still culturally important neighbour, the Hill of Skryne (c. 25km and 28km from the nearest of the proposed turbines). The Hill of Tara is a candidate UNESCO World Heritage site that attracts a large number of visitors and international tourists on an annual basis.

Croghan Hill in County Offaly is a distinct landscape feature with important geological and archaeological associations, which is located within the western outer portion of the study area approximately 21km from the nearest of the proposed turbines. It is an extinct volcano that lies a short distance to the southwest of the proposal site. It is a prominent hill in the context of the vast midland bogs and thus, it has been a focus of settlement in this area since the Bronze Age, based on the dating of a burial cairn on its summit. Although most of the hill appears to be in private ownership there are recognised local walking routes to the summit past an ancient graveyard high on its eastern slopes.

The Rock of Dunamase is another distinctive landscape feature topped with castle ruins. It is located on the south-western perimeter of the study area approximately 30km from the nearest of the proposed turbines. This is a publicly accessible site that is popular with tourists and affords vast 360 degree views from the castle on the summit.

Dún Allinne is an ancient ceremonial site on the low hill of Knockaulin near Old Kilcullen in County Kildare approximately 17km from the nearest turbines. It is thought to be the site of inauguration for the Kings of Leinster and is a candidate UNESCO World Heritage site with similar cultural heritage associations to the Hill of Tara. It is not publicly accessible and is therefore not considered to be particularly relevant to the visual impact assessment. Therein lies an important distinction between the Archaeological, Architectural and Cultural Heritage appraisal in chapter 14 and this visual impact evaluation. The heritage appraisal considers the feature and its setting as a receptor whereas the visual assessment considers the viewer to be the receptor. Whilst many heritage locations are relevant to both assessments (setting / views from), those locations that are not publicly accessible or regularly frequented by lay visitors are not considered to be particularly relevant visual receptor locations.

Lough Ennell at the eastern periphery of the study area is a popular location for fishing and boating as well as other passive recreational pursuits. Belvedere House is a popular tourist attraction on the eastern shores of the Lough. Lilliput at the southern end of the Lough has an adventure centre and coffee shop. Jonathan Swift Park at Lilliput is named in honour of the legend that the author was inspired by this location when writing Gulliver's Travels.

The Curragh is a distinctive flat, open area of commonage that is used by the public for walking and exercise. It is also used for exercising horses and is home to the Curragh racecourse.

Visibility of the scheme has been investigated through desk studies and/or fieldwork from all of the amenity and heritage features outlined above and where relevant and available these views are included for assessment herein.

Views of Recognised Scenic Value

Views of recognised scenic value are primarily indicated within County Development Plans in the context of scenic views/routes designations, but they might also be indicated on touring maps, guide books, road side rest stops or on post cards that represent the area. In this instance there are not considered to be any iconic views that are not otherwise included as designated scenic views in the relevant county development plans.

15.9.5.1 Kildare County Development Plan (2011 – 2017)

The Kildare County Development Plan contains a number of designated scenic views. These consist of scenic routes, hilltop views and canal views from canal bridges. There are a number of these clustered around the central study area particularly considering the concentration of canals. It should be noted that hilltop views relate to both views to and from relatives hilltops. However, in most instances public access is not available to the top of the hill. Relevant designated views, which have been included for assessment herein are included in Table 15.8 below.

Table 15.8: Relevant Designated Views for County Kildare

Designated View No. (from CDP)	Location	Represented for assessment herein by
Designated Routes		
20	Views of Plains of Kildare and West Central Boglands. Views to and from Newtown Hills	**KEDR30**
28	Views from county roads (L5017 & L26) of Carbury Castle and Hill: Teelough road junction with the R402 and upland area at Mylerstown	**KEDR3, KEDR4 and 10MR31**
40	Views of Ballynafagh Lake	**KEDR7**
27	Views to the south of open countryside; from L138 Kilmeague cross roads to Coolaght	**10CP30 and KEDR38**
6	Views of Robertstown Countryside and Views across the Canal	**10CP7**
8	Views of Bogland Plains; L3002 from Kilmoney Cross Roads to Feighcullen Cross Roads at Boston Hill	**KEDR13**
38	Views of Allenwood to Lullymore Local Road	**KEDR14**
39	Views of Lullymore to Rathangan Local Road	**KEDR15**
19	Views of Canal, River Slate and Surrounding Countryside from R414 at Rathangan	**10CP9**
3	Views of Curragh Plains, from the M7 Interchange to St. Ledgers Bottoms	**KEDR31**
35	Views of Dún Aillinne from the N78 – to Knockbounce	**KEDR24**
Canal Views		
GC10	Binns Bridge Robertstown	**10CP7**
GC16	New Bridge Littletown	**KEDR38**
GC12	Bond Bridge Derrymullen	**10AH4**
GC13	Hamiltons Bridge Killinagh Lower	**KEDR39**
GC14	Ticknevin Bridge Ticknevin	**10AH5**
GC24	Rathangan Bridge Rathangan	**10CP9**

Designated Views from Surrounding Counties

There are a number of designated views from surrounding counties contained within the study area and most of those that are relevant to this proposal are contained in County Meath. These will be dealt with below under a separate heading. The nearest and most elevated designated views from the South Dublin County Development Plan and the Wicklow County Development Plan have been selected for illustrative purposes. This is on the basis that they are both more than 25km away from the nearest turbines. The selected South Dublin view is from Saggart Hill and the selected Wicklow view is from the R756 above the settlement of Hollywood. The view from the 'Rock of Dunamase' is a designated scenic view in the Laois County development plan and this has been included for assessment herein. There are not considered to be any scenic view designations in County Offaly that are relevant to this proposal. Whilst there are several designations relating to the view of Croghan Hill there are none from the hill itself. There are also not considered to be any designated scenic views within County Westmeath that are relevant to this proposal.

Meath County Development Plan (2013 – 2019)

There are 94 no. designated scenic views and prospects identified in the current Meath County Development Plan, which is a considerable increase from the previous development plan. Through a filter process involving desk study and fieldwork investigation specific to this proposal, a set of relevant designated views for County Meath has been narrowed down to the following list (Table 15.9).

Table 15.9: Relevant Designated Views for County Meath

Designated View No. (from CDP)	Location	Represented for assessment herein by
44	Hill of Tara	**MHDR17**
47	Skryne Church	**MHDR16**
83	Clonard Blackshade - Blackshade Bridge over the Royal Canal and with views along the canal in both directions	**MHDR34**
54	On R161 at Royal Canal- views along Royal Canal to the east and west at intersection with R161 – Regional value	**MHDR33**
53	On R161 at Inchatore Bridge to west of Donore - View of Boyne in open and largely undeveloped countryside – local value	**MHDR18**
79	Boyne valley from Scarrif Bridge - View of Boyne in open and largely undeveloped countryside	**MHDR32**
78	Boyne valley from Derrindaly Bridge - View of Boyne in open and largely undeveloped countryside	**MHDR31**
84	Coole Hill - Elevated Views across open countryside at Coole hill off road from Kilcock to Summerhill	**MHDR30**
52	Hill of Ward	**MHDR40**

15.9.6 Identification of Viewshed Reference Points as a Basis for Assessment

The results of the ZTV analysis provide a basis for the selection of Viewshed Reference Points (VRP's), which are the locations used to study the landscape and visual impact of the proposed wind farm in detail. It is not warranted to include each and every location that provides a view of this development as this would result in an unwieldy report and make it extremely difficult to draw out the key impacts arising from the project. Instead, a variety of receptor locations was selected that would provide views of the proposed wind farm from different distances, different angles and different contexts.

The visual impact of a proposed development is assessed using up to 6 categories of receptor type as listed below:

- Key Views (from features of national or international importance);
- Designated Scenic Routes and Views;
- Local Community views;
- Centres of Population;
- Major Routes; and
- Amenity and heritage features;

Where a VRP might have been initially selected for more than one reason it will be assessed according to the primary criterion for which it was chosen. The characteristics of each receptor type vary as does the way in which the view is experienced. These are described below.

Key Views

These VRP's are at features or locations that are significant at the national or even international level, typically in terms of heritage, recreation or tourism. They are locations that attract a significant number of viewers who are likely to be in a reflective or recreational frame of mind possibly increasing their appreciation of the landscape around them. The location of this receptor type is usually quite specific.

Designated Scenic Routes and Views

Due to their identification in the County Development Plan this type of VRP location represents a general policy consensus on locations of high scenic value within the Study Area. These are commonly elevated, long distance, panoramic views and may or may not be mapped from precise locations. They are more likely to be experienced by static viewers who seek out or stop to take in such vistas.

Local Community Views

This type of VRP represents those people that live and/or work in the locality of the wind farm, usually within a 5km radius of the site. Although the VRP's are generally located on local level roads they also represent similar views that may be available from adjacent houses. The precise location of this VRP type is not critical, however, clear views are preferred, particularly when closely associated with a cluster of houses and representing their primary views. Coverage of a range of viewing angles using several VRP's is necessary in order to sample the spectrum of views that would be available from within the local landscape. In this instance feedback from local residents informed the selection of a number of the selected VRP's via feedback from the developer's on-site representatives. It should be reiterated that in this instance that the open views represented in the local community category are not necessarily typical views from the central study area and have been selected as worst-case-scenario views in terms of visual exposure. Whilst this is appropriate for the visual assessment cognizance should also be taken of the Route Screening analysis in terms of understanding the typical visual scenario in the central study area.

Centres of Population

VRP's are selected at centres of population primarily due to the number of viewers that are likely to experience that view. The relevance of the settlement is based on the significance of its size in terms of the Study Area or its proximity to the site. The VRP may be selected from any location within the public domain that provides a clear view either within the settlement or in close proximity to it.

Major Routes

These include motorways, national and regional level roads as well as rail lines and even ferry routes. They are relevant VRP locations due to the number of viewers potentially impacted by the proposed development.

The precise location of this category of VRP is not critical and might be chosen anywhere along the route that provides clear views towards the proposal site, but with a preference towards close and/or elevated views.

Major routes typically provide views experienced whilst in motion and these may be fleeting and intermittent depending on screening by intervening vegetation or buildings.

Amenity and Heritage Features

These views are often one and the same given that heritage locations can be important tourist and visitor destinations and amenity areas or walking routes are commonly designed to incorporate heritage features. Such locations or routes tend to be sensitive to development within the landscape as viewers are likely to be in a receptive frame of mind with respect to the landscape around them. The sensitivity of this type of visual receptor is strongly related to the number of visitors they might attract and, in the case of heritage features, whether these are discerning experts or lay tourists. Sensitivity is also heavily influenced by the experience of the viewer at a heritage site as distinct from simply the view of it. This is a complex phenomenon that is likely to be different for every site. Experiential considerations might relate to the sequential approach to a castle from the car park or the view from a hilltop monument reached after a demanding climb. It might also relate to the influence of contemporary features within a key view and whether these detract from a sense of past times. It must also be noted that the sensitivity rating attributed to a heritage feature for the purposes of a landscape and visual assessment is not synonymous with its importance to the Archaeological or Architectural Heritage record. In this instance meetings with Local Authority Heritage Officers informed the selection of several of the VRP's for this category.

Table 15.10: Selected Viewshed Reference Points (VRP's)

VRP No.	Location	Direction of View
KEDR2	Local Road at Grange	SW
KEDR3	Local road at Knockcor	W
KEDR4	Local road at Teelough	NE
KEDR7	Local road north of Prosperous	W
KEDR10	Local road at Oughterard	NW
KEDR11	Allen Cross roads	NW
KEDR13	Local road at Bostoncommon	N
KEDR14	R414 at Lullymore East	360°
KEDR15	R414 at Barneran	S
KEDR21	R415 at Rathbride	W
KEDR24	R418 at Moortown	N
KEDR30	Local road at Newtown	SW
KEDR31	M7/R445 at the Curragh	N
KEDR38	Harberton Bridge on the Barrow Line	360°
KEDR39	Hamilton's Bridge on the Grand Canal	360°
KEDR40	Local road at Furryhill	NW
KEDR41	Tower on the Hill of Allen	360°
KEDR42	Barrow Canal Bridge at Glenaree	NE
MHDR17	Hill of Tara	360°
MHDR18	Bridge over the River Boyne at Donore	S
MHDR30	Local road at Coole	W
MHDR35	Local road at Rathcore	W
MHDR36	Canal overpass of the R160 at Boynedock	W

VRP No.	Location	Direction of View
MHDR40	Tlaghta (Hill of Ward)	NE
SDDR1	Local road at Saggart Hill	NW
WWDR1	R756 above Hollywood	NW
06LC17	Local road at Ballynakill	360°
06LC32	Broadford	N
07LC30	Local r4oad at Newtownhortland	W
10LC12	R402 at Ballnamullagh	N
10LC13	Local road at Drehid	N
10LC14	Timahoe Cross Roads	N
10LC16	R403 at Derrinturn	NE
10LC32	Local road at Ballyteige South	NW
06CP5	R156 between Raharney and Killucan	SE
06CP10	R156 near Ballivor	S
06CP12	Longwood	S
06CP13	Enfield	SW
06CP30	Clonard	E
07CP1	Summerhill	SW
10CP7	Robertstown	NW
10CP9	Rathangan	E
10CP15	Portarlington	NE
10CP17	Newbridge	N
10CP30	Kilmeage	W
11CP1	Maynooth	W
11CP30	Papal Cross, Phoenix Park, Dublin City	W
11CP32	Clane	W
11CP33	Naas	NW
06MR7	R148 overpass of the M4 at Kinnegad	SE
06MR14	Local road overpass of M4 near Moyvalley	NW
07MR30	M4 motorway at Ballyvoneen	SW
10MR31	R402 at Carbury	N&E
06AH4	Royal Canal view from the Blackshade Bridge	SE
10AH3	Croghan Hill	E
10AH4	Shee Bridge over the Grand Canal near Allenwood	SW
10AH5	Ticknevin Bridge over the Grand Canal	SE
10AH31	Carbury Castle on Carbury Hill	N and E
10AH32	Top of Round Tower in Kildare Town	N
10AH33	Blundell Castle, Edenderry	SE
10AH34	Lullymore cemetery	SE

VRP No.	Location	Direction of View
11AH1	Dun Ailinne	N
14AH1	Rock of Dunamase	N
07KV5	Top of Trim Castle	S

15.10 Potential Significant Impacts

Based on the assessment criteria employed herein, potential significant impacts (i.e., those impacts of significance which may arise prior to consideration of mitigation measures and which, therefore, can be distinguished from residual impacts), are considered most likely to occur in instances where highly sensitive landscape and visual receptors coincide with high order landscape and visual effects (see descriptions in Tables 15.1, 15.2 and 15.4). From previous experience for this type of project in rural settings it is considered that potentially significant landscape and visual impacts have the potential to occur in the following ways.

Landscape Impacts
- Irreversible physical effects on sensitive landscape features
- Disruption of existing land use patterns and/or ecological networks
- Incongruous change to areas of sensitive landscape character

Visual Impacts
- A combination of visual and spatial dominance as seen from highly sensitive receptor locations. This is most likely to occur within 2-3km of the proposed wind farm (the first 4 zones shown on the TVI map – see Section 15.9.2).
- Visual clutter and ambiguity as seen from highly sensitive receptor locations. This can occur at any distance, but tends to occur beyond 2-3km as turbines can become stacked in perspective and a more two dimensional layout is perceived.
- A combination of both of the above effects.

From baseline studies and early stage assessment specific to the proposed Maighne Wind Farm, the most highly sensitive physical landscape receptors are considered to be the likes of the River Boyne, Pollardstown Fen and the canal corridors. Other important heritage locations listed in Section 15.9.5 are also sensitive in terms of landscape setting. In a more general sense the areas designated as highly sensitive Landscape Character Areas (LCA4 – Chair of Kildare Hills and LCA3 – Northern Hills) in the Kildare County Development Plan need to be considered closely.

The most sensitive visual receptors are likely to be the designated scenic routes and views identified in the County Kildare and surrounding County Development Plans, which are sensitive receptor locations on the basis that they represent a consensus on scenic amenity.

15.11 Mitigation Measures

Given the highly visible nature of commercial wind energy developments it is not generally feasible to screen them from view using on-site measures as would be the primary form of mitigation for many other types of development. Instead, landscape and visual mitigation for wind farms must be incorporated into the early stage site selection and design phases.

In this instance the two main forms of landscape and visual mitigation employed are:

- The use of fewer taller turbines rather than a greater number of shorter turbines (height versus density relationship)
- The dissemination of impacts across five spatially distinct turbine clusters
- The buffering of residential receptors

15.11.1 Turbine Height versus Density Relationship

The relationship between the height and the density or number of turbines required to achieve a particular power output is a key design consideration. Several case studies and surveys have highlighted that when given an option people tend to prefer a scenario of fewer larger turbines. One such study commissioned by Bord Failte in 2008 found that;

> "*In terms of the size and composition of wind farms, tourists tended to prefer farms containing fewer turbines. If both produced the same amount of electricity, tourists also preferred wind farms containing a small group of large turbines (55%) to a large group of smaller turbines (18%).*"

The use of tall turbines as part of a mitigation strategy may seem counter-intuitive, but this has been one of the key design attributes of the Maighne Wind Farm from the outset. Firstly, it is important to note that as a starting point, a wind energy development within a lowland setting such as this needs to avail of turbines at the taller end of the range (c. 150m tip height+) in order to be feasible in terms of wind yield. There is also a balance to be struck between the visual and spatial dominance of turbines and the clutter and frequency of turbines within a view as both of these effects contribute towards the magnitude of visual impact. On the basis of these factors and through design stage analysis, it is considered that the slightly increased sense of visual dominance imparted by the proposed 169m turbines is preferable to the reduced level of permeability and increased visual clutter associated with a greater number of shorter turbines required to achieve the same output. This is illustrated in Figure 15.16 below, which compares a similar energy yield across three turbine heights within the same view. This is only intended as an illustrative diagram to show the balancing relationship between turbine height and density.

Figure 15.16: Turbine height versus density relationship (same power output within view)

It is considered that the flat to mildly undulating nature of the sites along with the large scale field pattern, broad peatland area and extensive forest plantations can accommodate tall turbines without undue conflicts of scale. However, even at a minimum separation distance of 500m, tall turbines have a greater potential to dominate the scale of rural dwellings and ancillary structures than shorter turbines. They also have the potential to be more visually overbearing than shorter turbines though *"the relationship between visual impact and turbine size is not directly proportional"* (1). Turbines of 185m, 170m and 156m tip height were considered for this project and eventually it was decided to use a 169m tip height option as the optimal balance between turbine height and turbine density in this landscape setting. Whilst this tip height is greater than most of the turbines currently in operation around the country, it is consistent with some of the latest applications and planning permissions (permitted Yellow River Wind Farm – 166m and proposed Oweninny Wind Farm – 175m).

15.11.2 The dissemination of impacts across five spatially distinct turbine clusters

One of the main ameliorating benefits of a clustered layout is seen from the results of the Route Screening Analysis (RSA) which indicates that within the lowland landscape only limited numbers of turbines (most often less than 5 and very seldom more than 10) could be seen from any particular location due to the relative height of intervening vegetation. Thus, the greater the separation between turbine clusters, the less likelihood of seeing turbines from adjacent clusters.

This is particularly significant for the Maighne project as the clusters are separated by considerable distances of generally more than 3km, thereby significantly reducing the potential visibility of large amounts of turbines. Due to this dispersion of clusters, the visual impacts for those living closest to the turbines are more likely to be akin to the effects experienced for a small to medium sized wind farm.

From elevated and more exposed viewing locations the gaps between turbine clusters can provide a visual relief from the view of turbines and give an enhanced sense of permeability and considered placement to the layout. At a broader level, the distinct clustering of the proposed turbines gives a sense that rather than being a large singular entity, this is a development of five modest scale, wind farms with a resulting dissemination of impacts.

15.11.3 Buffering of Residential Receptors

One of the key constraints employed from the outset of the design of this proposal has been to provide a minimum 500m buffer zone around residential receptors. In conjunction with a number of other imposed environmental constraints, this has resulted in the proposed turbines being placed into a robust receiving landscape of bogs, bog fringes and open farmland. This degree of buffering from residential dwellings is of benefit to several aspects of residential amenity including noise, shadow flicker and visual impact. In relation to visual impact, it is worth noting that, according to the laws of perspective, the doubling of viewing distance equates to a halving of perceived height. By ensuring that turbines do not occur within the immediate vicinity of houses, there is less potential for conflicts of scale between these structures and also a reduced sense of overbearing from the tall turbines.

15.12 Residual Landscape Effects

15.12.1 Landscape Character, Value and Sensitivity

Effects on landscape character will be considered at both the localised scale of the site and its immediately surrounding landscape as well as the broader scale of the study area. Landscape sensitivity in this project level LVIA context needs to go beyond the generic measures of sensitivity employed in the county Landscape Character Assessment and focus on the attributes of the proposal. In terms of sensitivity to this proposed wind farm development the most sensitive landscapes and landscape features are likely to be those that exhibit enclosed and intricate landform and land use patterns and/or a strong sense of heritage or past times not strongly influenced by modern development. Areas with a strong sense of the naturalistic or with low levels of built development are also likely to be sensitive to this wind farm proposal.

Central Study Area (< c. 5km from nearest turbines)

Approximately half of the proposed turbines will be placed directly into cutaway bogs with the remainder located in the marginal fringes that surround the bog. This is something of a transitional area to more productive farmland. The cutaway bogs themselves have an almost post-industrial character evidenced by the linear furrows of the harvesting pattern. Whereas, the bog fringes have a slightly more naturalistic character of unharvested peatland with a covering of bog grasses and acid tolerant shrub and woodland species that have been left largely unmanaged. The bog fringes also tend to contain extensive geometric conifer plantations, which contrast against the unmanaged scrubland character but this is, nonetheless, a low intensity land use.

Given the boggy nature of the wind farm sites the landscape of the central study area is particularly flat. Whilst there are low crests of hills that rise out of the bog they are not as distinctive on the ground as that may appear on maps.

This is on the basis that the degree of vegetation within the central study area tends to limit views to relatively short distances and does not allow these low hills to form part of a distinctive or enclosing skyline from most areas. Indeed, one of the more notable aspects of undertaking fieldwork in this landscape is the difficulty in orientating one's self when navigating through the flat peatland and farming zones of the central study area. This is due to the homogeneity of the land cover and relative absence of distinctive landscape features. The exception to this is in the immediate vicinity of the 'Chair of Kildare Hills' and to a slightly lesser extent the 'Northern (Newtown) Hills'. Carbury Hill is also a distinctive knoll particularly due to the castle at its summit, however, it is not a notable feature of the landscape over distances of more than a couple of kilometres. Crossing over canals gives a brief sense of place and placement, but given that there are several branches of the canal network traversing the central study area this can actually add to the sense of disorientation and sameness. Natural watercourses within the central study area tend to be relatively small in volume and corridor width as this is something of a watershed within the midlands with rivers like the Boyne and Blackwater emanating in this region. In this respect the natural watercourses are not similar to the field drains, canals and canal feeders.

Another notable or surprising aspect of the central study area is the actual extent of cutaway bogs that exist there. Other than travelling along straight undulating bog roads there can be little sense at times that immediately beyond the roadside vegetation is a vast peatland area. There are of course exceptions to this, such as in the area around Lullymore where the road passes through the centre of the bog and a low degree of roadside screening allows longer distance views across a broad peatland landscape.

The general character of the central study area is that of a working rural landscape contained in both productive and extractive land uses. There are few elements of the naturalistic other than riparian vegetation flanking watercourses and the canals and scrubby woodland surrounding the bogs. There is a relatively low level of built development mainly limited to rural dwellings, farmsteads and sheds. As commercial peat harvesting winds down, the remaining land uses tend to be of a low intensity.

There is not a high concentration of built heritage features or demesne landscapes within the central study area and where these do occur they do not strongly contribute to the prevailing landscape character. One exception is in the vicinity of Carbury where the character of the landscape is influenced by the prominently located Carbury Castle and in a more subtle way by Williamstown House and demesne and Newbury Hall and demesne nearby (see Chapter 14 - Heritage for greater detail on heritage assets). In this instance the landscape character is also influenced by the large Carbury Bog, which has sections that have been harvested at a commercial and domestic scale as well as untouched areas that form part of the Carbury bog Natural Heritage Area (NHA).

In terms of the landscape designations within the Kildare and Meath County Development Plans it is felt that the Landscape Character Areas (LCAs) are appropriately defined. However, there appears to be some inconsistency with the sensitivity judgements. For example, the Chair of Kildare Hills, which contain the Hill of Allen, Dunmurry Hill and Red Hill is a distinctive landscape unit and is understood to have important heritage associations. Nonetheless, the high sensitivity rating it has been attributed in the development plan belies the fact that these hills are extensively quarried, have been cloaked in commercial conifer plantations and topped by communications masts. Whilst there are many parts of the country in which a low crest of hills such as this would not register as having any particular landscape importance it is accepted that within a flat, lowland context such as this, isolated elevated terrain has had a certain reverence through the ages. Other more notable examples within the outer study area include the Hill of Tara and Croghan Hill. It is also worth noting that Carbury Hill lies within the 'low sensitivity' LCA of 'north-western Lowlands'. Even though the hill itself has not been assigned its own high sensitivity LCA, it is acknowledged that it is a high sensitivity landscape feature within a broader context of 'low sensitivity' landscape character. Whilst the canal network is a distinctive aspect of the central study area, it is a relic of industrial activity and the movement of goods during earlier periods. Although the canals are largely used for recreational purposes these days thematically they are consistent with the productive character of the landscape within the central study area.

Overall, it is considered that the central study area is a robust and productive rural area without a high degree of distinction or uniqueness. The land use pattern is broad and only marginally productive in some cases yet there is little sense of the naturalistic. Land uses also tend to be of a relatively low level of intensity and this is complimented by a similarly low level of built development. Outside of the bog areas there is a reasonable population level distributed throughout the web of local roads. However, this population is well dispersed and settlements tend to be small rural service centres concentrated around the canal network. Whilst there are some notable landscape features with associated heritage value these tend not to have a strong influence over the landscape character beyond a couple of kilometres.

For these reasons the sensitivity of the central study area is generally considered to be **Low** with some isolated landscape features of **medium** sensitivity.

Wider Study Area (c. 5-30km)

Like the central study area, the wider study area is also relatively homogenous in terms of landscape character. That is, it is predominantly a productive rural area contained in pastoral farmland and interspersed by peat bogs. Whilst there are a number of more distinctive landscape features, these tend to be near the periphery of the study area. These include the Lakelands of County Westmeath and the foothills of the Wicklow Mountains and the Slieve Bloom Mountains to the southeast and southwest respectively. There are also culturally important hilltops within the wider study area including the Hill of Tara, the Hill of Skryne, Croghan Hill and the Rock of Dunamase. Whilst these hilltops are accepted to have important cultural and heritage associations, they are not considered to strongly influence the character of the landscape beyond a short distance (2-3km).

Another distinctive aspect of the eastern perimeter of the study area is the densely populated urban area of Dublin City's Western suburbs and satellite towns. From this urban area, a number of major transport corridors diverge, including motorways, rail lines and the canal network. Thus, it is considered that the eastern half of the outer study area is distinctly different to all of the other quarters, which are comparatively lowly populated rural areas. The zone of transition from peri-urban to rural is relatively abrupt. It could be defined by the R407 regional Road, which runs in a north-south direction between the settlements of Kilcock, Clane and Naas. Although there is a considerable amount of farmland to the east of this road, this is interspersed with closely associated settlements and suburbs, the major transport corridors described above as well as the industrial and business park facilities that gravitate towards these conduits. To the west of the R407 are boglands and low hills, which also serve to reinforce the abrupt transition from a major urban hinterland into the purely rural landscape of the central study area.

In terms of large scale industry and infrastructural developments there is the prominent form of the Lagan Cement plant near Kinnegad as well as electricity peaking plants at Rhode and Ballykilleen. Thus, the character of this landscape is strongly influenced by human intervention and modification, particularly in relation to energy production. The distinctive linear commercial harvesting patterns within most of the larger peat bogs is also physical testimony to a legacy of energy production in this wider area.

In terms of landscape sensitivity, the Hill of Tara, which is a candidate UNESCO World Heritage site is attributed a 'very high' rating in accordance with the criteria provided herein. This is consistent with the sensitivity rating in the Meath County Development Plan. Dún Allinne is also a candidate UNESCO site, but this is not reflected in the landscape or visual designations in the Kildare County Development Plan and it does not have the same iconic status as the Hill of Tara in terms of public perception. Thus, its landscape sensitivity is judged to be slightly lower (High). Although not UNESCO world Heritage sites, Croghan Hill and the Rock of Dunamase also have cultural and heritage significance as prominent hilltops within the context of their lowland surroundings. For this reason they are also considered to be of high sensitivity. Again, this concurs with the sensitivity ratings of Offaly County Council and Laois County Council for these landscape features.

Other notable landscape features with higher sensitivity than the surrounding lowland landscape context include; the Hill of Skryne; the Hill of Ward; the Lakes of County Westmeath (Lough Ennell, Lough Owel and Lough Derravaragh); Pollaphouca Reservoir at the base of the Wicklow Mountains in County Wicklow; the River Boyne; the River Liffey; the canal network; Pollardstown Fen and the Curragh. All of these features have distinctive or naturalistic landscape character, but this tends not to extend far beyond their immediate setting. Whilst some of these landscape features also have cultural heritage associations, which are an important consideration in terms of landscape value, this does not always translate directly into the landscape sensitivity judgement. This is on the basis that they may not be particularly distinctive landscape features within the wider landscape.

The settlement of Trim is one of 30 towns in Ireland to have been given heritage town status due to its obvious mediaeval character. It is a popular tourist destination with a tourist office and access to Trim Castle and its attendant landscape, which is dissected by the River Boyne. For this reason Trim is attributed a landscape sensitivity in the mid to high range.

In summary, it is considered that aside from some isolated landscape features which are considered to be in the higher ranges of sensitivity, the vast majority of the outer study area is of low landscape sensitivity.

The relative sensitivities of the various landscape features and character areas contained within both the central and wider study area are outlined in Table 15.11 below.

Table 15.11: Landscape Sensitivity within the Study Area

Landscape Sensitivity	Landscape features / areas	Applicable LCA
Very High	• Hill of Tara	• Tara Skryne Hills
High	• Croghan Hill • Rock of Dunamase • Hill of Skryne • Hill of Ward • River Boyne • Dún Allinne	• **LCA not defined* • **LCA not defined* • Tara Skryne Hills • Ward Lowlands • Boyne Valley • Central Undulating Lands
High-medium	• Heritage settlement of Trim	• Boyne valley
Medium	• 'Chair of Kildare Hills' – LCA4 (Kildare (CDP) • 'Northern (Newtown) Hills' – LCA3 (Kildare (CDP) • 'Central Lowlands' – LCA6 (Meath CDP) • Canal network	• Chair of Kildare Hills • Northern (Newtown) Hills • Central Lowlands • Grand canal corridor and Royal Canal corridor
Medium-low	• General areas of rolling pastoral farmland in the northern and southern reaches of the study area	Various
Low	• Flat farmland, Scrubby bog fringes and forest plantations within the central and wider study area • Major Urban areas and rural hinterland in eastern study area	• Western Boglands and North-western Lowlands • Various
Negligible	• Major transport corridors • Quarries, business parks and industrial sites	• Various

* Some County Development Plans do not include geographically distinct Landscape Character Areas (LCAs)

15.12.2 Magnitude of Landscape Impacts

The physical landscape as well as the character of the site and its immediate surrounds will be affected by the proposed turbines (and related ancillary development, such as the substation, access and circulation roads and areas of hard standing for the turbines). By contrast, for the wider landscape of the study area, landscape impacts relate exclusively to the influence of the proposed turbines on landscape character.

There will be physical impacts on the land cover of the site as a result of newly formed access tracks and areas of hard standing around each turbine as well as from clearance required for the substations. Much of the access track network currently exists as farm, forest and bog tracks that will need only minor upgrade works to facilitate construction and maintenance of the turbines. Furthermore, on flat sites such as these, there is little requirement for modification of the terrain through cut and fill slopes in order to construct access roads and flat areas of hard standing. Thus, there will be a relatively minor loss of arable land to construction works for the turbines in the context of the greater site. This is on the basis that none of the proposal features has a significant 'footprint' and most of the turbines are contained in cutaway peatland or marginal grazing land. Any temporary excavations or stockpiles of material will be re-graded to marry into existing site levels and reseeded appropriately.

A total of up to 63 ha. of commercial conifer forest will be harvested in order to accommodate the construction and operation of the proposed turbines. Although this represents a modification to the planned felling regime, it is only the timing of such operations that is altered and this has very little effect on landscape character. There will be a loss of small sections of existing hedgerows as a result of delivering long turbine components to the construction sites. However, following construction those sections of hedgerow that will not be impacted by operational activities can be replanted insofar as possible. Prevailing land use activities will also be able to continue almost unabated around the turbines.

The principal landscape impact will be the change in character of the immediate area due to the introduction of large scale structures with moving components. These will be a prominent and defining landscape feature within the local landscape as would be the case for a commercial scale wind farm placed into almost any landscape context. Nonetheless, this is a broad landscape context of large cutaway bogs, conifer plantations and marginal peatland fringes where field sizes tend to be large. In this respect, the proposed wind farm will be well assimilated in terms of scale within the flat terrain and broad land cover patterns of the central study area. There will be a slightly stronger contrast of scales between the proposed turbines and the rural dwellings and associated farm structures in the near vicinity of the sites. The scale and extent of the proposed turbine structures will add an intensity of built development to a landscape in the central study area that is currently characterised by low levels of such development. Similarly, the movement of the turbine blades will introduce a slightly higher degree of movement to a landscape that is currently relatively static. The degree of perceived development intensity will vary depending on the size of the nearest turbine cluster. Where more than about 3 turbines occur or several clusters occur within a couple of kilometres these effects will be noticeably greater than where a fewer number of turbines occur within the immediate area.

There are no other existing wind energy developments within the central study area so this proposal represents a new and uncharacteristic form of development in the local area. However, with the recent construction of the Mount Lucas Wind Farm (28 turbines - 150m tall) in a cutaway bog setting in County Offaly approximately 10km to the west, there is a perception that this is an emerging form of development in the lowland and bog landscape of the midlands. Thus, wind farms could not be described as an unfamiliar or uncharacteristic form of development in the wider study area. It is also considered that there is a strong thematic relationship and natural synergy between the generation of energy from peat extraction and the harnessing of wind energy on the same sites. Despite the modal shift, these areas can continue a considerable legacy as 'energy landscapes' in the public perception.

In relation to demesne landscapes and notable heritage features, such as those around Carbury, there is potential for turbines to conflict with the sense of 'past times' or nostalgic landscape character (this is addressed in detail in Chapter 14 – Cultural Heritage). In the case of the stately houses and demesnes this sense of landscape character is relatively insular in that it is substantially contained within the walls and mature field boundaries of these sites. These boundary features also tend to limit the degree of intervisibility between the heritage assets and the proposed turbines and, therefore, the degree to which the demesne landscape character is affected by the proposal. Whilst there is a considerably higher degree of intervisibility between the elevated Carbury Castle and the nearest cluster of proposed turbines (Windmill), the castle ruins command over a fairly typical rural landscape of lowland pastoral farming and bogs that is considered to be of low sensitivity generally (in the Kildare CDP). Given the physical separation distance of nearly 2.5km to the small Windmill cluster of turbines as well as the perceptual separation to the surrounding lowland context, there is little sense that they will impose on the historic character of Carbury Hill and its associated heritage features (see Chapter 14 – Archaeology, Architectural and Cultural Heritage for greater detail regarding the 'setting' of Carbury Castle). There are also few opportunities where the proposed turbines and Carbury Castle can be viewed in combination within the same viewshed, which tends to reinforce the sense of separation between these potentially conflicting entities (see visual impact section for further discussion).

The fact that wind energy developments represent an additional land use rather than a change of land use is one of the more positive aspects of this form of renewable energy in rural areas. Within the rural landscape of the central study area, which has considerable landscape value associated with its productive capacity, the addition of another layer of productivity is not incongruous with the existing character. Furthermore, this particular landscape has a legacy of energy production through peat harvesting and consequently, there is a thematic link to this successive form of renewable energy production. Whilst wind turbines are built structures and have a commercial function, in Ireland they are structures that are more synonymous with rural areas than urban or industrial areas.

Though they are sometimes referred to as industrial, this is something of a misnomer as it evokes connotations of traditional industrial developments with an intense cluster of bulky structures on the outskirts of significant settlements. By contrast, wind farms are a relatively dispersed arrangement of slender structures overlaid on, rather than disrupting, the existing land use pattern.

Beyond distances of approximately 2-3km, even tall wind turbines begin to become part of the overall landscape matrix rather than a defining feature of landscape character. Therefore, beyond the central study area, the proposed wind farm is less likely to influence landscape character to a significant degree and this potential continues to decrease with distance. The degree to which aspects of the wider study area could be influenced by the proposed turbines is also affected by intervisibility. The Route Screening Analysis shows that within lowland areas there is likely to be little or no intervisibility between the immediate landscape context and the proposed turbines beyond about 3km. Where this does occur it is likely to be across an open foreground of cutaway bog, a context within which the turbines are considered to be comfortably assimilated in terms of scale and function.

Another factor to consider in terms of effects on landscape character, is the perceptual transition between landscape types. Even where a comparatively high degree of intervisibility might occur between the proposal site and elevated areas of terrain such as the 'Chair of Kildare Hills', there is a sense of separation in the landscape character units. In this example, the crest of hills is perceived as an island in a lowland 'sea' of bogs and pastoral farmland. The fact that the turbines are clearly perceived to be anchored within the lowland context results in them having less of a sense of imposition on the discrete upland landscape character unit. Given the considerable separation distance between the proposed turbine clusters of more than 3km in most cases, there is little sense that the scheme is crowding around these discrete upland areas.

A distinctive aspect of the greater study area is that it contains a number of prominent, isolated hills that are important heritage locations. Furthermore, their historic value is linked to the commanding views they afford over the surrounding countryside. There is also understood to have been important visual connections between these hills, which include Tara, Skryne, Croghan, and Ward amongst others (see Cultural Heritage chapter 14). This wind farm proposal is not considered to interfere with the direct visual links between these features or the character of their immediate landscape settings (partly due to the significant distance between these features and the turbines). In terms of character, the vast landscape that surrounds these prominent hills is an anthropogenic rural one dotted with settlements and criss-crossed by a dense web of roads and a variety of productive and extractive land uses. It is an evolving landscape (rather than a nostalgic or museum landscape) where people continue to live and work with changing technologies, having done so for millennia.

Site activity will be at its greatest during the construction phase due to the operation of machinery on site and movement of heavy vehicles to and from site. This phase will have a more significant impact on the character of the site, but it is a temporary impact that will cease upon completion of the scheme (approximately 2 years). The intensity of construction impacts will also be dispersed around the site during this period as the turbines cannot all be constructed at once. Therefore, construction impacts will not be constant at any one site with the exception of site entrances and along principal access roads.

Given the small footprint of the development features, physical landscape effects will be long term, but not permanent in respect of the definitions provided in the EPA Guidelines. Within a year or two of decommissioning there is likely to be little evidence that wind turbines existed on these sites and the prevailing land use of the time will be allowed to envelop it.

In summary, there will be physical impacts on the land cover of the site as a result of this development, but these will be relatively minor in the context of the already modified context of cutaway peatland, conifer plantations and pastoral farmland. Furthermore, a high proportion of the existing track network from these land uses will be utilised in the construction and operational phases of the development. Effects on landscape character will be most noticeable within the central study area (<5km) due to the perceived scale, intensity and extent of the proposed development in this immediate context. The proposed wind farm will be a new and defining feature of the landscape character in the central study area, but it is not considered to be an incongruous feature within this robust and anthropogenic landscape setting. On balance, the magnitude of landscape effect in the central study area is deemed to be **Medium-low** in the nearest 2-3km especially in relation to larger clusters of turbines (c.>3). This will reduce to a **Low** magnitude beyond this threshold or where only a small turbine cluster occurs in the immediate vicinity.

Within the wider study area (c. 5-30km) the effects on landscape character are considerably lower and will reduce further as separation distance increases. The proposed wind farm will be perceived as one form of development within a pattern of other broad scale anthropogenic land uses. Whilst wind energy developments are not a characteristic feature of the wider study area they are not an unfamiliar form of development either.

Consequently, the magnitude of landscape effect for the wider study area is judged to be no greater than **Low** out to approximately 15-20km and only when clear intervisibility exists. Beyond this distance threshold the magnitude of landscape impact is considered to reduce to **Negligible**.

15.12.3 Significance of landscape Effects

The significance of landscape impacts is a function of landscape sensitivity weighed against the magnitude of the landscape impact. This is derived from the significance matrix (Table 15.3) used in combination with professional judgement. Based on the written assessment contained above in Sections 15.12.1 and 15.12.2 the significance of landscape impacts is summarised below.

Table 15.12: Significance of Landscape Impact

Landscape features/character units	Landscape Sensitivity	Magnitude of Landscape Effect (highest level)	Significance of Landscape Impact
• Hill of Tara	Very High	Negligible	**Slight-imperceptible**
• Croghan Hill	High	Negligible	**Imperceptible**
• Rock of Dunamase	High	Negligible	**Imperceptible**
• Hill of Skryne	High	Negligible	**Imperceptible**
• Hill of Ward	High	Negligible	**Imperceptible**
• River Boyne	High	Low	**Slight**
• Dun Ailinne	High	Low	**Slight**
• Heritage Settlement of Trim	High-medium	Low-negligible	**Slight-imperceptible**
• 'Chair of Kildare Hills'	Medium	Medium-low	**Moderate-slight**
• 'Northern (Newtown) Hills'	Medium	Medium-low	**Moderate-slight**
• 'Central Lowlands'	Medium	Medium-Low	**Moderate-slight**
• Canal network	Medium	Medium-low	**Moderate-slight**
• General areas of rolling pastoral farmland in the northern and southern reaches of the study area	Medium-low	Low-negligible	**Slight-imperceptible**
• Flat farmland, Scrubby bog fringes and forest plantations within the central study area	Low	Medium-low	**Slight**
• Major Urban areas and rural hinterland in eastern study area	Low	Low-negligible	**Imperceptible**
• Major transport corridors	Negligible	Medium-low	**Imperceptible**
• Quarries, business parks and industrial sites	Negligible	Negligible	**Imperceptible**

Summary

As can be seen from Table 15.12 above, the highest level of landscape impact significance is 'Moderate-slight', which is in the mid to low range of the significance matrix. This is considered likely to occur for those landscape character units in the central study area that have a higher sensitivity than the typical lowland landscape that otherwise surrounds the proposal sites. These character units include the elevated 'Chair of Kildare Hills', the 'Northern Hills' and the canal network, which consists of the Royal Canal, the Grand Canal and the Barrow Branch.

This level of impact is also considered to be a worst-case scenario in respect of the nearest aspects of these landscape character areas. For example, it is only short sections of the canal network that are within close enough proximity to the proposed turbines, which may be affected to this degree. Unlike the elevated character units the canal network is generally well enclosed by tall vegetation that lines its tow paths. Where turbines are not visible beyond the immediate corridor of the canal they will have little impact on the character of the canal. Furthermore, the canals were created in the spirit of industry and intended to pass through landscapes that contain the various productive and extractive land uses to which they served. Therefore, it is not considered that the proposed wind turbines would conflict with the essence of the canal network, even where they occur in close proximity or influence the character of the surrounding landscape.

The remaining landscape impact significance judgements are all within the range of slight to imperceptible. There are two main reasons for these low levels of impact. All of the highly sensitive landscape receptors are considered to be contained within the outer periphery of the study area where the effects of the proposed wind farm on landscape character are considered to be negligible. Alternatively, the receptors are landscape character units with mid to low levels of sensitivity in and around the central study area where the mid to low magnitude of landscape impact is considered to result in similarly low levels of significance.

In considering the proposal in the context of the Wind Energy Development Guidelines (2006) the criteria for the 'Flat Peatland' landscape type is deemed to be of most relevance, but consideration must also be had to the 'Hilly and Flat Farmland' guidance as the proposal sites cover areas of both. The guidance for development in 'Hilly and Flat Farmland' is slightly contrasting to that for 'Flat Peatland' areas, particularly in respect of the spatial extent and height of turbines. The proposal is more consistent with the guidance for the latter. In such instances it is necessary to understand the basis for the respective guidance. For flat peatland sites, broad scale landscape patterns with a high degree of openness and long distance visibility is anticipated by the guidelines as indicated in the reference photography used. For hilly and flat farmland a higher degree of enclosure by more intricate landform and land use patterns is anticipated. In this instance the landscape of the central study area is most strongly influenced by the characteristics described for flat peatland. That is, a broad scale land use pattern consisting of cutaway bogs, forest plantations and bog fringes of scrubland and large fields of marginal grazing. Nonetheless, there is a relatively high degree of enclosure provided by the vegetation patterns described. Furthermore, each of the five proposed clusters is relatively discrete in a geographical sense and the overall development is consistent with a series a small and medium sized wind farms. For these reasons the proposal is considered to be consistent with the Wind Energy Guidelines.

One of the key ameliorating factors in respect of the attributed landscape impacts is the fact that the proposed wind farm will be located in the heart of a working rural landscape, within which, it is not an incongruous feature and may be perceived as an additional layer of productivity. Indeed, because it functions largely above the ground plain, it is a supplementary rather than alternative land use. Existing landscape patterns and land use practices will remain almost unaffected below the turbines.

Wind farms are often referred to as industrial developments particularly when trying to evoke connotations of industrial landscape character. However, in the Irish context they are a form of development that is far more synonymous with rural, upland and peatland areas. Though the proposed wind farm will bring an increased intensity of built development to this rural area, it will not impart an industrial landscape character as might be typified by the Lagan cement works near Kinnegad for example.

Overall, it is considered that the proposed Maighne Wind Farm will not give rise to significant landscape impacts. Instead, these impacts are considered to be no higher than Moderate-slight even within the central study area.

15.13 Residual Visual Effects

Table 15.13 below summarises the full textual assessment of visual effects for each VRP contained in Appendix M.1a and M.1b. Whilst the 'receptor sensitivity analysis table' and full textual assessment for each VRP is normally contained within the landscape and visual chapter, in this instance, given the high number of VRP's, it is considered more prudent to place this material in a separate appendix and focus herein on the significance of the findings. The left hand side of the table incorporates statistical data associated with the view of turbines, whilst the right hand side contains professional judgements in respect of the same view. It is important to note that the professional judgements are based on the effects experienced in relation to the view and are not directly influenced by the statistical data. These aspects are only combined within Table 15-13 in order to identify patterns of effect to better inform the conclusions of this assessment.

Table 15.13: Summary of Visual Effects at Viewshed Reference Points (VRP's)

VRP No.	Distance to nearest turbine km	No. of turbine nacelles visible	Visual intensity category (TVI)	Visual receptor Sensitivity (from table 15-8)	Visual Impact Magnitude	**Significance of Visual effect**
KEDR2	4.39	37	25-50	High-medium	Medium	**Moderate**
KEDR3	0.89	3	100-200	Medium	Medium	**Moderate**
KEDR4	1.78	8	75-100	Medium	Low	**Slight**
KEDR7	6.27	1	1-5	Medium	Negligible	**Imperceptible**
KEDR10	16.44	47	1-5	High-medium	Low-negligible	**Slight-imperceptible**
KEDR11	3.61	20	50-75	Medium	Medium	**Moderate**
KEDR13	1.71	36	100-200	High-medium	Medium	**Moderate**
KEDR14	1.82	27	100-200	Medium	Medium	**Moderate**
KEDR15	0.84	10	200-400	Medium	High-medium	**Moderate**
KEDR21	7.15	31	10-25	Medium	Medium	**Moderate**
KEDR24	18.76	36	1-5	High	Low-negligible	**Slight**
KEDR30	2.87	18	1-5	High-medium	Medium-low	**Moderate**
KEDR31	11.11	1	1-5	High-medium	Negligible	**Imperceptible**
KEDR38	2.53	21	75-100	Medium	Medium-low	**Moderate-slight**
KEDR39	1.64	15	100-200	Medium	Low	**Slight**
KEDR40	21.38	46	1-5	High-medium	Low-negligible	**Slight-imperceptible**
KEDR41	4.04	47	50-75	Medium	Medium-low	**Moderate-slight**
KEDR42	0.56	7	200-400	Medium	Medium	**Moderate**
MHDR17	25.34	42	1-5	Very high	Low-negligible	**Slight**
MHDR18	5.62	0	10-25	Medium	Negligible	**Imperceptible**
MHDR30	8.72	14	1-5	Medium	Low	**Slight**
MHDR34	2.88	19	50-75	Medium	Medium	**Moderate**
MHDR35	4.96	11	10-25	High-medium	Medium-low	**Moderate-slight**
MHDR40	20.44	8	1-5	High	Negligible	**Imperceptible**
SDDR1	23.43	47	1-5	High	Low-negligible	**Slight**
WWDR1	27.63	27	1-5	High-medium	Negligible	**Slight-imperceptible**
06LC17	0.54	9	400-600	Medium-low	High	**Substantial-moderate**

VRP No.	Distance to nearest turbine km	No. of turbine nacelles visible	Visual intensity category (TVI)	Visual receptor Sensitivity (from table 15-8)	Visual Impact Magnitude	**Significance of Visual effect**
06LC32	1.72	6	100-200	Medium-low	Medium	**Moderate-slight**
07LC30	0.65	11	200-400	Medium-low	High-medium	**Moderate**
10LC12	0.95	13	200-400	Medium-low	High-medium	**Moderate**
10LC13	0.61	11	200-400	Low	High	**Moderate**
10LC14	3.43	7	100-200	Low	Medium-low	**Slight**
10LC16	2.04	13	100-200	Medium-low	Low	**Slight**
10LC32	0.84	6	400-600	Medium-low	High	**Substantial-moderate**
06CP5	13.52	27	1-5	Medium-low	Low	**Slight**
06CP10	9.83	20	1-5	Low	Low	**Slight-imperceptible**
06CP12	1.44	16	200-400	Medium-low	Medium	**Moderate-slight**
06CP13	3.37	18	50-75	Low	Medium-low	**Slight-imperceptible**
06CP30	3.23	4	25-50	Medium-low	Low	**Slight**
07CP1	12.72	0	1-5	Medium-low	Negligible	**Imperceptible**
10CP7	4.91	17	5-10	High-medium	Low	**Slight**
10CP9	4.57	6	25-50	Medium	Medium-low	**Moderate-slight**
10CP15	19.80	38	1-5	Medium-low	Low-negligible	**Slight-imperceptible**
10CP17	10.05	0	1-5	Low	Negligible	**Imperceptible**
10CP30	2.99	0	25-50	Medium-low	Low	**Slight**
11CP1	12.70	0	1-5	Medium-low	Negligible	**Imperceptible**
11CP30	29.75	0	1-5	High	Negligible	**Imperceptible**
11CP32	8.93	3	1-5	Low	Negligible	**Imperceptible**
11CP33	15.73	13	1-5	Low	Low	**Slight-imperceptible**
06MR7	9.57	12	1-5	Low	Low-negligible	**Imperceptible**
06MR14	1.00	23	200-400	Low	High-medium	**Moderate-slight**
07MR30	3.93	20	25-50	Low	Medium-low	**Slight**
10MR31	3.11	8	75-100	Medium-low	Medium	**Moderate-slight**
06AH4	0.61	11	200-400	Medium	Medium	**Moderate**
10AH3	19.91	47	1-5	High	Low-negligible	**Slight**
10AH4	1.97	4	100-200	Medium	Low	**Slight**
10AH5	2.71	4	25-50	Medium	Negligible	**Imperceptible**
10AH31	2.38	34	75-100	High-medium	Medium-low	**Moderate**
10AH32	9.62	15	5-10	High-medium	Low	**Slight**
10AH33	6.63	12	10-25	Medium	Low	**Slight**
10AH34	2.28	15	100-200	Medium	Medium	**Moderate**
11AH1	17.6	41	1-5	High	Low	**Slight**
14AH1	29.81	21	1-5	High	Negligible	**Slight-imperceptible**
07KV5	15.89	20	1-5	Very High	Low-negligible	**Slight**

Impacts on Designated Views

Designated scenic views tend to be attributed for three principal reasons within this study area. They are either elevated panoramic vistas over the plains from elevated uplands and isolated hilltops or, alternatively, they are canal or river views from hump-backed bridges. In this flat landscape even the small degree of elevation (2-3m) achieved by crossing a canal bridge can open up a broad vista and there will always be channelled views along the canal or river corridor that extend further than prevailing views within the lowland context.

This is due to the high degree of vegetative screening within the lowland context of field hedgerows, conifer plantations and scrubby bog fringes. The other type of designated view relates to the view of prominent hills or landscape features from the surrounding lowland context. The VRP set that has been assessed herein represents each of these types of designated view.

Most of the elevated, designated scenic views assessed as part of this study occur in the periphery of the study area and are afforded from either the foothills of the Wicklow Mountains or the Slieve Bloom uplands or isolated hilltops such as the Hill of Tara, the Hill of Ward or Croghan Hill. These isolated hilltops have strong heritage associations due to their relative prominence within a vast flat landscape, which has made them strategic hubs for millennia. The most notable of these is the Hill of Tara, which is a UNESCO candidate world heritage site. It is also one of the most popular tourist attractions in the country attracting visitors at a national and international level. Heritage and tourism attributes have been considered when assessing the sensitivity of these hilltop visual receptors. However, it should be noted that the majority of hilltops within the study area, including those designated as scenic view points in the Kildare County Development Plan, are contained within private ownership and although there may be informal public access permitted they do not appear to attract significant numbers of visitors. The elevated vistas afforded from the southern quarters of the study area tend to be more representative of long distance views that are afforded throughout these broader upland areas. Given the considerable viewing distances of generally greater than 20km, the significance of visual impacts is in the slight to imperceptible range for all of these designated views, even where the sensitivity of the location is deemed to be high or very high. This is due to the fact that although the proposed turbines may be faintly visible above the distant horizon from views in excess of 20km, the entire intervening landscape context is that of an anthropogenic, and largely contemporary landscape of settlement and production. Within such views the turbines are perceived to be an additional background element of the overall land use pattern.

An exception to the peripheral array of elevated designated views are those afforded from the 'Chair of Kildare hills' and 'Northern (Newtown) Hills' in the central study area. Whilst there is a web of local roads that criss-cross the Newtown Hills affording occasional long distance views (KEDR2 and KEDR30), in the vicinity of the 'Chair of Kildare Hills', which are more abrupt landscape features, roads tend to navigate around the base of the hills. Thus, access to these hilltops is not readily afforded. The most notable of these hill tops is the Hill of Allen, which has heritage associations relating to Fionn mac Cumhaill and the Fianna. Although this is contained in private ownership, there is an informal path around the Roadstone quarry to a viewing tower folly on its summit. The view from this tower (KEDR41) epitomises the nature of this proposal as it reveals the turbines within a context of a range of broad scale productive and extractive land uses. This includes quarrying, conifer plantations, cutaway bogs and pastoral farmland. Although the scale and extent of the proposed turbines is acknowledged they are seen to be well accommodated, both spatially and thematically, within this vast scene.

It is considered that the value of canal views lies in the slight elevation they provide, their present day associations with recreational amenity and their latter-day sense of industrial heritage. None of these attributes makes them particularly sensitive to changes in views resulting from appropriate forms of development within the surrounding landscape. There are also a considerable number of such designated views within the central study area given the concentration of the canal network within this landscape and only a small proportion of these will be affected at all by the proposed development. This is mainly due to the degree of screening provided by mature canal-side vegetation. Even where one or two turbines might be visible on the alignment of the canal or the perpendicular approach roads, much of the surrounding turbine cluster is likely to be screened by intervening vegetation at close quarters. The most affected of the designated canal views is Boyne Lock near Longwood (06AH4), where turbines from the Ballynakill cluster line the canal at close quarters. This is also an elevated section of the canal with a comparatively low degree of canal-side vegetation. Rather than impinging on the character of the canal and the amenity of canal users this view symbolises a strong thematic relationship between current and former icons of technology and industry. Notably these are both forms of development that are more synonymous with rural than urban areas.

In the view from 06AH4 the nearest turbines are seen at a dramatic scale and with a strong sense of perspective that complements that of the canal. Whilst they are a highly dominant visual feature in this scene, the overall significance of visual impact is not likely to reduce if they were less prominent and seen in a less dramatic fashion rotating amongst intervening trees. Instead, they may be perceived as an unapologetic and complementary way-marker for canal users.

There are several designated views in County Meath relating to views over the River Boyne from road bridges. Following investigations it was found that the proposed turbines only entered into the nearest such view to the development and this is represented by MHDR18.

Only the blade tips of turbines will be seen at a considerable distance above an intervening treeline and the significance of impact is deemed to be Imperceptible.

There are two main instances where scenic views have been designated in relation to views of iconic landscape or heritage features and these include the Hill of Allen and Carbury Castle on top of Carbury Hill. In both instances turbines will intrude on the view of these features as seen from surrounding designated scenic routes, which happen to run through medium and low sensitivity Landscape Character Areas according to the Kildare County Development Plan. In neither case is it considered that the turbines are a significant detraction on the view of these features. For Carbury Castle the nearest turbines are those of the Windmill cluster approximately 2.5km to the north. These are seldom seen in the same visual context from the surrounding roads (KEDR4) and when this does occur (KEDR3 and 10MR31) they are seen at widely disparate viewing angles or substantially screened. Thus, they are not considered to noticeably compete with or detract from the view of Carbury Castle. In the case of the Hill of Allen, the turbines from the Cloncumber cluster will be seen at a considerable scale to the fore of the hill from surrounding designations (KEDR14 and KEDR15). However, in this instance the turbines are clearly contained within a separate landscape of flat lowlands and although they will rise substantially above the profile of the hill, they are not seen to compete with it and nor will they detract from the view of it to a significant degree due to the sense of permeability in the layout.

Due to the nature of the study area, designated views tend to take in scenes with a productive rural character consisting of a range of broad scale land uses that also vary in terms of intensity. The value of these scenic views tends to relate to the extent of the view on offer or particular landform or heritage features within the view rather than any sense of the naturalistic. Whilst the proposed wind farm may represent a visual intrusion on some designated views it does not represent a visual obstruction due to the slender nature of the turbine structures which retain a sense of visual permeability. Furthermore, the turbines are not considered to be incongruous in the spatial or a thematic sense within this broad, anthropogenic landscape context. For these reasons, it is considered that the proposal will not give rise to any significant impacts at designated scenic views.

Impacts on views from key receptors

Key receptors include those locations that are valued at a national or international level and attract large numbers of tourists and visitors who are likely to have a heightened appreciation of the surrounding landscape context. There are considered to be two such locations within the study area and these are the Hill of Tara (MHDR17) and Trim Castle (07KV5). From the Hill of Tara open views towards the proposed wind farm are afforded, but at a considerable distance (25km) and in the context of a vast panoramic view in all directions. From here, the proposed wind farm will only be faintly visible at a very small scale and only under the clearest of viewing conditions. The turbines are not considered to give rise to any particular aesthetic issues and they are not considered to be incongruous in the broad rural setting that spreads in all directions from the hill. For these reasons, the magnitude of visual impact is deemed to be Low-negligible. The Slight significance of visual impact attributed to the Hill of Tara is more a consequence of its very high sensitivity rating than the degree of effect likely to be experienced. The most important aspect of this summary judgement is that the undeniable sensitivity of this receptor is inherent in it. It is also worth noting that there are a number of instances around the country where wind turbines occur within 20km of highly sensitive tourism and heritage features without having caused any notable contention in relation to the setting of the feature in question. These include; the Dunmore turbines that have been constructed on a ridge approximately 9km north of Brú na Bóinne; the Rock of Cashel where wind energy development occurs on the Templemore plains, within the Slieve Felim range and at Kill Hill; The Burren, where several wind energy developments line the Slieve Aughty ridgeline to the east, and; Lough Derg in County Donegal where turbines rise above the ridge that encloses the western side of the Lough and the Monastic site contained on an island at its centre.

Trim Castle at the heart of the recognised 'heritage settlement' of Trim (07KV5) is a popular tourist and heritage feature within the study area and visitors are afforded access to its ramparts to take in vast vistas over the rural hinterland of the settlement. Open views of the proposed wind farm will be afforded from this elevated lookout, but at considerable distances of nearly 20km to the nearest turbines and over 35km to the furthest cluster. Given the small perceived scale, the faint visibility and working rural context of the proposed turbines, the significance of visual impact is judged to be Slight from Trim Castle.

In respect of tourist views from the Hill of Tara and Trim Castle, it is worth noting the Fáilte Ireland 'Guidelines on the treatment of tourism in an Environmental Impact Statement' (2011). Section 3 of these Guidelines states that: *"It is important to note that there appears to be evidence that the visitor's expectations of 'beautiful' scenery does not exclude an admiration of new – modern developments – such as wind farms – which appear to be seen as indicative of modern, informed and responsible attitude to the environment."* Under section 4 in relation to 'New Developments' the same Guidelines reiterate *"that some types of new or improved large scale infrastructure such as roads – can improve the visitor experience – by increasing safety and comfort or can convey a sense of environmental responsibility – such as wind turbines"*. These guidelines clearly reflect the need for a pragmatic approach to assessing the visual impacts of new development in the landscape even in relation to sensitive receptors. They also highlight that there are some positive connotations relating to wind energy development from a tourism perspective.

Impacts on local community views

Local community views are considered to be those experienced by those people who live, work and move around the area within approximately 5km of the site. These are generally the people that are most likely to have their visual amenity affected by a wind energy proposal due to proximity to the turbines, a greater potential to be surrounded by turbines and having turbines as a constant feature of their daily views. In this instance eight local community VRPs were selected for the visual impact assessment and the highest significance of impact attributed is Substantial-moderate, which occurs in respect of two of these. The first of these is a cluster of dwellings between the edge of the Bog of Allen and the Barrow Line canal at Ballyteige South (10LC32). Whilst this location is typical of most local community views, in that only one cluster of turbines is visible, in this instance the view consists of the reasonable lateral extent of the Cloncumber cluster, which occurs throughout the north-western quarters with a number of turbines seen at a prominent scale in close proximity above the vegetation that lines the canal. This scenario is considered to be something of an anomaly within the study area as these dwellings are contained within a marginal landscape at the edge of the bog, whereas most local receptors are dispersed throughout the more productive rural landscape with a reasonable separation distance to the bog and transitional scrubland in which turbines have generally been placed. The main ameliorating factor in this instance is that the principal view for these dwellings, to the south across the Bog of Allen and towards the Hill of Allen, is unaffected by the proposed turbines, which lie in the opposite direction. The other location to be attributed a Substantial-moderate significance of impact is at Ballynakill (06LC17) where turbines from the Ballynakill cluster are prominently visible on both sides of the road. This is very much a worst-case-scenario in terms of the lateral dispersion of turbines throughout different aspects of the view, which occurs for only a short section of this road. Whilst the open landscape in this locality facilitates relatively clear views of this turbine cluster, this also allows for a comprehensible view of the turbines within a broad scale land use pattern.

The sensitivity of local community views tends not to be a strongly differentiating factor in this instance as they are all considered to be in the mid to low range. This is on the basis that the VRP's are contained within a robust rural landscape and views tend not to be vast or particularly unique. The main aspect of local community receptor sensitivity is that of the susceptibility of local residents to changes in the day-to-day views, particularly from dwellings. This is accounted for in the overall assessment of sensitivity at these receptors.

The local community VRP locations are all selected on the basis of the most open views available in order to represent a worst case scenario. It is important to note that these are not necessarily typical views of the scheme from within the local landscape and this is another benefit of undertaking Route Screening Analysis (RSA) on every public road within 5km of the turbines. The RSA clearly indicates that beyond a threshold of approximately 2-3km the proposed turbines begin to become fully screened by intervening hedgerow vegetation. This has implications for the number of turbines that are visible from any particular location as well as the amount of each turbine that is visible above the screening. That is, wind turbines that are visible beyond approximately 1km tend to reveal only partial blade sets above intervening vegetation and given the dispersed nature of the clusters comprising the scheme there are seldom views of more than one cluster or the full extent of the larger clusters from within the lowland context that makes up the vast majority of the study area.

This is evidenced by nearly all of the photomontages except those applicable to elevated designated scenic views. It is also confirmed by the supplementary analysis of the 'Open View' category of the RSA, which shows that there is seldom a view of more than 5 turbines afforded from roads within the central study area, particularly local roads.

Viewshed reference points 10LC12, 10LC13 and 10LC32 were all deliberately selected in close proximity to several of the largest cluster of turbines in areas shown by the Theoretical Visual Intensity (TVI) map to be among the most potentially exposed to visual impacts. The most impacted of these is considered to be 10LC32, which is discussed above and is somewhat atypical of the viewing scenarios presented in the central study area. 10LC12 and 10LC13 present the more typical scenario with the former representing an end-on view of the elongated Drehid-Hortland cluster and 10LC13 a side-on view of the same group of turbines. From 10LC13 turbines are seen in a relatively dense cluster, but with a strong sense of perspective generated between the nearest and furthest of the visible turbines. This allows an understanding of the actual spatial separation between them and ameliorates the sense of clutter somewhat. Whilst some sense of visual clutter remains there is not a strong sense of being surrounded by turbines. Furthermore, turbines more than about 2km away tend to be fully screened from view. By contrast, in the view from 10LC12 the turbines are dispersed across a broad lateral portion of the southerly view, but with a relatively low degree of intensity so that a sense of permeability remains. The turbines are also seen at similar scales to each other and with the lesser degree of perspective than from 10LC13. Under both these scenarios the magnitude of visual impact is considered to be in the mid to high range, but on balance of mid to low order sensitivity at these receptors, the overall significance balances out at moderate.

It is interesting to note that in all cases where a High or High-medium magnitude of impact is deemed to occur, the Theoretical Visual Intensity (TVI) score is greater than 200. This level of TVI is predominantly contained within 1km of the nearest turbines and thus, it can be surmised that higher order impacts tend to be substantially contained within close proximity to the larger clusters of the development where there is a relatively low population density, generally surrounding substantial peatland areas.

Impacts on Centres of Population

Small settlements in the central study area were included in the local community VRP category and have been addressed above. This category includes larger settlements and those located outside of the central study area. The highest level of impact attributed to any of the centres of population included for assessment is Moderate-slight at both Rathangan (10CP9) and Longwood (06CP12) for quite different reasons. At Rathangan a tight cluster of turbines (Cloncumber) are seen close to the alignment of the canal and are considered to contribute to a minor degree of visual clutter. At 06CP12 which had to be positioned just outside of the settlement to avail of an open view, the nearest turbines are seen at a prominent scale, but a coherent layout.

More remarkable is the low degree of impact experienced at all other centres of population within the study area. This occurs because nearly all significant settlements are located in highly screened lowland areas rather than on prominent ground where they might be afforded clearer views of the proposed turbines. The eastern half of this study area is more populated than just about any study area subject of a wind energy application in the country to date. Indeed, this is one of the more sensitive aspects of the wider visual context. However, there is a very low degree of scheme visibility from the outskirts of Dublin and its western commuter belt settlements and consequently, there are also very low levels of significance in this more densely populated zone.

Impacts on major routes

Of the major routes that pass through the study area, the most affected by this proposal is likely to be the M4 motorway as it exits a section of cut just beyond the toll plaza for west bound motorists. This is represented by Viewshed reference point 07MR30. The first point of consideration is that motorists on a busy motorway are amongst the least susceptible of visual receptors to changes in views. Furthermore, although there are relatively clear views of some turbines in close proximity to the road at this elevated location they are well accommodated in terms of scale and function within the underlying landscape context. Thus, the significance of impact is only considered to be Slight in this instance. The M7 motorway to the south of the scheme is almost unaffected by this proposal as there are few locations that would afford any view of turbines and these will be at distances in excess of 10km.

KEDR31 at the Curragh is one viewpoint that was retained in the final VRP set that is from the M7 and this indicates that the proposed turbines will be almost impossible to discern.

The railway network tends to hug the ground plain with roads passing over it rather than the other way around. It also has a reasonable degree of trackside screening for most sections and for these reasons it is generally considered to be affected by the proposal to a very low degree.

The one exception is to the south of Longwood where it runs adjacent to the canal near Boyne Dock. This view is represented by 06AH4, which is actually on the canal above the railway line. The same reasons that the proposed turbines are not considered to have a significant effect on the canal view also apply to the view from the train. That is, to pass under these turbines for a brief section of the journey is likely to be more of an exciting rather than detracting experience for train travellers. Although this may seem to be a subjective statement, such experiential considerations are expressed in the Wind Energy Development Guidelines; *"…… the possibility of driving through a wind energy development closely straddling a road could prove an exciting experience"*.

The remaining regional road network is well represented within this assessment, but generally in the context of other more relevant and/or sensitive receptor types such as centres of population and local community views.

Impacts on Heritage and Amenity features

One of the key amenity and heritage assets contained within the study area is considered to be the canal network. Canal views from road bridges are designated as scenic views in the Kildare County Development Plan and these have been assessed and discussed in detail in earlier in this section under the heading 'impacts on designated views'. In addition to these point receptor locations a visibility analysis was also undertaken from all of the canal network within 5km of proposed turbines. This followed a similar, but more rudimentary methodology to the Route Screening Analysis (RSA), but only in that the analysis was done by bicycle, in the field. It was also done from both tow paths. The canal screening analysis shows that only within close proximity to turbines are they likely to be visible above the canal-side vegetation. This is a function of both the height of this vegetation and the viewer's immediate proximity to it. Although turbines will be visible on occasion from the canal network due to proximity or brief absences of canal-side screening, this is not considered to have a significant effect on visual amenity. The canals are deemed to be a robust industrial heritage asset and the occasional view of turbines amongst a variety of other productive and extractive land uses should only serve to punctuate the canal user's journey rather than being a constant feature of views.

A number of hilltop heritage sites were identified in the baseline section where the sensitivity of the receptor location is intrinsically associated with the vast panoramic vistas they afford over the flat midlands context. These include; the Hill of Tara; Hill of Skryne; Croghan Hill; the Rock of Dunamase; Dún Allinne; the Hill of Allen and the Hill of Ward. Many of these are designated as scenic views in the relevant County Development Plans and have been assessed and discussed earlier in this section in relation to impacts on 'designated views'. The notable exceptions are Dún Allinne and Croghan Hill. These important heritage sites are not subject of public rights of way and are not included as scenic view points in the relevant County Development Plans. For the same reasons as described above in relation to the other hilltop views in the outer portions of the study area, including the small scale and considerable viewing distance to the turbines, the scheme is not considered to give rise to more than a low order visual impact significance at these locations.

As discussed previously, Carbury Castle on Carbury Hill is one of the more important heritage assets in the central study area. Whilst this has been discussed in detail in relation to the designated scenic views that surround it (representing 'views of' the feature), this section considers the 'views from' the hilltop itself. From here a clear view of the three turbines from the Windmill cluster is afforded directly to the north. These are seen in a clear and legible manner within the heart of a section of cutaway peatland. They are contained at a reasonable separation distance from Carbury Hill (2.5km) within the diverse and productive lowland context that surrounds it on all sides. These turbines are not considered to significantly detract from the setting of this heritage feature (see Chapter 14 Cultural Heritage for more detail).

In the vicinity of Carbury there are also several stately houses and associated demesne landscapes including Williamstown house and Newbury Hall. These are relatively well contained within mature vegetation at the boundaries affording little intervisibility with the nearest of the proposed turbines.

10MR31 represents a view from the R402 regional Road that takes in Carbury Castle to the north-west and Newbury Hall to the South.

The proposed turbines are substantially screened from this location, however, in the case of Newbury Hall, the blade tips of two turbines will be seen to cut the tree line a short distance to the right of the roof line of this structure resulting in some distraction from the view of it, albeit not a designed or principal view. The Windmill turbines to the North will also reveal blade sets above intervening trees and buildings, but these are not considered to compete with the profile of Carbury Castle or Carbury Hill in terms of scale or alignment.

Lullymore Heritage and Discovery Park is contained within a woodland setting particularly at its periphery and thus, the proposed turbines are likely to be screened from most aspects of the park. An alternative viewpoint representing Lullymore (10AH34) is obtained from the monastic site and cemetery on the opposite side of the R414. This indicates that the Cloncumber turbine cluster will be visible to the south, but partially screened. There may be some intrusion on the view of the Hill of Allen, but overall, the significance of impact is deemed to be moderate.

Both the Curragh and Lough Ennell were identified in the baseline section as being amenity areas to be considered in respect of potential impacts from the proposal. However, neither of these features was subsequently considered to be affected by the proposal as indicated by the ZTV maps in the case of Lough Ennell and photomontage KEDR31 in respect of the Curragh.

Summary of visual impacts

Whilst local residents are acknowledged to be among the most susceptible viewer groups, this is balanced by the lower value of the views that are afforded from within the lowland landscape where the rural population is concentrated. These views tend to be limited in extent and are of a typical rural nature, which is reinforced by the Kildare County Landscape Character Assessment for those LCA's in which proposed turbines are located. It must be noted that the sensitivity of visual receptors is not a direct reflection of the quality of the landscape in view, but rather its capacity to accommodate change. A good example of this apparent disparity is canal views. These can be tranquil and of high scenic quality, but, due to the industrial heritage associations of these waterways, they are not considered to be highly sensitive visual receptor locations.

The value of designated views within the study area tends to relate more to the extent of the view on offer rather than remote or naturalistic character, which is often associated with designated scenic views in other parts of the country. In this instance, the landscape in view is generally an anthropogenic rural one, within which, the view of new development will not necessarily conflict with scenic values.

The nature of visibility within the study area has been exhaustively analysed using a sequential combination of tools that began with computer generated Zone of theoretical Visibility (ZTV) and then Theoretical Visual Intensity (TVI) mapping. This was followed by Route Screening Analysis (RSA) from the local road and canal network, then finally the assessment of photomontages generated from an extensive range of representative visual receptor locations. These forms of analysis represent an orderly transition from objective baseline studies to professional appraisal that incorporates a high degree of rigour. One of the most important points to note from this sequence of analysis is that a traditional ZTV map is of little value in understanding visibility within lowland settings. This was proved by the findings of the RSA, which showed a substantially lower degree of actual visibility occurs in the central study area than is implied by the ZTV map. The RSA also reinforced the findings of the TVI mapping, which had indicated that the intensity of visibility falls away exponentially over the first 2-3km. In this instance the same 2-3km distance is shown by the RSA to coincide with the threshold that intervening vegetation begins to fully screen turbines from view within the lowland landscape. That is, screened views become more commonplace than open views beyond this distance band. This key threshold also limits the number of turbines that are potentially in view from within the lowland setting even in relatively close proximity to the various turbine clusters. The RSA indicates that even when turbines are visible there will seldom be a view of more than 10 and most often a view of less than 5. This typical visibility scenario from within the central study area is well represented by 10LC13 near the Drehid-Hortland turbine cluster. This view consists of two turbines that are prominently visible in close proximity with another 6 turbines visible to lesser degrees beyond, due to a function of screening and diminishing scale. Both the ZTV map and the wireframe image accompanying the photomontage for 10LC13 indicate that the majority of proposed turbines would be visible from here if not for this degree of vegetative screening.

This reinforces the conclusion that for those people who live and work within the lowland landscape of the study area (almost all), the proposed development will be perceived as a series of small to medium sized wind farms dispersed over a broad area with equally dispersed impacts.

Two of the key sensitivities identified in the Kildare County Development Plan for the 'Western Boglands' and 'North-western Lowlands' LCA's, which contain the proposed wind farm are 'smooth terrain' and 'low vegetation' as these attributes result in long distance vistas and an inability to visually absorb development. Whilst this is true in some instances within these LCA's and is certainly true within the heart of the peatland areas (see KEDR14), this is by no means the typical viewing scenario. The main reason being, that the population and the road network (visual receptors) are concentrated outside of the bogs within more productive zones where vegetation patterns are tighter and taller.

The more typical scenario sees dwellings lining the local road network within a band of pastoral farmland that quickly gives way to marginal farmland, scrubland and/or conifer plantations that tend to hide the substantial peatlands beyond. Indeed, driving around the local road network gives a viewer little impression of how extensive the peatlands actually are in the central study area.

In the process of assessing the visual impacts of this proposal it has become clear that there are two distinct ways in which it tends to be viewed from within the study area. Either, it is fully visible in a clear and cohesive manner from elevated vantage points or, it is partially visible with only a fraction of the proposed turbines rising above and between sections of foreground vegetation in a more ambiguous manner. The first scenario is typically represented by the designated view VRP set whilst the second scenario is more typical of the other receptor types contained in the lowland setting. On balance of the inverse nature of the 'screening' versus 'legibility' relationship it is not considered that the proposed Maighne Wind farm will give rise to any significant visual impacts. Instead, the levels of visual impact somewhat belie the actual scale and extent of turbines proposed and this only serves to highlight how robust the receiving environment is. Notwithstanding, it is acknowledged that mid to high order visual impact significance will occur at some locations, particularly in close proximity to the larger turbine clusters. This level of significance would be typical for almost any commercial wind farm project, even those of a much lesser capacity. One of the key ameliorating features of this scheme design is the dispersed arrangement of the various clusters. This generally allows impact levels for local receptors to relate to the modest scale of the nearest cluster rather than the more substantial scale of the wider development. Another important point to reiterate, is that the wind farm proposal represents a visual intrusion, but never a visual obstruction (blocking) of views.

15.13.1 Cumulative Impacts

The Scottish Natural Heritage (SNH) Guidelines relating to the Cumulative Effects of Wind Farms (2005) identify that cumulative impacts on visual amenity consist of combined visibility and sequential effects. The same categories have also been subsequently adopted in the Landscape Institute's 2013 revision of the Landscape and Visual Impact Assessment Guidelines.

> *'Combined visibility occurs where the observer is able to see two or more developments from one viewpoint. Combined visibility may either be in combination (where several wind farms are within the observer's arc of vision at the same time) or in succession (where the observer has to turn to see the various wind farms).*
>
> *Sequential effects occur when the observer has to move to another viewpoint to see different developments. The occurrence of sequential effects may range from frequently sequential (the features appear regularly and with short time lapses between, depending on speed of travel and distance between the viewpoints) to occasionally sequential (long time lapses between appearances, because the observer is moving very slowly and / or there are large distances between the viewpoints.)'*

Cumulative impacts of wind farms tend to be adverse rather than positive as they relate to the addition of moving manmade structures into a landscape and viewing context that already contains such development. Based on guidance contained within the SNH Guidelines relating to the Cumulative Effects of Wind Farms (2005) and the DoEHLG Wind Energy Guidelines (2006), cumulative impacts can be experienced in a variety of ways. In terms of landscape character, additional wind energy developments might contribute to an increasing sense of proliferation.

A new wind farm might also contribute to a sense of being surrounded by turbines with little relief from the view of them. The term 'skylining' is used in the SNH Guidelines to describe the effect *"where an existing windfarm is already prominent on a skyline the introduction of additional structures along the horizon may result in development that is proportionally dominant. The proportion of developed to non-developed skyline is therefore an important landscape consideration"*.

In terms of visual amenity, there is a range of ways in which an additional wind farm might generate visual conflict and disharmony in relation to other wind energy developments. Some of the most common include visual tension caused by disparate extent, scale or layout of neighbouring developments. A sense of visual ambivalence might also be caused by adjacent developments traversing different landscape types. Turbines from a proposed wind farm that are seen stacked in perspective against the turbines of nearer or further developments tend to cause visual clutter and confusion. Such effects are exacerbated when, for example, the more distant turbines are larger than the nearer ones and the sense of distance is distorted.

Table 15.14 below provides Macro Works' criteria for assessing the magnitude of cumulative impacts, which are based on the SNH Guidelines (2005).

Table 15.14: Magnitude of Cumulative Impacts

Magnitude of Impact	Description
Very High	• The proposed wind farm will strongly contribute to wind energy development being the defining element of the surrounding landscape. • It will strongly contribute to a sense of wind farm proliferation and being surrounded by wind energy development. • Strongly adverse visual effects will be generated by the proposed turbines in relation to other turbines.
High	• The proposed wind farm will contribute significantly to wind energy development being a defining element of the surrounding landscape. • It will significantly contribute to a sense of wind farm proliferation and being surrounded by wind energy development. • Significant adverse visual effects will be generated by the proposed turbines in relation to other turbines.
Medium	• The proposed wind farm will contribute to wind energy development being a characteristic element of the surrounding landscape. • It will contribute to a sense of wind farm accumulation and dissemination within the surrounding landscape. • Adverse visual effects might be generated by the proposed turbines in relation to other turbines.
Low	• The proposed wind farm will be one of only a few wind farms in the surrounding area and will be viewed in isolation from most receptors. • It might contribute to wind farm development becoming a familiar feature within the surrounding landscape. • The design characteristics of the proposed wind farm accord with other schemes within the surrounding landscape and adverse visual effects are not likely to occur in relation to these.
Negligible	• The proposed wind farm will most often be viewed in isolation or occasionally in conjunction with other distant wind energy developments. • Wind energy development will remain an uncommon landscape feature in the surrounding landscape. • No adverse visual effects will be generated by the proposed turbines in relation to other turbines.

15.13.2 Cumulative Baseline

There is one existing wind farm and three permitted wind farms within the study area. These are outlined in Table 15.15 below.

Table 15.15: Other Wind Farms within the Study Area

Wind Farm name	Turbine No.	Distance and direction from proposal site	Status
Yellow River	32	11km W	Permitted
Mount Lucas	28	17km W	Existing
Crowinstown	3	21km NNW	Permitted
Dryderstown	1	22km NW	Permitted

Note: The Proposed Emlagh Wind farm in north County Meath has not been included for cumulative assessment herein as it is not contained within the 30km study area (c.35km between nearest turbines).

15.13.3 Department of Environment, Heritage and Local Government (DoEHLG) 'Wind Energy Development Guidelines' (2006)

As stated earlier with respect to the landscape baseline (15.7) the proposal is sited in an area that is most consistent with the 'Flat Peatland' landscape type identified within the Guidelines. The guidance with respect to cumulative impact in this landscape type is;

> *"The openness of vista across these landscapes will result in a clear visibility of other wind energy developments in the area. Given that the wind energy developments are likely to be extensive and high, it is important that they are not perceived to crowd and dominate the flat landscape. More than one wind energy development might be acceptable in the distant background provided it was only faintly visible under normal atmospheric conditions"*

Hilly and Flat Farmland

> *"It is important that wind energy development is never perceived to visually dominate. However, given that these landscapes comprise hedgerows and often hills, and that views across the landscape will likely be intermittent and partially obscured, visibility of two or more wind energy developments is usually acceptable."*

It is considered that the above guidance gives a good balance of the characteristics of the study area in terms of open visibility and potential for cumulative impacts to occur. The central study area has the flat terrain, broad landscape pattern of the flat peatland landscape type, but with a much higher degree of containment by vegetation structures than is anticipated by the guidelines. In this respect, it is more similar to the hilly and flat farmland landscape type. The other aspect to bear in mind is that the vast majority of receptors including settlements, rural dwellings and the road network are contained within the productive farmland zone rather than in open bog areas. Thus, open visibility for vast distances is rarely afforded. It is important to note that cumulative impact in respect of the scheme relates only to its relationship with other developments within the study area and not between the clusters of this development, which have already been assessed in respect of their visual interrelationship. For these reasons, the proposed wind farm is considered to be consistent with the guidelines for both the 'flat peatland' and 'hilly and flat farmland' landscape types from the guidelines in regard to cumulative impacts.

15.13.4 Cumulative Zone of Theoretical Visibility

The cumulative ZTV map (See Volume 4 of the EIS) indicates that:

- The vast majority of the study area (c.80%) will have theoretical views of some of the existing permitted or proposed turbines. This may be as high as 95% in the western half of the study area and as low as 70% in the eastern half. The main areas without any theoretical view of turbines are within the north-eastern periphery and the south-eastern quarter of the study area beyond subtly raised terrain.

- There are very clear patterns with regard to the cumulative ZTV within the study area due to the flatness of the terrain. The main areas where only existing and permitted wind farms would be potentially visible occur sporadically in all extremities of the study area except to the east. These areas represent less than 10% of the Study Area. Conversely, the vast majority of the landscape that will only have potential views of the proposed Maighne Wind Farm occur in the central and eastern half of the study area. These represent approximately 30% of the study area.

- Combined theoretical visibility of the proposal in conjunction with other wind farms occurs throughout an extensive portion of the northern and eastern quarters. The only exceptions being the elevated foothills of the Wicklow Mountains and Slieve Bloom range in the southern and south-eastern extremities of the study area.

- The most important consideration with regard to the cumulative ZTV map (as with the standard ZTV map) is that it is a computer generated theoretical output that bears little correspondence to actual visibility within the study area due to the effects of vegetative screening in this flat terrain. As indicated by the results of the Route Screening Analysis (RSA), intervisibility of turbines that are separated by more than 3km is only likely to occur from open and elevated ground or tall structures.

The following table identifies the characteristics of the cumulative view of wind farms from each of the VRP's used earlier in the assessment of the visual impacts of the proposed scheme in its own right.

Table 15.16: Nature of Cumulative Impacts

VRP Ref.	No. of other wind farms in view	Nearer or further than proposal	Combined view (within a single viewing arc)	Succession view (within a series of viewing arcs from the same location)	Sequential view (view of different developments moving along a linear receptor)
KEDR2	2	Much further	Yes	No	No
KEDR3	-	-	-	-	-
KEDR4	-	-	-	-	-
KEDR7	-	-	-	-	-
KEDR10	-	-	-	-	-
KEDR11	-	-	-	-	-
KEDR13	2	Further	Yes	Yes	No
KEDR14	-	-	-	-	-
KEDR15	-	-	-	-	-
KEDR21	-	-	-	-	-
KEDR24	1	Further	No	Yes	No
KEDR30	1	Much further	Yes	No	No
KEDR31	-	-	-	-	-

VRP Ref.	No. of other wind farms in view	Nearer or further than proposal	Combined view (within a single viewing arc)	Succession view (within a series of viewing arcs from the same location)	Sequential view (view of different developments moving along a linear receptor)
KEDR38	1	Much further	Yes	Yes	Yes
KEDR39	2	Much further	Yes	Yes	Yes
KEDR40	2	Further	Yes	No	No
KEDR41	2	Further	Yes	Yes	No
KEDR42	1	Much further	No	Yes	Yes
MHDR17	4	Similar distances	Yes	Yes	No
MHDR18	-	-	-	-	-
MHDR30	-	-	-	-	-
MHDR34	-	-	-	-	-
MHDR35	2	Further	No	Yes	No
MHDR40	-	-	-	-	-
SDDR1	2	Further	Yes	No	No
WWDR1	2	Similar distances	Yes	No	No
06LC17	-	-	-	-	-
06LC32	-	-	-	-	-
07LC30	-	-	-	-	-
10LC12	-	-	-	-	-
10LC13	-	-	-	-	-
10LC14	-	-	-	-	-
10LC16	-	-	-	-	-
10LC32	-	-	-	-	-
06CP5	1	Similar distance	No	Yes	Yes
06CP10	-	-	-	-	-
06CP12	-	-	-	-	-
06CP13	-	-	-	-	-
06CP30	-	-	-	-	-
07CP1	-	-	-	-	-
10CP7	-	-	-	-	-
10CP9	-	-	-	-	-
10CP15	1	Similar distance	No	Yes	No
10CP17	-	-	-	-	-
10CP30	-	-	-	-	-
11CP1	-	-	-	-	-
11CP30	-	-	-	-	-

VRP Ref.	No. of other wind farms in view	Nearer or further than proposal	Combined view (within a single viewing arc)	Succession view (within a series of viewing arcs from the same location)	Sequential view (view of different developments moving along a linear receptor)
11CP32	-	-	-	-	-
11CP33	2	Further	Yes	No	No
06MR7	1	Similar distance	No	Yes	Yes
06MR14	1	Further	No	Yes	Yes
07MR30	2	Much further	Yes	Yes	Yes
10MR31	-	-	-	-	-
06AH4	-	-	-	-	-
10AH3	2	Both nearer	Yes	Yes	No
10AH4	-	-	-	-	-
10AH5	-	-	-	-	-
10AH31	1	Further	No	Yes	No
10AH32	-	-	-	-	-
10AH33	1	Similar distance	No	Yes	No
10AH34	-	-	-	-	-
11AH1	1	Further	Yes	No	No
14AH1	2	Similar distance	No	Yes	No
07KV5	2	Further	Yes	No	No

15.13.5 Cumulative Impact Assessment

Using the cumulative baseline information outlined above, a summary assessment of cumulative impact is provided below.

Table 15.16 above emphasises the nature of cumulative visibility within the study area and shows several clear patterns. Less than half of the VRP's used for this assessment have any cumulative views of the proposal in conjunction with other wind energy developments. It should also be noted that the VRP set is heavily weighted in relation to clear and elevated views, particularly in relation to designated scenic views. Thus, the degree of intervisibility with other wind energy developments is overemphasised in the table above compared to the more contained views that are typical of the vast majority of the lowland landscape of the study area, which will have a much lower degree of cumulative intervisibility. This is reinforced by the low degree of intervisibility between the various turbine clusters that make up the Maighne wind energy proposal, as evidenced in the results of the RSA and the photomontages produced at lowland receptor locations. The RSA results indicate that at viewing distances beyond about 2km there is very little visibility of turbines within the lowland aspects of the central study area due to vegetation screening. For this reason, the intervisibility between the proposal and other wind farms, which are separated by much greater distances is considered to be very low.

Cumulative views will almost never include the two small wind energy developments to the northwest (Crowinstown and Dryderstown) due to separation distances and levels of terrain and vegetative screening.

The proposed wind farm will most commonly be seen in conjunction with the permitted Yellow River Wind Farm and the existing Mount Lucas Wind Farm. Most often these will all be viewed together from elevated vantage points.

Whether they are viewed in 'combination' or in 'succession' depends on the angle of view in question. Given that most of the elevated views lie to the northeast and southeast, these developments will generally be closely aligned in such views. There are few representative VRPs that lie between the proposed Maighne wind farm and the two substantial wind farms to the west. This is mainly due to the low number of sensitive receptors in this peatland dominated landscape as well as limited views afforded across it. Consequently, there are a few instances where the proposed turbines are likely to be seen at similar viewing distances to the existing and permitted wind farms to the west. Wherever this might occur within the west central study area, the existing and permitted developments will be seen in opposite directions to the proposal.

In terms of magnitude of cumulative impact the most affected receptor is considered to be Croghan Hill (10AH3). From this prominent hilltop, which lies directly between the permitted Yellow River and existing Mount Lucas wind farms, the proposed Maighne Wind Farm will serve to visually link through the eastern quarters of the view albeit at a much greater distance. A considerable proportion of the northern, eastern and southern skyline viewed from Croghan Hill will contain turbines and these will be seen at various scales relating to proximity. This is one of the few locations to experience any noticeable degree of cumulative visual impact. However, one of the key ameliorating factors in this instance is that the lowland landscape viewed from Croghan Hill is a very robust and anthropogenic one, containing a number of energy-related landscape features. These include vast cutaway bogs and electricity peaking plants.

Wind energy development is now a familiar feature of the study area (following the construction of the Mount Lucas Wind Farm). In conjunction with the other existing and permitted wind farms within the study area, the proposal will begin to generate a sense that wind energy development is becoming a characteristic feature of the midlands landscape. However, this is not considered to be to the extent that wind energy development is the defining feature of this landscape, which will retain the current variety of productive land uses at the ground plain. Any sense of wind farm accumulation will be experienced from the relatively few prominent viewing locations rather than from within the lowland context where the vast majority of the midlands population live, work and move around.

The design of the proposed wind farm is considered to be in line with the siting, design and extent of the other existing and permitted wind energy developments within the study area. That is, it consists of dispersed clusters of turbines, generally with three-dimensional layout patterns, and a variety of cluster sizes. This results in dispersed drifts of turbines, which meander throughout the lowland context without overcrowding the landscape at any particular location. The higher densities of turbines are almost always associated with vast peatland areas where they are well assimilated in the midlands context. Thus, the proposal will continue an established design approach within this midlands context, which aids cohesion and assimilation and will reduce the potential for adverse cumulative impacts arising from conflicting design approaches.

In terms of cumulative aesthetic considerations, the proposed turbines will almost never be seen stacked together with other existing or permitted turbines in perspective, which can give rise to issues of scale confusion and visual clutter. This will remain the case even where the developments may be contained within direct alignment with each other. This is due to the considerable separation distances between them, which ensures that one wind energy development will always be seen as a very distant background feature in relation to the other. Although the turbines of the proposed wind farm and other existing and permitted schemes may on occasion be visible at similar scales from viewpoints that lie between them, where this occurs the developments will be seen in opposite directions or at widely disparate viewing angles.

Overall, it is considered that the proposed Maighne Wind Farm will contribute an additional cumulative effect that is in the order of **Medium-Low** in terms of the classifications defined in Table 15.14 above.

15.14 Conclusions

15.14.1 Landscape Impacts

The significance of landscape impacts is assessed on the basis of the sensitivity of landscape receptors balanced against the magnitude of the landscape impact. For a proposal of this scale and extent, landscape receptors can range from Landscape Character Areas (LCAs) down to distinctive collections of landscape elements or individual features. Landscape impacts may occur from direct physical effects and/or due to changes in landscape character in the local or wider area.

There will be physical impacts on the land cover of the site as a result of this development, but these will be relatively minor in the context of the already modified farming, forestry and peatland harvesting context and the high proportion of existing tracks that will be utilised. There will be a minor loss of hedgerow vegetation due to the delivery of turbine components and construction, but these will be reinstated by way of mitigation where possible.

In terms of effects on landscape character, the highest level of landscape impact significance is deemed to be 'Moderate-slight', which is in the mid to low range in terms of the categories utilised in this appraisal. This occurs for those landscape character units in the central study area that have a higher sensitivity than the typical lowland landscape that otherwise surrounds the proposal sites. These character units include the elevated 'Chair of Kildare Hills', the 'Northern Hills' and the canal network, which consists of the Royal Canal, the Grand Canal and the Barrow Branch. This is on the basis of medium sensitivity rating and medium-low magnitude of visual impact in what is considered to be a robust receiving environment in the central study area.

The wider study area contains a number of high and very high sensitivity heritage landscape features. The most important of these is considered to be the Hill of Tara due to its candidate world heritage status as well as the volume of visitors it attracts. The proposal is deemed to result in a Slight-imperceptible significance of impact on the Hill of Tara, largely due to the considerable separation distance of 25km, which renders the proposal a very distant background element of the landscape setting of this heritage feature. As always, the significance judgement is based on a balance of receptor sensitivity and impact magnitude judgements, which in this instance, are at the opposite ends of the spectrum. That is, the degree of landscape impact is considered to be 'Negligible' for the Hill of Tara. A similar scenario occurs for the other highly sensitive landscape receptors in the outer study area as there is considered to be very limited potential for the proposed turbines to significantly influence landscape character, within an existing, anthropogenic, rural landscape context, beyond the central study area.

In respect of the landscape and wind energy policies contained within the Kildare Landscape Character Assessment, which forms a part of the current Development Plan, it is considered that the proposal is an acceptable form of development that is appropriately sited in medium and low sensitivity character units. It is also deemed to be appropriately designed in respect of the underlying broad scale land use patterns, which are most consistent with the 'Flat Peatland' and 'Hilly and Flat Farmland' landscape types in the Wind Energy Development Guidelines (2006).

For the reasons contained herein, it is considered that the proposed Maighne Wind Farm will not give rise to significant landscape impacts within either the central or wider study area. These will instead peak at mid to low levels within the central study area and dissipate quickly to low and imperceptible levels beyond.

15.14.2 Visual Impacts

Visual impacts are assessed on the basis of visual receptor sensitivity versus the magnitude of the visual impact. Sensitivity is established on the basis of viewer (receptor) susceptibility as well as the value associated with the view in question. Impact magnitude is the function of the visual presence of the proposal and its effect on visual amenity. Visual impacts are assessed at 64 no. visual receptor locations throughout the study area, which are classified in terms of receptor type including; designated scenic views; Key views; local community views; centres of population; major routes, and; heritage and amenity features.

Receptor sensitivity is considered to range widely across the study area between very high and low. Those receptor locations at the upper end of the spectrum tend to be important heritage and tourist features that also afford vast panoramic vistas over the surrounding landscape such as the Hill of Tara, Trim Castle and the Rock of Dunamase. These tend to be located at the periphery of the study area beyond 20km of the nearest turbines. Whereas, at the lower end of the spectrum are locations that take in more typical lowland views across a more contained landscape setting that is not particularly remarkable or unique. Whilst it is acknowledged that local residents are among the most susceptible receptors this is accounted for in the sensitivity judgements, which also balance the value of the view on offer.

Within this study area, designated views tend to be in the mid to high range in terms of sensitivity, depending on how vast the panorama is and taking account of the fact that the landscape in view is typically an anthropogenic rural one rather than a remote and naturalistic one. Aside from elevated viewpoints, other forms of designated view within the study area relate to views of elevated hills and features from within the surrounding lowland landscape and also canal views from bridges. It is not considered that canal views are particularly sensitive to new forms of development such as that proposed, on the basis that they are industrial heritage features themselves.

The majority of visual impact magnitude judgements are in the mid to low range due to a combination of high levels of screening, the dispersed layout of the scheme and the robust rural landscape context in view. However, there are a small proportion of views within close proximity to the larger of the proposed turbine clusters where mid to high order visual impact magnitude is considered to occur. At these locations the nearest turbines invariably have a dominant visual presence within the scene and the intensity or lateral extent of turbines is also likely to be considerable. A notable aspect of this proposed wind farm is that there are several VRP locations where the turbines have a dominant visual presence that is moderated by an aesthetically striking view of the proposed turbines, which complements the picturesque qualities of the view and reduces the magnitude of effect. This scenario most notably occurs at KEDR41 – Hill of Allen, KEDR13 – Bostoncommon and 06AH4 – Boynedock. In many ways these particular views epitomise the nature of the receiving environment and its assimilation potential for the proposed wind farm.

On the basis of sensitivity versus magnitude, only 2 of the 63 VRP locations are considered to experience a Substantial-moderate significance of impact. This occurs at 06LC17 on the basis of a dominant visual intrusion throughout several aspects of the vista. Although this is a desirably simple view of the proposed turbines within a broad lowland context, there will be some sense of being surrounded by turbines for local residents. The other instance of Substantial-moderate significance occurs at 10LC32 - Ballyteige South on the basis of the nearest turbines having a dominant visual presence and contributing some elements of visual clutter. By way of amelioration, the principal views from this locality are across the bog towards the Hill of Allen in the opposite direction of the proposed turbines. From experience, this is a very low proportion of VRPs to incur this mid to high order of significance, which is testimony to the robustness of the receiving visual context and the dispersed nature of the scheme. At 15 of the VRPs, the significance of impact is judged to be moderate, which is a more typical proportion of a VRP set to experience mid-range significance, but clearly the vast majority of VRP's will be subject to only low order significance. What makes this outcome so notable is that this scheme is large by comparison to most other wind energy proposals and yet the visual impacts are similar or lower than they commonly are for much more modest scale developments.

Based on the visual impact assessment contained herein, it is not considered that the proposed Maighne Wind Farm will result in any significant visual impacts. Instead, these will tend to be in the mid to low range for most receptors even in the central study area and occasionally in the mid to high range for local receptors in close proximity to the larger of the proposed clusters. Higher magnitude visual impacts are not considered to coincide with high sensitivity receptors. Even where high magnitude impacts do occur, the scheme represents a permeable 'intrusion' on views rather than an 'obstruction' of them.

15.14.3 Cumulative Impacts

There is presently one existing wind farm and three permitted wind farms within the study area so wind energy development is considered to be a familiar, but not a strongly characteristic or defining feature of it. The proposed wind farm will most commonly be viewed in isolation from within the lowland context of the study area, which represents the vast majority of it. From occasional elevated vantage points within the study area, which tend to be designated as scenic views, the proposal will be commonly seen in conjunction with the permitted Yellow River Wind Farm and the existing Mount Lucas Wind Farm, which both lie to the west.

Due to the considerable separation distances to these developments, there will not be any cumulative aesthetic issues arising such as turbine stacking or scale confusion. However, in some instances the skyline will be occupied by a broad array of turbines from the three schemes. This is most notable from the summit of Croghan Hill which is the most centrally located prominent viewpoint between these developments.

Overall, it is considered that the proposal will contribute to wind energy development becoming a characteristic feature of this midlands context, but it is not considered to give rise to a significant cumulative effect. Instead, this impact is deemed to be in the mid to low order.

15.14.4 Concluding Statement

Although the initial impression of this extensive wind energy development proposal is that a broad area of the North Kildare lowlands would be covered with tall wind turbines, which would dominate the landscape and surround its inhabitant, this landscape and visual appraisal reveals quite a different reality. That is, due to the dispersed nature of the proposal and the high degree of screening provided within the lowland landscape, this wind energy development will be perceived as a series of small to medium sized developments rather than a sprawling singular one. Rather than dominate the underlying landscape it is considered to integrate with it reflecting the organic and meandering pattern of the peatland areas that it occupies and abuts. The dispersed arrangement of the various clusters results in equally dispersed impacts. The magnitude of these impacts reflects the robustness of the receiving landscape and visual setting as well as the discretely portioned views of the scheme. Only from occasional elevated vantage points that rise out of the lowland landscape is the overall scale of the development apparent. The most sensitive of these locations are contained at significant distances from the proposal (20km+) where it will be perceived as another element within a vast, productive landscape pattern.